# 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 describes an overview, configuration precautions for the disk array, and the array configuration flow. |
| Chapter 2 Array Configuration and Management [BIOS Utility] | This chapter explains the procedure to set up BIOS Utility. BIOS Utility is a basic utility to set up and manage the array controller. |
| Chapter 3 Preparations | This chapter explains how to update device drivers and apply hotfix. |
| Chapter 4 Array Configuration and Management [ServerView RAID] | This chapter explains an overview of and requirements for ServerView RAID Manager, and how to install and use it. |
| Chapter 5 Array Configuration and Management [GAM] | This chapter explains the overview and requirements of GAM, and how to install and use it. |
| Chapter 6 Replacing Hard Disk | This chapter explains maintenance related issues, such as hard disk replacement. Since the procedure varies depending on the management tools used, read the description concerning your management tool. |
| Appendix | This section explains the event codes for ServerView RAID and GAM, and the notes on the array controller usage. |

# 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.

### ■ CD/DVD drive descriptions

In this manual, both CD-ROM and DVD-ROM drives are described as CD/DVD drives. Select a proper drive depending on your environment.

### ■ 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/DVD drive letters are shown as [CD/DVD drive]. Enter your drive letter according to your environment.

  [CD/DVD 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 a dash ( – ).

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

↓

Click the [Start] button – [Programs] – [Accessories].

## ■ Abbreviations

The following expressions and abbreviations are used throughout this manual.

table: Abbreviation of product name

| Product name | Expression and abbreviation | |
|---|---|---|
| Integrated Mirroring SAS | the array controller, this array controller | |
| Microsoft® Windows Server® 2003, Standard Edition<br>Microsoft® Windows Server® 2003, Enterprise Edition<br>Microsoft® Windows Server® 2003 R2, Standard Edition<br>Microsoft® Windows Server® 2003 R2, Enterprise Edition | Windows Server 2003 | Windows |
| Microsoft® Windows Server® 2003, Standard x64 Edition<br>Microsoft® Windows Server® 2003, Enterprise x64 Edition<br>Microsoft® Windows Server® 2003 R2, Standard x64 Edition<br>Microsoft® Windows Server® 2003 R2, Enterprise x64 Edition | Windows Server 2003 x64 [Note 1] | |
| Microsoft® Windows® 2000 Server<br>Microsoft® Windows® 2000 Advanced Server | Windows 2000 Server | |
| Microsoft® Windows® 2000 Professional | Windows 2000 Professional | |
| Microsoft® Windows® XP Professional | Windows XP | |
| Red Hat Enterprise Linux 5 (for x86) | Red Hat Linux | Linux |
| | RHEL5 (x86) | |
| Red Hat Enterprise Linux 5 (for Intel64) | RHEL5 (Intel64) | |
| Red Hat Enterprise Linux AS (v.4 for x86) | RHEL-AS4 (x86) | |
| Red Hat Enterprise Linux ES (v.4 for x86) | RHEL-ES4 (x86) | |
| Red Hat Enterprise Linux AS (v.4 for EM64T) | RHEL-AS4( EM64T) | |
| Red Hat Enterprise Linux ES (v.4 for EM64T) | RHEL-ES4 (EM64T) | |
| Red Hat Enterprise Linux AS (v.3 for x86) | RHEL-AS3 (x86) | |
| Red Hat Enterprise Linux ES (v.3 for x86) | RHEL-ES3 (x86) | |
| SUSE™ Linux® Enterprise Server 9 | SLES9 or SUSE Linux | |

[Note 1]: Unless otherwise noted, Windows Server 2003 can also mean Windows Server 2003 x64.

## ■ Information for PRIMERGY

For the latest information on PRIMERGY, update modules, drivers and the software, refer to the Fujitsu PRIMERGY website.

http://www.fujitsu.com/global/services/computing/server/ia/driver/

Regarding BIOS and FW, contact to Fujitsu Support Office.

Refer to the website (http://www.fujitsu.com/global/contact/computing/PRMRGY_index.html).

## ■ PRIMERGY Startup Disc

"PRIMERGY Startup Disc" referred in this manual is supplied with a PRIMERGY server. Depending on your PRIMERGY type, "PRIMERGY Document &Tool CD" may be supplied instead . Then "PRIMERGY Startup Disc" also means "PRIMERGY Document & Tool CD" in this manual.

## ■ Trademarks

# Contents

## Chapter 1 Overview



## Chapter 2 Array Configuration and Management [BIOS Utility]



## Chapter 3 Preparations

# Chapter 1
# Overview

1

This chapter describes an overview, configuration precautions for the disk array, and 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

ServerStart will help you set up Steps from **2** to **4**.

### 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 Linux inforomation, see the PRIMERGY page on the Fujitsu website (http://primergy.fujitsu.com/).

### 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 describes an overview of the disk array (RAID levels and logical drives) and its function.

## 1.2.1 Array controller specifications

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

table: Specifications

| Item | Contents | | |
|---|---|---|---|
| Product name | No model name (LSI SAS 1068) | No model name (LSI SAS 1064E) | RAID 0/1 SAS 4P (LSI SAS 1064E) |
| Where to be installed in the server | Onboard [Note 1] | Onboard [Note 1] | PCI-E Slot installable card |
| Interface | SAS (Serial Attached SCSI) | | |
| The number of ports | 8 ports | 4 ports | 4 ports |
| Cache memory and capacity | Not available | | |
| Supported OS | OS supported by the server | | |
| Management Tools | Available tools are: (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.<br>Make sure to install management tools before using the array controller.<br>Install either ServerView RAID or GAM, but not both at a time. For which to use, see ReadmeEN.html on Array Controller Document & Tool CD.<br><br>• BIOS Utility<br>BIOS Utility in the array controller.<br>→"Chapter 2 Array Configuration and Management [BIOS Utility]" (pg.23)<br>• ServerView RAID<br>→"Chapter 4 Array Configuration and Management [ServerView RAID]" (pg.55)<br>• Global Array Manager (GAM)<br>→"Chapter 5 Array Configuration and Management [GAM]" (pg.89) | | |

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

## 1.2.2 What is Disk Array?

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

## 1.2.3 RAID Levels

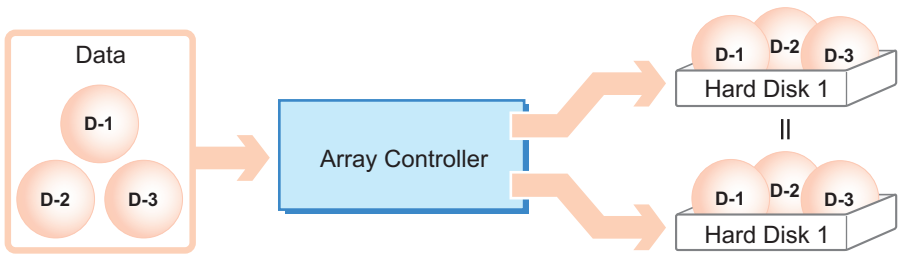
There are several types of RAID levels, with different characteristics.
This array controller only supports RAID 1.

table: Characteristics of each RAID level

| RAID Level | Number of hard disks | Available total capacity | Redundancy |
|---|---|---|---|
| RAID 1 | 2 | Capacity of one hard disk | Yes |

### ■ RAID 1 (Mirroring)

Mirroring is a function in which data is written into two hard disks in duplicate. When operating in RAID 1 disk array configuration, the system always writes the same data in the two hard disks using the redundancy feature. Operation continues even when one of the hard disks fails and loses redundancy (Critical).
RAID 1 always consists of two hard disks and the actual capacity you can use is the capacity of one hard disk.




IMPORTANT

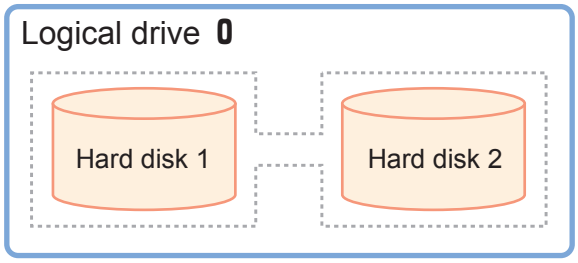
- With RAID 1, operation continues even if one of the hard disks fails (critical). However, the data could be lost if both hard disks fail. If the status of a logical drive becomes critical, replace the failed hard disk as soon as possible to recover the redundancy.
  See "Chapter 6 Replacing Hard Disk" (→pg.123) for how to replace hard disks.

POINT

- Backup the data as frequently as possible just in case even with redundancy.

## 1.2.4 Logical Drive

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




IMPORTANT

- Hard disks 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, see "1.3.1 Logical Drive Initialization" (→pg.16).

### ■ Status during hard disk failure

If one of the hard disks fails, the logical drive loses its redundancy, and the status becomes critical. If the other drive also fails, the logical drive status becomes "Offline" (unavailable).

## 1.2.5 Checking Hard Disk Status

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

POINT

- Status indicators differ depending on a management tool. For the status information, see the appropriate section in your management tool's documents.
  - BIOS Utility
    →"2.3.2 Viewing Information on Logical Drive and Hard Disk" (pg.31)
  - ServerView RAID
    →"4.4.3 Tree View Layout" (pg.73)
  - 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.
  →"Appendix A A List of ServerView RAID Event Logs" (pg.138)
  →"Appendix B A List of GAM Event Logs" (pg.158)

## ■ Logical drive status

Logical drive statuses are shown in the table below.

table: Logical drive status

| Status | Description |
|---|---|
| Online | The logical drive is operating normally. |
| Critical | A redundant logical drive (RAID 1) is currently operating without redundancy due to a hard disk failure. Replace the failed hard disk as soon as possible and perform a rebuild to restore the online status. See "Chapter 6 Replacing Hard Disk" (→pg.123) for how to replace hard disks and rebuild. |
| Offline | This indicates that the logical drive is not operating. Two or more hard disk failure in a logical drive leads to offline state. The data in the logical drive will be lost. |

## ■ Hard disk status

Hard disk statuses are shown in the table below.

table: Hard disk status

| Status | Description |
|---|---|
| Online | The hard disk is configured in the disk array and operating normally. |
| Unused | It is out of operation as the hard disks are not configured in the disk array. The hard disk is operating normally. |
| Failed | The disk is damaged and data read/write is disabled. Replace the hard disk and perform a rebuild. See "Chapter 6 Replacing Hard Disk" (→pg.123) for how to replace a hard disk. |
| Offline | Data read/write is disabled by the array controller. Perform a rebuild to use the hard disk again. |
| Rebuild | The hard disk is currently being rebuilt. |
| Failure Predicted | The hard disk is currently operating normally, but may fail in the near future (failure predicted status). See "Chapter 6 Replacing Hard Disk" (→pg.123) and replace the hard disk as soon as possible. |

IMPORTANT

- If there is a hard disk with failure status, there may be a hard disk failure and the disks may be operating without redundancy. The hard disk must be replaced as soon as possible. See "6.1.2 Replacing Failed Hard Disk [ServerView RAID]" (→pg.125) and "6.2.2 Replacing Failed Hard Disk [GAM]" (→pg.132) fo how to replace a hard disk.

POINT

- This array controller sets the redundancy management priority as primary or secondary for each hard disk in the logical drive.
  When one hard disk 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, initialization is required to make the hard disks in the logical drive consistent.
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. 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 fails, the data will be lost.
- Before the initialization, the secondary hard disk 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 keeps blinking during the initialization.

## 1.3.2 Rebuild

Even if a hard disk in a logical drive fails, if there is redundancy (RAID 1), the logical drive continues to operate in critical. However, if another hard disk in the same logical drive also fails, the status of the logical drive becomes unavailable (offline). Rebuild is a operation to recover a logical drive from critical to normal (online).
The rebuild process is performed in the background in parallel with normal I/O access. During rebuilding, if a logical drive becomes critical, the redundancy of the logical drive remains lost. Once the rebuild is complete, it is restored to online.
You can start a rebuild by executing [Synchronize] in BIOS Utility or by executing [Rebuild] in the array management tool (ServerView or GAM).

### ■ Estimated time for rebuild

The estimated time for rebuild differs depending on I/O load from the server. The table below shows the estimated time when the I/O load is none and high.
It also differs depending on such factors as the server configuration and the availability of hard disks to be used. Use them only as a reference.

table: Estimated time for rebuild

| Hard disk capacity | No load | High load |
|---|---|---|
| 73GB | approx. 4 hrs | approx. 7 hrs |
| 147GB | approx. 7 hrs | approx. 14 hrs |
| 300GB | approx. 15 hrs | approx. 30 hrs |

POINT

- The rebuild is performed in parallel with regular I/O operation. Therefore, I/O performance for the logical drives can be degraded during rebuild. With this array controller, the I/O performance degrades about 50% at maximum.
- If the system restarts or shuts down during rebuild, the rebuild is resumed from where it was stopped the next time.

## 1.3.3 Media Verification

Media verification is a function that detects media errors on a hard disk in advance and restores data using the data on the other hard disks.
This array controller always performs media verification when the logical drive is in online state.
If there are media errors on the hard disks that were not replaced, the rebuild cannot restore their data.
Media verification reduces the risk of data loss at rebuild, by correcting media errors in advance.

## 1.3.4 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 hard disks, which determines the failure risk in advance and issues a warning when the risk is high.
Although a hard disk will still operate normally even when a risk of a failure is predicted, that hard disk may fail in the near future and should be replaced as soon as possible. See "6.1.3 Preventive Replacement of Hard Disk [ServerView RAID]" (→pg.127) or "6.2.3 Preventive Replacement of Hard Disk [GAM]" (→pg.134) for the replacement procedure. The hard disk for which failure is predicted can be identified by management tools or event logs.

# 1.4 Notes before Operation

Check the following before starting the operation.

## 1.4.1 Cautions When Using This Product

The usage may be limited depending on the server to be installed in.

## 1.4.2 Notes on Hard Disk to Be Used

The following notes apply to the hard disks to be used. Please read them in advance.

### ● Usable hard disk

Use the hard disks of the same model (with the same capacity and speed) in a logical drive. Check that the installed hard disks have the same capacity and speed. Also, check that the hard disks are installable on the server.

### ● Reusing hard disk

Hard disks containing data may have partition information or array configuration information. Using such disks without taking the proper measures may cause unexpected problems. When using a previously used hard disk, erase the data by performing low level format on the system that was using the hard disk before installing it to the array controller.
The same caution applies when using hard disks used by this product on another system. See "2.5 Low Level Formatting of Hard Disks" (→pg.45) and completely erase the information on the hard disk before using it on another system.

### ● Removing hard disk

When the server is runnning, do not remove hard disks except for the following situations:

- When replacing a failed hard disk
- When replacing a hard disk as a preventive measure

### ● Notes on connecting device

Do not connect any devices other than Fujitsu-supported hard disks 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 on Using Array Controller

When using Windows in a disk array configuration, one of the following events may be recorded 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 the OS retry, you can continue 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 disks.

## 1.5.2 Using ServerView RAID under Windows 2000 Server Environment

Under the conditions below, at the restart of Windows 2000 Server, events reporting abnormalities of hard disks or logical drives may be recorded.

- When restarting Windows 2000 Server after installing Windows 2000 Server and ServerView RAID using ServerStart.
- When restarting Windows 2000 Server after applying the hotfix KB904374 of Windows 2000 Server with ServerView RAID installed in it.

The details of the recorded events are as follows.
Note that the [Array Controller Name], Logical drive [%s], Disk [%s], and [Server Name] in the messages are different according to the types of array controller that is installed, the number of created logical drives, the number of installed hard disks, and the setting values of the server name.

- **For events via ServerView**

| | |
|---|---|
| Source | Fujitsu ServerView Services |
| ID | 3 |
| Message | ServerView received the following alarm from server [Server Name]:<br>Adapter [Array Controller Name]: Disk [%s] missing after reboot<br>(Server [Server Name]) |
| Description | Unable to find the hard disk at the restart of the server. |
| Example | ServerView received the following alarm from server PRIMERGY03:<br>Adapter LSI 1068SASIME-2399 (0): Disk (0) missing after reboot<br>(Server PRIMERGY03) |

| | |
|---|---|
| Source | Fujitsu ServerView Services |
| ID | 3 |
| Message | ServerView received the following alarm from server [Server Name]:<br>Adapter [Array Controller Name]:Logical drive [%s] missing after reboot<br>(Server [Server Name]) |
| Description | Unable to find the logical drive at the restart of the server. |
| Example | ServerView received the following alarm from server PRIMERGY03:<br>Adapter LSI 1068SASIME-2399 (0): Logical drive (0) missing after reboot<br>(Server PRIMERGY03) |

- **Source: For ServerView RAID events, or ServerView RAID Manager event window**

| | |
|---|---|
| Source | ServerView RAID |
| ID | 10476 |
| Message | Adapter %s: Disk (%s) missing after reboot |
| Description | Unable to find the hard disk at the restart of the server. |
| Example | Adapter LSI 1068SASIME-2399 (0): Disk (0) missing after reboot |

| | |
|---|---|
| Source | ServerView RAID |
| ID | 10477 |
| Message | Adapter %s: Logical drive %s missing after reboot |
| Description | Unable to find the logical drive at the restart of the server. |
| Example | Adapter LSI 1068SASIME-2399 (0): Logical drive (0) missing after reboot |

When the events above are recorded, check the state of the array using ServerView RAID Manager. If the array is recognized as the normal state, ignore the events.

**POINT**

- Information that Windows SCSI mini port driver outputs will be changed by applying the hotfix. So, the information is different from what ServerView RAID had until then. So, the events above occur at the first restarting after applying the hotfix.
- The events will not occur if the state of the array is normal after the next startups.
- The events are recorded when restarting the server after installing Windows 2000 Server since the hotfix is automatically applied if you install the server using ServerStart.

Chapter 2

# Array Configuration and Management [BIOS Utility]

2

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

# 2.1 Starting and Exiting BIOS Utility

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

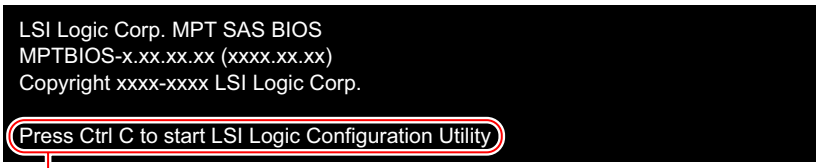
IMPORTANT

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

## 2.1.1 Starting BIOS Utility

Follow the procedure below:

1. After turning on the server, 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 BIOS Utility starts up after the POST of the server is complete.

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

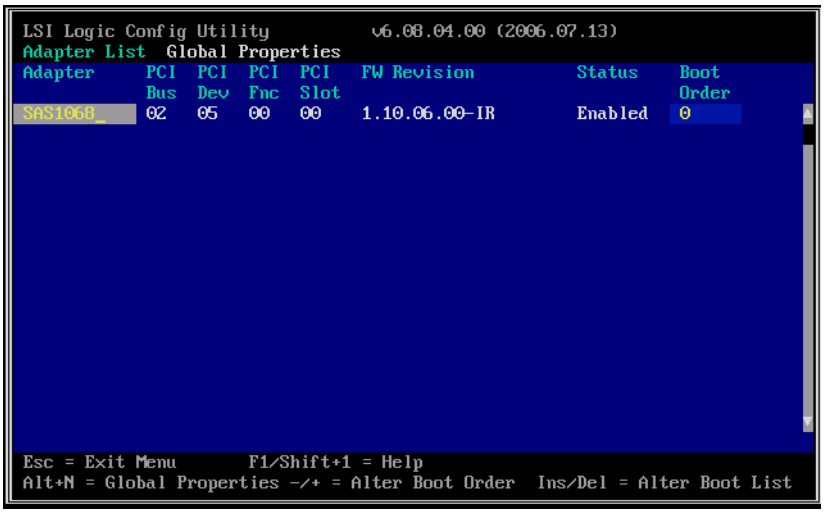
IMPORTANT

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

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

In this case, see "Chapter 6 Replacing Hard Disk" (→pg.123) to check the hard disk status. If there is a failed hard disk, replace the disk and perform rebuild.

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




**POINT**

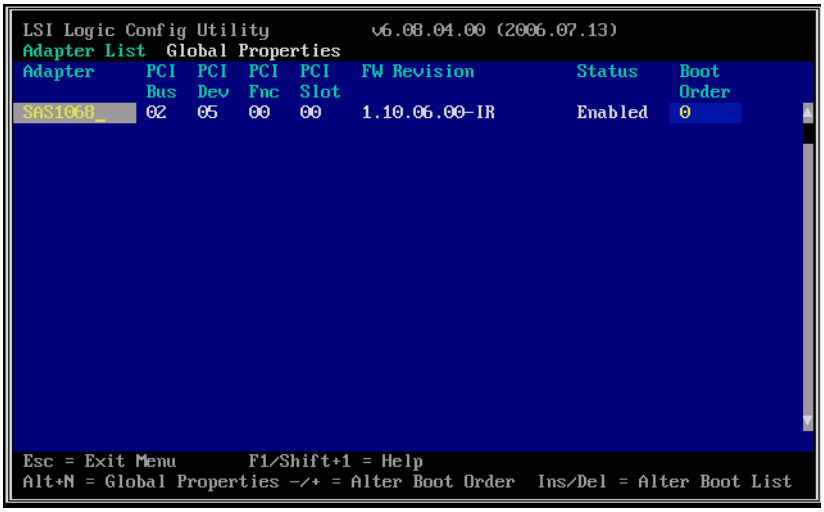
- For this array controller, "SAS1068" or "SAS1064E", depending on a server and a card, appears on [Adapter] of the above screen.

## 2.1.2 Exiting BIOS Utility

Follow the procedure below to exit BIOS Utility.

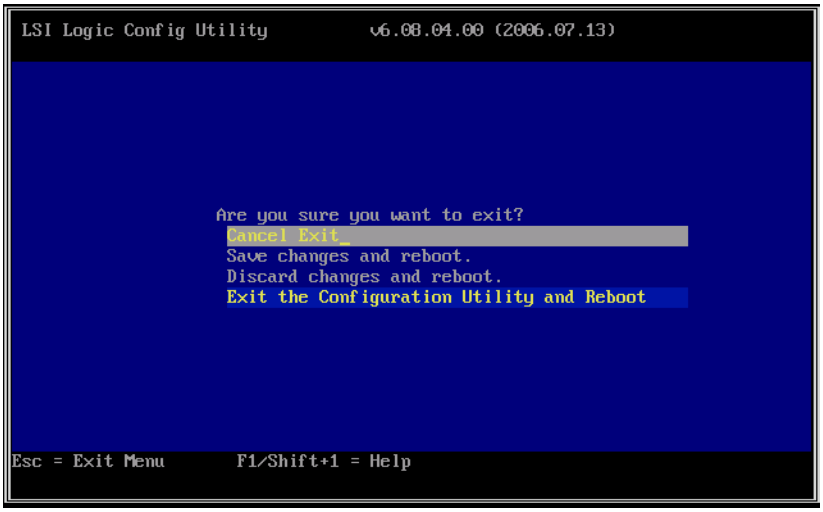
**1** Display the [Adapter List] screen.

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.

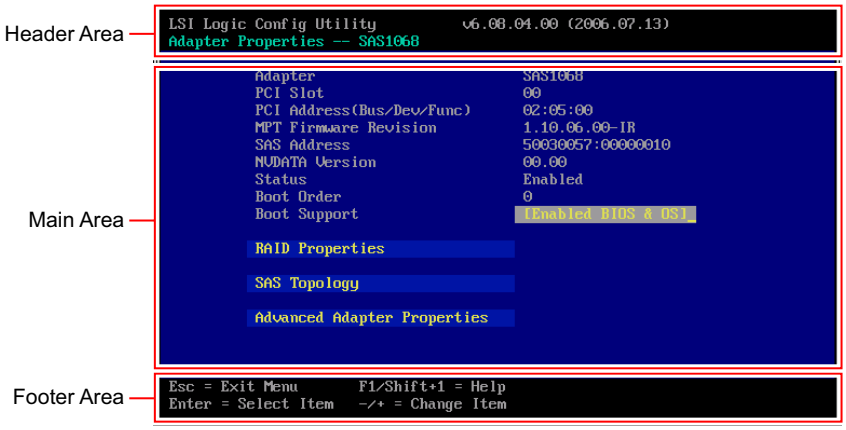



**3** Select [Exit the Configuration Utility and Reboot] and press the [Enter] key.

BIOS Utility closes and the system restarts.

# 2.2 BIOS Utility Screen Layout

BIOS Utility screen consists of three areas.
The displayed contents vary depending on functions to be selected.




**POINT**

- In 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 appears. Explanation of function keys is displayed.

# 2.3 Viewing Information

With BIOS Utility, you can see information on the array controller, a logical drive, and hard disks.

- Viewing Information on Array Controller (→pg.28)
- Viewing Information on Logical Drive and Hard Disk (→pg.31)

## 2.3.1 Viewing Information on Array Controller

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

### ■ Adapter Properties

**1** Start up BIOS Utility.

→"2.1.1 Starting BIOS Utility" (pg.24)

POINT

- If 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 be accessed, but only one controller is shown. So, simply press the [Enter] key.

The [Adapter Properties] screen appears.

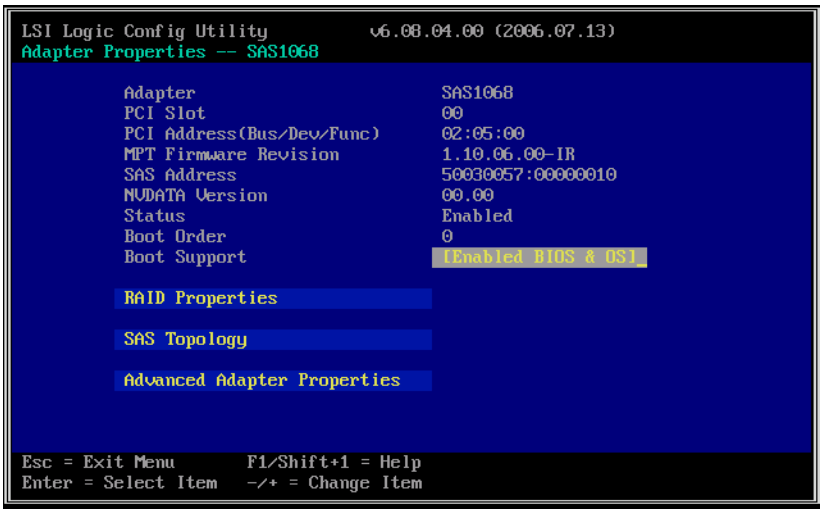


table: Array controller information on the [Adapter Properties] screen

| Item | | Description |
|---|---|---|
| Adapter | | Displays the name of the array controller. |
| PCI Slot | | Displays the PCI slot number where the array controller is installed. |
| 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 of the array controller. |
| SAS Address | | Displays the SAS address of the array controller. |
| NVDATA Version | | Displays the NVRAM revision of the array controller. |
| Status | | Displays the status of the array controller. |
| | Enabled | Indicates that the array controller BIOS is available. |
| | Disabled | Indicates that the array controller BIOS is unavailable. |
| | Error | Indicates that the array controller's BIOS is not operating due to failures. |
| Boot Order | | Displays the boot order of the array controllers when multiple array controllers are installed. With this array controller, this item is always "0" because only one controller can be installed 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 BIOS or the OS driver) and the configuration cannot be changed. |

POINT

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

## ■ Global Properties

**1** Start up BIOS Utility.

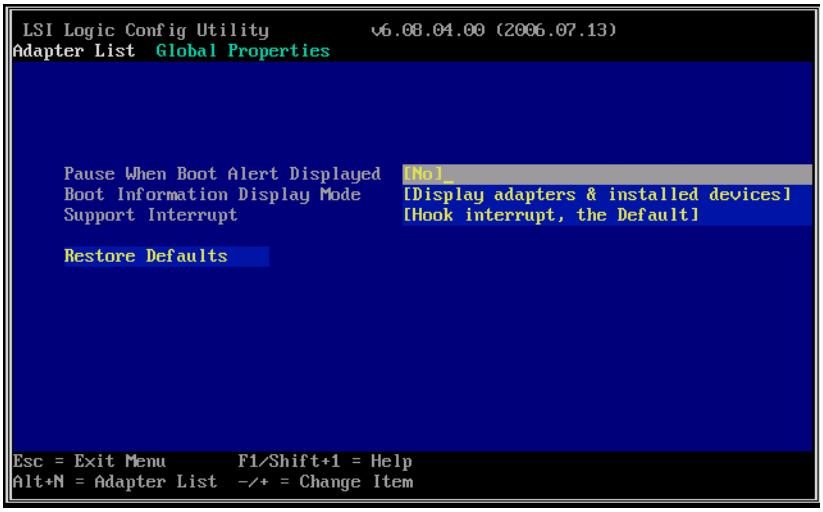
→"2.1.1 Starting BIOS Utility" (pg.24)

POINT

- If 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 default values of the items on this screen. If you have changed them by mistake, select [Restore Defaults] and press the [Enter] key to restore the default values.

table: 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).<br>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 disks).<br>The default value is "Display adapter & installed devices". |
| Set Interrupt | Indicates whether or not to accept INT 13h interrupts.<br>The default value is "Hook interrupt, the default". |

**POINT**

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

## 2.3.2 Viewing Information on Logical Drive and Hard Disk

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

**1** Start up BIOS Utility.

→"2.1.1 Starting BIOS Utility" (pg.24)

**POINT**

- If 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.

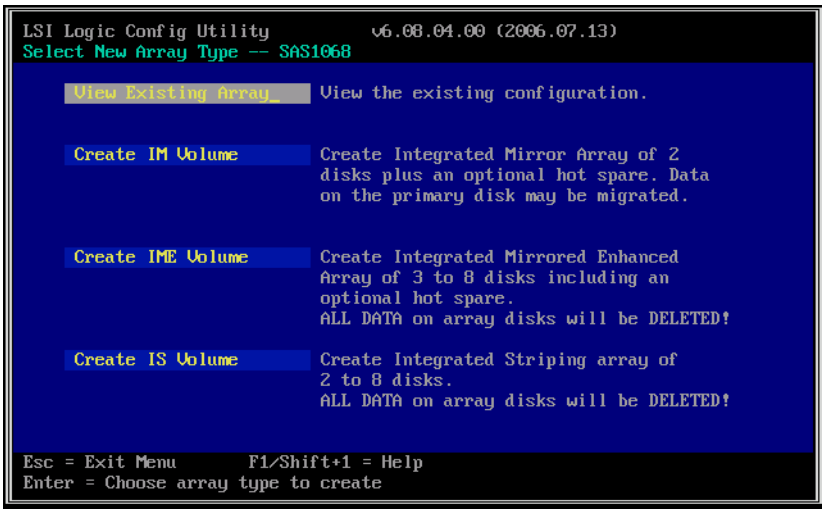
**POINT**

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

The [Adapter Properties] screen appears.

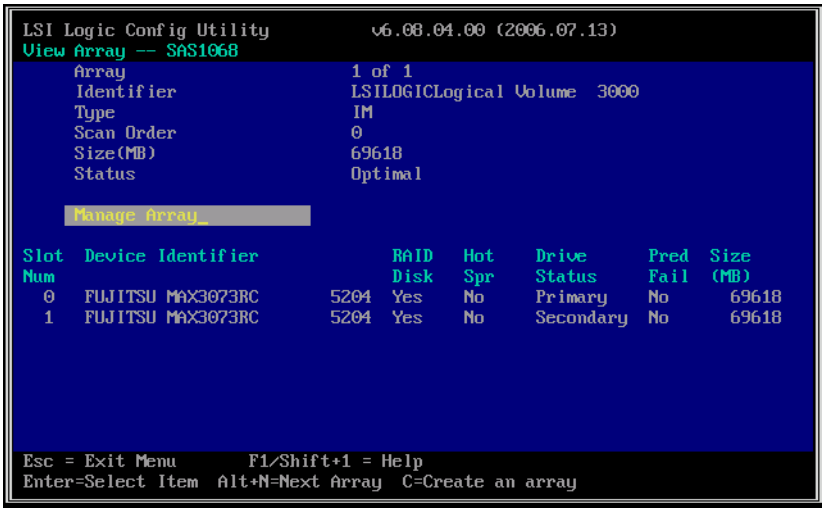
**3** Select [RAID Properties] and press the [Enter] key.

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 a logical drive and the hard disks that belong to the logical drive.




**POINT**

- When no logical drives exist, [View Existing Array] is not displayed.

See "■ Information on logical drives" (→pg.32) for information on logical drives, and "■ Information on hard disks" (→pg.33) for details on hard disks.

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

The display returns to the [Adapter Properties] screen.

## ■ Information on logical drives

This section explains each item in the information on logical drives.

**POINT**

- The information on logical drives 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 drives for which information is currently shown are displayed. Since this array controller only suppors one logical drive, "1 of 1" always appears.

### ● Identifier

The name to identify the logical drive if displayed. It is usually displayed as "LSILOGICLogical Volume 3000".

### ● Type

The type of logical drive is displayed. It is always displayed as "IM ".

### Scan Order

The scan order among multiple logical drives is displayed. Since this array controller only supports one logical drive, "0" always appears .

### Size (MB)

The total capacity of the logical drive is displayed.

### Status

The current status of the logical drive is isplayed. The meaning of each status is shown below:

table: Logical drive status

| Status Indicator | Description |
|---|---|
| Optimal | The logical drive is operating normally. |
| Degraded | The logical drive is operating without redundancy because one of the hard disks has failed. See "Chapter 6 Replacing Hard Disk" (→pg.123) and immediately replace the failed hard disk. |
| Failed | The logical drive is unavailable because multiple hard disks have failed. See "Chapter 6 Replacing Hard Disk" (→pg.123) and immediately replace the failed hard disks. |
| 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 disks still contain the previous system information. See "2.5 Low Level Formatting of Hard Disks" (→pg.45) to format the hard disks, and then configure a new logical drive. |

## Information on hard disks

This section explains each item of the hard disk information.

POINT

- The information on hard disks is displayed at the bottom of the [View Array] screen.

### Slot Num

The number of a physical slot in which the hard disk is installed is displayed.

### Device Identifier

The hard disk vendor name, the model name, and the firmware version of the hard disk are displayed from left to right.

### RAID Disk

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

### Hot Spr

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

## Drive Status

It displays the current status of the hard disk. The meaning of each status is shown below:

table: Hard disk status

| Status Indication | Description |
|---|---|
| --------- | The hard disk is operating normally but does not belong to a logical drive. |
| Primary | The hard disk is operating normally and is configured as the primary disk of RAID 1. |
| Secondary | The hard disk is operating normally and is configured as the secondary disk of RAID 1. |
| Missing | The hard disk has failed and there is no response.<br>See "Chapter 6 Replacing Hard Disk" (→pg.123), and replace the failed hard disk. |
| Failed | The hard disk has a failure.<br>See "Chapter 6 Replacing Hard Disk" (→pg.123), and replace the failed hard disk. |
| Offline | The hard disk is offline state and data read/write is disabled.<br>See "Chapter 6 Replacing Hard Disk" (→pg.123) and replace the hard disk in the offline state. |
| Initing | The hard disk is being formatted. |
| Inactive | The hard disk cannot be used because it contains information of another system.<br>See "2.5 Low Level Formatting of Hard Disks" (→pg.45) to format the hard disk before using it.<br>There is also a possibility that the detected hard disk has a failure. See "Chapter 6 Replacing Hard Disk" (→pg.123), and if the hard disk has a failure, immediately replace the drive. |
| Not Syncd | The hard disk is included in a logical drive, but the initialization or the rebuild is not complete. If the hard disk is in this status even though initialization or rebuild is complete, the drive must have a failure.<br>See "Chapter 6 Replacing Hard Disk" (→pg.123) to replace the failed hard disk. |
| Wrg Type | The hard disk cannot be used as a part of logical drive because the drive is the wrong type or is not an appropriate product.<br>If the hard disk is in this status, the drive may have a failure.<br>See "Chapter 6 Replacing Hard Disk" (→pg.123) to replace the failed hard disk. |
| Too Small | The hard disk cannot be used as a part of logical drive because its capacity is too small.<br>If the hard disk is in this status, the drive may have a failure.<br>See "Chapter 6 Replacing Hard Disk" (→pg.123), and replace the failed hard disk. |
| Max Dsks | The number of hard disks exceeds the maximum possible number that can be configured in a logical drive.<br>If the hard disk is in this status, the drive may have a failure.<br>See "Chapter 6 Replacing Hard Disk" (→pg.123) to replace the failed hard disk. |
| No SMART | The hard disk cannot be used because it does not support S.M.A.R.T. failure prediction function.<br>If the hard disk is in this status, the drive may have a failure.<br>See "Chapter 6 Replacing Hard Disk" (→pg.123) to replace the failed hard disk. |
| Wrg Intfc | The hard disk cannot be used as a part of logical drive because its interface is not SAS.<br>If the hard disk is in this status, the drive may have a failure.<br>See "Chapter 6 Replacing Hard Disk" (→pg.123) to replace the failed hard disk. |

## Pred Fail

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

IMPORTANT

- A hard disk with [Pred Fail] "Yes" is exceeding the PFA (S.M.A.R.T.) threshold and may fail in the near future. See "Chapter 6 Replacing Hard Disk" (→pg.123) to replace the hard disk as soon as possible as a preventive measure.

### Size

The capacity of the hard disk is displayed in MB.

# 2.4 Creating and Deleting Logical Drive

To use a logical drive with redundancy (RAID 1), create and initialize it with BIOS Utility.
When deleting a logical drive, the hard disks configured in the logical drive can be restored unconfigured.

## 2.4.1 Creating and Initializing Logical Drive

Follow the procedure below to create a logical drive.
After creating a logical drive, initialize it to make it redundant.

**POINT**

- For how to initialize a logical drive, see "1.3.1 Logical Drive Initialization" (→pg.16).

**1** Start up BIOS Utility.

→"2.1.1 Starting BIOS Utility" (pg.24)

**POINT**

- If 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.

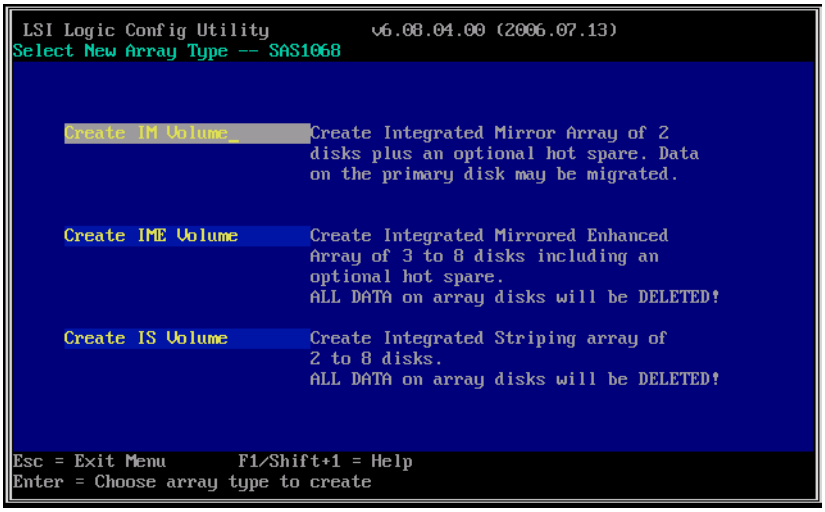
**POINT**

- This screen is for selecting an array controller to access, but only one controller is shown. So, simply 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.

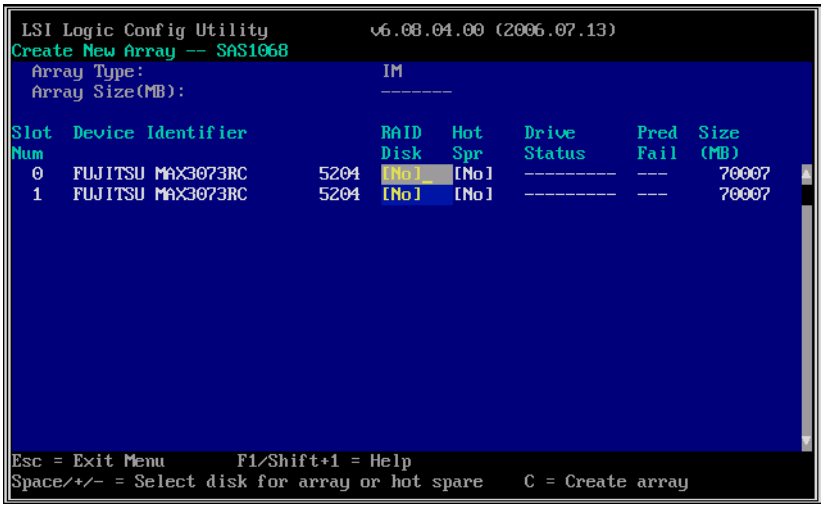



**4** Select [Create IM Volume] and press the [Enter] key.

**POINT**

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

The [Create New Array] screen appears.

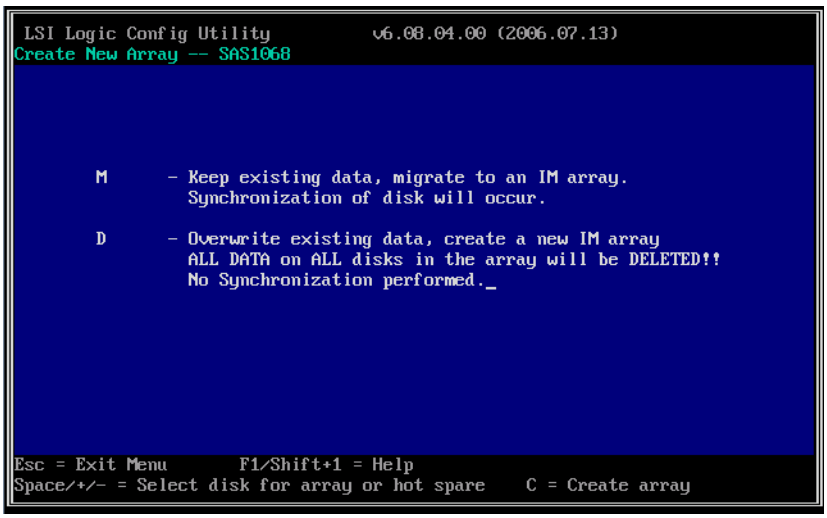


**5** Move the cursor to the [RAID Disk] field of the hard disk to be configured as the primary disk and press the [Space] key.

**POINT**

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

The methods to make a logical drive are displayed.

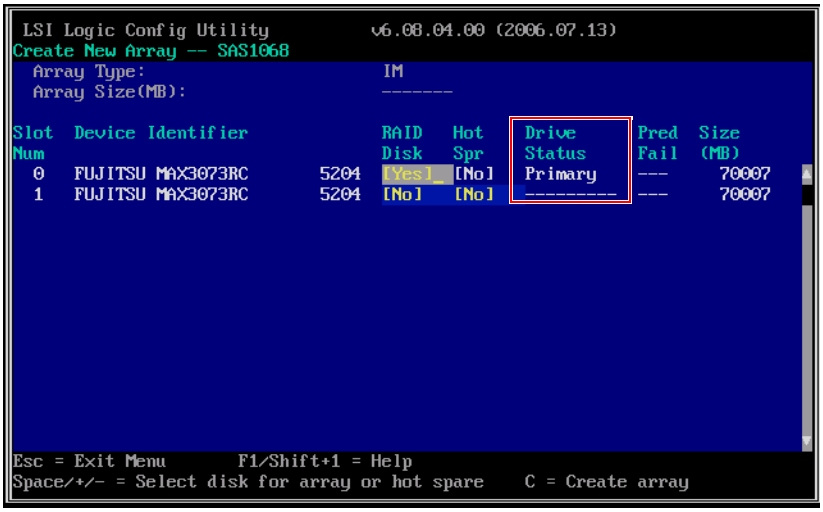



**6** Press the [M] key to select a method from the upper row.

**IMPORTANT**

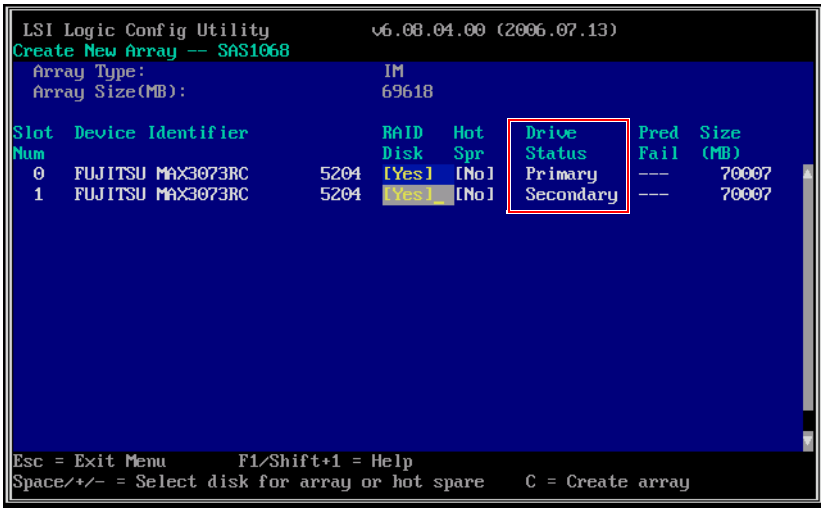
- Do not press the [D] key here. This array controller does not support the method selected with the [D] key.

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



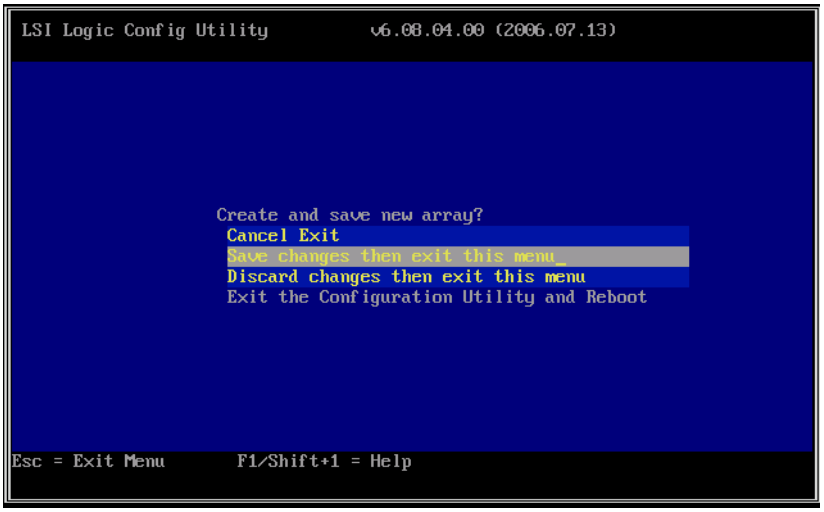
**7** Move the cursor to the [RAID Disk] field of another drive and press the [Space] key.

The [Drive Status] becomes "Secondary".




**8** Press the [C] key.

The 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.

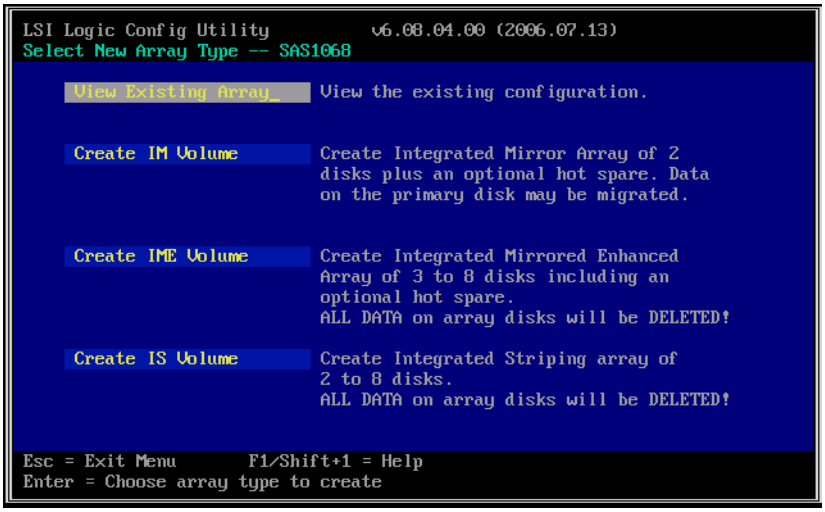
When the creation is complete, the [Adapter Properties] screen appears.

IMPORTANT

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

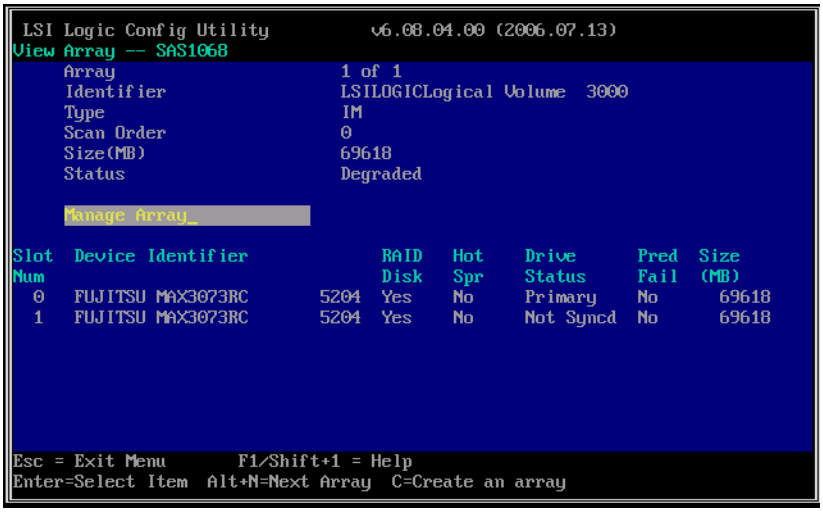
**10** Initialize the logical drive. Select [RAID Properties] and press the [Enter] key.

The [Select New Array Type] screen appears.



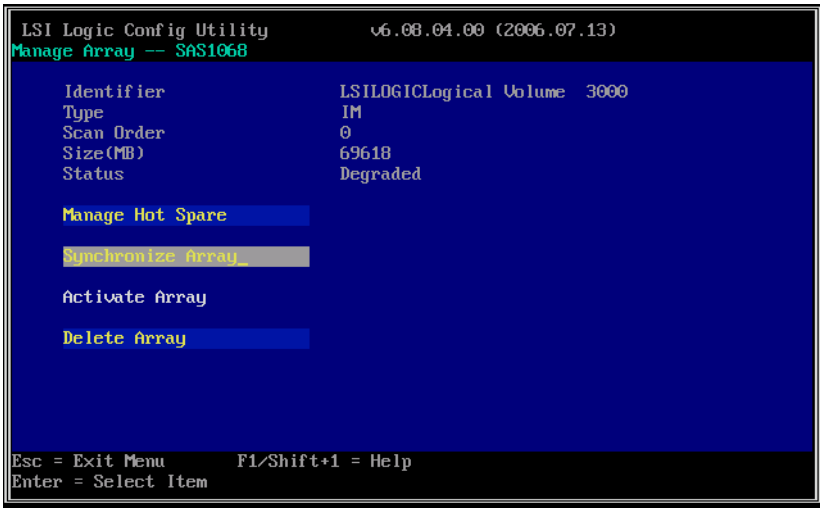

**11** Select [View Existing Array] and press the [Enter] key.

The [View Array] screen appears.



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

The [Manage Array] screen appears.

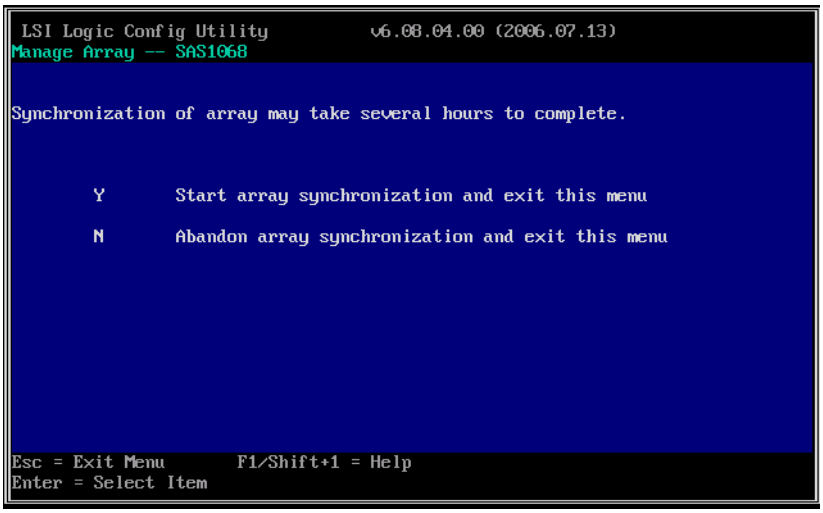



**13** Select [Synchronize Array] and press the [Enter] key.

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 fails, data will be lost.
- Before the initialization, the secondary hard disk 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 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 Logical Drive

To delete the logical drive and restore the hard disks to their original state (not belonging to a logical drive), follow the procedure below.

IMPORTANT

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

**1** Start up BIOS Utility.

→"2.1.1 Starting BIOS Utility" (pg.24)

POINT

- If 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.

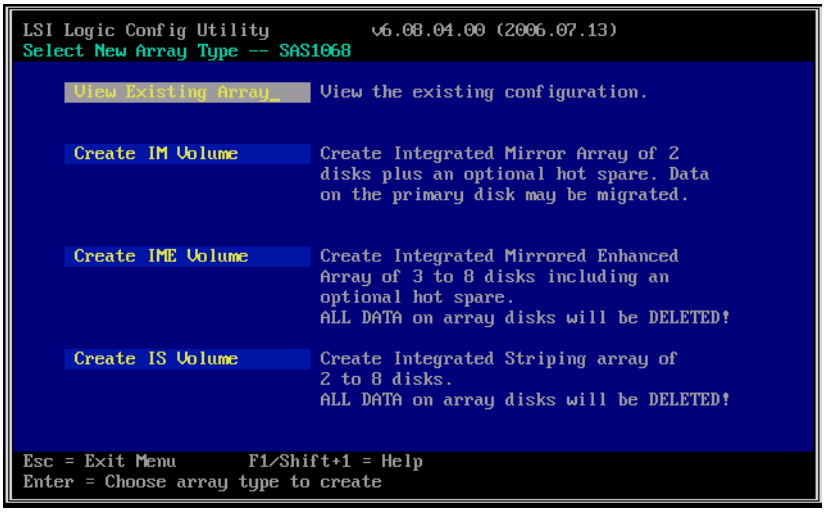
POINT

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

The [Adapter Properties] screen appears.

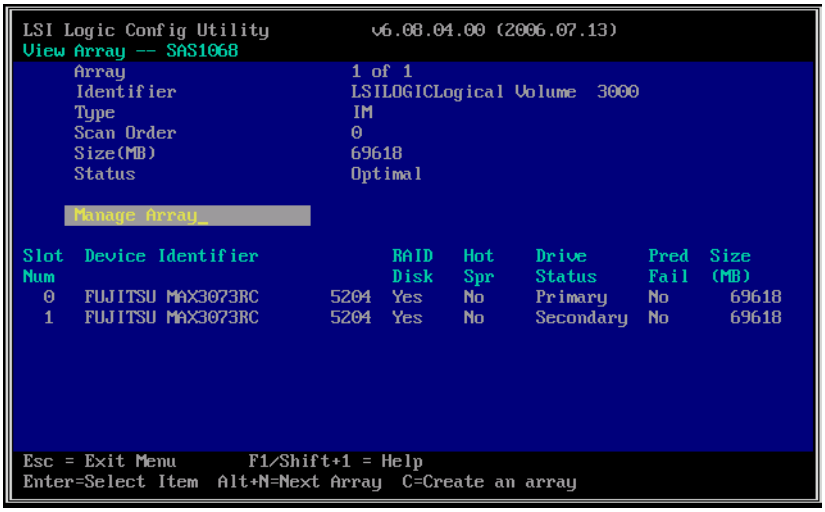
**3** Select [RAID Properties] and press the [Enter] key.

The [Select New Array Type] screen appears.



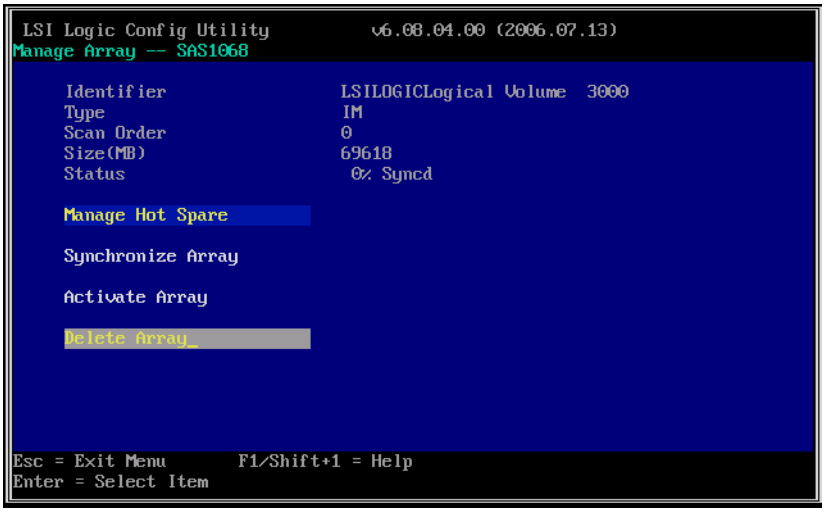

**4** Select [View Existing Array] and press the [Enter] key.

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 Disks

This section explains how to perform a low level formatting of hard disks in BIOS Utility.
When you reuse a hard disk that was previously used in another system, follow the procedure below to format it.

IMPORTANT

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

POINT

- Hard disk formatting can only be done for hard disks that are not contained in a logical drive.
- To format the hard disks contained in a logical drive, delete the logical drive first, referring to "2.4.2 Deleting Logical Drive" (→pg.42) , and then format the hard disk with the following procedure.
- It is not possible to format multiple hard disks at the same time.

**1** Start up BIOS Utility.

→"2.1.1 Starting BIOS Utility" (pg.24)

POINT

- If 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.

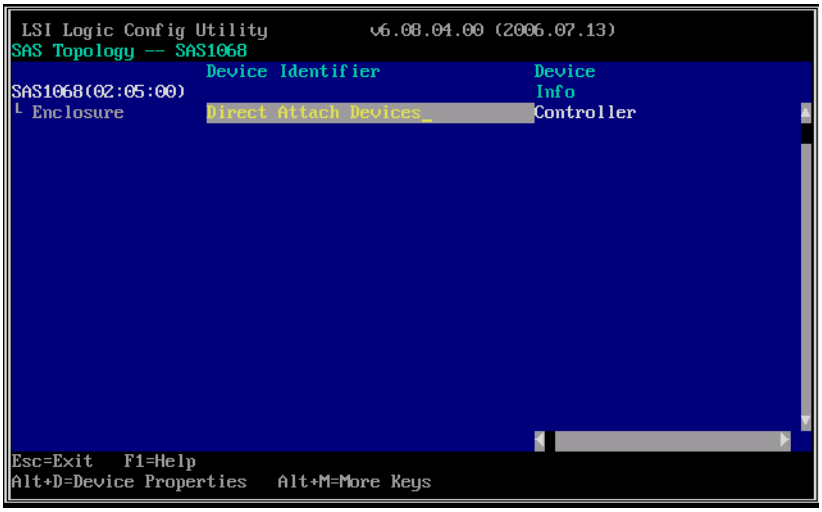
POINT

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

The [Adapter Properties] screen appears.

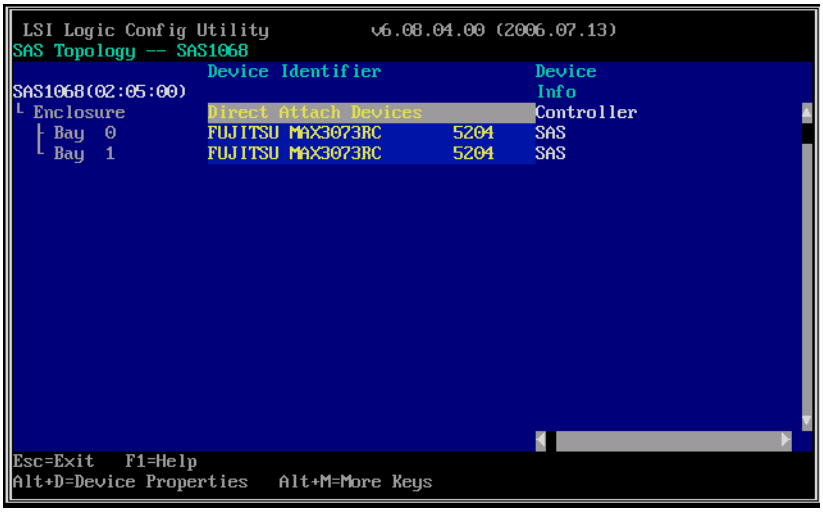
**3** Select [SAS Topology] and press the [Enter] key.

The [SAS Topology] screen appears.



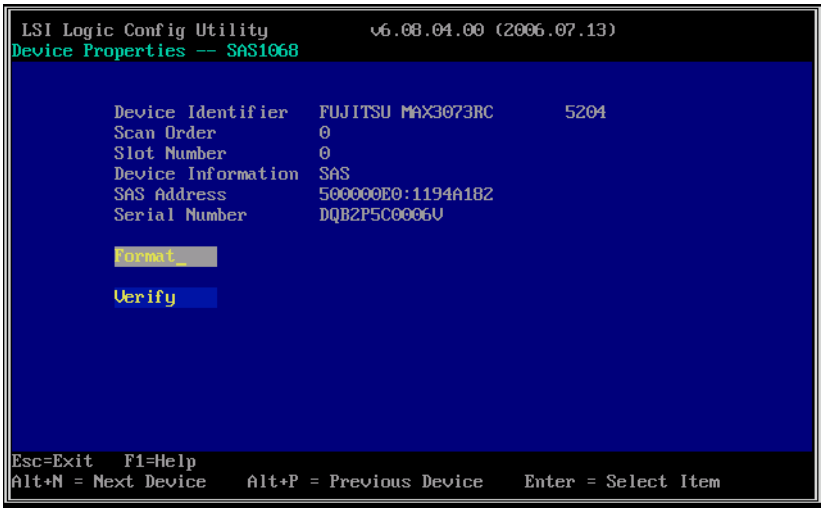

**4** Select [Direct Attached Devices] and press the [Enter] key.

A list of the connected hard disks is displayed.



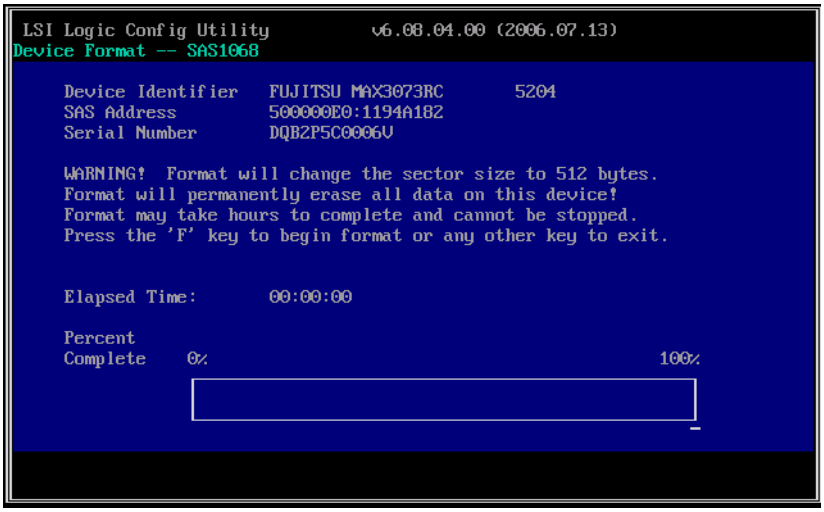
**5** Select the hard disk you wish to format and press the [Alt] + [D] keys.

The [Device Properties] screen appears.



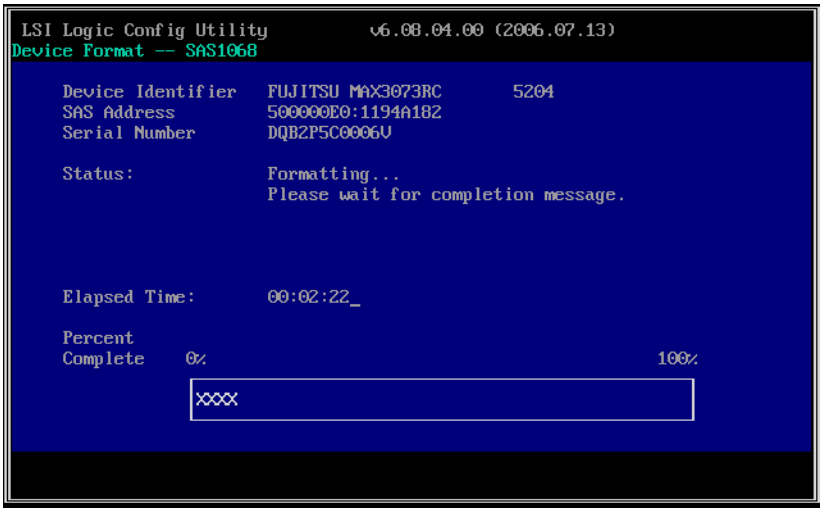

**6** Select [Format] and press the [Enter] key.

The [Device Format] screen appears.



**7** Press the [F] key.

Hard disk 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

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

# 3.1 Updating Device Drivers

This section explains how to update the device drivers installed in the server.
The driver update operation varies depending on the OS to be used.
Before the update, create driver disks using "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 "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 with "Array Controller Document & Tool CD" by following the procedure below.

1. Prepare formatted floppy disks.
2. Insert "Array Controller Document & Tool CD" into the CD/DVD drive.
3. Copy the drivers for the OS to be used 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 device driver version, see ReadmeEN.html on "Array Controller Document & Tool CD".

## 3.1.2 Updating Drivers (Windows Server 2003)

1. Log on to Windows with Administrator privileges.
2. Exit all programs before updating.

3 Select [System] from [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] or [LSI Logic Adapter, SAS 3000 series, 4-port 1064E-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] or [LSI Logic Adapter, SAS 3000 series, 4-port 1064E-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 if 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
  or
- LSI Logic Adapter, SAS 3000 series, 4-port 1064E-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 Drivers (Windows 2000 Server)

1. Log on to Windows with Administrator privileges.
2. Exit all programs before updating.
3. Select [System] from [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] or [LSI Adapter, SAS 3000 series, 4-port with 1064E].
   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] or [LSI Adapter, SAS 3000 series, 4-port with 1064E] 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 if 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
    or
  - LSI Adapter, SAS 3000 series, 4-port with 1064E

  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 Hotfix

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

IMPORTANT

- For the hotfix, use "PRIMERGY Startup Disc" or "ServerStart Disc 1 CD-ROM" supplied with the server. Make sure to apply 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 "PRIMERGY Startup Disc" or "ServerStart Disc 1 CD-ROM" into the CD/DVD drive.
4. Run the following program to apply the hotfix.
   - For Windows 2000 Server
     [CD/DVD drive]:\HOTFIX\W2K\ENU\Windows2000-KB904374-x86-ENU.EXE
   - For Windows Server 2003 Service Pack 1
     [CD/DVD drive]:\HOTFIX\W2K3\WindowsServer2003-KB916048-x86-ENU.exe
   - For Windows Server 2003 x64 Service Pack 1
     [CD/DVD drive]:\HOTFIX\W2K3x64\WindowsServer2003.WindowsXP-KB916048-x64-ENU.exe

Chapter 4

# Array Configuration and Management [ServerView RAID]

4

This chapter explains an overview of and requirements for ServerView RAID Manager, and how to install and use it.

# 4.1 Requirements for ServerView RAID

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

## 4.1.1 ServerView RAID Overview

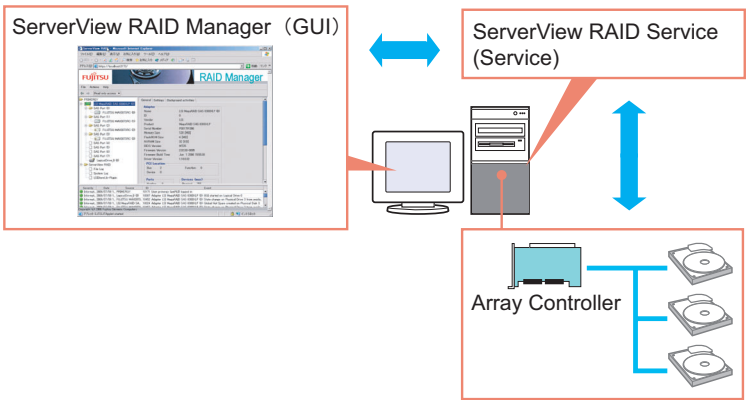
This software runs on the OS to monitor and manage the array controller.
ServerView RAID is an application software that allows you to manage a disk array system connected to the array controllers (RAID controllers).
Using ServerView RAID, which is a client-server application, you can manage array controllers 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 operation of the array controller.

- **ServerView RAID Manager**

  It is a graphical user interface that uses a Web browser and Java. You manage and configure array controller 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 which to use, see ReadmeEN.html on 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 | 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<br>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.138).

### ■ ServerView RAID Manager (when managed from 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 × 600 or better resolution (1024× 768 or more recommended), 256 or more colors |
| OS | Windows Server 2003 SP1 or later<br>Windows XP<br>Windows 2000 Server Service Pack 4 or later<br>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 need to 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. The two levels of access privileges are shown below:

### ■ User privilege

The User privileges are mainly used to see the status of the array controllers, hard disks, 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 disks, and logical drives. However, you cannot rebuild hard disks, 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 privilege

This privileges are for management, maintenance, and configuration of the array controllers, hard disks, and logical drives. To use the Administrator privilege, 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, you can use all the other functions such as rebuilding hard disks, and changing the hard disk 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 properly.

POINT

- Make sure to create the "raid-adm" group and name it "raid-adm".

## 4.1.4 Using ServerView RAID in Linux Environment

To use ServerView RAID in Linux environment, install device drivers for Linux and ServerView RAID.

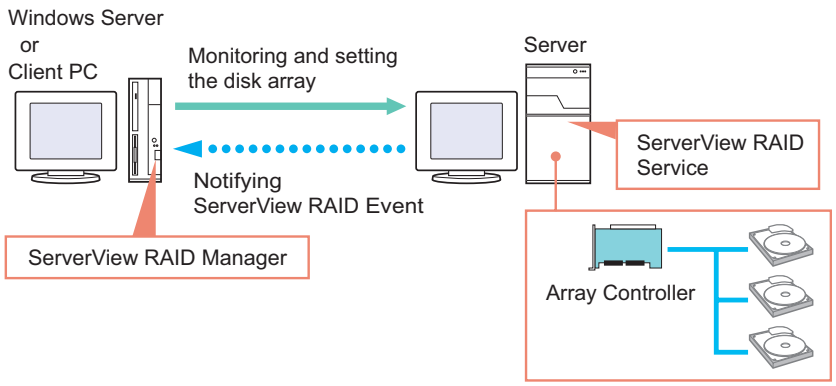
POINT

**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 Operation via Network" (→pg.59).

## 4.1.5 Operation via Network

In a network environment, an array on a server can be monitored and managed from a server or a Windows client PC connected to the network.
When you 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:

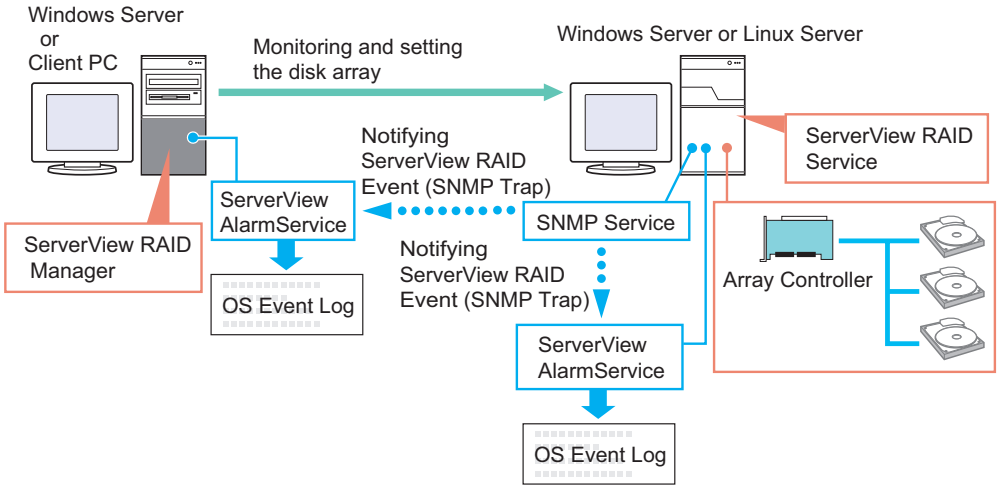


**POINT**

- 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 will not be blocked.
  ServerView RAID uses the TCP port 3173.

## ■ Interaction with ServerView 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, the configuration is as follows:

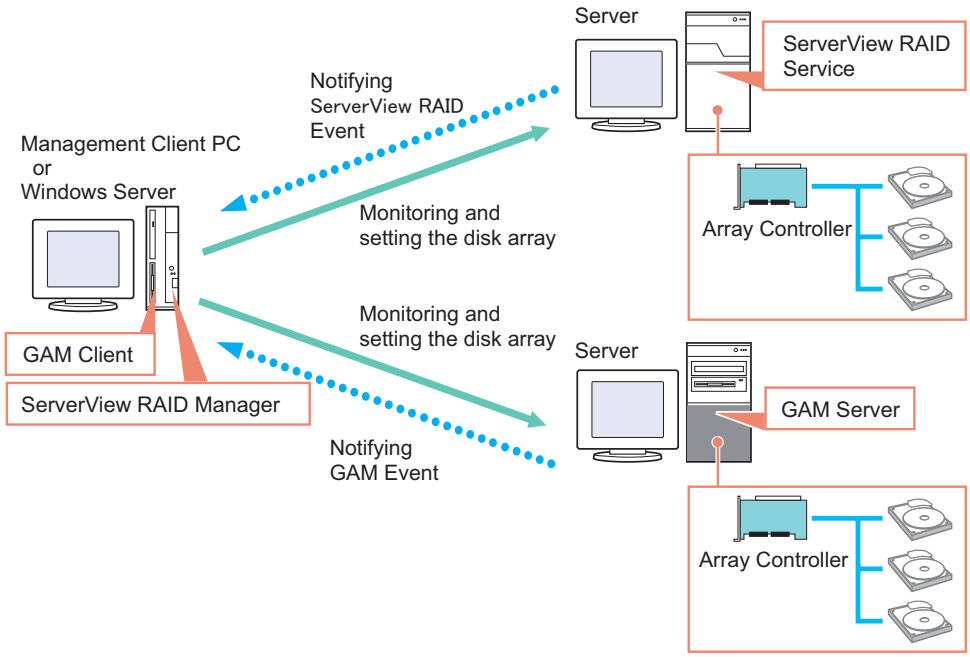



**IMPORTANT**

- Make sure to install ServerView on the server.

## 4.1.6 When Using 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.
The configuration is as follows:




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 different versions of GAM Servers coexist, use the newer version of GAM Client than GAM Server.

# 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

Follow the procedure below 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 Array Controller Document & Tool CD provided with this product into the CD/DVD 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 the [Start] button – [Run...]. Enter the following path and click [OK].
   [CD/DVD 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 [User must change password at next logon].
  Generally, [Password never expires] 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.
- Make sure to create the "raid-adm" group. Make sure to create the group with the name "raid-adm".

## 4.2.2 How to Uninstall ServerView RAID

Follow the procedure below to uninstall ServerView RAID.

IMPORTANT

- Do not uninstall ServerView RAID unless you need to update ServerView RAID or in other special cases.

**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 the programs.

**2** Click the [Start] button – [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

Configure the necessary Web browser before using ServerView RAID Manager. Also, note the following precautions:

### ● General precautions

- ServerView RAID Manager needs Java plug-in. Install Java on the server or client PC on which you use ServerView RAID Manager. If Java is not installed, install Java by referring to "Installing Java™ 2 Runtime Environment Standard Edition" under "Chapter 2 Installation" in "ServerView User's Guide" on PRIMERGY Startup Disc.
- 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

- Set SSL enable.
  Select [Tools] – [Internet Options] – [Advanced] – [Security], and set SSL 2.0 and SSL 3.0 enable.
- 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 set the following items enable in the configuration window:
  - "SSL 2.0" and "SSL 3.0"
  - "Enable Java"

## 4.3.2 Starting ServerView RAID Manager

Follow one of the procedures below to start ServerView RAID Manager:

- **From the [Start] button**

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

- **From ServerView**

  Start ServerView RAID Manager with the RAID Manager linking function of ServerView.
  For how to start ServerView RAID Manager from ServerView, see "RAID Manager Linking" in "ServerView User's Guide" on PRIMERGY Startup Disc.

- **From the server name or IP address**

  Start ServerView RAID Manager by directly specifying the host name or the IP address of the server.
  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] button

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

   Starting by directly specifying the server name or IP address

   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/

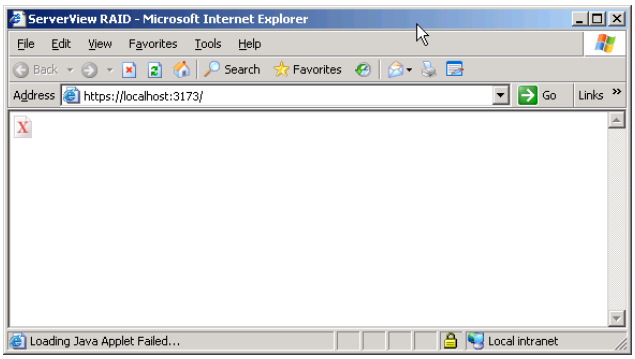
   **POINT**

   - 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 when 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 not be able 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.58).
- 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.

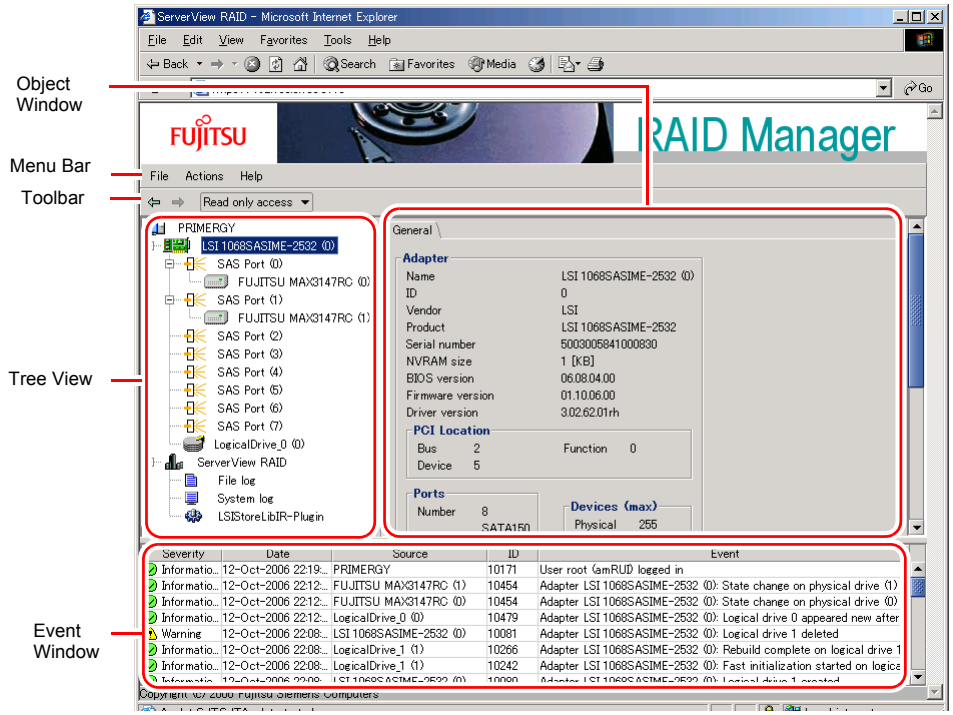

**2** Exit the Web browser.

# 4.4 ServerView RAID Manager Window Layout

This section explains 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 change 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

Menu bar provides menus for performing various function of ServerView RAID Manager.
For details on the ServerView RAID Manager menus, see "4.4.2 Menu Layout and Functions" (→pg.71).

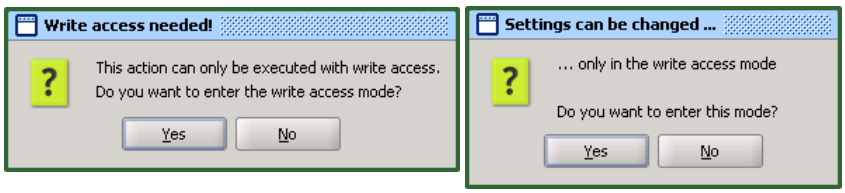
## ■ Toolbar

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.
- Read only access (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**

- You can use the [Write access] mode only when you log in to ServerView RAID with Administrator privileges. When you log in with User privileges, you can only use the [Read only access] mode.
  →"4.3.2 Starting ServerView RAID Manager" (pg.66)
- 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 make the access mode automatically switched 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 Tree View Layout" (→pg.73).

### ■ Event window

ServerView RAID monitors the operation of the array controllers and hard disks connected to the controllers.
When any behavior that is considered as an event (for example, a failure of a hard disk 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:<br>Information<br>Warning<br>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 unavailable.
- The [Actions] menu is the same as the right-clicked menu when the object is selected in the tree view.

## When an array controller is 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 is selected

table: [Actions] menu (When a hard disk is selected)

| Menu | Function |
|---|---|
| Locate device | It turns on the hard disk failure LED to indicate the drive's location. |
| Stop location | It turns off the hard disk 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 | It changes the status of the hard disk to offline (Failed).<br>**Note:**<br>▸ Do not use this function unless you are instructed to do so, for example during preventive replacement of a hard disk or during maintenance. This operation may cause data loss. |
| Start rebuild | Starts a rebuild ([Rebuild]) for the selected hard disk. |

## 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 disks that make up the selected logical drive to indicate their locations. |
| Stop location | Turns off the hard disk 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.<br>**Note:**<br>▸ Do not use it. Event log files are used when analyzing failures. If you delete event log files, the analysis may become difficult. |

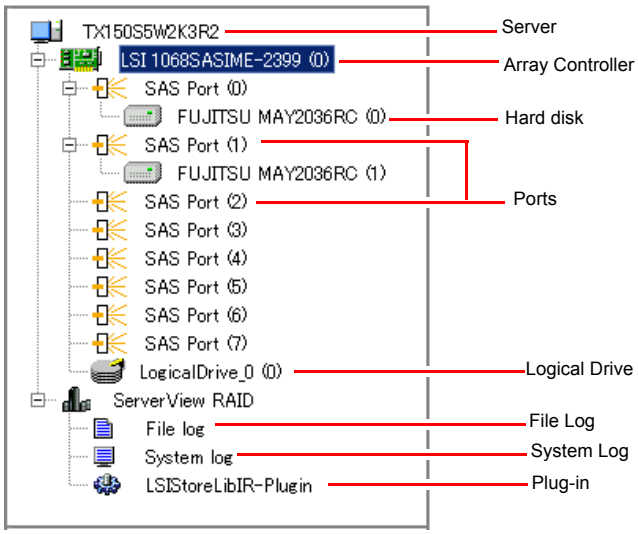
## ■ [Help] menu

table: [Help] menu

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

## 4.4.3 Tree View Layout

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 disks and the logical drive.




### ● Server

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

### ● Controller

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

### ● Port

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

### ● Hard disk

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

You can also see the status of each hard disk with icons.

table: hard disk status icon

| Icon | Displayed in | Status | Description |
|---|---|---|---|
|  | Gray | Online<br>(Operational) | Configuring an array and operating normally |
|  | White | Unused<br>(Available) | Unused or available |
|  | Gray<br>with an "×" mark | Failure/Offline<br>(Offline) | The hard disk configuring the array is being failed, or unwritable |
|  | White<br>(dotted frame)<br>with "×" | Unrecognizable<br>(Failed (Missing)) | Not recognized, or failed. |
|  | Gray | Rebuild<br>(Rebuilding) | Rebuild is in progress |
|  | Gray<br>with "!" | Failure Prediction<br>(S.M.A.R.T. Error) | A failure is expected |
|  | Yellow background | Locating | [Locate Device] function is running |

**POINT**

- When you select the icon of each hard disk, more detailed information is displayed in the object window. Note that you cannot see some information on unrecognizable hard disks.
  For details, see "4.7.3 Checking Hard Disk Status" (→pg.82).
- S.M.A.R.T. Error may appear with another status.

## ● Logical drive

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 with icons.

table: Logical drive status icons

| Icon | Status | Description |
|---|---|---|
|  | Online<br>(Operational) | Operating normally. |
|  | Critical<br>(Degraded) | Operating without redundancy |
|  | Offline<br>(Failed) | Not available |
|  | Locating | [Locate Logical Drive] function is running on the logical drive. |

**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.84).

### ● 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.76).

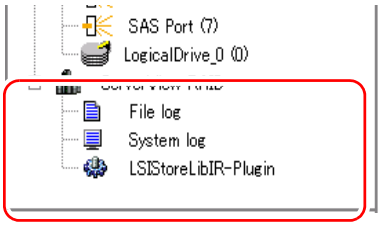
# 4.5 Setting ServerView RAID

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.65)

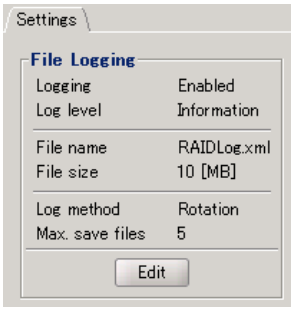
**2** In the tree view, select the icon you want.




**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 logging 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.77)

- When you set System log:

  →"■ System log" (pg.78)

IMPORTANT

- Setting for ServerView RAID, the Multiplexer and the LSIStorelibIR-Plugin are not supported, Do not use them.

**5** Click [OK].

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

## ■ File log

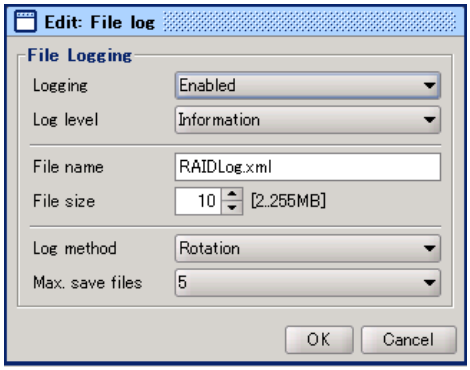



table: File log

| Options | Setting | | Description |
|---|---|---|---|
| Logging | Enabled | Cannot be changed | Sets event logging to the log file enable. Always set 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 from 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 | The 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 server/ Windows Server 2003 | C:\Program Files\Fujitsu Siemens\RAID\web\public\ |
| For Windows Server 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 for failure analysis. The available 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 | Sets event logging to the OS event log enable. |
| 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.<br>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 whose settings you can change under System Log is "Source: ServerView RAID".

# 4.6 Rebuild

This section explains how to rebuild hard disks.

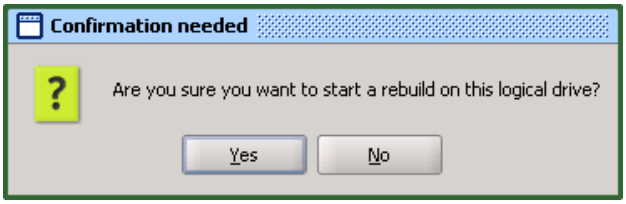
Rebuild is an operation to recover a logical drive in "Critical" status (Degraded) to "Online" (Operational) status. For details on rebuild, see "1.3.2 Rebuild" (→pg.16).
To manually execute a rebuild, follow the procedure below.

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.70).
- Just replacing a hard disk does not execute a rebuild. Make sure to perform the rebuild operation. For how to replace the hard disk and perform a rebuild, see "Chapter 6 Replacing Hard Disk" (→pg.123).

**1** Start the ServerView RAID Manager and log in with Administrator privileges.
→"4.3 Starting and Exiting ServerView RAID Manager" (pg.65)

**2** In the tree view, right-click the replaced hard disk ( ), and [Start rebuild] from the displayed menu.
A confirmation window appears.




**3** Click [Yes].
When the rebuild starts, [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 rebuild is complete.

# 4.7 Checking Status [ServerView RAID Manager]

The following information can be checked using ServerView RAID Manager.

- Information on events or errors that have occurred: "Appendix A A List of ServerView RAID Event Logs" (→pg.138)
- Server information: "4.7.1 Checking Server Condition" (→pg.80)
- Array configuration or controller information: "4.7.2 Checking Array Controller Status" (→pg.81)
- Hard disk information: "4.7.3 Checking Hard Disk Status" (→pg.82)
- Logical drive information: "4.7.4 Checking Logical Drive Status" (→pg.84)
- Information on tasks running in the background: "4.7.5 Checking Progress of Background Task" (→pg.86)

## 4.7.1 Checking Server Condition

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

**1** Start ServerView RAID Manager and log in.

→"4.3 Starting and Exiting ServerView RAID Manager" (pg.65)

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

Detailed information on the selected server is displayed.

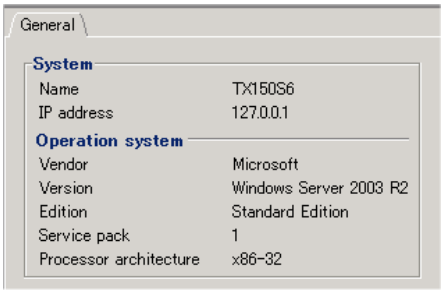



table: Detailed information on servers

| Item | Category | Description |
|---|---|---|
| System | Name | Server name. |
| | IP address | Displays the server IP address.<br>The loopback address (127.0.0.1) may be displayed depending on the server network settings. |

table: Detailed information on 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]: Not all of the items may be displayed depending on the OS types or settings.

## 4.7.2 Checking Array Controller Status

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

**1** Start ServerView RAID Manager and log in.

→"4.3 Starting and Exiting ServerView RAID Manager" (pg.65)

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

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

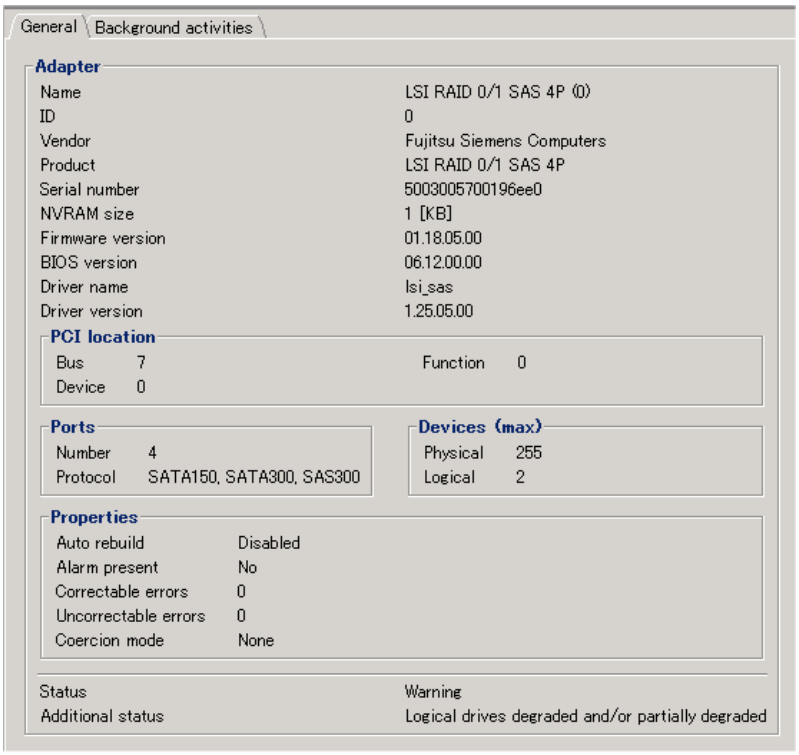


table: Detailed information about array controllers

| Item | Category | Description |
|---|---|---|
| Adapter | Name | Model name of the array controller. |
| | ID | The number of the array controller. |
| | Vendor | Vendor name of the array controller. |
| | Product | Product name of the array controller. |
| | Serial number | Serial number of the array controller. |
| | NVRAM size | Size of the array controller NVRAM. |
| | Firmware version | Firmware version of the array controller. |
| | BIOS version | BIOS version of the array controller. |
| | Driver name | Driver name of the array controller. |
| | Driver version | Driver version of the array controlle. |
| PCI Location | Bus | Bus number for the array controller. |
| | Function | Function number for the array controller. |
| | Device | Device number for the array controller. |
| Ports | Number | Number of ports on the array controller. |
| | Protocol | Protocol supported by the array controller. |
| Devices (max) | Physical | Logical maximum number of physical devices. |
| | Logical | Logical maximum number of logical devices. |
| Properties | Auto rebuild | Indicates whether auto rebuild is enabled or disabled. |
| | Alarm present | Indicates whether the alarm is present or not. |
| | Correctable errors | 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 receives a failure status. |
| | Uncorrectable errors | |
| | Coercion mode | Indicates whether or not coercion of the hard disk capacity is performed. |
| Status | | Displays the current status of the array controller. |
| Additional status | | Displays the details of the current status of the array controller |

**POINT**

- The [Background activities] tab is displayed if a background task is running.
- Regarding the information displayed in the [Background activities] tab, see "■ Checking with Background activities from array controller" (→pg.87).

## 4.7.3 Checking Hard Disk Status

Detailed information on hard disks connected to the controller is displayed in the object window.

1 Start ServerView RAID Manager and log in.

→"4.3 Starting and Exiting ServerView RAID Manager" (pg.65)

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

Detailed information about the selected hard disk is displayed.

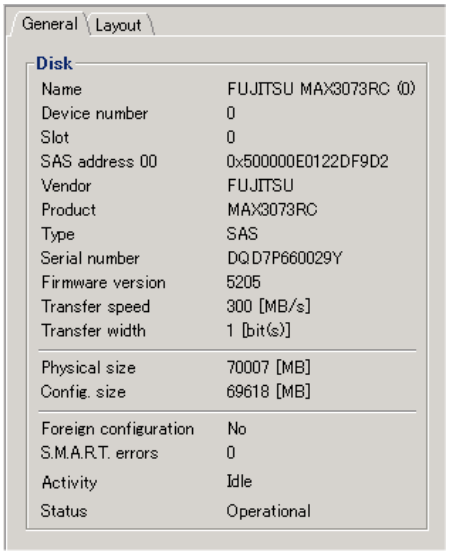



table: Detailed information on hard disks

| Item | Category | Description |
|---|---|---|
| Disk | Name | Hard disk model name. The number in parentheses is the device number of the hard disk. |
| | Device number | Device number of the hard disk. |
| | Slot | Number of the slot where the hard disk is installed. |
| | SAS address 00 | SAS address of the hard disks. |
| | Vendor | Hard disk vendor name. |
| | Product | Hard disk product name. |
| | Type | Protocol type of the hard disk. |
| | Serial number | Serial number of the hard disk. |
| | Firmware version | Version of the hard disk's firmware. |
| | Transfer speed | Ttransfer speed between the hard disk and the controller. |
| | Transfer width | Data transfer width of the hard disk is displayed. |
| | Physical size | Physical capacity of the hard disk. |
| | Config. size | Available hard disk capacity when connected to the array controller. |
| | Foreign configuration | Not supported. |
| | S.M.A.R.T errors | Counts S.M.A.R.T. failure predictions for the hard disk. |
| | Activity | Displays running tasks for the hard disk.<br>• Idle: No running tasks.<br>• Rebuilding: A rebuild is in progress. |
| | Status | Displays current status of the hard disk. |

## 4.7.4 Checking Logical Drive Status

Detailed information on 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 ServerView RAID Manager and log in.

→"4.3 Starting and Exiting ServerView RAID Manager" (pg.65)

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

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:

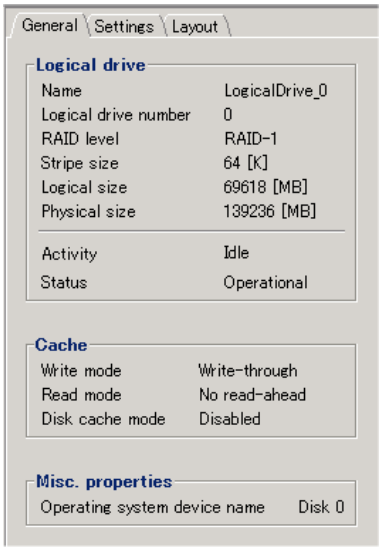


table: Detailed information about logical drives

| Item | Category | Description |
|---|---|---|
| Logical Drive | Name | Logical drive name. |
| | Logical drive number | Logical drive number. |
| | RAID level | RAID level set for the logical drive. |
| | Stripe size | Striping size used by the logical drive. |
| | Logical size | Logical size of the logical drive. |
| | Physical size | Physical size of the logical drive. |
| | Activity | Running tasks for the logical drive.<br>When background tasks are running, the running tasks and their progress are displayed on the progress bar.<br>For details, see "4.7.5 Checking Progress of Background Task" (→pg.86). |
| | Status | Current status of the logical drive. |
| Cache | Write mode | Current write policy status of the logical drive. |
| | Read mode | Not supported. |
| | Disk cache mode | |
| Misc. properties | Operating system device name | Overview of HDD devices used in the OS. |

When you select the [Layout] tab:

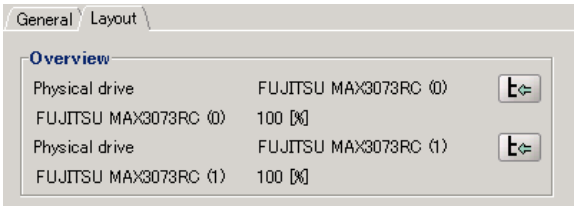



table: Logical drive layout information

| Item | Category | Description |
|---|---|---|
| Overview | Disk | Displays the hard disks composing the target logical drive. |
| | Used capacity | Displays the capacity of hard disks used in the target logical drive. |
| | Partitions | Displays the overview of HDD devices used in the OS |

## 4.7.5 Checking Progress of Background Task

ServerView RAID Manager allows 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 | • With detailed information on logical drives<br>• With background activities from array controllers<br>• With detailed information on hard disks |

### ■ Checking with detailed information on logical drives

You can check the background tasks runnning on the selected logical drive.

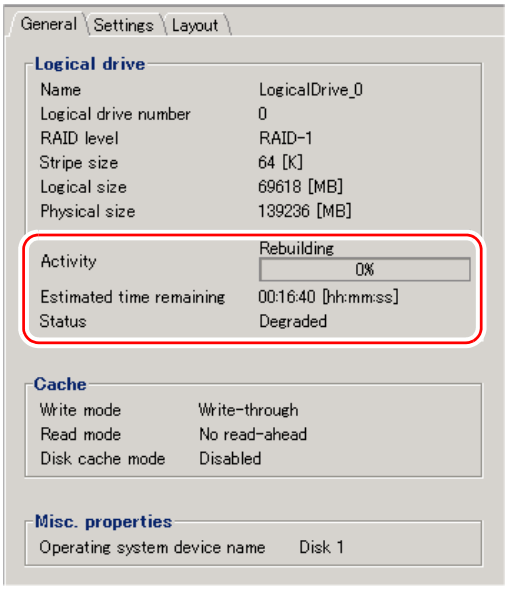
**1** Start ServerView RAID Manager and log in.

→"4.3 Starting and Exiting ServerView RAID Manager" (pg.65)

**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 running in [Activity].



## ■ Checking with Background activities from array controller

You can check all the background tasks runnning in the selected array controller.

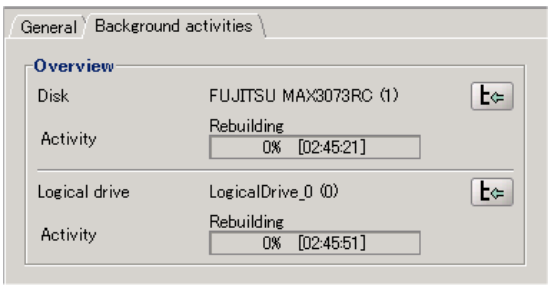
**1** Start ServerView RAID Manager and log in.

→"4.3 Starting and Exiting ServerView RAID Manager" (pg.65)

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

**3** Click the [Background activities] tab.

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




**POINT**

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

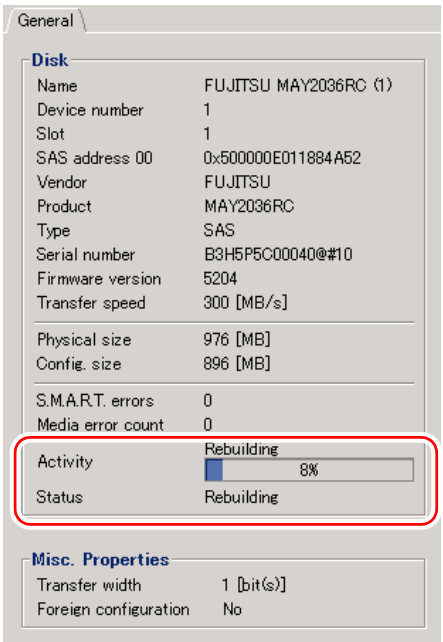
## ■ Checking with detailed information on hard disk

You can check rebuild running on the selected hard disk.

1. Start ServerView RAID Manager and log in.
   →"4.3 Starting and Exiting ServerView RAID Manager" (pg.65)

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

3. Click the [General] tab.
   You can check the progress of the rebuild being executed in [Activity].




## ■ How to calculate estimated time for background task

For on-going background tasks, you can figure out approximate time a task will take referring to the progress bar.

1. Measure the period of time taken for a 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) × 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 explains the overview and requirements of GAM, and how to install and use it.

# 5.1 Overview and Requirements for GAM

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

## 5.1.1 GAM Overview

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

- **GAM Server (monitoring function)**

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

- **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 disks 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 which to use, see ReadmeEN.html on Array Controller Document & Tool CD. If by mistake you have installed ServerView RAID rather than GAM, uninstall ServerView RAID, and then install GAM. 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 GAM Server and GAM Client. 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 | • For Windows<br>64MB or more free space in the partition in the OS.<br>• For Linux<br>64MB or more free space under /usr and /var |
| Appication | TCP/IP, SNMP service, and ServerView must be installed. |
| OS | A supported OS of the server that the array controller is installed in. |

IMPORTANT

- Apply the latest Service Pack for the OS.
- Make sure to install the Fujitsu-specified device drivers and GAM.
- Make sure to configure the network 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 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 available TCP/IP |
| Input device | A mouse or other pointing devices |
| Processor | Pentium® or later |
| Memory | 256MB or more |
| Hard disk | 32MB or more free space |
| Monitor | 800×600 or better resolution (1024 ×768 or more recommended) |
| OS | Windows Server 2003<br>Windows XP<br>Windows 2000 Server Service Pack 4 or later<br>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 disks, and logical drives. To use User privileges, sign on with a user name and a password 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 checking its status.

### ■ Administrator privileges

This function is used for management, maintenance, and configuration of controllers, hard disks, 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 logical drive data consistent, and changing a 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 accordingly.
- If GAM information cannot be monitored from ServerView, the network settings may be incorrect. In this case, check the network settings again.

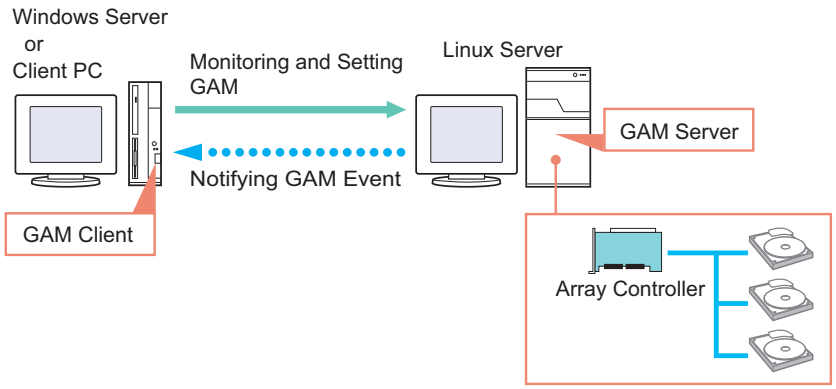
## 5.1.4 Using GAM in Linux Environment

To use GAM in a Linux environment, you need to install device drivers and GAM.
For using Linux, see the Linux manual on the Fujitsu website (http://primergy.fujitsu.com/).

**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 that GAM Client on a Windows server or on a client PC manages a Linux server.

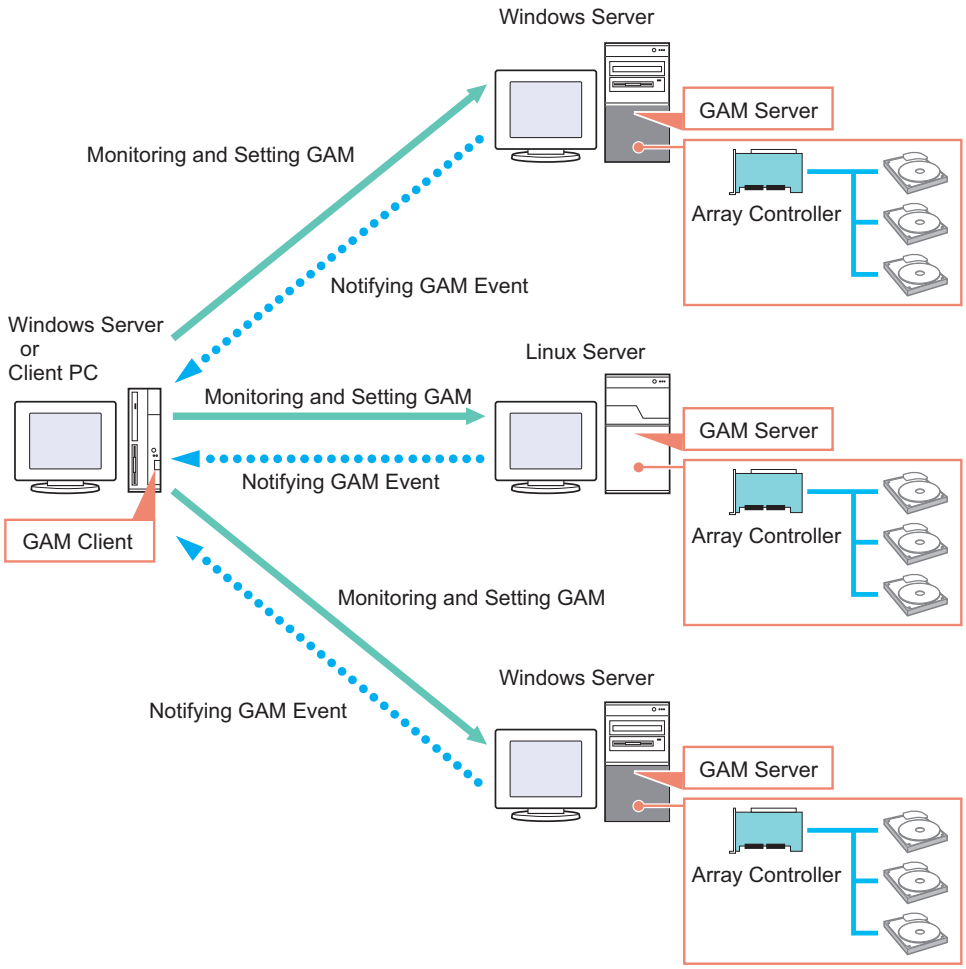



**POINT**

- On Linux servers, install GAM Server and edit the configuration file to set the GAM event recipient and enable storing event logs after the installation. For details, see the Linux manual on the URL sited above.
- 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 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 that GAM Client on the other Windows client manages GAM Server.



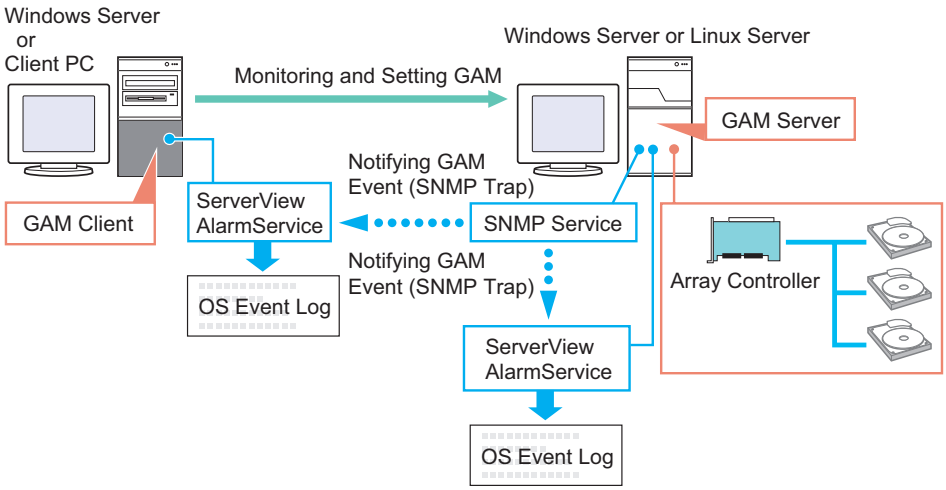

**POINT**

- You need to configure the server receiving GAM events during GAM installation. For details, see step 11 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 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 different versions of GAM Servers coexist, use the newer version of GAM Client than GAM Server.

## ■ Interaction with ServerView AlarmService

The following figure shows the interaction with ServerView AlarmService when GAM Client on the other Windows servers (client) manage 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**

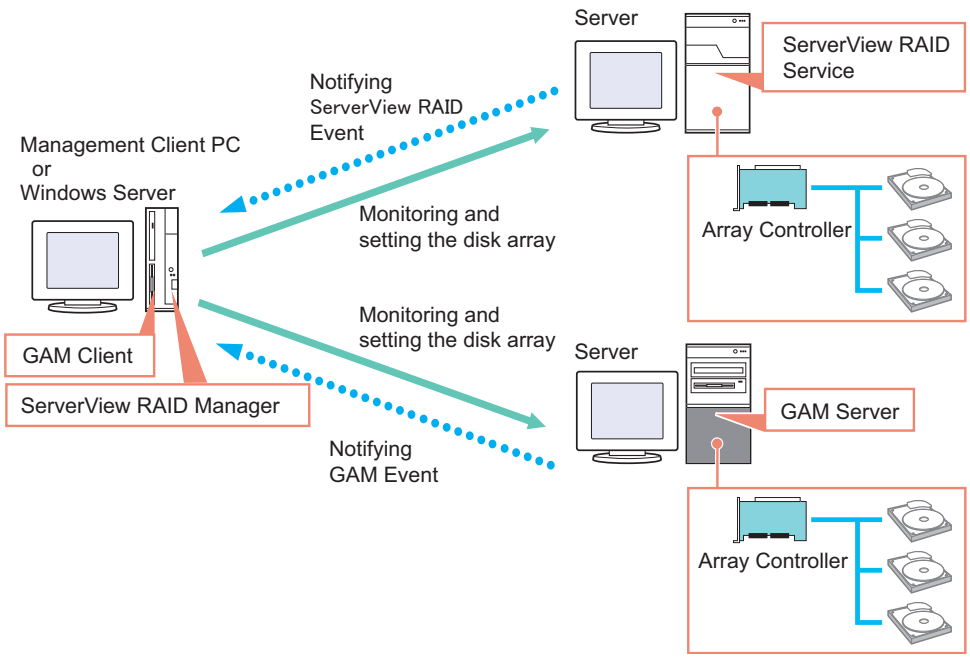
- ServerView must be installed on the GAM Client server/PC as well.

**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

Follow the procedure below 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 "Array Controller Document & Tool CD" provided with this product into the CD/DVD 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 the [Start] button – [Run...]. Enter the following path and click [OK].

[CD/DVD drive]:\RAIDTOOL\GAM\Windows\install.bat

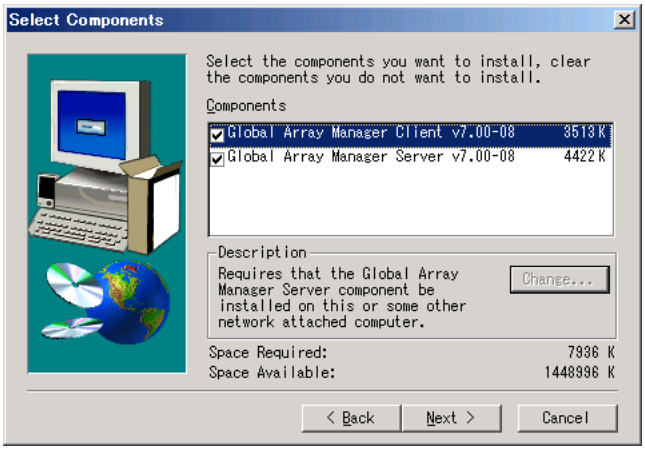
The [Global Array Manager Setup] wizard starts up.

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

The [Software License Agreement] screen appears.

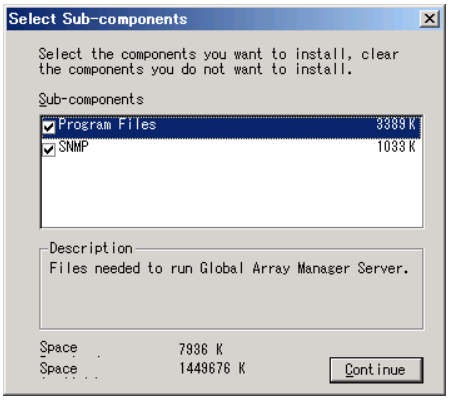
### 5 Click [Yes].

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**

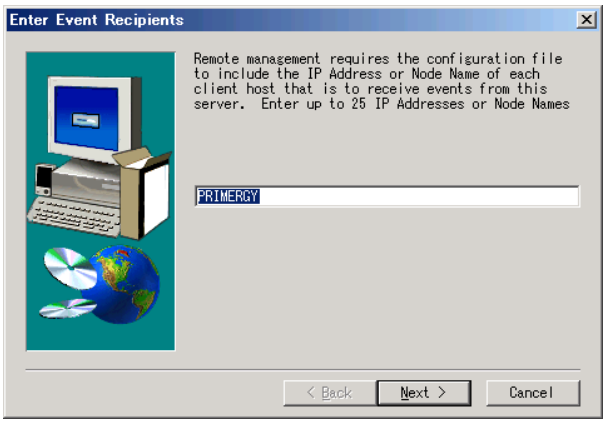
- If GAM is already installed, a warning message will appear to confirm overwriting. After clicking [Cancel] to close the warning message box, click [Cancel] and then [Exit Setup] to quit the GAM setup. If the command prompt is displayed, click the [×] button to close the command prompt. After uninstalling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

Follow the procedure below 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 the [Start] button – [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 the [Start] button – [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 vx.xx.xxxx 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 Setting" (→pg.111) 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.

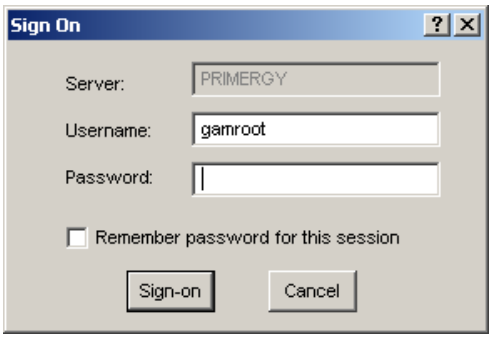
**1** To start GAM, click the [Start] button – [Programs] (or [All Programs] in Windows Server 2003) – [Mylex Global Array Manager Client].

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 "5.1.3 Access Privileges to GAM" (→pg.92).

## 5.3.2 Exiting GAM

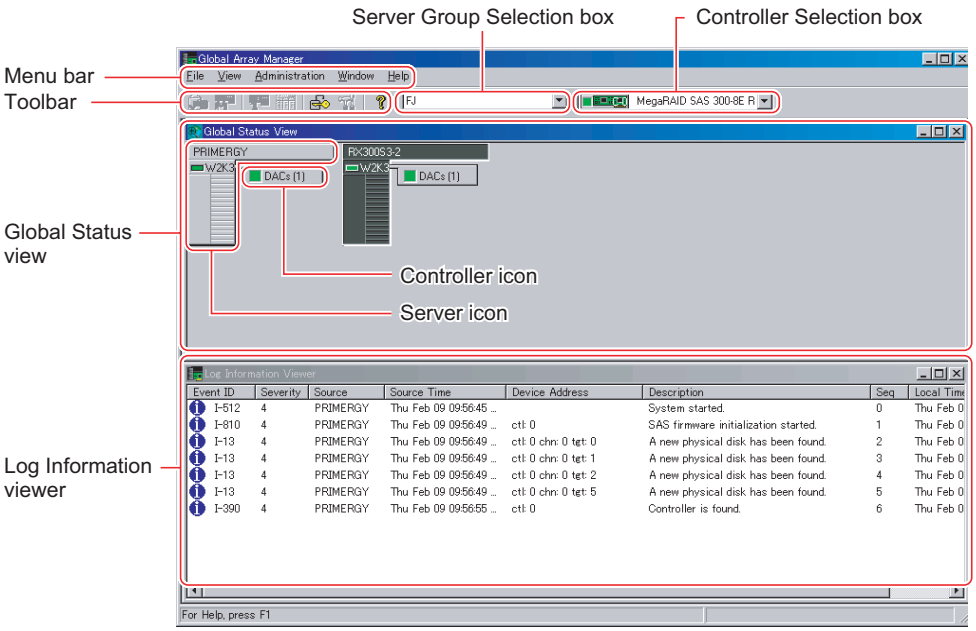
To exit GAM, click [Exit] from [File] in the GAM menu bar.

# 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

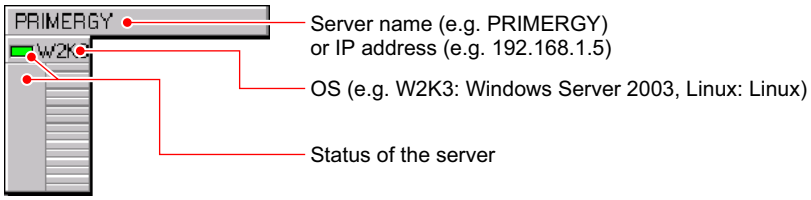
Allows you to select the array controller to be operated. Clicking ▼ displays the onboard array controller connected to the currently selected server, or the controller ID and type (e.g. Integrated Mirroring SAS) of the array card.

## ■ Global Status View

Displays the servers in the currently selected server group.

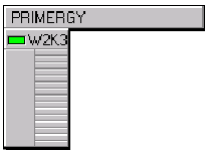
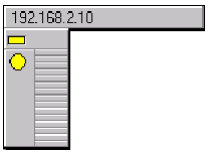
### ● Server icon

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.<br>• Network malfunction<br>• No power on the server<br>• The server IP or host name has been changed.<br>• 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 disks. |
|  | 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.<br>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 disks 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.<br>[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.<br>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.<br>**Note:**<br>▸ 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 disks connected. |
| Advanced Functions | Not supported. |
| Settings | Not supported. |

table: [Administration] menu

| Menu | Function |
|---|---|
| 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.

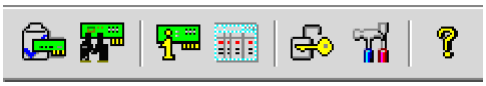


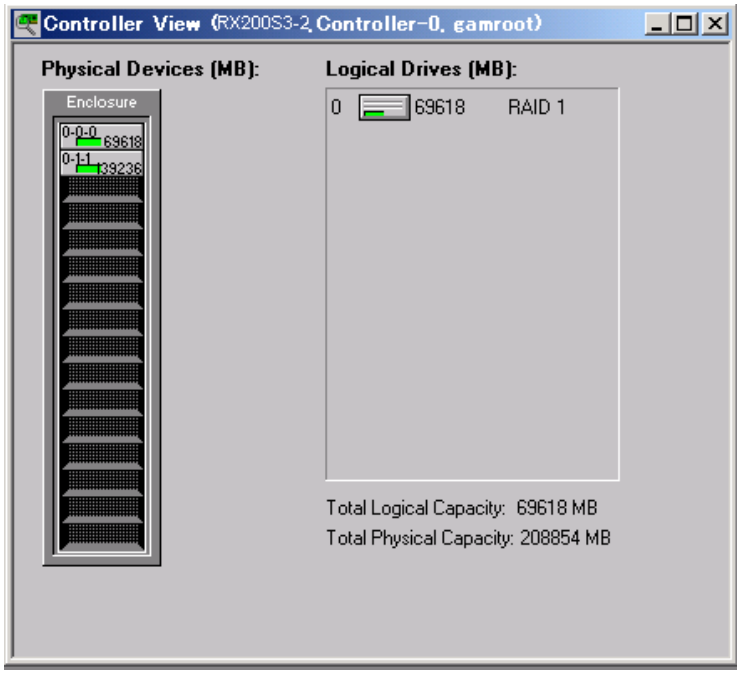
table: Toolbar icons

| 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 disks 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).

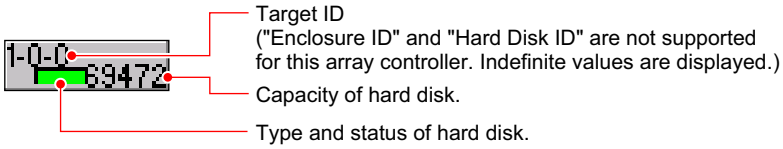
The following window appears.




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

## Hard disks

Displays information about each hard disk.




The hard disk status icon is displayed as follows.

table: Hard disk status icon

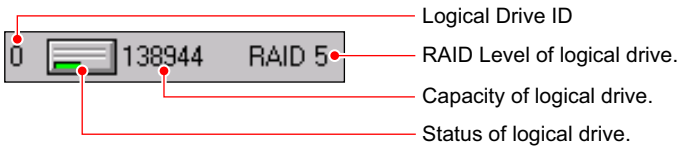
| Icon | Color | Status | Description |
|---|---|---|---|
|  | Green | Online<br>(OnLine) | Normal |
|  | Red | Failure / Offline<br>(Dead / Offline) | The hard disk has a failure, cannot be recognized, or cannot be read and written. |
|  | Yellow | Rebuild<br>(Rebuilding) | Rebuild in progress |
| 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

**POINT**

- Double-click the icon for each hard disk to see more detailed information. For more details, see "5.6.3 Viewing Hard Disk Information" (→pg.115).
- If a hard disk is in an unrecognizable state, detailed information may not be displayed even when double-clicking its hard disk icon.

## Logical drives

Displays information about each logical drive.




The logical drive status icon is displayed as follows.

table: Logical drive status icon

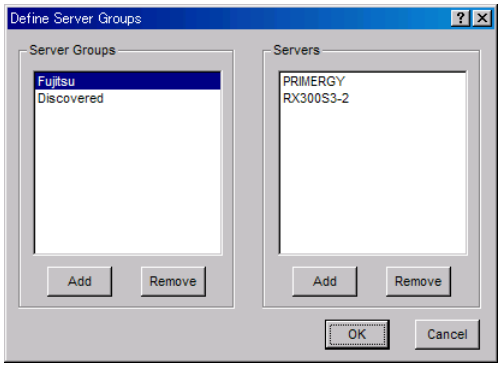
| Icon | Color | Status | Description |
|---|---|---|---|
|  | Green | Online | Normal |
|  | Yellow | Critical | Operating without redundancy |
|  | Red | Offline | Not available |

**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.118).

# 5.5 Server Group and Server Setting

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.114)
- Hard disk information: "5.6.3 Viewing Hard Disk Information" (→pg.115)
- Logical drive information: "5.6.4 Viewing Logical Drive Information" (→pg.118)
- Information about tasks running in the background: "5.6.5 Checking Progress of Background Tasks" (→pg.120)

## 5.6.1 Events

GAM monitors the operation of array controllers and hard disks 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 write events or errors on the event logs in the OS, you need to install ServerView. See the "ServerView User's Guide" bundled with ServerView for the installation and settings.
- 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**

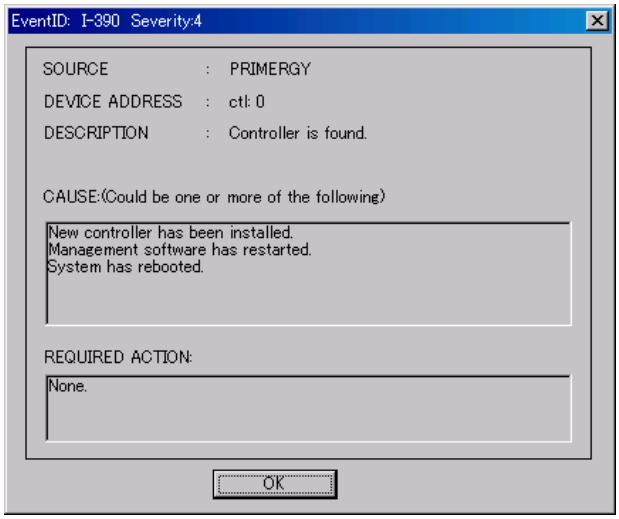
- The event histories displayed in the Log Information Viewer are stored in the file GAM2CL.LOG. This file may be used when investigation is necessary. (Viewing or monitoring of this log file is not supported.)
  GAM2CL.LOG is stored in the following locations.

| | |
|---|---|
| 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 disks 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).

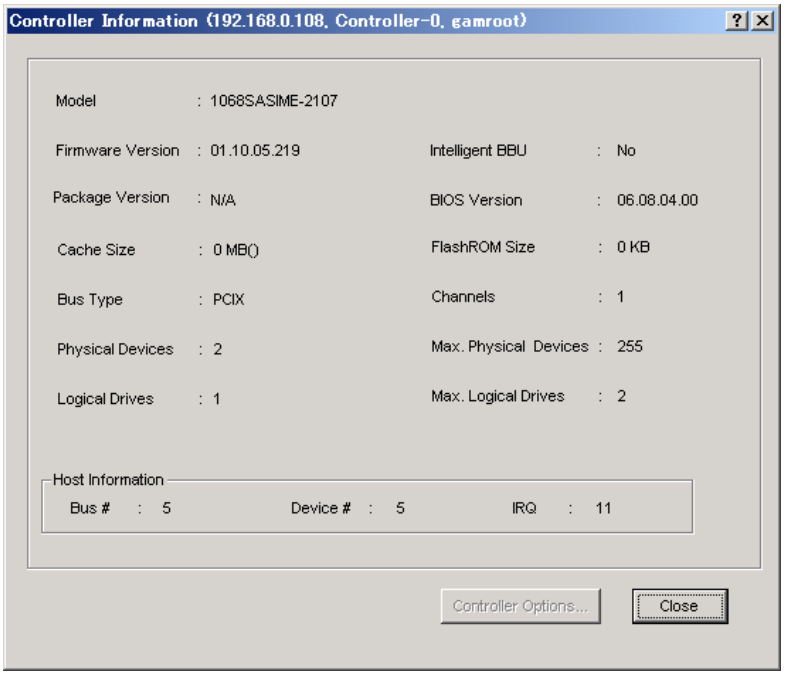
### ■ Displaying detailed information about the array controller

**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 the array controller

The following information is displayed.

table: Detailed information about the array controller

| 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 disks connected to the array controller. |
| Max. Physical Devices | Not supported. |
| Logical Drives | The number of the logical 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 Information

Using Controller View, you can view detailed information about the hard disks 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.

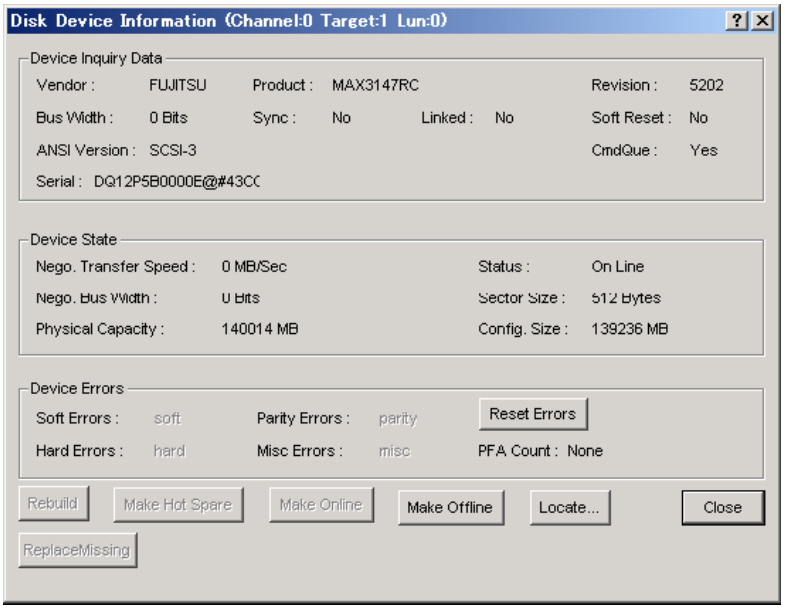
→"5.4.4 Starting Controller View and the Window Layout" (pg.109)

POINT

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

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

Detailed information about the selected hard disk 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 disks

The following information is displayed.

table: Detailed information about hard disks

| Item | Description |
|---|---|
| Vendor | Information about the hard disk vendor. |
| Product | Model number of the hard disk. |
| Revision | The version of the hard disk'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. |
| Slot | The number of the slot where the hard disk is installed. |
| Nego. Transfer Speed | Not supported. |
| Nego. Bus Width | Not supported. |
| Sector Size | The sector size. |
| Physical Capacity | The physical capacity of the hard disk. |
| Config. Size | The hard disk's available capacity when connected to this array controller. |
| Status | The current status of the hard disk.<br>For details about the status, see "● Hard disks" (→pg.110). |

table: Detailed information about hard disks

| Item | Description |
|---|---|
| Soft Errors / Parity Errors / Hard Errors / Misc Errors | Not supported.<br>(The number of recovery attempts made by the array controller for temporary or minor errors. This can be ignored unless the hard disk gets a failure status.) |
| PFA Count | The counter for the S.M.A.R.T. failure predictions for the hard disk. |

## ■ 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 is Failure. Click this button to perform a rebuild of the hard disk.→"5.7 Rebuild" (pg.121)
- [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 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 to indicate the drive's location.
- [ReplaceMissing] button
  Not supported.
- [Close] button
  Closes the detailed hard disk 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.

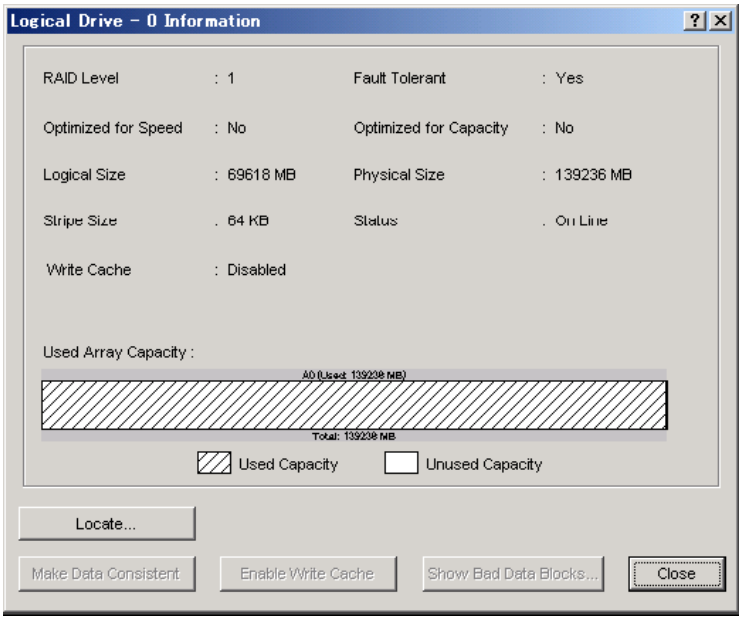
→"5.3 Starting and Exiting GAM" (pg.102)

**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.<br>For details about the status, see "● Logical drives" (→pg.110). |
| 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.

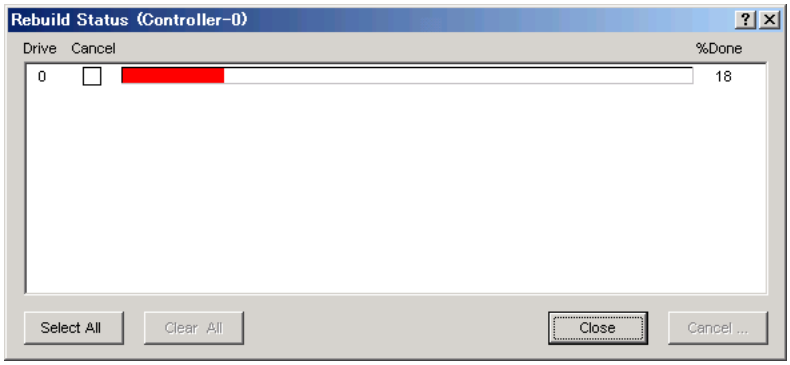
- [Locate] button
  Blinks the failure LED of all the hard disks that compose the logical drive to indicate their locations.
- [Close] button
  Closes the detailed logical drive information window.

## 5.6.5 Checking 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) × 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, follow the procedure below.

IMPORTANT

- Just replacing the hard disk does not execute a rebuild. Make sure to perform the rebuild operation. For how to replace the hard disk and how to perform a rebuild, see "Chapter 6 Replacing Hard Disk" (→pg.123).

**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 with "Failure" state (  ) in the [Controller View] window.

The detailed information about the hard disk 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 and the related logical drives are restored to Online status.


**5** Click [OK] to exit.

# Chapter 6

# Replacing Hard Disk

6

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

# 6.1 How to Replace Hard Disk [ServerView RAID]

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

## 6.1.1 Checking Hard Disk to be Replaced [ServerView RAID]

Check the target hard disk number before replacing it.

**1** Start the ServerView RAID Manager and log in.

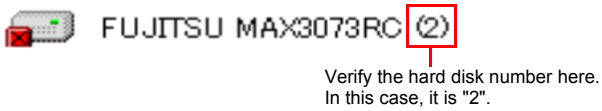
→"4.3 Starting and Exiting ServerView RAID Manager" (pg.65)

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

A failed hard disk is indicated with the / icon.

A hard disk 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 icon.




IMPORTANT

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

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

Detailed information about the selected hard disk 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.

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

If there is a failed hard disk

See "6.1.2 Replacing Failed Hard Disk [ServerView RAID]" (→pg.125) to replace the hard disk.

If there is a hard disk that is predicted to fail

See "6.1.3 Preventive Replacement of Hard Disk [ServerView RAID]" (→pg.127) to replace the hard disk with the failure prediction warning.

IMPORTANT

**When a hard disk failed and another is predicted to fail**

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

POINT

- Failed hard disks can also be confirmed using BIOS Utility. Start BIOS Utility and check the [View Array] view. For more details, see "2.3.2 Viewing Information on Logical Drive and Hard Disk" (→pg.31).

## 6.1.2 Replacing Failed Hard Disk [ServerView RAID]

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

POINT

- For how to remove and install hard disks, see "User's Guide" located on "PRIMERGYStartup Disc supplied with the server.

IMPORTANT

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

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

Adding one to the slot number identified in steps 1 to 2 in →"6.1.1 Checking Hard Disk to be Replaced [ServerView RAID]" (pg.124) 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 failure LED is lit for the bay corresponding to the failed hard disk on the server.

For the locations of the bays and of the hard disk failure LED, see "User's Guide" located on "PRIMERGY Startup Disc supplied with the server.

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

For how to remove hard disks, see "User's Guide" located on "PRIMERGY Startup Disc supplied with the server.

IMPORTANT

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

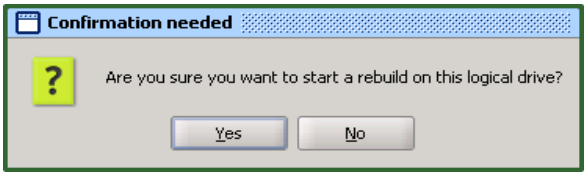
**4** Wait at least one minute until the hard disk motor has stopped spinning.

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

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

**7** In the tree view, select the newly installed hard disk ( ) 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'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 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 where the rebuild was performed.)
  - In the Event Window

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

  - For OS Event Log

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

- For the approximate time to complete the rebuild, see "■ Estimated time for rebuild" (→pg.16) or "■ How to calculate estimated time for background task" (→pg.88).
- If the system restarts or shuts down during rebuild, the rebuild is resumed from where it was stopped the next time.

## 6.1.3 Preventive Replacement of Hard Disk [ServerView RAID]

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

POINT

- For how to remove and install hard disks, see "User's Guide" located on "PRIMERGY Startup Disc supplied with the server.

IMPORTANT

- Replace the failed hard disk 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.
- When two or more hard disks are predicted to fail, replace one drive at a time.
- If any hard disk is being rebuilt, wait until the rebuild process is finished.

### ■ Preventive replacement of hard disk with RAID 1 configuration

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

**1** Using ServerView RAID Manager, check the drive number of the hard disk 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 Hard Disk to be Replaced [ServerView RAID]" (→pg.124) 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 at this point, replace that drive first, referring to "6.1.2 Replacing Failed Hard Disk [ServerView RAID]" (→pg.125). If any hard disk is being rebuilt, wait until the rebuild process is finished.

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

Detailed information about the selected hard disk 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 on the server.

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

**POINT**

- The hard disk confirmed here has received a failure prediction warning (the target hard disk 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, 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, 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 has changed to "Offline" in the object window.

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

For how to remove hard disks, see "User's Guide" located on "PRIMERGY Startup Disc supplied with the server.

IMPORTANT

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

POINT

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

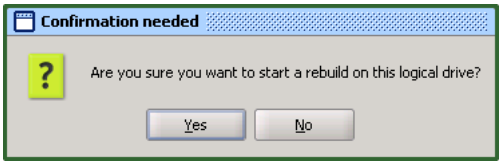
**9** Wait at least one minute until the hard disk motor has stopped spinning.

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

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

**12** In the tree view, select the newly installed hard disk (  ) 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'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 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 where the rebuild was performed.)
  - In the Event Window

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

- If the system restarts or shuts down during rebuild, the rebuild is resumed from where it was stopped the next time.
- For the approximate time to complete the rebuild, see "■ Estimated time for rebuild" (→pg.16) or "■ How to calculate estimated time for background task" (→pg.88).

# 6.2 How to Replace Hard Disk [GAM]

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

## 6.2.1 Checking Hard Disk to be Replaced [GAM]

Check the slot number of the target hard disk 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.

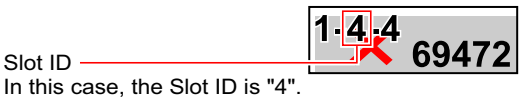
→"5.4.4 Starting Controller View and the Window Layout" (pg.109)

**3** Check the displayed icon for the hard disk.

A failed hard disk is indicated with the  icon.

A hard disk 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 icon.




IMPORTANT

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

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

Detailed information about the selected hard disk 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.

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

If there is a failed hard disk

See "6.2.2 Replacing Failed Hard Disk [GAM]" (→pg.132) to replace the hard disk.

If there is a hard disk that is predicted to fail

See "6.2.3 Preventive Replacement of Hard Disk [GAM]" (→pg.134) to replace the hard disk with the failure prediction warning.

IMPORTANT

**When a hard disk failed and another is predicted to fail**

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

POINT

- Failed hard disks can also be confirmed using BIOS Utility. Start BIOS Utility and check the [View Array] view. For more details, see "2.3.2 Viewing Information on Logical Drive and Hard Disk" (→pg.31).

## 6.2.2 Replacing Failed Hard Disk [GAM]

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

POINT

- For how to remove and install hard disks, see "User's Guide" located on "PRIMERGY Startup Disc supplied with the server.

IMPORTANT

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

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

Adding one to the slot number identified in steps 1 to 3 in "6.2.1 Checking Hard Disk to be Replaced [GAM]" (→pg.131) 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 failure LED is lit for the bay corresponding to the failed hard disk on the server.

For the location of the bays and of the hard disk failure LED, see "User's Guide" located on "PRIMERGY Startup Disc supplied with the server.

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

For how to remove hard disks, see "User's Guide" located on "PRIMERGY Startup Disc supplied with the server.

IMPORTANT

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

**4** Wait at least one minute until the hard disk motor has stopped spinning.

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

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

**7** Double-click the icon for the newly installed hard disk 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'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 has changed to "Online" in the [Disk Device Information] window (→pg.115) 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.)
  - 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 "■ Estimated time for rebuild" (→pg.16) or "■ Calculating the approximate time needed for a background task" (→pg.120).
- If the system restarts or shuts down during rebuild, the rebuild is resumed from where it was stopped the next time.

## 6.2.3 Preventive Replacement of Hard Disk [GAM]

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

POINT

- For how to remove and install hard disks, see "User's Guide" located on "PRIMERGY Startup Disc supplied with the server.

IMPORTANT

- Replace the failed hard disk 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.
- If any hard disk is being rebuilt, wait until the rebuild process is finished.

### ■ Preventive replacement a hard disk with a RAID 1 configuration

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

**1** Using GAM, check the slot number of the hard disk 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 Hard Disk to be Replaced [GAM]" (→pg.131) results in the bay number.

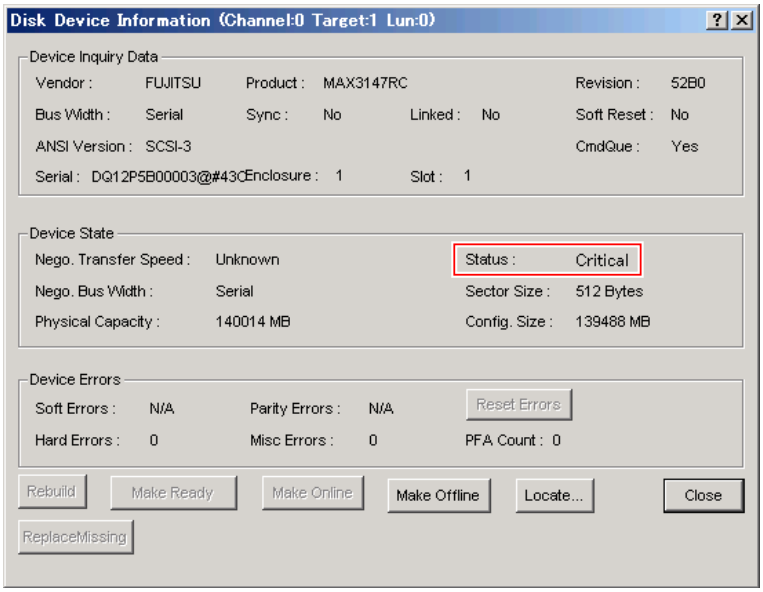
Example: If the slot number is 4, the location of the drive is bay 5.

IMPORTANT

- If there is a failed hard disk at this point, replace that drive first, referring to "6.2.2 Replacing Failed Hard Disk [GAM]" (→pg.132). If any hard disk is being rebuilt, wait until the rebuild process is finished.

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

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




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

The hard disk failure LED corresponding to the hard disk starts to flash or light up.
For the location of the bays and of the hard disk failure LED, see "User's Guide" located on "PRIMERGY Startup Disc supplied with the server.

**POINT**

- The hard disk confirmed here has received a failure prediction warning (the target hard disk 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 identified in Step 3 about an inch (1 to 3 cm) to disconnect it from the connector.

For how to remove hard disks, see "User's Guide" located on "PRIMERGY Startup Disc supplied with the server.

IMPORTANT

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

POINT

- Although a pop-up of "Error returned by firmware." may appear when the hard disk 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 motor has stopped spinning.

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

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

**11** Double-click the icon for the newly installed hard disk 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'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 has changed to "Online" in the [Disk Device Information] window (→pg.115) of GAM.

POINT

- If the system restarts or shuts down during rebuild, the rebuild is resumed from where it was stopped the next time.
- If the [Controller View] display is not updated, execute [Scan Devices] from the [Administration] menu.

# Appendix

This section explains the event codes for ServerView RAID and GAM, and the notes on the array controller usage.

# 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<br>As for this product, the names are "LSI 1068SASIME ...", "LSI 1064ESASIME ...", and "RAID 0/1 SAS 4P". |
| Disk %s | Number of the hard disk |
| 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 "User's Guide" located on "PRIMERGY Startup Disc" 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.<br>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.<br>Another client has obtained Write Access mode. | None. |
| 10017 | INFORMATIONAL | Adapter %s: SCSI sense data on disk (%s) available: %s (Server %s) | A hard disk reported sense information. | There is no problem as long as the target hard disk is online because the controller has performed a recovery. |
| 10021 | INFORMATIONAL | Adapter %s: Disk (%s) marked online (Server %s) | The hard disk status is now online. | None. |
| 10022 | CRITICAL | Adapter %s: Disk (%s) marked offline (Server %s) | The hard disk status is now offline. | None. |
| 10023 | MAJOR | Adapter %s: Disk (%s) timed out (Server %s) | The hard disk has been timed out. | Check that the hard disk is connected properly.<br>If the hard disk has failed, replace it and perform a rebuild. |
| 10024 | INFORMATIONAL | Adapter %s: Global hot spare created on disk (%s) (Server %s) | A global hot spare has been created. | None. |
| 10025 | MINOR | Adapter %s: Global hot spare deleted on disk (%s) (Server %s) | A global hot spare has been disabled. | None. |
| 10026 | INFORMATIONAL | Adapter %s: Dedicated hot spare created on disk (%s) (Server %s) | A dedicated spare disk drive has been created. | Dedicataed spare disks are not supported. Make sure to properly set a spare disk. |
| 10027 | MINOR | Adapter %s: Dedicated hot spare deleted on disk (%s) (Server %s) | The dedicated spare disk has been disabled. | None. |
| 10028 | INFORMATIONAL | Adapter %s: Disk (%s) marked available (Server %s) | The hard disk status is now available. | None. |
| 10029 | INFORMATIONAL | Adapter %s: Rebuild on disk (%s) started (Server %s) | Rebuilding of the hard disk has started. | None. |

table: A list of ServerView RAID event logs

| ID | Severity | Log Entry | Description | Recovery Action |
|---|---|---|---|---|
| 10030 | MAJOR | Adapter %s: Rebuild on disk (%s) failed (Server %s) | Rebuilding the hard disk has failed. | Check the present status of the logical drive.<br>• If in the critical state: Replace the failed hard disk and perform a rebuild again.<br>• If in the offline state: Contact an office listed in the "Contact Information" of the "Start Guide". |
| 10032 | INFORMATIONAL | Adapter %s: New disk (%s) detected (Server %s) | A new hard disk has been detected. | None. |
| 10033 | MINOR | Adapter %s: Disk (%s) removed (Server %s) | A hard disk was removed. | Replace and rebuild the hard disk. |
| 10038 | MAJOR | Adapter %s: Error on disk (%s) detected (Server %s) | An error has been detected on a hard disk. | Replace the hard disk failure, 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 disk (%s) (Server %s) | I/O retry for the hard disk has been performed. | There is no problem as long as there is no hard disk failure, because the firmware has performed a recovery. |
| 10041 | MAJOR | Adapter %s: ECC Error on disk (%s) (Server %s) | An ECC error on the hard disk has been detected. | There is no problem as long as the target hard disk is online because the controller has performed a recovery. |
| 10043 | MAJOR | Adapter %s: Media error on disk (%s) (Server %s) | A media error has been detected on the hard disk. | There is no problem as long as the target hard disk is online because the controller has performed a recovery. |
| 10044 | MINOR | Adapter %s: S.M.A.R.T. warning on disk (%s) (Server %s) | A failure has been predicted for a hard disk. | Replace the hard disk as a preventive measure. |
| 10045 | MINOR | Adapter %s: S.M.A.R.T. error on disk (%s) (Server %s) | A failure has been predicted for a hard disk. | Replace the hard disk 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. |

table: A list of ServerView RAID event logs

| ID | Severity | Log Entry | Description | Recovery Action |
|---|---|---|---|---|
| 10057 | MAJOR | Adapter %s: Rebuild failed on logical drive %s (Server %s) | Rebuilding of the logical drive has failed. | Check the present status of the logical drive.<br>• If in the critical state: Replace the failed hard disk and perform a rebuild again.<br>• If in the offline state: Contact an office listed in the "Contact Information" of the "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. |
| 10078 | MAJOR | Adapter %s: Logical drive %s degraded (Server %s) | The logical drive status is now degraded. | Replace and rebuild the failed hard disk. |
| 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 deleted. | None. |
| 10082 | INFORMATIONAL | Adapter %s: Logical drive %s operational (Server %s) | The logical drive status is now online. | None. |
| 10085 | INFORMATIONAL | Adapter %s: Initialization started on logical drive %s (Server %s) | Foreground initialization of the logical drive has started. | None. (Foreground Initialization is not supported.) |
| 10086 | INFORMATIONAL | Adapter %s: Initialization finished on logical drive %s (Server %s) | Foreground Initialization of the logical drive has been completed. | None. (Foreground Initialization is not supported.) |
| 10087 | INFORMATIONAL | Adapter %s: BGI started on logical drive %s (Server %s) | Background initialization of the logical drive has started. | None. |
| 10088 | INFORMATIONAL | Adapter %s: BGI finished on logical drive %s (Server %s) | Background initialization of the logical drive has been completed. | None. |
| 10089 | MINOR | Adapter %s: BGI canceled on logical drive %s (Server %s) | Background initialization of the logical drive has been canceled. | None. (Background initialization resumes automatically after a certain period of time.) |
| 10090 | MINOR | Adapter %s: Initialization canceled on logical drive %s (Server %s) | Foreground initialization of the logical drive has been canceled. | None. (Foreground Initialization is not supported.) |
| 10095 | INFORMATIONAL | Adapter %s: Alarm enabled (Server %s) | An alarm has been enabled. | An alarm is not supported. Check array controller settings. |

table: A list of ServerView RAID event logs

| ID | Severity | Log Entry | Description | Recovery Action |
|---|---|---|---|---|
| 10096 | MINOR | Adapter %s: Alarm disabled (Server %s) | An alarm has been disabled. | None. |
| 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: BIOS stop on error enabled (Server %s) | Stop on Error has been enabled. | None. |
| 10117 | INFORMATIONAL | Adapter %s: BIOS stop on error disabled (Server %s) | Stop on Error has been disabled. | None. |
| 10131 | INFORMATIONAL | Adapter %s: S.M.A.R.T. poll interval changed (Server %s) | S.M.A.R.T. Poll Interval 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. |
| 10170 | MAJOR | Reboot required (Server %s) | Reboot is required. | Restart the system. |
| 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. |
| 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. |

table: A list of ServerView RAID event logs

| ID | Severity | Log Entry | Description | Recovery Action |
|---|---|---|---|---|
| 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 in seconds. | 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. |
| 10221 | MAJOR | Adapter %s: Multi-bit ECC error: ECAR=%s | A multi-bit error has been detected. | Replace the cache memory or the battery backup unit. If this error occurs again, contact an office listed in the "Contact Information" of "Start Guide". |
| 10222 | MAJOR | Adapter %s: Single-bit ECC error: ECAR=%s | A single-bit error has been detected. | Replace the cache memory or the battery backup unit. If this error occurs again, contact an office listed in the "Contact Information" of "Start Guide". |
| 10223 | MAJOR | Adapter %s: Not enough adapter memory (Server %s) | There is not a sufficient amount of Controller memory. | Contact an office listed in the "Contact Information" of "Start Guide". |
| 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. |

table: A list of ServerView RAID event logs

| ID | Severity | Log Entry | Description | Recovery Action |
|---|---|---|---|---|
| 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. |
| 10240 | MAJOR | Adapter %s: Initialization failed on logical drive %s (Server %s) | Foreground initialization has failed. | None. (Foreground initialization on the OS is not supported.) |
| 10241 | INFORMATIONAL | Adapter %s: Initialization progress on logical drive %s is %s (Server %s) | Foreground initialization is in progress. | None. (Foreground initialization on the OS is not supported.) |
| 10243 | INFORMATIONAL | Adapter %s: Full initialization started on logical drive %s (Server %s) | Full initialization has started. | 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 disk (%s) (error %s) (Server %s) | An error has occurred on the hard disk. | Replace and rebuild the failed hard disk. |
| 10259 | MAJOR | Adapter %s: Disk (%s) is not supported (Server %s) | An unsupported hard disk has been detected. | Use a supported hard disk. |
| 10263 | MINOR | Adapter %s: Predictive failure: Disk (%s) (Server %s) | A failure has been predicted for a hard disk. | Replace the hard disk as a preventive measure. |
| 10264 | MAJOR | Adapter %s: Puncturing bad block on disk (%s) at LBA %s (Server %s) | A media error has been detected in the source hard disk 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 disk (%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 disk (%s) (Server %s) | The rebuild of the hard disk has been completed. | None. |
| 10268 | INFORMATIONAL | Adapter %s: Rebuild progress on disk (%s) is %s (Server %s) | The rebuild is in progress. | None. |

table: A list of ServerView RAID event logs

| ID | Severity | Log Entry | Description | Recovery Action |
|---|---|---|---|---|
| 10269 | INFORMATIONAL | Adapter %s: Rebuild resumed on disk (%s) (Server %s) | The rebuild has resumed. | None. |
| 10270 | INFORMATIONAL | Adapter %s: Rebuild automatically started on disk (%s) (Server %s) | The rebuild of the hard disk has started automatically. | None. |
| 10272 | MAJOR | Adapter %s: Reassign write operation failed on disk (%s) at LBA %s (Server %s) | The reassign operation has failed. | Replace and rebuild the failed hard disk. |
| 10273 | MAJOR | Adapter %s: Unrecoverable medium error during rebuild on disk (%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 disk (%s) at LBA %s (Server %s) | A media error has been recovered. | None. |
| 10275 | MAJOR | Adapter %s: Unrecoverable medium error during recovery on disk (%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: Disk (%s) | Sense information of the hard disk has been reported. | There is no problem as long as the target hard disk is online because the controller has performed recovery. |
| 10277 | INFORMATIONAL | Adapter %s: State change on disk (%s) from available to available (Server %s) | The hard disk is now available. | None. |
| 10278 | INFORMATIONAL | Adapter %s: State change by user on disk (%s) from available to available (Server %s) | The hard disk status is now available. | 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 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 and cables. If the system connections are correct, yet a hard disk has failed, replace the hard disk and perform a rebuild.<br>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 connection configuration. 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 cannot be 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 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 disk (%s) (Server %s) | The hard disk cannot be accessed. | Replace and rebuild the failed hard disk. |
| 10297 | MINOR | Adapter %s: Marking logical drive %s inconsistent due to active writes at shutdown (Server %s) | The consistency of the logical drive has been lost due to the shutdown during the Write operation. | None.<br>Automatically restored with Write Journaling. |
| 10336 | MINOR | Adapter %s: Disk (%s) too small to be used for auto rebuild (Server %s) | There is not a sufficient amount of hard disk capacity to perform a rebuild. | Replace the hard disk with sufficient capacity. |
| 10339 | INFORMATIONAL | Adapter %s: Bad block table on disk (%s) is 80% full (Server %s) | The Bad Block Table use rate has exceeded 80%. | Replace the hard disk as a preventive measure. |

table: A list of ServerView RAID event logs

| ID | Severity | Log Entry | Description | Recovery Action |
|---|---|---|---|---|
| 10340 | MINOR | Adapter %s: Bad block table on disk (%s) is full; unable to log Block %s (Server %s) | The Bad Block Table is full. | Replace the hard disk as a preventive measure. |
| 10344 | MINOR | Adapter %s: Single-bit ECC error: ECAR=%s | A single-bit error has been detected. | Replace the cache memory or the battery backup unit. If this error occurs again, contact an office listed in the "Contact Information" of "Start Guide". |
| 10345 | MINOR | Adapter %s: Single-bit ECC error: ECAR=%s | A single-bit error has been detected. | Replace the cache memory or the battery backup unit. If this error occurs again, contact an office listed in the "Contact Information" of "Start Guide". |
| 10346 | INFORMATIONAL | Adapter %s: Single-bit ECC error: ECAR=%s | A single-bit error has been detected. | Replace the cache memory or the battery backup unit. If this error occurs again, contact an office listed in the "Contact Information" of "Start Guide". |
| 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 finished %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 finished (Server %s) | The self-test has been completed. | None. |
| 10359 | INFORMATIONAL | Adapter %s: Foreign configuration detected (Server %s) | Foreign Configuration has been detected. | None.<br>(Replace and rebuild the failed hard disks.) |
| 10360 | INFORMATIONAL | Adapter %s: Foreign configuration imported (Server %s) | Foreign Configuration has been imported. | None. |

table: A list of ServerView RAID event logs

| ID | Severity | Log Entry | Description | Recovery Action |
|---|---|---|---|---|
| 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 system, and replace the failed hard disk and perform a rebuild.<br>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. |
| 10366 | MINOR | Adapter %s: SAS port %s | The errors in the SAS port have exceeded the threshold. | Contact an office listed in the "Contact Information" of "Start Guide". |
| 10367 | MINOR | Adapter %s: Bad block reassigned on disk (%s) from LBA %s to LBA %s (Server %s) | A bad block of the hard disk 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: Disk (%s) on array %s row %s marked missing (Server %s) | The hard disk has been marked as missing. | Replace and rebuild the failed hard disk. |
| 10377 | MINOR | Adapter %s: Disk (%s) is not certified (Server %s) | The hard disk is not a certified drive. | Replace the hard disk with a certified drive. |
| 10378 | MINOR | Adapter %s: Dirty cache data discarded by user (Server %s) | Dirty cache data has been discarded by the user's operation. | Perform Make Data Consistent. |
| 10379 | MINOR | Adapter %s: Disks missing from configuration at boot (Server %s) | An undetected hard disk during startup exists. | Replace and rebuild the failed hard disk. |
| 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 and rebuild the failed hard disk. |

table: A list of ServerView RAID event logs

| ID | Severity | Log Entry | Description | Recovery Action |
|---|---|---|---|---|
| 10382 | MINOR | Adapter %s: Previous configuration completely missing at boot (Server %s) | The previous configuration cannot be found during startup. | Turn off the server and check the connection of the hard disks, cables, the power supply, etc..<br>If this error occurs again, contact an office listed in the "Contact Information" of "Start Guide". |
| 10386 | INFORMATIONAL | Adapter %s: Disk (%s) rebuild not possible as SAS/SATA is not supported in an array (Server %s) | Rebuilding of the hard disk is not possible because SAS/SATA is not supported. | None.<br>(SATA HDD is not supported.) |
| 10388 | MAJOR | Adapter %s: Logical drive %s partially degraded (Server %s) | The logical drive status is now degraded. | Replace and rebuild the failed hard disk. |
| 10390 | INFORMATIONAL | Adapter %s: Coercion mode changed (Server %s) | The coercion mode has been changed. | None. |
| 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 disks are not supported by the RAID key. | Contact an office listed in the "Contact Information" of "Start Guide". |
| 10402 | MINOR | Adapter %s: Disks missing (Server %s) | hard disks do not exist. | Replace and rebuild the failed hard disk. |
| 10403 | INFORMATIONAL | Adapter %s: Rebuild rate changed to %s%% (Server %s) | Rebuild Rate has been changed. | None. |
| 10405 | INFORMATIONAL | Adapter %s: S.M.A.R.T. poll interval changed to %s min (Server %s) | S.M.A.R.T. Poll Interval has been changed. | None. |
| 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 degraded. | Replace and rebuild the failed hard disk. |
| 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 and rebuild the failed hard disk. |
| 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 degraded 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 degraded. | Replace and rebuild the failed hard disk. |

table: A list of ServerView RAID event logs

| ID | Severity | Log Entry | Description | Recovery Action |
|---|---|---|---|---|
| 10417 | MAJOR | Adapter %s: State change on logical drive %s from degraded to partially degraded (Server %s) | The logical drive status is now degraded. | Replace and rebuild the failed hard disk.. |
| 10418 | CRITICAL | Adapter %s: State change on logical drive %s from degraded to failed (Server %s) | The logical drive status has changed from degraded 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 degraded 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 degraded. | Replace and rebuild the failed hard disk. |
| 10421 | MAJOR | Adapter %s: State change on logical drive %s from partially degraded to partially degraded (Server %s) | The logical drive status is now degraded. | Replace and rebuild the failed hard disk. |
| 10422 | CRITICAL | Adapter %s: State change on logical drive %s from partially degraded to failed (Server %s) | The logical drive status has changed from degraded to offline. | Contact an office listed in the "Contact Information" of "Start Guide". |
| 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 degraded. | Replace and rebuild the failed hard disk. |
| 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 degraded. | Replace and rebuild the failed hard disk. |
| 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 disk (%s) from available to failed (Server %s) | The hard disk status has changed from available to failed. | Replace the failed hard disk. |
| 10428 | INFORMATIONAL | Adapter %s: State change by user on disk (%s) from available to hot spare (Server %s) | The hard disk has changed from unused to a spare disk. | None. |
| 10429 | INFORMATIONAL | Adapter %s: State change by user on disk (%s) from available to rebuilding (Server %s) | The hard disk status has changed from available to rebuilding. | None. |

table: A list of ServerView RAID event logs

| ID | Severity | Log Entry | Description | Recovery Action |
|---|---|---|---|---|
| 10430 | INFORMATIONAL | Adapter %s: State change by user on disk (%s) from available to operational (Server %s) | The hard disk status has changed from available to operational. | None. |
| 10431 | INFORMATIONAL | Adapter %s: State change by user on disk (%s) from failed to available (Server %s) | The hard disk status has changed from failed to available. | None. |
| 10432 | CRITICAL | Adapter %s: State change by user on disk (%s) from failed to failed (Server %s) | The hard disk status is now failed. | Replace and rebuild the failed hard disk. |
| 10433 | INFORMATIONAL | Adapter %s: State change by user on disk (%s) from failed to hot spare (Server %s) | The hard disk has changed from the failed to a spare disk. | None. (HotSpare is not supported.) |
| 10434 | INFORMATIONAL | Adapter %s: State change by user on disk (%s) from failed to rebuilding (Server %s) | The hard disk status has changed from failed to rebuilding. | None. |
| 10435 | INFORMATIONAL | Adapter %s: State change by user on disk (%s) from failed to operational (Server %s) | The hard disk status has changed from failed to operational. | None. |
| 10436 | INFORMATIONAL | Adapter %s: State change by user on disk (%s) from hot spare to available (Server %s) | The hard disk has changed from a spare disk to the available. | None. (HotSpare is not supported.) |
| 10437 | CRITICAL | Adapter %s: State change by user on disk (%s) from hot spare to failed (Server %s) | The hard disk has changed from a spare disk to the failed. | Replace the failed hard disk and configure the new drive as a HotSpare drive. (HotSpare is not supported.) |
| 10438 | INFORMATIONAL | Adapter %s: State change by user on disk (%s) from hot spare to hot spare (Server %s) | The hard disk is now a spare disk. | None. (HotSpare is not supported.) |
| 10439 | INFORMATIONAL | Adapter %s: State change by user on disk (%s) from hot spare to rebuilding (Server %s) | The hard disk has changed from a spare disk to rebuild. | None. (HotSpare is not supported.) |
| 10440 | INFORMATIONAL | Adapter %s: State change by user on disk (%s) from hot spare to operational (Server %s) | The hard disk status has changed from a spare disk to operational. | None. (HotSpare is not supported.) |
| 10441 | INFORMATIONAL | Adapter %s: State change by user on disk (%s) from rebuilding to available (Server %s) | The hard disk status has changed from rebuilding to available. | None. |
| 10442 | CRITICAL | Adapter %s: State change by user on disk (%s) from rebuilding to failed (Server %s) | The hard disk status has changed from rebuilding to failed. | Replace and rebuild the failed hard disk. |

table: A list of ServerView RAID event logs

| ID | Severity | Log Entry | Description | Recovery Action |
|---|---|---|---|---|
| 10443 | INFORMATIONAL | Adapter %s: State change by user on disk (%s) from rebuilding to hot spare (Server %s) | The hard disk status has changed from rebuilding to a spare disk. | None. (HotSpare is not supported.) |
| 10444 | INFORMATIONAL | Adapter %s: State change by user on disk (%s) from rebuilding to rebuilding (Server %s) | The hard disk status is now rebuilding. | None. |
| 10445 | INFORMATIONAL | Adapter %s: State change by user on disk (%s) from rebuilding to operational (Server %s) | The hard disk status has changed from rebuilding to operational. | None. |
| 10446 | INFORMATIONAL | Adapter %s: State change by user on disk (%s) from operational to available (Server %s) | The hard disk status has changed from operational to available. | None. |
| 10447 | CRITICAL | Adapter %s: State change by user on disk (%s) from operational to failed (Server %s) | The hard disk status has changed from operational to failed. | Replace and rebuild the failed hard disk. |
| 10448 | INFORMATIONAL | Adapter %s: State change by user on disk (%s) from operational to hot spare (Server %s) | The hard disk status has changed from operational to a spare disk. | None. |
| 10449 | INFORMATIONAL | Adapter %s: State change by user on disk (%s) from operational to rebuilding (Server %s) | The hard disk status has changed from operational to rebuilding. | None. |
| 10450 | INFORMATIONAL | Adapter %s: State change by user on disk (%s) from operational to operational (Server %s) | The hard disk status is now operational. | None. |
| 10451 | CRITICAL | Adapter %s: State change on disk (%s) from available to failed (Server %s) | The hard disk status has changed from available to failed. | Replace the failed hard disk. |
| 10452 | INFORMATIONAL | Adapter %s: State change on disk (%s) from available to hot spare (Server %s) | The hard disk status has changed from available to a spare disk. | None. |
| 10453 | INFORMATIONAL | Adapter %s: State change on disk (%s) from available to rebuilding (Server %s) | The hard disk status has changed from available to rebuilding. | None. |
| 10454 | INFORMATIONAL | Adapter %s: State change on disk (%s) from available to operational (Server %s) | The hard disk status has changed from available to operational. | None. |
| 10455 | INFORMATIONAL | Adapter %s: State change on disk (%s) from failed to available (Server %s) | The hard disk status has changed from failed to available. | None. |
| 10456 | CRITICAL | Adapter %s: State change on disk (%s) from failed to failed (Server %s) | The hard disk status is now failed. | Replace and rebuild the failed hard disk. |

table: A list of ServerView RAID event logs

| ID | Severity | Log Entry | Description | Recovery Action |
|---|---|---|---|---|
| 10457 | INFORMATIONAL | Adapter %s: State change on disk (%s) from failed to hot spare (Server %s) | The hard disk status has changed from failed to a spare disk. | None. (HotSpare is not supported.) |
| 10458 | INFORMATIONAL | Adapter %s: State change on disk (%s) from failed to rebuilding (Server %s) | The hard disk status has changed from failed to rebuilding. | None. |
| 10459 | INFORMATIONAL | Adapter %s: State change on disk (%s) from failed to operational (Server %s) | The hard disk status has changed from failed to operational. | None. |
| 10460 | INFORMATIONAL | Adapter %s: State change on disk (%s) from hot spare to available (Server %s) | The hard disk status has changed from a spare disk to available. | None. |
| 10461 | CRITICAL | Adapter %s: State change on disk (%s) from hot spare to failed (Server %s) | The hard disk status has changed from a spare disk to failed. | Replace the failed hard disk and configure the new drive as a spare disk drive. (HotSpare is not supported.) |
| 10462 | INFORMATIONAL | Adapter %s: State change on disk (%s) from hot spare to hot spare (Server %s) | The hard disk status is now a spare disk. | None. (HotSpare is not supported.) |
| 10463 | INFORMATIONAL | Adapter %s: State change on disk (%s) from hot spare to rebuilding (Server %s) | The hard disk status has changed from a spare disk to rebuilding. | Replace and rebuild the failed hard disk. (HotSpare is not supported.) |
| 10464 | INFORMATIONAL | Adapter %s: State change on disk (%s) from hot spare to operational (Server %s) | The hard disk status has changed from a spare disk to operational. | None (HotSpare is not supported.) |
| 10465 | INFORMATIONAL | Adapter %s: State change on disk (%s) from rebuilding to available (Server %s) | The hard disk status has changed from rebuilding to available. | None. |
| 10466 | CRITICAL | Adapter %s: State change on disk (%s) from rebuilding to failed (Server %s) | The hard disk status has changed from rebuilding to failed. | Replace and rebuild the failed hard disk. |
| 10467 | INFORMATIONAL | Adapter %s: State change on disk (%s) from rebuilding to hot spare (Server %s) | The hard disk status has changed from rebuilding to a spare disk. | None. (HotSpare is not supported.) |
| 10468 | INFORMATIONAL | Adapter %s: State change on disk (%s) from rebuilding to rebuilding (Server %s) | The hard disk status is now rebuilding. | None. |
| 10469 | INFORMATIONAL | Adapter %s: State change on disk (%s) from rebuilding to operational (Server %s) | The hard disk status has changed from rebuilding to operational. | None. |
| 10470 | INFORMATIONAL | Adapter %s: State change on disk (%s) from operational to available (Server %s) | The hard disk status has changed from operational to available. | None. |
| 10471 | CRITICAL | Adapter %s: State change on disk (%s) from operational to failed (Server %s) | The hard disk status has changed from operational to failed. | Replace and rebuild the failed hard disk. |

table: A list of ServerView RAID event logs

| ID | Severity | Log Entry | Description | Recovery Action |
|---|---|---|---|---|
| 10472 | INFORMATIONAL | Adapter %s: State change on disk (%s) from operational to hot spare (Server %s) | The hard disk status has changed from operational to a spare disk. | None. (HotSpare is not supported.) |
| 10473 | INFORMATIONAL | Adapter %s: State change on disk (%s) from operational to rebuilding (Server %s) | The hard disk status has changed from operational to rebuilding. | None. |
| 10474 | INFORMATIONAL | Adapter %s: State change on disk (%s) from operational to operational (Server %s) | The hard disk status is now operational. | None. |
| 10476 | MAJOR | Adapter %s: Disk (%s) missing after reboot (Server %s) | A hard disk was not found during startup. | At the OS restart after adding and removing option cards, this event may occur. Check the condition of the array using ServerView RAID Manager. If it is OK, then there is no problem. Also, the problem described at "1.5.2 Using ServerView RAID under Windows 2000 Server Environment" (→pg.19) is not a problem. When there are failed hard disks, replace and rebuild them. |
| 10477 | MAJOR | Adapter %s: Logical drive (%s) missing after reboot (Server %s) | A logical drive cannot be found during startup. | At the OS restart after adding and removing option cards, this event may occur. Check the condition of the array using ServerView RAID Manager. If it is OK, then there is no problem. Also, this event occurs after the array configuration or the problem described at "1.5.2 Using ServerView RAID under Windows 2000 Server Environment" (→pg.19) occurs, there is no problem. When it occurs during regular operation, contact an office listed in the "Contact Information" of "Start Guide". |
| 10478 | INFORMATIONAL | Adapter %s: Disk (%s) appeared new after reboot (Server %s) | A new hard disk 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. |

table: A list of ServerView RAID event logs

| ID | Severity | Log Entry | Description | Recovery Action |
|---|---|---|---|---|
| 10485 | INFORMATIONAL | Adapter %s: State change on disk (%s) from available to offline (Server %s) | The hard disk status has changed from available to offline. | None. |
| 10486 | INFORMATIONAL | Adapter %s: State change by user on disk (%s) from available to offline (Server %s) | The hard disk status has changed from available to offline. | None. |
| 10487 | INFORMATIONAL | Adapter %s: State change by user on disk (%s) from failed to offline (Server %s) | The hard disk status has changed from failed to offline. | None. |
| 10488 | MINOR | Adapter %s: State change by user on disk (%s) from hot spare to offline (Server %s) | The hard disk status has changed from a spare disk to offline. | Replace and rebuild the failed hard disk. |
| 10489 | INFORMATIONAL | Adapter %s: State change by user on disk (%s) from offline to available (Server %s) | The hard disk status has changed from offline to available. | None. |
| 10490 | MAJOR | Adapter %s: State change by user on disk (%s) from offline to failed (Server %s) | The hard disk status has changed from offline to failed. | Replace and rebuild the failed hard disk. |
| 10491 | INFORMATIONAL | Adapter %s: State change by user on disk (%s) from offline to hot spare (Server %s) | The hard disk status has changed from offline to a spare disk. | None. |
| 10492 | INFORMATIONAL | Adapter %s: State change by user on disk (%s) from offline to offline (Server %s) | The hard disk status has changed from offline to offline. | None. |
| 10493 | INFORMATIONAL | Adapter %s: State change by user on disk (%s) from offline to operational (Server %s) | The hard disk status has changed from offline to operational. | None. |
| 10494 | INFORMATIONAL | Adapter %s: State change by user on disk (%s) from offline to rebuilding (Server %s) | The hard disk status has changed from offline to rebuilding. | None. |
| 10495 | MINOR | Adapter %s: State change by user on disk (%s) from operational to offline (Server %s) | The hard disk status has changed from operational to offline. | Replace and rebuild the failed hard disk. |
| 10496 | MINOR | Adapter %s: State change by user on disk (%s) from rebuilding to offline (Server %s) | The hard disk status has changed from rebuilding to offline. | Replace and rebuild the failed hard disk. |
| 10497 | INFORMATIONAL | Adapter %s: State change on disk (%s) from failed to offline (Server %s) | The hard disk status has changed from failed to offline. | None. |
| 10498 | MINOR | Adapter %s: State change on disk (%s) from hot spare to offline (Server %s) | The hard disk status has changed from a spare disk to offline. | Replace and rebuild the failed hard disk. |
| 10499 | INFORMATIONAL | Adapter %s: State change on disk (%s) from offline to available (Server %s) | The hard disk status has changed from offline to available. | None. |

table: A list of ServerView RAID event logs

| ID | Severity | Log Entry | Description | Recovery Action |
|---|---|---|---|---|
| 10500 | MAJOR | Adapter %s: State change on disk (%s) from offline to failed (Server %s) | The hard disk status has changed from offline to failed. | Replace and rebuild the failed hard disk. |
| 10501 | INFORMATIONAL | Adapter %s: State change on disk (%s) from offline to hot spare (Server %s) | The hard disk status has changed from offline to a spare disk. | None. |
| 10502 | INFORMATIONAL | Adapter %s: State change on disk (%s) from offline to offline (Server %s) | The hard disk status has changed from offline to offline. | None. |
| 10503 | INFORMATIONAL | Adapter %s: State change on disk (%s) from offline to operational (Server %s) | The hard disk status has changed from offline to operational. | None. |
| 10504 | INFORMATIONAL | Adapter %s: State change on disk (%s) from offline to rebuilding (Server %s) | The hard disk status has changed from offline to rebuilding. | None. |
| 10505 | MINOR | Adapter %s: State change on disk (%s) from operational to offline (Server %s) | The hard disk status has changed from operational to offline. | Replace and rebuild the failed hard disk. |
| 10506 | MINOR | Adapter %s: State change on disk (%s) from rebuilding to offline (Server %s) | The hard disk status has changed from rebuilding to offline. | Replace and rebuild the failed hard disk. |
| 10509 | INFORMATIONAL | Adapter %s: Rebuild on disk (%s) resumed (Server %s) | Rebuilding of the hard disk has resumed. | None. |
| 10511 | INFORMATIONAL | Adapter %s: BGI restarted on logical drive %s (Server %s) | Background initialization has restarted on the logical drive. | None. |
| 10513 | INFORMATIONAL | Adapter %s: Rebuild on logical drive %s resumed (Server %s) | Rebuilding of the logical drive has resumed. | None. |
| 10518 | MAJOR | Adapter %s: SAS port %s lost link (Server %s) | SAS link has disconnected. | None. |
| 10519 | INFORMATIONAL | Adapter %s: SAS port %s restored link (Server %s) | SAS link has restored. | None. |
| 10526 | CRITICAL | Adapter %s: Adapter missing after reboot (Server %s) | A controller is missing. | None. |
| 10527 | INFORMATIONAL | Adapter %s: Adapter appeared new after reboot (Server %s) | A controller is newly detected. | None. |
| 10528 | MINOR | Adapter %s: Rebuild aborted on disk (%s) (Server %s) | Rebuilding has stopped. | None. |
| 10536 | CRITICAL | Adapter %s: Command timeout on disk (%s), CDB: %s (Server %s) | A timeout occurred during a command processing. | None. |
| 10537 | MINOR | Adapter %s: Disk (%s) reset (type %s) (Server %s) | A hard disk is prompted to reset. | None. |

table: A list of ServerView RAID event logs

| ID | Severity | Log Entry | Description | Recovery Action |
|---|---|---|---|---|
| 10540 | MAJOR | Adapter %s: Uncorrectable medium error logged for logical drive %s at LBA %s (on disk (%s) at LBA %s) (Server %s) | An uncorrectable medium error is detected. | None. |
| 10541 | MINOR | Adapter %s: Medium error corrected on logical drive %s at LBA %s (Server %s) | A medium error has been corrected. | None. |
| 10544 | CRITICAL | Adapter %s: Adapter needs replacement, faulty IOP detected (Server %s) | A failure has detected on IO processor of a controller. | None. |
| 10559 | INFORMATIONAL | Adapter %s: Additional information for failed disk (%s) - firmware version: %s, serial number %s, first use: %s, total running time: %s days | Additional information for a failed hard disk is displayed. | None. |

# 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 |
| 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 "User's Guide" located on "PRIMERGY Startup Disc" 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: A list of GAM event logs

| GAM ID | Severity | Description | Details | Corrective action |
|---|---|---|---|---|
| 1 (0x001) | Info/1 | A physical disk has been placed online. | A hard disk has become operational. | None. |
| 2 (0x002) | Info/1 | Physical disk added as hot spare. | A hard disk has been set as a hot spare. | None. |
| 3 (0x003) | Error/3 | Physical disk error found. | • A bad sector was found on the media.<br>• A mechanical failure of the device.<br>• The host device detected an invalid sequence.<br>• The target device is missing. | Check the state of the target hard disk. If it has a failure, see "6.2.2 Replacing Failed Hard Disk [GAM]" (→pg.132) to replace it and perform a rebuild. If the error occurred only temporarily and does not occur again, the hard disk 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 Hard Disk [GAM]" (→pg.134). |
| 4 (0x004) | Error/3 | Physical disk PFA condition found; this disk may fail soon. | A failure has been predicted for the hard disk. | See "6.2.3 Preventive Replacement of Hard Disk [GAM]" (→pg.134) and replace the hard disk 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.<br>(When abnormality occurs in the SAS interface, this may be notified not during rebuild processing.) | See "5.6.4 Viewing Logical Drive Information" (→pg.118) to check the current status of the logical drive.<br>• For Critical state:<br>See "6.2.2 Replacing Failed Hard Disk [GAM]" (→pg.132) to replace the hard disk and perform the rebuild again.<br>• For Offline state:<br>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 for the rebuild. | See "6.2.2 Replacing Failed Hard Disk [GAM]" (→pg.132) to replace the hard disk and perform a rebuild. |
| 11 (0x00B) | Error/3 | Rebuild stopped because logical drive failed. | Rebuild terminated abnormally due to failures in multiple hard disks. | Contact an office listed in the "Contact Information" of "Start Guide". |

table: A list of GAM event logs

| GAM ID | Severity | Description | Details | Corrective action |
|---|---|---|---|---|
| 12 (0x00C) | Error/3 | Physical disk has failed. | A hard disk has failed. | See "6.2.2 Replacing Failed Hard Disk [GAM]" (→pg.132) to replace the hard disk and perform a rebuild. |
| 13 (0x00D) | Info/1 | A new physical disk has been found. | A new hard disk was detected. | None. |
| 14 (0x00E) | Info/1 | A physical disk has been removed. | A hard disk was removed. A hard disk has become undetectable. | None. |
| 15 (0x00F) | Info/1 | A previously configured disk is now available. | A hard disk 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 disks. |
| 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 disks. |
| 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 disks. |
| 23 (0x017) | Warning/2 | Soft error found. | An error was detected on a hard disk, 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 Hard Disk [GAM]" (→pg.134) to replace the hard disk as a precautionary measure. |
| 24 (0x018) | Warning/2 | Misc error found. | An error was detected on a hard disk, 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 Hard Disk [GAM]" (→pg.134) to replace the hard disk 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 reported sense information. | Because the controller is performing a recovery, no action is required as long as the corresponding disk is Online. |
| 29 (0x01D) | Info/1 | Initialization started. | A hard disk formatting has started. | Wait until the format is completed. |
| 30 (0x01E) | Info/1 | Initialization completed. | The hard disk format has been completed. | None. |

table: A list of GAM event logs

| GAM ID | Severity | Description | Details | Corrective action |
|---|---|---|---|---|
| 31 (0x01F) | Error/3 | Initialization failed. | The hard disk format failed. | See "6.2.2 Replacing Failed Hard Disk [GAM]" (→pg.132) to replace the hard disk. |
| 32 (0x020) | Error/3 | Initialization canceled. | The hard disk format was canceled. | Format the hard disk again. |
| 33 - 41 (0x021 - 0x029) | Error/3 | A physical disk failed because ••• | A hard disk has failed. | See "6.2.2 Replacing Failed Hard Disk [GAM]" (→pg.132) to replace the hard disk 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 Failed Hard Disk [GAM]" (→pg.132) to replace the hard disk and perform a rebuild. |
| 43 - 49 (0x02B - 0x031) | Error/3 | A physical disk failed because ••• | A hard disk has failed. | See "6.2.2 Replacing Failed Hard Disk [GAM]" (→pg.132) to replace the hard disk and perform a rebuild. |
| 50 (0x032) | Error/3 | Physical disk status changed to offline. | A hard disk has become offline. | None. |
| 52 (0x034) | Error/3 | Physical disk status changed to rebuild. | The hard disk status has become rebuild. | None. |
| 53 (0x035) | Warning/2 | Physical device ID did not match. | The hard disk 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 failed to start. | Check that the hard disk is connected properly. If the hard disk has failed, see "6.2.2 Replacing Failed Hard Disk [GAM]" (→pg.132) to replace the hard disk and perform a rebuild. |
| 55 (0x037) | Warning/2 | Physical disk negotiated different offset than config. | A hard disk has negotiated an offset different from the configuration. | Check that the hard disk is connected properly. If the hard disk has failed, see "6.2.2 Replacing Failed Hard Disk [GAM]" (→pg.132) to replace the hard disk and perform a rebuild. |
| 56 (0x038) | Warning/2 | Physical disk negotiated different bus width than config. | A hard disk has negotiated a bus width different from the configuration. | Check that the hard disk is connected properly. If the hard disk has failed, see "6.2.2 Replacing Failed Hard Disk [GAM]" (→pg.132) to replace the hard disk and perform a rebuild. |
| 57 (0x039) | Error/3 | Physical drive missing on startup. | No hard disk was detected during startup. | Check that the hard disk is connected properly. If the hard disk has failed, see "6.2.2 Replacing Failed Hard Disk [GAM]" (→pg.132) to replace the hard disk and perform a rebuild. |

table: A list of GAM event logs

| GAM ID | Severity | Description | Details | Corrective action |
|---|---|---|---|---|
| 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 Failed Hard Disk [GAM]" (→pg.132) to replace the hard disk 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 is connected to only one disk channel. | Check that the hard disk is connected properly. If the hard disk has failed, see "6.2.2 Replacing Failed Hard Disk [GAM]" (→pg.132) to replace the hard disk and perform a rebuild. |
| 68 (0x044) | Info/1 | Physical disk type is not approved by vendor. | An installed hard disk is not vendor approved. | Use a vendor supported hard disk. |
| 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 has acquired an inappropriate loop ID. | See "6.2.2 Replacing Failed Hard Disk [GAM]" (→pg.132) to replace the hard disk 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 has failed.<br>• The hard disk is not compatible with the system.<br>• The enclosure slot hardware failed. | See "6.2.2 Replacing Failed Hard Disk [GAM]" (→pg.132) to replace the hard disk 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.28)) 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. |
| 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". |

table: A list of GAM event logs

| GAM ID | Severity | Description | Details | Corrective action |
|---|---|---|---|---|
| 76 (0x04C) | Info/1 | A Configuration On Disk (COD) with unsupported features has been detected. | The array configuration information of the hard disk contains features that are not supported.<br>An array configuration information created by another system was detected. | Connect a compatible hard disk. |
| 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 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 has been replaced with a smaller capacity drive than configured. | Reconnect a proper hard disk. |
| 101 (0x065) | Error/3 | Error. | An unknown error was detected. | If the hard disk has failed, see "6.2.2 Replacing Failed Hard Disk [GAM]" (→pg.132) to replace the hard disk 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 operaton failed. | A Reassign operation failed. | If the hard disk has failed, see "6.2.2 Replacing Failed Hard Disk [GAM]" (→pg.132) to replace the hard disk 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. |
| 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. |

table: A list of GAM event logs

| GAM ID | Severity | Description | Details | Corrective action |
|---|---|---|---|---|
| 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 is smaller then the other hard disk. | See "6.2.2 Replacing Failed Hard Disk [GAM]" (→pg.132) to replace the hard disk 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 Hard Disk [GAM]" (→pg.134) and replace the hard disk 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 Hard Disk [GAM]" (→pg.134) and replace the hard disk 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 failure. | See "6.2.2 Replacing Failed Hard Disk [GAM]" (→pg.132) to replace the hard disk 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. | See "6.2.2 Replacing Failed Hard Disk [GAM]" (→pg.132) to replace the hard disk and perform a rebuild. |
| 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. |

table: A list of GAM event logs

| GAM ID | Severity | Description | Details | Corrective action |
|---|---|---|---|---|
| 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 Failed Hard Disk [GAM]" (→pg.132) to replace the hard disk. 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.<br>• 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.<br>• 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 disks 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. | Check the logs surrounding the process and perform necessary actions. |
| 163 (0x0A3) | Error/3 | Reconstruct detected uncorrectable double medium errors. | Due to media errors detected in the same position on multiple hard disks, data cannot be recovered. | If a corrupted file is found, restore it from the backup. |
| 164 (0x0A4) | Info/1 | Reconsrtuction resumed. | Reconstruction was resumed. | None. |
| 165 (0x0A5) | Error/3 | Reconstruction resume failed due to configuraiton mismatch. | Reconstruction resume terminated abnormally due to configuration mismatch. | Recreate the array and restore the backup data. |

table: A list of GAM event logs

| GAM ID | Severity | Description | Details | Corrective action |
|---|---|---|---|---|
| 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 cannot be used, because SAS and SATA devices are mixed. | Check if any unsupported hard disks are installed. If there is an unsupported hard disk 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 disks. |
| 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.<br>• 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.<br>• 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. |
| 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.<br>• 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. |

table: A list of GAM event logs

| GAM ID | Severity | Description | Details | Corrective action |
|---|---|---|---|---|
| 403 (0x193) | Error/3 | Installation aborted. | The configuration changed while the system was offline. | Shut down the server and check the hard disk connections. Check that the appropriate hard disks are installed, and remove any inappropriate hard disks.(For example, a hard disk 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 has a failure. | See "6.2.2 Replacing Failed Hard Disk [GAM]" (→pg.132) to replace the hard disk 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. |
| 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. |

table: A list of GAM event logs

| GAM ID | Severity | Description | Details | Corrective action |
|---|---|---|---|---|
| 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 disks. |
| 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 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. | Check the array configuration. If there is a failed hard disk, see "6.2.2 Replacing Failed Hard Disk [GAM]" (→pg.132) 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 was converted. | None. |
| 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 connections. Check that the appropriate hard disks are installed, and remove any inappropriate hard disks. (For example, a hard disk 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. |

table: A list of GAM event logs

| GAM ID | Severity | Description | Details | Corrective action |
|---|---|---|---|---|
| 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 connected was previously used in another system. If a hard disk that was previously used in another system is connected, that hard disk 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, see "6.2.2 Replacing Failed Hard Disk [GAM]" (→pg.132) to replace the hard disk 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". |
| 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 function failed. | An error was detected in an SMP function. | Contact an office listed in the "Contact Information" of "Start Guide". |

table: A list of GAM event logs

| GAM ID | Severity | Description | Details | Corrective action |
|---|---|---|---|---|
| 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". |

# C Notes on Usage for the Array Controller

This section explains notes on usages for this array controller.

## C.1 When Replacing Array Controllers

Changing an array controller due to some kind of troubles when using Integrated Mirroring SAS function (RAID 1) of this array controller will result in the loss of information about hard disk consistency stored in the array controller. In order to make the data consistent again, you need to initialize the logical drive of the array controller.
This is required because the array controller stores the consistency data concerning whether the Write data was properly written into hard disks in the past. The data is stored on a nonvolatile RAM (NVRAM) of the controller. Saving information with a maintenance tool will enable you to restore the information after the controller replacement. With successful data saving and restoration, you do not need to initialize the logical drive.
Depending, however, on what caused the problem like a failure of the system itself, a maintenance tool may not start on the system and the data may not be saved. Then you need to initialize the logical drives to make the data consistent. Even when you succeed in saving and restoring NVRAM information, unsuccessful data consistency result will require you the initialization.
Logical drive initialization described here is the same as a rebuild operation for its identical operation to copy data on the background and make the data consistent between two hard disks.

### ■ Notes during initialization

- Logical drive initialization of Integrated Mirroring SAS is done through background initialization. You can use the hard disks even during the initialization process. The operation may be slower than on initialized logical drives due to insufficient I/O processing. Operation slow down may account for up to 50% of the full operation.
- During the OS operation, the hard disk failure LED on the front side of the hard disk to be initialized blinks just like at the time of rebuilding operation. With ServerView, maintenance LEDs on the front and back of the controller blink. After the initialization, the LEDs automatically stop blinking. Then check the condition of each device through not only the LEDs but also such devices as ServerView Console.
- Resetting or turning off the server before the completion of the initialization will stop the initialization. The next initialization will start from the point at which the initialization was stopped last time it was reset or shut down.
- RAID 1 logical drive is without redundancy until the completion of the initialization. It regains the redundancy once the initialization is completed.

- You can assure the completion of initialization by displaying logical drive information from ControllerView of GAM utility. Online status means the completion. Critical status means unfinished initialization. →"● Logical drives" (pg.110)
  For ServerView RAID, Online status of a logical drive means the completion. Critical status means unfinished initialization. →"● Logical drive" (pg.74)

## ■ Estimated time for initialization

Estimated time for the initialization without hard disk access is shown below. The time shown below is the total time period for the OS operation without any kind of power shut down.
It takes longer than what shown below when initialization takes place with access to hard disks.

table: Estimated time for initialization

| Hard disk capacity | No load | High load |
|---|---|---|
| 73GB | approx. 4hrs | approx. 7hrs |
| 147GB | approx. 7hrs | approx. 14hrs |
| 300GB | approx. 15hrs | approx. 30hrs |

POINT

- Information in the with load columns is the estimated time for all time high-loaded access from hard disks.
- The numbers described above are estimates. The actual time may be different depending on your system environment.

# Index

## I



## L



## M



## P



## R



## S



## T



## U



## V

Integrated Mirroring SAS
User's Guide

B7FY-2311-01ENZ0-00

Issued on January, 2008

Issued by FUJITSU LIMITED