NEC

N8103-149/150/151/160 RAID controller
User's Guide

Preface

Congratulations for your purchase of the N8103-149/150/151/160 RAID controller (hereafter called the RAID controller).

The User's Guide describes how to install and use the RAID controller correctly and safely. Read the guide thoroughly before handling it. In addition, refer to this manual when you want to know how to use it or some malfunction occurs. Always keep the manual at hand so that you can see it as soon as possible if necessary.

For the server in which the disk array controller is installed, refer to the User's Guide of the server. Read "Notes on Use" carefully before handling the RAID controller.

■ Make sure you read this manual before using the RAID controller. After reading this manual carefully, store it in a safe

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NEC ESMPRO, NEC EXPRESSBUILDER and Universal RAID Utility are registered trademarks of NEC Corporation.

All other brand and product names may be trademarks of their respective companies.

(TM), (R) mark is not specified in this text.

Notes:

Keep this User's Guide at hand for quick reference at anytime necessary.
Be sure to read this section carefully.

⚠ NOTES ON USE - Always read the Notes -

The following includes information necessary for proper and safe operation of the product.

SAFETY INDICATIONS

In the User's Guide, "WARNING" or "CAUTION" is used to indicate a degree of danger. These terms are defined as follows:

| ⚠ WARNING | Indicates the presence of a hazard that may result in death or serious personal injury. |

| ⚠ CAUTION | Indicates the presence of a hazard that may cause minor personal injury, including burns, or property damage. |

Precautions against hazards are presented with the following symbols. The individual symbols are defined as follows:

	Attention	This symbol indicates the presence of a hazard. An image in the symbol illustrates the hazard type.	(Example) ⚠ Precaution against electric shock
	Prohibited Action	This symbol indicates prohibited actions. An image in the symbol illustrates a particular prohibited action.	(Example) 🚫 Prohibition of disassembly
●	Mandatory Action	This symbol indicates mandatory actions. An image in the symbol illustrates a mandatory action to avoid a particular hazard.	(Example) Unplug the power cord!

Symbols Used in This Manual and Warning Labels

Attentions

⚠	Indicates a general notice or warning that cannot be specifically identified.
⚡	Indicates that improper use may cause an electric shock.
♨	Indicates that improper use may cause personal injury.
🔥	Indicates that improper use may cause fumes or fire.

Prohibited Actions

🚫	Indicates a general prohibited action that cannot be specifically identified.
🚫	Do not disassemble, repair, or modify the server. Otherwise, an electric shock or fire may be caused.
🚫	Do not touch the server with wet hand. Otherwise, an electric shock may be caused.

Mandatory Action

🔌	Unplug the power cord of the server. Otherwise, an electric shock or fire may be caused.
❗	Indicates a mandatory action that cannot be specifically identified. Make sure to follow the instruction.

Safety Indications

This section provides notes on using your product safely. Read this section carefully to ensure proper and safe use of the product. For symbols, see "SAFETY INDICATIONS" provided earlier.

General

⚠ WARNING
Do not use the product in life-critical applications or applications requiring high reliability. The product is not intended for integration with or control of facilities or equipment that may affect human life or that require a high degree of reliability, such as medical equipment, nuclear power facilities or instruments, aerospace instruments, transportation facilities or instruments. NEC does not assume any liability for accidents resulting in injury or death, or for any damages to property that may occur as a result of using the product in such facilities, equipment, or control systems.
Do not use the server if any smoke, odor, or noise is present. If smoke, odor, or noise is present, immediately turn off the server and disconnect the power plug from the AC outlet, then contact your service representative. Using the server in such conditions may cause a fire.
Keep needles or metal objects away from the server. Do not insert needles or metal objects into ventilation holes or cartridge slot of the server. Doing so may cause an electric shock.

⚠ CAUTION
Keep water or foreign matter away from the server. Do not let any form of liquid (water etc.) or foreign matter (e.g., pins or paper clips) enter the server. Failure to follow this warning may cause an electric shock, a fire, or a failure of the server. When such things accidentally enter the server, immediately turn off the power and disconnect the power plug from the AC outlet. Do not disassemble the server. Contact your service representative.

Power Supply and Power Cord Use

⚠ CAUTION

Disconnect the power cord(s) before installing or removing the product in/from the server.

Make sure to power off the server and disconnect the power cord(s) from a power outlet before installing/removing the product in/from the server, or connecting with the peripheral devices. All voltage is removed only when the power cords are unplugged.

Do not use any damaged cable.

Make sure the cable condition before connection. Using the damaged connector, bent connector pin, or dirty connector may cause a fire due to short-circuit.

Do not hold the power plug with a wet hand.

Do not disconnect/connect the plug while your hands are wet. Failure to follow this warning may cause an electric shock.

Do not pull the cable when disconnecting the power cord.

When disconnecting the power cord from the server, hold the plug and pull it straight out. Pulling the cord out by the cable portion could damage the cable to result in an electrical shock hazard or a fire.

Installation, Relocation, Storage, and Connection

> ⚠ **CAUTION**
>
> **Do not connect any interface cable with the power cord of the server plugged to a power source.**
>
> Make sure to power off the server and unplug the power cord from a power outlet before connecting/disconnecting any interface cable to/from the server.   If the server is off-powered but its power cord is plugged to a power source, touching a cable or connector may cause an electric shock or a fire resulted from a short circuit.
>
> **Do not use any unauthorized interface cable.**
>
> Use only interface cables authorized by NEC and locate a proper device and connector before connecting a cable. Using an unauthorized cable or connecting a cable to an improper destination may cause a short circuit, resulting in a fire.
> Also, observe the following notes on using and connecting an interface cable.
> - Do not step on the cable.
> - Do not place any object on the cable.
> - Do not use the server with loose cable connections.
> - Do not use any damaged cable connector.
> Make sure the cable is securely locked with screw.

⚠ CAUTION

Do not use or store the product in the place where corrosive gases exist.

Make sure not to locate or use the server in the place where corrosive gases (sulfur dioxide, hydrogen sulfide, nitrogen dioxide, chlorine, ammonia, ozone, etc) exist.
Also, do not install it in the environment where the air (or dust) includes components accelerating corrosion (ex. sulfur, sodium chloride) or conductive metals. There is a risk of a fire due to corrosion and shorts of an internal printed board.
Consult with your service representative for the location appropriate to the server.

Avoid installation in extreme temperature conditions.

Immediately after the server is powered off, its internal components such as Physical Devices are very hot. Leave the server until its internal components fully cool down before installing/removing any component.

Cleaning and Working with the Product

WARNING
Do not disassemble, repair, or alter the server. Never attempt to disassemble, repair, or alter the product on any occasion. Failure to follow this instruction may cause an electric shock or fire as well as malfunctions of the product.
Disconnect the power plug before accessing inside the server. Make sure to power off the server and disconnect the power plug from a AC outlet before accessing inside the server. Touching any internal device of the server with its power cord connected to a power source may cause an electric shock even if the server is off-powered.

CAUTION
Make sure to complete installation. Always connect the DC cable and/or interface cable firmly. An incompletely connected cable may cause a contact failure, resulting in smoking or fire.

x

During Operation

	⚠ CAUTION
⚠ 🚫	**Avoid contact with the server during thunderstorms.** Disconnect the power plug from the outlet when a thunderstorm is approaching. If it starts thundering before you disconnect the power plug, do not touch any part of the server containing the product. Failure to follow this warning may cause an electric shock.
⚠ ⚠ 🚫	**Keep animals away from the server.** Keep animals away from the server containing the product. Pet's discharges or fur may enter the server and cause a fire or electric shock.
🚫	**Do not use a cellular phone or a pager around the server.** Turn off the cellular phone or pager near the server containing the product. Radio interference may cause malfunctions of the server.

Notes on Use - for correct operation of the Product-

Note the following when you use the RAID controller. If you ignore the notes, your assets (including important data and/or other devices) may be damaged.

- The RAID controller is the PCI device for connecting the Serial-Attached SCSI(SAS) devices and Serial-ATA(SATA)devices at the Express5800 series. You can not use for the other purpose.

- The RAID controller is an extremely sensitive electronic device. First make your body contact with metallic frame of the server to discharge static electricity from your body before handling the RAID controller. Do not drop the RAID controller. Do not make the RAID controller hit against other objects.

- The RAID controller can connect the hard disk drive or the solid state drive(here after called Physical Device) of identical standard.

- For the supported system, additional HDD cage and Physical Device, ask your sales representative.

- The RAID controller may be limited for intermingling with the other PCI devices (the other RAID controller, the mirroring board, the SCSI controller). For details on the intermingling with the other PCI device, ask your sales representative.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide the reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.
However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures.

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment to an outlet on a circuit different from the one to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Industry Canada Class B Emission Compliance Statement
This Class B digital apparatus complies with Canadian ICES-003.

Avis de conformité à la réglementation d'Industrie Canada
Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

N8103-149/150/151 Korean KC Standards

Korean KC Standards
B 급 기기 (가정용 방송통신기자재)
이 기기는 가정용(B 급) 전자파적합기기로서 주로
가정에서 사용하는 것을 목적으로 하며, 모든
지역에서 사용할 수 있습니다.

Certification No	: KCC-REM-LS2-25410
Basic Model Number of Equipment	: 25410
Applicant	: LSI CORPORATION
Equipment Name	: PCI Express RAID
Manufacturer	: LSI CORPORATION
Country of Origin	: China

N8103-160 Korean KC Standards

Korean KC Standards
B 급 기기 (가정용 방송통신기자재)
이 기기는 가정용(B 급) 전자파적합기기로서 주로
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지역에서 사용할 수 있습니다.

Certification No	: KCC-REM-LS2-25421
Basic Model Number of Equipment	: 25421
Applicant	: LSI CORPORATION
Equipment Name	: PCI Express RAID adapter
Manufacturer	: LSI CORPORATION
Country of Origin	: China

This Manual

The guide is intended for persons who are familiar with operating systems including Windows and fundamental operations of general-purpose I/O devices including the keyboard and mouse.

Text Conventions

The following conventions are used throughout this User's Guide. For safety symbols, see "SAFETY INDICATIONS" provided earlier.

⚠ CAUTION	
Notice	Items to be observed or points to be noted when operating the product.
✔ Check	Items to be checked when operating the product
Tips	Information useful or convenient for you

In the Package

The carton contains various accessories, as well as the product itself. See the packing list to make sure that you have everything and that individual components are not damaged. If you find any component missing or damaged, contact your sales agent.

Transfer to Third Party

Make sure to provide this manual along with the product to a third party.

	About data on the hard disk drive
Notice	■ Be sure to take appropriate measures not to leak important data (e.g., customers' information or companies' management information) on the removed hard disk drive and removed solid state drive to any third parties. ■ Data seems to be erased when you empty "Recycle Bin" of Windows or execute the "format" command of the operating system. However, the actual data remains written on the hard disk drive. Data not erased completely may be restored by special software and used for unexpected purposes. ■ It is strongly recommended that the software or service (both available at stores) for data erasure should be used in order to avoid the trouble explained above. For details on data erasure, ask your sales representative. ■ NEC assumes no liability for data leakage if the product is transferred to third party without erasing the data.

To transfer or sell any software application that comes with the product to a third party, the following requirements must be satisfied:

All provided software applications must be transferred and no backup copies must be retained. Software applications must be uninstalled before transferring the product.

Disposal

Dispose of the product according to all national laws and regulations.

> **Notice**
>
> It is the user's responsibility to completely erase or modify all the data stored in storage device such as solid state drive, Hard Disk, backup data cartridge, floppy disk, or any other media (CD-R/CD-RW) so that the data cannot be restored.

Data Backup

The device failure due to shock or thermal changes, as well as operator's misconduct, may cause loss of data. To avoid loss of data, NEC recommends that you should make a back-up copy of your valuable data on a regular basis.

Transportation

To transport the product, remove the product from the server and put it in the shipping carton along with accessories according to Chapter 1.

Maintenance Parts

The holding period of maintenance parts of your RAID controller is five years from the truncation of manufacturing.

Abbreviations

Formal title	Abbreviation
N8103-149/150/151/160 RIAD Controller User's Guide	this manual
N8103-149/150/151/160 RIAD Controller	RAID controller
Operating System	OS
Universal RAID Utlity	URU
Drive Group	DG
Virtual Drive	VD
hard disk drive / HDD solid state drive / SSD	Physical Device

Terms of WebBIOS and Universal RAID Utility

Terms in WebBIOS	Terms in Universal RAID Utility
Drive Group (DG)	Disk Array
Virtual Drive (VD)	Logical Drive
Optimal Online	Online
Degraded Partially Degraded	Degraded
Unconfigured Good	Ready
Background Initialize	Background Initialization
Write Back with BBU	Auto Switch
Always Write Back	Write Back
LED	Slot lump
Manage Powersave	HDD Power Saving

Contents

Chapter 1 Overview

Read this chapter first if you use the RAID controller for the first time.

This chapter describes the notes you should always follow while you use the RAID controller, the features of the RAID controller, and the hardware setup.

1. Notes on Use - Always Follow These Notes -

Follow the notes described below to allow you to use the RAID controller safely.

1-1. Installation of Universal RAID Utility

Install URU which manages RAID controllers on OS. The installation of URU allows you to perform the following operations:

- Events and errors occurred on array system can be registered in the event log and used effectively for troubleshooting and diagnosis.
- URU event information can be monitored by using NEC ESMPRO.
- Manual rebuild and Consistency Check etc. can be executed.

For the installation of URU, refer to the "Universal RAID Utility User's Guide" in NEC EXPRESSBUILDER CD-ROM that comes with the server.

1-2. LED behavior of Hot Spare disks

When Hot Spare disks cannot be recognized due to failure, etc., LED turns on becomes solid amber. LED turns off after you swap the Hot Spare with a new physical device.

✔ **Check**	LED also becomes solid amber when you remove Hot Spare disks. In that case, please reset Hot Spare setting first, and then remove the disks.

1-3. Patrol Read to keep data redundancy

Patrol Read periodically verifies all sectors of Physical Devices connected to a controller. This feature allows a system to find and correct media defects to avoid losing data redundancy.

For detail about Patrol Read, refer to (Chapter 3 Features of RAID controller).

> ✔ **Check**
>
> Access LED blinks frequently during patrol read.

- When Patrol Read finds and corrects media defects following message is recorded in the system event log and Universal RAID Utility log viewer. These messages don't mean abnormal.

  • Universal RAID Utility logs

Severity	Information
ID	319
Description	[CTRL:X PD:Y(ID=z) (Vendor/Model of Physical Device Firmware Version of Physical Device)] Correctable Medium Error happened to Physical Device.

  • System event logs

Source	raidsrv
Type	Information
Event ID	319
Description	[CTRL:X PD:Y(ID=z) (Vendor/Model of Physical Device Firmware Version of Physical Device)] Correctable Medium Error happened to Physical Device.

> ✔ **Check**
>
> When OS is Linux, information of source, Type, and event ID is not displayed in system log (syslog). Only the content of the explanation column is recorded.

1-4. Standby/Hibernation

The RAID controller does not support the standby/hibernation feature. If you use the feature, unexpected messages may be registered on RAID log in Universal RAID Utility and OS log (Windows event log or Linux system log).

1-5. Predictive replacement of Physical Devices

When the RAID controller detects S.M.A.R.T error the following event is recorded in the system event log and URU log viewer. This means that the Physical Device could be failed soon. Please replace it as soon as possible.

・Universal RAID Utility log

Severity	Warning
ID	305
Description	[CTRL:%1(ID=%2) PD:%3(ID=%4) %5%6] Detected S.M.A.R.T. Error.

%1 : Number of RAID Controller
%2 : ID of RAID Controller
%3 : Number of Physical Device
%4 : ID of Physical Device
%5 : Vendor and Model of Physical Device
%6 : Firmware Version of Physical Device

・System log

Source	raidsrv
Type	Warning
Event ID	305
Description	[CTRL:X PD:X(ID=X) (Vendor/Model of Physical Device Firmware Version of Physical Device)] Detected S.M.A.R.T.. Error.

Notice

It would be better to confirm the Physical Devices you should replace by Locate in advance. For detail about Locate, refer to Chapter 5 Operations (5-5 Locate).

Check

When OS is Linux, information of source, Type, and event ID is not displayed in system log (syslog). Only the content of the explanation column is recorded.

1-6. System BIOS setting when you use two or more RAID controllers

When you connect two or more RAID controllers to a system, set Option ROM in System BIOS menu to be disabled for all RAID controllers except for one that boots up OS.
For detail about how to set Option ROM in System BIOS menu, refer to a user's guide of the server.

Notice

OS cannot be booted if Option ROM setting is disabled for a RAID controller which boots up OS.

1-7. Slot number of Physical device

Physical Devices shown in WebBIOS and those shown in Universal RAID Utility are identified as follows.

- WebBIOS

    Slot number shown in Physical View *1

        *1: The slot number, type of Physical Device, its capacity, and its current status are shown in Physical View.

            The slot number shown on WebBIOS corresponds to the number on the Physical Device bay.

- Universal RAID Utility

    Slot shown in Physical Device Properties

        The slot number shown on WebBIOS corresponds to the Physical Device ID shown on Universal RAID Utility. For more information, refer to the Universal RAID Utility User's Guide.

Physical View of WebBIOS
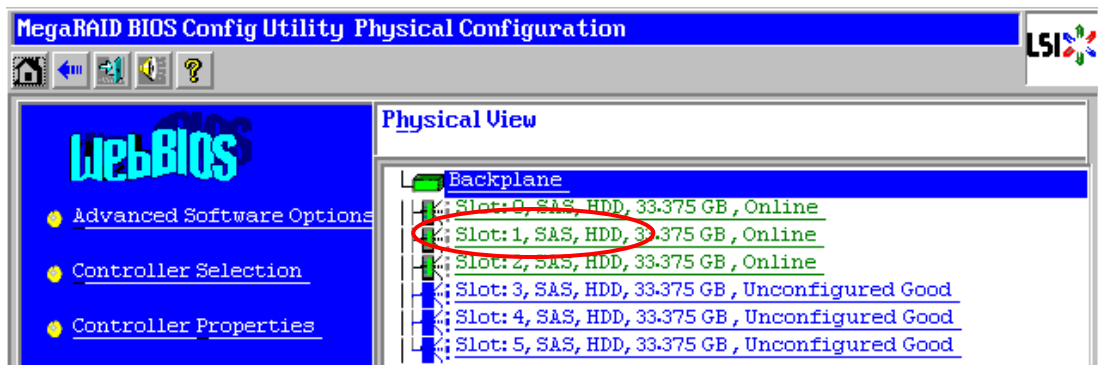
Property of Physical Device of Universal RAID Utility
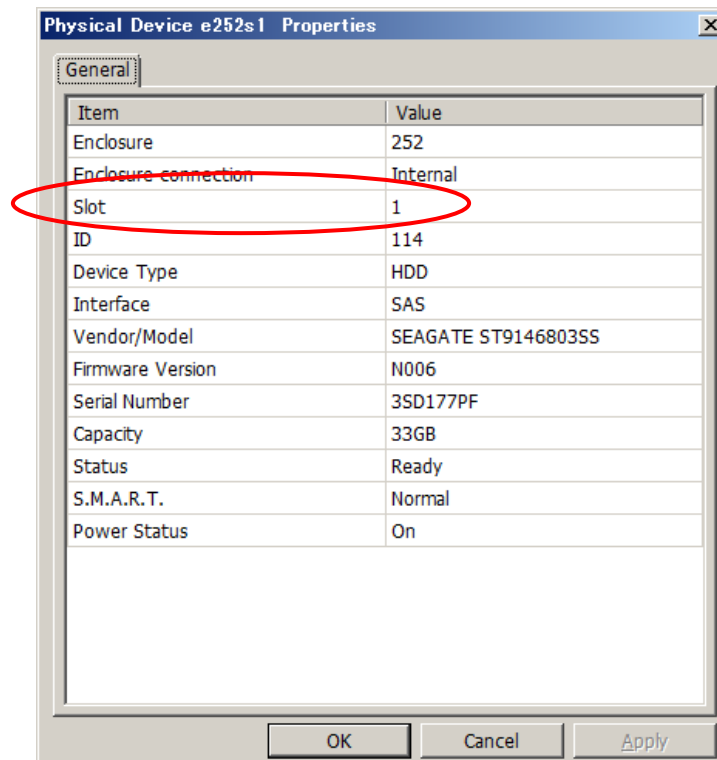
1-8. Screen after "Exit" of WebBIOS

There's no problem if the message may disappear when you push "Space" or "Enter" with "Please Reboot your System" is displayed. Restart the server.

1-9. When you connect two Disk Expansion Unit to one N8103-160 RAID controller

When you connect two JBOD to one N8103-160 RAID controller, please connect the same model of Disk Expansion Unit(SAS JBOD Enclosure).

1-10. Global Fault LED

Global Fault LED lights amber immediately following the power-on and reboot of a server for a few second.

2. Specification

Item	Specification				Remarks
	N8103-149	N8103-150	N8103-151	N8103-160	
Number of SAS connectors	2 internal connectors			2 external connectors	4 ports per a connector
Cache size	512MB		1GB		
PCI bus	Complying with PCI Express 2.0				
PCI connector	PCI Express (x8)				
Maximum PCI bus transfer rate	5Gigabits/lane				
Device interface	SAS/SATA available				
Data transfer rate	SAS/SATA: 6.0 Gb/s				
RAID level	0, 1, 10	0, 1, 5, 6, 10, 50, 60			
Maximum Physical Devices	8				
Maximum Lgical Drives	64				Maximum number of LDs for each DG is 64.
Dimensions	69 (width)x130(depth)mm			69(width)x175(depth)mm	
Weight	About 0.1 kg				
Operating voltage	3.3V/12V				
Power consumption (max.)	13W				
Operating environment	Temperature: 10ºC to 40ºC Humidity: 20% to 80%				Without condensation

3. Features of this RAID controller

This RAID controller has two channels (4 ports per a channel) of interface connectors to which SAS/SATA devices can be connected. The RAID controller designed to deliver breadkthrough IOPS and bandwidth performance. It offers 6Gb/s transfer rate per port.

Features

- 6 Gb/s transfer rate per port.
- 512 MB or 1GB DDR-III cache.
- Supporting RAID levels 0, 1, 5, 6, 10, 50, 60
- Error reporting via NEC ESMPRO
- Detecting drive fault automatically
- Hot Swap available --- you can replace faulty drive without system shutdown

    Notice
    - This RAID controller does not support the PCI hot plug feature.
    - RAID levels 5, 6, and 50, 60 are not supported by N8103-149.

4. Functions of Parts

This section describes function of each part on the RAID controller.

(N8103-149/150/151 Front view)
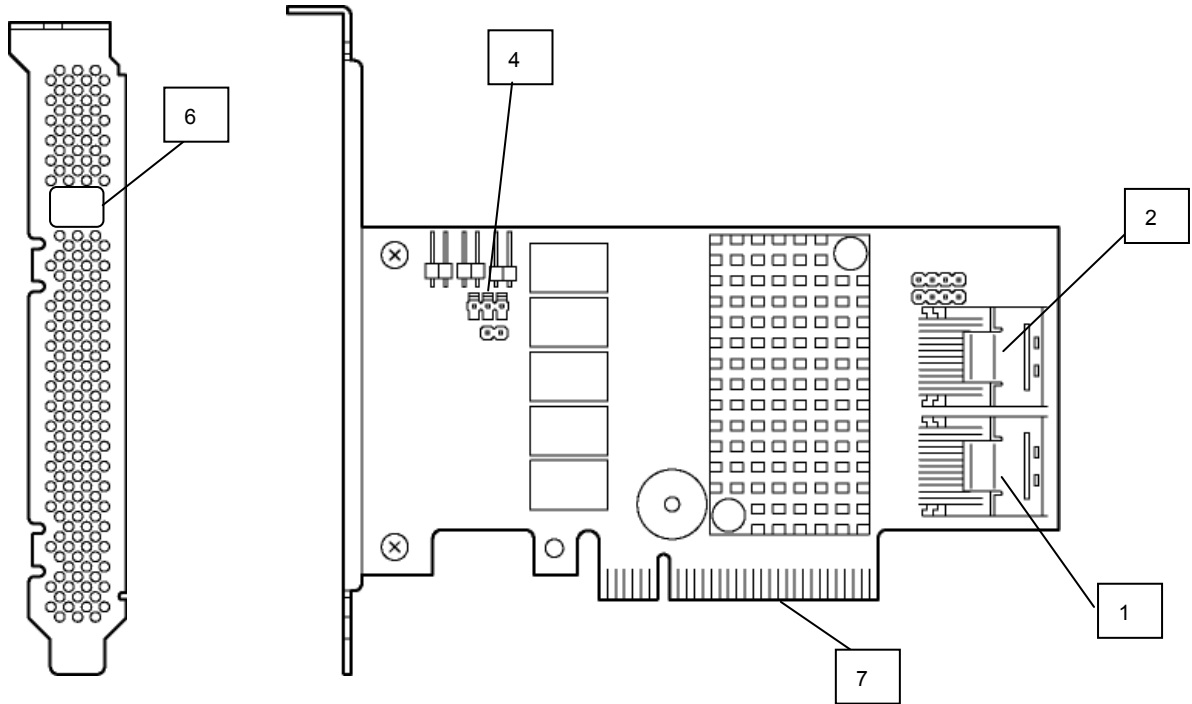
(N8103-149/150/151 Rear view)

| 1 | Channel 1 (Ports 0 - 3)
Allow the RAID controller to be connected to SAS devices. |
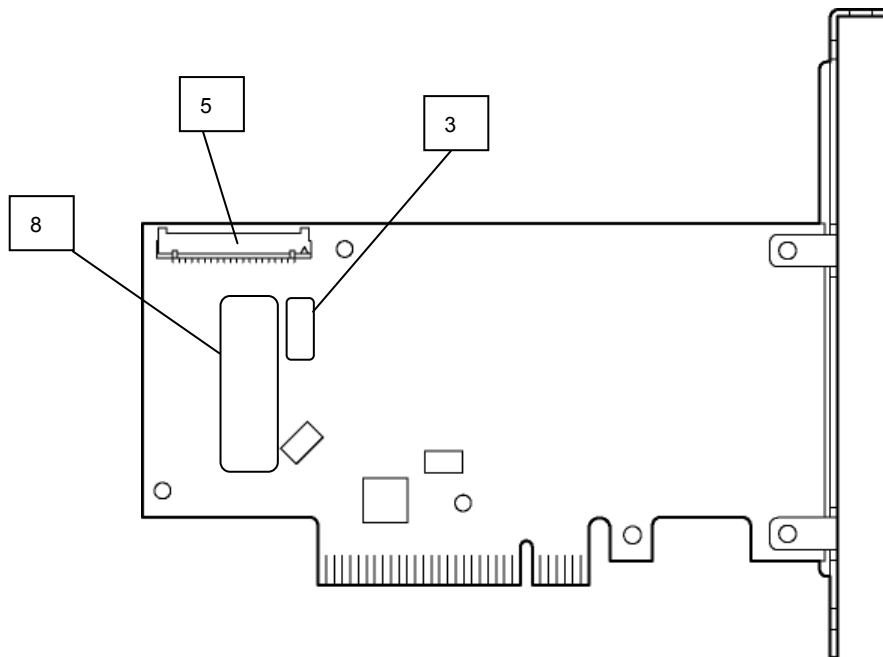
1 Channel 1 (Ports 0 - 3)
Allow the RAID controller to be connected to SAS devices.

2 Channel 2 (Ports 4 - 7)
Allow the RAID controller to be connected to SAS devices.

3 HW label
Indicates the management revision of the RAID controller.

4 Key Connector
N8103-149 : Not used
N8103-150 : Upgrade key is installed.
N8103-151 : MegaRAID CacheCade can be attached.

5 Battery connector
Used to connect Battery Backup Unit.

6 N code label
Indicates the N code of the RAID controller.

7 PCI Express connector
The connector allows the RAID controller to be connected to a PCI slot (PCI Express) in
the server.

8 Serial number label
Indicates the a serial number of the RAID controller.

(N8103-160 Front view)
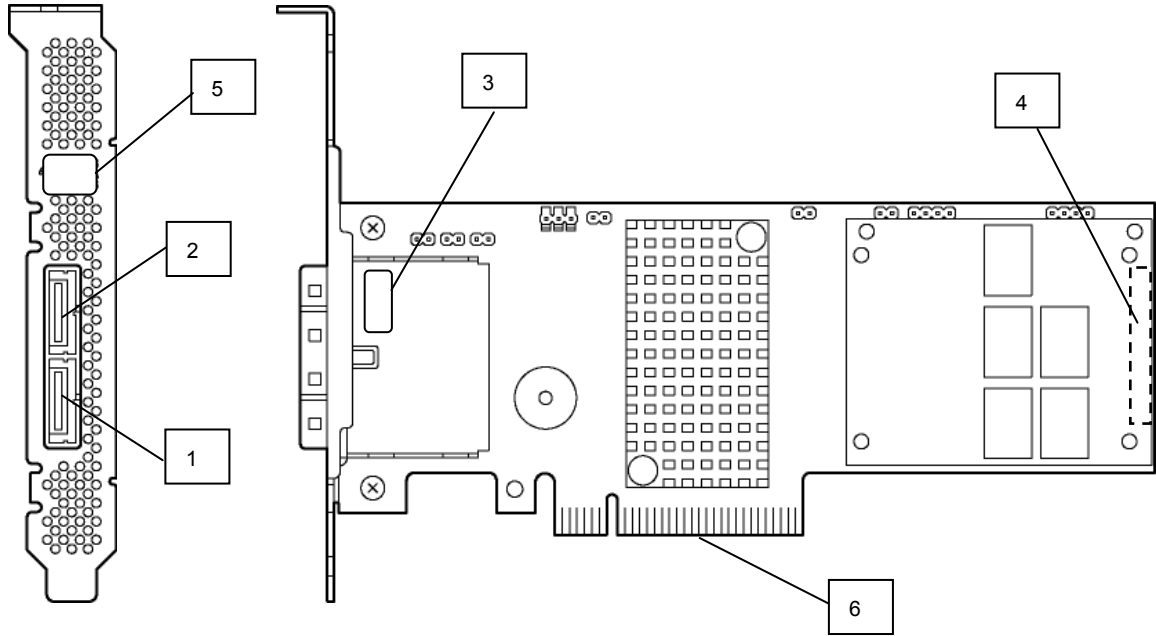
(N8103-160 RAID Rear view)
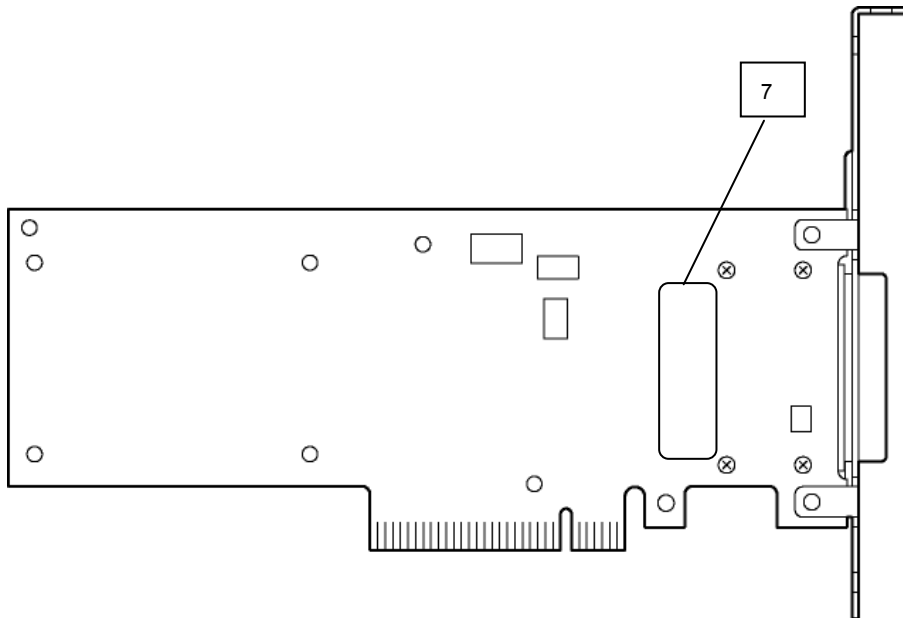
| 1 | Channel A |
| | Allow the RAID controller to be connected to SAS devices. |

| 2 | Channel B |
| | Allow the RAID controller to be connected to SAS devices. |

| 3 | HW label |
| | Indicates the management revision of the RAID controller. |

| 4 | Battery connector |
| | Used to connect Battery Backup Unit. |

| 5 | N code label |
| | Indicates the N code of the RAID controller. |

| 6 | PCI Express connector |
| | The connector allows the RAID controller to be connected to a PCI slot (PCI Express) in the server. |

| 7 | Serial number label |
| | Indicates a serial number of the RAID controller. |

5. Hardware Setup

Refer to a User's Guide of servers for how to install RAID controllers into the servers.

5-1. How to attach a bracket

A full-height PCI bracket is attached to a card shipped from our factory. If you want to use a low-profile PCI slot, you need to replace the full-height bracket with a low-profile PCI bracket.

1. Remove two screws by which the full-height PCI bracket is fastend to the card.

2. Remove the full-height PCI bracket.

3. Install the low-profile PCI bracket on the card.

4. Fasten the low-profile PCI bracket with the two screws removed in step 1.

(N8103-149/150/151)

Full-height PCI bracket

Low-profile PCI bracket

(N8103-160)

Full-height PCI bracket
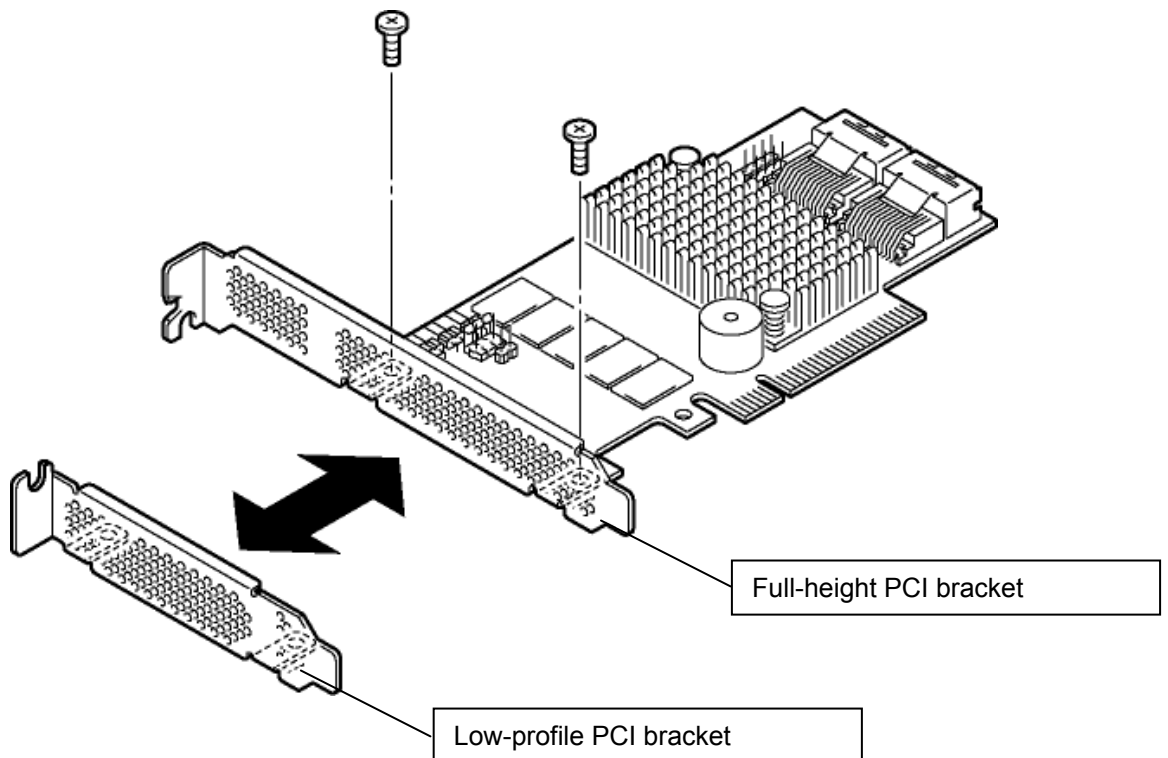
Low-profile PCI bracket
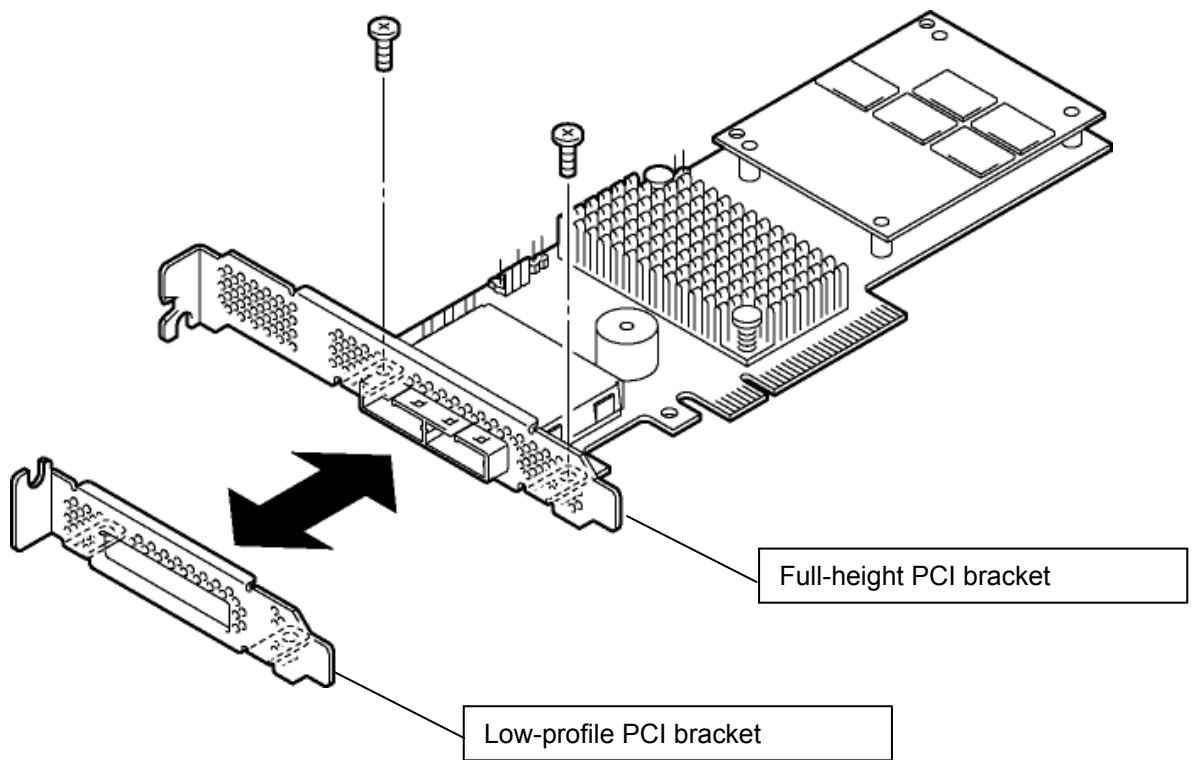
Tips

Take the same procedure to replace a low-profile PCI bracket with a full-height PCI bracket.

5-2. Notes on Installing the RAID controller

Refer to a User's Guide of servers for how to install RAID controllers into the servers.

Notice

Note the following before setup.
- You may not be able to install RAID contorollers you want to use due to a restriction of servers. Refer to a User's Guide for servers in advance.
- Physical Devices to be connected to the RAID controller should have the same specification. Contact your service representative for Physical Devices which can be connected to the RAID controller.
- Coexistence with other PCI boards (including RAID controller, mirroring board, and SCSI controller) may be limited. Before using the RAID controller together with other PCI boards, ask your service representative whether the RAID controller can coexist with the other PCI boards.
- When the RAID controller cannot be inserted into the PCI slot (PCI Express) well, pull out it once and insert it again. Note that the RAID controller may be damaged if excess force is given to it.
- When you take out and insert an additional key, please be sure to turn OFF a power supply and to unplug a power cord from an electric socket
- Store the removed additional slot cover carefully. The removed screw will be used to install the RAID controller. Do not lose them.
- The RAID controller does not support the PCI hot-plug feature. Before install or remove the RAID controller from the server, always turn off a power supply and unplug a power cord from an electric socket.
- Port numbers are predefined according to the physical location of Physical Device. When connecting the RAID controller to the server with SAS cable, check if the cable connector is appropriate to port number. Connecting an incorrect cable may cause a malfunction of the device. Refer to the User's Guide for servers for port numbers on servers.

5-3. How to connect a LED Cable

Connect the LED cable coming with a server to the Physical Device LED connector. For the connection, refer to the figure and the connection table below. For the connection to a motherboard, refer to a User's Guide for servers. If it is difficult to connect the LED cable, pull out the card from the PCI (or PCI Express) slot once and connect the LED cable to the card and then put the card back to the PCI slot. You don't need to use the LED cable for N8103-160.

(N8103-149/150/151)

Physical Device LED connector

Connected with cable

1 2		1 2
J1A1	J1A3	J2A2
Global fault LED		Global activity LED
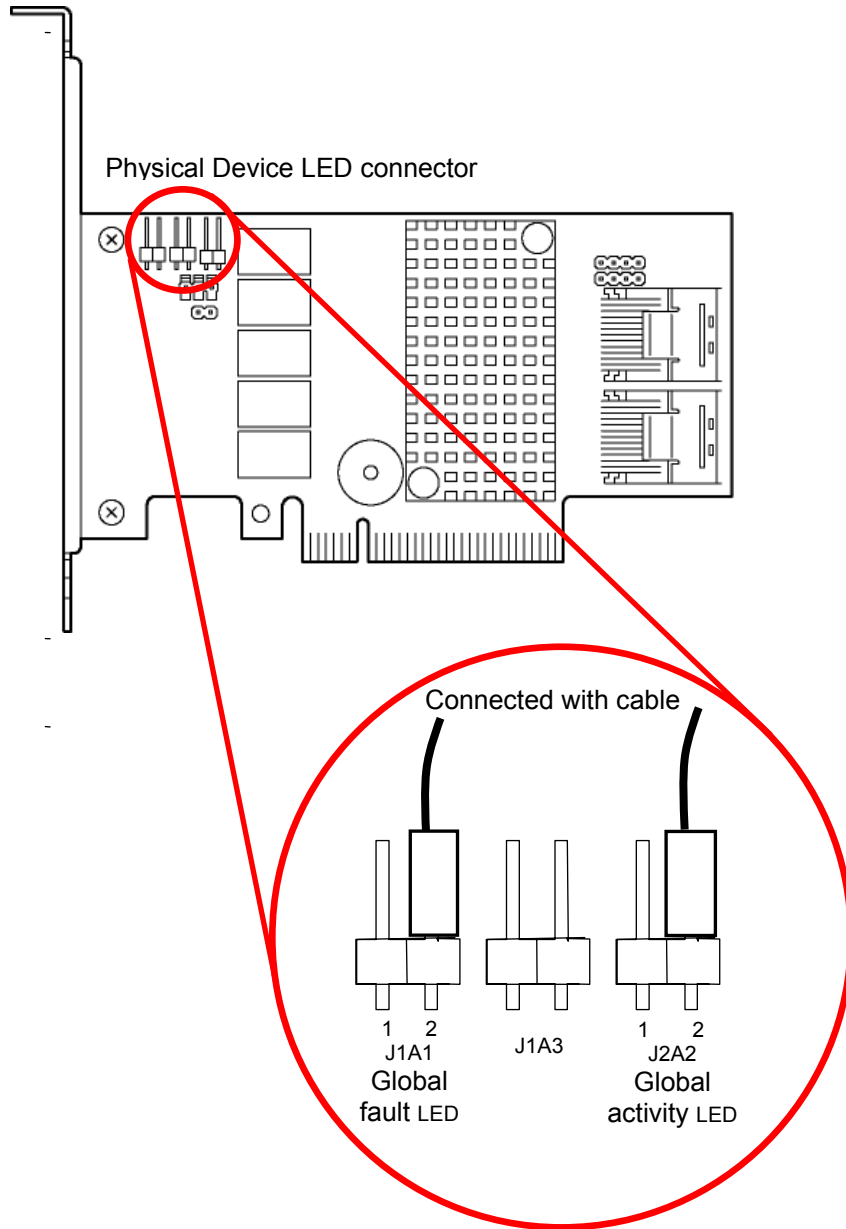
LED cable connection table]

Physical Device LED connector	LED cable (coming with server)
Global fault LED connector (J1A1)	Connected with cable
J1A3	Not used
Global activity LED connector（J2A2）	Connected with cable

5-4. How to attach an additional key

When you attach additional key to this RAID controller, please remove this RAID controller from PCI slot. For the connection, refer to the figure below.
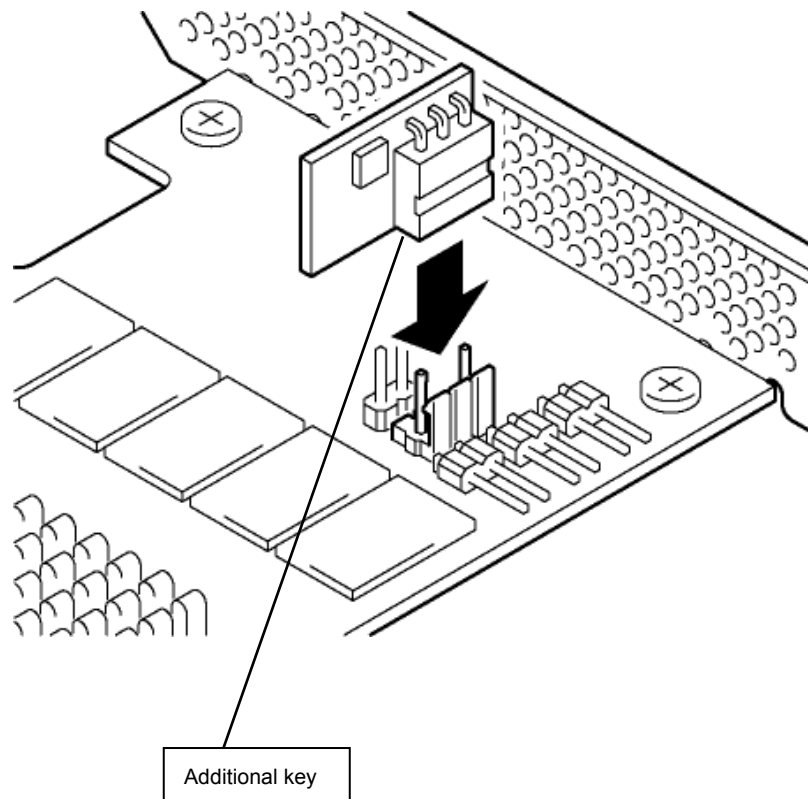
Additional key

> **Notice**
>
> Also when you remove additional key, please remove this RAID controller from PCI slot.

> **Tips**
>
> ■ There are two kinds of additional keys. One is an Upgrade key and the other one is N8103-156 MegaRAID CacheCade.
> ■ The Upgrade key is already attached on the RAID controller of N8103-150.

Chapter 2 RAID Features

This chapter describes the RAID features which this RAID controller supports.

1. Overview

1-1. What is RAID (Redundant Array of Inexpensive Disks)?

RAID is an acronym for "Redundant Array of Inexpensive Disks". It is a storage technology that combines multiple Physical Devices into a logical unit.

In actual, RAID can be configured with more than one Physical Device as a Drive Group (DG) to operate the Physical Devices effectively. This can bring higher performance than a single Physical Device of a large capacity.

This RAID controller has a feature to divide a single DG into several Logical Drives (Virtual Drives) up to 64 Virtual Drives. Maximum number of logical drive for each DG is 64. The host computer recognizes these Virtual Drives as if it were a single Physical Device. The host computer accesses to more than one Physical Device configuring a DG in parallel.

Some RAID levels can recover data from remaining data and parity by using rebuild feature if an error occurs in a single Physical Device. This can provide high reliability for the system.

1-2. RAID Levels

The record mode enabling the RAID feature includes several levels. Among the levels, this RAID controller supports the following levels; RAID 0, RAID 1, RAID 5, RAID 6, RAID 10, RAID 50, and RAID 60. The number of Physical Devices required to create a Drive Group (DG) varies depending on the RAID level as shown in the table below.

RAID level	Number of required Physical Devices	
	Minimum	Recommended number
RAID 0	1	-
RAID 1	2	-
RAID 5	3	8 and fewer
RAID 6	3	8 and fewer
RAID 10	4	-
RAID 50	6	8 and fewer for each DG
RAID 60	6	8 and fewer for each DG

Notice
- RAID levels 5, 6, 50, and 60 are not supported by N8103-149.
- 8 or less drives are strongly recommended to create Disk Group (DG) for higher reliability.
- If you use large capacity drives to create redundant Virtual Drives, it takes a long time to rebuild them when a Physical Device failed. Since the system loose redundant during the rebuild, RAID6 or RAID60 are strongly recommended for higher reliability rather than RAID5 when you use large capacity drives. In RAID6 and RAID60, data is still available even when any two of Physical Devices failed.

Tips
- You can not use 8kB stripe size when you create RAID6 with three physical devices.
- You can not use 8kB strip size when you create RAID60 with plural DGs configured with three physical devices respectively.
- For details of the RAID levels, refer to (2. RAID Levels) described later in this chapter.

1-3. Drive Group

A Drive Group (DG) is configured with more than one Physical Device.
You can create maximum eight DGs on thisRAID controller.

The figure below shows a sample configuration. The three Physical Devices are connected to the RAID controller, creating one DG.
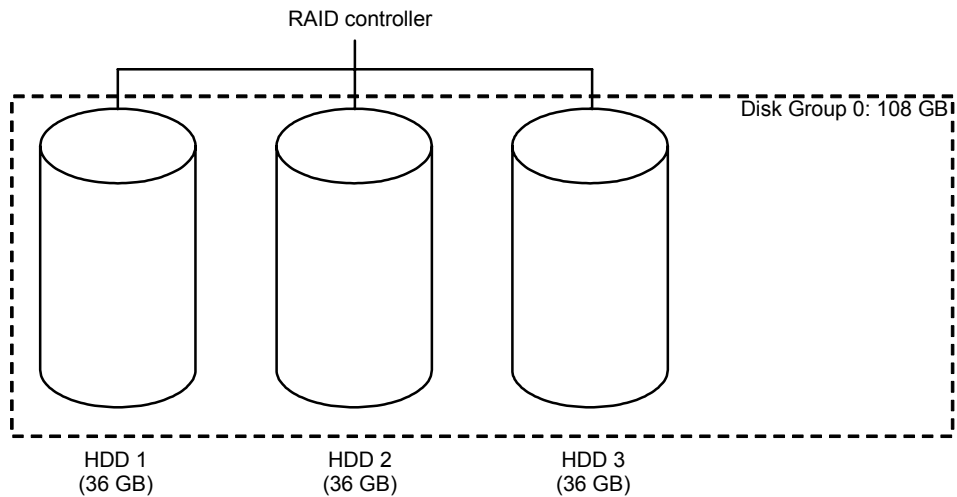
1-4. Virtual Drive

Virtual Drive (VD) is a logical drive defined in Drive Group (DG). VD is recognized as a physical drive by OS. Up to 64 VDs are permitted by the RAID controller. The maximum number of VDs per DG is 64.

The figure below shows a sample configuration in which the RAID controller is connected with three Physical Devices, creating one DG. Two RAID5 VDs are defined in the DG.
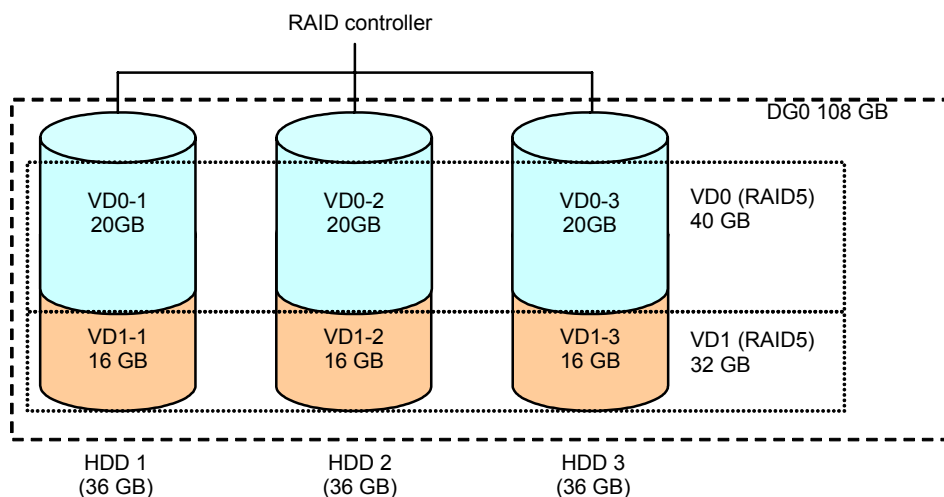
1-5. Parity

The parity means redundant data. A single set of redundant data is created from the data saved in more than one Physical Device.

The created redundant data is used for data recovery when a Physical Device is defected.

1-6. Hot Swap

The Hot Swap allows you to removed (or replaced) a Physical Device while the operating system is running.

1-7. Hot Spare Disk

The Hot Spare disk is a disk used to automatically replace a failed Physical Devices in a redundant RAID configuration. Detecting a Physical Device fault, the system disconnects the Physical Device logically (or makes it offline) and starts rebuild using the Hot Spare disk.

Tips

For Hot Spare rebuild (rebuild using Hot Spare disks), refer to "Chapter 3 Features of RAID controller".

1-8. Write Cache Setting (Write Policy)

·   You can select the following 3 settings about write policy of Virtual Drives (VDs).

(1) Write Back with BBU

This setting is available if the controller is connected to addittional RAID Battery Backup Unit. Write access performance can be much better than write thru mode. If the battery is either charging, bad, or missing, the VDs will run in write thru mode.

(2) Write Through

If the controller is not connected to the battery, this setting is recommended. If you feel that it takes much longer to write data to your VDs than to read data from them, it is recommended to connect the battery.

(3) Always Write Back

This setting is available whether the battery is present or not. However data in cache memory on the controller will be discarded when power failure occurs while the battery is breaking down or charging. Please provide a UPS unit for power failure.

| ✔ Check | ■ For write cache setting, refer to Chapter 4 (3-3.Parameters for Virtual Drive Definition).
 ■ When you purchase the battery, it has not been fully charged yet. If you have selected 'Write Back with battery', please keep the system booted up for about 12 hours until current write policy becomes write back.
 ■ When you select " Always Write Back " equipped with the battery, please note the data of the cache memory to disappear when the power failure occurs while the battery is breaking down, or charging.
 ■ Operation mode should be "Advance mode" to change write cache setting by using URU. For the detailed operation, refer to the "Universal RAID Utility User's Guide" in NEC EXPRESSBUILDER CD-ROM that comes with the server. |

Checking by Utility

Check the settings using the RAID controller management utility URU.For the information of write cache setting, see the property of the Logical Drive. Click the Logical Drive whose information is to be seen on the Tree View and click [Properties] on the pull-down menu of menu item [File].

The [General] tab indicates the property of the Logical Drive.

(1) Write Back

      Writes data to the cache memory asynchronously.

(2) Write Through

      Writes data to the cache memory synchronously.
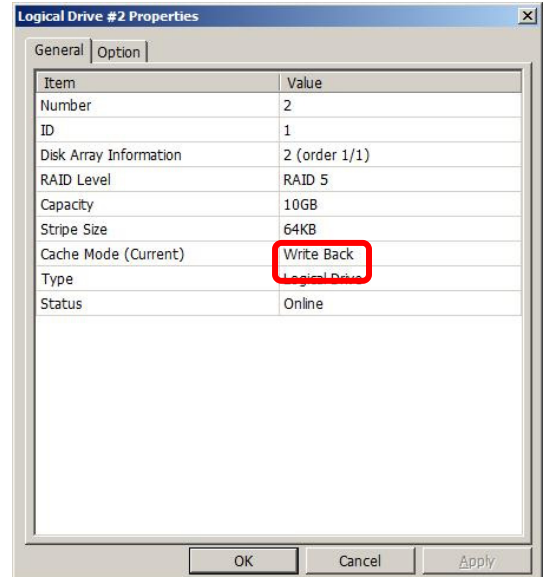
The [Option] tab allows you to see the settings of the Logical Drive.

You can change the settings in the Advanced Mode.

(1) Auto Switch: Switches the mode automatically between Write Back and Write Through depending on the existence and/or status of battery.

(2) Write Back: Writes data to the cache memory asynchronously.

(3) Write Through: Writes data to the cache memory synchronously.
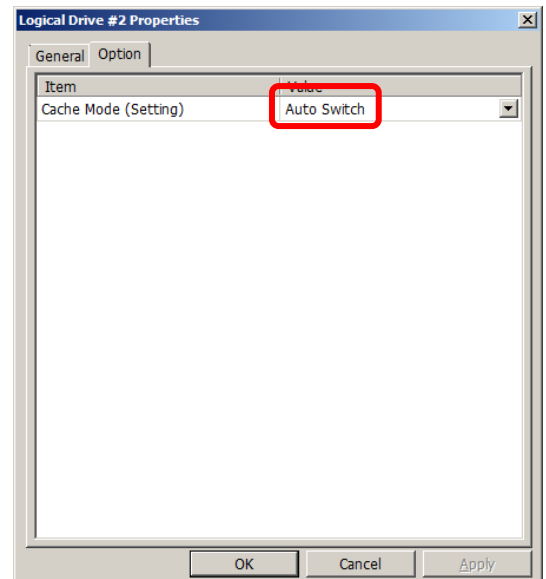
Tips

When OS is Linux, information on source, Type, and event ID is not displayed in system log (syslog). Only the content of the explanation column is recorded.

2. RAID Levels

This section details the RAID levels which the RAID controller can support.

2-1. Characteristics of RAID Levels

The table below lists the characteristics of the RAID levels.

| Level	Function	Redundancy	Characteristics
RAID0	Striping	No	Data read/write at the highest rate Largest capacity Capacity: (capacity of single Physical Device) x (number of Physical Devices)
RAID1	Mirroring	Yes	Two Physical Devices required Capacity: capacity of single Physical Device
RAID5	Striping of both data and redundant data	Yes	Three or more Physical Devices required Capacity: (capacity of single Physical Device) x ((number of Physical Devices) - 1)
RAID6	Striping of both data and redundant data	Yes	Three or more Physical Devices required Capacity: (capacity of single Physical Device) x ((number of Physical Devices) - 2)
RAID10	Spanning of RAID1	Yes	Four or more Physical Devices required Capacity: (capacity of single Physical Device) x ((number of Physical Devices) / 2)
RAID50	Spanning of RAID5	Yes	Six or more Physical Devices required Capacity: (capacity of single Physical Device) x ((number of Physical Devices) - number of DGs)
RAID60	Spanning of RAID6	Yes	Six or more Physical Devices required Capacity: (capacity of single Physical Device) x ((number of Physical Devices) – (2 x number of DGs))

Tips

- You can not use 8kB stripe size when you create RAID6 with three physical devices.
- You can not use 8kB strip size when you create RAID60 with plural DGs configured with three physical devices respectively.
- 8 spans are the maximum for this RAID contoroller.

2-2. RAID0

In RAID 0, data is broken into fragments called blocks. The number of blocks is dictated by the stripe size, which is a configuration parameter of the array. The blocks are written to their respective Physical Devices simultaneously on the same sector. This mode is called "striping".In the figure below, data is recorded in stripe 1 (disk 1), stripe 2 (disk 2), and stripe 3 (disk 3)… in the order. Because RAID0 allows all Physical Devices to be accessed in parallel, it can provide the best disk access performance.

Notice RAID 0 cannot have data redundancy. If a Physical Device is defected, the data saved in the Physical Device cannot be recovered.

```
                        +------------------+
                        |  RAID controller |
                        +------------------+
              +-----------------+---------------+
        +-----------+   +-----------+   +-----------+
        |           |   |           |   |           |
        |   HDD 1   |   |   HDD 2   |   |   HDD 3   |
        |           |   |           |   |           |
        +-----------+   +-----------+   +-----------+
        +-----------+   +-----------+   +-----------+
        |  Stripe 1 |   |  Stripe 2 |   |  Stripe 3 |
        +-----------+   +-----------+   +-----------+
        |  Stripe 4 |   |  Stripe 5 |   |  Stripe 6 |
        +-----------+   +-----------+   +-----------+
```
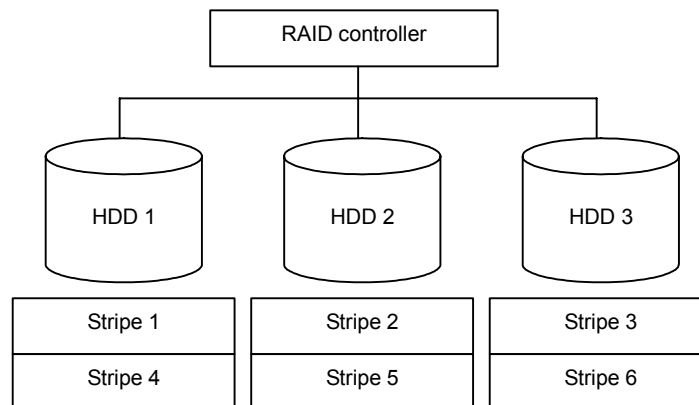
2-3. RAID1

In the RAID1 level, data is written identically to multiple Physical Devices. This mode is called "mirroring".

When data is written onto a single Physical Device, the same data is written onto another Physical Device. If either of the Physical Devices is defected, the other Physical Device containing the same data can substitute for the defected Physical Device. Thus the system can continue to operate without interruption.

```
                    +------------------+
                    |  RAID controller |
                    +------------------+
              +----------------------------+
        +-----------+                +-----------+
        |           |                |           |
        |   HDD 1   |                |   HDD 2   |
        |           |                |           |
        +-----------+                +-----------+
        +-----------+                +-----------+
        |  Stripe 1 |                |  Stripe 1 |
        +-----------+                +-----------+
        |  Stripe 2 |                |  Stripe 2 |
        +-----------+                +-----------+
```
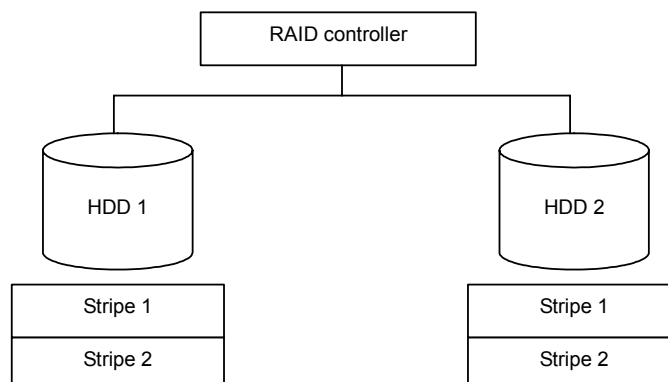
2-4. RAID5

In RAID5, data is distributed to Physical Devices by striping and, at the same time, the parity (redundant data) is distributed to the Physical Devices. This mode is called "block-level striping with distributed parity".

Each of stripe x, stripe x+1, and parity (x, x+1) created from stripe x and stripe x+1 is written onto a specific Physical Device. Accordingly, the total capacity assigned to the parity is just the same as the capacity of a single Physical Device. If any one of the Physical Devices configuring a logical drive is defected, data is still available with no problems.

RAID controller		
HDD 1	HDD 2	HDD 3
Stripe 1	Stripe 2	Parity (1, 2)
Stripe 4	Parity (3, 4)	Stripe 3
Parity (5, 6)	Stripe 5	Stripe 6
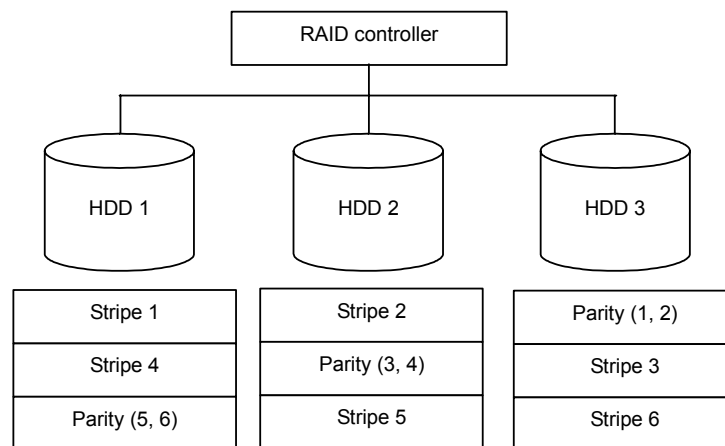
2-5. RAID6

A RAID 6 extends RAID 5 by adding an additional parity block (Q) created by different calculation method such as weighting by some factor, thus it uses block-level striping with two parity blocks distributed across all member disks. This mode is called "block-level striping with double distributed parity". Accordingly, the total capacity assigned to the parity is just the same as the capacity of two Physical Devices. If any two of the Physical Devices configuring a logical drive are defected, data is still available with no problems.

RAID Controller			
HDD 1	HDD 2	HDD 3	HDD 4
Stripe1	Stripe2	Parity P(1,2)	Parity Q(1,2)
Stripe3	Parity P(3,4)	Parity Q(3,4)	Stripe4
Parity P(5,6)	Parity Q(5,6)	Stripe5	Stripe6
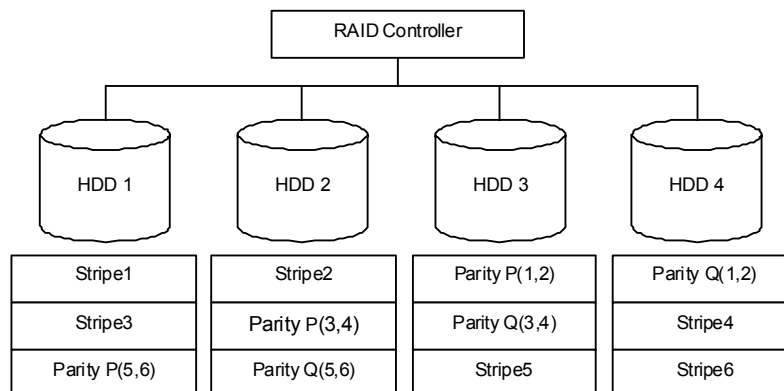
2-6. RAID10

Data to be recorded is distributed to two Physical Devices in mirroring mode. Then, each mirrored data is written onto Physical Device by striping. Owing to this feature, high disk access performance of RAID0 and, in addition, high reliability of RAID1 can be achieved.

RAID controller			
HDD 1	HDD 2	HDD 3	HDD 4
Stripe 1	Stripe 1	Stripe 2	Stripe 2
Stripe 3	Stripe 3	Stripe 4	Stripe 4
Stripe 5	Stripe 5	Stripe 6	Stripe 6

RAID1   RAID1
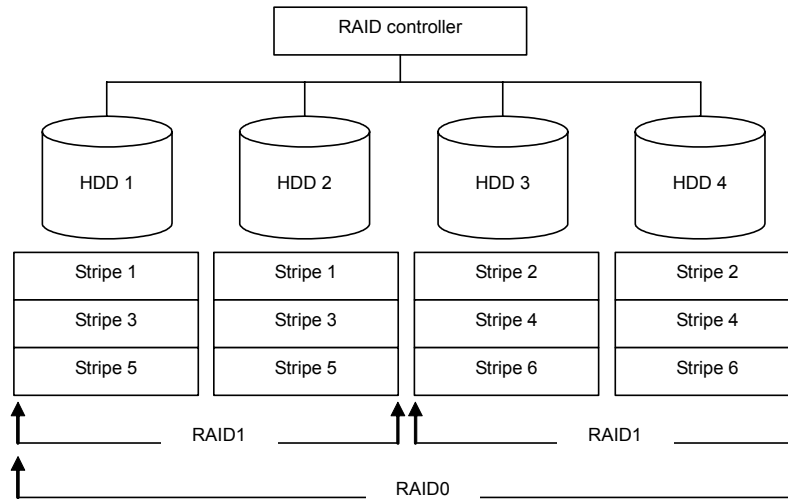
RAID0

2-7. RAID50

Data is distributed to Physical Devices by block-level striping with distributed parity, and then written onto Physical Devices by striping. Owing to this feature, high disk access performance of RAID0 and, in addition, high reliability of RAID5 can be achieved.

RAID controller					
HDD 1	HDD 2	HDD 3	HDD 4	HDD 5	HDD 6
Stripe 1	Stripe 2	Parity (1, 2)	Stripe 3	Stripe 4	Parity (3, 4)
Stripe 6	Parity (5, 6)	Stripe 5	Stripe 8	Parity (7, 8)	Stripe 7
Parity (9, 10)	Stripe 9	Stripe 10	Parity (11, 12)	Stripe 11	Stripe 12

RAID5   RAID5
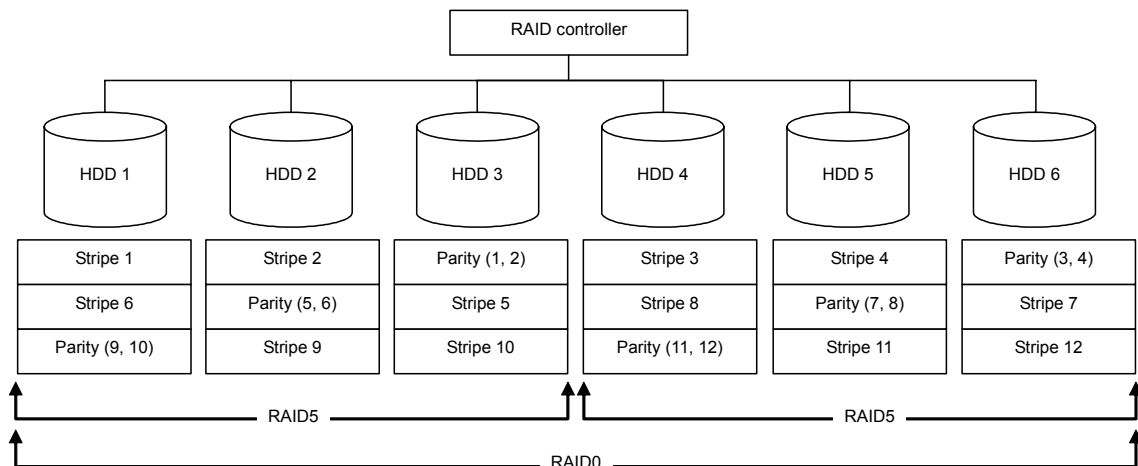
RAID0

2-8.RAID60

Data is distributed to Physical Devices by block-level striping with double distributed parity, and then written onto Physical Devices by striping. Owing to this feature, high disk access performance of RAID0 and, in addition, high reliability of RAID6 can be achieved.

RAID Controller

HDD 1	HDD 2	HDD 3	HDD 4	HDD 5	HDD 6	HDD 7	HDD 8
Stripe 1	Stripe 2	Parity P (1, 2)	Parity Q (1, 2)	Stripe 3	Stripe 4	Parity P (3, 4)	Parity Q (3, 4)
Stripe 5	Parity P (5, 6)	Parity Q (5, 6)	Stripe 6	Stripe 7	Parity P (7, 8)	Parity Q (7, 8)	Stripe 8
Parity P (9, 10)	Parity Q (9, 10)	Stripe 9	Stripe 10	Parity P (11, 12)	Parity Q (11, 12)	Stripe 11	Stripe 12

RAID6   RAID6

RAID0
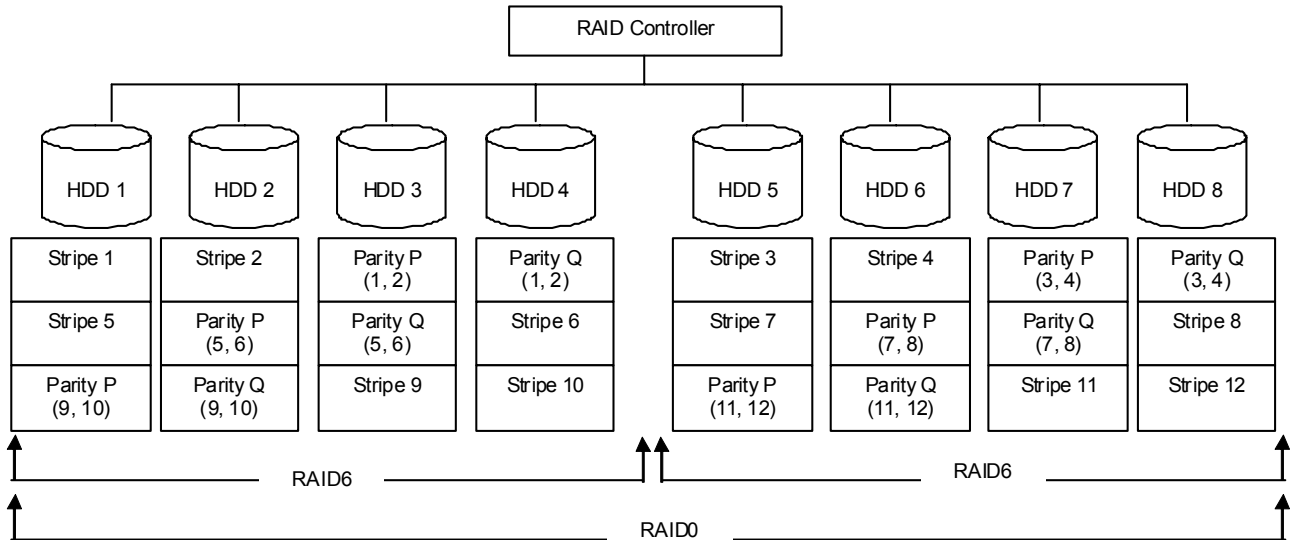
Notice	RAID levels 5, 6, 50, and 60 are not supported by N8103-149.

Chapter 3 RAID controller Features

This chapter describes the features of the RAID controller.

1. Rebuild

If a Physical Device is defected, the rebuild feature can recover the data in the defected Physical Device. The rebuild can be applied to redundant Virtual Drives (VDs) in the RAID1, RAID5, RAID6, RAID10, RAID50 or RAID60 level.

1-1. Manual Rebuild

The manual rebuild can be performed by using URU and WebBIOS, the management utility of the RAID controller. Select a Physical Device and start the rebuild manually.

For the detailed operation to perform by using URU, refer to the "Universal RAID Utility User's Guide" in NEC EXPRESSBUILDER CD-ROM that comes with the server.

For the detailed operation to perform by using WebBIOS, refer to Chapter4 (5-2 Manual Rebuild).

1-2. Auto Rebuild

The RAID controller can automatically start the rebuild without use of any utility such as URU. The auto rebuild includes two types as follows:

- Hot Spare rebuild
  Automatic rebuild by using Hot Spare disks. In the configuration including Hot Spare disks, the rebuild is performed automatically if a Physical Device assigned to a Virtual Drive (VD) is defected.

- Hot Swap rebuild
  Automatic rebuild by Hot Swapping defected Physical Device.

Notice	Note the following for the rebuild: ■ The Physical Device used for rebuild should have the same capacity, rotation speed, and other specification as the defected Physical Device. ■ During rebuild, the processing rate is decreased due to much load. ■ During rebuild, do not shutdown or reboot the server. ■ The interval from the removal of the defected Physical Device to the installation of a substitute Physical Device should be 60 sec or longer. ■ If the Hot Swap rebuild does not operate, perform the manual rebuild. ■ The Physical Devices that is failed once or more cannot be specified as a Hot Spare disk.

2. Patrol Read

The patrol read gives the read & verify test in the entire area of Physical Devices. It can be performed for all Physical Devices assigned to Virtual Drives (VDs) and Hot Spare disks.

The Patrol Read allows subsequent defects of Physical Devices to be detected and repaired.

For Physical Devices configuring redundant VDs or those assigned to Hot Spare disks, error sectors detected during Patrol Read can be repaired.

Notice

Note the following for the patrol read:
- Patrol Read feature is factory-set to "Enabled".
- Patrol Read feature runs automatically on Physical Devices at regular intervals.
- For the detailed operation, refer to the "Universal RAID Utility User's Guide" in NEC EXPRESSBUILDER CD-ROM that comes with the server.

3. Consistency Check

The Consistency Check is used to check consistency among Virtual Drives (VDs). It is available for redundant VDs except for RAID0.

You can perform Consistency Check through WebBIOS or URU.

Consistency Check performs not only consistency check but also repair of error sectors. Accordingly, it can be used as preventive maintenance.

Notice

Note the following for Consistency Check:
- During Consistency Check, the processing rate is decreased due to much load.
- If you shut donw or reboot the system during Consistency Check it resumes after the system restarts.
- For scheduled operation for Consistency Check, use WebBIOS, or use task scheduling feature in OS and register a raidcmd of URU as a task.

4. Background Initialize

The Background Initialize is automatically executed when RAID5 Virtual Drive (VD) is created in the Drive Group (DG) composd of five or more Physical Devices, or RAID6 VD is created in the DG composd of seven or more Physical Devices.

The Background Initialize performs the parity generation processing to the area not initialized in the background. The processing is equivalent to that of Consistency Check.

However, the Background Initialize is not performed in the following cases.

- Full Initialize has already been executed and completed normally before executing Background Initialize.[1]

    [1] Full Initialize is a function to clear the entire area of a VD with "0".

- Consistency Check has already been executed and completed normally before executing Background Initialize.

- Rebuild has already been executed and completed normally before executing Background Initialize.[2]

    [2] Background initialize may be performed after rebuild when the configuration is RAID 6.

- "Yes" is specified for "Disable BGI" in VD Definition.

- VD is in degraded or offline state.[3]

    [3] Background Initialize is performed if the VD configured as RAID6 is partially degraded.

The Background Initialize is performed again if any of the following cases occurred in the VD even though Background Initialize has already completed.

- When the VD is degraded or offline, you execute Make Online to a Physical Device which is in Offline status, after that the VD becomes Optimal state.

- When you replace the RAID controller with another one the maintenance parts and others.

- When you execute Reconstruction to existing VD to make RAID5 or RAID6 VD with five or more Physical Devices.

Notice

Note the following for Background Initialize:
- During Background Initialize, the processing rate is decreased due to much load.
- Background Initialize will restart a few minutes later even if it is interrupted.

5. Reconstruction

The reconstruction feature is used to change configuration and/or RAID level of existing Virtual Drive (VD). The Reconstruction contains the following three features, however, the RAID controller supports "Migration with addition" only.

> **Notice**
> - You can use WebBIOS for Reconstruction. URU does not support Reconstruction.
> - This RAID controller does not support the Expand feature and Virtual drive Erase.

5-1. Removed physical drive

Unsupported.

5-2. Migration only

Unsupported.

5-3. Migration with addition

Use this feature to add Physical Devices to existing Virtual Drive (VD). The execution patterns are as shown below (α: Number of Physical Devices to be added).

Before execution		After execution		Description
RAID level	Numver of Physical Devices	RAID level	Number of Physical Devices	
RAID0	X	RAID0	x+α	Capacity increased : equivalent to α Physical Devices.
RAID0	1	RAID1	2	Capacity remains unchanged.
RAID0	X	RAID5	x+α	Capacity increased : equivalent to α-1 Physical Devices.
RAID0	X	RAID6	x+α (α=2 or more)	Capacity increased : equivalent to α-2 Physical Devices.
RAID1	2	RAID0	2+α	Capacity increased : equivalent to α+1 Physical Devices.
RAID1	2	RAID5	2+α	Capacity increased : equivalent to α Physical Devices.
RAID1	2	RAID6	2+α	Capacity increased : equivalent to α-1 Physical Devices.
RAID5	X	RAID0	x+α	Capacity increased : equivalent to α+1 Physical Devices.
RAID5	X	RAID5	x+α	Capacity increased : equivalent to α Physical Devices.
RAID5	X	RAID6	x+α	Capacity increased : equivalent to α-1 Physical Devices.
RAID6	X	RAID0	x+α	Capacity increased : equivalent to α-2 Physical Devices.
RAID6	X	RAID5	x+α	Capacity increased : equivalent to α+1 Physical Devices.
RAID6	X	RAID6	x+α	Capacity increased : equivalent to α Physical Devices.

Note the following for the Reconstruction:
■ Be sure to make backup copy of data and perform Consistency Check before starting Reconstruction.
■ You can not perform Reconstruction on the configuration where several VDs are defined in one DG.
■ During Reconstruction, the processing rate is decreased due to much load.
■ Reconstruction can be performed for the degraded or partially degraded VD. However, it is recommended to execute Rebuild to recover the VD, then execute Reconstruction.
■ During Reconstruction, do not shutdown or reboot the server.
■ In some configuration, Background Initialize may start automatically Reconstruction is complete.

Notice

Ex: Migration with addition for RAID5 Virtual Drive

The figure below shows an example of adding a single 36GB Physical Device to a RAID5 VD configured with three 36GB Physical Devices.
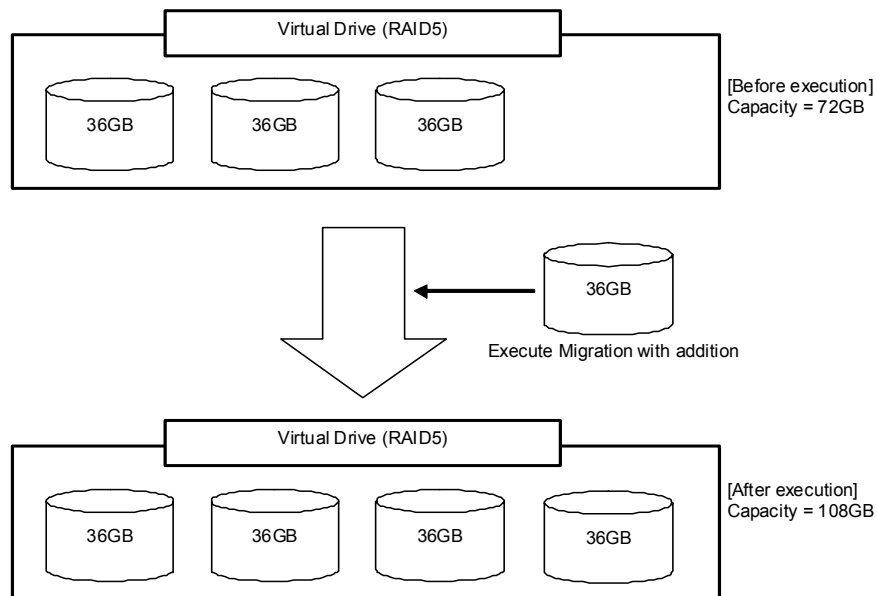
6. Manage Powersave

Manage Powersave is a function to carry out a spin down and power saving, when there is no access in physical devices for a definite period of time.

Manage Powersave contains the following three features, however, this RAID controller supports "Hot spare drives" only.

> **Tips**
>
> At Universal RAIDUtility, it can be set up by "the HDD Power Saving function."

> **Notice**
>
> Note the following for Manage Powersave:
> - When Patrol Read, Consistency Check, changing parameters and any setup are performed while the physical device is spun down.the physical device is spun up.
> - A spin up may take about 2 minutes.
> - Manage Powersave is not applicable to SSDs.

6-1. Unconfigured drives

Unsupported.

6-2. Hot spare drives

You can define in 30 minutes – 24 hours for definite period of time to spin down a physical device.

> **Tips**
>
> - With UniversalRAIDUtility, you can define in 30 minutes - 8 hours for definite period of time to spin down a physical device.
> - The delay for about 5 minutes may come out of power-saving shift time from the set-up time.

6-3. Configured drives

Unsupported.

7. Premium feature

Premium feature is enabled by an additional key which is attached to this RAID controller. You need to purchase an additional key as separate item.

Tips	Refer to Chapter 1 (5. Hardware Setup) for how to attach an additional key.

7-1. CacheCade

CacheCade uses SSD as read cache and improves random read performance.

Tips	For the detailed operation to perform by using WebBIOS, Refer to Chapter 4 (4. how to create CacheCade).

Notice	■ It depens on system configuration and system operations how performance which is brought by CacheCade improves. ■ CacheCade is treated as a VD by this RAID controller however OS can not recognize the CacheCade VD as a disk. ■ The maximum size of CacheCade is 512GB in total. ■ SSDs used for CacheCade should have the same capacity, the same SAS or SATA interface and other specification. ■ Only one VD as CacheCade is supported by this RAID controller. ■ CacheCade cannot be enabled for VDs configured with SSD(s).

Chapter 4 WebBIOS

This chapter describes the feature of WebBIOS.

1. Supported Functions

❑ Indication of model name and capacity of Physical Device

❑ Indication of allocation status of Physical Device

❑ Creation of VD

   ❑ Setting of RAID Level

   ❑ Setting of Stripe size

   ❑ Setting of Read Policy / Write Policy / IO Policy

❑ Creation of CacheCade

❑ Indication of configuration information and status of VD

❑ Removal of VD

❑ Clearing of configuration

❑ Execution of initialization

❑ Execution of Check Consistency

❑ Execution of manual rebuild

❑ Execution of reconstruction

❑ Setting of Manage Powersave

2. WebBIOS Menu

2-1. Starting WebBIOS

When you see the screen as shown below, press **Ctrl** + **H** to start WebBIOS.

```
LSI MgaRAID SAS-MFI BIOS
Version XXXX(Build MMM DD, YYYY)
Copyright(c) 20XX LSI Corporation

HA - X (Bus X Dec X) MegaRAID SAS 92XX-8X
FW package: XX.X.X-XXXX

0 Virtual Drive(s) found on the host adapter.

0 Virtual Drive(s) handled by BIOS.
Press <Ctrl> <H> for WebBIOS.__
```

POST screen image (with no Virtual Drive assigned)

The [Adapter Selection] screen is shown after passing through POST. Select [Adapter No.] box of an adapter you want to operate with WebBIOS, then click [Start].

Adapter No.	Bus No.	Device No.	Type	Firmware Pkg. Version
0. ◉	9	0	LSI MegaRAID SAS 9267-8i	23.1.1-0006

Start
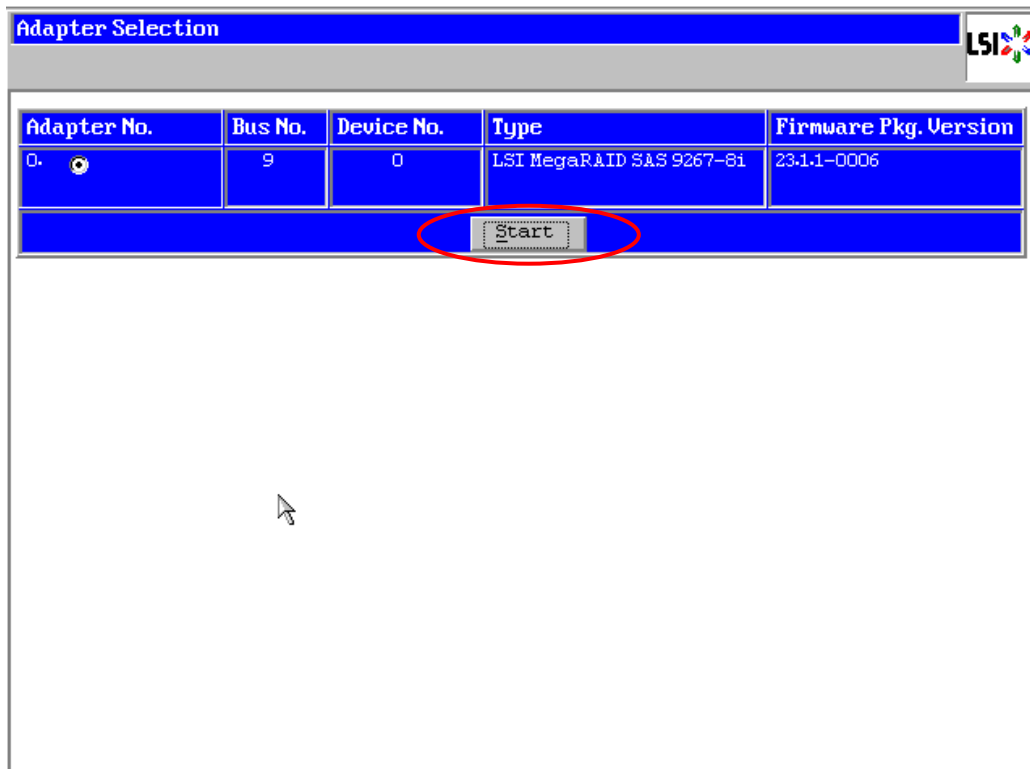
- ■ Do not press unnecessary key such as **Pause** during POST.
- ■ If you fail to press **Ctrl** + **H** or the system proceeds without displaying the WebBIOS Adapter Selection, reboot the system, and press **Ctrl** + **H** on POST screen.

Notice

2-2. Main Menu

When the adapter is selected on [Adapter Selection], the WebBIOS Top Menu appears.

See the following [*WebBIOS Menu*] table about function of each menu. Also, see the [*Status Indication of Virtual Drive*] table, the [*Status Indication of Physical Device*] table about each status of Virtual Drive (VD) and physical device.
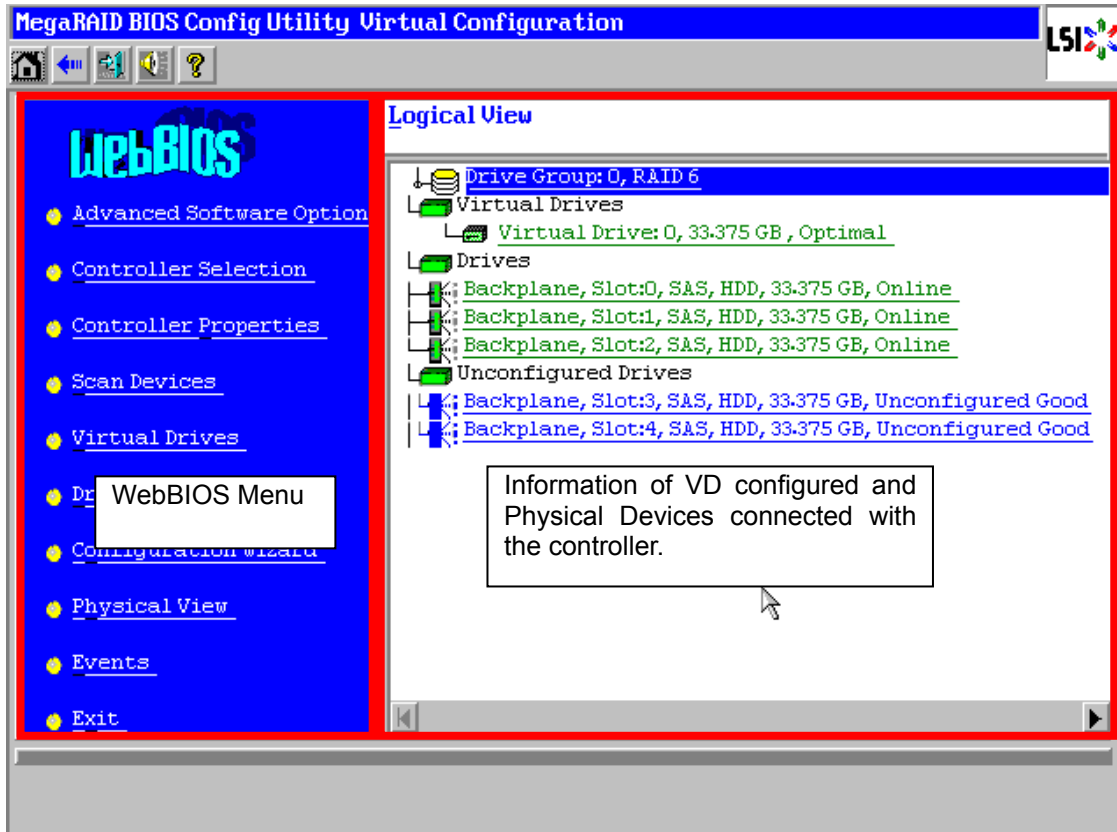
WebBIOS Menu

Advanced Software Options	Displys advanced features supported by this controller.
Controller Selection	Goes back to Adapter Selection menu.
Controller Properties	Displays properties of the controller.
Scan Devices	Detects Physical Devices connected with the controller again.
Virtual Drives	Opens operation window for VD that has already been configured.
Drives	Opens operation window for Physical Device connected with the controller.
Configuration Wizard	Displays the wizard to configure VD.
Physical View / Logical View	Switches indication between Physical Devices and VD configuration.
Events:	Displays event data.
Exit	Goes to Exit menu of WebBIOS.

Status Indication of Virtual Drive (not shown on Physical View)

Optimal	Indicates that the VD is in normal state. The indication is green.
Partially Degraded	Indicates that one of the Physical Devices in the relevant VD is degraded but the VD is still redundant. For example, one Physical Device is degraded in RAID6/60 configuration. The indication is blue.
Degraded	The VD is not redundant any longer. It indicates that one of the Physical Devices (or two of the Physical Devices in RAID6/60) in the relevant VD is/are degraded. The indication is blue.
Offline	The VD is in offline state. The indication is red.
Initialization	The VD is being initialized.
ConsistencyCheck	Consistency Check is being performed to the VD.
Rebuild	The VD is being rebuilt.
BackGroundInitialize	The VD is being initialized in background.
Reconstruction	The VD is being reconstructed.

Status Indication of Physical Device

Unconfigured Good	The Physical Device connected with the controller is not in use. The indication is blue.
Online	Indicates that the Physical Device in configuration is in normal state. The indication is green.
Offline	Indicates that the Physical Device in configuration is in offline state. The indication is red.
Unconfigured Bad	The Physical Device is faulty. (The Physical Device in this status can be checked only on Physical View.) The indication is black.
Failed	The Physical Device is faulty. The indication is red.
Rebuild	The Physical Device is being rebuilt. The indication is yellow.
Hotspare	The Physical Device is assigned to Hot Spare. The indication is pink.

Notice

- The right frame of Physical View shows slot number, type, capacity, and status of Physical Device.
- The slot number in Physical View indicates the slot number of the Physical Device bay.
- This controller does not support the Events feature.
- The Physical Device that has S.M.A.R.T error is displayed in yellow and the Pred Fail Count of the Physical Device becomes "1".
- S.M.A.R.T. error predicts the future failure of a Physical Device with its self-diagnosis. Though the device may not be faulty in a short time later, we recommend you to replace it with new one.

2-3. Advanced Software Options

This menu displys advanced features which this RAID controller suppots.

2-4. Controller Selection

If one or more RAID controllers are installed in the server, you need to select an adapter that you want to operate. Clicking [Controller Selection] on WebBIOS top menu opens the [Adapter Selection] screen.

Adapter No.	Bus No.	Device No.	Type	Firmware Pkg. Version
0. ●	9	0	LSI MegaRAID SAS 9267-8i	23.1.1-0006

Start

2-5. Controller Properties

When you click [Controller Properties] on WebBIOS Top Menu, the configuration information is displayed.

The configuration information is continued on the next page. Click [Next] to view more information.

Click [Next] to see the detailed settings of this controller.

The detailed setting is continued on the next page. Click [Next] to view more information.

Default settings and their explanation

Item	Default	Description	Change
Battery Backup	Present None	Displays Properties of a battery. • When a battery is installed: Present • When a battery is not installed: None	-
Set Factory Defaults	No	-	Prohibited[*1]
Cluster Mode	Disabled	-	Prohibited
Rebuild Rate	30	-	Permitted
BGI Rate	30	-	Permitted
CC Rate	30	-	Permitted
Reconstruction Rate	30	-	Permitted
NCQ	Enabled	-	Prohibited
Coercion Mode	None	-	Prohibited
S.M.A.R.T. Polling	300	-	Prohibited
Alarm Control	Disabled	Disabled: Does not issue an alarm. Enabled: Issues an alarm. Silence: Stops an alarm if beeped.	Permitted[*2]
Patrol Read Rate	30	-	Permitted
Cache Flush Interval	4	-	Prohibited
Spinup Drive Count	2	-	Prohibited
Spinup Delay	9	-	Prohibited
Stop CC On Error	No	Specify the operation at error detection in Check Consistency. No: Recover and resume. Yes: Abort	Permitted
Maintain PD Fail History	Enabled	-	Prohibited
Controller BIOS	Enabled	-	Prohibited
Manage Powersave	Setting	-	Permitted
Global Hotspare for Emergency	Disable	-	Prohibited
Schedule CC	Supported	Set the scheduled consistency check.	Permitted
StopOnError	Disable	-	Prohibited
Disk Activity	Disable	-	Prohibited
Link Speed	Manage	-	Prohibited

Unconfigured Good for Emergency	Disable	-	Prohibited
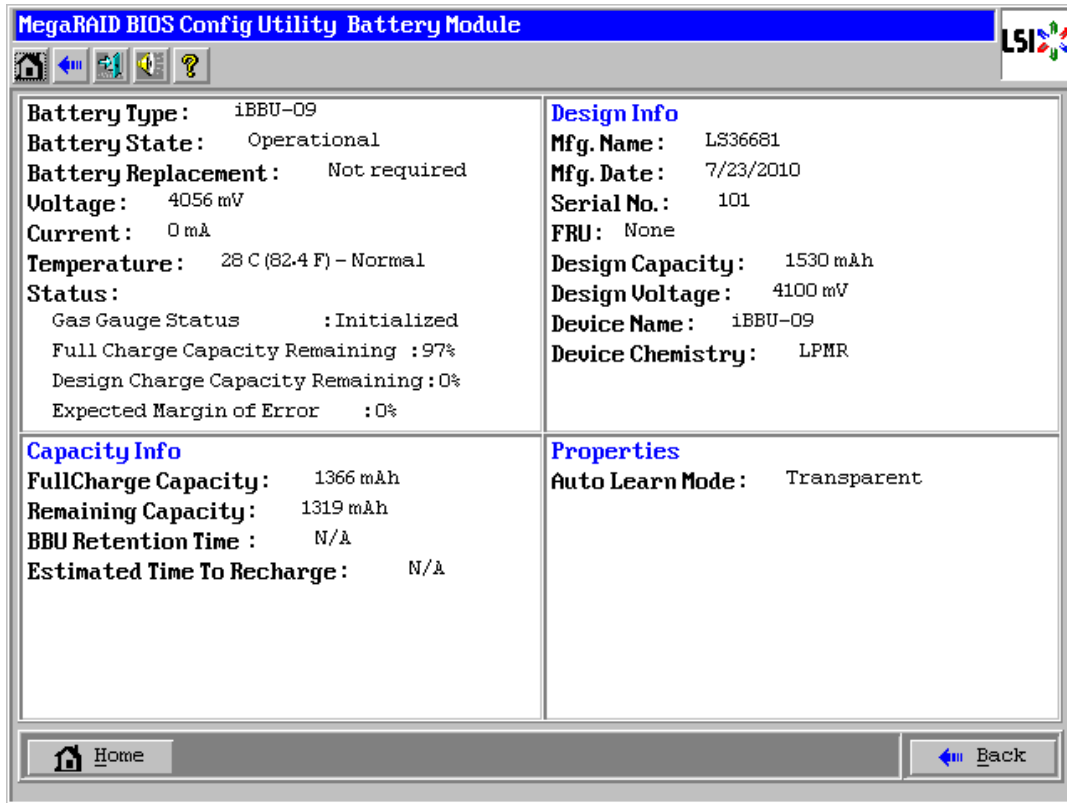
Notice

*[1]: Do not perform "Set Factory Defaults". If performed, the NEC's factory-set value will no longer be restored.

*[2]: If Alarm Control is set to "Enabled", the server issues an alarm sound when the VD is partialliy degraded or degraded due to failure of Physical Device.

Tips

How to change Setting Value

On [Controller Properties] screen, change a parameter to desired value, and then click [Submit] at the center of the screen to determine the new value.

If an additional battery is installed, the status of "Battery Backup" is indicated as "Present".
Clicking [Present] opens the Battery Status screen as shown below.。

```
MegaRAID BIOS Config Utility Battery Module                          LSI

Battery Type:      iBBU-09              Design Info
Battery State:     Operational          Mfg. Name:    LS36681
Battery Replacement:   Not required     Mfg. Date:    7/23/2010
Voltage:     4056 mV                    Serial No.:    101
Current:    0 mA                        FRU:  None
Temperature:    28 C (82.4 F) - Normal  Design Capacity:   1530 mAh
Status:                                 Design Voltage:    4100 mV
  Gas Gauge Status       : Initialized  Device Name:   iBBU-09
  Full Charge Capacity Remaining :97%   Device Chemistry:   LPMR
  Design Charge Capacity Remaining:0%
  Expected Margin of Error    :0%

Capacity Info                           Properties
FullCharge Capacity:    1366 mAh        Auto Learn Mode:    Transparent
Remaining Capacity:     1319 mAh
BBU Retention Time :     N/A
Estimated Time To Recharge:    N/A




        Home                                              Back
```

Tips

■ The value shown in "Current" field indicates battery status.
  - Positive value: Battery is being charged
  - Negative value: Battery is being discharged..
■ WebBIOS does not refresh the indication on window. To view the indication,
  change window (e.g., go back to Top Menu), then check status again.

Clicking [Settings] in "Manage Powersave" column opens the "Power Save Setting" screen as shown below.
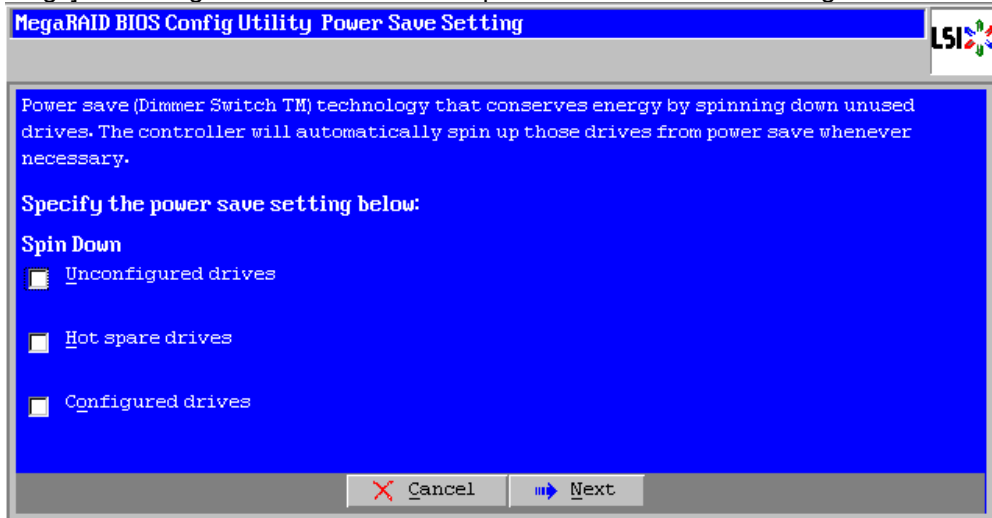
Default settings and their explanation about Management Powersave

Item	Default	Description	Change	Item
Unconfigured drives	No Marks	Select drive types to spindown. This controller suppots only for Hot spare drives.	Prohibited	
Hot spare drives	No Marks		Permitted	
Configured drives	No Marks		Prohibited	

Clicking [Supported] in "Schedule CC" column opens setting screen for scheduled consistency check.

Default settings and their explanation about Schedules of Check Consistency

Item	Default	Description	Change
CC Frequency	Disable	Specify the interval of schedule for the Check Consistency. Disable: Does not operate. Continuous : Operates always. Hourly : Operates once every hour. Daily : Operates once every day. Weekly : Operates once every week. (Recommended value) Monthly : Operates once every month. (Recommended value)	Permitted
CC Start Time	12 : 00 AM	Specify the start time of the schedule for the Check Consistency.	Permitted
Select VDs to Exclude CC	No Marks	Specify VDs to which you don't want to operate the Check Consistency. Checked: Does not operate the Check Consistency to the selected VDs. UnChecked: Operates the Check Consistency to all VDs.	Permitted
CC Start (mm/dd/yyyy)	01/01/2000	Specify start date of the schedule for the Check Consistency in the first time.	Permitted
CC Mode	Sequential	Sequential: Operates the Check Consistency to more than one VD one by one. Concurrent: Operates the Check Consistency at the same time to more than one VD.	Permitted

Notice

Specify "CC Frequency" to enough time because it is the Interval of the start time of Check Consistency.

2-6. Scan Devices

When you click [Scan Devices] on WebBIOS Top Menu, the connected Physical Devices are detected again. Use this feature when you have installed a new Physical Device additionally while the WebBIOS is running.

Notice
- If the newly connected Physical Device contains other configuration information, [Foreign Configuration] screen as shown below appears. To use the Physical Device as new one, click [Clear] to clear the configuration information in the Physical Device.
- If you want to create a logical drive by using the URU with the newly connected Physical Device containing other configuration information, first clear other configuration information using this Scan Devices feature.

(*) URU does not have this feature.
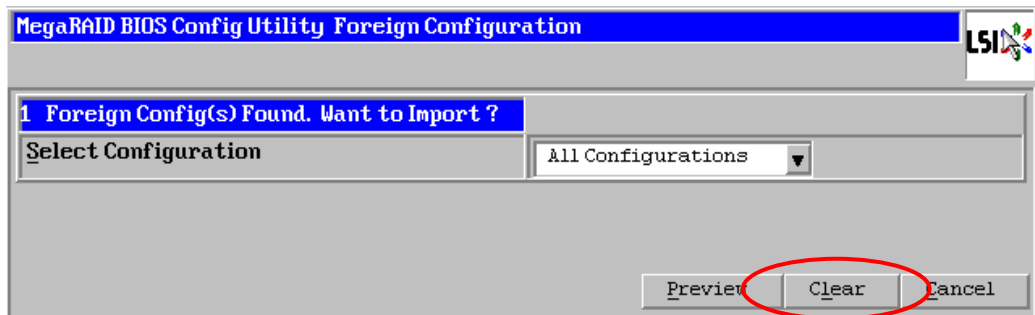
2-7. Virtual Drives

When you click [Virtual Drives] on WebBIOS Top Menu, you can see the screen for operating the Virtual Drive (VD) that has already been configured. Exsiting VDs are shown in List of VDs box.


Fast Initialize	Clears the top area of a selected VD
Slow Initialize	Clears whole area of a selected VD
Check Consistency	Checks consistency in the whole area of a selected VD If inconsistency is found, correct it.
Properties	Displays the properties of a selected VD Refet to Cahpter 4 (3-3. Parameters for Virtual Drive Definition) for details.

Set Boot Drive(Current =XX)
 	
Default: NONE
	Selects a VD to start OS.
	If the system contains several VDs and you want to start the OS from the VD other than VD0, you need to specify the boot drive manually as shown below. Use the default setting in any other cases.
	[Setting procedure]
	    1. Select a VD you want to start OS from the List of VDs box.
	    2. Put a checkmark on "Set Boot Drive (Current =XX)".
	    3. Click [Go].

Notice

- If no VD exists, the List of VDs box will be blank. Use this menu only when a VD exists.
- Even the "Set Boot Drive" is properly specified, the OS may fail to start due to Boot Priority specified in BIOS SETUP of the server.
- Inconsistency may be detected at the first Check Consistency performed after the VD was configured.

2-8. Drives

When you click [Drives] on WebBIOS Top Menu, the screen for operating the connected Physical Drives appears.
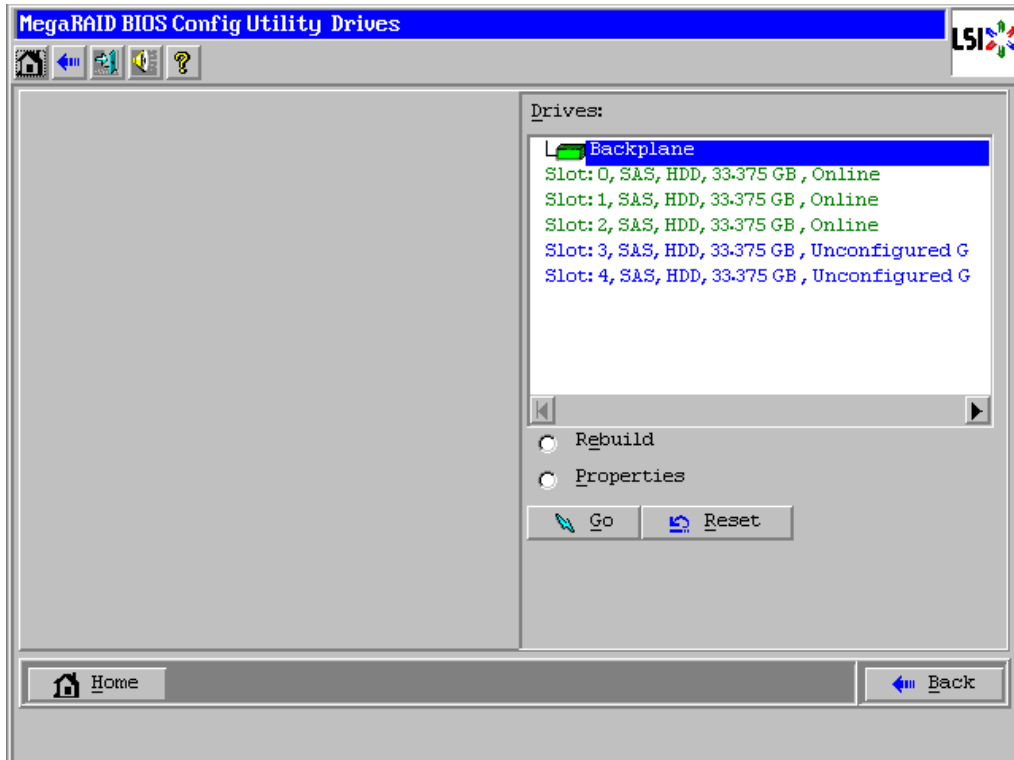
	If no device is connected, the upper right column of the screen will be blank. Use this menu only when a Physical Device is being connected.
Notice	

Take the following procedures to check Physical Device Properties. Shown below is an example to check property of a Physical Device.

1. Click a Physical Device you want to check.

2. Click the checkbox for [Properties].

3. Click [Go].
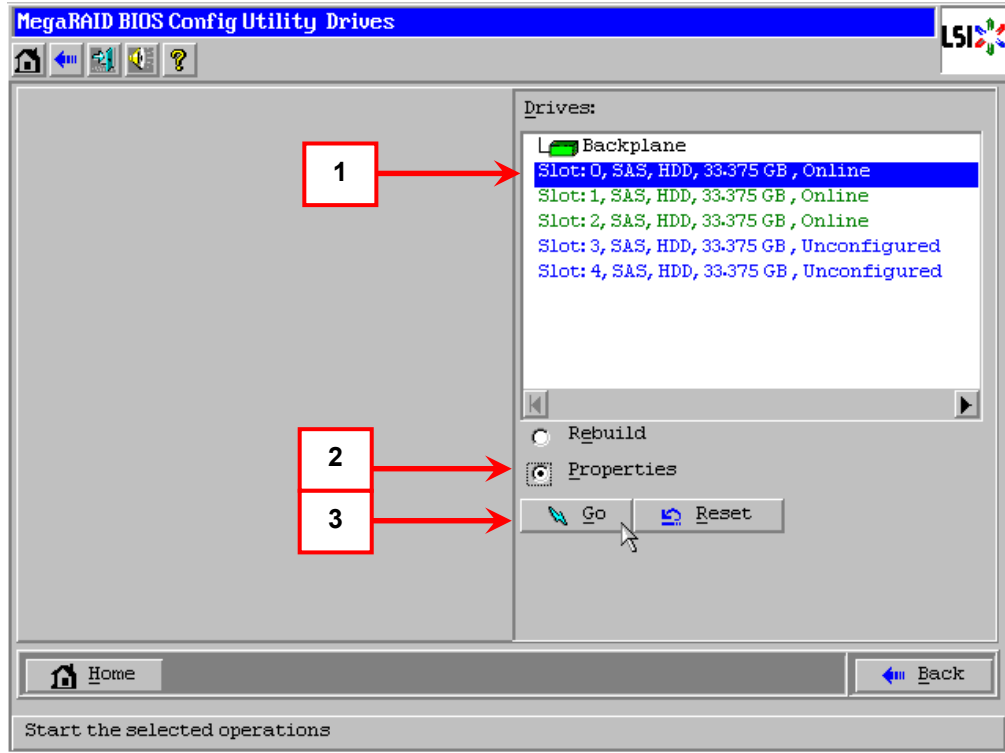
The Properties screen as shown below appears.
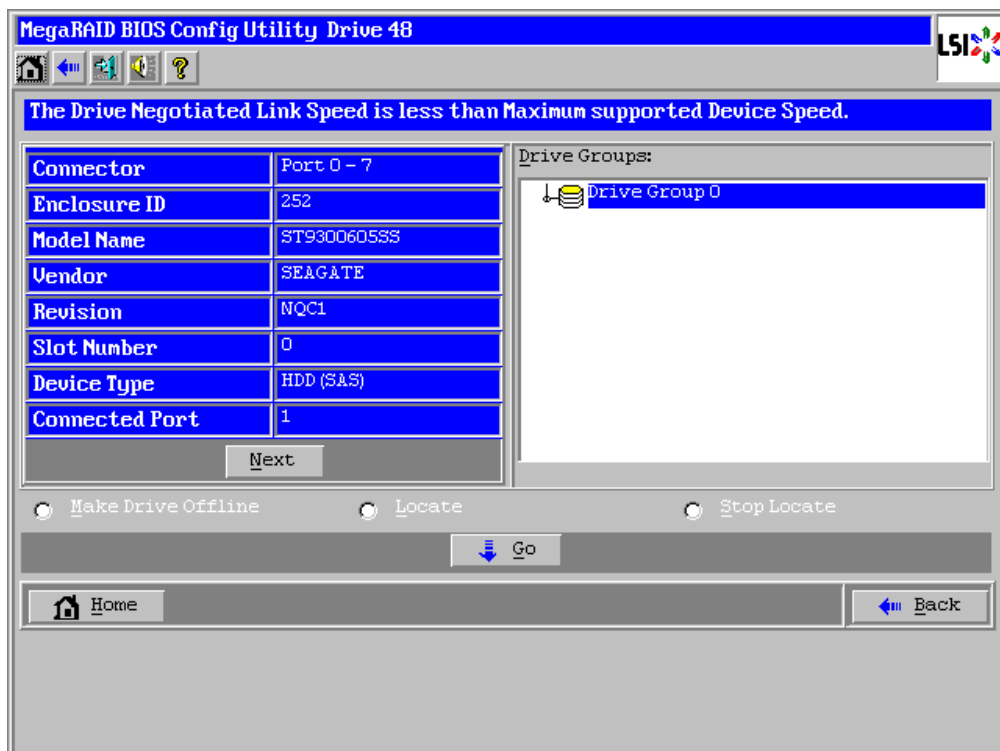
Physical Drive Properties

Locate	Let Disk Status lamp lights or blinks.
Stop Locate	Let Disk Status lamp goes out.
Make Global HSP	A selected Physical Device is assigned as Hot Spare available for all DGs.
Make Dedicated HSP	A selected Physical Device is assigned as Hot Spare available only for the specific DG.
Remove HOTSPARE	The selected Physical Device is unassigned from Hot Spare and made Unconfigured Good state.
Make Unconf Bad	Make a selected Physical Device in faulty state. This is indicated on a Physical Device of which status is "Unconfigured Good".
Make Unconf Good	Make a selected Physical Device in "Unconfigured Good" state. This is indicated on a Physical Device of which status is "Unconfigured Bad".
Prepare Removal	Make the power status of a selected Physical Device in "Powersave" state. This is indicated on a Physical Device of which power status is "On" and the status is "Unconfigured Good".
Undo Removal	Make the power status of a selected Physical Device in "On". This is indicated on a Physical Device of which power status is "Powersave".
Make Dive Offline	Make a selected Physical Device in "Offline" state. This is indicated on a Physical Device of which status is "Online".
Make Drive Online	Make a selected Physical Device in "Online" state. This is indicated on a Physical Device of which status is "Offline".
Rebuild Drive	Start rebuilding a VD that contains a selected Physical Device. This is indicated for a Physical Device of which status is "Offline".
Mark as Missing	Remove a VD that contains a selected Physical Device from the DG. This is indicated on a Physical Device of which status is "Offline".
Drive Erace	This RAID Controller does not support this feature.

Notice This RAID Controller does not support Drive Erace feature.

2-9. Configuration Wizard

Use this wizard to configure a Virtual Drive (VD) using the Physical Devices connected. The detailed explanation of this feature is given in Capter 4 (3. How to create Virtual Drives) and (4. How to create CacheCade).

2-10. Physical View / Logical View

If Virtual Drives (VDs) have been configured, Drive Group (DG) is displayed on WebBIOS Top Menu. Clicking [Physical View] displays information for Physical Devices in DG. Clicking [Logical View] displays VD in DG.
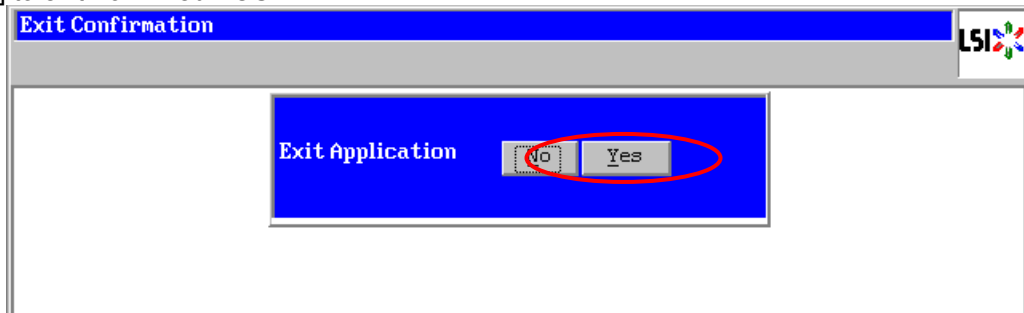
2-11. Events

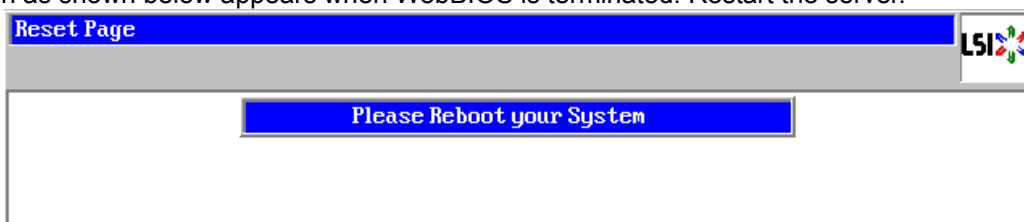The Events screen is used to confirm the system events.

Notice	This RAID Controller does not support Events feature.

2-12. Exit

When you click [Exit] on WebBIOS Top Menu, a confirmation screen to exit from WebBIOS is displayed. Click [Yes] to exit from WebBIOS.

The screen as shown below appears when WebBIOS is terminated. Restart the server.

There's no problem if the message may disappear when you push "Space" or "Enter" with "Please Reboot your System" is displayed.
Restart the server.

Notice

3. How to Create Virtual Drives

This section describes the procedures for configuration of Virtual Drive (VD) using WebBIOS. Follow the notes described below to allow you to create Virtual drives.

1) The Physical Devices configuring the DG should have the same capacity and rotation speed.

2) Be sure to execute Check Consistency after creating VD.

3) When you install an OS in a VD on the RAID Controller, create one VD only which is for OS installation.

	Inconsistency may be detected at the first Check Consistency performed after the VD was configured.
Tips	

3-1.Configuration Wizard

When you click [Configuration Wizard] on WebBIOS Top Menu, the screen as shown below appears.
Select a relevant operation, and click [Next] at lower right of the screen.
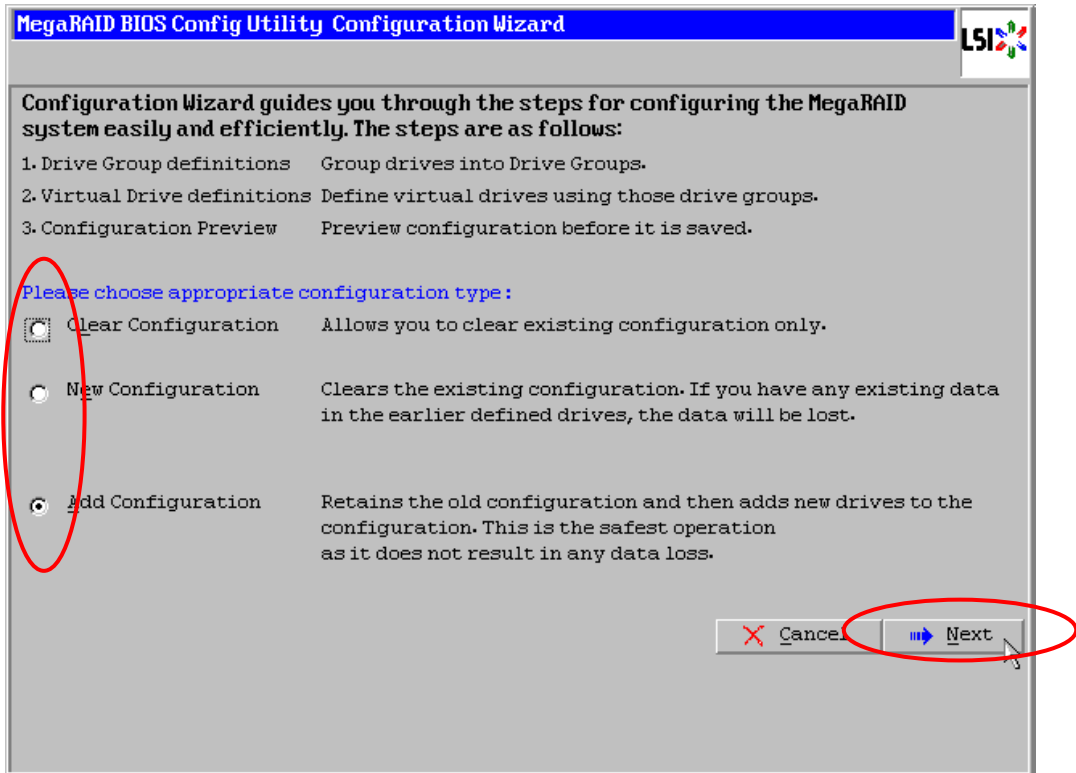
Clear Configuration	Allows you to clear existing configuration (RAID information).
New Configuration	Clears the existing configuration and creates a new VD.
Add Configuration	Retains the old VD and then adds new VD.

Notice

If you create a VD by New Configuration, any existing data in the earlier defined drives will be lost.

When you use [N8103-156 MegaRAID CacheCade], the following screen is displayed.
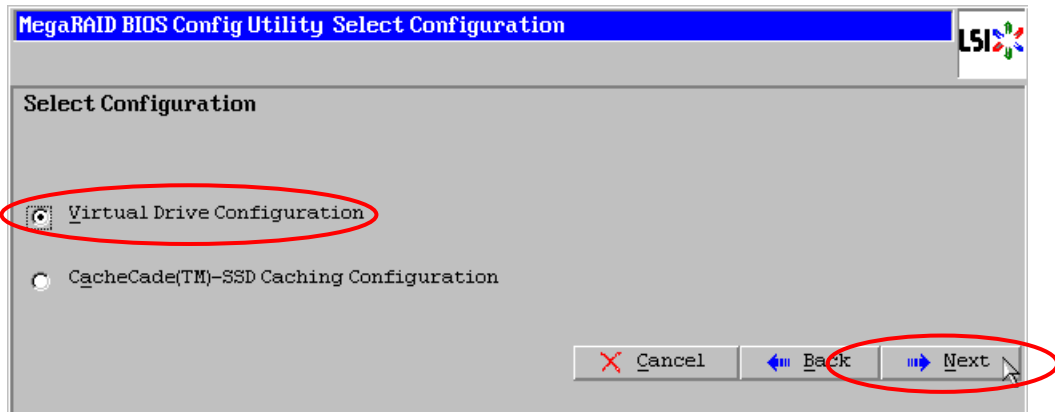
If you create a VD, select [Virtual Drive Configration] andclick [Next].

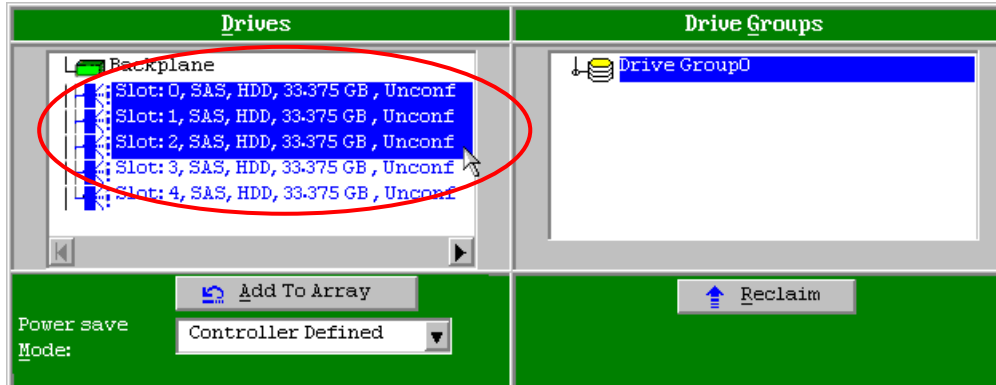When you select [Add Configuration], the screen as shown below appears.

Be sure to select [Manual Configuration], and click [Next].
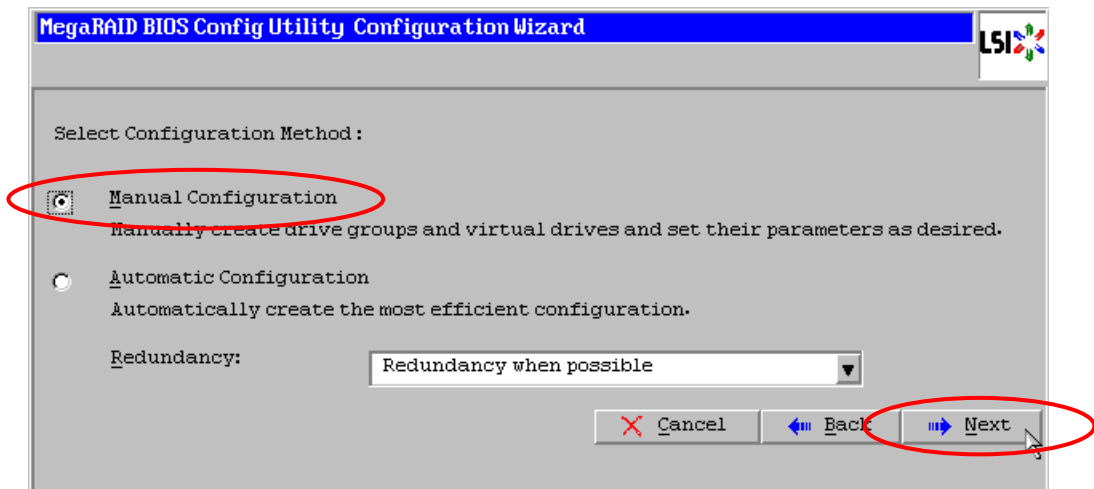
This RAID Controller does not support "Automatic Configuration" feature.
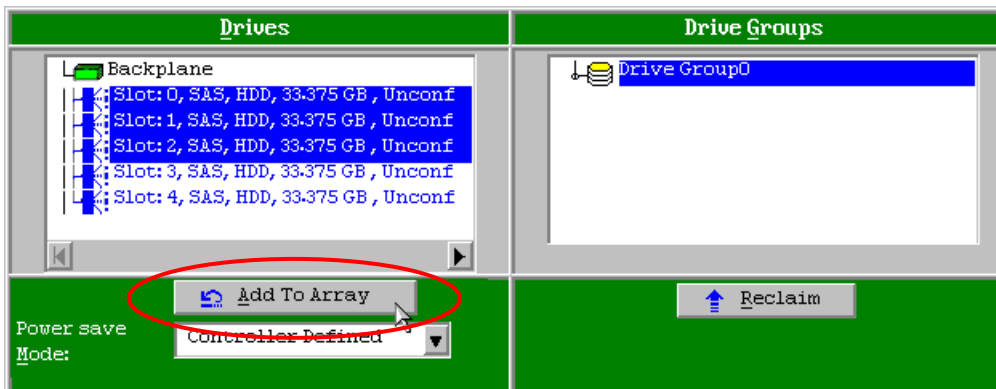
Notice

Use this menu to define several Physical Devices as a Drive Group (DG).

1. While pressing **Ctrl**, click Physical Devices to be included in DG.
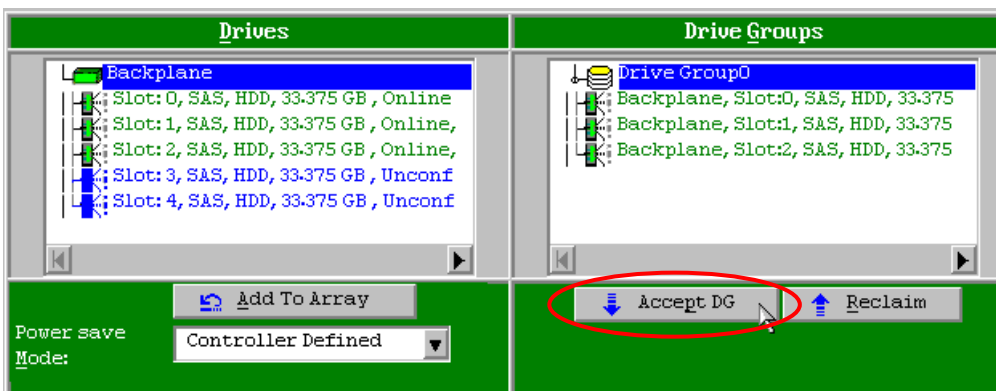

Do not change "Power save Mode" setting.   "Controller Defined" should be selected.

2. After you selected Physical Devices, click [Add to Array] at the lower left of the screen.

3. A new DG is displayed in the Drive Groups frame. To define the new DG, click [Accept DG] at the lower right of the screen.

4. After the DG has been defined, click [Next] at the lower right of the screen.
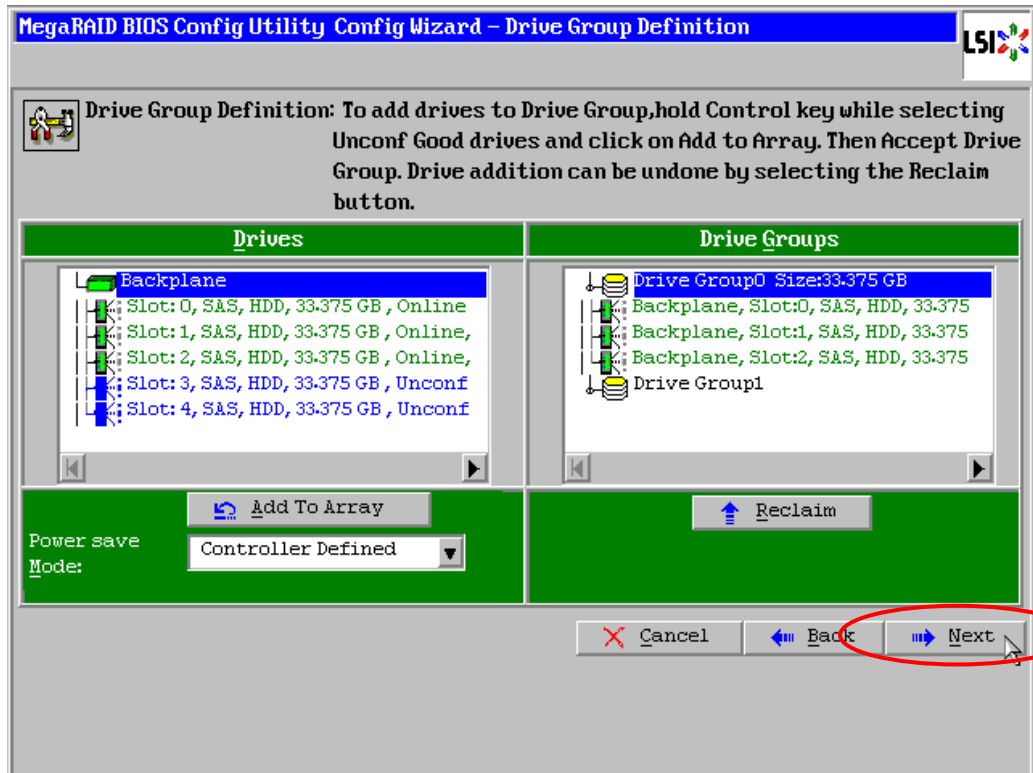
5. Then, the Span Definition screen appears.Select a DG to define Virtual Drive (VD) from "Array With Free Space" frame, then click [Add to SPAN]. The DG is defined in the "Span" field to the right.

Notice
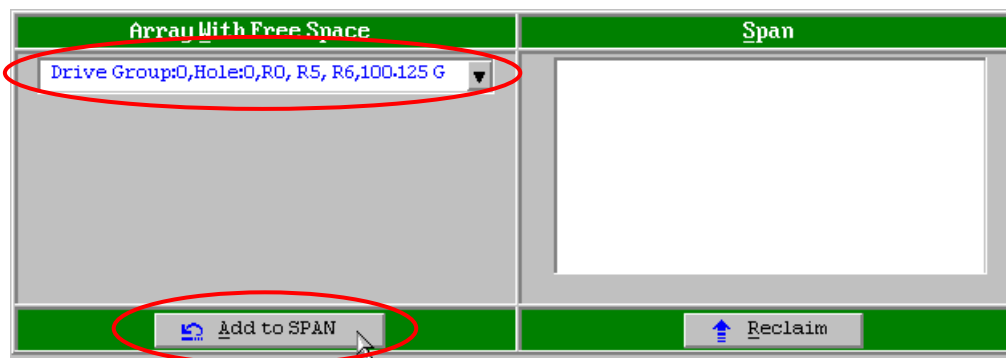
To configure RAID0, 1, 5, or 6, perform Span Definition to a single DG only. You cannot select plural DGs at the same time.

6. After the Span has been defined, click [Next] at the lower right of the screen.

MegaRAID BIOS Config Utility Config Wizard – Span Definition

LSI

Span Definition: To add array hole to a Span, select an array hole from the drop-down.Click on Add To Span. Array hole will be added to the span.Array Hole addition can be undone by selecting the Reclaim button.

Array With Free Space	Span
	Drive Group:0,R0, R5, R6,100-125 GB
	The selected DG was added to a Span.

Add to SPAN	Reclaim

Cancel Back **Next**
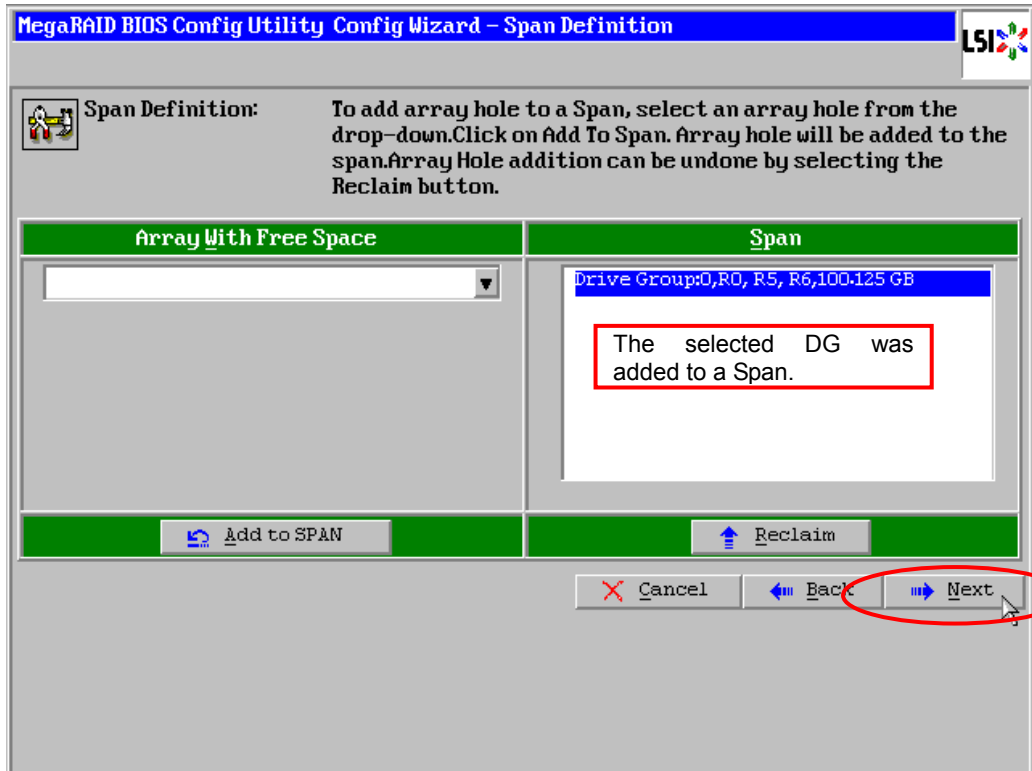
7. Define a VD in the DG that has been created in previous step. When the DG was defined, [Virtual Drive Definition] screen is displayed. Available RAID levels and their maximum size for a VD are displayed in the "Next LD, Possible RAID Levels" column.

As an example, define a RAID5 VD of 67.750GB.

a) Specify the necessary parameters in left columns.

b) Enter "67.750" in "Select Size" field, and select "GB" as a unit.

c) Click [Accept] at the lower center of the screen.

	■ You can enter any value into "Select Size" field, but If you click [Update Size], a maximum value that is defined RAID level is automatically input.
Tips	■ If you want to define another VD, click [Back] and repeat steps starting from Span Definition screen described in step5.

d) After you define a VD, click [Next].
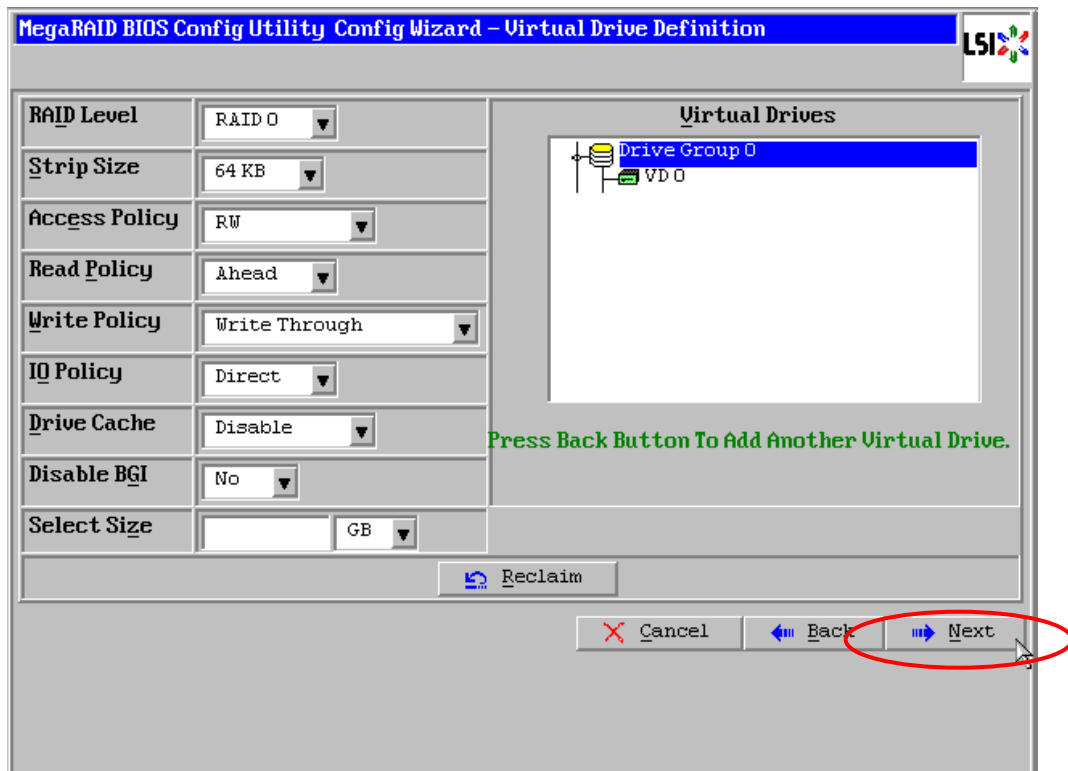
Notice

RAID1 may be configured with three or more Physical Devices in DG. However, with this RAID controller, the DG must contain only two Physical Devices.
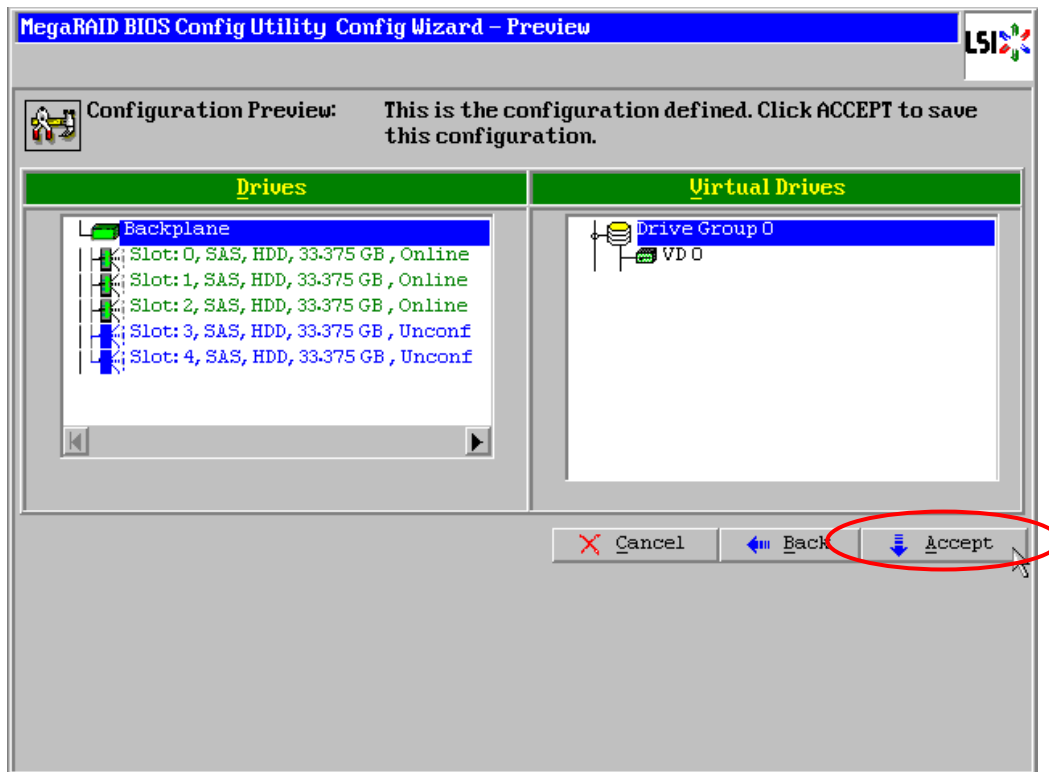
Tips

- You can not use 8kB stripe size when you create RAID6 with three physical devices.
- You can not use 8kB strip size when you create RAID60 with plural DGs configured with three physical devices respectively.
- For details of the RAID levels, refer to (2. RAID Levels) described later in this chapter.

e) VD is created in DG as shown in the screen below. After making sure that the VD is created correctly, click [Accept] at the lower right of the screen.

f) The confirmation message "Save this Configuration?" appears. Click [Yes] to save the configuration.

g) The confirmation message "Want to Initialize the New Virtual Drives?" appears. To perform Initialize, select [Yes].

Tips

- When you select [Yes] at the step g), "Fast Initialize" is performed.
- "Fast Initialize" clears only the top sector where partition information is written.

h) If you click [Yes] at the step g), "Virtual Drives" operation screen is displayed. If no other operation is required, click [Home] at the lower left of the screen.
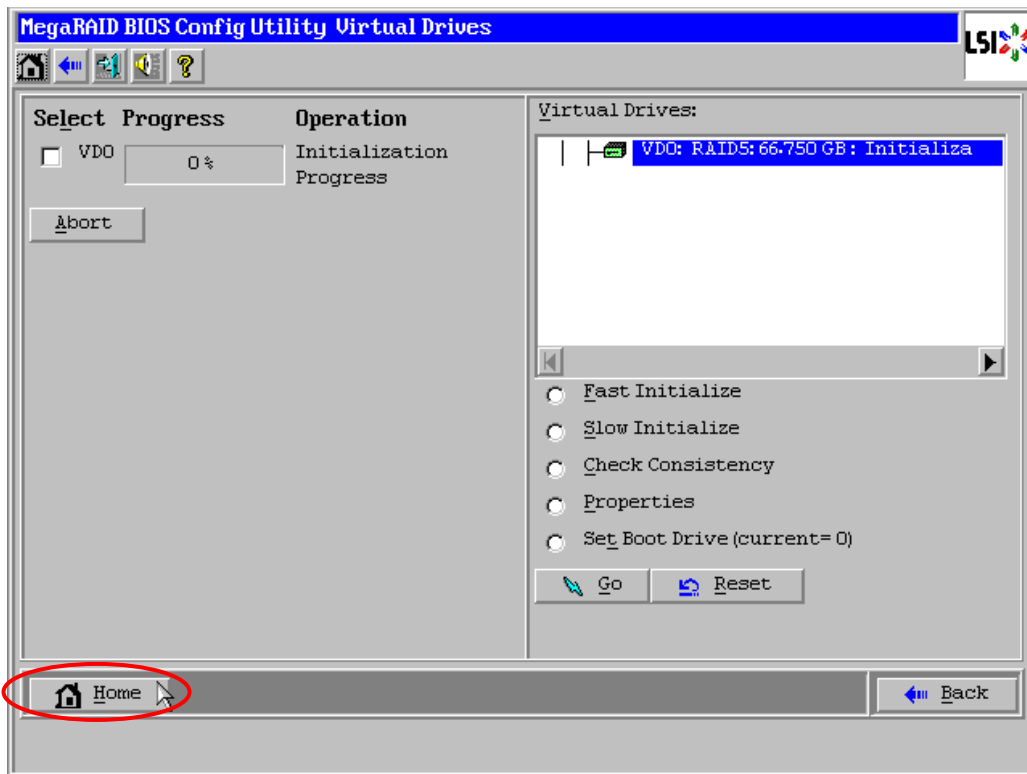
i) WebBIOS Top Menu is displayed. VDs you have created is displayed in the right frame of the screen.
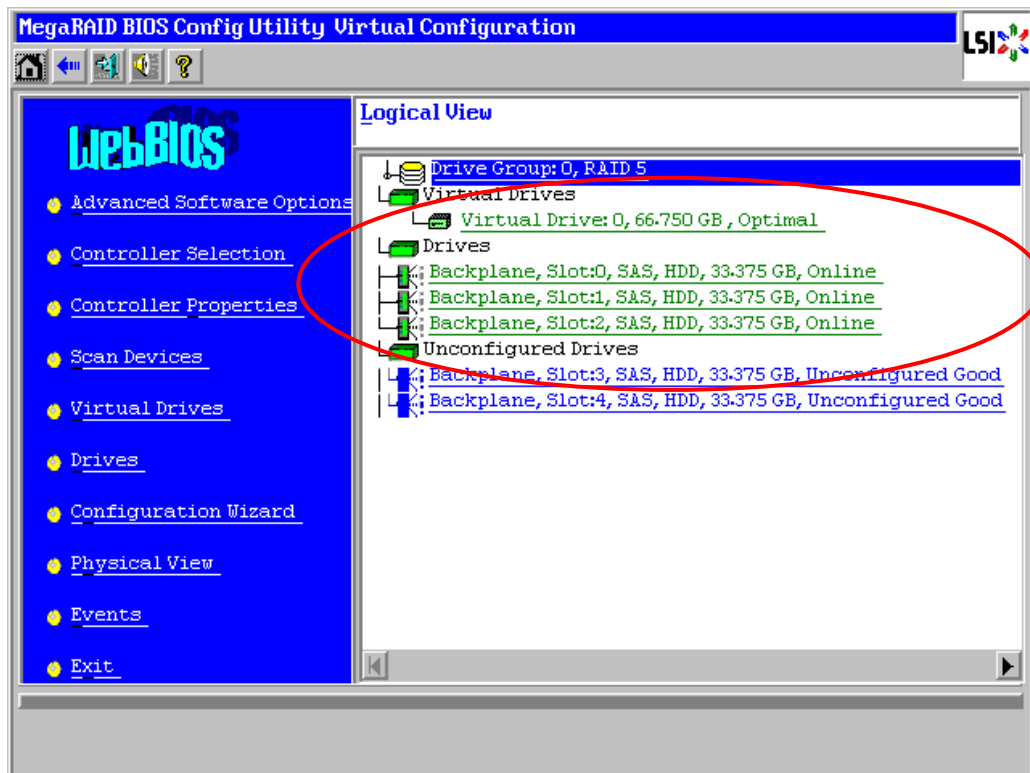
3-2. Configure SPAN

The following explains the sample procedure to configure RAID10 (spanning of RAID1) with four Physical Devices.

Notice

Do not attempt to configure RAID00. It is not supported.

1. Click [Configuration Wizard] on WebBIOS Top Menu to start Wizard.

2. While pressing **Ctrl**, click Physical Devices to be included in Drive Group (DG). (In the example, two DGs will be configured and spanned.)

Notice
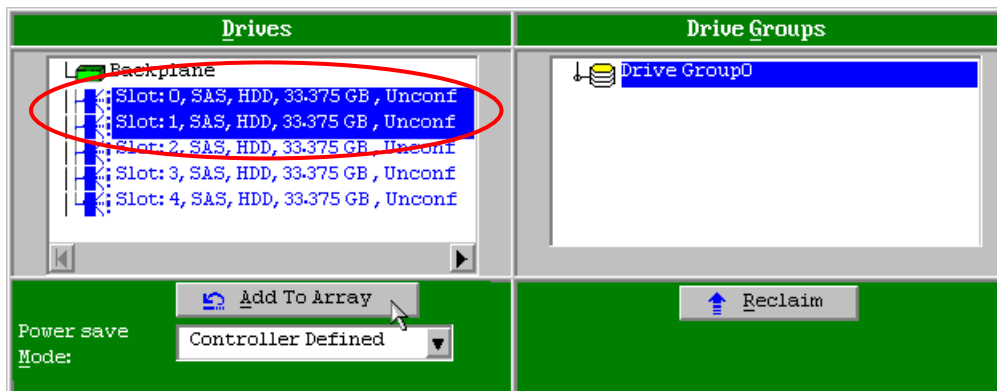
Do not change "Power save Mode" setting.　"Controller Defined" should be selected.

3. Upon completion of selection, click [Add to Array] at the lower left of the screen. After making sure that the new DG has been defined in Drive Groups frame to the right, click [Accept DG].
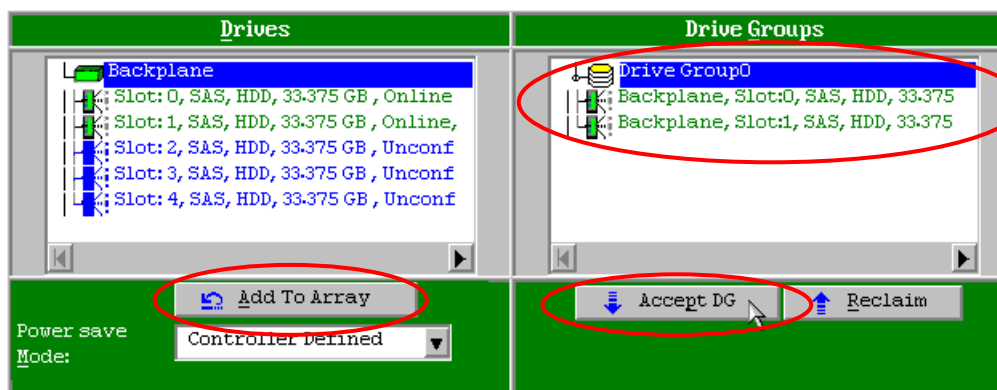
4. A new DG is defined in the Drive Groups frame. Define another DG in the similar procedures. After DGs have been defined, click [Next] at the lower right of the screen.
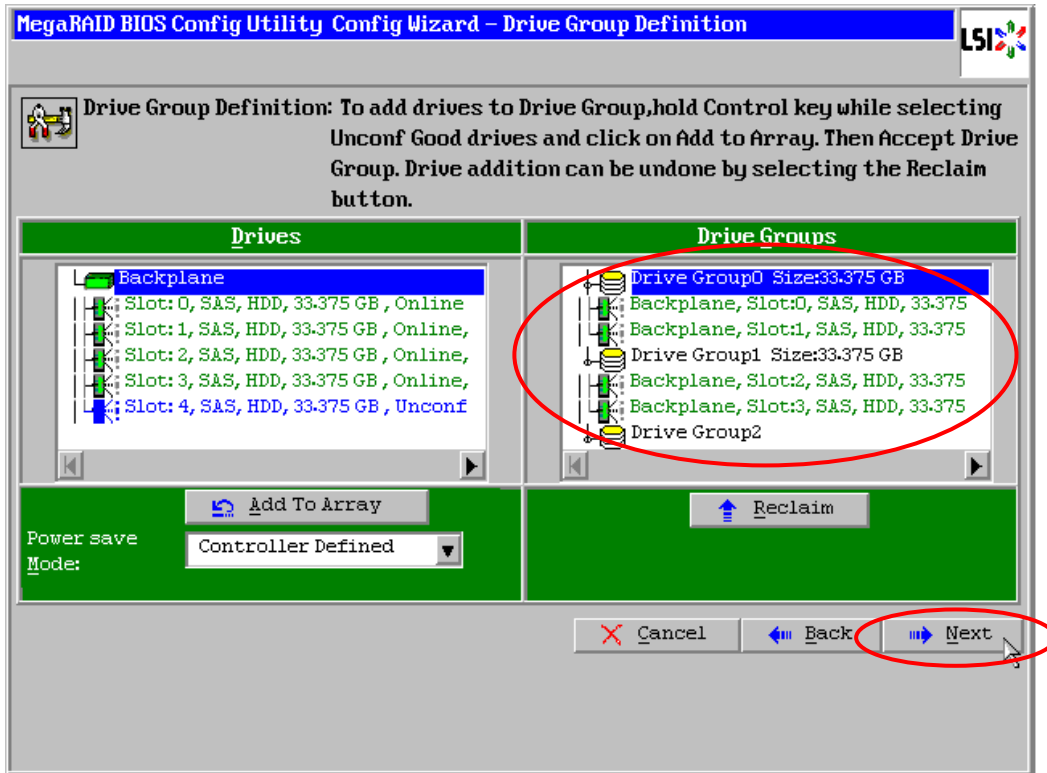
■ To configure RAID10,50 or 60, select several DGs containing the same number of Physical Devices for Span Definition.
■ You can not configure a Span with DGs containing the different number of Physical Devices.

5. When DGs were defined, [Span Definition] screen is displayed. Select DG0 from "Array With Free Space" frame, then click [Add to SPAN]. The DG is defined in the "Span" field to the right.
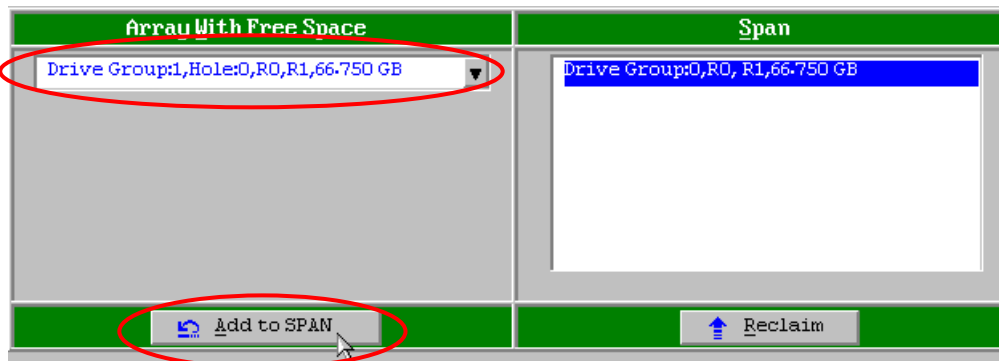
6. Then, select DG1 and click [Add to SPAN]. The two DGs are defined in the "Span" field at the right, click [Next] at the lower right of the screen.
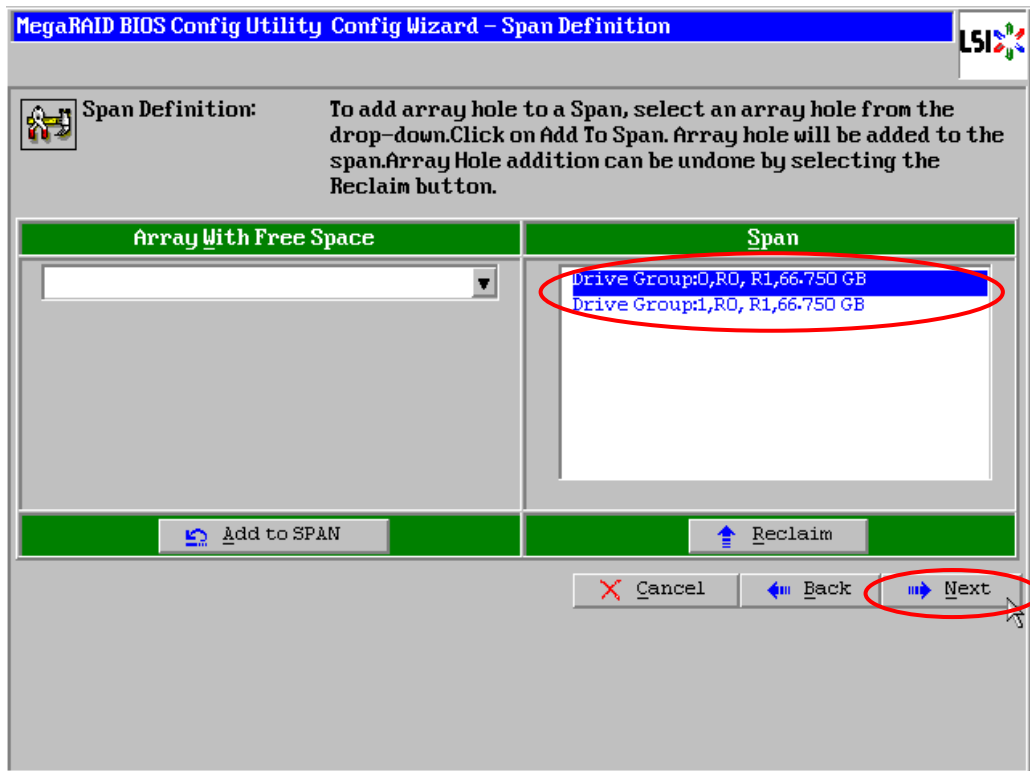
7. The Virtual Drive (VD) Definition screen is displayed. Enter the necessary parameters, and click [Accept].
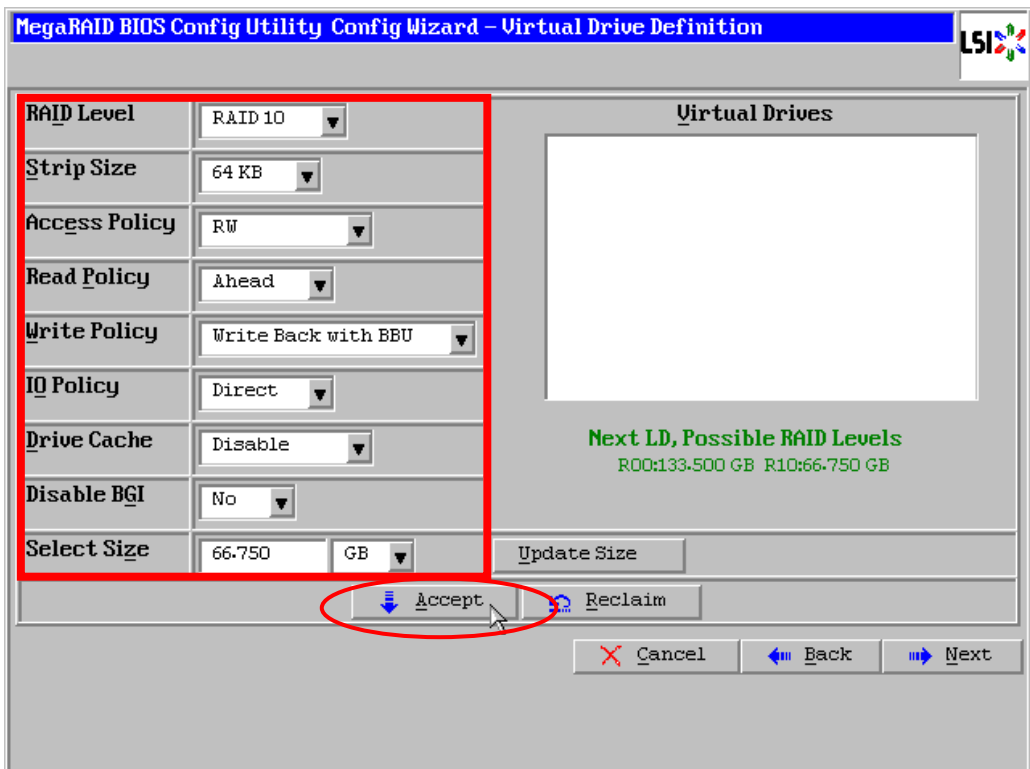
8. Make sure that both DG0 and DG1 are defined as VD0, then click [Next] at the lower right of the screen.
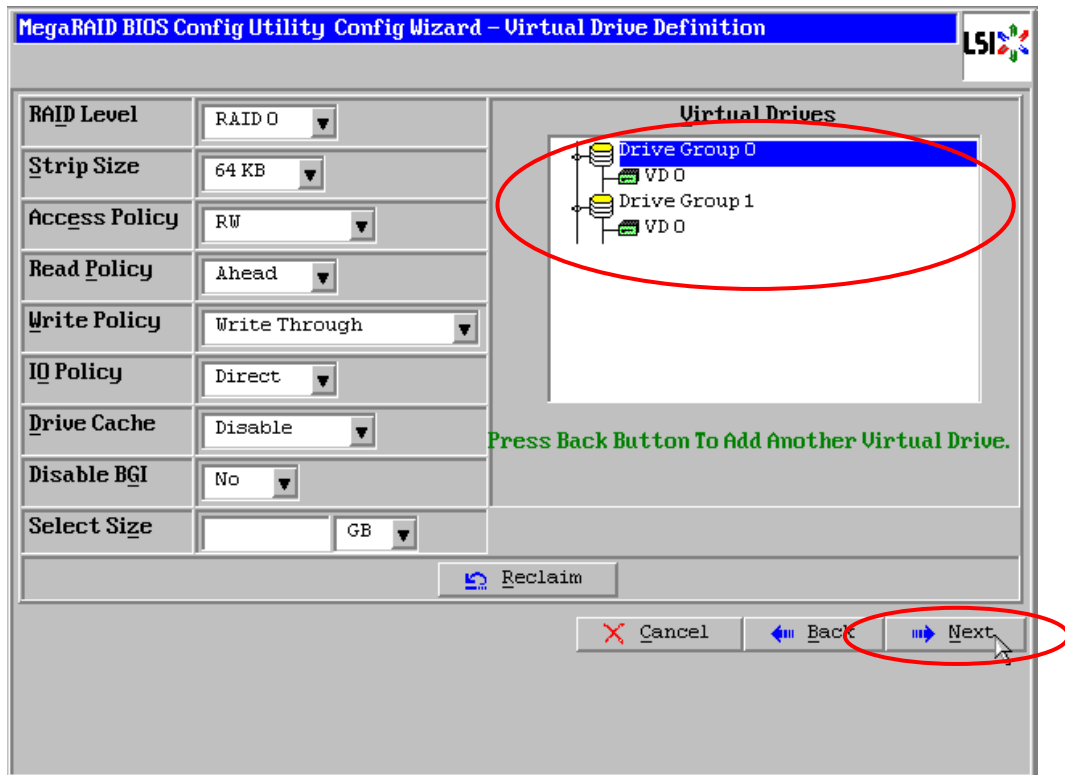
> **Notice**
>
> When you create RAID10 with this RAID controller, each DG must contain only two Physical Devices.

9. On the "Preview" screen, make sure the VD is defined correctly, then click [Accept] at the lower right of the screen.
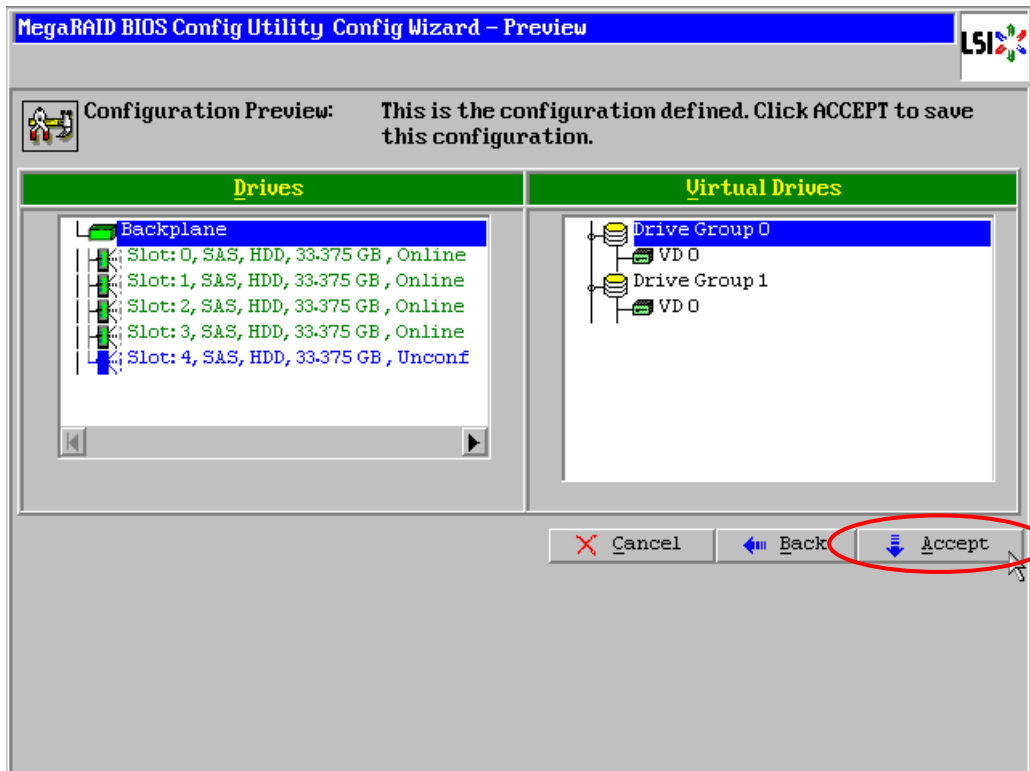
10. The confirmation message "Save this Configuration?" appears. Click [Yes] to save the configuration.

11. The confirmation message "All data on the new Virtual Drives will be lost. Want to Initialize?" appears. If you want to perform "Fast Initialize", Click [Yes].

12. "Virtual Drives" operation screen is displayed. If no other operation is required, click [Home] at the lower left of the screen.

13. The WebBIOS Top Menu is displayed. VDs you have created are displayed in the right frame of the screen.
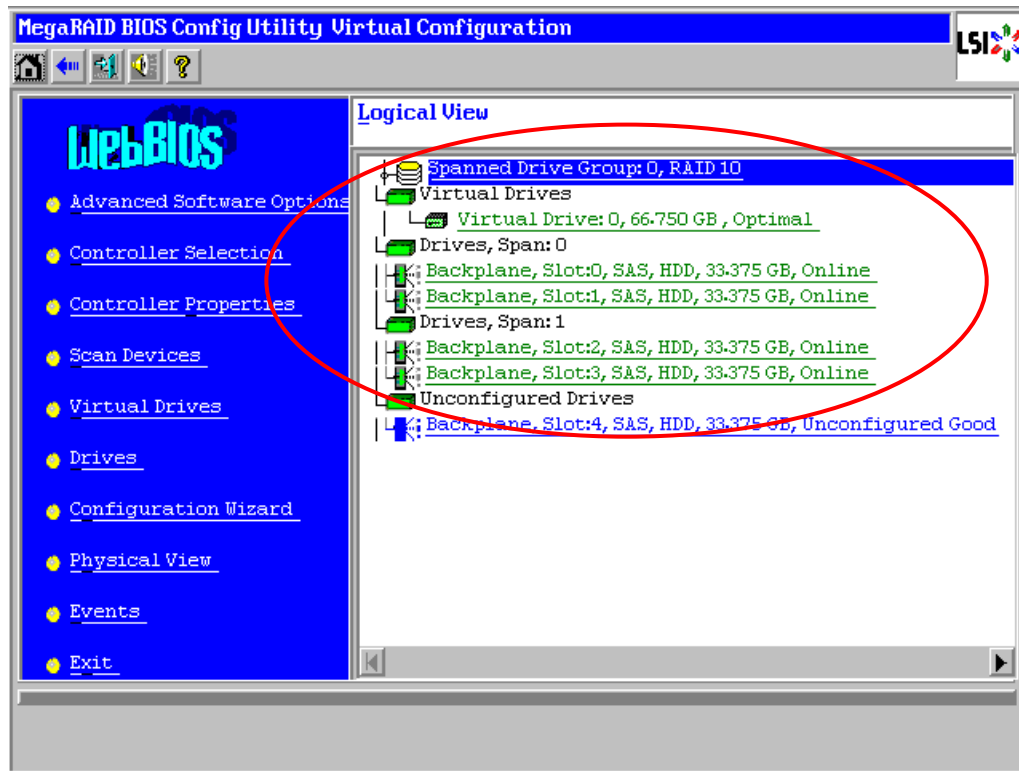
3-3. Parameters for Virtual Drive Definition

Listed below are parameters for Configuration Wizard.

Item	Parameter	Remarks
RAID Level	RAID 0 / RAID 1 / RAID 5 / RAID 6 / RAID 00 / RAID 10 / RAID 50 / RAID60	RAID 00 is not supported.
Strip Size	8 KB / 16 KB / 32 KB / **64 KB** / 128 KB / 256 KB / 512 KB / 1024 KB	Recommended value: 64KB
Access Policy	**RW** / Read Only / Blocked	Recommended value: RW
Read Policy	Normal / **Ahead**	Recommended value: Ahead
Write Policy	**Write Back with BBU** / Always Write Back / Write Through	Write Back with BBU：Write Back with battery Always Write Back：Constant Write Back Recommended value: Write Back with BBU
IO Policy	**Direct** / Cached	Recommended value: Direct
Drive Cache	Unchanged / Enable / **Disable**	Recommended value: Disable
Disable BGI	**No** / Yes	Specify whether to perform Background Initialize after creation of VD Recommended value: No

Notice
- Recommended values are different from this table when you use CacheCade. Refer to Chapter 4 (4.How to create CacheCade.
- BGI (Background Initialize) is available only for the following VDs:
    - RAID5 VD configured with five or more Physical Devices.
    - RAID6 VD configured with seven or more Physical Devices.

Tips
- You can not use 8kB stripe size when you create RAID6 with three physical devices.
- You can not use 8kB strip size when you create RAID60 with plural DGs configured with three physical devices respectively.
- For details of the RAID levels, refer to (2. RAID Levels) described later in this chapter.

The Write Policy has the following modes. Select a mode suitable for your environment.

Item		Description
Write Policy	Write Back with BBU	Normal write back mode The controller uses cache memory for writing. However, if the battery is being charged or failed, the controller operates in write through mode automatically. Thus, this mode can provide higher data security.
	Always Write Back	Constant write back mode The controller always uses cache memory for writing regardless of battery charged status or existence of battery. Be sure to use UPS when you select this mode for write policy.
	Write Through	Write through mode The controller does not use cache memory for writing data. This mode can provide the highest data security, however, the writing performance is lower than that in write back mode.

Notice
- If Always Write Back mode is selected, the controller operates in write back mode even if the battery has failed or insufficiently charged. The data in cache memory may be lost at an occurrence of power failure.
- Be sure to use UPS when you select the Always Write Back mode for write policy.

The Disk Cache Policy has the following modes. Select a mode suitable for your environment.

Unchanged	■ The controller uses the default write cache policy of Physical Device. ■ The default value may not be identical to the factory-set value, therefore, do not specify this mode.
Enabled	■ The controller always uses the write cache policy of Physical Device. ■ Be sure to use UPS when you select this mode for disk cache policy.
Disabled	■ The controller does not use the write cache policy of the Physical Device. ■ This mode can provide the highest data security, however, the writing performance is lower than that in Enabled mode. ■ It is recommended to use this mode for the sake of data security.

Notice
- If "Unchanged" is specified for Disk Cache Policy, the default value may not be identical to the factory-set value, therefore, do not specify this mode.
- If Enabled is specified for Disk Cache Policy, the controller uses the write cache policy of the Physical Device. Accordingly, the data in cache memory of the Physical Device may be lost at an occurrence of power failure.
- Be sure to use UPS when you select Enabled mode for disk cache policy.
.

You can change parameters for Virtual Drive (VD) definition except for RAID Level and Stripe Size. On the WebBIOS Top Menu, click [Virtual Drives] and specify parameters in "Policies" frame, then click [Cange].

If the Write Policy is changed to write through mode while the RAID controller runs with "Write Back with BBU" mode, the reason of change will be displayed in [Reason for Difference in Write Policy].
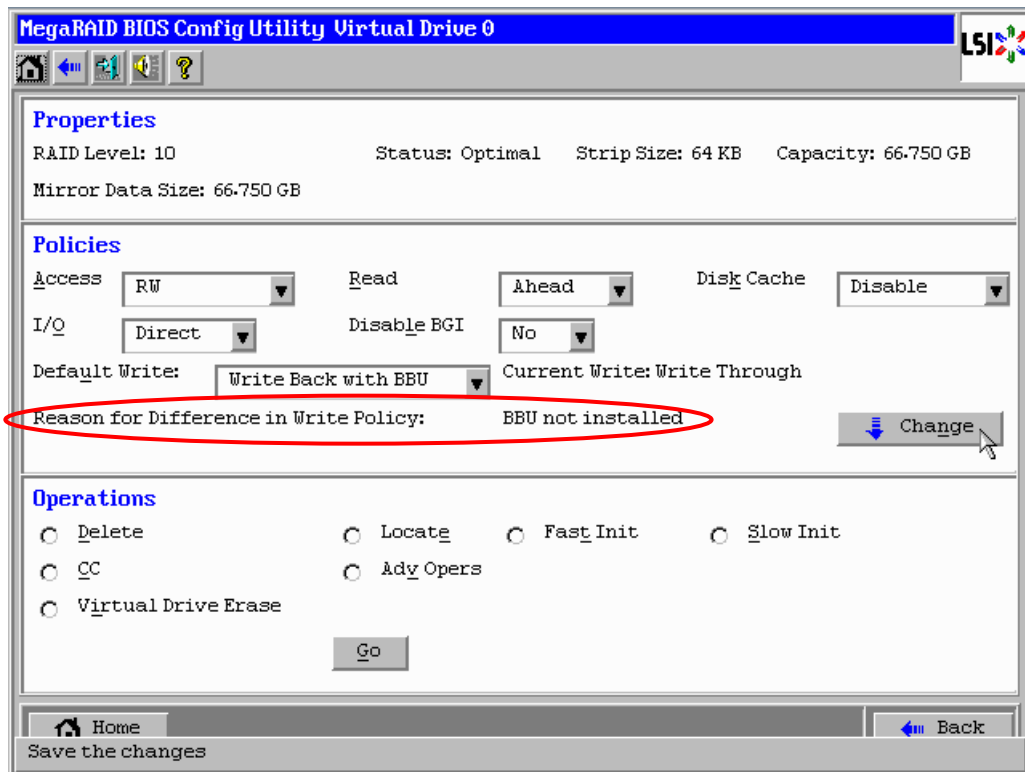
Indication on [Reason for Difference in Write Policy]	Description
BBU not installed	The BBU is not attached to the RAID controller or the BBU is not detected by the RAID controller.
BBU is failed	The BBU is attached but needs to be replaced.
BBU is discharged	The remaining capacity of the Battery goes below.
BBU in re-learn cycle	The BBU is undergoing a learn cycle.
Reconstruction	A reconstruction operation is in progress.

4. How to create CacheCade

This section describes the procedures for how to create CacheCade using WebBIOS.
When you use [N8103-156 MegaRAID CacheCade], you can create CacheCade.
You need to change parameters for VDs to be enabled CacheCade.

Notice

- It depens on system configuration and system operations how performance which is brought by CacheCade improves.
- CacheCade is treated as VD by this RAID controller however OS can not recognize the CacheCade VD as a disk.
- The maximum size of CacheCade is 512GB in total.
- SSDs used for CacheCade should have the same capacity, the same SAS or SATA interface and other specification.
- Only one VD as CacheCade is supported by this RAID controller.
- CacheCade cannot be enabled for VDs configured with SSD(s).

4-1.Configuration Wizard

When you click [Configuration Wizard] on WebBIOS Top Menu, the screen as shown below appears. Select the relevant operation, and click [Next] at lower right of the screen.
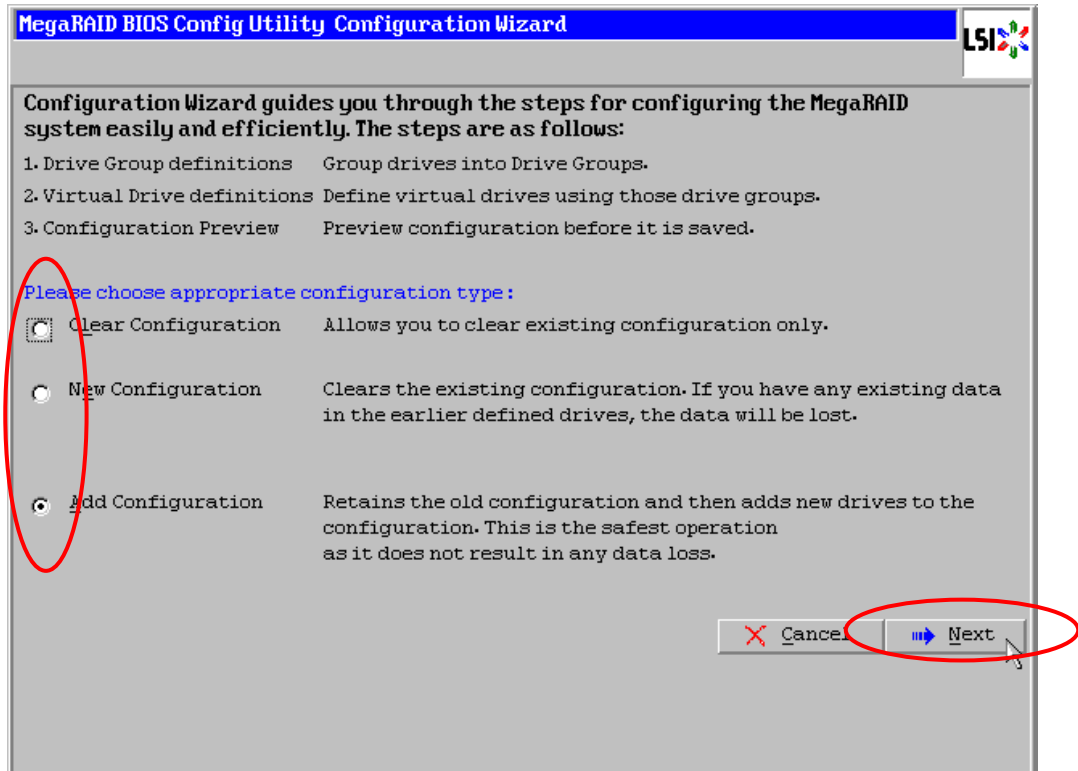
Clear Configuration	Allows you to clear existing configuration (RAID information).
New Configuration	Clears the existing configuration and creates a new VD.
Add Configuration	Retains the old VD and then adds new VD.

Notice

If you create a CacheCade by New Configuration, any existing data in the earlier defined drives will be lost.

The following screen is displayed.
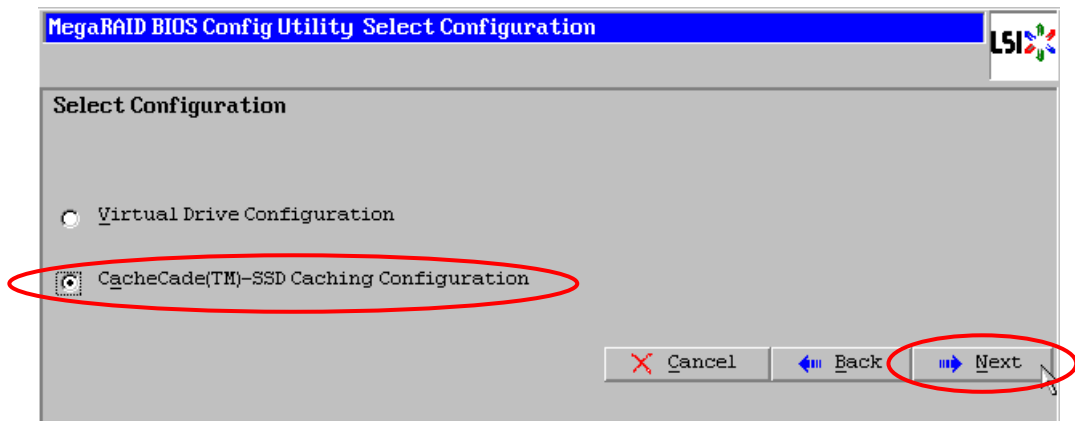
If you create CacheCade, select [CacheCade(TM)-SSD Caching Configuration] and click [Next].

SSD which you can use for CacheCade is displayed in Drives field.

1. While pressing **Ctrl**, click the Physical Devices to be included in DG.
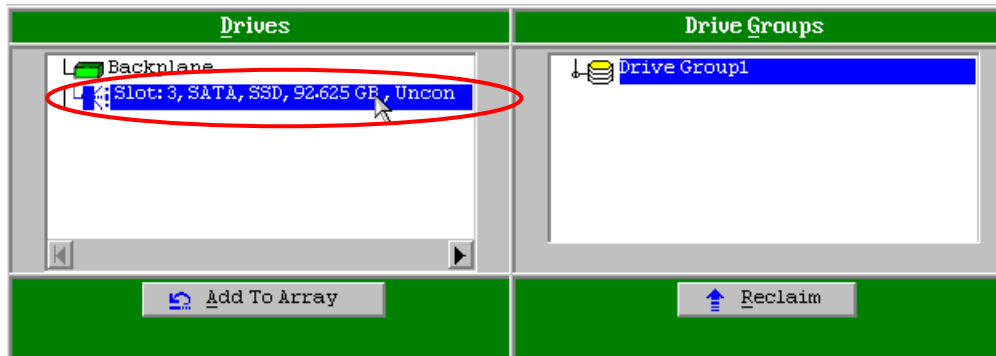
2. After you selected Physical Devices, click [Add to Array] at the lower left of the screen.
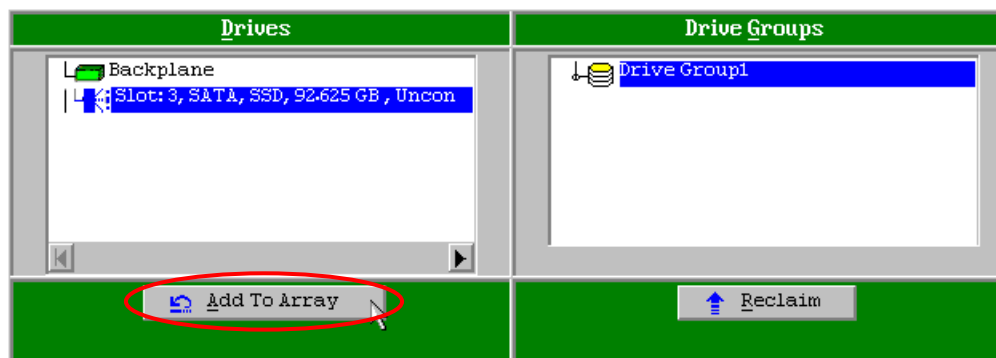
3. A new DG is displayed in the Drive Groups frame. To define the new DG, click [Accept DG] at the lower right of the screen.
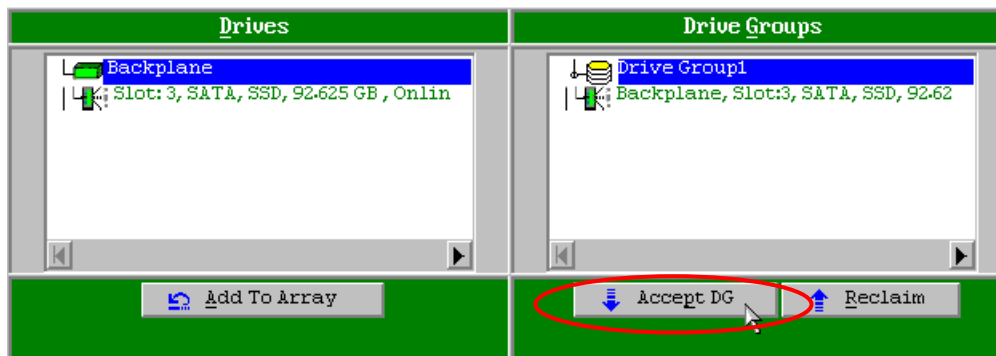
4. After the DG has been defined, click [Next] at the lower right of the screen.
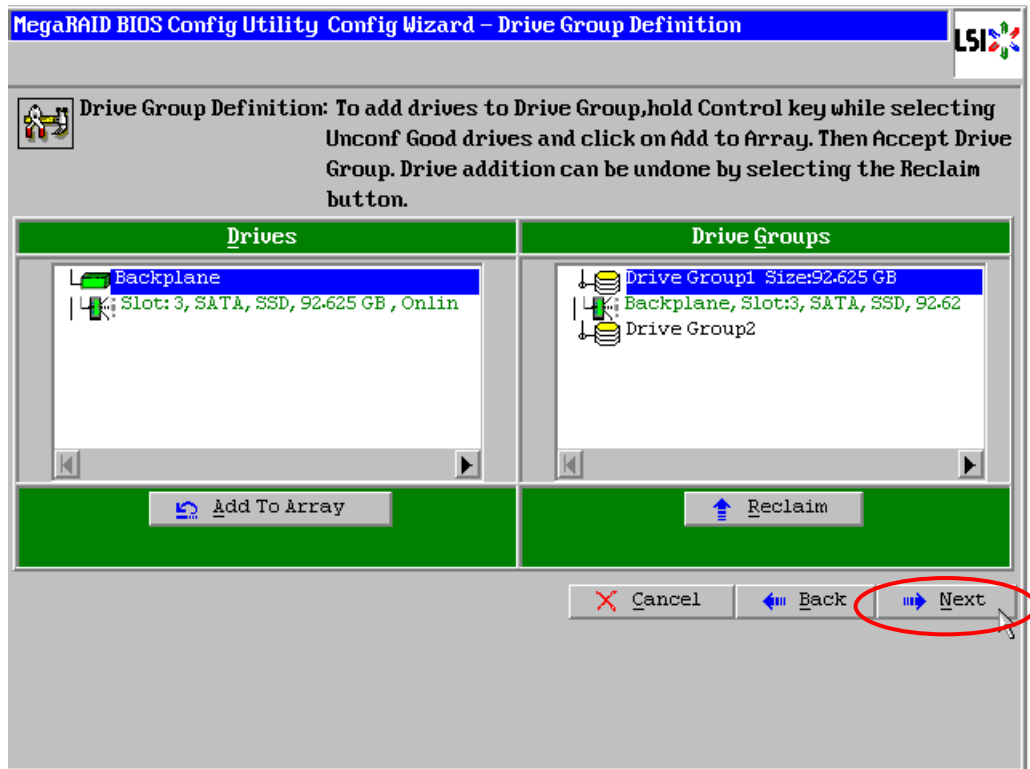
5. Then, the Span Definition screen appears. Select a DG to define Cache Cade from "Array With Free Space" frame, then click [Add to SPAN]. The DG is defined in the "Selected Array" field to the right.
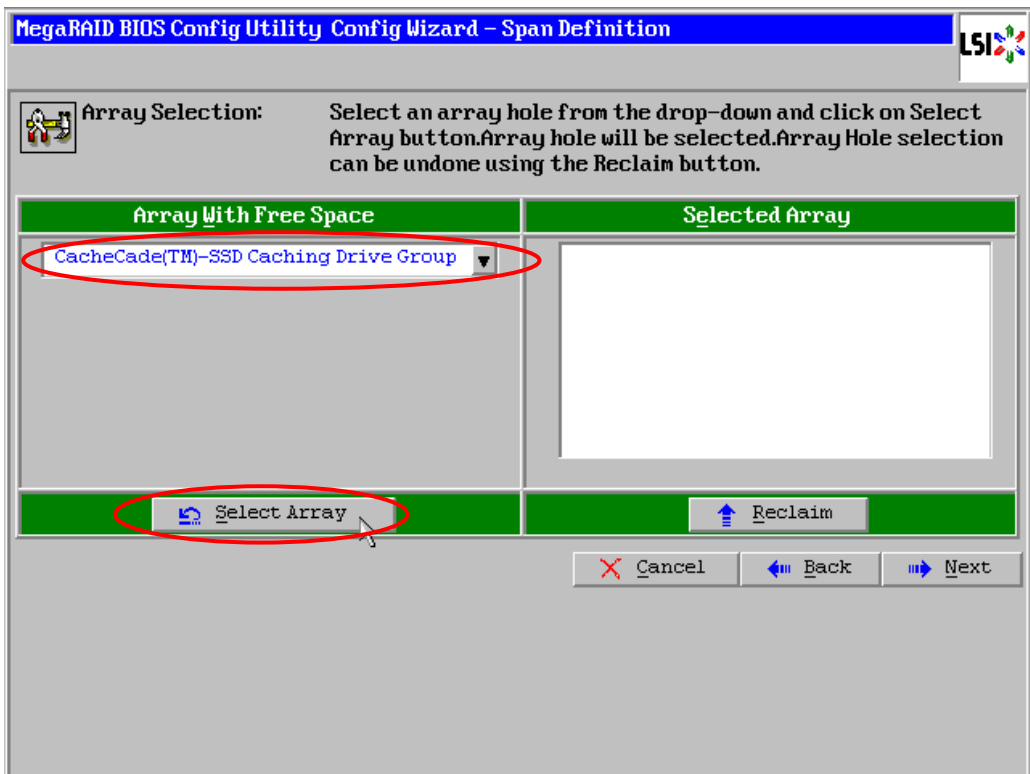
6. After the Span has been defined, click [Next] at the lower right of the screen.
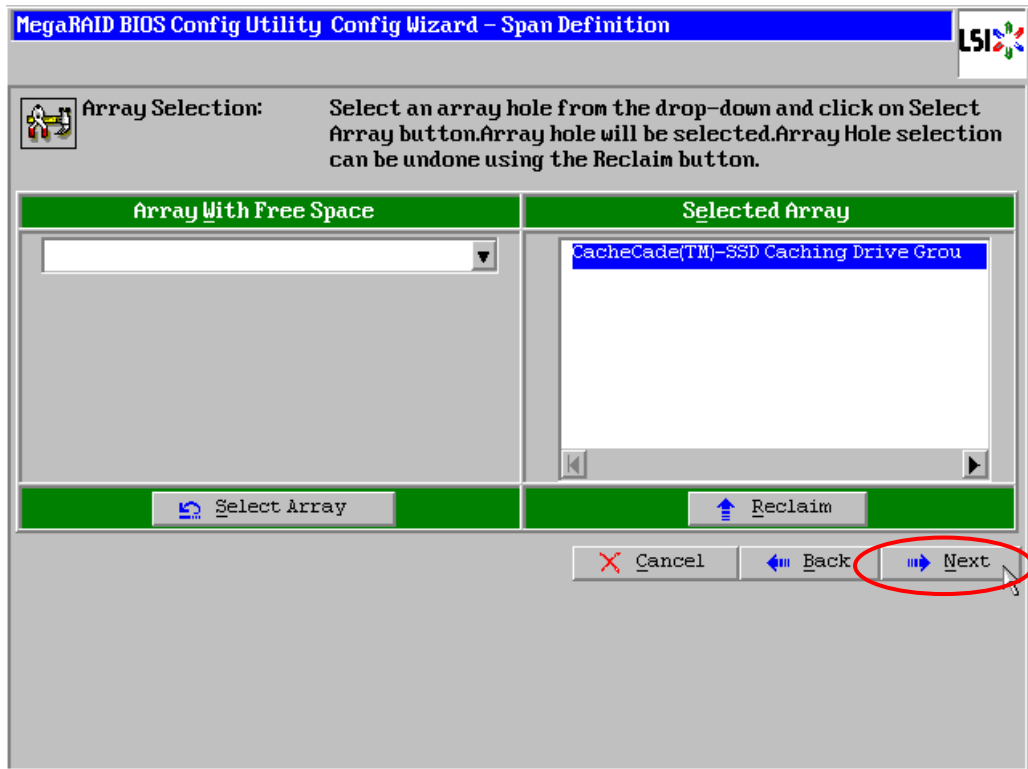
7. Then, the CacheCade Definition screen appears, click [Accept] and [Next].
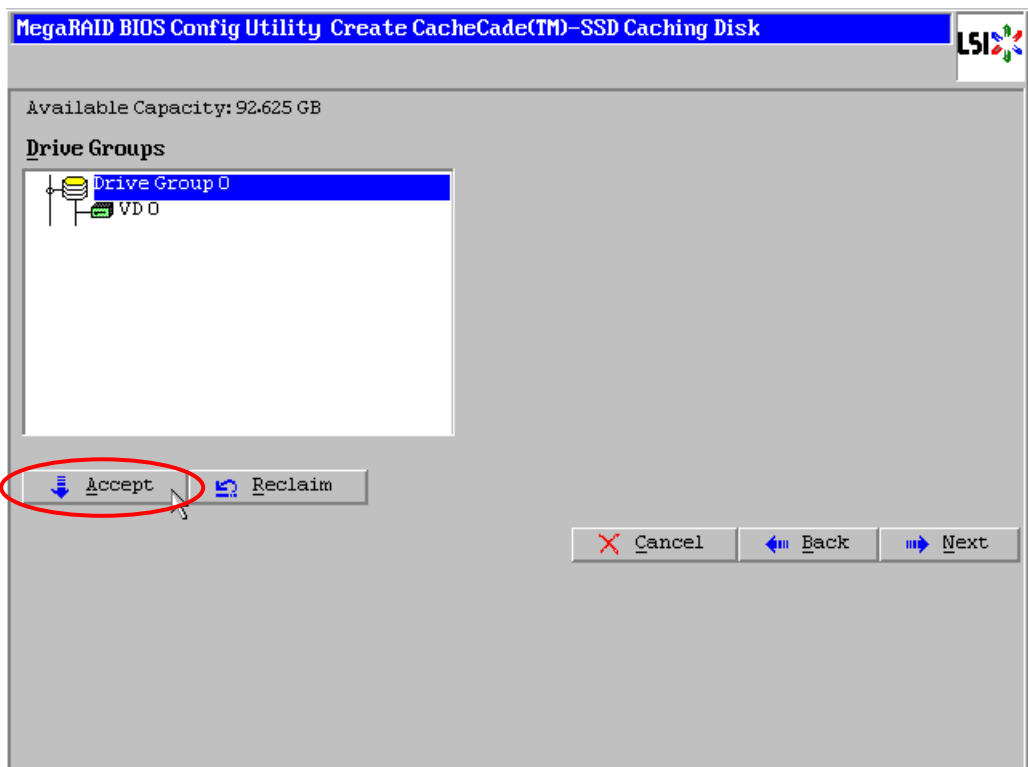
8. After making sure that the CacheCade has been defined in Drive Groups frame to the left, click [Next].
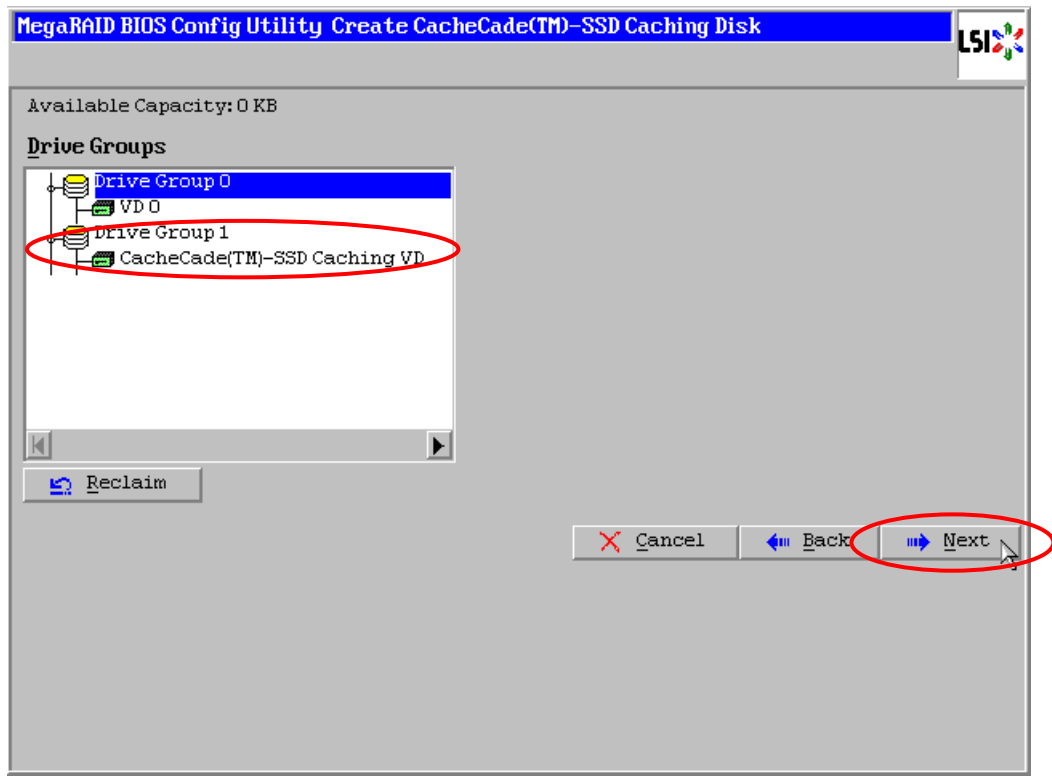
9. CacheCade is created under the DG as shown in the Virtual Drives frame below. After making sure that the CacheCade is created correctly, click [Accept] at the lower right of the screen.
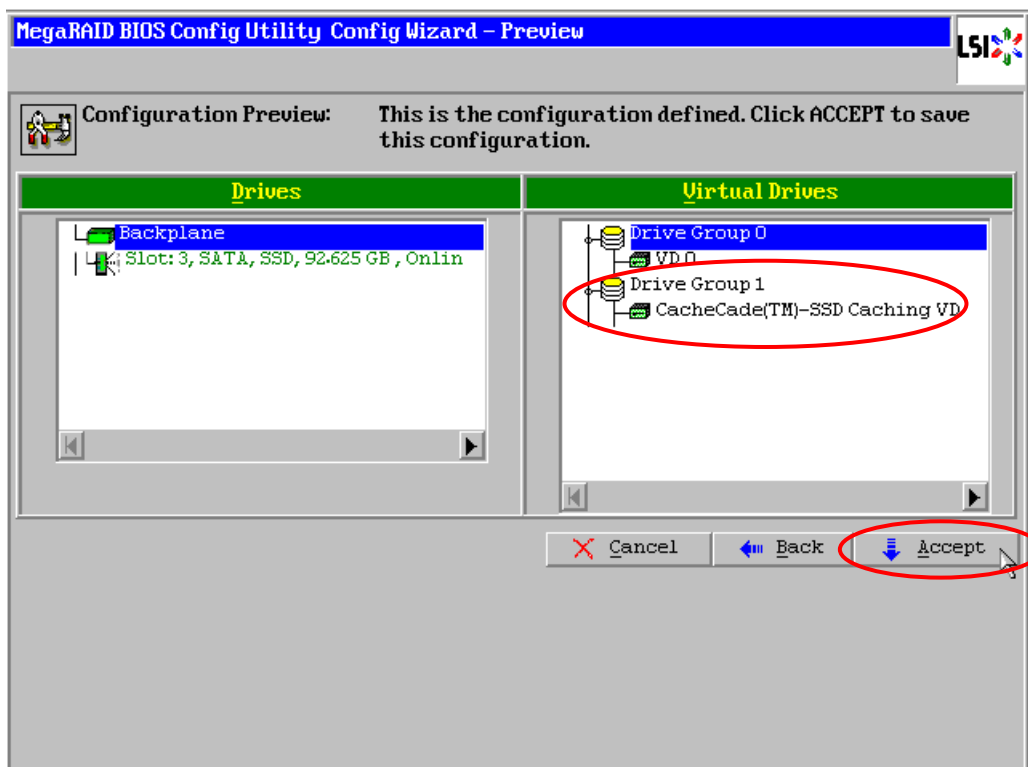
10. The confirmation message "Save this Configuration?" appears. Click "Yes" to save the configuration.

11. WebBIOS Top Menu is displayed. CacheCade you have created is displayed in the right frame of the screen.
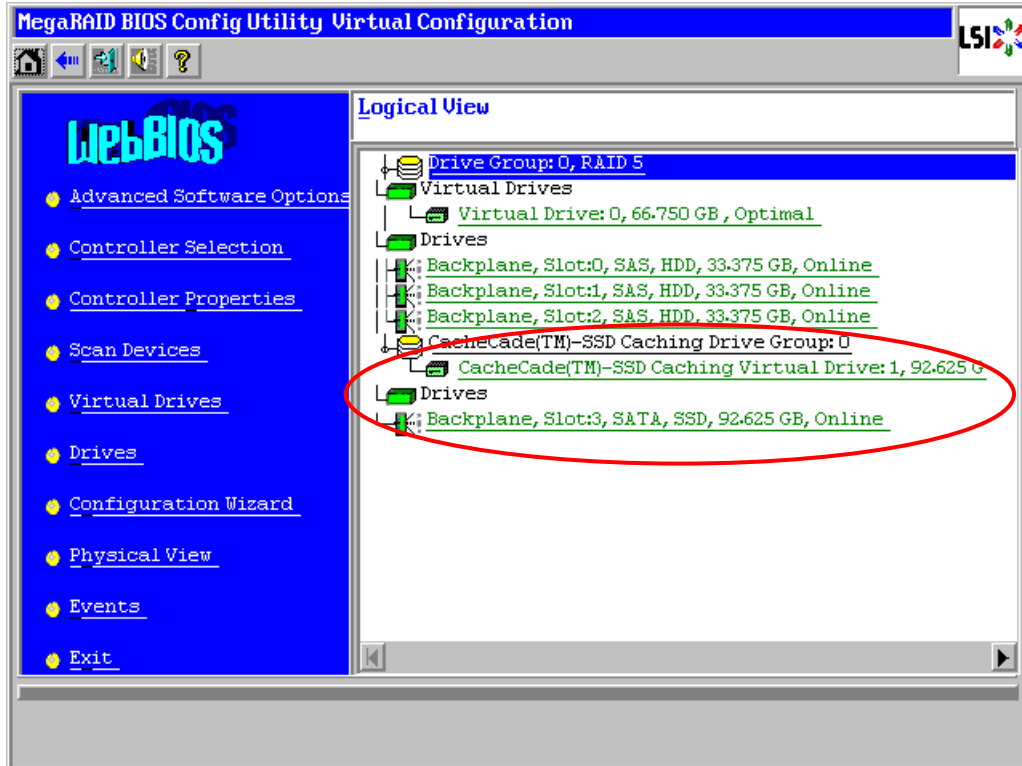
4-2.Change setting of VD

It is necessary to chabge setting of VD when you use CacheCade. Click VD which has already existed from "Logical View" on WebBIOS Top menu.
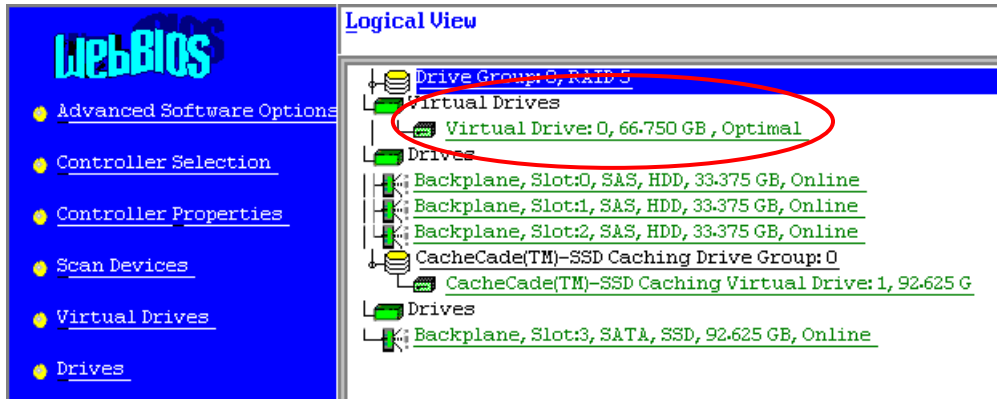
The screen as shown below appears. Change a value "Read" and "I/O" according to the following list and click [Change].
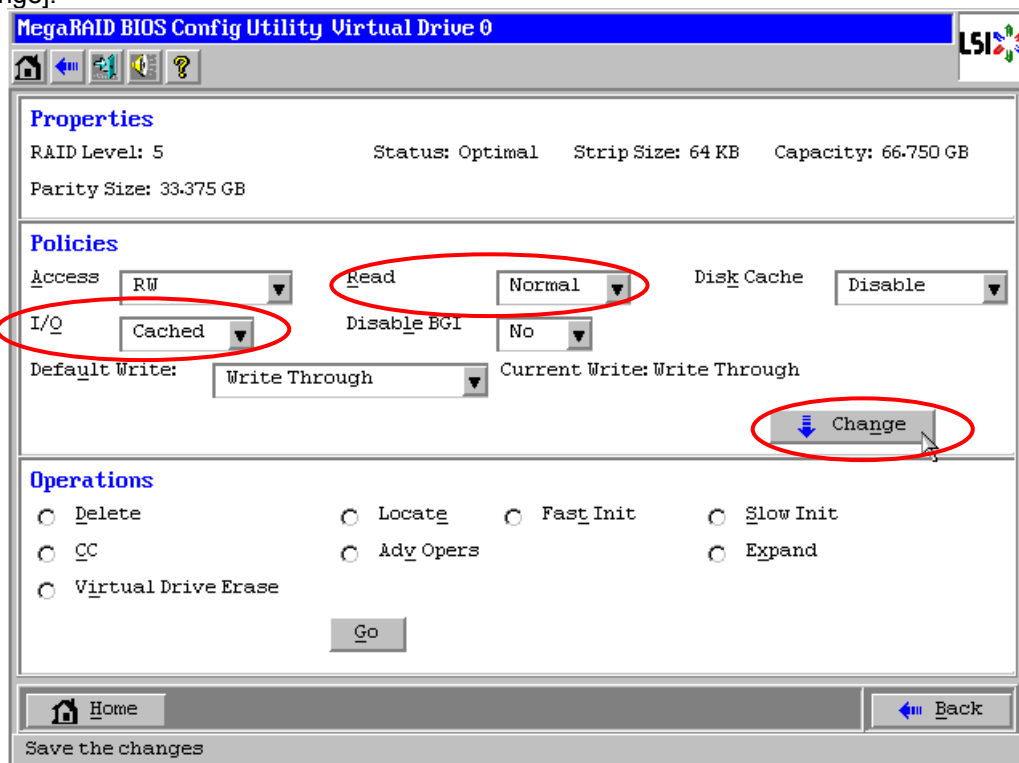
Item	Parameter	Remarks
Read	Normal	Default value: Ahead
I／O	Cached	Default value: Direct

Notice
- It is necessary to change setting of VD when you use CacheCade.
- If you create a new VD, set the parameters according to the table above for "Read" Policy and "I/O" Policy.
- If you use Universal RAID Utility, it automatically set the parameters for all VD. (except VD using SSD)

5. Operation for features

5-1. Check Consistency

Check Consistency is used to check consistency among Virtual Drives (VDs).

1. Start WebBIOS.

2. Click [Virtual Drives] on WebBIOS Top Menu.

3. Select a VD to perform Check Consistency from the upper right frame of Virtual Drives screen.

4. Click the checkmark column for Check Consistency from the lower right frame of Virtual Drives screen.

5. Make sure that Check Consistency is checked, and click [Go].
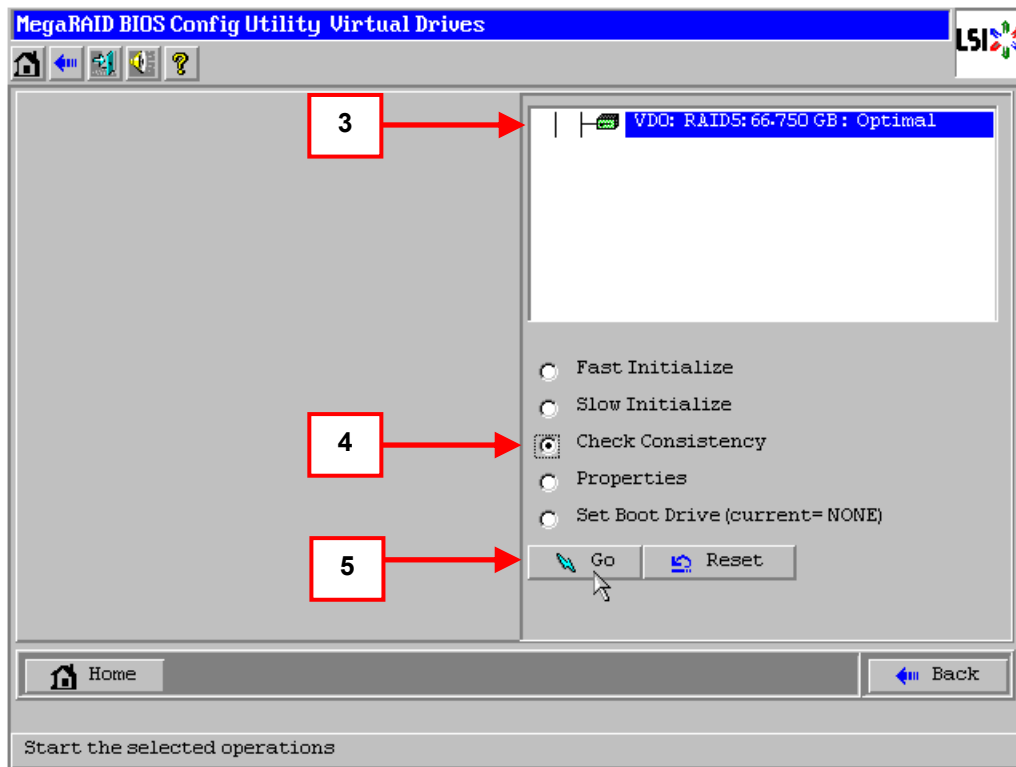
6. If you perform Check Consystency at first time, inconsistency may be detected. If the following alert is displayed, click [Yes] to perform Check Consistency. A lot of inconsistency may be detected, however, it is not a failure.
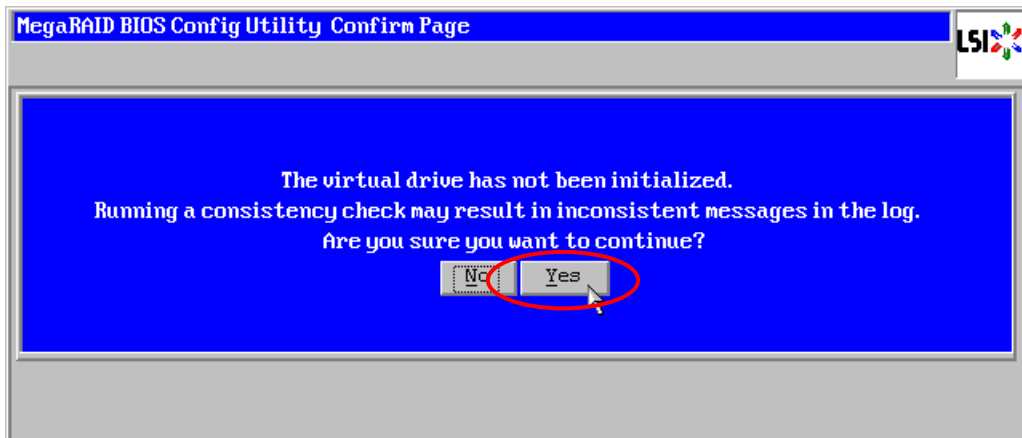
7. The progress of Check Consistency is displayed on the left frame of Virtual Drives screen.

8. Click [Home] at the lower left of Virtual Drives screen to return to the Top Menu.

Notice
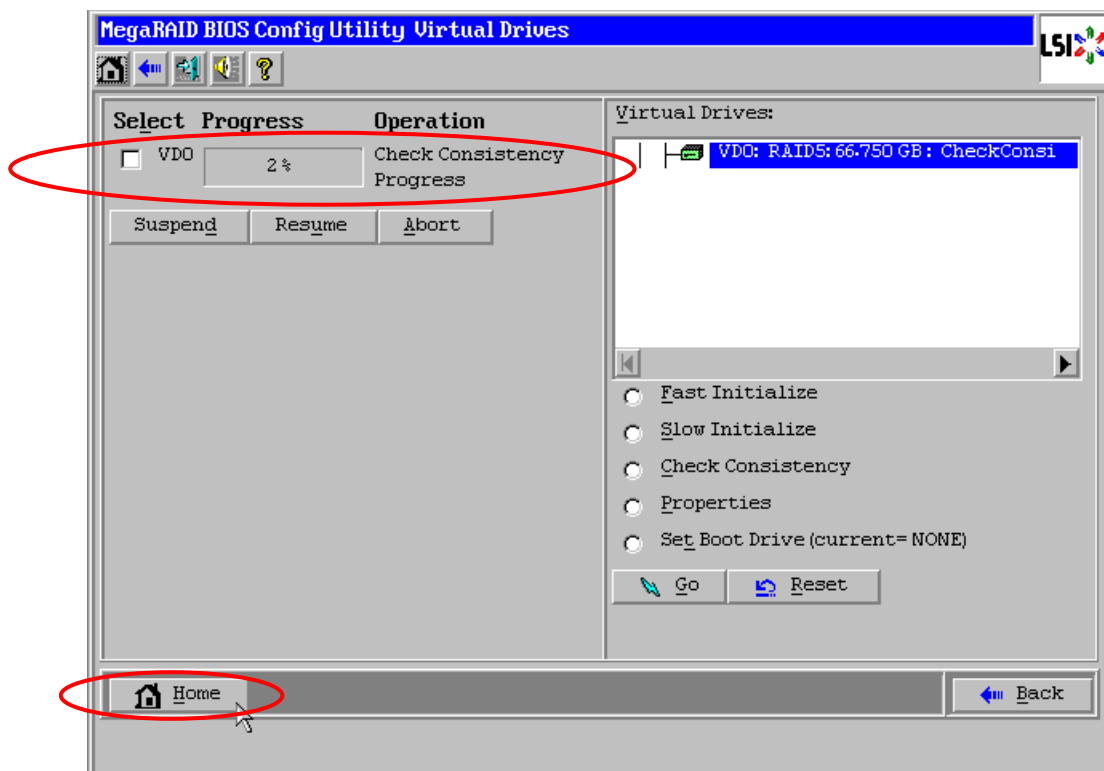
A lot of inconsistency may be detected at Check Consistency performed immediately after the VD was configured due to inconsistencies in the unused area. In such a case, an alert may be logged.

5-2. Manual Rebuild

Rebuild can be performed automatically when the failed Physical Device is replaced in Hot Swap mode. However, if the failed Physical Device is replaced after turning off the power of the server, Rebuild will not start automatically. Use Manual Rebuild feature to recover the Virtual Drives (VDs) as described below.

> **Notice**
> - To perform rebuild automatically in Hot Swap mode, be sure to replace Physical Device while the OS or WebBIOS is running.
> - You can view the progress of rebuild on Universal RAID Utility screen or click [Virtual Drive] on WebBIOS Top Menu.

Described below are procedures based on assumption:

One of the Physical Devices failed in a RAID5 VD configured with three Physical Devices. Replace the failed Physical Device with new one after turning off the power of the server. In this case the rebuild does not start automatically due to non-Hot Swap replacement. Use Manual Rebuild feature to recover the VDs as described below.

1. Start WebBIOS.

   Make sure that the status for the replaced Physical Device is indicated as "Unconfigured Good" in the right frame of the Top Menu. In the example below, the Physical Device in slot number 2 has been replaced.

2. Select the newly connected Physical Device (the Physical Device in slot number 2 in the example) from the right frame of Top Menu.
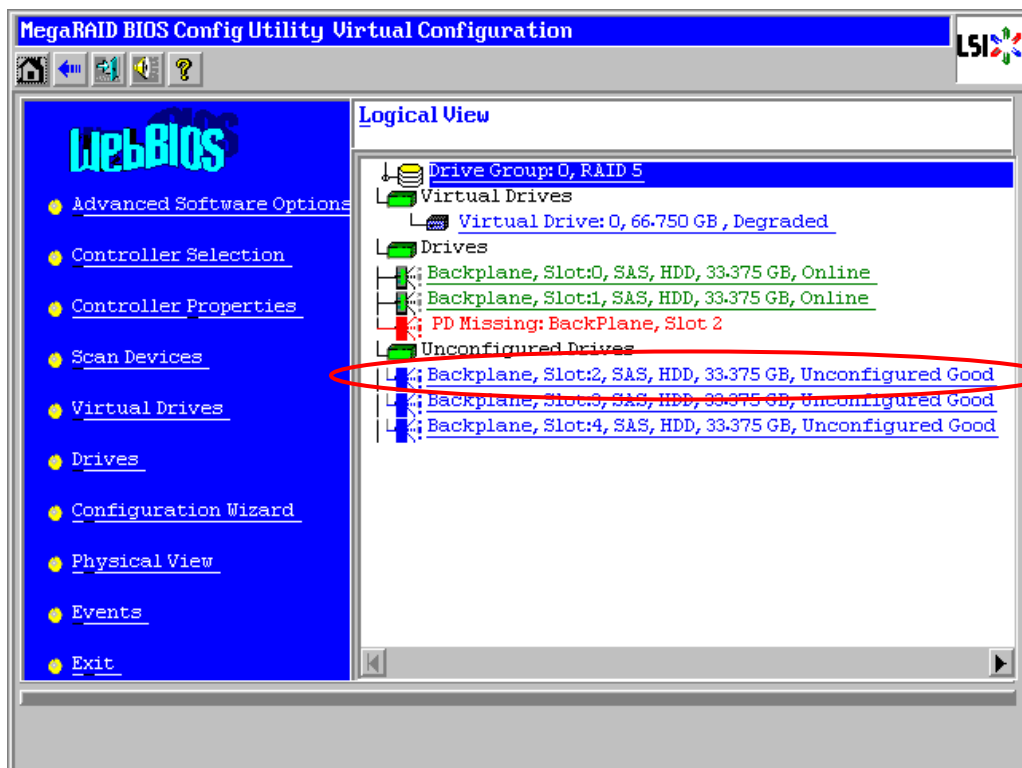
> **Tips**
> The indication "PD Missing: BackPlane,Slot2" represents that the Physical Device in VD having been installed in slot number 2 was removed.

3. The properties for the Physical Drive is displayed.

4. Select the Drive Group (DG) you want to rebuild and check to "Make Dedicated HSP", and then click [Go] on the lower center of the screen.
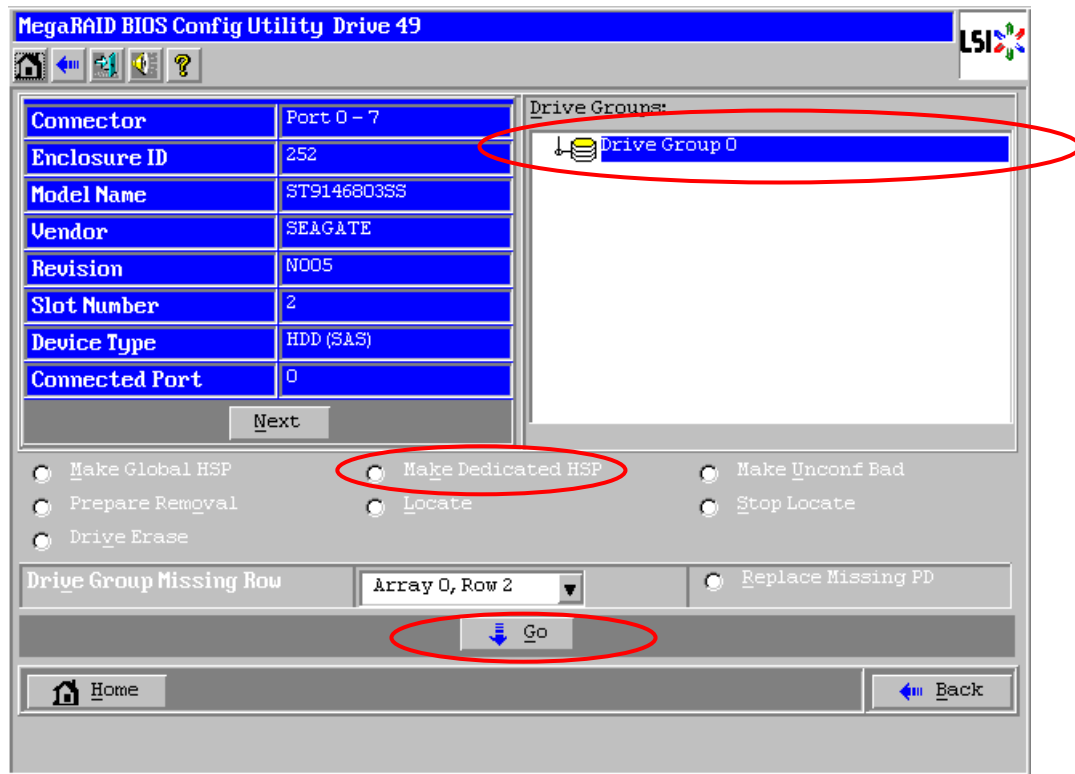
5. You can see progress of the rebuild in [Rebuild Progress] column. Click [Home] at the lower left of the screen to go back to WebBIOS Top Menu.
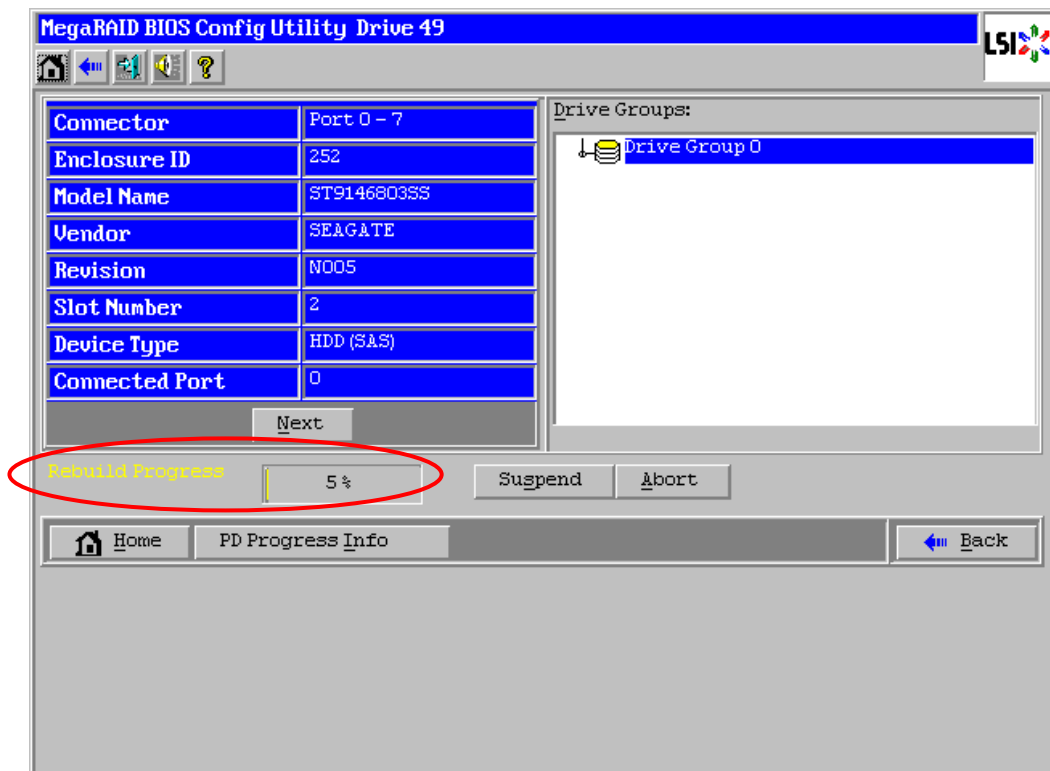
6. The WebBIOS Top Menu changes as shown below during rebuild. If you click on the Physical Device being rebuilt, the progress of rebuild is displayed.
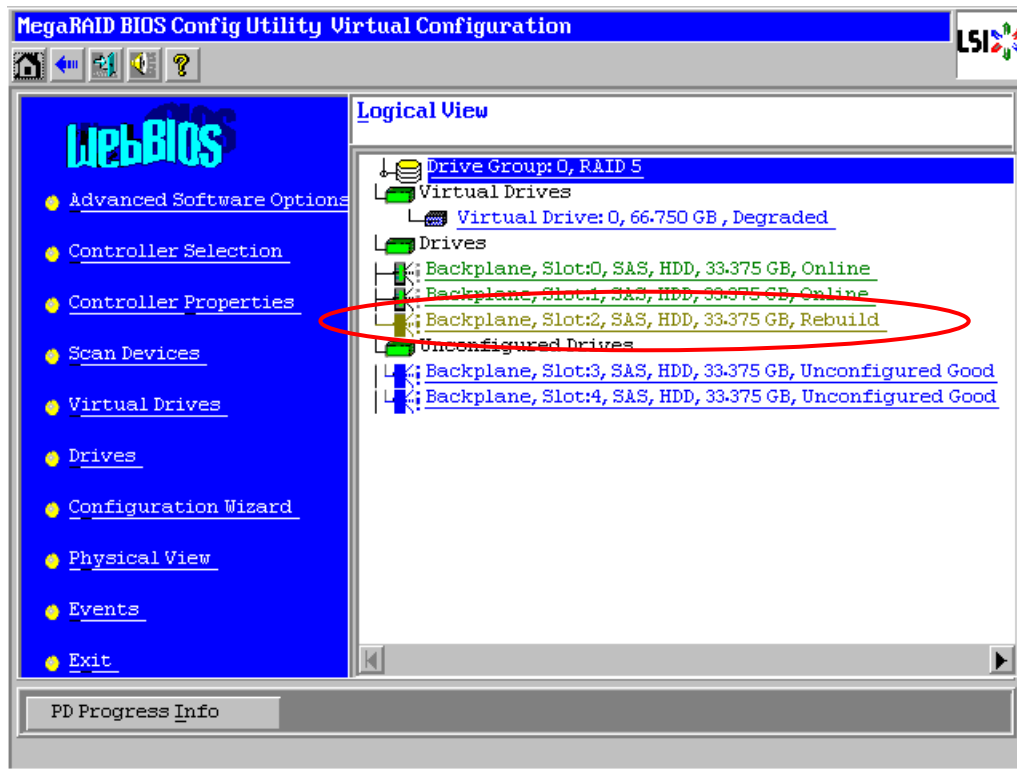
7. When the rebuild completes, the status for the Physical Device becomes "Online" and that of the VD becomes "Optimal".
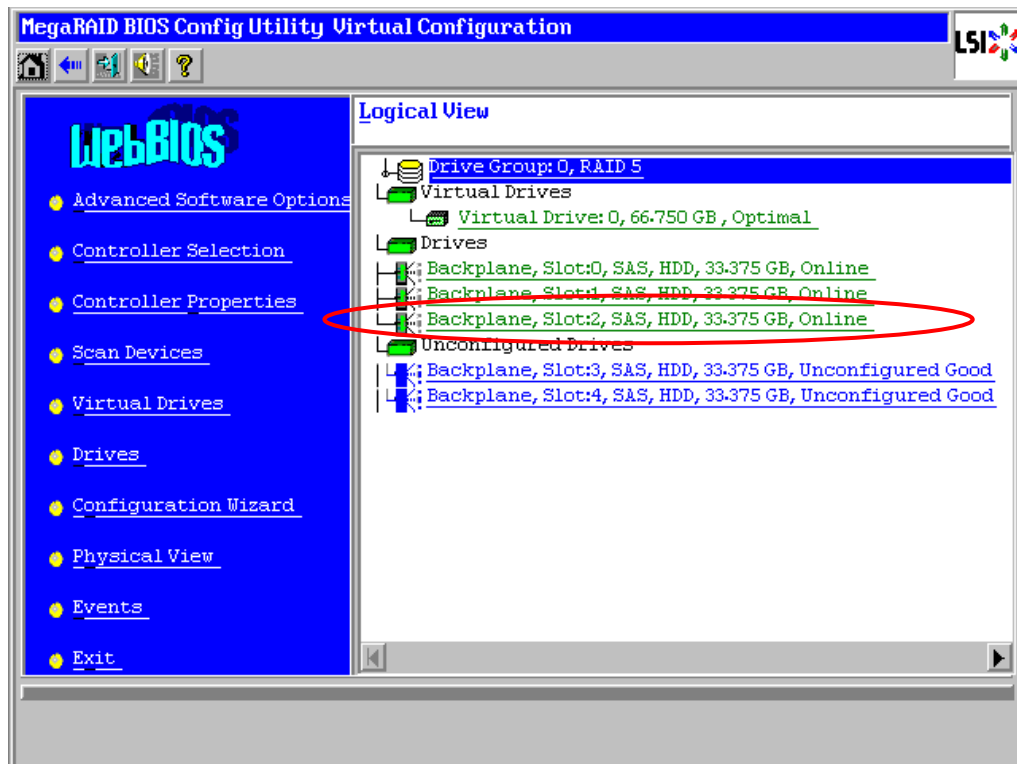
5-3. Hot Spare

Described below are procedures based on assumption:

Add a Physical Device to a RAID5 Virtual Drive (VD) configured with three Physical Devices and assign a newly added Physical Device as Hot Spare Disk.

1. Start WebBIOS.

Make sure that the status for the added Physical Device is indicated as "Unconfigured Good" in the right frame of the Top Menu.

2. Select the newly connected Physical Device (the Physical Device in slot number 3 in the example) from the right frame of Top Menu.
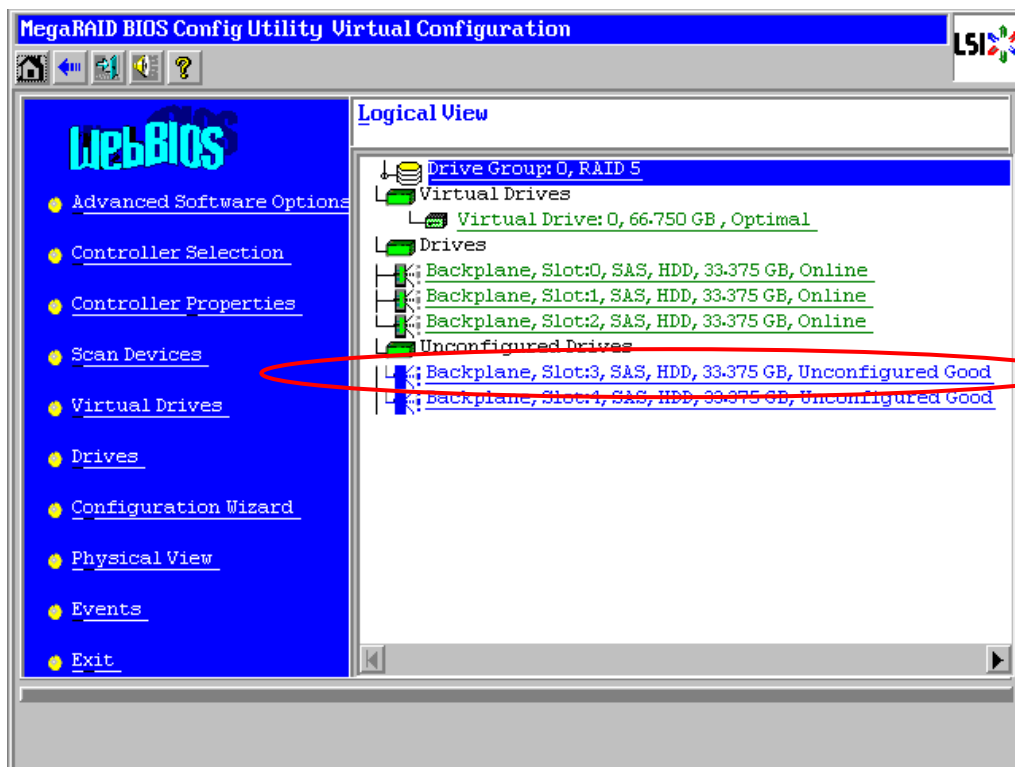
3. The properties for the Physical Device is displayed.

4. This RAID controller has two types of Hot Spare. Create a Hot Spare of either type.

Global HSP	Indicates the Hot Spare available for all DGs.
Dedicated HSP	Indicates the Hot Spare available only for the specific DG. You need to specify the target DG.

[In the case of creating a Global HSP]

Select "Make Global HSP" and then click [Go] on the lower center of the screen.
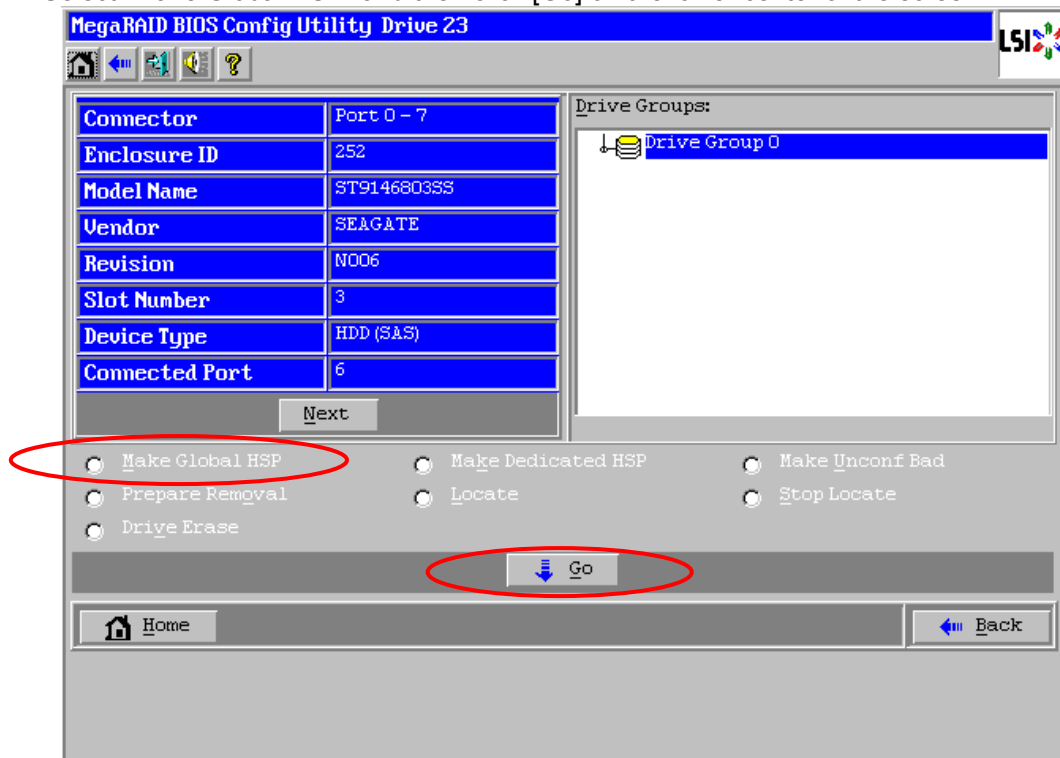
[In the case of the creating a Dedicated HSP]

Select the DG you want to specify as Hot Spare and select "Make Dedicated HSP" and then click [Go] on the lower center of the screen.
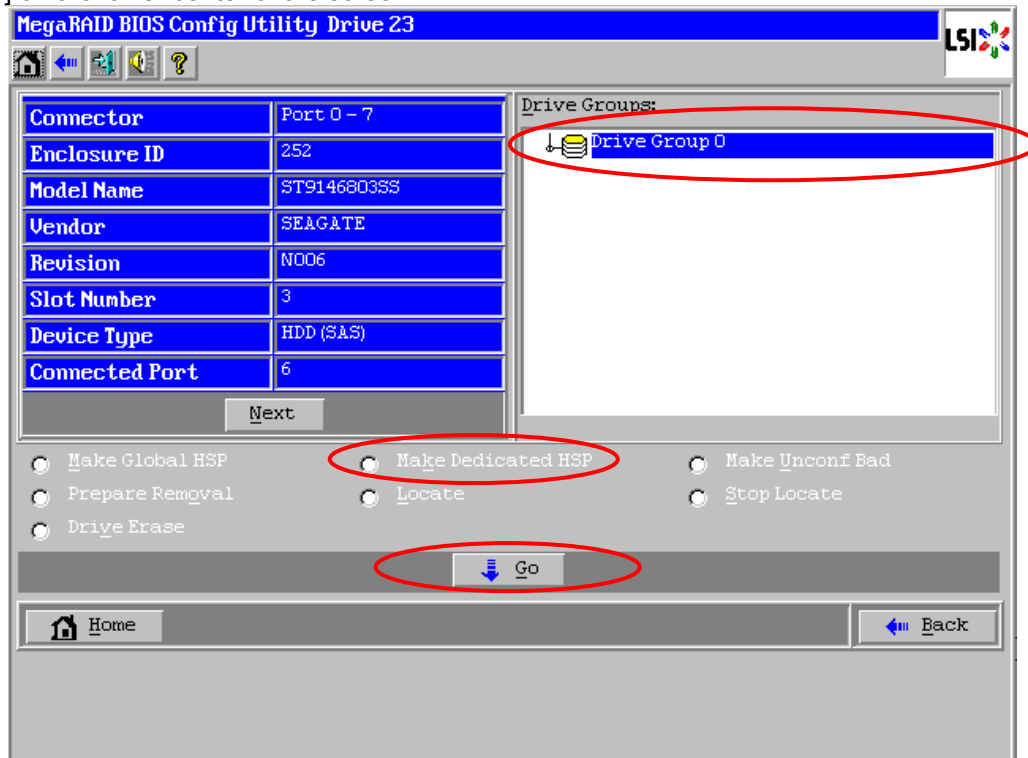
5. Click [Next] and then the properties for the Physical Device is displayed.
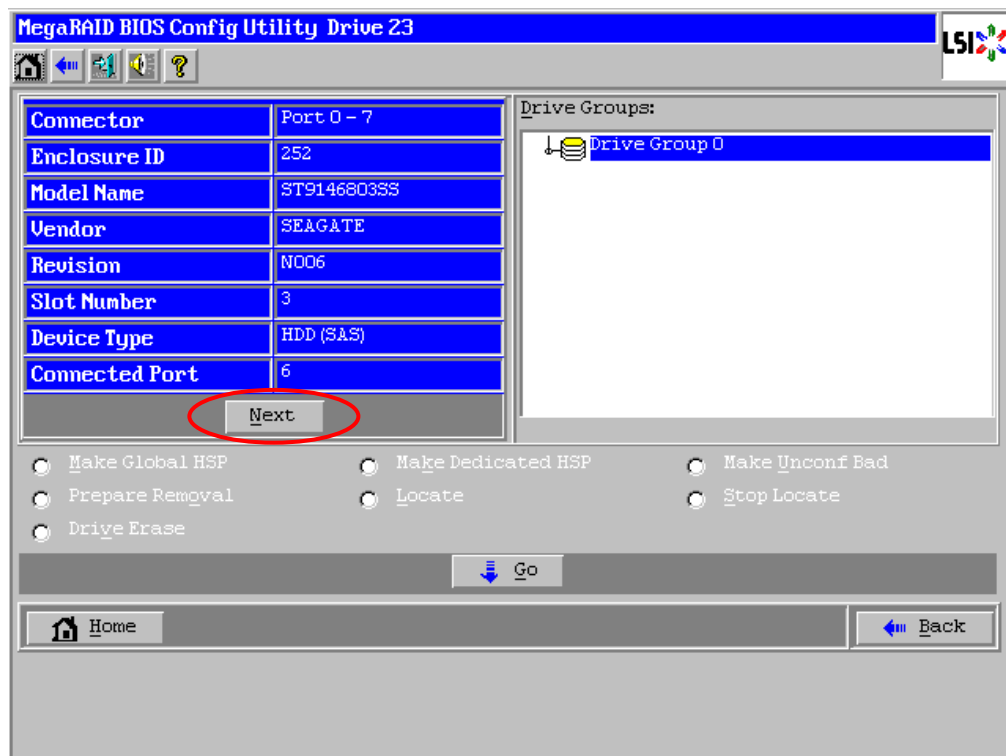
6. The status for the newly connected Physical Device changes to "GL HOTSPARE" or "DED HOTSPARE". Click [Home] at the lower left of the screen to go back to WebBIOS Top Menu.
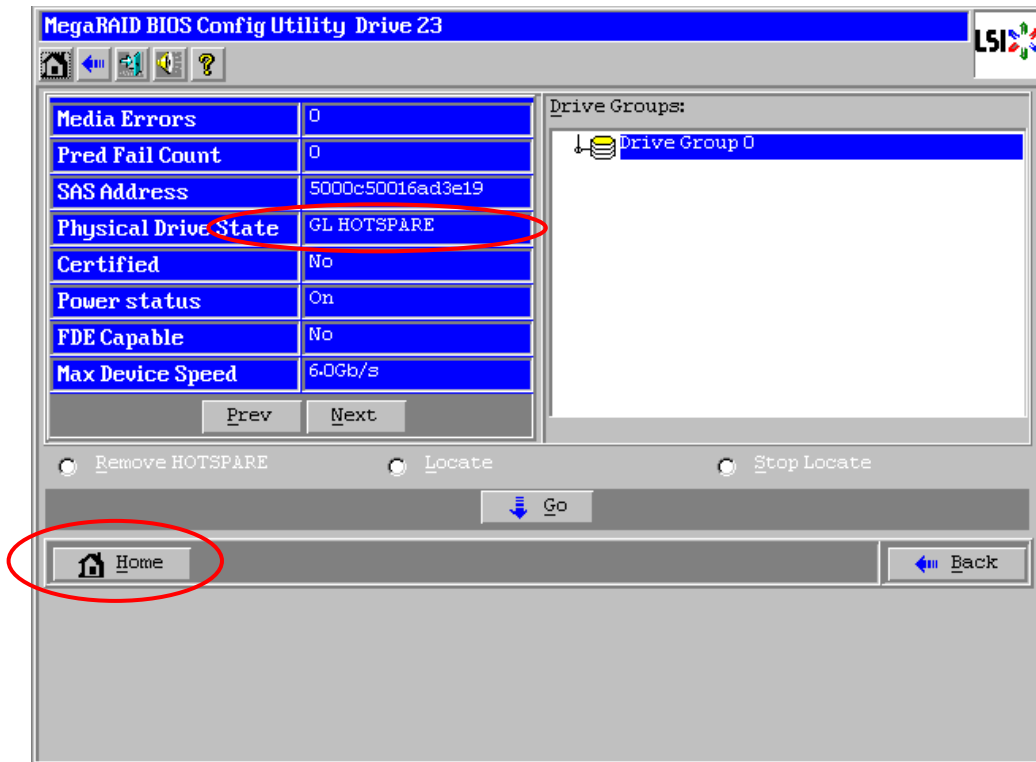
7. Make sure that the status for the Physical Device is indicated as "Hotspare" in the right frame of the Top Menu.
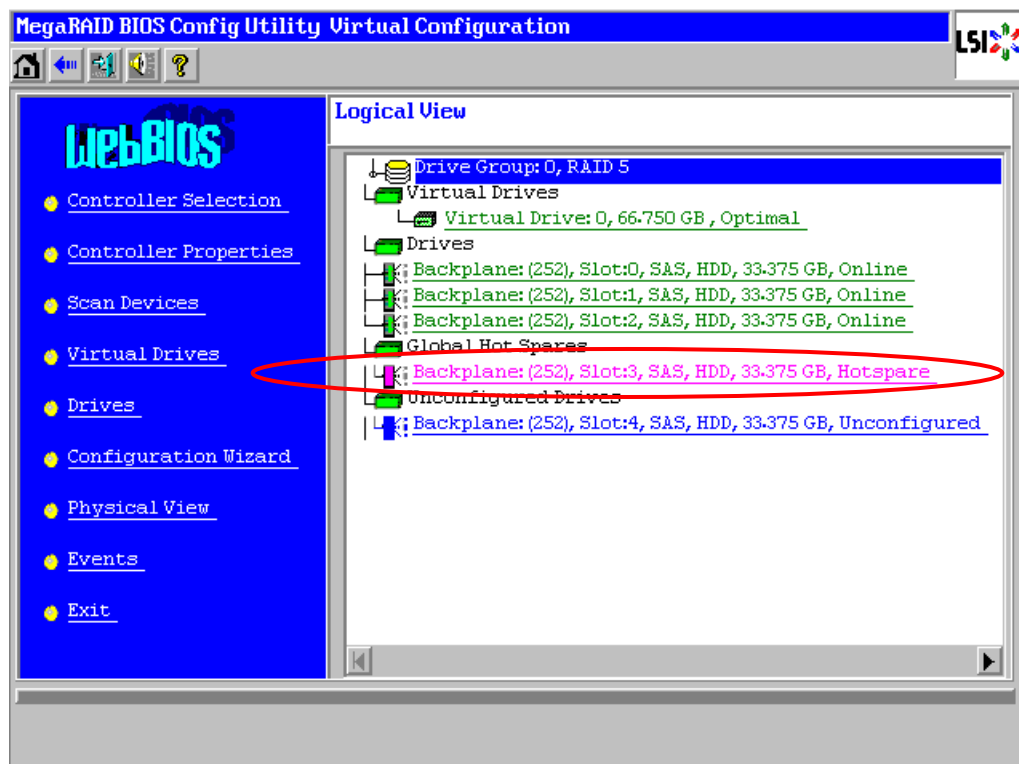
5-4. Reconstruction

With this feature you can change RAID configuration, such as RAID level and capacity, for existing Virtual Drives with an additional Physical Device.

Described below are procedures based on assumption:

Add a Physical Device to a RAID5 Virtual Drive (VD) configured with three Physical Devices to make a RAID5 VD configured with four Physical Devices.

1. Start WebBIOS.

    Make sure that the status for the added Physical Device is indicated as "Unconfigured Good" in the right frame of the Top Menu.

2. Select a VD you want to reconstruct (VD 0 in the example) from the right frame of Top Menu.
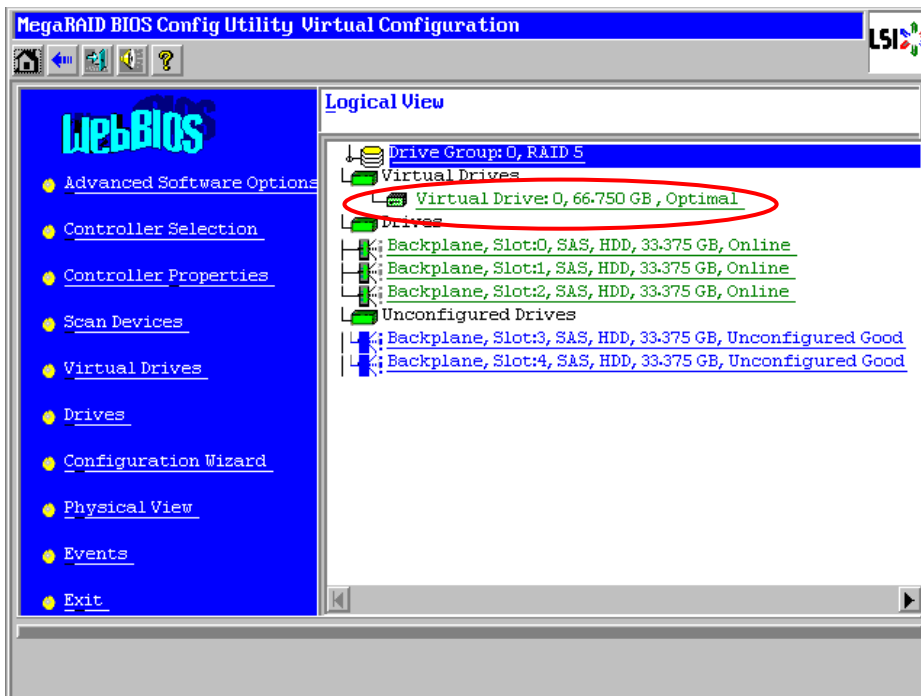
3. Select "Adv Opers" and then click [Go].
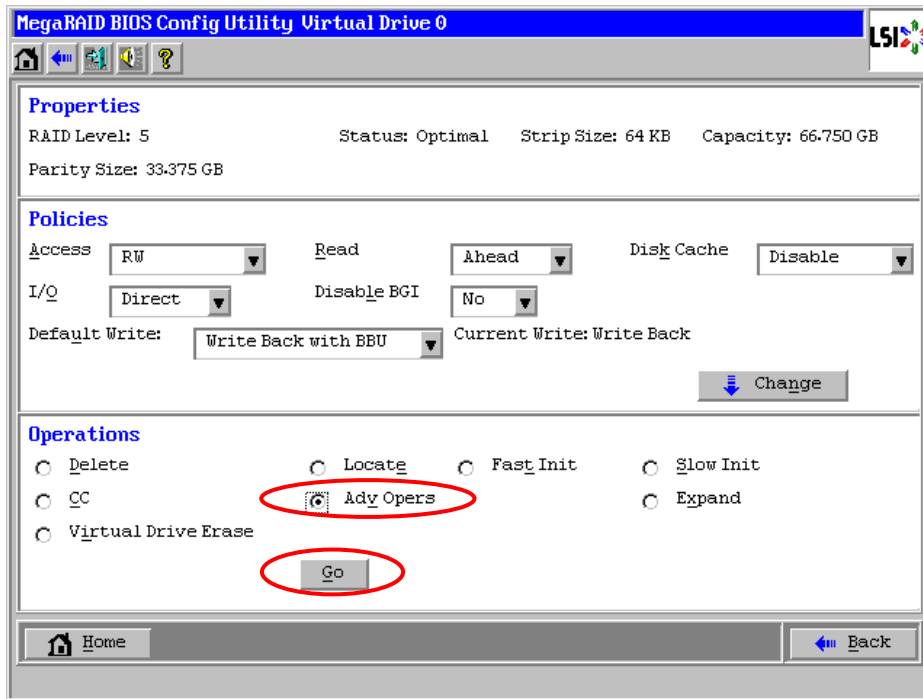
This RAID controller does not support the Expand feature and Virtual drive Erase.

Notice

4. Items required for reconstruction are displayed on the left of the screen.
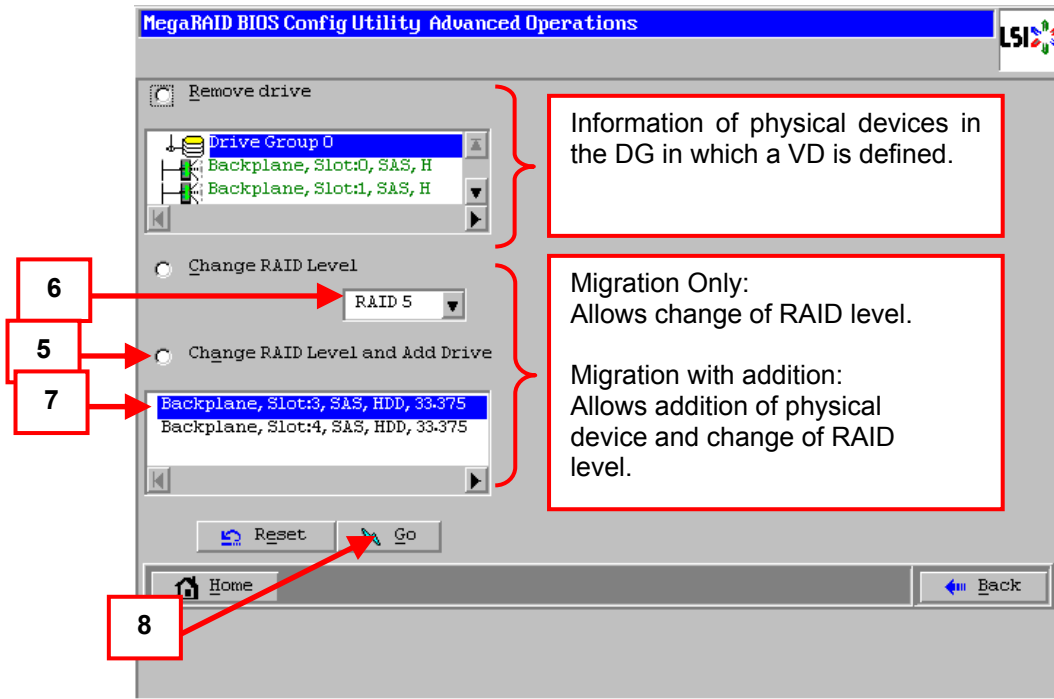
5. Select " Change RAID Level and Add Drive".

6. Specify the RAID level used after reconstruction.

7. Select a Physical Device to be added.

8. When you finished Steps 5 to 7, click [Go] at the lower right of the screen.

9. The progress of the reconstruction is displayed on the lower left of the screen. Click [Home] at the lower left of the screen to return to the WebBIOS Top Menu.

Notice

- The capacity of VD may be incorrectly displayed after reconstruction. In this case, perform Scan Devices from the Top Menu.
- The following policies are temporarily changed while reconstruction is being executed. When reconstruction is finished, the previous values are restored.
  – Read Policy: Normal
  – Write Policy: Write Through
  – Access Policy: Cached I/O
- During reconstruction, do not shutdown or reboot the server.

5-5. Locate

The Locate command makes an LED on Physical Device light or blink to confirm the location of the slot. We recommend you to check the slot of Physical Device before adding Virtual Drive (VD) or Hot Spare disks, reconstructing VD, or replacing Physical Device.

How to execute Locate command on WebBIOS

1. Click a Physical Device to check the location in the right frame of the WebBIOS Top Menu.

2. The properties of the Physical Device are displayed. Select [Locate].

3. Click [Go]. The LED of the Physical Device lights or blinks.

4. Select [Stop Locate].

5. Click [Go]. The LED of the Physical Device goes out.
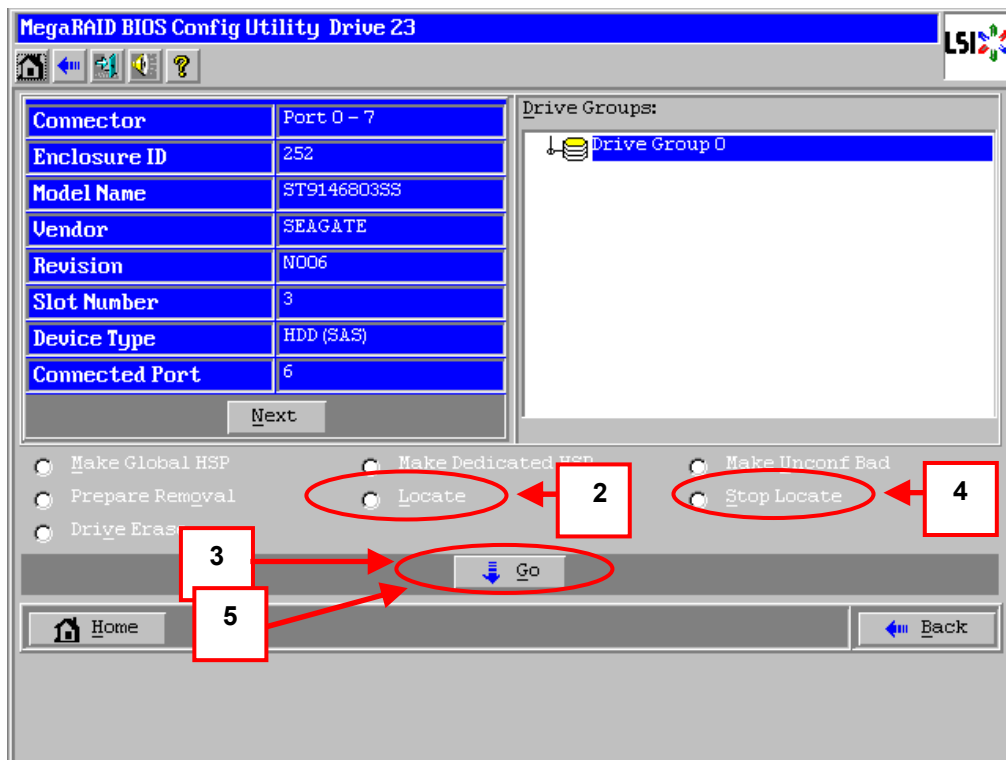
5-6. Slow Initialize

Slow Initialize writes zero to all the sectors of the data area in the Virtual Drive (VD).

1. Start WebBIOS.
2. Click [Virtual Drives] in the right frame of the on the WebBIOS Top Menu.
3. Select a VD to perform Slow Initialize from the upper right frame of the Virtual Drives screen.
4. Click the checkmark column for Slow Initialize from the lower right frame of the Virtual Drives screen.
5. Make sure that Slow Initialize is checked, and click [Go].
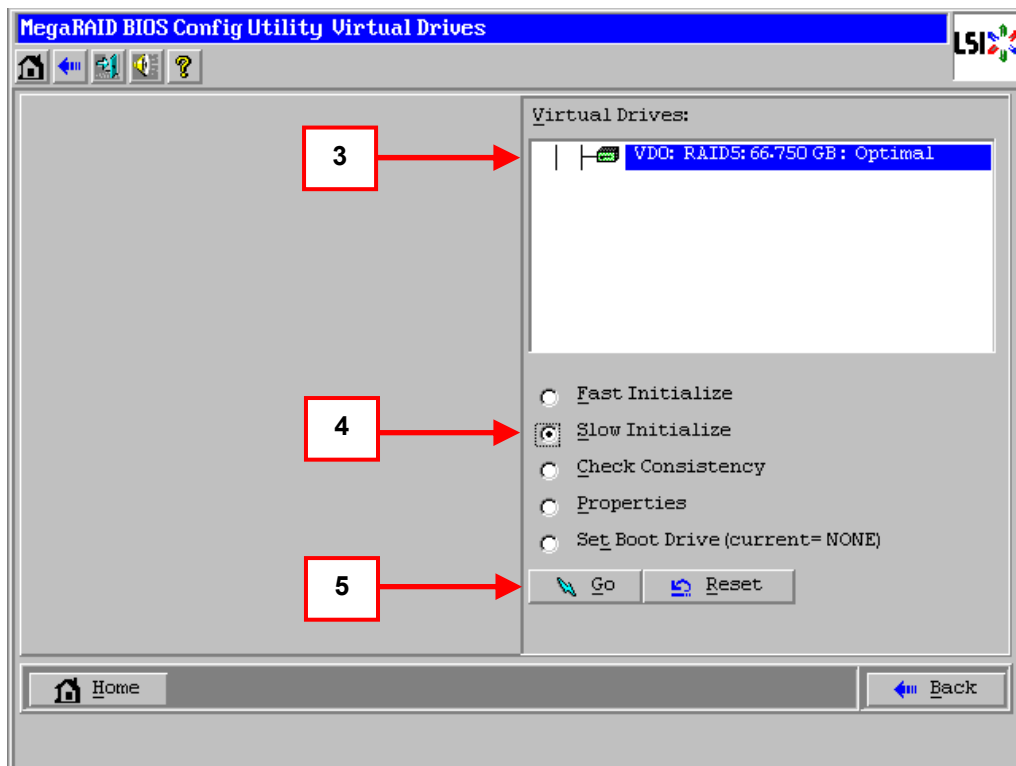
Notice	■ When you create a new VD using the Configuration Wizard of WebBIOS and specify to perform the Initialize to the new VD, the Initialize is Fast Initialize. It clears the first sector that contains partition information. ■ Slow Initialize takes a long time to complete. ■ Slow Initialize deletes all data. Take care for this operation.

5-7. Manage Powersave

Manage Powersave is a function to carry out a spin down and power saving, when there is no access to physical devices for a definite period of time.

Manage Powersave contains the following three features, Unconfigured drives／Hot spare drives／Configured drives. However, this RAID controller supports " Hot spare drives " only.

Setting procedure

1. When you click [Controller Properties] on WebBIOS Top Menu, the configuration information is displayed.The configuration information is continued on the next page. Click [Next] to view more information.

MegaRAID BIOS Config Utility Controller Information			LSI
LSI MegaRAID SAS 9267-8i			
Serial Number	SV11211830	FRU	04
SubVendorID	0x1000	Drive Security Capable	No
SubDeviceID	0x9267	PortCount	8
HostInterface	PCIE	NVRAMSize	32 KB
Firmware Version	3.140.25-1422	Memory Size	1024 MB
FW Package Version	23.1.1-0006	Min Strip Size	8 KB
Firmware Time	Oct 12 2011;17:55:13	Max Strip Size	1 MB
WebBIOS Version	6.1-21-Rel	Virtual Drive Count	1
Drive Count	5	Hot Spare Spin Down	Disabled
Unconfig Good Spin Down	Disabled	Power Save Mode for Config Drives	None

Next

Home   Back

2. The configuration information is continued on the next page. Click [Next] to view more information.

3. Click [Next] to see the detailed settings of this controller.

4. Click [Settings] in "Manage Powersave" column, then the "Power Save Setting" screen is displayed.
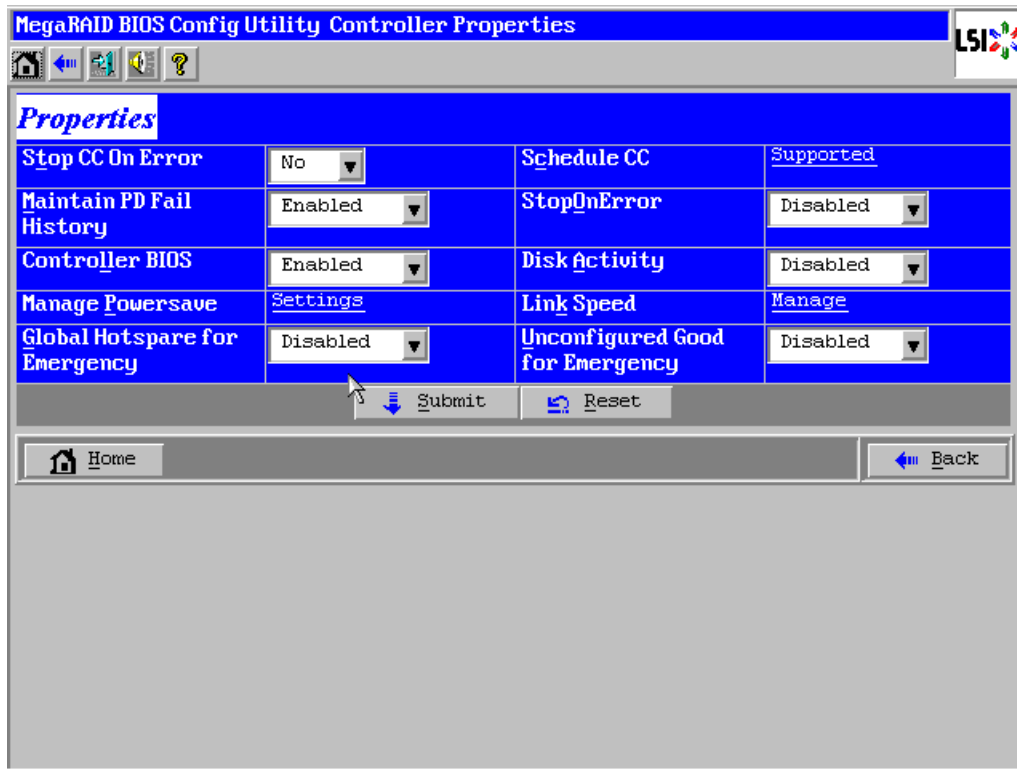
5. Select "Hot spare drives" and then click [Next] on the lower center of the screen.
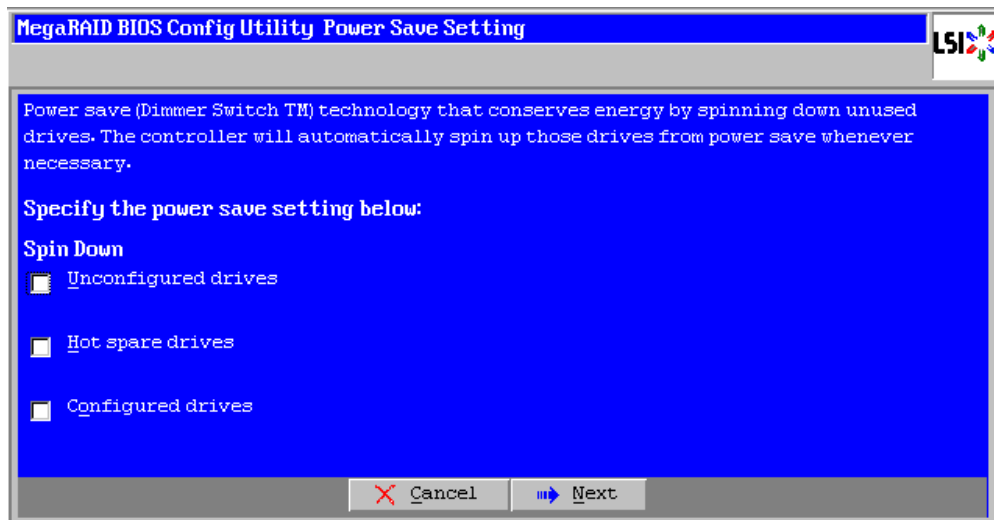
6. Select "Drive standby time" from pulldown menu and then click [Finish].
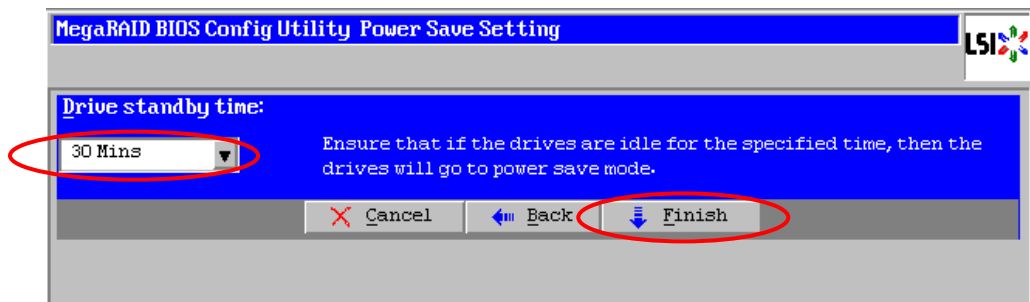
7. Click [Yes] to return to the WebBIOS Top Menu.
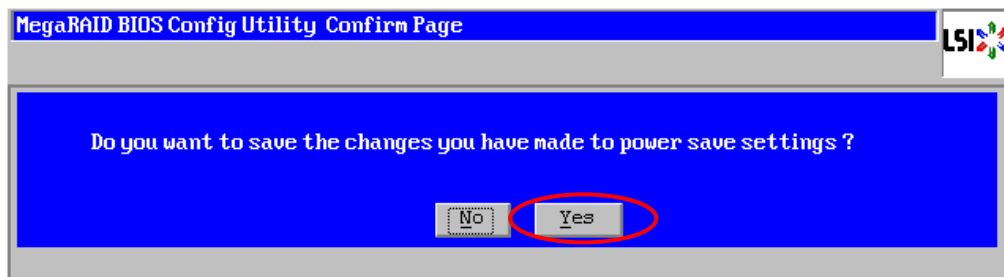
5-8. WebBIOS and Universal RAID Utility

You can use Universal RAID Utility for configuration, management and monitoring of RAID System after start up OS.

The point to be kept in mind when using Universal RAID Utility together with WebBIOS is as follows.

Terms

Terms used in WebBIOS differs from those used in URU.

When you use Universal RAIDUtility together with WebBIOS, substitute terms according to the following list.

Terms in WebBIOS	Terms in Universal RAID Utility
Controller（Adapter）	RAID Controller
Virtual Drive	Logical Drive
Drive Group	Disk Array
Drive	Physical Device

Setting of Priority for background tasks

WebBIOS displays and sets Rebuild Priority, Patrol Read Priority, and Consistency Check Priority of the RAID Controller by percentage. However, URU uses three levels as High/Middle/Low for them.

> **Tips**
> - WebBIOS can set BGI Rate (Background Initialize Priority). However, URU cannot set it.
> - URU can set Initialization Priority. However, this RAID Controller does not have the function of the setting of Initialization Priority. Therefore, URU does not display [Initialization Priority] in the [Options] tab of RAID Viewer. In addition, you will fail if you change the Initialization Priority by raidcmd.

Refer to the table below for correspondence.

Setting value of WebBIOS and the display level of Universal RAID Utility(URU)

Item	Setting value of WebBIOS	Universal RAID Utility level
Priority of Rebuild (URU) Rebuild Rate (WebBIOS)	80~100	High
	31~79	Middle
	0~30	Low
Priority of Patrol Read (URU) Patrol Read Rate (WebBIOS)	80~100	High
	31~79	Middle
	0~30	Low
Priority of Check Consistency (URU) WebBIOS CC Rate (WebBIOS)	80~100	High
	31~79	Middle
	0~30	Low

Setting level of Universal RAID Utility(URU) and the setting value

Item	Setting level of Universal RAID Utility	Setting value
Priority of Rebuild (URU) Rebuild Rate (WebBIOS)	High	90
	Middle	50
	Low	10
Priority of Patrol Read (URU) Patrol Read Rate (WebBIOS)	High	90
	Middle	50
	Low	10
Priority of Check Consistency (URU) WebBIOS CC Rate (WebBIOS)	High	90
	Middle	50
	Low	10

Chapter 5 Operation and Maintenance

1. Maintenance Service

Service representatives subordinate to or authorized by NEC provide services of the RAID controller. You can get the services for your own convenience.

For the services, contact the NEC sales department or representatives.

2. Preventive Maintenance

2-1. Data Backup

In case of an unexpected accident, it is recommended to back up data in Physical Devices routinely.

For the data backup, refer to the User's Guide of the server.

3. Maintenance

This RAID controller supports the following maintenance features

- Configuration on Disk (COD)
- Rebuild

3-1. Configuration on Disk (COD)

The COD is a feature that writes the configuration information into Physical Devices. The feature prevents the configuration information from being lost if the RAID controller is defected and replaced. After the RAID controller is replaced, it can read the configuration information from Physical Devices to operate the controller normally.

| ✔ **Check** | The RAID controller does not save the configuration information within it. Instead, it writes and saves the configuration information in Physical Devices. |

3-2. Rebuild

When a Physical Device is defected, the rebuild feature recovers the data in the defected Physical Device. The feature is available for redundant Virtual Drives in RAID1, RAID5, RAID6, RAID10, RAID50, and RAID60 level.

Refer to Chapter 3 (1.Rebuild) for details.

4. Replace a RAID controller

Replace the RAID controller in the following procedure:

| ✔ **Check** | For the handling of the server, refer to the User's Guide for the server. |

⚠ CAUTION

Avoid installation in extreme temperature conditions.

Immediately after the server is powered off, its internal components such as hard disk drives are very hot. Leave the server until its internal components fully cool down before installing/removing any component.

Turn off a power supply of the server and unplug a power cord from an electric socket. With the power of the server being ON, shutdown OS to turn off the power.

1. Remove the side cover and several components on the server appropriately.

2. Remove the cables (SAS cable, battery cable, etc) from the RAID controller.

| **Notice** | Before removing the SAS cables, see the port numbers of the SAS connectors on the RAID controller and those of the SAS cables to write down the connecting configuration. |

3. Remove the screw fixing the RAID controller and remove the RAID controller from the server.

| **Notice** | ■ If you use a battery, connect the removed battery to a new RAID controller after you replaced it. For detail, refer to User's Guide for the battery and the server.
■ Always write down the position of the removed PCI slot (PCI Express). |

4. Insert the replaced RAID controller into the same PCI slot (PCI Express) and fix it with the screw.

5. Connect all the cables removed in step 3 following the connecting configuration written down previously.

6. Install the side cover and other components removed in step 2 on the server.

7. Connect the power cords to an electric socket and turn on the power of the server. Make sure that the server is booted normally.

5. Troubleshooting

5-1. Error Messages

When RAID Controller detects any error at the POST, it displays an error message on the display screen. The following table lists error messages of the RAID Controller and actions to take.

On-screen message	Action
Memory/battery problems were detected. The adapter has recovered, but cached data was lost. Press any key to continue, or 'C' to load the configuration utility.	Please contact your service representative.
Firmware version inconsistency was detected. The adapter has recovered, but cached data was lost. Press any key to continue, or 'C' to load the configuration utility.	Please contact your service representative.
Foreign configuration(s) found on adapter Press any key to continue, or 'C' to load the configuration utility, or 'F' to import foreign configuration(s) and continue.	Press C to run the utility to import or clear configuration.
Foreign configuration import did not import any drives. Press any key to continue.	Please contact your service representative.
Previous configuration cleared or missing Importing configuration created on MM/DD hh:mm Press any key to continue, or 'C' to load the configuration utility.	Please contact your service representative.
An enclosure was found that contains both SAS and SATA drives, but this controller does not allow mixed drive types in a single enclosure. Please correct the problem then restart your system. Press any key to continue, or 'C' to load the configuration utility.	RAID Controller may be faulty. Contact your service representative to replace the RAID Controller.
SAS drives were detected, but this controller does not support SAS drives. Please remove the SAS drives then restart your system. Press any key to continue, or 'C' to load the configuration utility.	RAID Controller may be faulty. Contact your service representative to replace the RAID Controller.
SATA drives were detected, but this controller does not support SATA drives. Please remove the SATA drives then restart your system. Press any key to continue, or 'C' to load the configuration utility.	RAID Controller may be faulty. Contact your service representative to replace the RAID Controller.
Invalid SAS topology detected. Please check your cable configurations, repair the problem, and restart your system.	Check if cable is connected properly. If the same error persists, contact your service representative.
The battery hardware is missing or malfunctioning, or the battery is unplugged. If you continue to boot the system, the battery-backed cache will not function. Please contact technical support for assistance. Press 'D' to disable this warning (if your controller does not have a battery).	\<When battery is not used> Press D to hide this message. \<When battery is used> Check if battery is connected properly. If the same error persists, contact your service representative.

On-screen message	Action
The battery is currently discharged or disconnected. Verify the connection and allow 30 minutes for charging. If the battery is properly connected and it has not returned to operational state after 30 minutes of charging then contact technical support for additional assistance.	\<When battery is not used\> Ignore this message. \<When battery is used\> Run WebBIOS or Universal RAID Utility to check if battery is detected. • Battery is not detected: – Check if battery is connected properly. – Battery may be insufficiently charged. Keep the system running for 30 mimits. Then, reboot and check battery. When battery is recognized, keep the system running for 24 hours or more to charge battery. • Battery is detected: – Keep the system running for 12 hours or more to charge battery. If the same error persists, contact your service representative.
The battery is currently discharged or disconnected. VDs configured in write-back mode will run in write-through mode to protect your data and will return to write-back policy when the battery is operational.If VDs have not returned to write-back mode after 30 minutes of charging then contact technical support for additional ssistance. The following VDs are affected: xx Press any key to continue.	
Your VDs that are configured for write-back are temporarily running in write-through mode. This is caused by the battery being charged, missing, or bad. Please allow battery to charge for 24 hours before evaluating battery for replacement. The following VDs are affected : XX Press any key to continue.	
Some configured disks have been removed from your system, or are no longer accessible. Please check your cables and also ensure all disks are present. Press any key to continue, or 'C' to load the configuration utility.	Check if cable and Physical Devices are connected properly. If the same error persists, contact your service representative.
The following VDs have missing disks: xx If you proceed (or load the configuration utility), these VDs will be marked OFFLINE and will be inaccessible. Please check your cables and ensure all disks are present. Press any key to continue, or 'C' to load the configuration utility.	
The following VDs are missing: xx If you proceed (or load the configuration utility), these VDs will be removed from your configuration. If you wish to use them at a later time, they will have to be imported. If you believe these VDs should be present, please power off your system and check your cables to ensure all disks are present. Press any key to continue, or 'C' to load the configuration utility.	
All of the disks from your previous configuration are gone. If this is an unexpected message, then please power off your system and check your cables to ensure all disks are present. Press any key to continue, or 'C' to load the configuration utility.	
The following VDs are missing complete spans: XX If you proceed (or load the configuration utility), these VDs will be removed from your configuration and the remaining drives marked as foreign. If you wish to use them at a later time, restore the missing span(s) and use foreign import to recover the VDs. If you believe these VDs should be present, please power off your system and check your cables to ensure all disks are present. Press any key to continue, or 'C' to load the configuration utility.	

On-screen message	Action
Invalid SAS Address present in MFC data. Please program valid SAS Address, and restart your system.	Please contact your service representative.
Invalid SAS Address present in SBR. Please contact your system support. Press any key to continue with Default SAS Address.	
The cache contains dirty data, but some VDs are missing or will go offline, so the cached data can not be written to disk. If this is an unexpected error, then please power off your system and check your cables to ensure all disks are present. If you continue, the data in cache will be permanently discarded. Press 'X' to acknowledge and permanently destroy the cached data.	Check if cable, Physical Devices, and upgrade key are connected properly. If the same error persists, contact your service representative. NOTE: If you press X, the data in cache memory will be lost.
Invalid memory configuration detected. Please contact your system support. System has halted.	Contact your service representative to replace the RAID Controller.
RAID Adapter FW Failed Validation!!! Adapter needs to be reflashed. Press any key to continue.	Contact your service representative to replace the RAID Controller.
Cache data was lost due to an unexpected power-off or reboot during a write operation, but the adapter has recovered. This could be due to memory problems, bad battery, or you may not have a battery installed. Press any key to continue or 'C' to load the configuration utility.	\<When battery is not used\> Run WebBIOS or URU to check the setting for cache mode. If forced write-back is specified, change it to Always Write Back or write through mode. \<When battery is used\> Check if battery is connected properly. If the same error persists, contact your service representative to replace the RAID Controller and battery.
Entering the configuration utility in this state will result in drive configuration changes. Press 'Y' to continue loading the configuration utility or please power off your system and check your cables to ensure all disks are present and reboot.	Check if the device is connected properly. Contact your service representative to replace the RAID Controller.
Multibit ECC errors were detected on the RAID controller. The DIMM on the controller needs replacement. Please contact technical support to resolve this issue. If you continue, data corruption can occur. Press 'X' to continue or else power off the system and replace the DIMM module and reboot. If you have replaced the DIMM press 'X' to continue.	Contact your service representative to replace the RAID Controller
Single-bit ECC errors were detected during the previous boot of the RAID controller. The DIMM on the controller needs replacement. Please contact technical support to resolve this issue. Press 'X' to continue or else power off the system and replace the DIMM module and reboot. If you have replaced the DIMM press 'X' to continue.	
Single-bit overflow ECC errors were detected during the previous Boot of the RAID controller. The DIMM on the controller needs replacement. Please contact technical support to resolve this issue. If you continue, data corruption can occur. Press 'X' to continue or else power off the system and replace the DIMM module and reboot. If you have replaced the DIMM press 'X' to continue.	

On-screen message	Action
Attached Enclosure doesn't support in controller's Direct mapping mode Please contact your system support. System has halted due to unsupported configuration.	Contact your service representative to replace the RAID Controller.
Firmware did not find valid NVDATA image. Please program valid NVDATA image and restart your system Press any key to continue.	Contact your service representative to replace the RAID Controller.
There are offline or missing virtual drives with preserved cache. Please check the cables and ensure that all drives are present. Press any key to continue, or 'C' to load the configuration utility.	Check if the device is connected properly. Contact your service representative to replace the RAID Controller.
Upgrade Key Missing! An upgrade key was present on a previous power cycle, but it is not connected. This can result in inaccessible data unless it is addressed. Please re-attach the upgrade key and reboot.	Check if the upgrade key is connected properly. Contact your service representative to replace the RAID Controller.
The most recent configuration command could not be committed and must be retried. Press any key to continue, or 'C' to load the configuration utility.	Check if cable and Physical Devices is connected properly. Contact your service representative to replace the RAID Controller.
The native configuration is no longer supported by the current controller and firmware. Please ensure that correct controller firmware is being used. Press any key to continue, the configuration will be marked foreign and part of it may be imported if possible.	Contact your service representative to replace the RAID Controller.
Advanced Software Options key(s) was missing, feature(s) deactivated - xx	Check if the extension key is connected properly. Contact your service representative to replace the RAID Controller.
Unrecoverable Error!!! Please check the SDRAM connection. If problems persist contact Tech Support.	Contact your service representative to replace the RAID Controller.
Memory Error!!! Detected Unsupported RAID Controller Memory Contact Tech support	
Memory Error!!! Please check the SDRAM connection. If problems persist contact Tech Support.	
Serial Boot ROM (SBR) device is corrupt or bad!!! Please contact Tech Support.	Contact your service representative to replace the RAID Controller.

5-2. Solving Problems

If the server equipped with the RAID controller does not operate normally or some utilities are disabled, check the following. Follow the action described in the relevant item if found.

(1) Fail to install the OS:
- ❑ Did you create VD?
  - → Create VDs by using WebBIOS.

(2) Fail to start the OS:
- ❑ Is RAID Controller inserted firmly straight into the PCI slot?
  - → Install the RAID Controller properly.
- ❑ Is the RAID Controller installed in the proper slot?
  - → You may not be able to install RAID contorollers you want to use due to a restriction of servers. Check if the slot is appropriate for the RAID Controller. Refer to a User's Guide for servers for a restriction.

If the RAID Controller is still not recognized correctly despite correct connection, the RAID Controller may be failed. Contact your service representative.

- ❑ Are Physical Devices properly installed?
  - → Install them properly.
- ❑ Is SAS cable connected correctly? (Check connection status with the server, Physical Devices, and additional HDD cage.)
  - → Connect the SAS cable properly. If the same error persists, the Physical Device may be faulty. Contact your service representative.

If the Physical Devices are still not recognized correctly despite correct connection, the Physical Devices may be failed. Contact your service representative.

- ❑ Is OptionROM of SystemBIOS Enable?
  - → OS cannot be booted if Option ROM setting is disabled for a RAID controller which boots up OS. Check the Option ROM setting in system BIOS. Refer to the user's guide of the server for the Option ROM setting.

(3) A Physical Device fails:
- → Contact your service representative.

(4) Rebuild fails:
- ❑ Is the capacity of the Physical Device to be rebuilt sufficient?
  - → The Physical Device to be rebuilt should have same capacity of the failed Physical Device.
- ❑ Is RAID0 configured for VD?
  - → RAID0 has no data redundancy. Therefore, rebuild is disabled in the RAID0 configuration. Replace the failed Physical Device, create the configuration data again and initialize the Physical Devices. Then recover the data by using backup data.

(5) Check consistency fails:
- ❑ Is VD "Partially Degraded" or "Degraded"?
  - → Replace the failed Physical Device with new one, then perform rebuild.
- ❑ Is RAID0 configured for VD?
  - → RAID0 has no data redundancy. Therefore, Check Consistency is disabled in the RAID0 configuration.

(6) Cannot set Write Back for cache mode:

→ The current cache mode of a RAID Controller is displayed on [Virtual Drives] - [Properties] - [Policies] - "Current Write". If a battery is faulty, not connected, or insufficiently charged, "Curernt Write" is changed to "Write Through" even if you specify "Default Write" in "Write Back with BBU". Refer to Chapter 4 (3-3.Parameters for Virtual Drive Definition) for details.

Indication on [Reason for Diff in Write]	Description
BBU not installed	The BBU is not attached to the controller or the BBU is not detected by the RAID controller. Are cables connected properly? → Check connection between a battery pack and a battery cable connector, a RAID controller and a battery cable connector. Is battery connected immediately before? → The battery may not be detected if it is insufficiently charged. If the battery is not detected even after 24 hours, reboot the system.
BBU is failed	The BBU is attached but needs to be replaced. → Contact your service representative.
BBU is discharged	The remaining capacity of the Battery goes below. → Wait for 12 hours or more to charge the battery.
BBU in re-learn cycle	The Battery is undergoing a learn cycle. → Wait for 12 hours or more to charge the battery.
Reconstruction	A reconstruction operation is in progress. → Check the Cache Mode setting after the reconstruction finished.

(7) A battery is not detected, or POST displays the following message:

> The battery hardware is missing or malfunctioning, or the battery is unplugged, or the battery could be fully discharged.   If you continue to boot the system, the battery-backed cache will not function.
> If battery is connected and has been allowed to charge for 30 minutes and this message continues to appear, then contact technical support for assistance.
> Press 'D' to disable this warning (if your controller does not have a battery).

❑ Are cables connected properly?
 Check connection between a battery pack and a battery cable connector, a RAID controller and a battery cable connector.
  → Connect them properly.
❑ Is battery connected immediately before?
  → The battery may not be detected if it is insufficiently charged. If the battery is not detected even after 24 hours, reboot the system.
 If the same error persists, the battery may be faulty. Contact your service representative.

(8) Event ID129:

The following message appears on Windows Event Log.

Source:	magasas2
Event ID:	129
Type:	Warning
Description	Information about Event ID (129) (Source: magasas2) is not found. -----

→ Retry by OS has succeeded. It is not the problem in operating the system.

(9) Access LED flashes:

❑ Access LED flashes frequently even while the Physical Device is not accessed.

→ The Access LED flashes if Patrol Read is running. With SATA hard disk drive, the LED may stay on.

N8103-149/150/151/160
RAID controller User's Guide

Jul 2012, Ver. 3

NEC Corporation
5-7-1, Shiba, Minato-ku, Tokyo, Japan
TEL (03)3454-1111 (main)