LSI MegaRAID SAS ZCR 8300XLP 0-Channel RAID Controller

User Guide

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Preface

Congratulations on your purchase of the Disk Array Controller.

The User's Guide describes how to install and use the LSI Logic MegaRAID SAS ZCR 8300XLP 0-Channel 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 find 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 disk array controller.

Keep this User Guide handy for quick reference.
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 Guide, "WARNING" or "CAUTION" is used to indicate a degree of danger. These terms are defined as follows:

⚠ WARNING Indicates a hazard that may result in death or serious personal injury.

⚠ CAUTION Indicates 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 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

Cautions

	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 a 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. Doing so may cause an electric shock or fire.

Mandatory Action

	Unplug the power cord of the server. Not doing so may cause an electric shock or fire.
	Indicates a mandatory action that cannot be specifically identified. Make sure to follow the instruction.

Safety Notes

Read the notes described below carefully to understand them, these will enable you to safely use your product. See "Safety Indications" described earlier for the descriptions of symbols.

General

⚠ WARNING

Do not use the product for services involving human lives or requiring high reliability.

The product is not intended to be used with or control facilities or devices concerning human lives, including medical devices, nuclear facilities and devices, aeronautics and space devices, transportation facilities and devices; and facilities and devices requiring high reliability. The manufacturer assumes no liability for any accident resulting in personal injury, death, or property damage if the Disk Expansion Unit has been used in the above conditions.

Do not use the product if you are aware of any suspect smoke, odour, or noise.

If smoke, odour, or noise is present, immediately switch off the unit and disconnect the power plug from the outlet. Contact your sales agent. Using the product in such conditions may cause a fire.

Keep needles or metal objects away from the server.

Do not insert needles or metal objects into the 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 the 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.

Always observe the following to prevent an electric shock or fire that could be caused by a damaged cord.

- Do not stretch the cord harness.
- Do not pinch the power cord.
- Do not bend the power cord.
- Keep chemicals away from the power cord.
- Do not twist the power cord.
- Do not place any object on the power cord.
- Do not bundle power cords.
- Do not alter, modify, or repair the power cord.
- Do not secure the power cord with staples or equivalents.
- Do not use a damaged power cord. (Replace a damaged power cord with a new one of the same specifications. Ask your sales agent for replacement.)

Do not hold the power plug if your hands are wet.

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 when the power cord of the Disk Expansion Unit is plugged to a power source.

Make sure to power off the server and unplug the power cord from a power outlet before connecting/disconnecting the interface cable. If the server is off-powered but its power cord is plugged to a power source, touching the cable may cause an electric shock or a fire may result from a short circuit. Also, connect/disconnect the interface cable after turning off the power of the destination.

Do not use any unauthorized interface cable.

Use only interface cables authorized by the manufacturer 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 the relevant screws.

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 (sulphur dioxide, hydrogen sulphide, nitrogen dioxide, chlorine, ammonia, ozone, etc) exist.
Also, do not set it in the environment where the air (or dust) includes components accelerating corrosion (ex. sulphur, sodium chloride) or conductive metals. There is a risk of a fire due to corrosion and/or short-circuits of an internal printed board.

Avoid installation in extreme temperature conditions.

Immediately after the server is powered off, its internal components, such as hard disk drives are very hot. Let the installed components fully cool down before installing/removing anything.

Cleaning and Working with the Product

⚠ WARNING

Do not disassemble, repair, or alter the server.

Do not attempt to disassemble, repair, or alter the product in any occasion other than those described in this User Guide. 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 the AC outlet before accessing inside the server. Touching any internal device of the server when 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 smoke or fire.

During Operation

⚠ CAUTION

Avoid contact with the server during thunderstorms.

Disconnect the power plug from the outlet when a thunderstorm is approaching. If the thunderstorm begins before you can 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.

Do not use a cellular phone or a pager around the server.

Turn off cellular phones or pagers near the server containing the product. Radio interference may cause malfunctions of the server.

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 Guide. For safety symbols, see "SAFETY INDICATIONS" provided earlier.

Items to be observed or points to be noted when operating the product.

Items to be checked when operating the product.

Information useful or convenient for you.

In the Package

Check the package contents.

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

Third Party Transfer

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

About data on the hard disk
Be sure to take appropriate measures not to leak important data (e.g., customers' information or companies' management information) on the removed hard disk 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. 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.
The manufacturer 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:

- Transfer all the provided software applications, and keep no backup copies.
- Uninstall software applications before transferring the product.

Disposal

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

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

Data Backup

We recommend you make a back-up copy of your valuable data on a regular basis in order to avoid severe data loss in the event of shocks, thermal changes, or operator mistakes.

Transportation

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

Abbreviations

Formal title	**Abbreviation**
LSI Logic MegaRAID SAS ZCR 8300XLP 0-Channel RAID Controller User's Guide	this manual
LSI Logic MegaRAID SAS ZCR 8300XLP 0-Channel RAID Controller	Disk array controller or card
Additional DAC Battery	additional battery
MegaRAID Storage Manager™	MSM
Operating System	OS
Hard disk drive	HDD

Contents

Chapter 1 Overview

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

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

1. Notes on Use - Always Follow These Notes -

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

1-1. Installation of MSM

Install the MegaRAID Storage Manager™ (called MSM hereafter), management utility which manages the disk array controller on OS. The installation of MSM 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.
- MSM event information can be monitored by using NEC ESMPRO.
- Manual rebuild and Consistency Check can be executed.

For more information on the installation of MSM, refer to the MegaRAID Storage Manager™ online manual.

1-2. Preventive Maintenance by Consistency Check

Routine Consistency Check is recommended as the preventive maintenance against subsequent defects of hard disk drives (called HDDs hereafter). This feature allows subsequent defects of HDDs to be found and repaired as soon as possible.

For the detailed features of Consistency Check, see "Chapter 3 Features of Disk Array Controller".

The recommended checking interval is once per week. Depending on the operation status of your system, the checking interval should be at least once per month.

To use the Consistency Check, MSM must be installed.

2. Specification

Item	Specification	Remarks
Number of SAS connectors	0 channel(Zero Channel RAID)	
Cache size	128 MB	
PCI bus	Conforming to PCI-X 1.0A	
PCI connector	PCI-X	64-bit /133 MHz Low Profile available
Maximum PCI bus transfer rate	133 MHz	
Device interface	SAS available	
Maximum data transfer rate	300 MB/sec	per 1 port
RAID level	0, 1, or 5	
Maximum number of disk array controllers installed in server	1	
Maximum number of connectable HDDs	8	
Maximum number of logical drives	40	
Outer dimension	64.4 (width) x 167.6 (depth) x 13 (height) mm	
Weight	77.05 g	
Operating voltage	3.3V	
Power consumption (max.)	16.5W	3.3V/5A
Operating environment	Temperature: 40ºC to 115ºC Humidity: 20% to 80%	Without condensation

3. Features of Disk Array Controller

This product is ZCR (Zero Channel RAID) controller conforming to SAS. It can be installed in a PCI-X expansion slot in a server with a motherboard that has a SAS controller. It converts the SAS controller into high performance RAID controller. An additional battery can be connected to this product to operate in the WriteBack mode, which can improve the access performance further.

Features of disk array controller

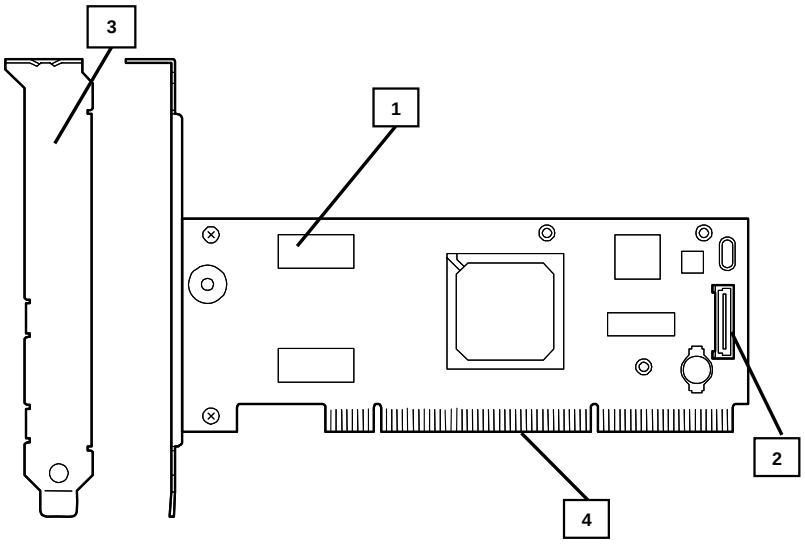
- Data transfer rate of up to 300 MB/sec
- 128 MB cache
- Support of RAID levels 0, 1, 5, spanning of RAID1, and spanning of RAID5
- Operation in WriteBack mode is available by connection of additional battery
- Report monitoring by NEC ESMPRO is available
- Automatic detection of faulty drive
- Replacement of failed HDD without system shutdown (hot-swap) is available

The disk array controller does not support the PCI hot plug feature.

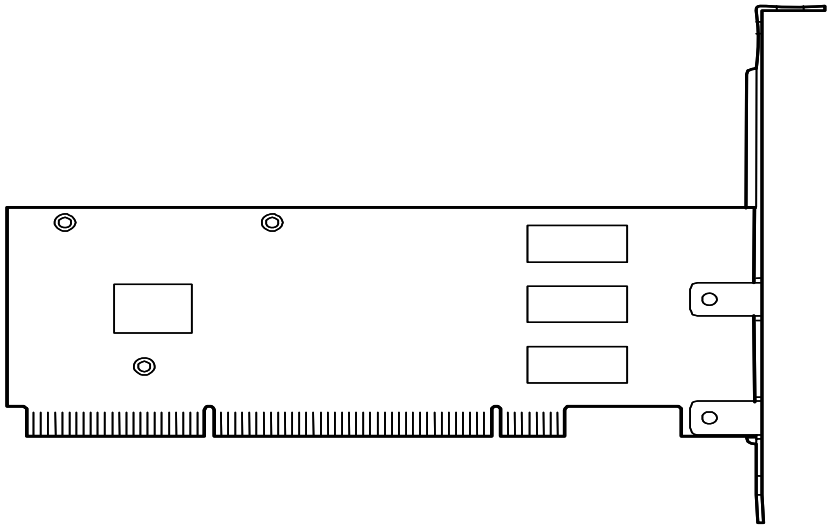
4. Names and Functions of Sections

This section describes the sections on the disk array controller.

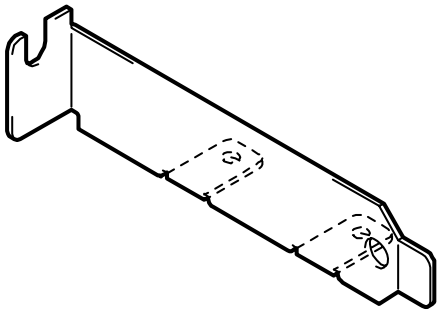
(Front view)



(Rear view)



(Low profile PCI bracket)



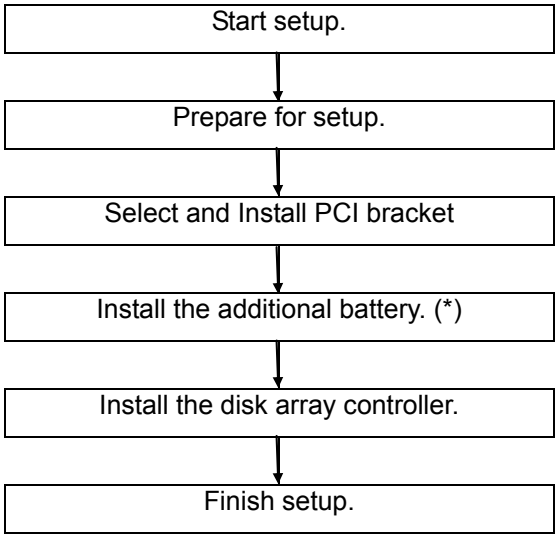
1	HW label
	Indicates the management revision of the disk array controller. **REV** XXX
2	Additional battery connector
	Used to connect a memory module or N8103-100 additional battery.
3	Not used
4	PCI connector
	The connector allows the disk array controller to be connected to a PCI slot in the server.

5. Hardware Setup

Install the disk array controller in a server as follows.

Check

Before the installation, always refer to the User's Guide of the server. The job flow varies depending on the server type or system configuration. Check the server type and system configuration before the installation to conduct setup correctly.



(*) This step is not required if the additional battery is not installed.

5-1. Prepare for setup

Note the following before the setup.

- Only a single disk array controller can be installed in a server.
- Some limitation may be imposed to the installation on the PCI slot (PCI Express) depending on the type of the server. Before the installation, check the limitation following the User's Guide of the server.
- HDDs to be connected to the disk array controller should have the same specification. Contact your service representative for HDDs which can be connected to the disk array controller.
- Coexistence with other PCI boards (including disk array controller, mirroring board, and SCSI controller) may be limited. Before using the disk array controller together with other PCI boards, ask your service representative whether the disk array controller can coexist with the other PCI boards.
- The disk array controller does not support the PCI hot-plug feature. Before install or remove the disk array controller from the server, always turn off the server and pull out the power cord from the receptacle.

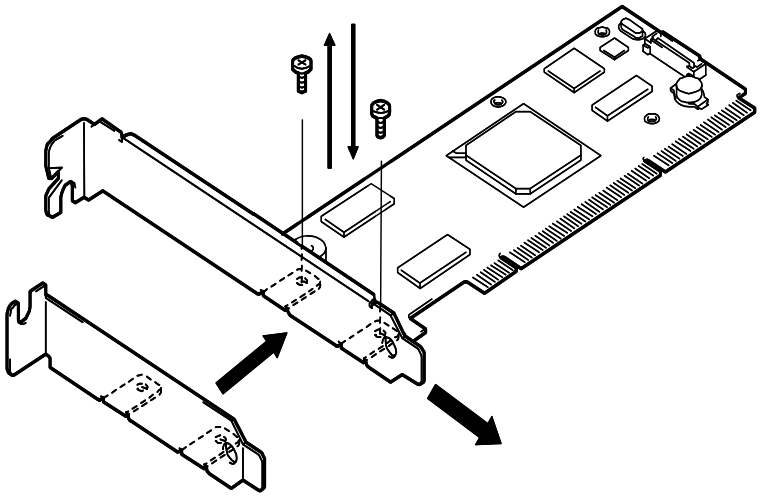
1. Exit from all applications and shutdown OS.
2. Power off the server.
3. Disconnect all the power cords connected to the power unit of the server.
4. Remove the side cover on the server following the procedure described in the User's Guide of the server.

For the installation or removal of the side cover and other components on the server, refer to the User's Guide of the server.

5-2. Selecting and Installing PCI Bracket

The card is delivered equipped with a full-height PCI bracket. To install the card in a low profile PCI slot, the full-height PCI bracket should be replaced with the low-profile PCI bracket coming with the card.

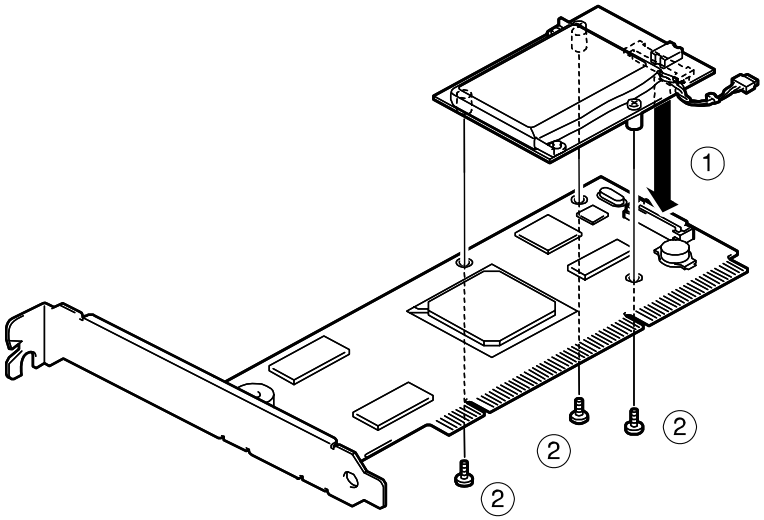
1. Remove the screws (2) fixing the full-height PCI bracket to the card.
2. Remove the full-height PCI bracket.
3. Install the low-profile PCI bracket on the card.
4. Fix the low-profile PCI bracket with the screws (2) removed in step 1.



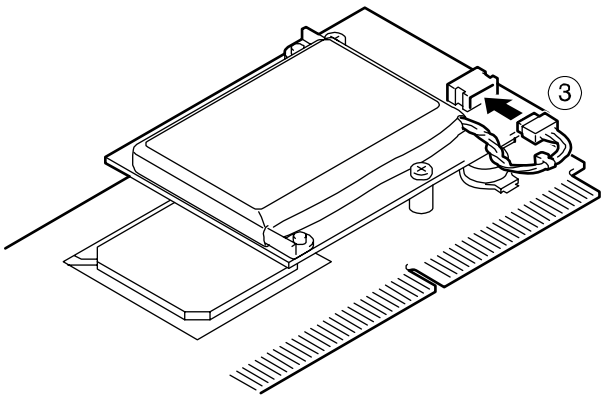
5-3. Installing Additional Battery

Install the additional battery to the zero channel RAID card as follows:

1. Position the battery pack daughter card so the screw holes on the standoffs are in line with the screw holes on the front side of the zero channel RAID card.
2. Carefully insert screws from the back of the card through the holes on the standoffs.

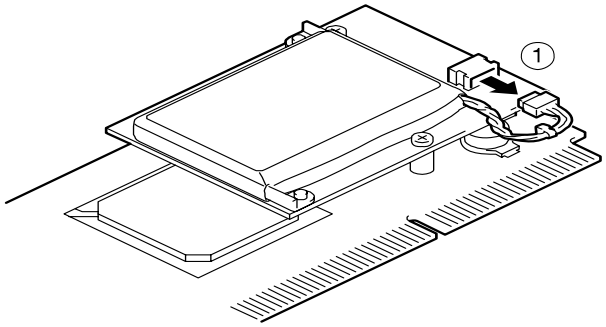


3. Connect battery harness connector to the mating connector on the battery pack. Note: Connector is keyed so that it will only mate in the correct orientation.



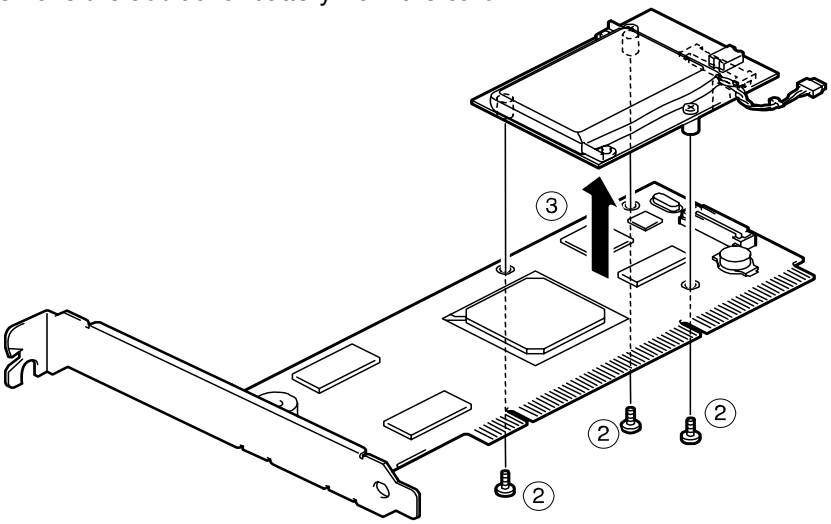
Remove the additional battery from the card as follows:

4. Pull out the additional battery cable from the battery harness connector.



5. Remove the screws from the back of the card.

6. Remove the additional battery from the card.



5-4. Installing the Disk Array Controller

1. Check the position of the PCI slot in which the disk array controller is to be installed and remove the corresponding additional slot cover.

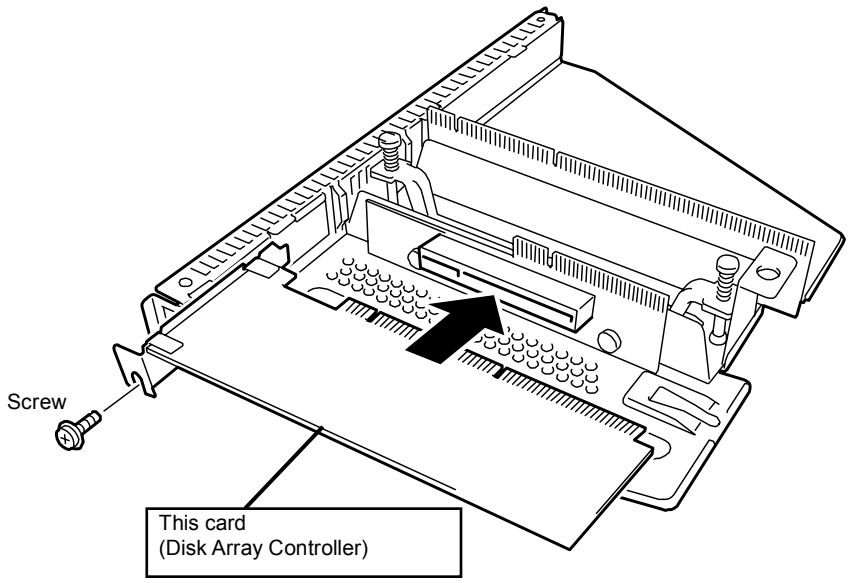
Notice

- Store the removed additional slot cover carefully. The removed screw will be used to install the disk array controller. Do not lose them.
- The disk array controller does not support the PCI hot-plug feature. Before install or remove the disk array controller from the server, always turn off the server and unplug the power cord.

Check

Some limitation may be imposed to the installation on the PCI slot depending on the type of the server. Before the installation, check the limitation following the User's Guide of the server.

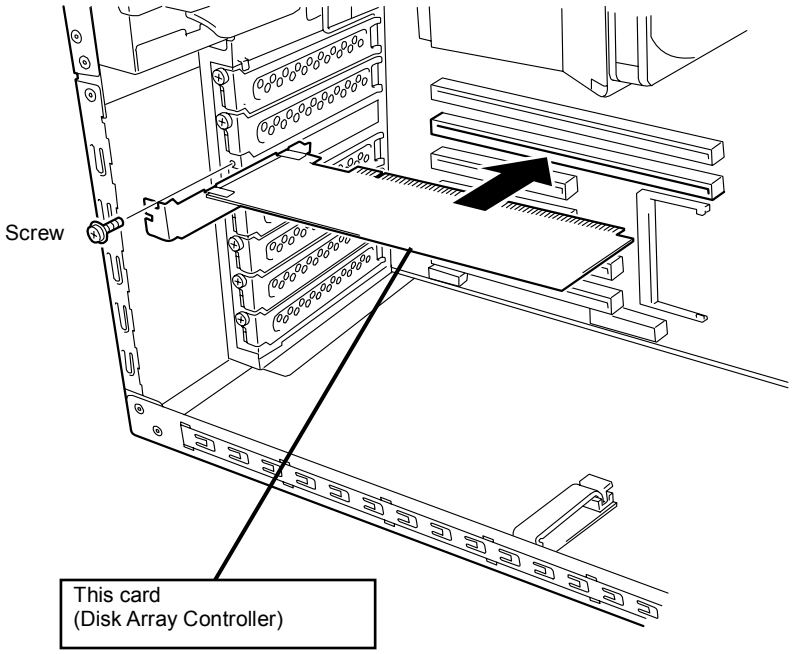
2. Insert the disk array controller into the PCI slot securely and fix it. To fix the disk array controller, use the screw removed when removing the slot cover.



Example: Rack-mount Model Server

This card (disk array controller)

Screw



Example: Tower Model Server

Notice

When the disk array controller cannot be inserted into the PCI slot (PCI Express) well, pull out it once and insert it again. Note that the disk array controller may be damaged if excess force is given to it.

Chapter 2 RAID functions

This chapter describes the RAID features which the disk array controller supports.

1. Overview of RAID

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

RAID is an abbreviation for "Redundant Array of Inexpensive Disks". The RAID technology allows several hard disk drives (HDDs) to be handled collectively.

RAID can configure several HDDs (at least 2) as a single array (disk group) to operate the HDDs effectively. This ensures higher performance than a single HDD of a large capacity.

This disk array controller has a feature to divide a single disk group into several logical drives (up to 40 virtual disks). The host computer recognizes these virtual disks as if they were a single HDD, and can access in parallel several HDDs configuring a disk group.

Some RAID levels can recover data from remaining data and parity by using are build feature if an error occurs in a single HDD. This ensures a high system reliability.

1-2. RAID Levels

The record mode enabling the RAID feature includes several levels. Among the levels, the disk array controller supports the following levels; RAID 0, RAID 1, and RAID 5. The number of HDDs required to create a disk group varies depending on the RAID level as shown in the table below.

RAID level	**Number of required HDDs**	
	Min.	**Max.**
RAID 0	1	8
RAID 1	2	2
RAID 5	3	8
Spanning of RAID 1	4	4
Spanning of RAID 5	6	8

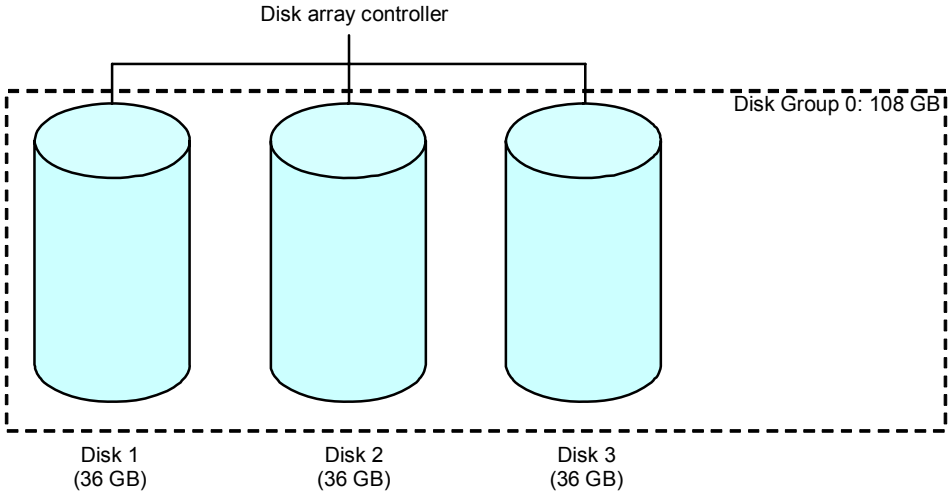
Tips

For details of the RAID levels, see "2. RAID Levels" described later in this chapter.

1-3. Disk Group

A disk group consists of at least 2 HDDs.
Up to eight disk groups are permitted by the disk array controller when eight HDDs are installed in the server.

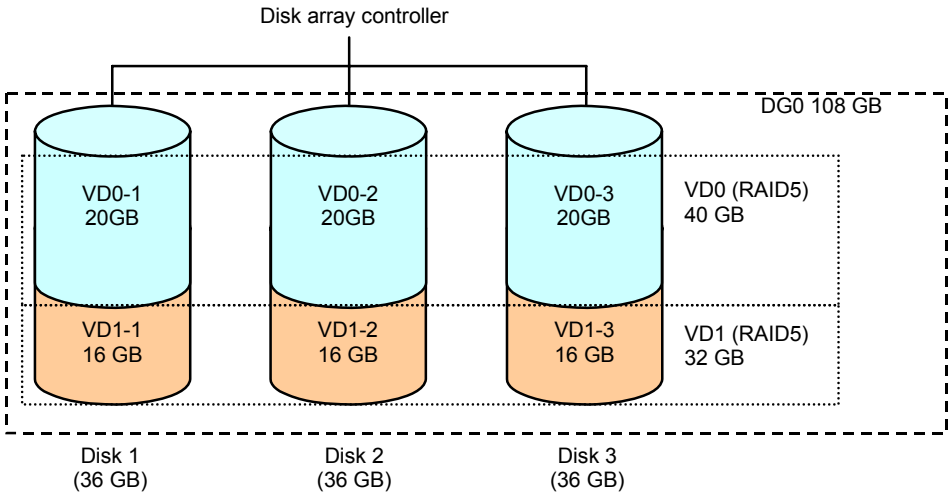
The figure below shows a sample configuration. The three HDDs are connected to the disk array controller, creating one disk group (DG).



1-4. Virtual Disk

Virtual disk is a logical drive defined in disk group. It is recognized as a physical drive by OS. Up 40 virtual disks are permitted by the disk array controller.

The figure below shows a sample configuration in which the disk array controller is connected with three HDDs, creating one disk group (DG). Two RAID5 virtual disks (VD) are defined in the DG.



1-5. Parity

Parity implies redundant data. A single set of redundant data is created from the data saved in more than one HDD.

The redundant data is used for data recovery when a HDD is defective.

1-6. Hot-Swap

The hot-swap enables a HDD to be removed (or replaced) under system operation.

1-7. Hot-Spare Disk

The hot-spare disk is prepared as an auxiliary HDD substituting for a defected HDD included in a logical drive which is configured at a redundant RAID level. Detecting a HDD fault, the system disconnects the HDD (or makes it offline) and starts rebuild using the hot-spare disk.

Tips

For standby rebuild (rebuild using hot-spare disks), see "Chapter 3 Features of Disk Array Controller".

2. RAID Levels

This section details the RAID levels which the disk array 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 HDD) × (number of HDDs)
RAID1	Mirroring	Yes	Two HDDs required Capacity: capacity of single HDD
RAID5	Striping of both data and redundant data	Yes	Three or more HDDs required Capacity: (capacity of single HDD) × ((number of HDDs) - 1)

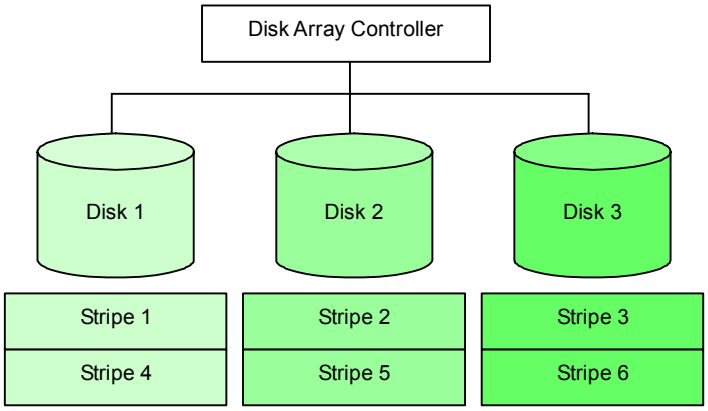
2-2. RAID0

In RAID 0, data to be recorded is distributed to HDDs. The 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 HDDs to be accessed collectively, it can provide the best disk access performance.

Notice

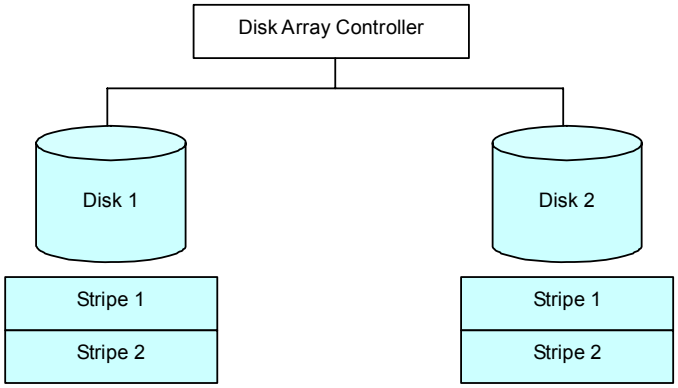
RAID 0 cannot have data redundancy. If a HDD is defected, the data saved in the HDD cannot be recovered.



2-3. RAID1

In the RAID1 level, data saved in a HDD is written to another HDD without change. The mode is called "mirroring".

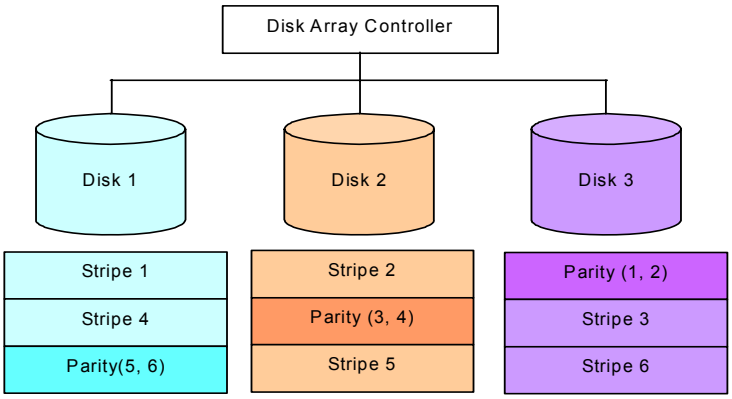
When data is written onto a single HDD, the same data is written onto another HDD. If either of the HDDs is defected, the other HDD containing the same data can substitute for the defected HDD. Thus the system can continue to operate without interruption.



2-4. RAID5

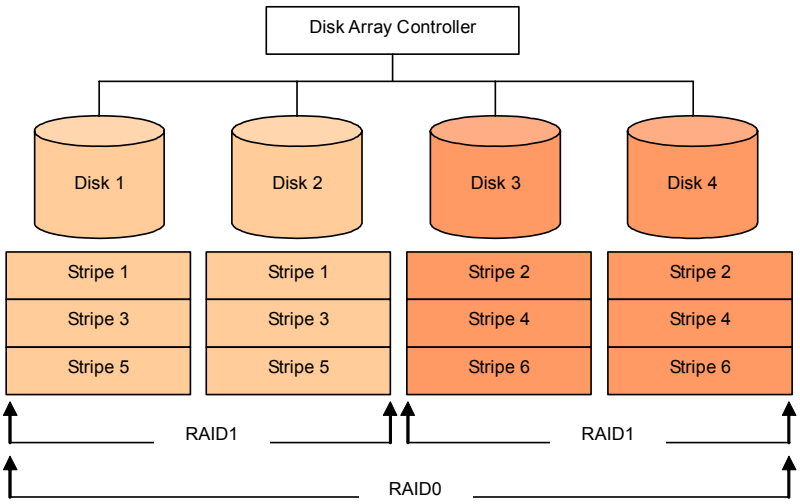
In RAID5, data is distributed to HDDs by striping and, at the same time, the parity (redundant data) is distributed to the HDDs. This mode is called "striping with distributed parity".

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 HDD. Accordingly, the total capacity assigned to the parity is just the same as the capacity of a single HDD. If any one of the HDDs configuring a logical drive is defected, data is still available with no problems.



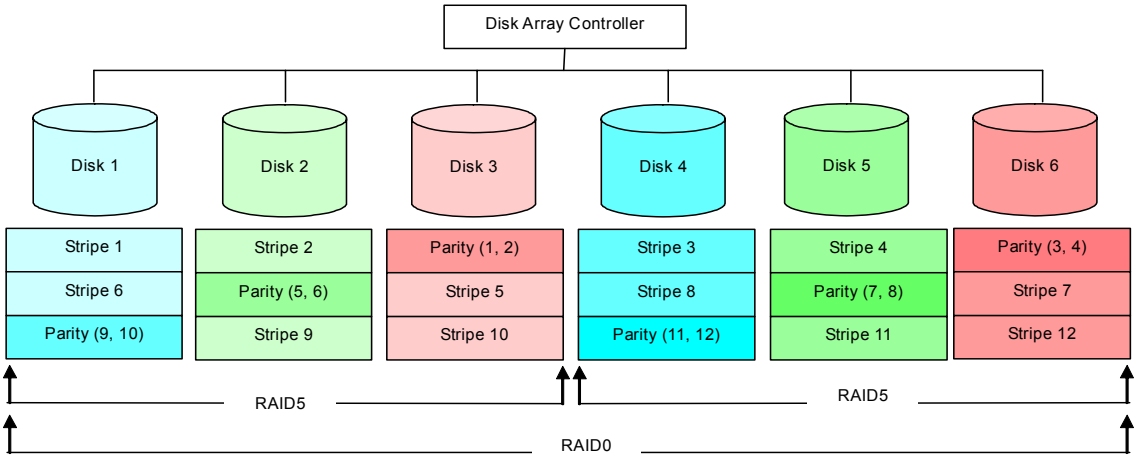
2-5. Spanning of RAID1

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



2-6. Spanning of RAID5

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



Chapter 3 Features of Disk Array Controller

This chapter describes the disk array controller features.

1. Rebuild

The rebuild feature can recover the data in a defective HDD. The rebuild can be applied to redundant virtual disks in the RAID1 or RAID5 level.

1-1. Manual Rebuild

The manual rebuild can be performed using MegaRAID Storage Manager™ (called MSM hereafter), the management utility of the disk array controller. Select a HDD and start the rebuild manually.

For the installation of MSM, refer to the online manual "Disk Array Controller (SAS) Software User Guide".

1-2. Auto Rebuild

The disk array controller automatically starts the rebuild without referring to any utility.

There are two different types of auto rebuild:

- Standby rebuild

  Automatic rebuild by using hot-spare disks. In this configuration, the rebuild is performed automatically if a HDD assigned to a virtual disk is defective.

- Hot-swap rebuild

  Automatic rebuild once the defective HDD has been hot-swapped with a functional one.

Note the following for the rebuild:

- The HDD used for rebuild should have the same capacity, rotation speed, and standard as the defective HDD.
- During rebuild, the processing rate is decreased.
- During rebuild, do not shutdown or reboot the server. If the server is shutdown by an unforeseen accident such as a power interruption, turn on the power again as soon as possible. The rebuild is automatically restarted.
- The interval between the removal of the defective HDD and the installation of a substitute HDD should be 90 sec or longer.
- If the hot-swap rebuild does not function, perform the manual rebuild.
- The following hard disk drive cannot be specified as a hot spare disk.
  – Hard disk drive with partitions
  – Hard disk drive used for another array
  Prepare another new hard disk drive or a formatted hard disk drive.

2. Patrol Read

The patrol read is a read & verify test in the entire HDD area. It can be performed for all HDDs assigned to virtual disks and hot-spare disks.

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

For HDDs configuring redundant virtual disks or those assigned to hot-spare disks, error sectors detected during the Patrol Read can be repaired.

Note the following for the patrol read:
- The Patrol Read feature is factory-set to "Disabled".
- To use the Patrol Read, MSM must be installed.
- If the system is restarted, the Patrol Read is aborted. Once the system is restarted, the Patrol Read runs from the first step (top of the HDD).
- For detailed operation, refer to the "MegaRAID Storage Manager™ User's Guide" in the EXPRESSBUILDER CD-ROM that comes with the server.

3. Consistency Check

The Consistency Check is used to check consistency among virtual drives. It is available for redundant virtual drives in the RAID1 or RAID5 level.

The Consistency Check can be performed through WebBIOS or MSM.

The Consistency Check performs a consistency check and can also repair some sector errors. It can also be used as a preventive maintenance.

Note the following for the Consistency Check:
- During the Consistency Check, the processing rate is decreased.
- If the system is restarted, the Consistency Check is aborted. However, the Consistency Check resumes after restart.
- For detailed operation, refer to the "MegaRAID Storage Manager™ User's Guide" in the EXPRESSBUILDER CD-ROM that comes with the server.

4. Background Initialize

The Background Initialize is automatically executed when the RAID5 virtual disk is created in a disk group composed of five or more HDDs.

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

The Background Initialize is not required in the following cases.

- Full Initialize has already been executed and completed normally.

  (*) Full Initialize is a function to clear the entire area of a virtual disk with "0".
- Consistency Check has already been executed and completed normally.
- Rebuild has already been executed and completed normally.
- "Yes" is specified for "Disable BGI" in VD Definition.

The Background Initialize is executed again if any of the following cases occurred in the virtual disk on which the Background Initialize has completed.

- When the virtual disk is degraded or offline, you execute Make Online to a HDD in offline status, and the virtual disk becomes Optimal state.
- When you replace the disk array controller with the maintenance parts and others.
- When you execute Reconstruction to an existing virtual disk to make RAID5 VD with five or more HDDs.

Note the following for Background Initialize:
- During Background Initialize, the processing rate is decreased.
- Background Initialize will resume a few minutes later if it is interrupted.

5. Reconstruction

The reconstruction feature is used to change configuration and/or RAID level of existing virtual disk. The Reconstruction contains the following three features, however, the disk array controller supports "Migration with addition" only.

5-1. Removed physical drive

Unsupported.

5-2. Migration only

Unsupported.

5-3. Migration with addition

Use this feature to add HDDs to existing virtual disk. On MSM, this feature is indicated as "Add Drive". The execution patterns are as shown below (α: Number of HDDs to be added).

Before execution		After execution		Description
RAID level	Number of HDDs	RAID level	Number of HDDs	
RAID0	x	RAID0	x+α	Capacity increased: equivalent to α HDDs
RAID0	1	RAID1	2	Capacity remains unchanged.
RAID0	x	RAID5	x+α	Capacity increased: equivalent to α-1 HDDs
RAID1	2	RAID0	2+α	Capacity increased: equivalent to α+1 HDDs
RAID1	2	RAID5	2+α	Capacity increased: equivalent to α HDDs
RAID5	x	RAID0	x+α	Capacity increased: equivalent to α+1 HDDs
RAID5	x	RAID5	x+α	Capacity increased: equivalent to α HDDs

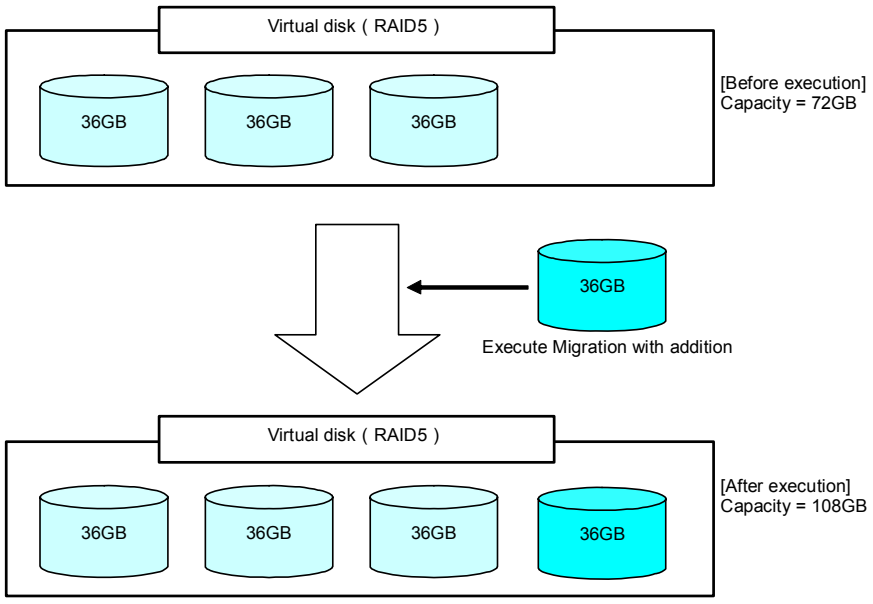
Notice

Note the following for the Reconstruction:

- Be sure to make a backup copy of the data and to perform a Consistency Check before starting Reconstruction.
- The Reconstruction is disabled in a configuration in which several virtual disks are defined in one disk group
- During Reconstruction, the processing rate is decreased.
- The Reconstruction is disabled for the degraded virtual disk. First execute Rebuild to recover the virtual disk, then execute Reconstruction.
- During Reconstruction, do not shutdown or reboot the server. If the server is shutdown by an unforeseen accident such as power interruption, turn on the power again as soon as possible. The Reconstruction is automatically restarted.
- In some configuration, Background Initialize may start automatically upon the completion of the reconstruction.

Ex: Migration with addition for RAID5 virtual disk

The figure below shows an example of adding a single 36GB HDD to a RAID5 virtual disk configured with three 36GB HDDs.



Chapter 4 Creating Virtual Disk

This section describes the configuration utility "WebBIOS".

1. Before Using WebBIOS

Read the following sections describing supported functions and precautions before using "WebBIOS".

1-1. Supported Functions

- Indication of model name and capacity of hard disk drive (called HDD hereafter)
- Indication of HDD allocation status
- Creation of virtual disk
- Setting of RAID level
- Setting of Stripe Block size
- Setting of Read Policy/Write Policy/IO Policy
- Indication of configuration information and status of virtual disk
- Removal of virtual disk
- Clearing of configuration
- Execution of initialization
- Execution of Consistency Check
- Execution of manual rebuild
- Execution of reconstruction

1-2. Notes on Creating Virtual Drive

- The HDDs configuring the disk group should have the same capacity and rotation speed.
- Be sure to execute a Consistency Check after creating VD.
- When installing an OS in VD under the disk array controller, create a VD dedicated to OS installation.
- When selecting an option from a pull-down menu, you cannot use a mouse. Click on the option, and please use the up/down cursor keys and then press the Enter key to choose the option instead of using a mouse.
- Some systems cannot use a mouse on WebBIOS. In that case, please use the keyboard instead of the mouse. Move the cursor on the screen using the TAB key and press Enter to select it. When you select a plural number of disks or disk groups for the spanning, hold the Shift key and press the up/down cursor.
- WebBIOS cannot be handled via the remote console functions of Diana Scope that your system may support.

2. Using WebBIOS

2-1. Starting WebBIOS

1. Power on the system. Press **Esc** when prompted to do so in order to view diagnostic messages.
2. Press **Ctrl** + **H** on POST screen to start WebBIOS.

POST screen image (with no virtual disk assigned)

```
LSI MegaRAID SAS - MFI BIOS Version XXXX (Build MMM DD, YYYY)
Copyright (c) 2006 LSI Logic Corporation

HA - X (Bus X    Dev X)    MegaRAID SAS 8300XLP
FW package: X.X.X - XXXX


0 Logical Drive(s) found on the host adapter.
0 Logical Drive(s) handled by BIOS.
Press <Ctrl> <H> for WebBIOS.
```

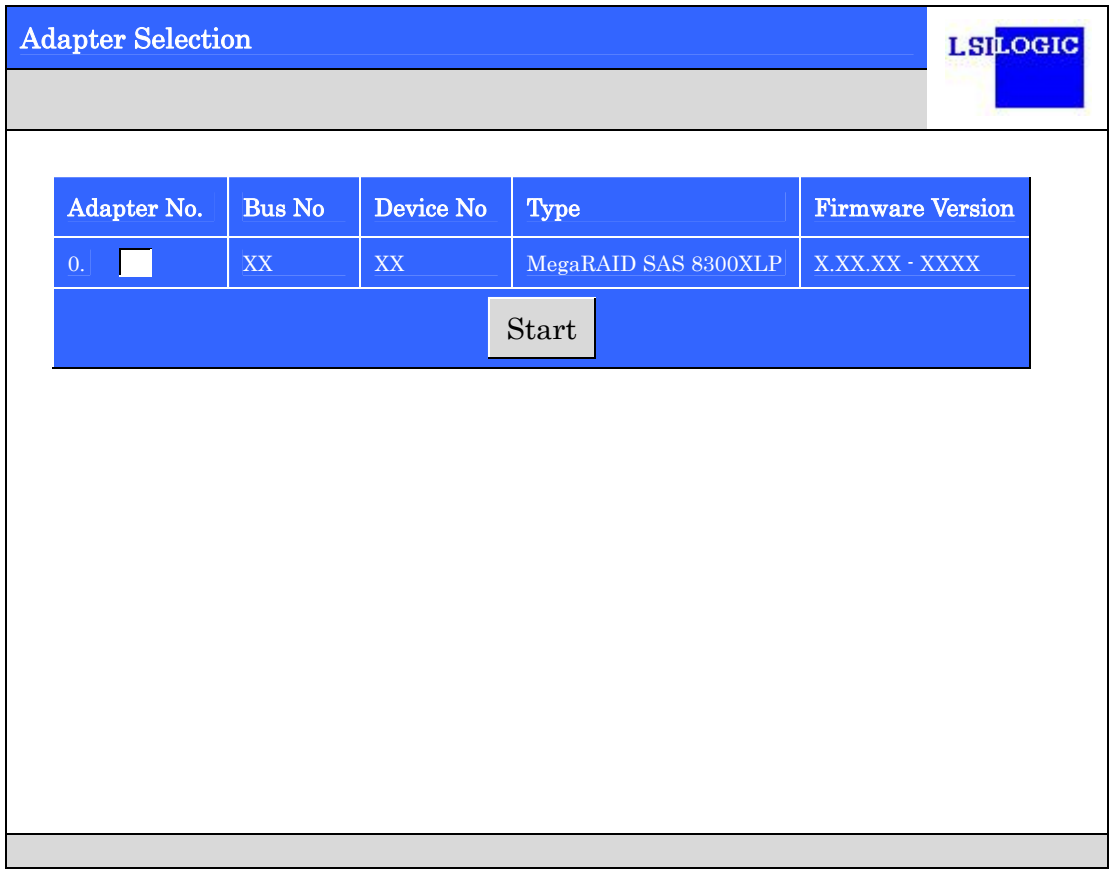
- Do not press unnecessary key such as **Pause** during POST.

2-2. Main Menu

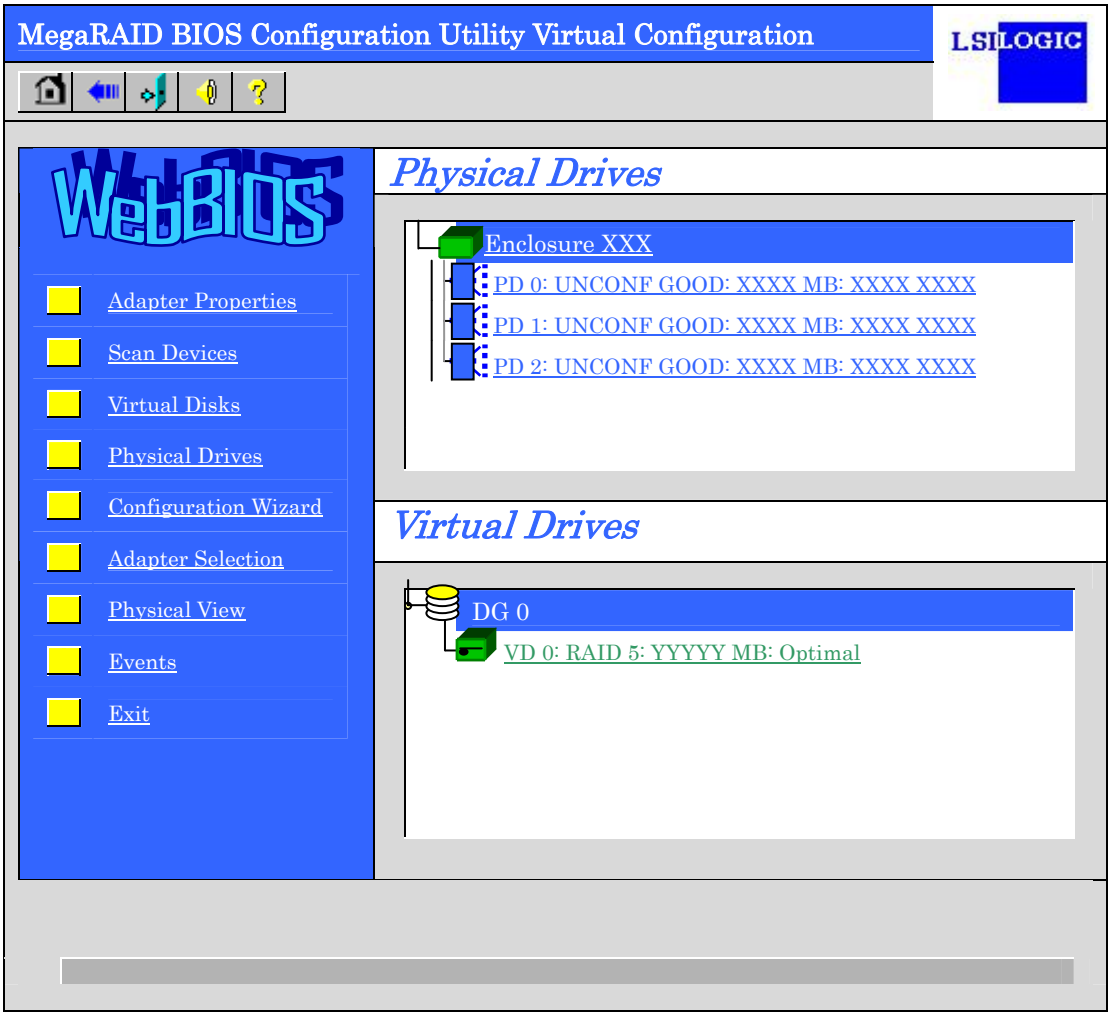
Shown below is [Adapter Selection] screen that appears first on WebBIOS. Select a controller to operate WebBIOS, and click [Start].

Notice

- When this product and LSI 8408E SAS Internal or LSI 8480E SAS External disk array controller are installed in a server, you cannot use mouse. Please use keyboard. Press TAB key to move the cursor and then press Enter key to select it.

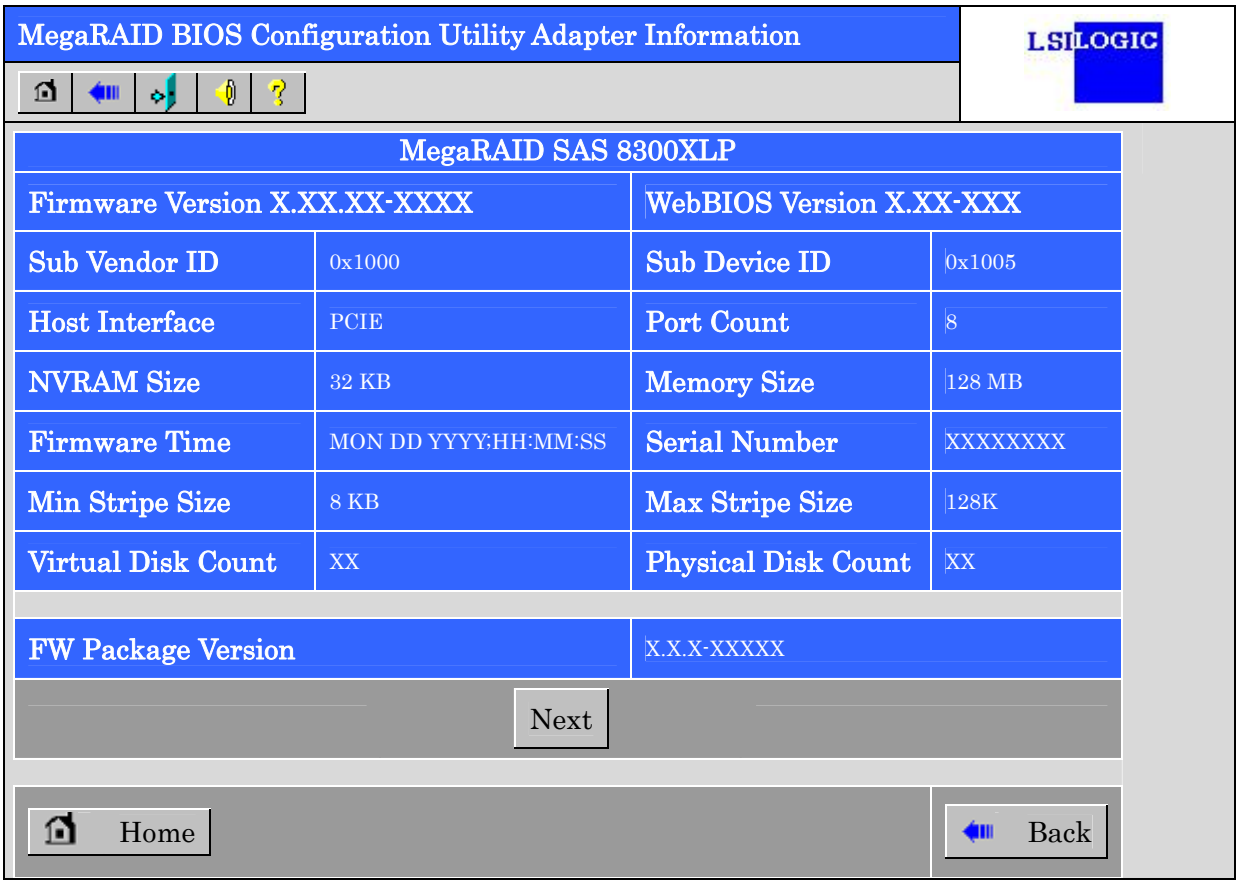


When the adapter is selected on [Adapter Selection], the WebBIOS Top Menu appears.

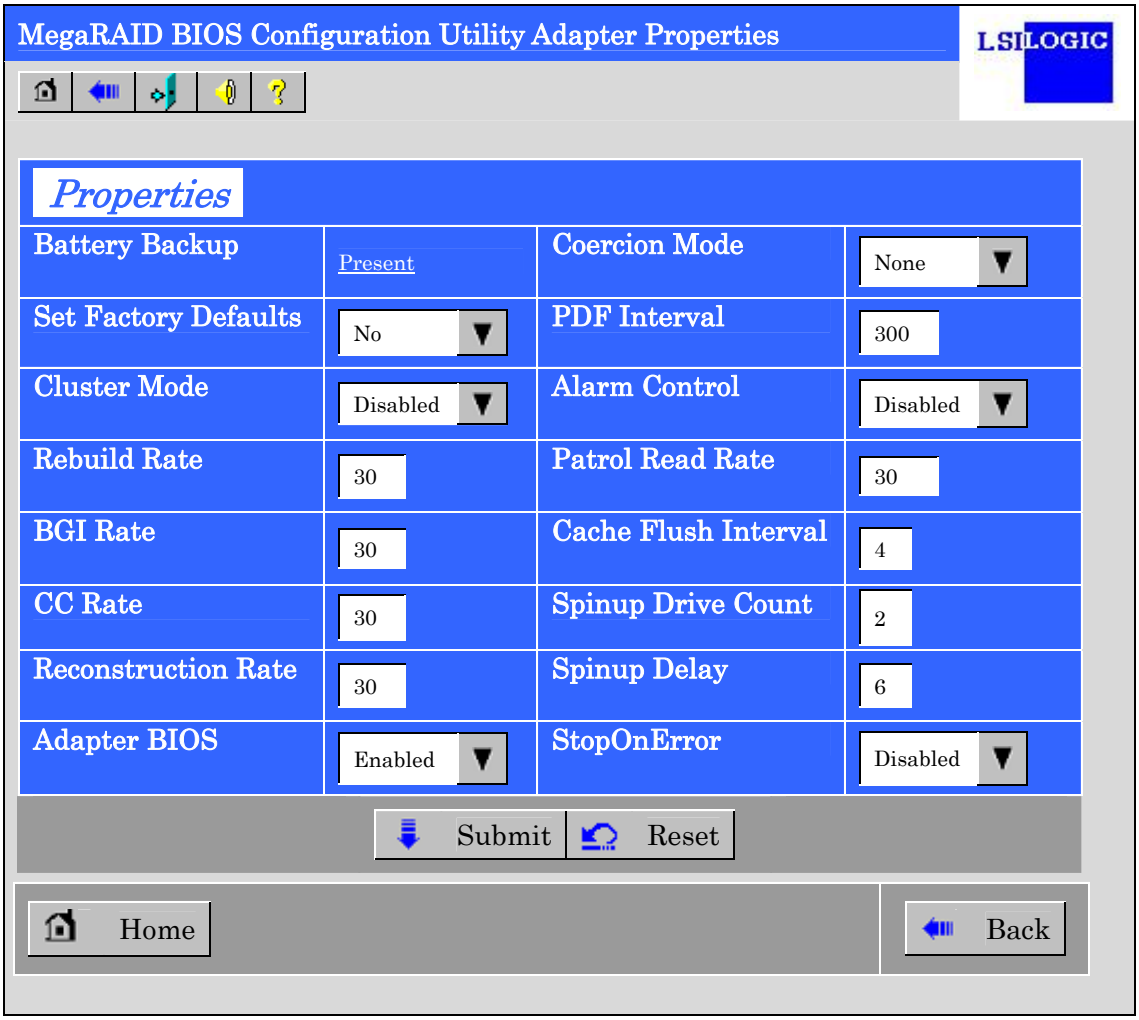


2-3. Adapter Properties

When you click [Adapter Properties] on WebBIOS Top Menu, the configuration information for the disk array controller is displayed.



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



Default settings and their explanation

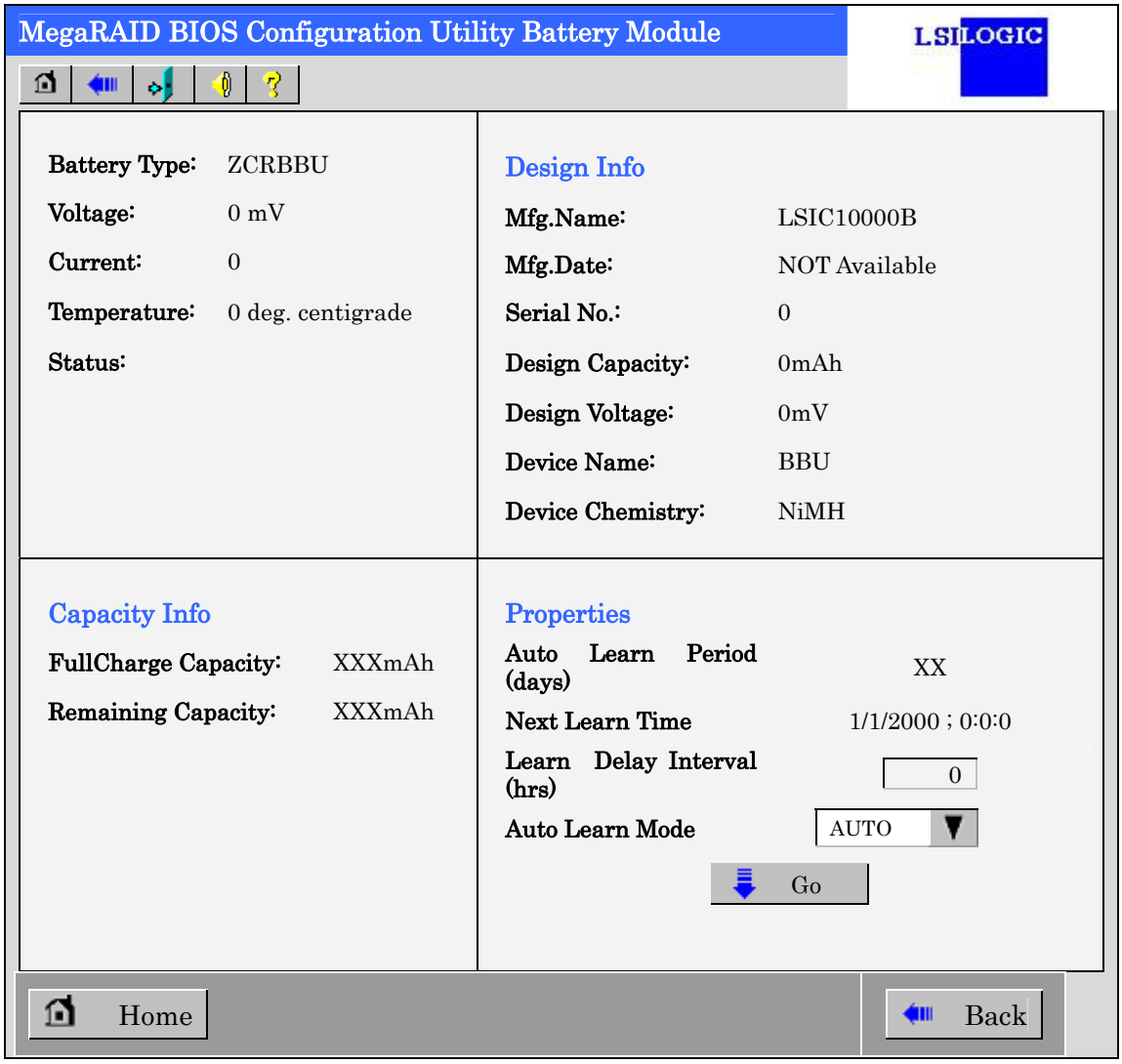
Item	Default	Description	Change
Battery Backup	Present None	Displays Properties of N8103-100 additional battery. When battery is installed: Present When battery is not installed: None	–
Set Factory Defaults	[No] Yes	Restores factory defaults.	Permitted
Cluster Mode	Disabled	–	Prohibited
Rebuild Rate	30	Recommended value: 30	Permitted
BGI Rate	30	Recommended value: 30	Permitted
CC Rate	30	Recommended value: 30	Permitted
Reconstruction Rate	30	Recommended value: 30	Permitted
Adapter BIOS	[Enabled] Disabled	–	Prohibited
Coercion Mode	[None] 128MB-way 1GB-way	–	Prohibited
PDF Interval	300	–	Prohibited
Alarm Control	[Disabled] Enabled Silence	Disabled: Does not issue an alarm. Enabled: Issues an alarm. Silence: Disables an alarm.	Permitted
Patrol Read Rate	30	Recommended value: 30	Permitted
Cache Flush Interval	4	–	Prohibited
Spinup Drive Count	2	–	Prohibited
Spinup Delay	6	–	Prohibited
StopOnError	[Disabled] Enabled	–	Prohibited

How to change setting value

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

- When this product and LSI 8408E SAS Internal or LSI 8480E SAS External disk array controller are installed in a server, you cannot use mouse. Please use keyboard. Press Tab key to move the cursor and then press Enter key to select it.
- To select a value in a pull-down menu, press up/down keys in the menu and then press Enter key.

The status of "Battery Backup" is indicated as "Present" when Additional DAC Battery is installed. Clicking [Present] opens the Battery Status screen as shown below.



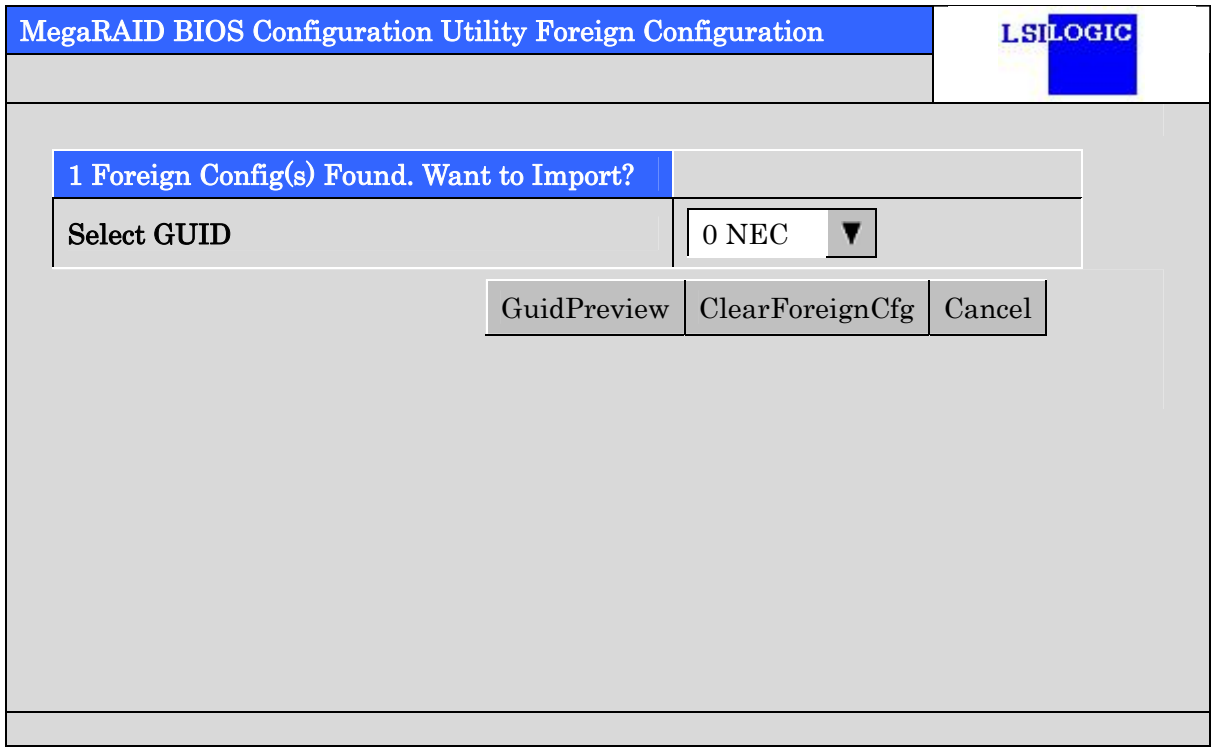
Notice

- Please do not change auto learn mode to other settings than auto.
- Some values of the battery information such as voltage, current, temperature and capacity are 0 because the battery is not intelligent BBU and is incapable of monitoring the values.

2-4. Scan Devices

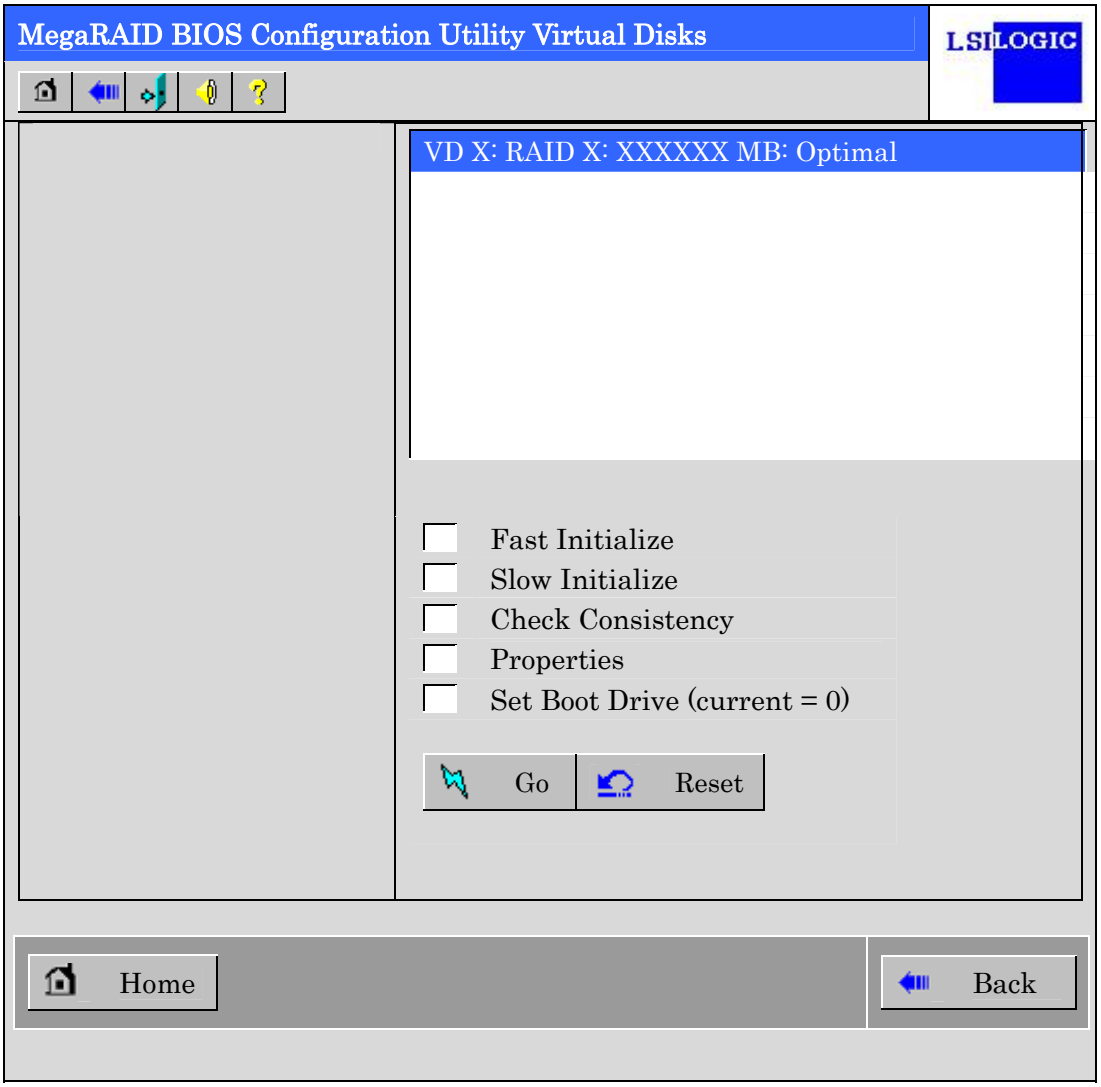
When you click [Scan Devices] on the WebBIOS top menu, the HDDs connected to the disk array controller are detected again. Use this feature when you have installed a new HDD while WebBIOS is running.

> **Notice**
>
> If the newly connected HDD contains other configuration information, [Foreign Configuration] screen shown below appears. To use the HDD as a new one, click [ClearForeignCfg] to clear the configuration information on the HDD.



2-5. Virtual Disks

When you click [Virtual Disks] on the WebBIOS top menu, the screen for operating the VD that has already been configured appears.

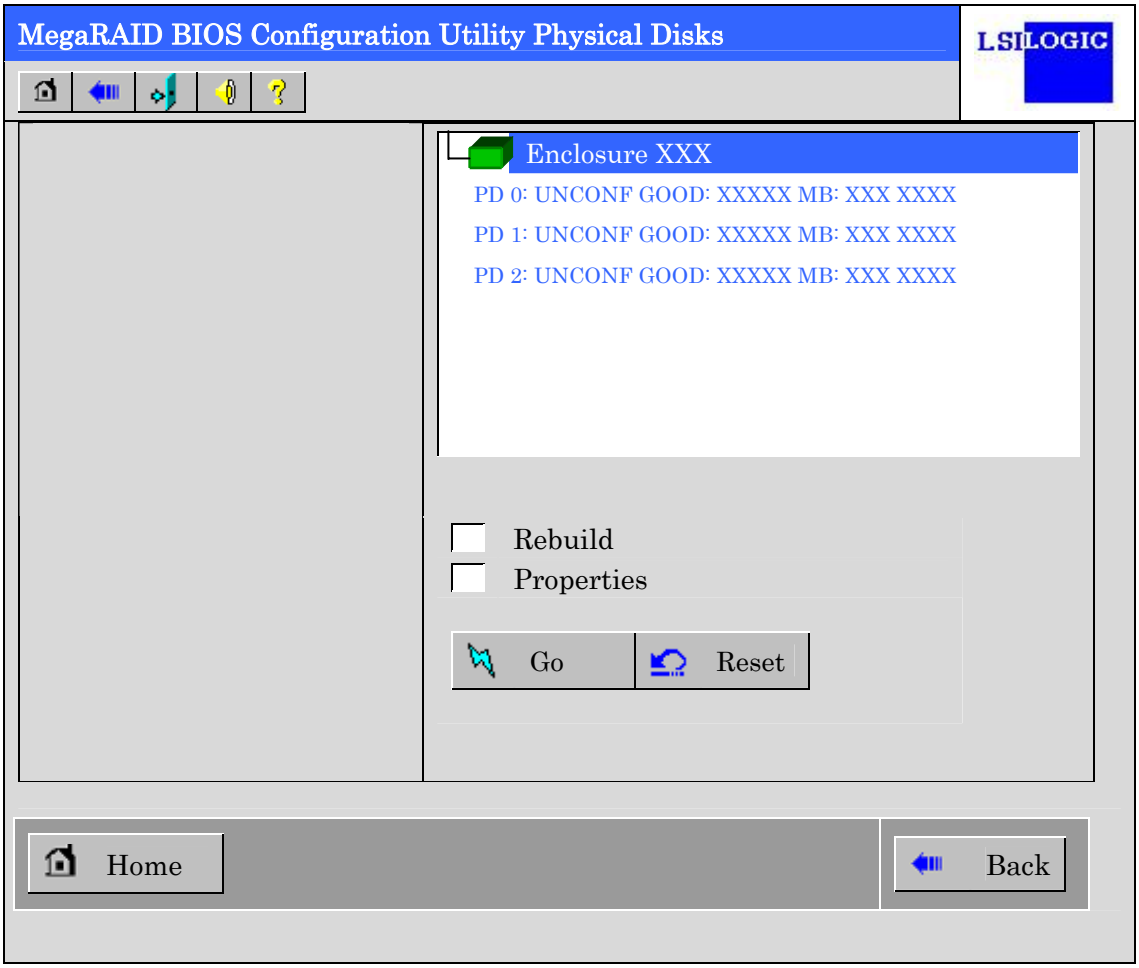


Notice

If no virtual disk exists, the upper right column of the screen will be blank. Use this menu only when a virtual disk exists.

2-6. Physical Drives

When you click [Physical Disks] on WebBIOS top menu, the screen for operating the physical drive (HDD) connected to the disk array controller.



Notice

If no physical disk exists, the upper right column of the screen will be blank. Use this menu only when a physical disk exists.

2-7. Configuration Wizard

Use this wizard to configure a RAID using the HDDs connected to the disk array controller. The detailed explanation of this feature is given in "Configuring Virtual Disk".

2-8. Adapter Selection

If several disk array controllers are installed in the server, you need to select an adapter controlled by WebBIOS to configure each adapter. Clicking [Adapter Selection] on WebBIOS top menu opens the [Adapter Selection] screen again.

2-9. Physical View / Logical View

If the virtual disk has been configured using the disk array controller, DG (disk group) is displayed on WebBIOS top menu. Clicking [Physical View] displays information for HDDs in DG. Clicking [Logical View] displays virtual disk in DG.

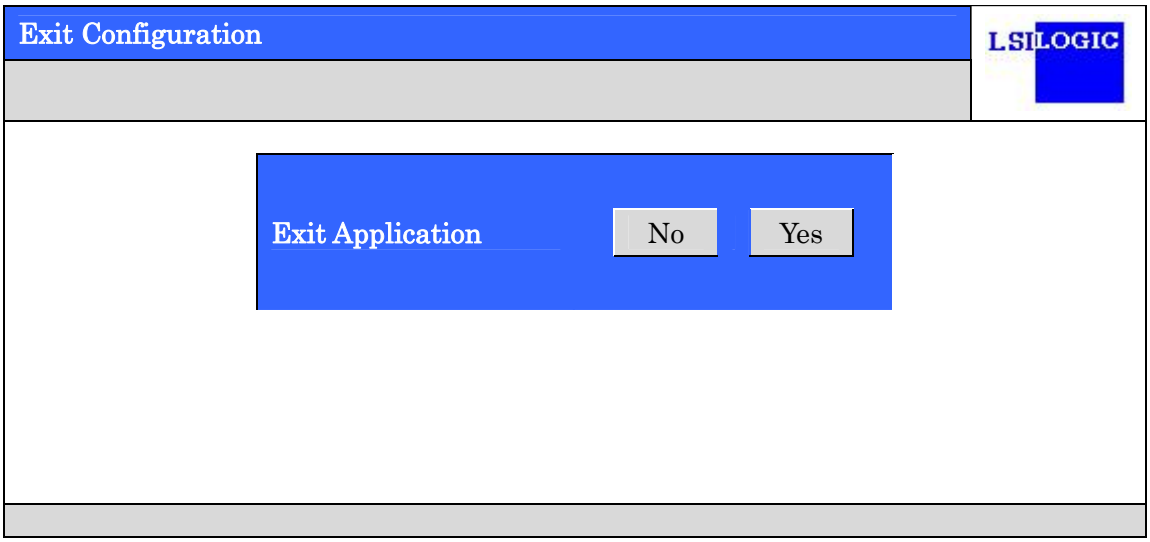
2-10. Events

The Events screen is used to confirm the system events.

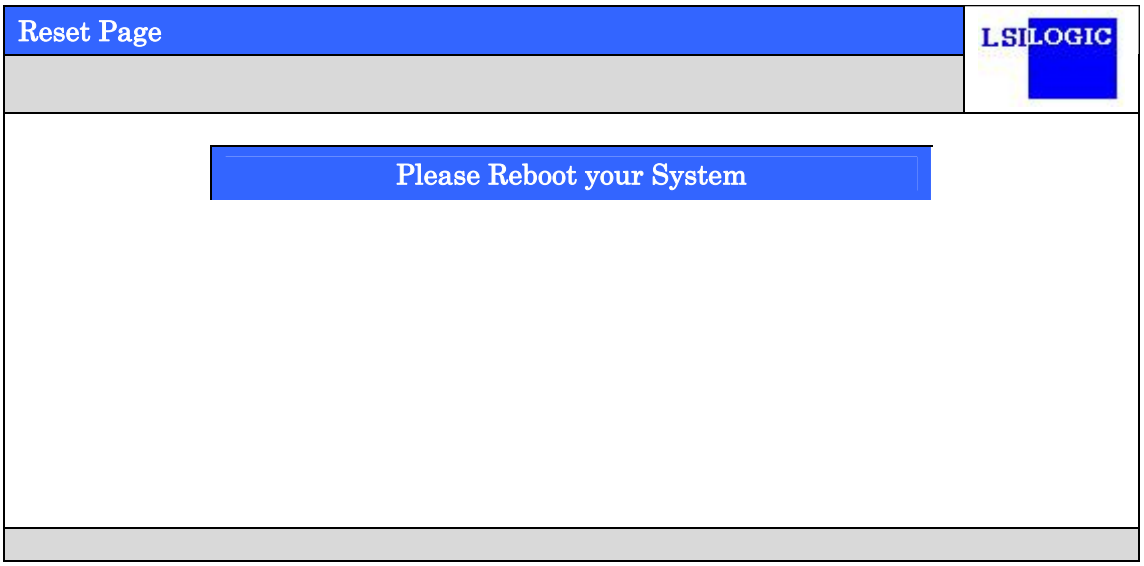
The disk array controller does not support Events feature.

2-11. 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.

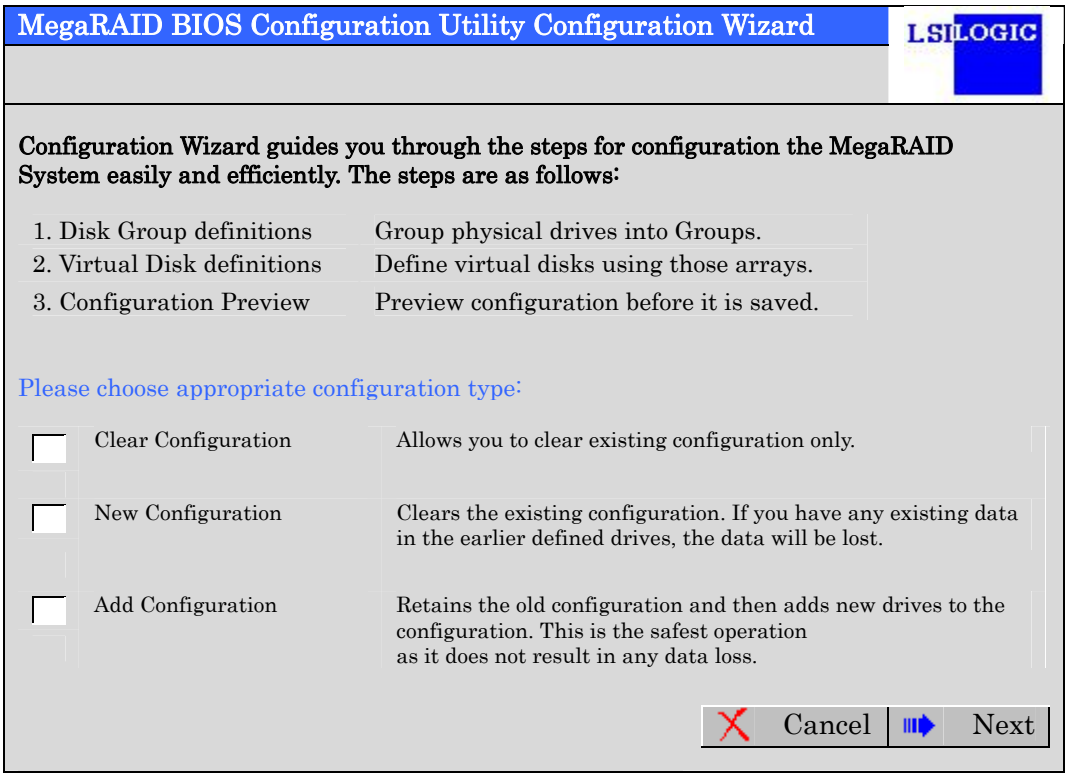


3. Configuring Virtual Disk

This section describes the procedures for configuration of VD (virtual disk) using WebBIOS.

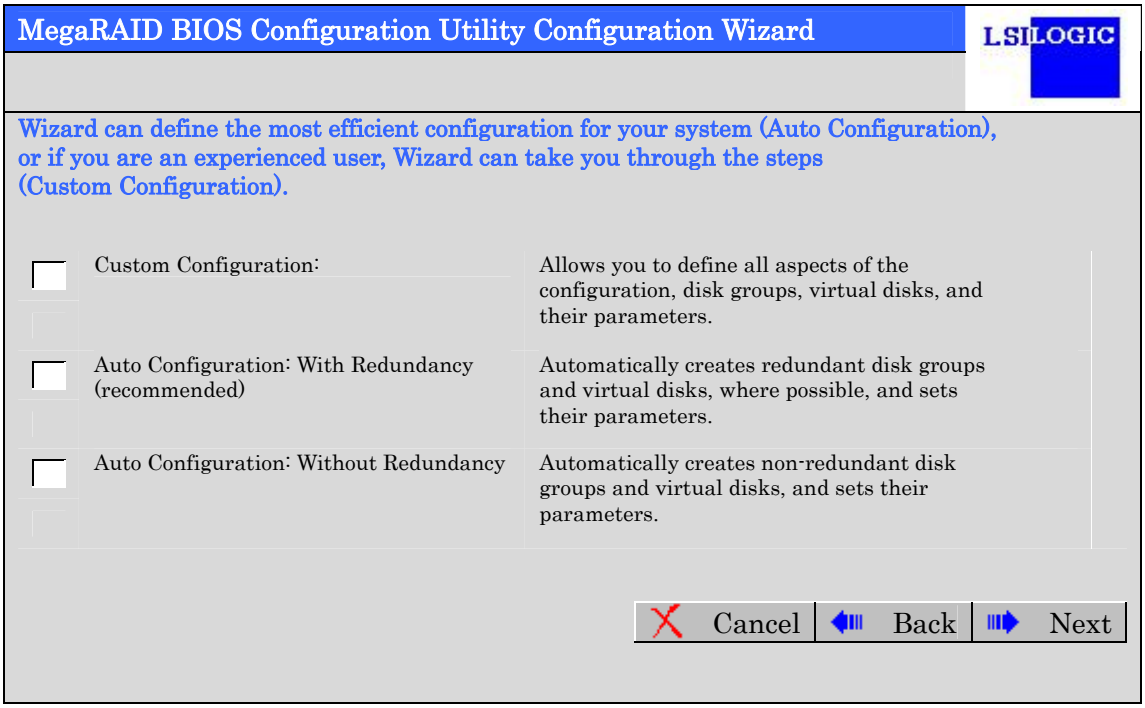
3-1. Configuration Wizard

When you click [Configuration Wizard] on WebBIOS top menu, the screen shown below appears. Select the relevant operation, and click [Next] at lower right of the screen.



Clear Configuration	Allows you to clear existing configuration.
New Configuration	Clears the existing configuration and creates a new VD. If you have any existing data in the earlier defined virtual disk, the data will be lost.
Add Configuration	Retains the old configuration and then adds new virtual disk.

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

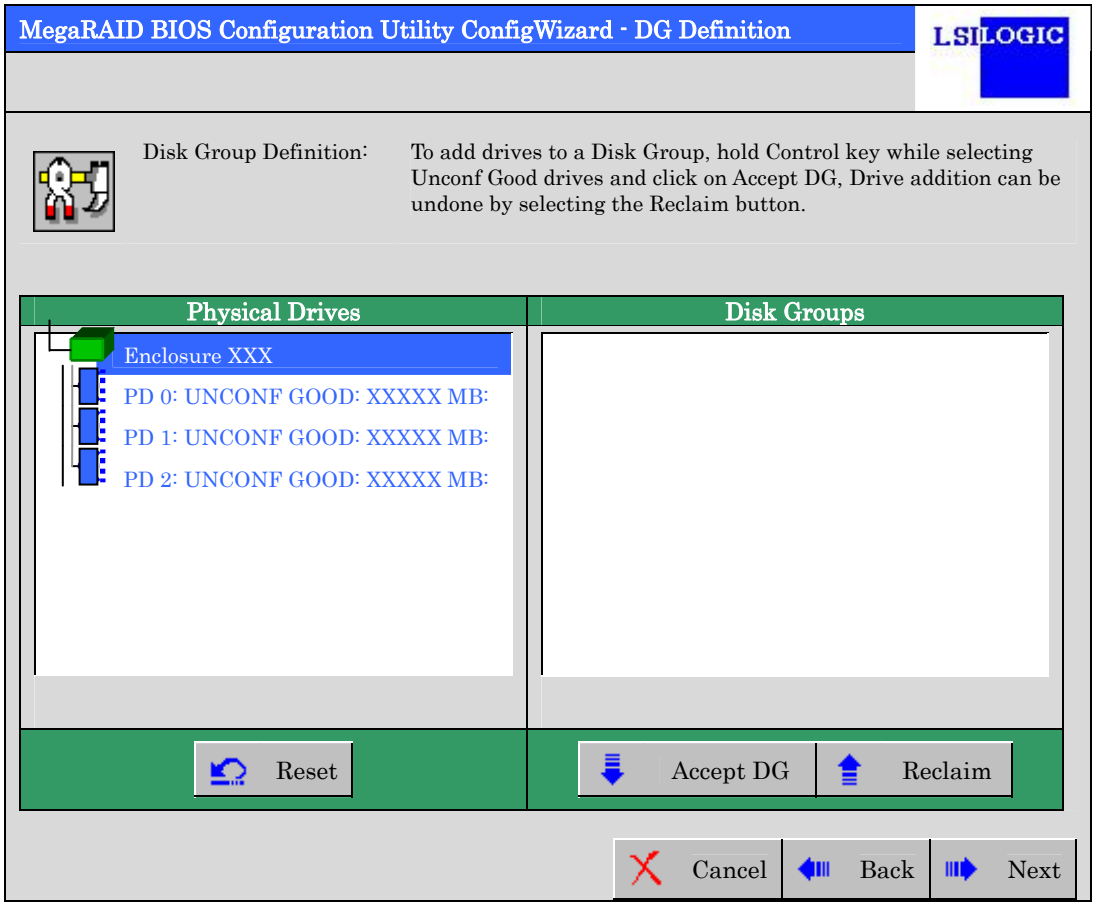


Custom Configuration:	Allows you to define all aspects of the configuration, RAID level, size, and others.
Auto Configuration with Redundancy:	Automatically creates redundant virtual disk.
Auto Configuration without Redundancy:	Automatically creates non-redundant virtual disk.

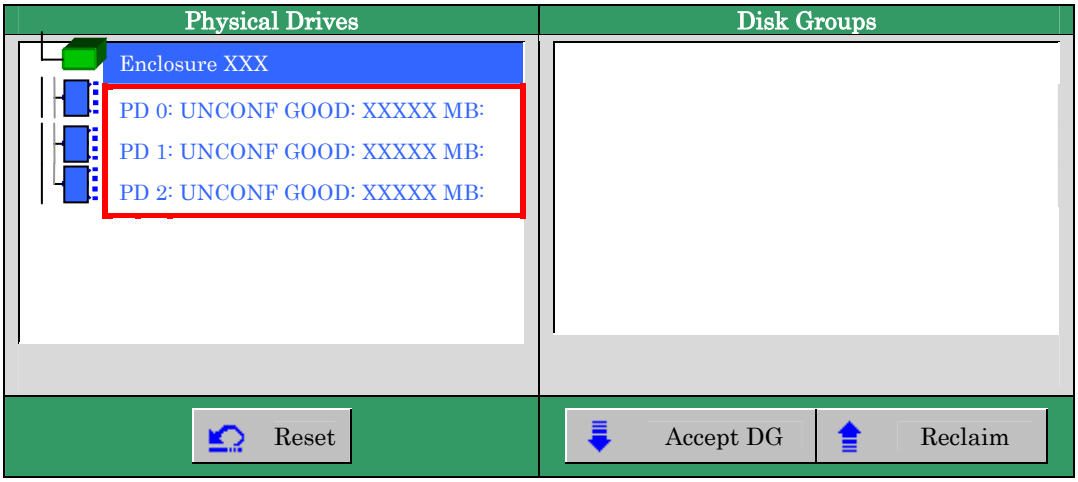
Notice

The disk array controller supports "Custom Configuration" only.

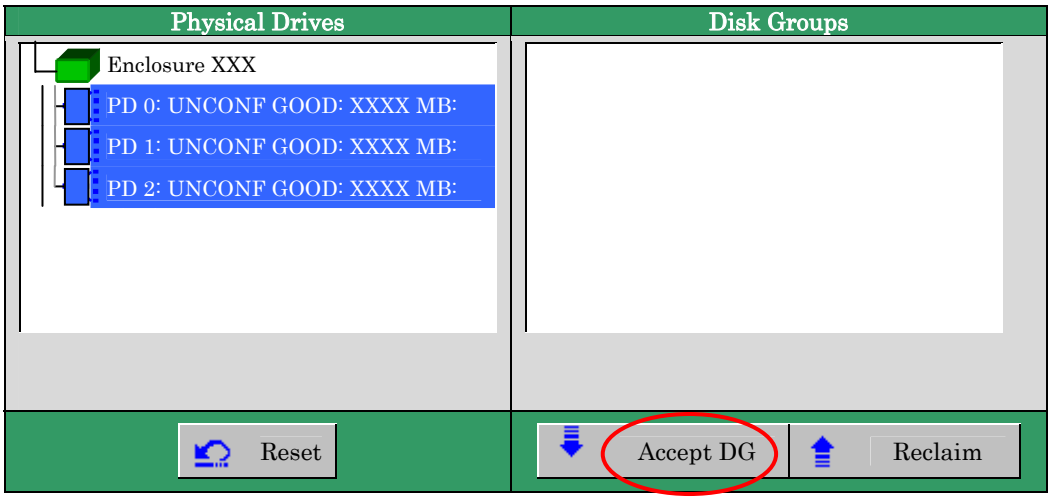
Use this menu to define several physical drives (PD) as a disk group (DG).



1. To add physical drives (HDD) to a Disk Group, hold **Ctrl** while selecting UNCONF GOOD drives.



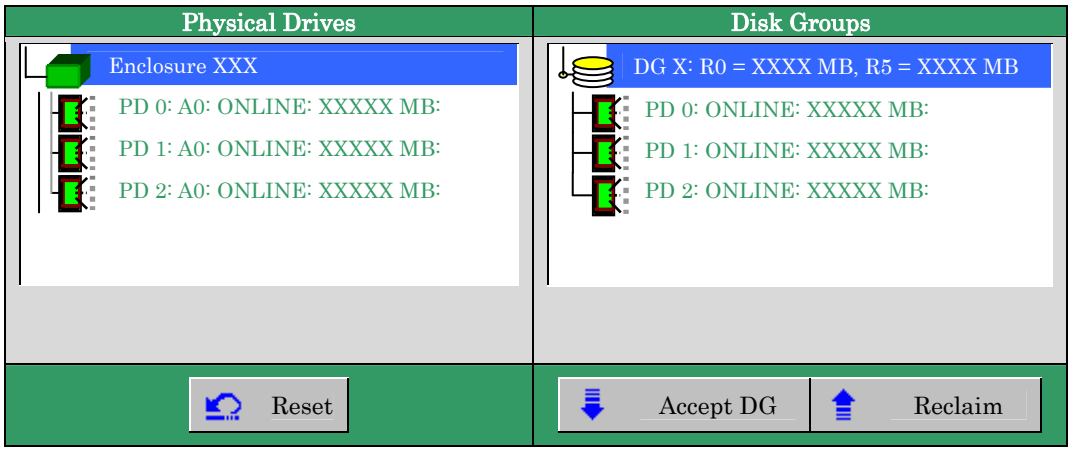
2. Upon completion of selection, click [Accept DG] at the lower right of the screen.



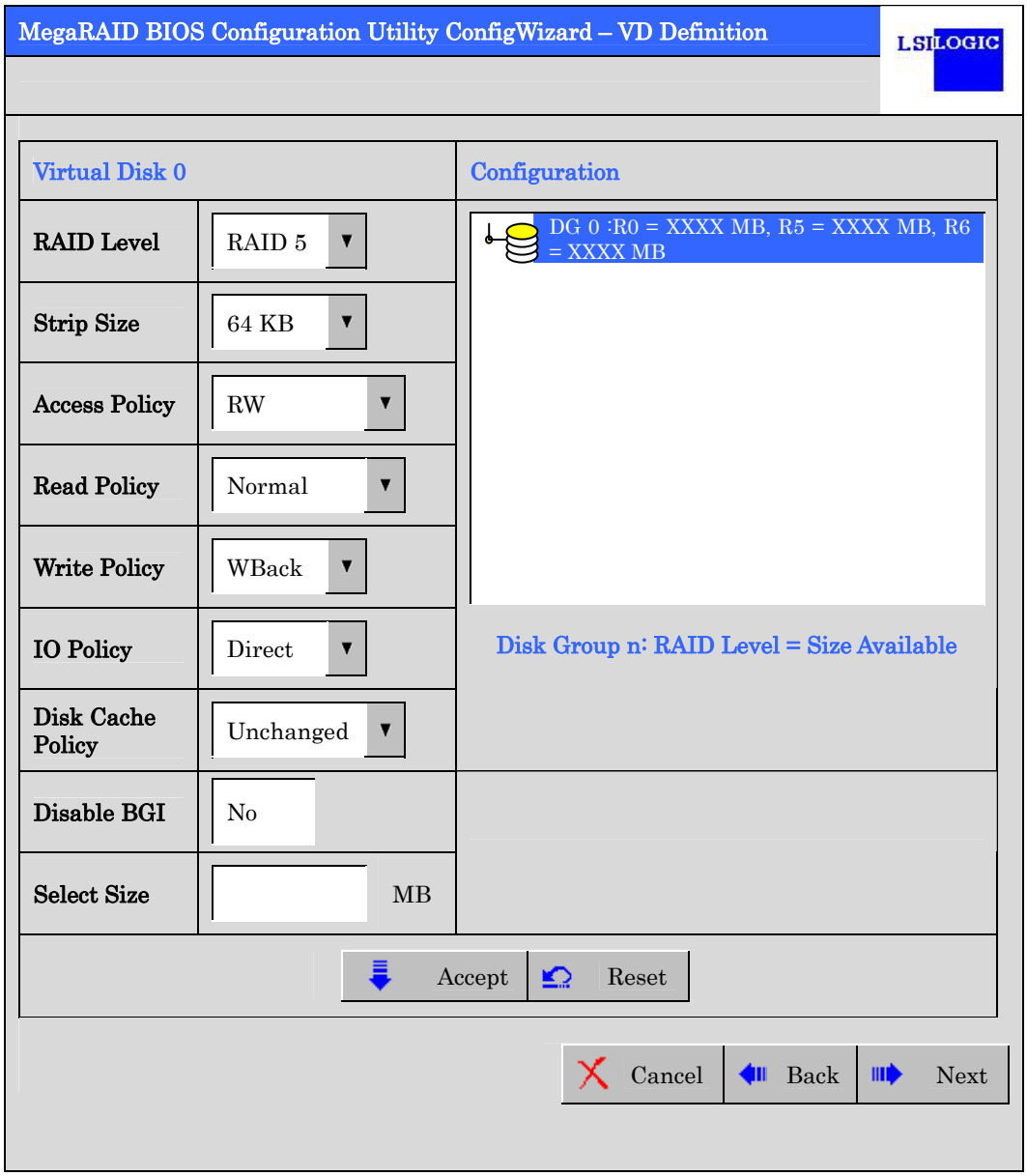
Notice

- When this product and LSI 8408E SAS Internal or LSI 8480E SAS External disk array controller are installed in a server, you cannot use mouse. Please use keyboard. Press Tab key to move the cursor and then press Enter key to select it.
- To select multiple physical drives by keyboard, first move the cursor on an UNCONF GOOD drive by Tab key and then hold **Shift** while selecting the drives by up/down keys.

3. A new DG is defined in the Disk Groups frame. After DG has been defined, click [Next] at the lower right of the screen.



Define the virtual disk (VD) in DG that has been created in previous step. When DG was defined, [VD Definition] screen is displayed. The defined DG is displayed in Configuration column. Available RAID levels and maximum size for VD are also displayed.

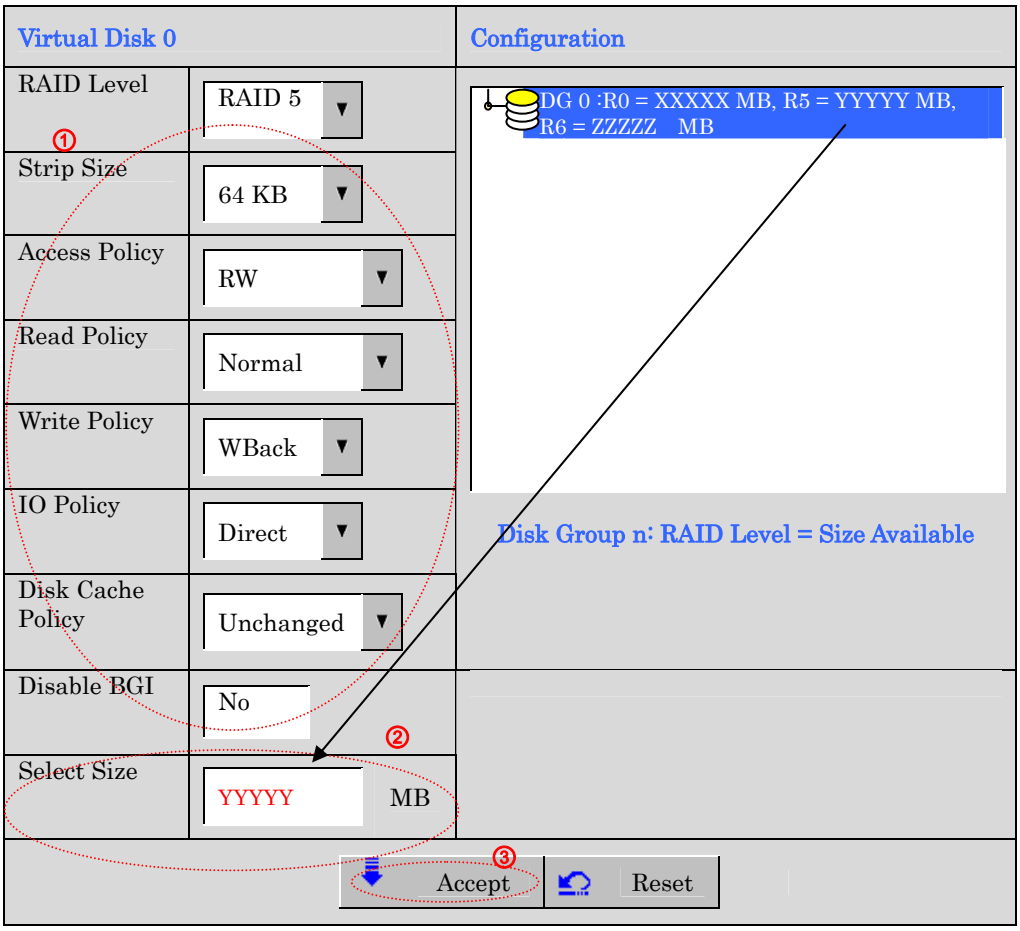


Notice

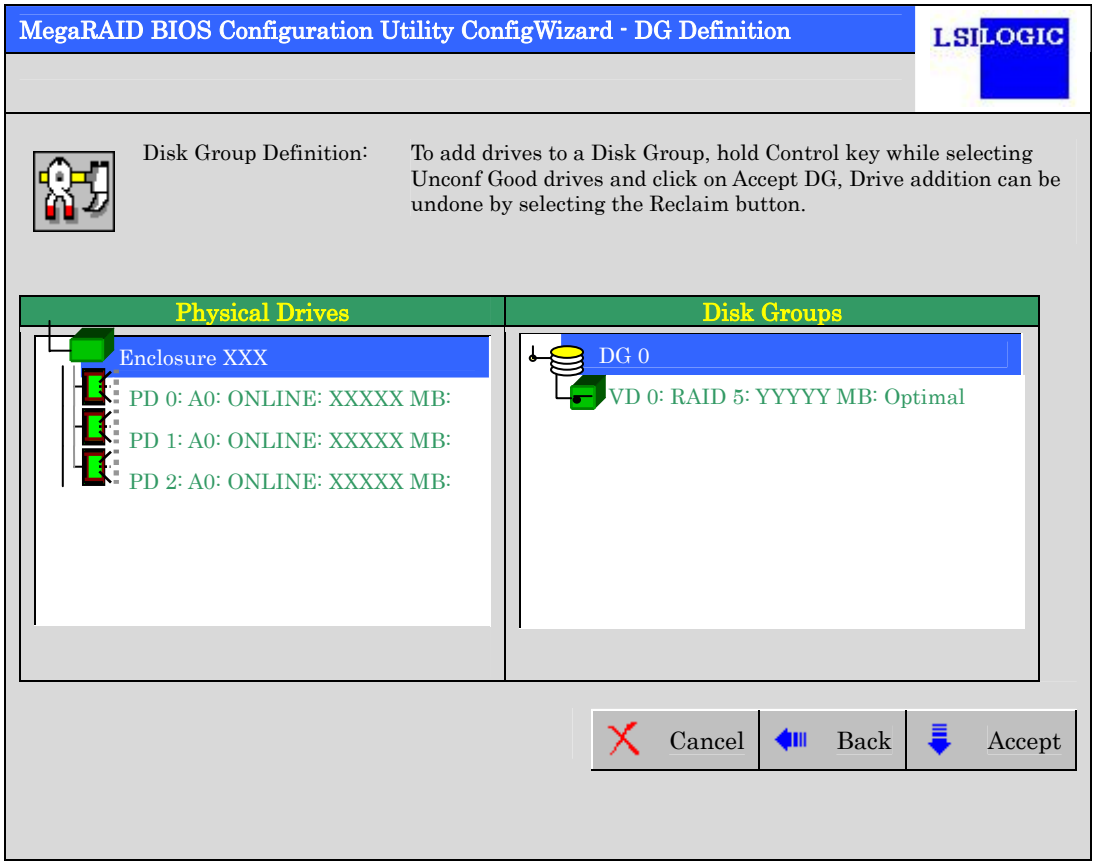
- When this product and LSI 8408E SAS Internal or LSI 8480E SAS External disk array controller are installed in a server, you cannot use mouse. Please use keyboard. Press Tab key to move the cursor and then press Enter key to select it.
- To select a value in a pull-down menu, press up/down keys in the menu and then press Enter key.

As an example, define a RAID5 VD of YYYYY MB.

1. Specify the necessary parameters in Virtual Disk column.
2. Enter "YYYYY" (the maximum size allowed for RAID5) in "Select Size" field.
3. Click [Accept] at the lower center of the screen.

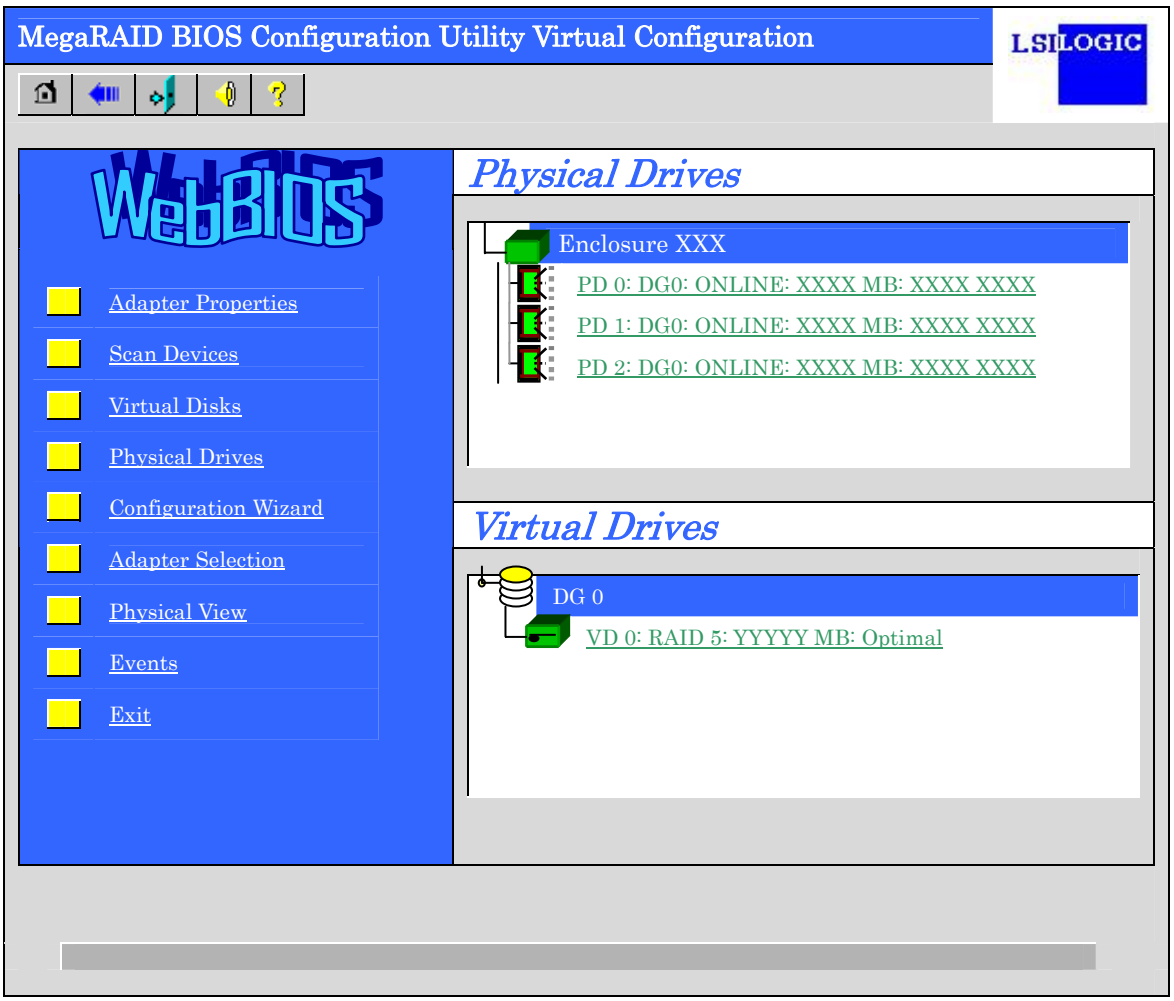


4. VD 0 is created in DG 0 as shown in the screen below.



5. After making sure that the VD is created correctly, click [Accept] at the lower right of the screen.
6. The confirmation message "Save this Configuration?" appears. Click "Yes" to save the configuration.
7. The confirmation message "Want to Initialize the New Virtual Disks?" appears. Normally, select "Yes".
8. "Virtual Disks" operation screen is displayed. If no other operation is required, click [Home] at the lower left of the screen.

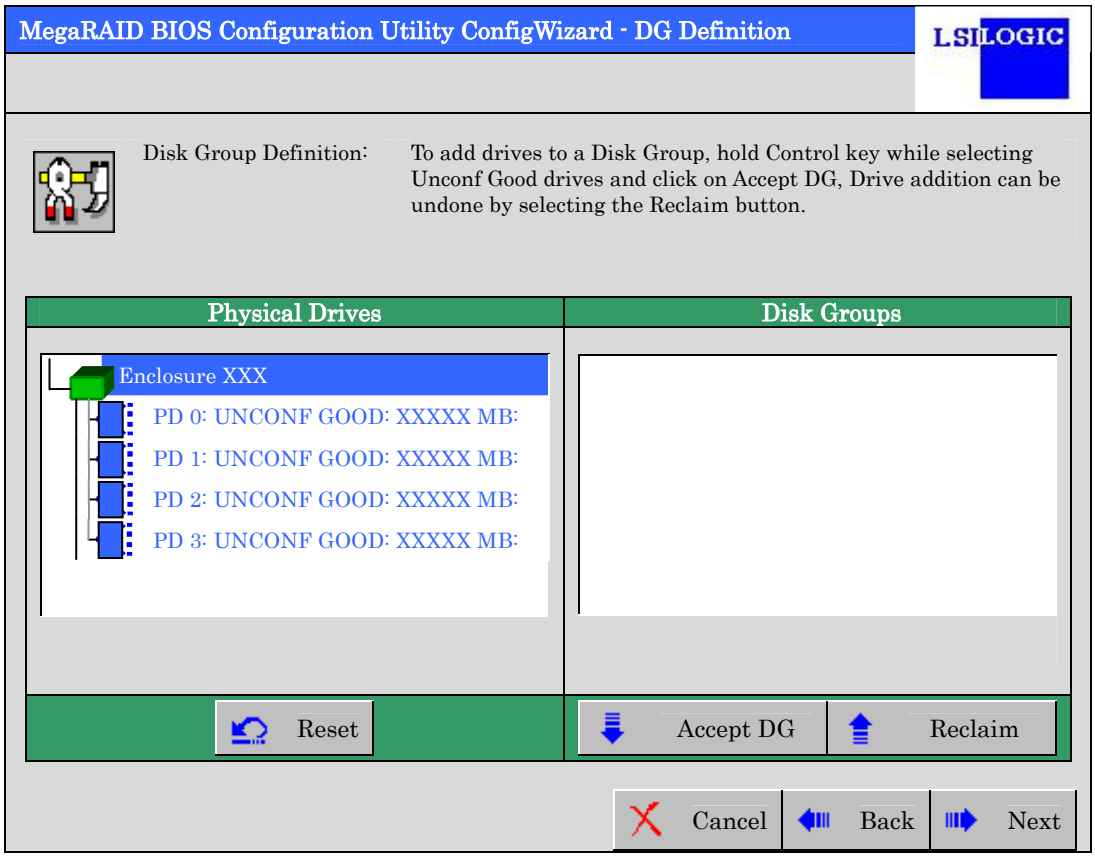
9. The WebBIOS top menu is displayed. Virtual Disk you have created is displayed in the lower right frame of the screen.



3-2. Configure SPAN

The following explains the sample procedure to configure the spanning of RAID1 with four HDDs.

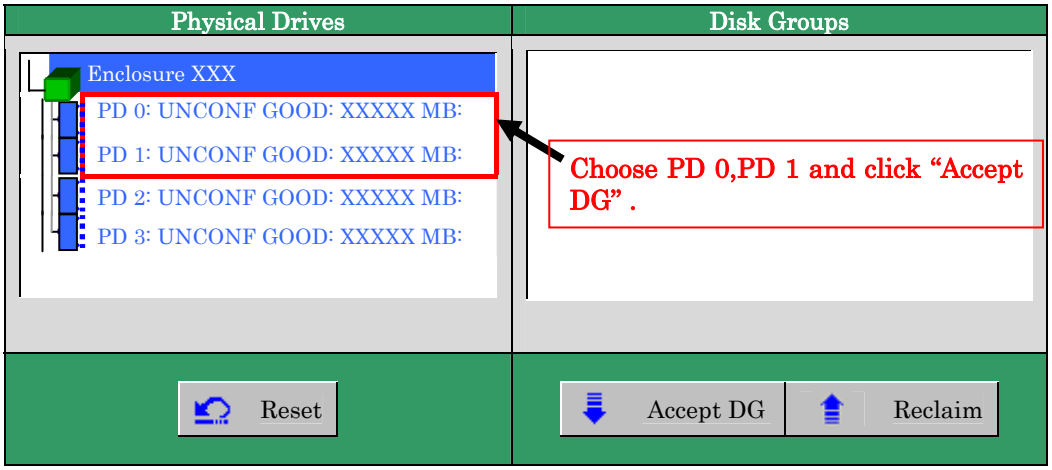
1. Click [Configuration Wizard] on WebBIOS top menu to start Wizard.

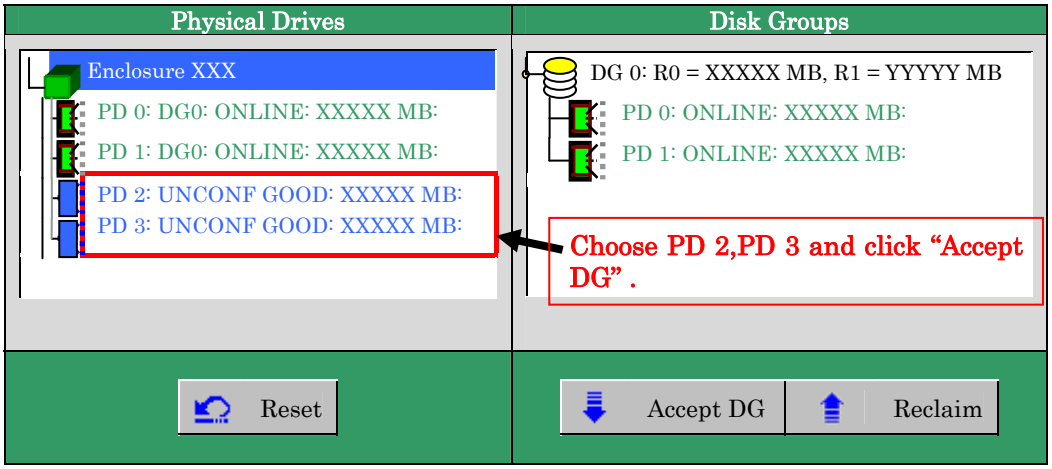


2. To add physical drives (HDD) to a Disk Group, hold Ctrl while selecting UNCONF GOOD drives. (In the example, two DGs will be configured and spanned.) Upon completion of selection, click [Accept DG] at the lower right of the screen.

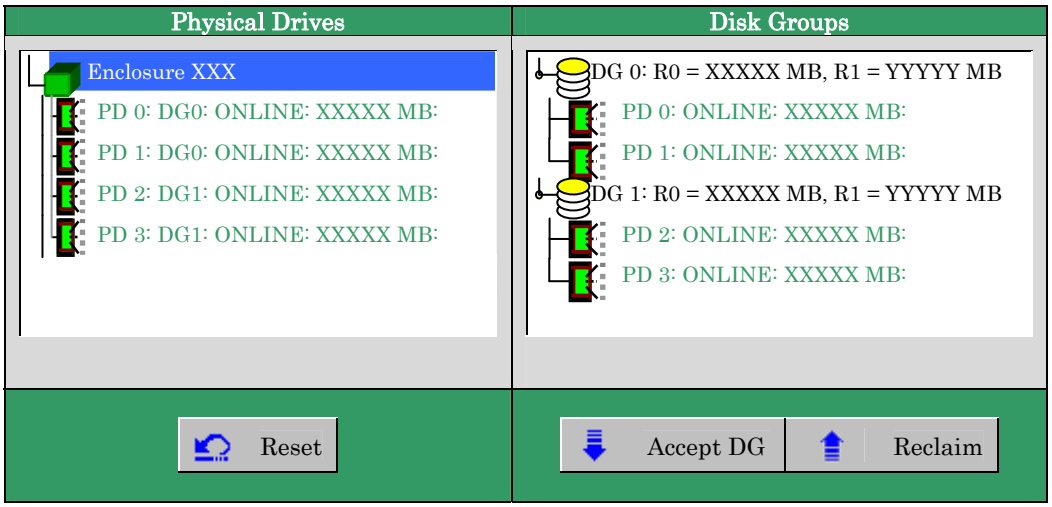
Notice

- When this product and LSI 8408E SAS Internal or LSI 8480E SAS External disk array controller are installed in a server, you cannot use mouse. Please use keyboard. Press Tab key to move the cursor and then press Enter key to select it.
- To select multiple physical drives by keyboard, first move the cursor on an UNCONF GOOD drive by Tab key and then hold **Shift** while selecting the drives by up/down keys.

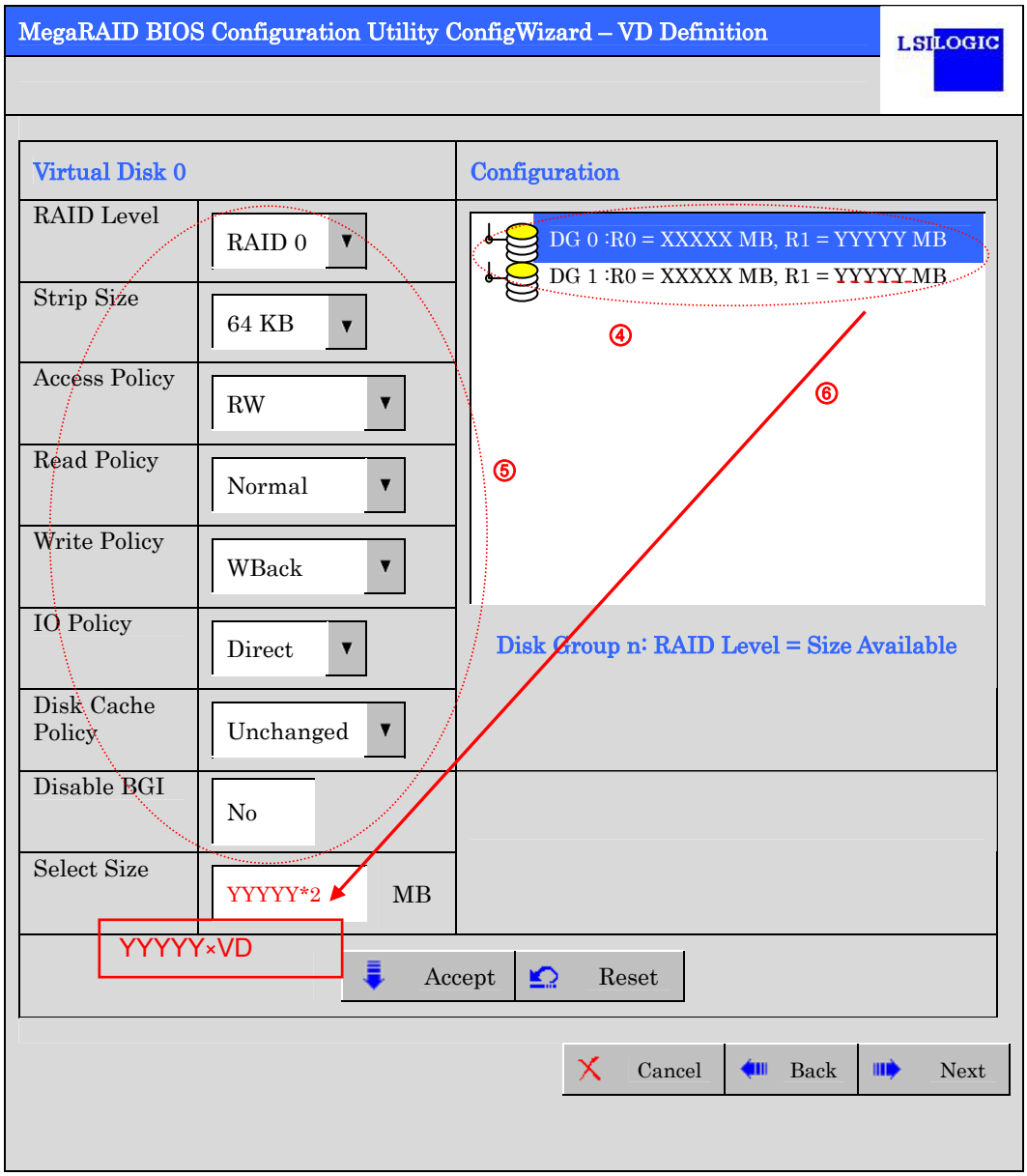




3. A new DG is defined in the Disk Groups frame. After DG has been defined, click [Next] at the lower right of the screen.



Configure the spanning of RAID1 using the DG that has been created in previous step. When DG was defined, [VD Definition] screen is displayed. The defined DG is displayed in Configuration column. Available RAID levels and maximum size for VD are also displayed.



4. Hold **Ctrl** and click the two DGs in the Configuration column to select.
5. Specify the necessary parameters in Virtual Disk column.
6. Enter "YYYYY*2" (the maximum size allowed for spanning of RAID1) in "Select Size" field.

Notice

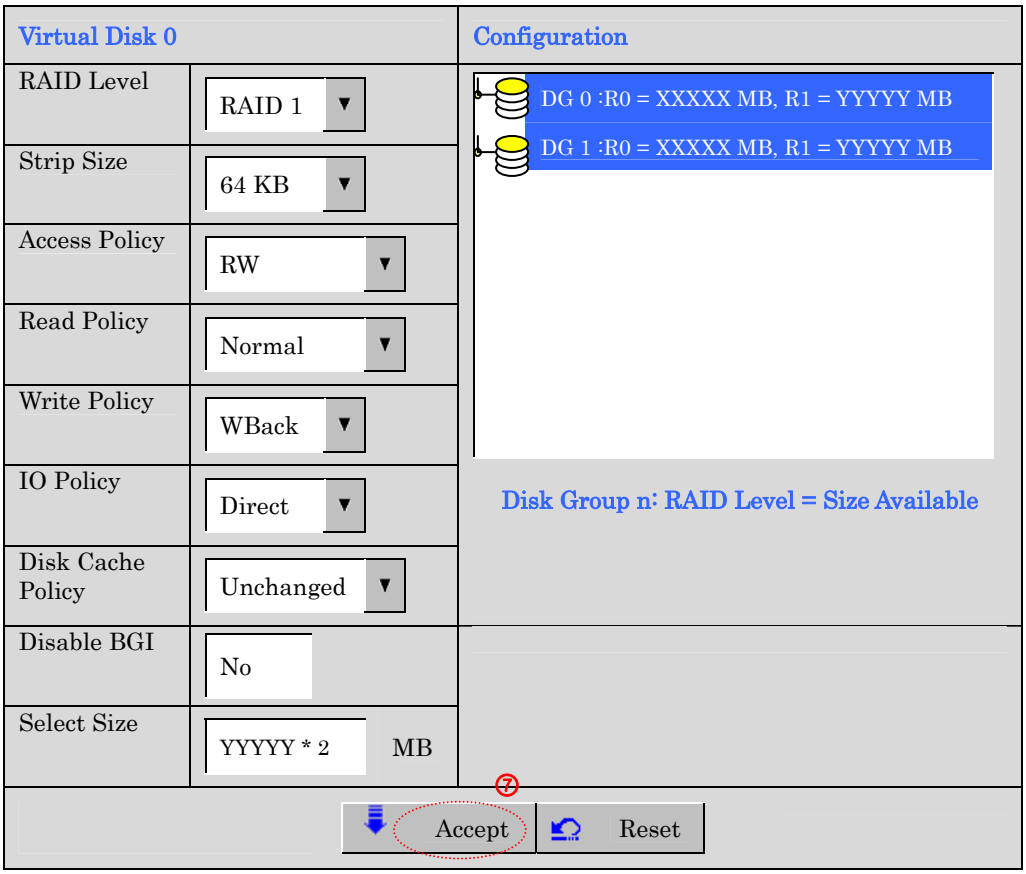
For disk capacity, enter the sum of "the maximum size allowed for RAID1".
To configure the spanning of RAID5, create several RAID VD, and enter the sum of "the maximum size allowed for RAID5".
(In the example below, enter "YYYYY * 2 MB" because the maximum size allowed for RAID1 is YYYYY MB.)

- Spanning of RAID1
  Value to be entered = the maximum size allowed for a single RAID1 VD * number of VDs to be spanned
- Spanning of RAID5
  Value to be entered = the maximum size allowed for a single RAID5 VD * number of VDs to be spanned

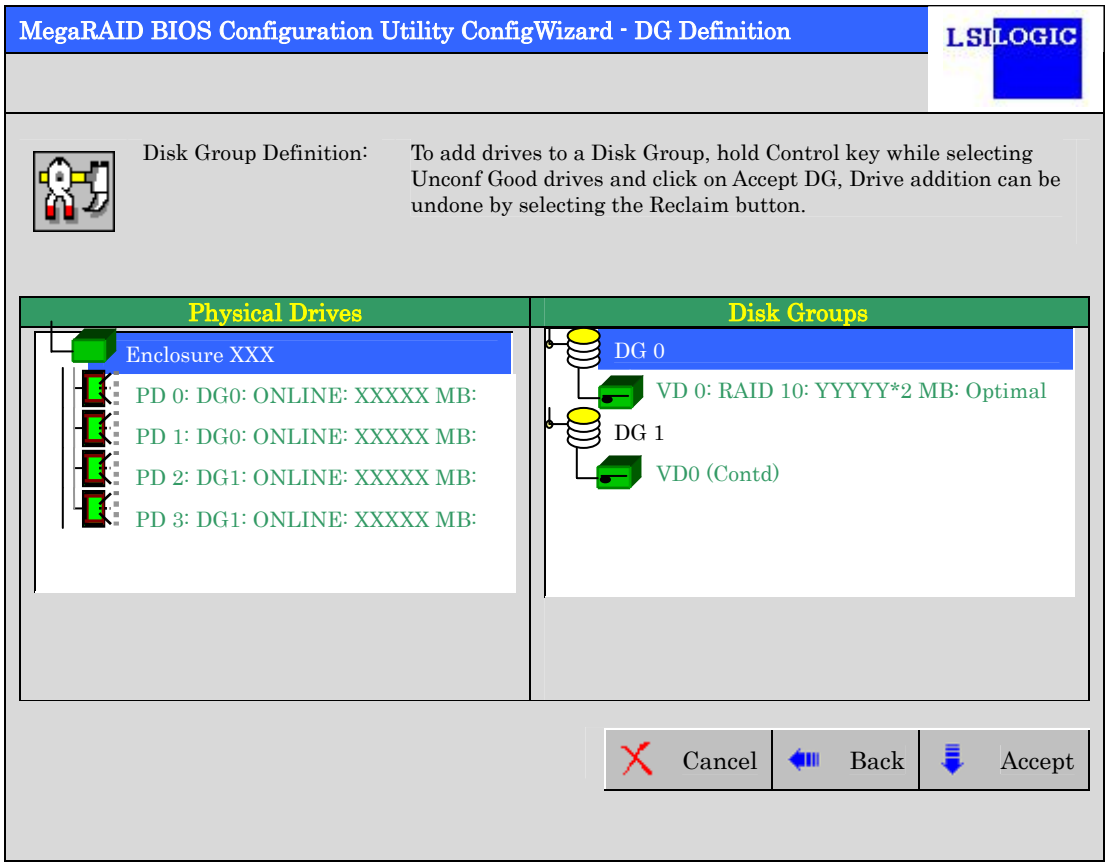
Notice

- When this product and LSI 8408E SAS Internal or LSI 8480E SAS External disk array controller are installed in a server, you cannot use mouse. Please use keyboard. Press Tab key to move the cursor and then press Enter key to select it.
- To select multiple disk groups by keyboard, first move the cursor on a disk group by Tab key and then hold **Shift** while selecting the disk groups by up/down keys.
- To select a value in a pull-down menu, press up/down keys in the menu and then press Enter key.

7. Click [Accept] at the lower center of the screen.



8. VD 0 is created in DG 0 as shown in the [Preview] screen below.



9. After making sure that the VD 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. The confirmation message "Want to Initialize the New Virtual Disks?" appears. Normally, select "Yes".
12. "Virtual Disks" 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. Virtual Disk you have created is displayed in the lower right frame of the screen.

3-3. Parameters for VD Definition

Listed below are parameters for Configuration Wizard.

Item	Parameter	Remarks
RAID Level	**RAID 0** / **RAID 1** / **RAID 5**	RAID6 is not supported
Strip Size	8 KB / 16 KB / 32 KB / **64 KB** / 128 KB	Recommended value: 64KB
Access Policy	**RW** / Read Only / Blocked	Recommended value: RW
Read Policy	**Normal** / Ahead / Adaptive	Recommended value: Normal
Write Policy	**WBack** / **WThru** / BadBBU	WBack: WriteBack WThru: WriteThru BadBBU: Unavailble
IO Policy	**Direct** / Cached	Recommended value: Direct
Disk Cache Policy	**Unchanged** / Enable / Disable	Recommended value: Unchanged
Disable BGI	**No** / Yes	Specify whether to perform Background Initialize after creation of VD. Recommended value: No

Notice

- BGI (Background Initialize) is available only for RAID5 VD configured with five or more HDDs.
- Even if you set write policy to WBack, the controller will actually run in write through mode when the battery is not charged enough. It will run in write back mode after the battery finished charging.
- You can select RAID6 at the VD definition, but the VD cannot be configured because the controller does not support it.

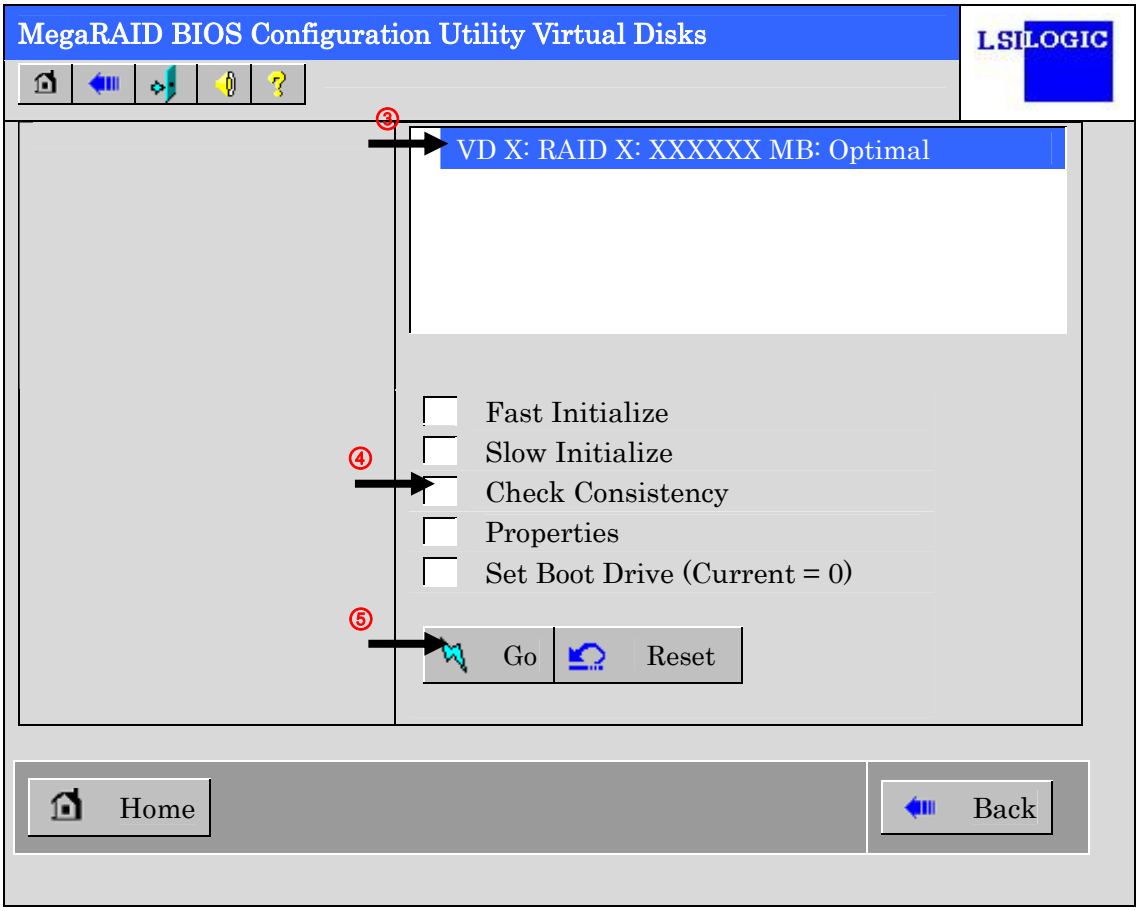
Notice

- When this product and LSI 8408E SAS Internal or LSI 8480E SAS External disk array controller are installed in a server, you cannot use mouse. Please use keyboard. Press Tab key to move the cursor and then press Enter key to select it.
- To select multiple physical drives by keyboard, first move the cursor on an UNCONF GOOD drive by Tab key and then hold **Shift** while selecting the drives by up/down keys.

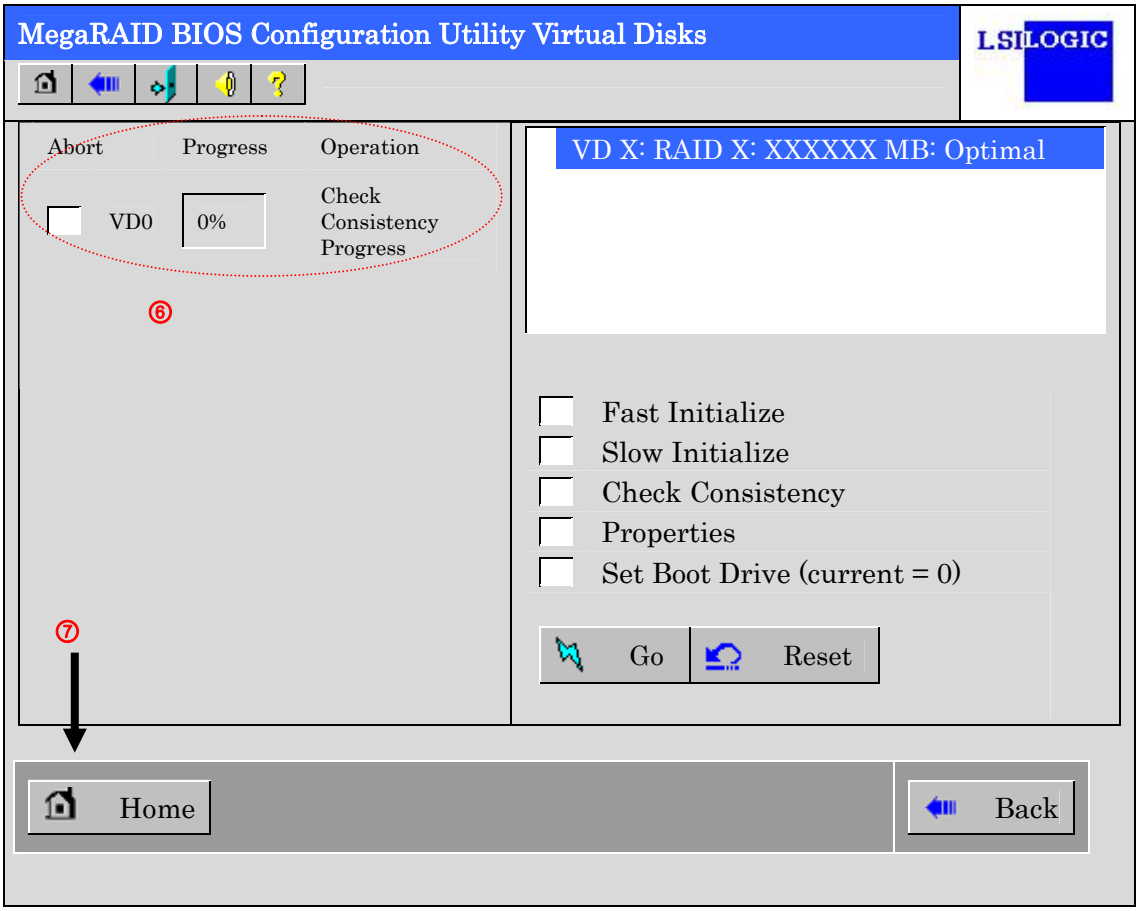
4. Operation of Various Features

4-1. Check Consistency

1. Start WebBIOS.
2. Click [Virtual Disks] on WebBIOS top menu.
3. Select a VD to perform Check Consistency from the upper right frame of Virtual Disks screen.
4. Click the checkmark column for Check Consistency from the lower right frame of Virtual Disks screen.
5. Make sure that Check Consistency is checked, and click [Go].



6. The progress of Check Consistency is displayed on the left frame of Virtual Disks screen.
7. Click [Home] at the lower left of Virtual Disks screen to return to the top menu.



Notice

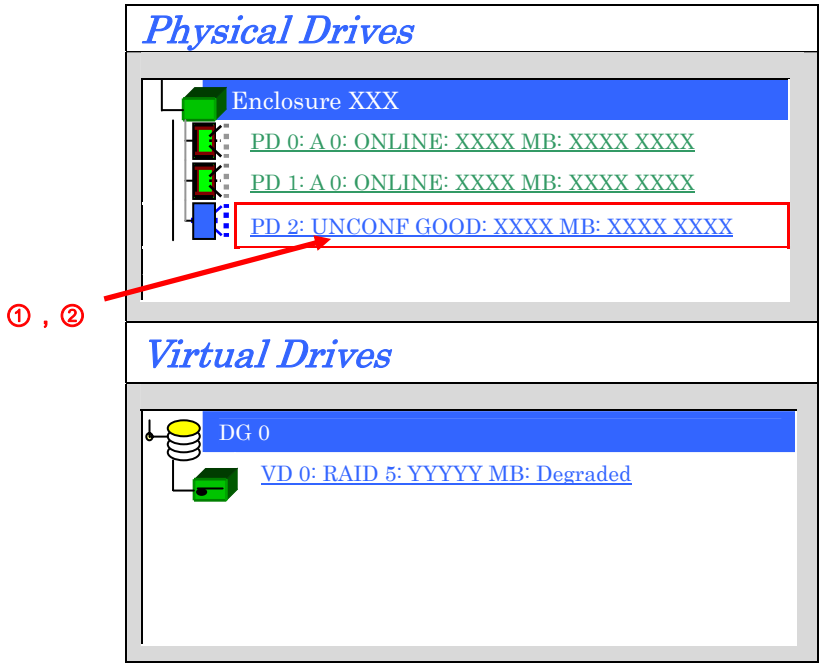
Click [Home] while the background task such as Consistency Check, Rebuild, or reconstruction is being executed. With the progress indication being displayed, the background task may be processed at slow rate on some servers.

4-2. Manual Rebuild

Described below are procedures based on assumption:
One of the HDDs failed in a RAID5 virtual disk configured with three HDDs.

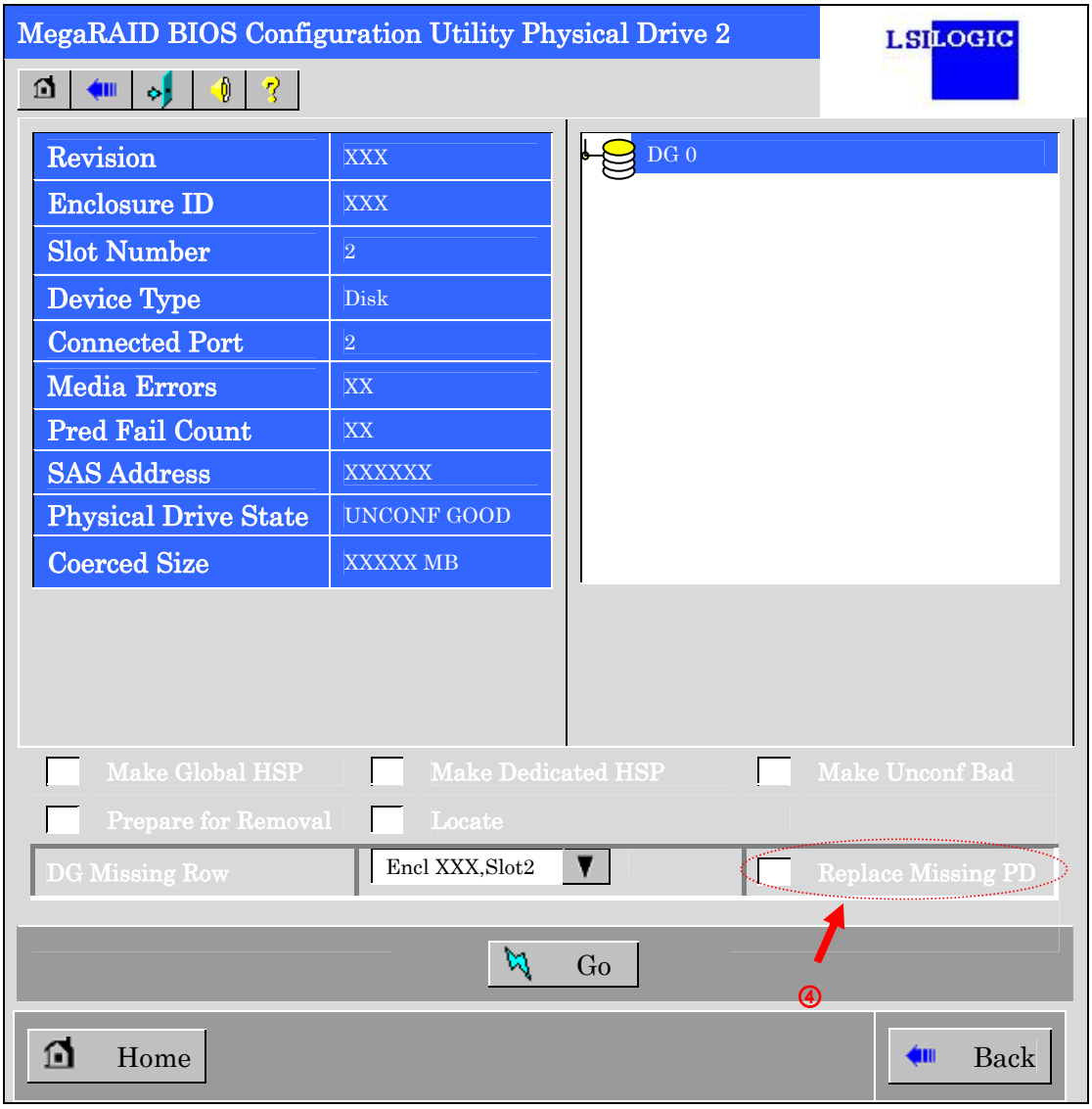
Replace the failed HDD with new one after turning off the power of the server. Auto Rebuild feature is disabled for non-hot-swap replacement. Use Manual Rebuild feature to recover the virtual disk as described below.

1. Start WebBIOS. Make sure that the status for the replaced HDD is indicated as "UNCONF GOOD" in the right frame of the top menu.

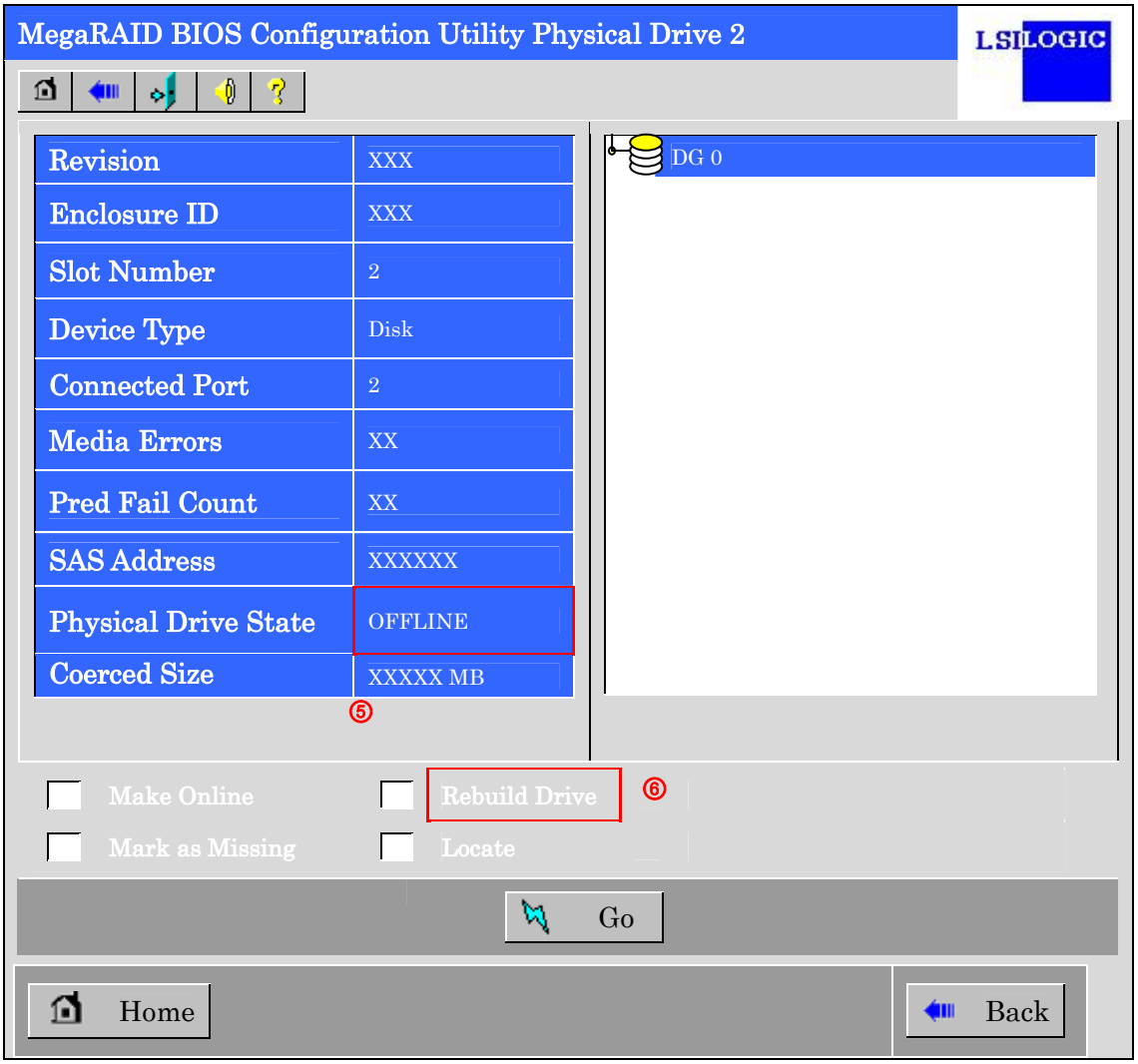


2. Select "PD2" (newly connected HDD) in [Physical Drives].

3. The properties for Physical Drive is displayed.
4. Select "Replace Missing PD" on the lower right of the screen, and then click [Go] on the lower center of the screen.



5. The newly connected HDD is built in DG0. The status is indicated as "OFFLINE" because the drive has not been rebuilt.
6. Select "Rebuild Drive" checkmark box at the lower center of the screen, and then click [Go].



7. When [Rebuild Progress] is displayed, click [Home] at the lower left of the screen to go back to WebBIOS top menu.

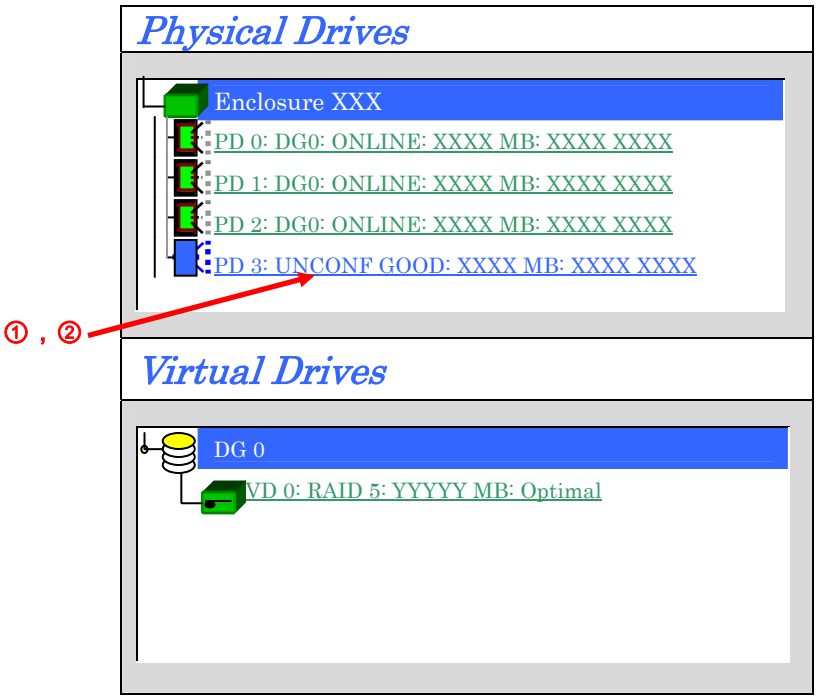
Notice

Click [Home] while the background task such as Consistency Check, Rebuild, or reconstruction is being executed. With the progress indication being displayed, the background task may be processed at slow rate on some servers.

4-3. Setting Hot Spare Disk

Described below are procedures based on assumption:
Add a HDD to a RAID5 virtual disk configured with three HDDs and assign a newly added HDD as Hot Spare Disk.

1. Start WebBIOS. Make sure that the status for the added HDD is indicated as "UNCONF GOOD" in the right frame of the top menu.

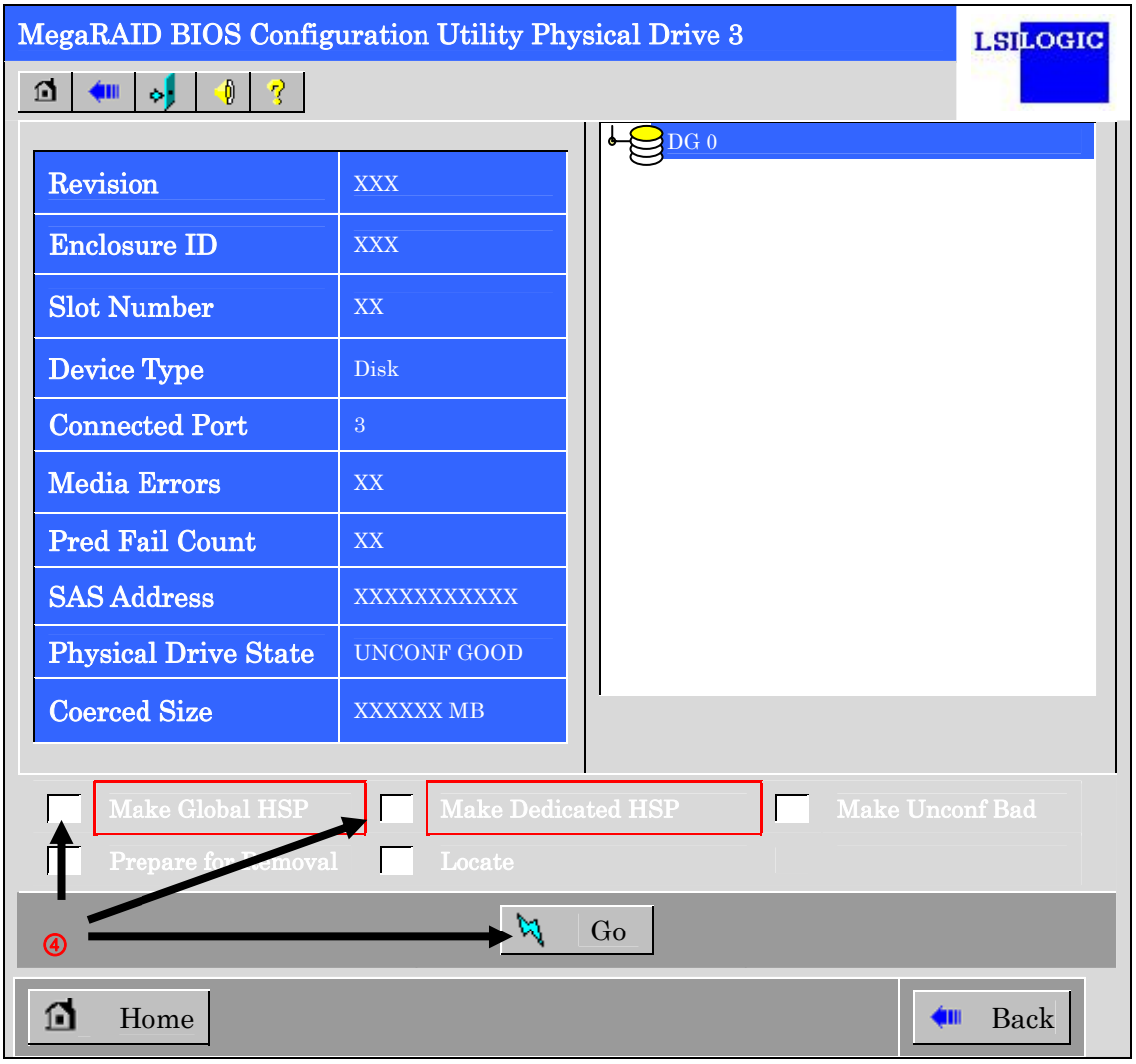


2. Select "PD3" (newly connected HDD) in [Physical Drives].
3. The properties for Physical Drive is displayed.

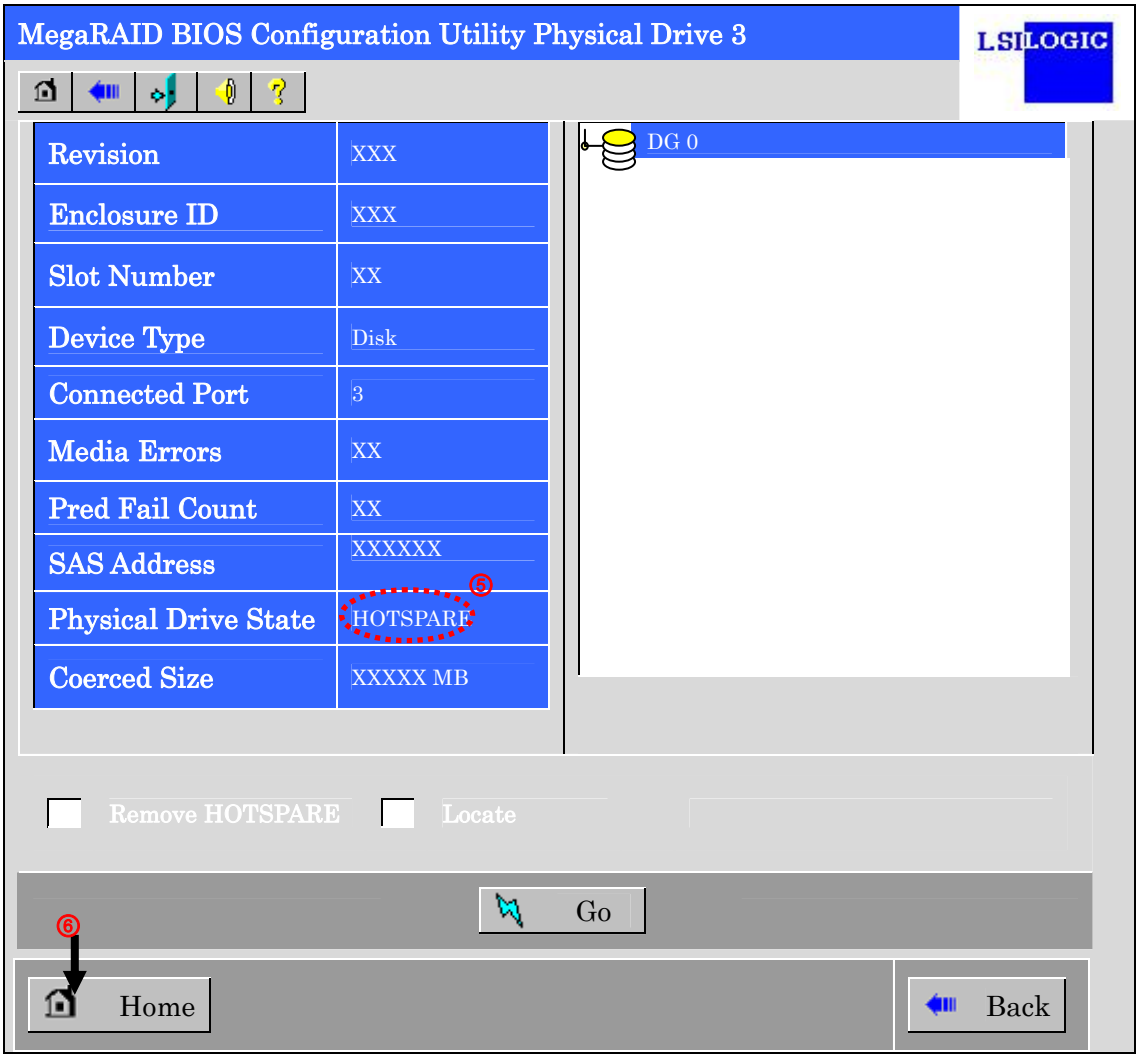
4. Select [Make Global HSP] or [Make Dedicated HSP] on the lower right of the screen, and then click [Go] on the lower center of the screen.

   Global HSP: Indicates the Hot Spare Disk available for all DGs.

   Dedicated HSP: Indicates the Hot Spare Disk available only for the specific DG. You need to specify the target DG.



5. The status for the newly connected HDD changes to "HOTSPARE".
6. Click [Home] at the lower left of the screen to go back to WebBIOS top menu.

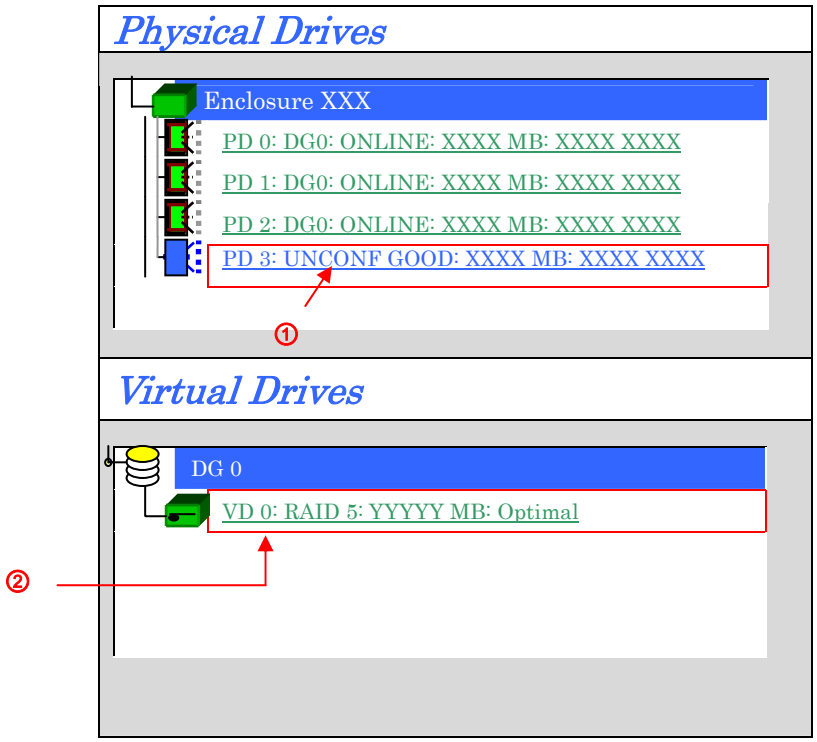


4-4. Reconstruction

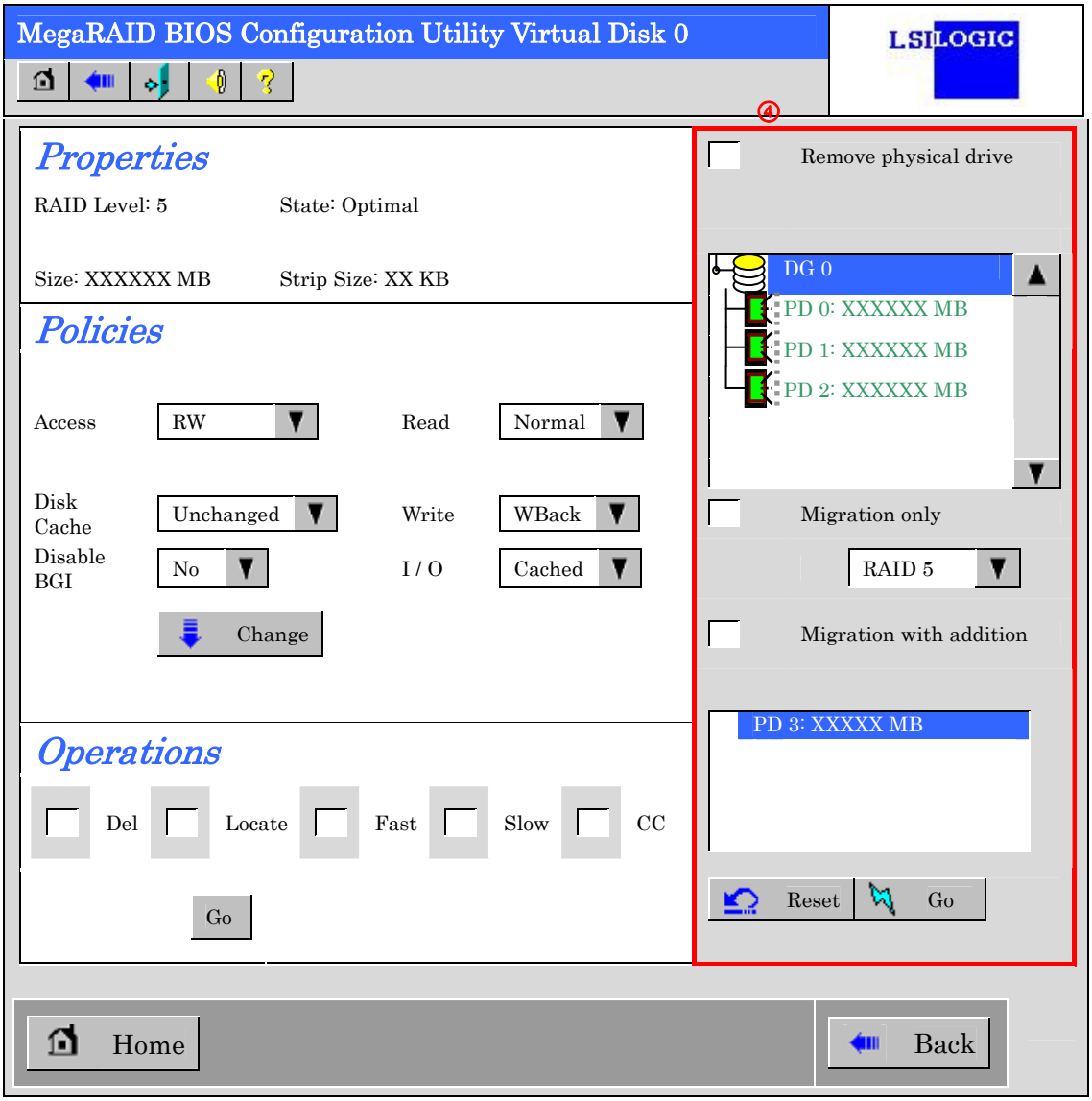
Described below are procedures based on assumption:
Add a HDD to a RAID5 virtual disk configured with three HDDs to make a RAID5 virtual disk configured with four HDDs.

1. Start WebBIOS. Make sure that the status for the added HDD is indicated as "UNCONF GOOD" in the right frame of the top menu.

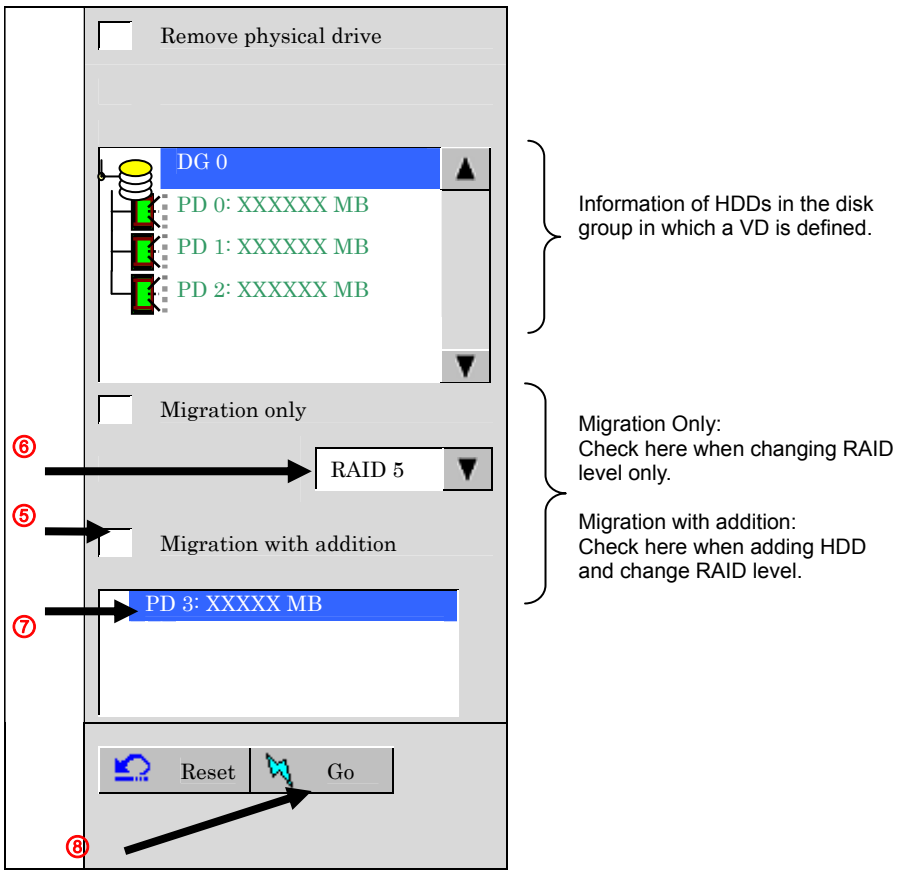
2. Select "VD 0" (already been constructed) in [Virtual Drives].



3. Setting menu for VD 0 is displayed.



4. On the right of the screen, items required for reconstruction are displayed.



5. Select "Migration with addition".
6. Specify the RAID level used after reconstruction.
7. Select a HDD to be added.
8. When you finished steps 5 to 7, click [Go] at the lower right of the screen.
9. The progress of 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 virtual disk may be incorrectly displayed after reconstruction. In this case, perform Scan Devices from the top menu.
- Click [Home] while the background task such as Consistency Check, Rebuild, or reconstruction is being executed. With the progress indication being displayed, the background task may be processed at slow rate on some servers.

Chapter 5 Operation and Maintenance

1. Maintenance Service

We recommend you contact Service Representative approved by the manufacturer to order genuine spare parts or to perform any operations on your system.

2. Preventive Maintenance

2-1. Data Backup

We recommend you backup routinely the data located on the HDDs to prevent severe loss should an incident occur.

For more information on data backup, refer to the Server User Guide.

2-2. Preventive Maintenance by Consistency Check

We recommend you perform a Consistency Check regularly as preventive maintenance against subsequent defects of HDDs, allowing them to be found and corrected as soon as possible.

For more information on the Consistency Check, see "Chapter 3 Disk Array Controller Features".

The recommended checking interval is once per week. Depending on the operating status of your system, the checking interval should be at least once per month.

MSM must be installed to perform the Consistency Check.

3. Maintenance

The disk array controller supports the following maintenance features

- Configuration on Disk (COD) feature
- Rebuild feature

3-1. Configuration on Disk (COD) Feature

The COD feature writes the configuration information into HDDs. This feature prevents the configuration information from being lost if the disk array controller is defective and requires replacement.

Once the disk array controller has been replaced, the COD feature can read the configuration information from the HDDs to operate the controller normally.

Check

The configuration information is not saved on the disk array controller but on the HDDs.

3-2. Rebuild Feature

The rebuild feature can recover the data that was stored in a defective HDD. This feature is available for redundant logical drives in the RAID1 and RAID5 levels.

See "Chapter 3 Disk Array Controller Features" for details.

4. Replacement of Disk Array Controller

Replace the disk array controller as described in the following procedure:

For more information on the handling of the server, refer to the Server User Guide.

Avoid installation in extreme temperature conditions.

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

1. Shutdown OS while the server is powered on, power off the server, and pull out the power cords from the receptacles.
2. If applicable, remove the side cover and other components from the server.
3. Remove the screw fixing the disk array controller and remove the disk array controller from the server.

- If applicable, disconnect the additional battery from the disk array controller you remove following the instructions from the "Additional DAC Battery User Guide".
- Always write down in which PCI slot the controller was installed.

4. Insert the replaced disk array controller into the same PCI slot and fix it with the screw.
5. Install the components removed during step 2.
6. Connect the power cords and power on the server. Make sure that the server boots normally.

5. Troubleshooting

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

(1) OS cannot be installed.

- ® Have virtual disks been created?

  → Create virtual disks using WebBIOS.

(2) OS cannot be booted.

- ® Is the disk array controller inserted into the mating PCI slot to the end straight?

  → If not, install the disk array controller correctly.

- ® Is the disk array controller inserted into a PCI slot to which some installation limitation is imposed?

  → Check the limitation imposed to the installation of the disk array controller and insert the controller into a correct slot.

If OS is not recognized despite the above actions, the disk array controller may be defected. Contact your service representative.

- ® Are HDDs inserted to the end of the slot?

  → Install the HDDs in the slot correctly.

- ® Are SAS cables connected to HDDs and/or additional HDD cage correctly?

  → Connect the cables correctly.

If OS is not recognized despite the above actions, one or more HDDs may be defected. Contact your service representative.

(3) HDD failed

→ Contact your service representative.

(4) Rebuild cannot be executed.

- ® Is the capacity of the HDD to be rebuilt rather small, isn't it?

  → Use a disk having the same capacity as the defected HDD.

- ® Is the RAID level of the virtual disk RAID0, isn't it?

  → Rebuild is not possible because of no redundancy in RAID0. Replace the defected HDD and create the virtual disk again.

(5) Consistency Check is disabled.

- ® Is the virtual disk degraded?

  → Replace the defected HDD and execute Rebuild.

- ® Is the RAID level of the virtual disk RAID0, isn't it?

  → Consistency Check is not possible because of no redundancy in RAID0.

(6) The additional battery is not recognized, or POST displays the message below.

・ When the additional battery is not available, following message displayed.

> 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).

⑧ Is the cable of the battery pack connected to the mating connector properly?

→ Connect the cable properly.

If the additional battery is not recognized still despite the above action, the battery may be defected. Contact your service representative.

・ When the additional battery is not charged enough, following message displayed.

> Your battery is bad or missing , and you have VDs configured for write-back mode. Because the battery is not usable , these VDs will actually run in write-through mode until the battery is replaced.
> The following VDs are affected : XX
> Press any key to continue.

⑧ Is the cable of the battery pack connected to the mating connector properly?

→ Connect the cable properly.

⑧ The battery pack may not be charged enough.

→ Please wait until the battery pack has finished charging. It may take several hours. When it has finished charging, the following messages are registered in MSM and application event log.

Controller ID:x Battery charge complete.

Controller ID:x BBU enabled; changing WT logical drives to WB.

- When the additional battery is installed or replaced, it takes more than several hours to complete charging the battery because the disk array controller reconditions the battery. For details, see "3. Reconditioning the battery" in Chapter 2 Installing BBU of N8103-100 Additional DAC Battery User's Guide.

If the additional battery is not recognized or does not finish charging still despite the above actions, the battery may be defected. Contact your service representative.

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