# SAS to SAS/SATA II RAID Subsystem

# **User Manual**

**Revision 1.0** 

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# Preface

### About this manual

This manual provides information regarding the hardware features, installation and configuration of the **SAS-to-SAS II RAID subsystem**. This document also describes how to use the storage management software. Information contained in the manual has been reviewed for accuracy, but not for product warranty because of the various environment/OS/settings. Information and specifications will be changed without further notice.

This manual uses section numbering for every topic being discussed for easy and convenient way of finding information in accordance with the user's needs. The following icons are being used for some details and information to be considered in going through with this manual:



#### NOTES:

These are notes that contain useful information and tips that the user must give attention to in going through with the subsystem operation.



#### IMPORTANT!

These are the important information that the user must remember.



#### WARNING!

These are the warnings that the user must follow to avoid unnecessary errors and bodily injury during hardware and software operation of the subsystem.



#### CAUTION:

These are the cautions that user must be aware of to prevent damage to the subsystem and/or its components.

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#### Changes

The material in this document is for information only and is subject to change without notice.

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# **Before You Begin**

Before going through with this manual, you should read and focus on the following safety guidelines. Notes about the subsystem's controller configuration and the product packaging and delivery are also included here.

## Safety Guidelines

To provide reasonable protection against any harm on the part of the user and to obtain maximum performance, user is advised to be aware of the following safety guidelines particularly in handling hardware components:

#### Upon receiving of the product:

- Place the product in its proper location.
- Do not try to lift it by yourself alone. Two or more persons are needed to remove or lift the product to its packaging. To avoid unnecessary dropping out, make sure that somebody is around for immediate assistance.
- It should be handled with care to avoid dropping that may cause damage to the product. Always use the correct lifting procedures.

#### Upon installing of the product:

- Ambient temperature is very important for the installation site. It must not exceed 30°C. Due to seasonal climate changes; regulate the installation site temperature making it not to exceed the allowed ambient temperature.
- Before plugging-in any power cords, cables and connectors, make sure that the power switches are turned off. Disconnect first any power connection if the power supply module is being removed from the enclosure.
- Outlets must be accessible to the equipment.
- All external connections should be made using shielded cables and as much as possible should not be performed by bare hand. Using anti-static hand gloves is recommended.
- In installing each component, secure all the mounting screws and locks. Make sure that all screws are fully tightened. Follow correctly all the listed procedures in this manual for reliable performance.

## **Controller Configurations**

This RAID subsystem supports single controller configuration.

# Packaging, Shipment and Delivery

- Before removing the subsystem from the shipping carton, you should visually inspect the physical condition of the shipping carton.
- Unpack and verify that the contents of the shipping carton are complete and in good condition.
- Exterior damage to the shipping carton may indicate that the contents of the carton are damaged.
- If any damage is found, do not remove the components; contact the dealer where you purchased the subsystem for further instructions.

# Unpacking the Shipping Carton

The shipping package contains the following:

	RAID Subsystem Unit
	One (1) power cord
	One (1) external SAS cable
	One (1) RJ45 Ethernet cable
the second se	One (1) external serial cable RJ11-to-DB9
	One (1) external serial cable DB9-DB9
	User Manual

NOTE: If any damage is found, contact the dealer or vendor for assistance.

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# Chapter 1 Product Introduction



The 8 bays RAID Subsystem

#### Highest Density Available

- Small Desktop Tower with 8 bay carriers
- Support Over 2TB

#### Extraordinary performance

- SATA II: The Next Generation Internal Storage Interconnect.
- Better connectivity, higher data transfer rates.
- Advanced Data Guarding technology (RAID ADG) provides the highest level of data protection.
- RAID ADG (RAID 6) can tolerate multiple simultaneous drive failures without downtime or data loss.

#### Exceptional Manageability

- Graphic User Interface (GUI) carry out user easy to remote management and configuration
- Menu-driven interface make user a convenient way to maintain the storage by locally LCD front console

#### Easy Installation, upgrade & Maintenance

 Provide a fast and easy way to install and upgrade the storage. Simplified maintenance reduces ongoing IT labor costs.

#### **Green Power Thinking**

 Save the power by adopt the new technology "MAID" (Massive Arrays of Idle Disks).

# 1.1 Key Features

#### **RAID** Features

- SAS 2.0 (6G) interface, compliant with SAS 1.0(3G) and SATAII device
- RAID level 0, 1, 3, 5, 6, 10(1E), 30, 50, 60, Expansion
- Write-through or write-back cache support
- Supports hot spare and automatic hot rebuild
- Allows online capacity expansion within the enclosure Local audible event notification alarm
- Supports password protection
- Built-in serial port interface for remote event notification.
- Dual host channels support clustering technology.
- Disk scrubbing/ array verify scheduling for automatic repair of all configured RAID sets
- Transparent data protection for all popular operating system.
- Support RAID ADG (RAID 6) which provides the highest level of data protection.
- Supports multiple array enclosures per host connection.
- Online RAID level migration.
- Support NTP protocol to synchronize RAID controller clock over the on-board Ethernet port

#### **RAID** Management

- Smart-function LCD Panel.
- Local audible notice for environmental detection.
- Real time drive activity and status indicators.
- Web-based Java GUI management utility.

# **1.1 Technical Specifications**

Model	EP-T803-S6S6	
Form - Factor	8 Bays Tower	
RAID Processor	800MHz RAID-On-Chip storage processor	
RAID Level	0, 1, 3, 5, 6, 10(1E), 30, 50, 60 and Expansion	
Cache Memory	512MB with ECC/REG protection	
No. of Channels	2   9	
(host + drive)	2 + 8	
Host Bus Interface	One 6Gb/s SAS (SFF-8088) port for Host One 6Gb/s SAS (SFF-8088) port for Host or Expansion (configurable)	
Drive Bus Interface	6Gb/s SAS, 6Gb/s SATA	
SAS Expansion	One 6Gb/s SAS (SFF-8088) (configurable)	
Hot-Swap Drive Trays	Eight (8) 1-inch trays	
Power Supply	400W Power Supply w/ PFC	
Cooling Fans	2	
Battery Backup	Option	
R-Link Support	Yes	
SNMP Protocol Support	Yes	
Array Roaming	Yes	
MAID Support	Yes	
Power Requirements	100 ~ 240 VAC, 7A ~ 4A, 50Hz ~ 60Hz	
Environment Detection	Temperature, Fan, Voltage	
Relative Humidity:	10% ~ 85% Non-condensing	
Operating Temp:	10°C ~ 40°C (50°F ~ 104°F)	
Physical Dimensions:	351.4(H) x 155(W) x 400.6(D) mm	
Weight	10 Kg (without Drives)	

**Function**: New Disk Auto Spare / Host Independent / Environment Monitor / Online Expansion / Continuous Rebuild / Online Consistency Check / Failed Drive Auto Rebuild / Failed Drive Indicators / Audible Alarm / Password Protection / Email Notification /Bad Block Auto-Remapping / Multiple RAID Selection / Online RAID Level Migration / Background RAID Initialization / S.M.A.R.T.

**Note**: Specifications are subject to change without notice. All company and product names are trademarks of their respective owners.

# 1.2 RAID Concepts

#### **RAID Fundamentals**

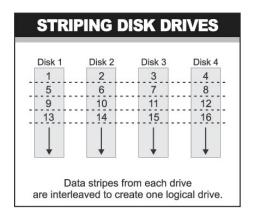
The basic idea of RAID (Redundant Array of Independent Disks) is to combine multiple inexpensive disk drives into an array of disk drives to obtain performance, capacity and reliability that exceeds that of a single large drive. The array of drives appears to the host computer as a single logical drive.

Five types of array architectures, RAID 1 through RAID 5, were originally defined; each provides disk fault-tolerance with different compromises in features and performance. In addition to these five redundant array architectures, it has become popular to refer to a non-redundant array of disk drives as a RAID 0 arrays.

#### Disk Striping

Fundamental to RAID technology is striping. This is a method of combining multiple drives into one logical storage unit. Striping partitions the storage space of each drive into stripes, which can be as small as one sector (512 bytes) or as large as several megabytes. These stripes are then interleaved in a rotating sequence, so that the combined space is composed alternately of stripes from each drive. The specific type of operating environment determines whether large or small stripes should be used.

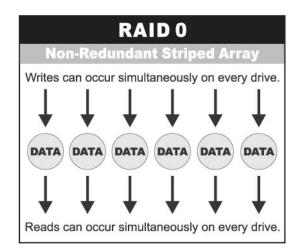
Most operating systems today support concurrent disk I/O operations across multiple drives. However, in order to maximize throughput for the disk subsystem, the I/O load must be balanced across all the drives so that each drive can be kept busy as much as possible. In a multiple drive system without striping, the disk I/O load is never perfectly balanced. Some drives will contain data files that are frequently accessed and some drives will rarely be accessed.



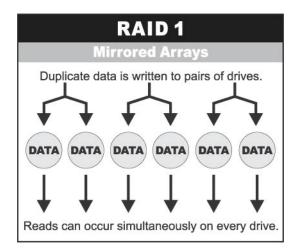
By striping the drives in the array with stripes large enough so that each record falls entirely within one stripe, most records can be evenly distributed across all drives. This keeps all drives in the array busy during heavy load situations. This situation allows all drives to work concurrently on different I/O operations, and thus maximize the number of simultaneous I/O operations that can be performed by the array.

## **Definition of RAID Levels**

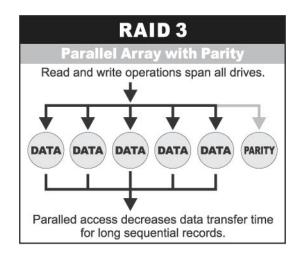
**RAID O** is typically defined as a group of striped disk drives without parity or data redundancy. RAID 0 arrays can be configured with large stripes for multi-user environments or small stripes for single-user systems that access long sequential records. RAID 0 arrays deliver the best data storage efficiency and performance of any array type. The disadvantage is that if one drive in a RAID 0 array fails, the entire array fails.



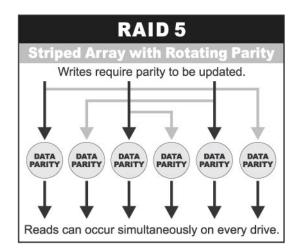
**RAID 1**, also known as disk mirroring, is simply a pair of disk drives that store duplicate data but appear to the computer as a single drive. Although striping is not used within a single mirrored drive pair, multiple RAID 1 arrays can be striped together to create a single large array consisting of pairs of mirrored drives. All writes must go to both drives of a mirrored pair so that the information on the drives is kept identical. However, each individual drive can perform simultaneous, independent read operations. Mirroring thus doubles the read performance of a single non-mirrored drive and while the write performance is unchanged. RAID 1 delivers the best performance of any redundant array type. In addition, there is less performance degradation during drive failure than in RAID 5 arrays.



**RAID 3** sector-stripes data across groups of drives, but one drive in the group is dedicated for storing parity information. RAID 3 relies on the embedded ECC in each sector for error detection. In the case of drive failure, data recovery is accomplished by calculating the exclusive OR (XOR) of the information recorded on the remaining drives. Records typically span all drives, which optimizes the disk transfer rate. Because each I/O request accesses every drive in the array, RAID 3 arrays can satisfy only one I/O request at a time. RAID 3 delivers the best performance for single-user, single-tasking environments with long records. Synchronized-spindle drives are required for RAID 3 arrays in order to avoid performance degradation with short records. RAID 5 arrays with small stripes can yield similar performance to RAID 3 arrays.

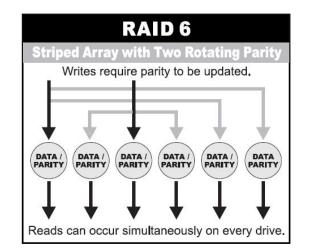


Under **RAID 5** parity information is distributed across all the drives. Since there is no dedicated parity drive, all drives contain data and read operations can be overlapped on every drive in the array. Write operations will typically access one data drive and one parity drive. However, because different records store their parity on different drives, write operations can usually be overlapped.



**Dual-level RAID** achieves a balance between the increased data availability inherent in RAID 1, RAID 3, RAID 5, or RAID 6 and the increased read performance inherent in disk striping (RAID 0). These arrays are sometimes referred to as RAID 10 (1E), RAID 30, RAID 50 or RAID 60.

**RAID 6** is similar to RAID 5 in that data protection is achieved by writing parity information to the physical drives in the array. With RAID 6, however, *two* sets of parity data are used. These two sets are different, and each set occupies a capacity equivalent to that of one of the constituent drives. The main advantage of RAID 6 is High data availability – any two drives can fail without loss of critical data.



#### In summary:

- RAID 0 is the fastest and most efficient array type but offers no fault-tolerance. RAID 0 requires a minimum of one drive.
- RAID 1 is the best choice for performance-critical, fault-tolerant environments. RAID 1 is the only choice for fault-tolerance if no more than two drives are used.
- RAID 3 can be used to speed up data transfer and provide fault-tolerance in singleuser environments that access long sequential records. However, RAID 3 does not allow overlapping of multiple I/O operations and requires synchronized-spindle drives to avoid performance degradation with short records. RAID 5 with a small stripe size offers similar performance.
- RAID 5 combines efficient, fault-tolerant data storage with good performance characteristics. However, write performance and performance during drive failure is slower than with RAID 1. Rebuild operations also require more time than with RAID 1 because parity information is also reconstructed. At least three drives are required for RAID 5 arrays.
- RAID 6 is essentially an extension of RAID level 5 which allows for additional fault tolerance by using a second independent distributed parity scheme (two-dimensional parity). Data is striped on a block level across a set of drives, just like in RAID 5, and a second set of parity is calculated and written across all the drives; RAID 6 provides for an extremely high data fault tolerance and can sustain multiple simultaneous drive failures. It is a perfect solution for mission critical applications.

# **RAID** Management

The subsystem can implement several different levels of RAID technology. RAID levels supported by the subsystem are shown below.

RAID Level	Description	Min. Drives
ο	Block striping is provide, which yields higher performance than with individual drives. There is no redundancy.	1
1	Drives are paired and mirrored. All data is 100% duplicated on an equivalent drive. Fully redundant.	2
3	Data is striped across several physical drives. Parity protection is used for data redundancy.	3
5	Data is striped across several physical drives. Parity protection is used for data redundancy.	3
6	Data is striped across several physical drives. Parity protection is used for data redundancy. Requires N+2 drives to implement because of two-dimensional parity scheme.	4
10 (1E)	Combination of RAID levels 1 and 0. This level provides striping and redundancy through mirroring. RAID 10 requires the use of an <u>even</u> <u>number</u> of disk drives to achieve data protection, while RAID 1E (Enhanced Mirroring) uses an <u>odd</u> <u>number</u> of drives.	4 (3)
30	Combination of RAID levels 0 and 3. This level is best implemented on two RAID 3 disk arrays with data striped across both disk arrays.	6
50	RAID 50 provides the features of both RAID 0 and RAID 5. RAID 50 includes both parity and disk striping across multiple drives. RAID 50 is best implemented on two RAID 5 disk arrays with data striped across both disk arrays.	6
60	<ul> <li>RAID 60 combines both RAID 6 and RAID 0</li> <li>features. Data is striped across disks as in RAID 0, and it uses double distributed parity as in</li> <li>RAID 6. RAID 60 provides data reliability, good overall performance and supports larger volume sizes.</li> <li>RAID 60 also provides very high reliability because data is still available even if multiple disk drives fail (two in each disk array).</li> </ul>	8

# 1.3 Array Definition

## 1.3.1 Raid Set

A Raid Set is a group of disk drives containing one or more logical volumes called Volume Sets. It is not possible to have multiple Raid Sets on the same disk drives.

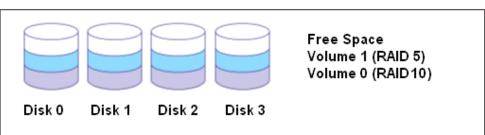
A Volume Set must be created either on an existing Raid Set or on a group of available individual disk drives (disk drives that are not yet a part of a Raid Set). If there are existing Raid Sets with available raw capacity, new Volume Set can be created. New Volume Set can also be created on an existing Raid Set without free raw capacity by expanding the Raid Set using available disk drive(s) which is/are not yet Raid Set member. If disk drives of different capacity are grouped together in a Raid Set, then the capacity of the smallest disk will become the effective capacity of all the disks in the Raid Set.

#### 1.3.2 Volume Set

A Volume Set is seen by the host system as a single logical device. It is organized in a RAID level with one or more physical disks. RAID level refers to the level of data performance and protection of a Volume Set. A Volume Set capacity can consume all or a portion of the raw capacity available in a Raid Set. Multiple Volume Sets can exist on a group of disks in a Raid Set. Additional Volume Sets created in a specified Raid Set will reside on all the physical disks in the Raid Set. Thus each Volume Set on the Raid Set will have its data spread evenly across all the disks in the Raid Set. Volume Sets of different RAID levels may coexist on the same Raid Set.

In the illustration below, Volume 1 can be assigned a RAID 5 level while Volume 0 might be assigned a RAID 10 level.





# 1.4 High Availability

# 1.4.1 Creating Hot Spares

A hot spare drive is an unused online available drive, which is ready to replace a failed disk drive. In a RAID level 1, 10, 3, 5, 6, 30, 50, or 60 Raid Set, any unused online available drive installed but not belonging to a Raid Set can be defined as a hot spare drive. Hot spares permit you to replace failed drives without powering down the system. When the RAID subsystem detects a drive failure, the system will do automatic and transparent rebuild using the hot spare drives. The Raid Set will be reconfigured and rebuilt in the background while the RAID subsystem continues to handle system request. During the automatic rebuild process, system activity will continue as normal, however, the system performance and fault tolerance will be affected.



**IMPORTANT**: The hot spare must have at least the same or more capacity as the drive it replaces.

## 1.4.2 Hot-Swap Disk Drive Support

The RAID subsystem has built-in protection circuit to support the replacement of SATA II hard disk drives without having to shut down or reboot the system. The removable hard drive tray can deliver "hot swappable" fault-tolerant RAID solution at a price much less than the cost of conventional SCSI hard disk RAID subsystems. This feature is provided in the RAID subsystem for advance fault tolerant RAID protection and "online" drive replacement.

## 1.4.3 Hot-Swap Disk Rebuild

The Hot-Swap feature can be used to rebuild Raid Sets with data redundancy such as RAID level 1, 10, 3, 5, 6, 30, 50 and 60. If a hot spare is not available, the failed disk drive must be replaced with a new disk drive so that the data on the failed drive can be rebuilt. If a hot spare is available, the rebuild starts automatically when a drive fails. The RAID subsystem automatically and transparently rebuilds failed drives in the background with user-definable rebuild rates. The RAID subsystem will automatically continue the rebuild process if the subsystem is shut down or powered off abnormally during a reconstruction process.

# Chapter 2 Identifying Parts of the RAID Subsystem

- 2.1 Main Components
- 2.1.1 Front View



Slot 6 • Slot 7 • Slot 8 •

#### 2.1.1.1 Disk Trays



#### **HDD Status Indicator**

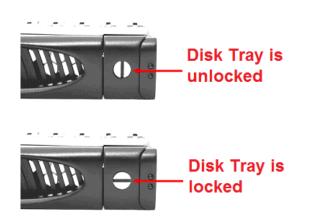


Part	Function
HDD Activity LED	This LED will blink blue when the hard drive is being accessed.
HDD Fault LED	Green LED indicates power is on and hard drive status is good for this slot. If there is no hard drive, the LED is off. If hard drive defected in this slot or the hard drive is failure, the LED is blinking red.

#### Lock Indicator

Every Disk Tray is lockable and is fitted with a lock indicator to indicate whether or not the tray is locked into the chassis or not. Each tray is also fitted with an ergonomic handle for easy tray removal.

When the Lock Groove is horizontal, this indicates that the Disk Tray is locked. When the Lock Groove is vertical, then the Disk Tray is unlocked.



# 2.1.1.2 Smart Panel



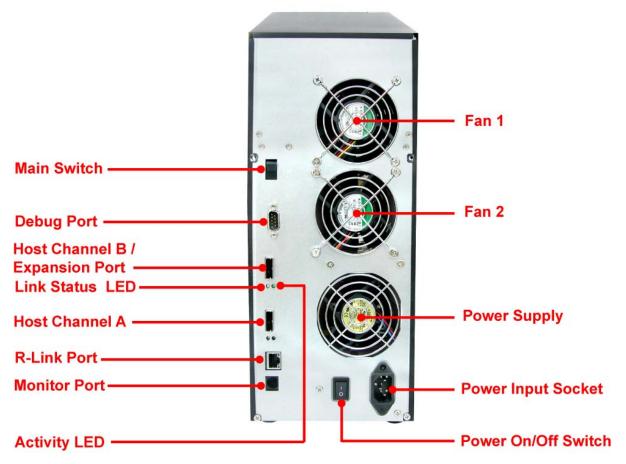
## **Smart Function Keys**

PARTS	FUNCTION	
Up and Down Arrow buttons	Use the Up or Down arrow keys to go through the information on the LCD screen. This is also used to move between each menu when you configure the subsystem.	
Select button	This is used to enter the option you have selected.	
Exit button <b>EXIT</b>	Press this button to return to the previous menu. NOTE: This button can also be used to reset the alarm beeper.	

#### **Environment Status LEDs**

Parts	Function
Disk Fault and Warning LED	If temperature irregularity in these systems occurs (CPU temperature over 90°C; Controller temperature over 70°C) or disk fault, this LED will turn red and an alarm will sound.
Access LED	Blue blinking LED indicates system is busy or data is being accessed.
Power LED	Green LED indicates power is on.

## 2.1.2 Rear View



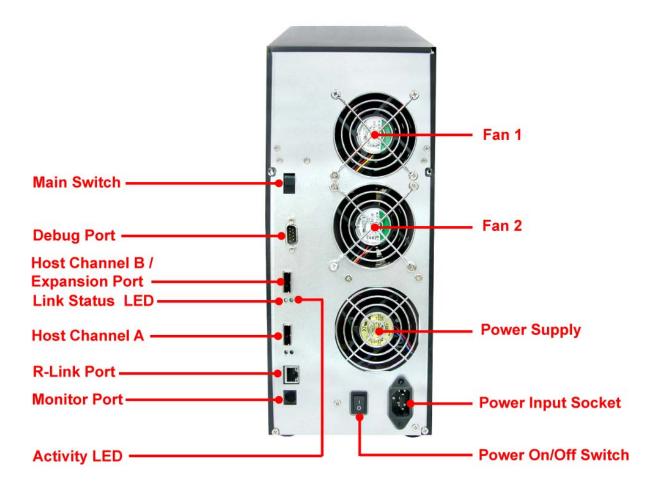
Part	Description	
Host Channel A, B	Two host channels (A and B/ Expansion) are available and can be use to connect to SAS HBA on the Host system, or to connect to SAS switch. Host channel B can be set as Host Post or Expansion Port.	
Debug Port	Use to check controller debug messages.	
Monitor Port	Use to manage the RAID subsystem via serial terminal console.	
R-Link Port	Use to manage the RAID subsystem via network and web browser.	

Indicator LED	Description	
Link Status LED	Green indicates Host Channel has connected or linked.	
Activity LED	Blue indicates the Host Channel is busy and being accessed.	

# Chapter 3 Getting Started with the Subsystem

# 3.1 Preparing the RAID Subsystem and Powering On

Here are the steps to prepare the RAID subsystem for use.



- 1. Attach network cable to the R-Link port and connect the other end of network cable to your network hub/switch. Or as alternative for configuration, you may connect the serial cable to the Monitor port and to the serial port of your host/server.
- 2. Connect the SAS cable(s) to the SAS Host Channel(s) of the RAID subsystem and to the SAS switch or SAS HBA on host/server.
- 3. Connect the power cord to the AC input socket. Plug the other end of power cord to the power source.
- 4. Press on the Power Switch.

# 3.2 Disk Drive Installation

This section describes the physical locations of the hard drives supported by the subsystem and give instructions on installing a hard drive. The subsystem supports hot-swapping allowing you to install or replace a hard drive while the subsystem is running.

a. Make sure the Lock Groove is in unlocked position. Press the button and the Drive Carrier handle will flip open.



b. Pull out an empty disk tray. Pull the handle outwards to remove the carrier from the enclosure.



c. Place the hard drive in the disk tray. Make sure the holes of the disk tray align with the holes of the hard drive.



d. Install the mounting screws on the bottom part to secure the drive in the disk tray.



- e. Slide the tray into a slot until it reaches a full stop.
- f. Press the lever in until you hear the latch click into place.



# Chapter 4 RAID Configuration Utility Options

#### **Configuration Methods**

There are four methods of configuring the RAID controller:

- a. VT100 terminal connected through the serial Monitor port
- b. Front panel touch-control buttons
- c. Web browser-based remote RAID management via the R-Link Ethernet port
- d. Telnet connection via the R-Link Ethernet port



NOTE: The RAID subsystem allows you to access using only one method at a time. You cannot use more than one method at the same time.

# 4.1 Configuration through Terminal

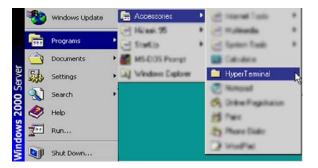
Configuring through a terminal will allow you to use the same configuration options and functions that are available from the LCD panel and via Telnet. To start-up:

1. Connect the Monitor port located at the rear of the system to another PC or a VT100 compatible terminal operating in an equivalent terminal emulation mode using serial cable.



NOTE: You may connect a terminal while the system's power is on.

- 2. Power-on the terminal.
- 3. Run the VT100 program or an equivalent terminal program.

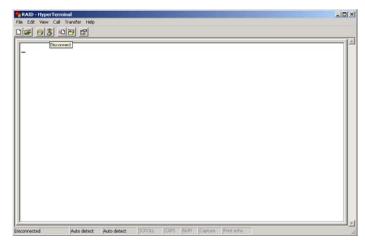


onnection Description	? ×
New Connection	
Enter a name and choose an icon for the con Name:	nection:
RAID	
ion 🔁 🗟 🌭 🖳 🚳	
OK	Cancel
Connect To	?×
RAID	
Enter details for the phone number that yo	u want to dial:
Country code: United States of America	ə (1) 👻
Arga code: 02	
Phone number:	
Connect using: Direct to Com1	

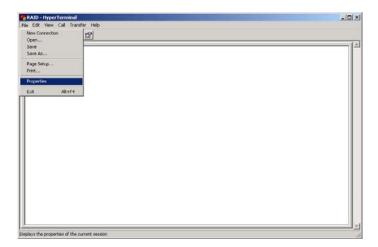
4. The default setting of the monitor port is 115200 baud rate, 8 data bit, non-parity, 1 stop bit and no flow control.

t Settings	
Bits per second: 115200	<u>×</u>
Data bits: 8	<u>×</u>
Earity: None	
Stop bits: 1	-
Elow control None	•
<u>A</u> dvanced	<u>R</u> estore Defaults

5. Click Sisconnect button.



6. Open the File menu, and then open Properties.



7. Open the Settings Tab.

RAID Properties	<u>1×</u>	
Connect To Settings		
RAID Ch	nge Icon	
Country/region: United States of Ameri		
Enter the area code without the long dist	ance prefix.	
Area code: 02 Phone number:		
Connect using: COM1		
Configure		
Use countri/region code and area o		
F Redel on those		
	K. Cancel	

- 8. Configure the settings as follows:
  - "Function, arrow and ctrl keys act as": Terminal Keys
  - "Backspace key sends": Crtl + H
  - "Emulation": VT100
  - "Telnet terminal ID": VT100
  - "Back scroll buffer lines": 500
  - Click OK.

RAID Properties	IN
Connect To Settings Function, arow, and oth keys act as C Tennical Laws C Windows Keys Backspace keys sends C Deli C Del C Datett, Space, Datett Emulation: Tennical Setting: Tennical Setting: Tennical Setting: Play sound when connecting or disconnecting Inguit Transiston. ASCII Setup.	
OK	ancel

- 9. Now, the VT100 is ready to use. After you have finished the VT100 Terminal setup, you may press the "X" key (in your Terminal) to link the RAID subsystem and Terminal together. Press "X" key to display the disk array Monitor Utility screen on your VT100 Terminal.
- 10. The Main Menu will appear.

RAID-HyperTe ile Edit <u>V</u> iew C	erminal Jall <u>T</u> ransfer <u>H</u> elp						_0
12 23							
		{Model Nar	ne} RAID C	Controller			
+ 	Main Menu						
	Quick Volume/Rai Raid Set Functio Volume Set Funct Physical Drives Raid System Func Ethernet Configu View System Even Clear Event Buff Hardware Monitor System Informati	n ion tion ration ts er					
ArrowKe	ey Or AZ:Move Cu	rsor, Ente	er:Select,	E\$C:Esca	pe, L:Line	Draw, X:Re	draw .
nnected 0:00:43	VT100 115200	B-N-1 SCROLL	CAPS NUM	Capture Prin	it echo		

#### **Keyboard Function Key Definitions**

"A" key - to move to the line above
"Z" key - to move to the next line
"Enter" key - Submit selection function
"ESC" key - Return to previous screen
"L" key - Line draw
"X" key - Redraw

#### Main Menu

The main menu shows all function that enables the customer to execute actions by clicking on the appropriate link.

<b>&amp; RAID - HyperTerminal</b> File Edit View Call Transfer Help	
{Model Name} RA	ID Controller
Hain Menu	
Ouick Volume/Raid SetupRaid Set FunctionVolume Set FunctionPhysical DrivesRaid System FunctionEthernet ConfigurationView System EventsClear Event BufferHardware MonitorSystem Information	<pre> • • Verify Password • • • • • • • • • • • • • • • • •</pre>
ArrowKey Or AZ: Move Cursor, Enter:Sel	ect, ESC:Escape, L:Line Draw, X:Redraw



NOTE: The password option allows user to set or clear the RAID subsystem's password protection feature. Once the password has been set, the user can only monitor and configure the RAID subsystem by providing the correct password. The password is used to protect the RAID subsystem from unauthorized access. The controller will check the password only when entering the Main menu from the initial screen. The RAID subsystem will automatically go back to the initial screen when it does not receive any command in twenty seconds. The RAID subsystem's factory default password is set to 0000000.

### VT100 terminal configuration Utility Main Menu Options

Select an option and the related information or submenu items display beneath it. The submenus for each item are shown in Section 4.2.1. The configuration utility main menu options are:

Option	Description
Quick Volume And Raid Set Setup	Create a RAID configuration which consists of all physical disks installed
Raid Set Functions	Create a customized Raid Set
Volume Set Functions	Create a customized Volume Set
Physical Drive Functions	View individual disk information
Raid System Functions	Setting the Raid system configurations
Ethernet Configuration	Setting the Ethernet configurations
Views System Events	Record all system events in the buffer
Clear Event Buffer	Clear all event buffer information
Hardware Monitor	Show all system environment status
System Information	View the controller information

# 4.2 Configuration through the LCD Panel

All configurations can be performed through the LCD Display front panel function keys, except for the "Firmware update". The LCD provides a system of screens with areas for information, status indication, or menus. The LCD screen displays menu items or other information up to two lines at a time. The RAID controller's factory default password is set to **00000000**.

#### **Function Key Definitions**

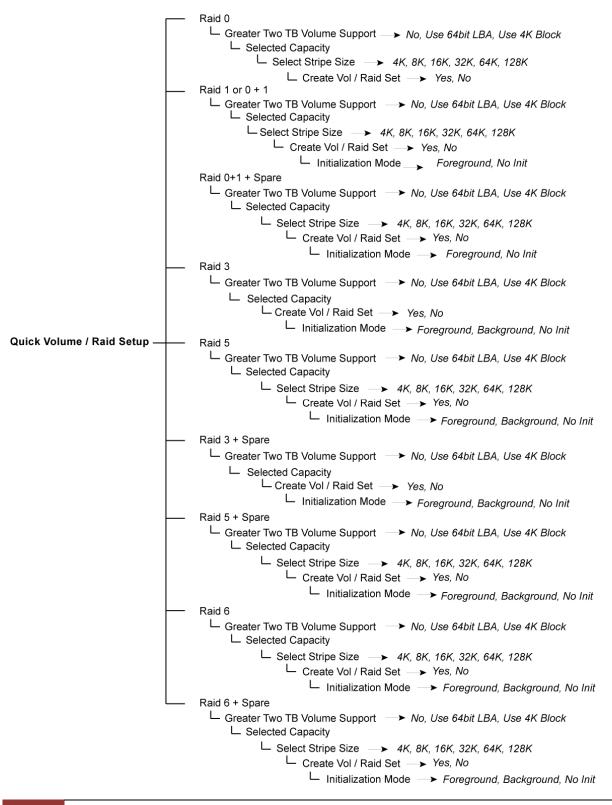
The four function keys at side of the front panel perform the following functions:

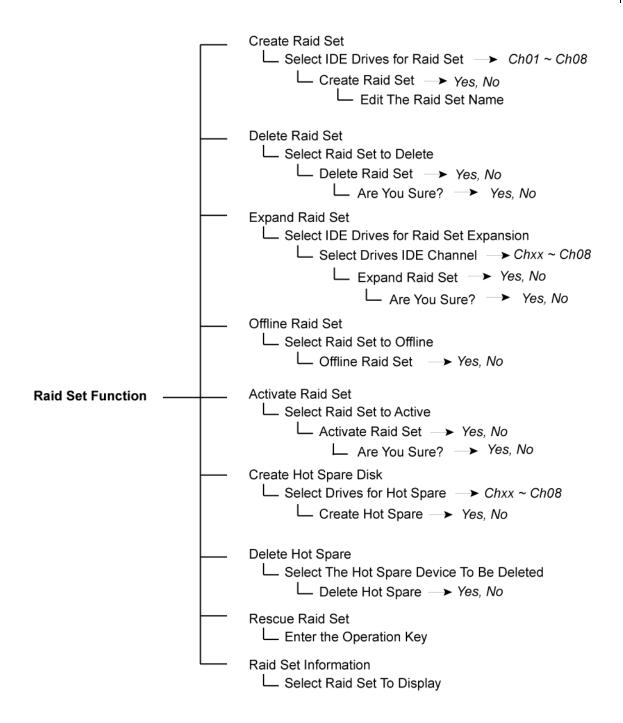


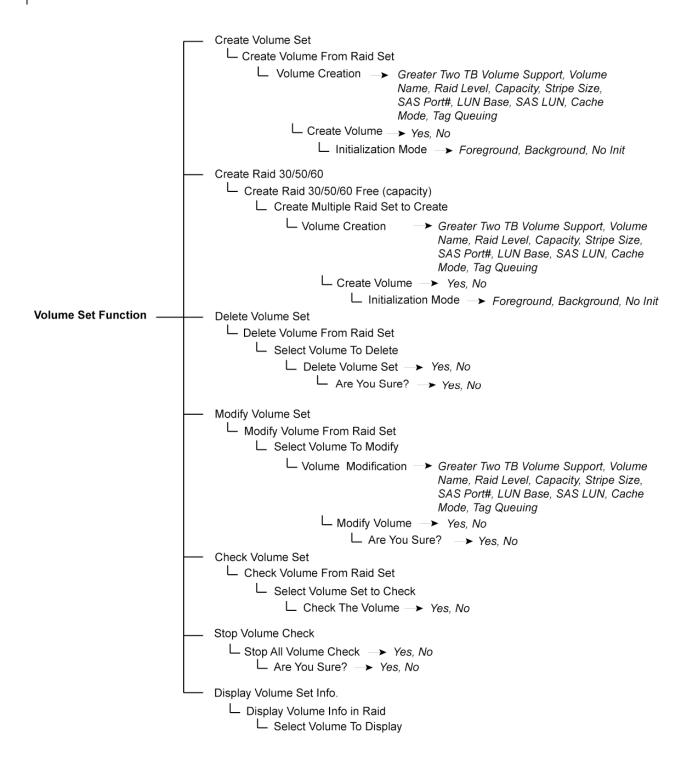
Parts	Function		
Up and Down Arrow buttons	Use the Up or Down arrow keys to go through the information on the LCD screen. This is also used to move between each menu when you configure the subsystem.		
Select button	This is used to enter the option you have selected.		
Exit button <b>EXIT</b>	Press this button to return to the previous menu. NOTE: This button can also be used to reset the alarm beeper.		

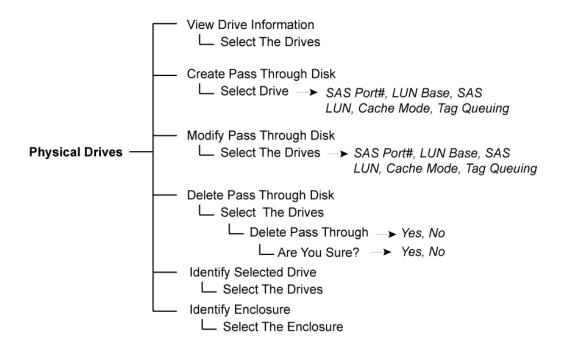
# 4.2.1 Menu Diagram

The following menu diagram is a summary of the various configurations and setting functions that can be accessed through terminal. The LCD panel menus also have similar functions except Update Firmware.

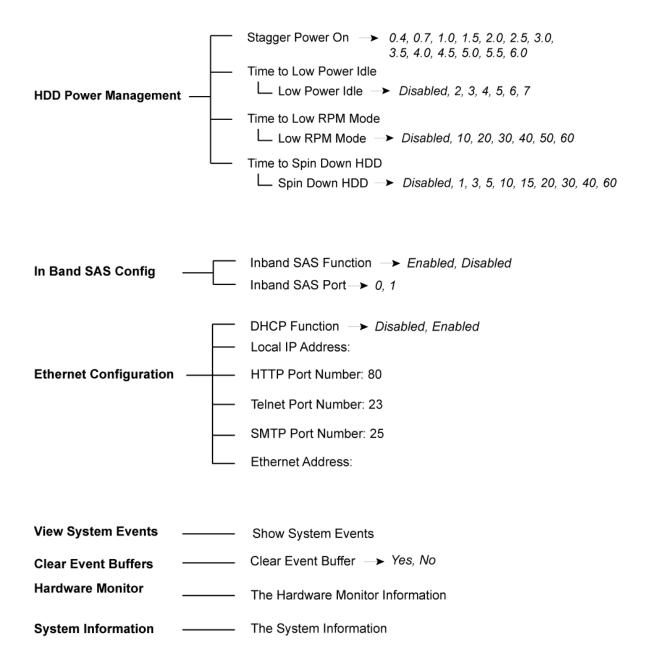








		Mute The Alert Beeper -> Yes, No
	<u> </u>	Alert Beeper Setting> Disabled, Enabled
		└── Save The Settings <i>─</i> ► <i>Yes, No</i>
		Change Password
		L Enter New Password
		Re-Enter Password
		└── Save The Password → Yes, No
		JBOD / RAID Function
		└── Configured AS JBOD? —► Yes, No
		└── Are You Sure? → Yes, No
		Background Task Priority —> UltraLow(5%), Low(20%) Medium(50%), High(80%)
Raid System Function ——	-	└── Save The Settings <i>─</i> ▶ <i>Yes, No</i>
	<u> </u>	SATA NCQ Support — <i>Enable, Disable</i>
	<u> </u>	HDD Read Ahead Cache —> Enable, Disable Maxtor, Disable
	<u> </u>	Volume Data Read Ahead> Normal, Aggressive, Conservative, Disabled
	<u> </u>	HDD Queue Depth Setting -> 1, 2, 4, 8, 16, 32
	<u> </u>	Controller Fan Detection — <i>Disabled, Enabled</i>
		L Save the Settings ➤ Yes, No
		SAS Port1 Configuration
		L JBOD Port, Host Port
	<u> </u>	Disk Write Cache Mode — Auto, Enabled, Disabled
		Capacity Truncation -> To Multiples of 10G, To Mulitples of 1G, Disabled
	<u> </u>	Update Firmware
	<u> </u>	Shutdown Controller
		└── Confirm Shutdown  →> Yes, No
		└── Are You Sure → <i>Yes, No</i>
		Restart Controller
		└── Confirm Reset → <i>Yes, No</i>
		└── Are You Sure → <i>Yes, No</i>



## 4.3 Configuration through web browser-based proRAID Manager

The RAID subsystem can be remotely configured via R-Link port with proRAID Manager, a web browser-based application. The proRAID Manager can be used to manage all available functions of the RAID controller.

To configure the RAID subsystem from a remote machine, you need to know its IP Address. Launch your web browser from remote machine and enter in the address bar: http://[IP Address].



IMPORTANT! The default IP address of the Controller R-Link Port is 192.168.1.100, and subnet mask is 255.255.255.0. DHCP client function is also enabled by default. You can reconfigure the IP Address or disable the DHCP client function through the LCD front panel or terminal "Ethernet Configuration" menu.



NOTE: If DHCP client function is enabled but a DHCP server is unavailable and the IP address is changed, a Controller Restart is necessary. If the DHCP client function is disabled and the IP address is changed, Controller Restart is not needed.

Note that you may need to be logged in as administrator with local admin rights on the remote machine to remotely configure the RAID subsystem. The RAID subsystem controller default User Name is "admin" and the Password is "00000000".

open all close all										
Raid System Console	RaidSet H	RaidSet Hierarchy								
Quick Function	RAID Set	Devices	; Vo	lume Set(Port/Lun)	Volume State	Capacity				
RAID Set Functions	Raid Set #	000 <u>E#1Slot</u> :	#1 Vo	umeVOL#000(1/0)	Normal	511.0GB				
Volume Set Functions		E#1Slot	<u>#2</u>							
Physical Drives     System Controls     Information     KAID Set Hierarchy     System Information     Hardware Monitor		E#1Slot:	#3		2					
		E#1Slot	≠4							
		E#1Slot								
		E#1Slot:								
		E#1Slot	#7		1					
		E#1Slot								
	• Enclosure Device		<u>#8</u>	V1.0						
	Device	E#1Slot:	#8Subsystem	1						
	Device Slot#1(11)	E#1Slot: e#1 : SAS RAID : Usage	#8 Subsystem	Model						
	Device <u>Slot#1(11)</u> <u>Slot#2(12)</u>	E#1Slot: e#1:SAS RAID : Usage Raid Set # 000	<ul> <li>Subsystem</li> <li>Capacity</li> <li>73.5GB</li> </ul>	Model FUJITSU MBA3073RC						
	Device <u>Slot#1(11)</u> <u>Slot#2(12)</u> <u>Slot#3(13)</u>	E#1Slot: e#1: SAS RAID : Usage Raid Set # 000 Raid Set # 000	<ul> <li><u>Capacity</u></li> <li>73.5GB</li> <li>73.5GB</li> </ul>	FUJITSU MBA3073RC FUJITSU MBA3073RC						
	Device <u>Slot#1(11)</u> <u>Slot#2(12)</u> <u>Slot#3(13)</u> <u>Slot#4(14)</u>	E#1Slot: e#1:SAS RAID Usage Raid Set # 000 Raid Set # 000 Raid Set # 000	±8         Capacity           73.5GB         73.5GB           73.5GB         73.5GB	Model FUJITSU MBA3073RC FUJITSU MBA3073RC FUJITSU MBA3073RC						
	Device <u>Slot#1(11)</u> <u>Slot#2(12)</u> <u>Slot#3(13)</u> <u>Slot#4(14)</u> <u>Slot#5(15)</u>	E#1Slot: Usage Raid Set # 000 Raid Set # 000 Raid Set # 000 Raid Set # 000	#8         Capacity           73.5GB         73.5GB           73.5GB         73.5GB           73.5GB         73.5GB	Model FUJITSU MBA3073RC FUJITSU MBA3073RC FUJITSU MBA3073RC FUJITSU MBA3073RC						
	Device Slot#1(11) Slot#2(12) Slot#3(13) Slot#4(14) Slot#5(15) Slot#6(16)	E#1Slot: Usage Raid Set # 000 Raid Set # 000 Raid Set # 000 Raid Set # 000 Raid Set # 000	≠8         Capacity           73.5GB         73.5GB           73.5GB         73.5GB           73.5GB         73.5GB           73.5GB         73.5GB	Model FUJITSU MBA3073RC FUJITSU MBA3073RC FUJITSU MBA3073RC FUJITSU MBA3073RC FUJITSU MBA3073RC						

#### Main Menu

The main menu shows all available function that user can execute by clicking on the appropriate hyperlink.

Individual Category	Description
Quick Function	Create a RAID configuration, which consists of all physical disks installed. The Volume Set Capacity, Raid Level, and Stripe Size can be modified during setup.
Raid Set Functions	Create customized Raid Sets.
Volume Set Functions	Create customized Volume Sets and allow modification of parameters of existing Volume Sets parameter.
Physical Drive	Create pass through disks and allow modification of parameters of existing pass through drives. This also provides a function to identify a disk drive.
System Control	For setting the RAID system configurations.
Information	To view the controller and hardware monitor information. The Raid Set hierarchy can also be viewed through the Raid Set Hierarchy item.

# Chapter 5 RAID Management

### 5.1 Quick Function

### 5.1.1 Quick Create

The number of physical drives in the RAID subsystem determines the RAID levels that can be implemented with the Raid Set. This feature allows user to create a Raid Set associated with exactly one Volume Set. User can change the Raid Level, Capacity, Volume Initialization Mode and Stripe Size. A hot spare can also be created depending upon the existing configuration.

If the Volume Set size is over 2TB, an option "Greater Two TB Volume Support" will be automatically provided in the screen as shown in the example below. There are three options to select: "No", "64bit LBA", and "4K Block").

proRAID <i>M</i> anager	xxxxxxxx	XXX				
open all close all  🔗						
Raid System Console	Quick Create Raid/Volum	ne Set				
P G Quick Function	Total Number Of Disks	8				
Quick Create	Select Raid Level	Raid 5 + Spare 💌				
⊕	Maximum Capacity Allowed	6000 GB				
Physical Drives	Select Capacity	6000 GB				
⊕- Gystem Controls ⊡- Guinformation	Greater Two TB Volume Support	No				
	Volume Initialization Mode	Foreground Initialization				
	Select Stripe Size	64 🕶 KBytes				
	🗖 Confirm The Operation					
	Submit Reset					

#### Greater Two TB Volume Support:

No: Volume Set capacity is set to maximum 2TB.

**64bit LBA**: Use this option for UNIX, Linux 2.6, and Windows Server 2003 + SP1 or later versions. The maximum Volume Set size is up to 512TB.

**4K Block**: Use this option for Windows OS such as Windows 2000, 2003, or XP. The maximum Volume Set size is 16TB. Just use the Volume as "Basic Disk". Volume can't be used as "Dynamic Disk"; also can't be used in 512Bytes block service program.

Tick on the **Confirm The Operation** option and click on the **Submit** button in the Quick Create screen. The Raid Set and Volume Set will start to initialize.

You can use **RaidSet Hierarchy** feature to view the Volume Set information (Refer to Section 5.6.1).



NOTE: In Quick Create your Raid Set is automatically configured based on the number of disks in your system. Use the Raid Set Function and Volume Set Function if you prefer to customize the Raid Set and Volume Set.

## 5.2 RAID Set Functions

Use the Raid Set Function and Volume Set Function if you prefer to create customized Raid Sets and Volume Sets. User can manually configure and take full control of the Raid Set settings, but it will take a little longer to setup than the Quick Create configuration. Select the Raid Set Function to manually configure the Raid Set for the first time or to delete existing Raid Set and reconfigure a Raid Set.

### 5.2.1 Create RAID Set

open all close all  🗠								
Raid System Console	Select The Drives For RAID Set							
Quick Function	Enclosure#1 : SAS RAID Subsystem V1.0							
RAID Set Functions		Slot#1	1000.2GB	WDC WD10EARS-00Y5B1				
Create RAID Set     Delete RAID Set		Slot#2	1000.2GB	WDC WD10EARS-00Y5B1				
Expand RAID Set	V	Slot#3	1000.2GB	WDC WD10EARS-00Y5B1				
Offline RAID Set Activate Incomplete RAID S	Г	Slot#4	1000.2GB	WDC WD10EARS-00Y5B1				
Create Hot Spare	Г	Slot#5	1000.2GB	WDC WD10EARS-00Y5B1				
Delete Hot Spare Rescue Raid Set	Г	Slot#6	1000.2GB	WDC WD10EARS-00Y5B1				
Olume Set Functions	Rai	d Set Name	Raid Set#	000				
∃- Physical Drives ∃- System Controls ∃- Information		Confirm The Jbmit Rese						

To create a Raid Set, click on the **Create RAID Set** link. A "Select The Drives For RAID Set" screen is displayed showing the disk drives in the system. Tick the box of each disk drive that will be included in Raid Set to be created. Enter the preferred Raid Set Name (1 to 16 alphanumeric characters) to define a unique identifier for the Raid Set. The default Raid Set name will always appear as **Raid Set # xxx**.

Tick on the **Confirm The Operation** option and click on the **Submit** button in the screen.

### 5.2.2 Delete RAID Set

To delete a Raid Set, click on the **Delete RAID Set** link. A "Select The RAID SET To Delete" screen is displayed showing all Raid Sets existing in the system. Select the Raid Set you want to delete in the Select column.

Tick on the **Confirm The Operation** and click on the **Submit** button to process with deletion.

open all close all					
Raid System Console	<ul> <li>Select</li> </ul>	t The Raid S	et To Delete	6	
Quick Function	Select	Raid Set Name	Member Disks	Raid State	Capacity
Create RAID Set	e	Raid Set # 000	4/4	Normal	4000.0GB
Expand RAID Set     Offline RAID Set     Activate Incomplete RAID S     Create Hot Spare     Delete Hot Spare     Rescue Raid Set     Volume Set Functions     Physical Drives     System Controls     Information	Con Deleted Submit	1	eration, Volu	umeSet In This	s RaidSet Will Also Be



NOTE: You cannot delete a Raid Set containing a Raid 30/50/60 Volume Set. You must delete the Raid 30/50/60 Volume Set first.

## 5.2.3 Expand RAID Set

Use this option to expand a Raid Set, when one or more disk drives is/are added to the system. This function is active when at least one drive is available.

Raid System Console	<ul> <li>Selection</li> </ul>	t The Raid Set Fo	or Raid Expansio	n		
Duick Function	Select	Raid Set Name	Member Disks	Raid State	Capacity	
Create RAID Set	۹	Raid Set # 000	3/3	Normal	3000.0GB	
Delete RAID Set     Expand RAID Set     Offline RAID Set	Submit	Reset				
Activate Incomplete RAID S     Create Hot Spare						
Delete Hot Spare						
Volume Set Functions						
Dives						
System Controls						

To expand a Raid Set, click on the **Expand RAID Set** link. Select the Raid Set which you want to expand.

Tick on the available disk(s) and check **Confirm The Operation**. Click on the **Submit** button to add the selected disk(s) to the Raid Set.

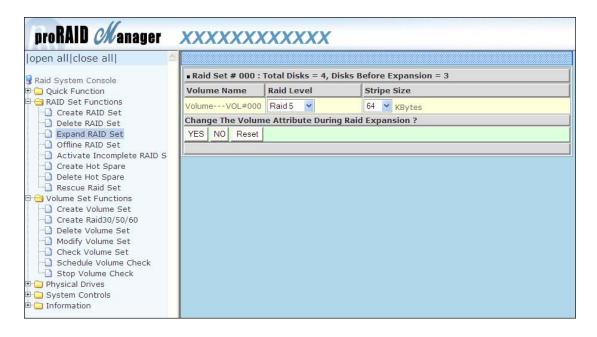


NOTE: Once the Expand Raid Set process has started, user cannot stop it. The process must be completed.



NOTE: If a disk drive fails during Raid Set expansion and a hot spare is available, an auto rebuild operation will occur after the Raid Set expansion is completed.

open all close all								
Raid System Console	• RAID Expan	RAID Expansion on : Raid Set # 000 ; Member Disks : 3						
Quick Function	Enclosure#	Enclosure#1 : SAS RAID Subsystem V1.0						
RAID Set Functions	Slot#4	1000.2GB	WDC WD10EARS-00Y5B1					
Delete RAID Set	Slot#5	1000.2GB	WDC WD10EARS-00Y5B1					
Expand RAID Set	□ Slot#6	1000.2GB	WDC WD10EARS-00Y5B1					
Offline RAID Set     Activate Incomplete RAID S     Create Hot Spare     Delete Hot Spare     Rescue Raid Set     Volume Set Functions     Physical Drives     System Controls     Information     RAID Set Hierarchy     System Information     Hardware Monitor	Submit Re	he Operation set						



Migration occurs when a disk is added to a Raid Set. Migrating status is displayed in the Raid Set status area of the Raid Set information. Migrating status is also displayed in the Volume Set status area of the Volume Set Information for all Volume Sets under the Raid Set which is migrating.



NOTE: A Raid Set cannot be expanded if it contains a Raid 30/50/60 Volume Set.

### 5.2.4 Offline RAID Set

If user wants to offline (and move) a Raid Set while the system is powered on, use the Offline Raid Set function. After completing the function, the HDD state of RAID Set member drives will change to "Offlined" Mode and the HDD Status LEDs will be blinking RED.

To offline a Raid Set, click on the **Offline RAID Set** link. A "Select The RAID SET To Offline" screen is displayed showing all existing Raid Sets in the subsystem. Select the Raid Set which you want to offline in the Select column.

Tick on the **Confirm The Operation**, and then click on the **Submit** button.

open all close all	*							
Raid System Console	• Select	Select The Raid Set To Offline						
🗉 🔁 Quick Function	Select	Raid Set Name	Member Disks	Raid State	Capacity			
Create RAID Set	e	Raid Set # 000	8/8	Normal	8001.6GB			
Delete RAID Set								
- Expand RAID Set		Confirm The Operation, VolumeSet In This RaidSet Will Also Be Offlined						
Offline RAID Set     Activate Incomplete RAID S	Submit	Reset						
Create Hot Spare								
Delete Hot Spare								
Rescue Raid Set								
Volume Set Functions								
🔁 Physical Drives								
System Controls								
Information								
-								
-								

### 5.2.5 Activate Incomplete RAID Set

Raid Set Information	
Raid Set Name	Raid Set # 000
Member Disks	3
Total Raw Capacity	247.0GB
Free Raw Capacity	0.0GB
Min Member Disk Size	82.3GB
Raid Set Power State	Operating
Raid Set State	Normal

When Raid Set State is "**Normal**", this means there is no failed disk drive.

#### When does "Incomplete" Raid Set State Happens?

If the RAID subsystem is powered off and one disk drive is removed or has failed in power off state, and when the subsystem is powered on, the Raid Set State will change to "Incomplete".

Raid Set Information	
Raid Set Name	Raid Set # 000
Member Disks	3
Total Raw Capacity	247.0GB
Free Raw Capacity	247.0GB
Min Member Disk Size	82.3GB
Raid Set Power State	Operating
Raid Set State	Incomplete

The Volume Set will not be visible and the failed or removed disk will be shown as "**Missing**". At the same time, the Host system will not detect the Volume Set, hence the volumes are not accessible.

#### When can the "Activate Incomplete RAID Set" function be used?

In order to access the Volume Set and corresponding data, use the **Activate Incomplete RAID Set** function to active the Raid Set. After selecting this function, the Raid State will change to "**Degraded**" state.

To activate the incomplete the Raid Set, click on the **Activate Incomplete RAID Set** link. A "Select The Raid Set To Activate" screen is displayed showing all existing Raid Sets in the subsystem. Select the Raid Set with "**Incomplete**" state which you want to activate in the Select column.

Raid System Console	<ul> <li>Selection</li> </ul>	t The Raid Set To	Activate		
Quick Function	Select	Raid Set Name	Member Disks	Raid State	Capacity
🗃 😋 RAID Set Functions	0	Raid Set # 000	2/3	Incomplete	247.0GB
Delete RAID Set     Expand RAID Set     Offline RAID Set     Offline RAID Set     Offline RAID Set     Offline RAID Spare     Delete Hot Spare     Delete Hot Spare     Rescue Raid Set     Volume Set Functions     Physical Drives     System Controls     Information	Submit	Reset			

Click on the **Submit** button to activate the Raid Set. The Volume Set(s) associated with the Raid Set will become accessible in "**Degraded**" mode.



NOTE: The "Activate Incomplete RAID Set" function is <u>only</u> used when Raid Set State is "Incomplete". It cannot be used when Raid Set configuration is lost. In case Raid Set configuration is lost, contact your vendor for support.

### 5.2.6 Create Hot Spare

When you choose the **Create Hot Spare** option in the Raid Set Function, all unused (non Raid Set member) disk drives in the subsystem appear. Select the target disk drive by clicking on the appropriate check box. Select the Hot Spare Type. Tick on the **Confirm The Operation** and click on the **Submit** button to create hot spare drive(s).

proRAID <i>M</i> anager	EF	<b>P-T80</b> 3	8-565	6				
open all close all  🧧								
🕄 Raid System Console	• S	Select The Drives For Hot Spare						
🖻 😋 Quick Function	• E	Enclosure#1 : ARECA RAID Subsystem V1.0						
Quick Create	7	Slot#7	73.5GB	FUJITSU MBA3073RC				
Create RAID Set	Γ	Slot#8	73.5GB	FUJITSU MBA3073RC				
Delete RAID Set	Sel	lect The Hot S	pare Type	Global Hot Spare				
Delete RAID Set     Expand RAID Set     Offline RAID Set     Activate Incomplete RAID S     Create Hot Spare     Delete Hot Spare     Rescue Raid Set     Volume Set Functions     Physical Drives     System Controls	Select The Hot Spare Type Confirm The Operation Submit Reset			Global Hot Spare Dedicated To RaidSet Dedicated To Enclosure				

Hot Spare Type	Description
Global Hot Spare	The Hot Spare disk is a hot spare on all enclosures connected in daisy chain. It can replace any failed disk in any enclosure.
Dedicated to RaidSet	The Hot Spare disk is a hot spare dedicated only to the RaidSet where it is assigned. It can replace any failed disk in the RaidSet where it is assigned.
Dedicated to Enclosure	The Hot Spare disk is a hot spare dedicated only to the enclosure where it is located. It can replace any failed disk on the enclosure where it is located.



NOTE: The Hot Spare Type can also be viewed by clicking on Raid Set Hierarchy in the Information menu.

open all close all  🧉						
😨 Raid System Console	RaidSe	t Hierarchy				
Cuick Function	RAID Set	Device:	s V	olume Set(Port/Lun)	Volume State	Capacit
RAID Set Functions	Raid Set	# 000 E#1Slot	#3			
Create RAID Set     Delete RAID Set		E#1Slot	#4			
- Expand RAID Set		E#1Slot	#5			
Offline RAID Set						
Activate Incomplete RAID S Create Hot Spare	chacterianae.	and the second	anananan			aasaasaasaasaasaasaa Aasaasaasaasaasaasaa
Delete Hot Spare	Enclose	Jre#1 : ARECA R	1	7		
Rescue Raid Set	Device	Usage	Capacity	Model		
Volume Set Functions Physical Drives	<u>Slot#1</u> (18)	Hot Spare	73.5GB	FUJITSU MBA3073RC	[Global]	
🗄 🗀 System Controls 🗃 🔁 Information	<u>Slot#2</u> (17)	Hot Spare	73.5GB	FUJITSU MBA3073RC	[Enclosure]	
RAID Set Hierarchy     System Information	<u>Slot#3</u> (16)	Raid Set # 000	73.5GB	FUJITSU MBA3073RC		
Hardware Monitor	<u>Slot#4</u> (15)	Raid Set # 000	73.5GB	FUJITSU MBA3073RC		
	Slot#5 (14)	Raid Set # 000	73.5GB	FUJITSU MBA3073RC		
	Slot#6 (13)	Hot Spare	73.5GB	FUJITSU MBA3073RC	[Raid Set # 000 ]	
	Slot#7 (12)	Hot Spare	73.5GB	FUJITSU MBA3073RC	[Global]	
	Slot#8 (11)	Free	73.5GB	FUJITSU MBA3073RC		

### 5.2.7 Delete Hot Spare

Select the target Hot Spare disk(s) to delete by clicking on the appropriate check box.

Tick on the **Confirm The Operation**, and click on the **Submit** button in the screen to delete the hot spare(s).

open all close all  🖉				
Raid System Console	Select The H	ot Spare Driv	ve To Delete	
Quick Function	Enclosure#1	: ARECA RA	ID Subsystem V1.0	
RAID Set Functions     Create RAID Set	Slot#1	73.5GB	FUJITSU MBA3073RC [Global]	
Delete RAID Set	Slot#2	73.5GB	FUJITSU MBA3073RC [Enclosure]	
Expand RAID Set	Slot#6	73.5GB	FUJITSU MBA3073RC [Raid Set # 000 ]	
Offline RAID Set     Activate Incomplete RAID S	Slot#7	73.5GB	FUJITSU MBA3073RC [Global]	
Possulo Paid Sot	Confirm Th Submit Rese	1		

### 5.2.8 Rescue Raid Set

If you need to recover missing Raid Set configuration using the "Rescue Raid Set" function, please contact your vendor's support engineer for assistance.

open all close all  *	
Raid System Console	Try To Rescue Missing RAIDSET
Quick Function	Enter 'RESCUE' To Try To Recover Missing RaidSet
AID Set Functions	Enter 'SIGNAT' To Regenerate RaidSet Signature If RaidSet Is Recovered
Create RAID Set  Cleate RAID Set  Cleat	Enter The Keyword
Offline RAID Set	Confirm The Operation
Activate Incomplete RAID S     Create Hot Spare	Submit Reset
Delete Hot Spare	
Rescue Raid Set	
Colume Set Functions	
System Controls	
information	

## 5.3 Volume Set Function

Volume Set is seen by the host system as a single logical device. It is organized in a RAID level with one or more physical disks. RAID level refers to the level of data performance and protection of a Volume Set. A Volume Set capacity can consume all or a portion of the raw capacity available in a Raid Set. Multiple

Volume Sets can exist on a group of disks in a Raid Set. Additional Volume Sets created in a specified Raid Set will reside on all the physical disks in the Raid Set. Thus each Volume Set on the Raid Set will have its data spread evenly across all the disks in the Raid Set.

### 5.3.1 Create Volume Set

The following are the Volume Set features:

- 1. Volume sets of different RAID levels may coexist on the same Raid Set.
- 2. Up to 128 Volume Sets in a Raid Set can be created by the RAID controller.

To create Volume Set from a Raid Set, expand the Volume Set Functions in the main menu and click on the **Create Volume Set** link. The **Select The Raid Set To Create On It** screen will show all existing Raid Sets. Tick on the Raid Set where you want to create the Volume Set and then click on the **Submit** button.

pen all close all	^					
Raid System Console	- Select	t The Raid Set To	Create Volume O	on It		
🗀 Quick Function	Select	Raid Set Name	Member Disks	Raid State	Capacity	
C RAID Set Functions	e	Raid Set # 000	8/8	Normal	8001.6GB	
Create Volume Set		1 1				
Create Raid30/50/60	Submit	Reset				
Delete Volume Set     Modify Volume Set						
Check Volume Set						
Schedule Volume Check						
Stop Volume Check						
Physical Drives						
System Controls						
Ginformation						
System Information						
System Information Hardware Monitor						
System Information     Hardware Monitor						

The Volume Set setup screen allows user to configure the Volume Name, Capacity, RAID level, Initialization Mode, Stripe Size, Cache Mode, Tagged Command Queuing, SAS Port/LUN Base/LUN, and Volume To Be Created.

RAID Set Functions     Member Disks     8       Volume Set Functions     Volume Set Functions     Volume Set Functions       Create Raid30/S0/50     Max Capacity Allowed     6001.2 GB       Delete Volume Set     Select Volume Capacity     6001.2 GB       Create Raid30/S0/50     Select Volume Capacity     6001.2 GB       Schedule Volume Set     Select Volume Support     No       Schedule Volume Check     Volume Initialization Mode     Foreground Initialization       Physical Drives     Volume Stripe Size     64	Raid System Console     Volume Name     VolumeVOL#000       Rail D Set Functions     Volume Name     VolumeVOL#000       Volume Set Functions     Member Disks     8       Volume Set Functions     Volume Raid Level     Raid 6 •       Create Raid30/S0/50     Delete Volume Set     Select Volume Capacity       Modify Volume Set     Select Volume Capacity     6001.2 GB       Schedule Volume Check     Creater Two TB Volume Support     No •       Volume Initialization Mode     Foreground Initialization	
Quick Function       Volume Name       VolumeVOL#000         RAID Set Functions       Member Disks       8         Volume Set       Create Raid30/50/60       Max Capacity Allowed       6001.2 GB         Delete Volume Set       Select Volume Check       Select Volume Check       Foreground Initialization         Dysical Drives       Volume Stripe Size       64 × KBytes         Volume Set Hinformation       Yolume Scite       SAID Set Hierarchy         Bystem Controls       Volume Stripe Size       64 × KBytes         Volume Information       Tagged Command Queuing       Enabled +         SAS Port:LUN Base:LUN       0 × ; 0 × ; 0 ×	Quick Function     Volume Name     VolumeVOL#000       RAID Set Functions     Member Disks     8       Oreate Volume Set     Volume Raid Level     Raid 6 →       Delete Volume Set     Max Capacity Allowed     6001.2 GB       Disks     Select Volume Capacity     6001.2 GB       Creater Volume Set     Select Volume Capacity     6001.2 GB       Disks     Select Volume Capacity     Foreare       Stop Volume Check     Volume Initialization Mode     Foreground Initialization	
Welmber Disks     8       Orreate Volume Set     Volume Raid Level       Create Raid30/50/60     Max Capacity Allowed       Delete Volume Set     Select Volume Capacity       Check Volume Set     Select Volume Capacity       Schedule Volume Check     Greater Two TB Volume Support       No off Volume Set     Select Volume Check       Stop Volume Check     Volume Initialization Mode       Physical Drives     Volume Stripe Size       System Controls     Volume Cache Mode       Worlde Set Hierarchy     Sas Port:LUN Base:LUN	Volume Set Functions     Member Disks     8       Create Volume Set     Volume Raid Level     Raid 6       Delete Volume Set     Max Capacity Allowed     6001.2 GB       Delete Volume Set     Select Volume Capacity     6001.2 GB       Check Volume Set     Greater Two TB Volume Support     No       Stop Volume Check     Volume Initialization Mode     Foreground Initialization	
Ocreate Volume Set       Volume Raid Level       Raid 6 •         Ocreate Raid30/50/60       Max Capacity Allowed       6001.2 GB         Delete Volume Set       Select Volume Capacity       6001.2 GB         Ocheck Volume Set       Select Volume Capacity       6001.2 GB         Ocheck Volume Check       Greater Two TB Volume Support       No         Physical Drives       Volume Stipe Size       64 • KBytes         System Controls       Volume Cache Mode       Write Back •         Tagged Command Queuing       Enabled •         SAS Port:LUN Base:LUN       0 • • : 0 • : 0 •	Create Volume Set     Volume Raid Level     Raid 6 ▼       Create Raid30/50/60     Max Capacity Allowed     6001.2 GB       Delete Volume Set     Select Volume Capacity     6001.2 GB       Check Volume Set     Greater Two TB Volume Support     No       Schedule Volume Check     Volume Initialization Mode     Foreground Initialization	
Delete Volume Set     Select Volume Capacity     60012     GB       Modify Volume Set     Select Volume Capacity     60012     GB       Check Volume Set     Greater Two TB Volume Support     No       Stop Volume Check     Volume Initialization Mode     Foreground Initialization       Physical Drives     Volume Stripe Size     64 × KBytes       System Controls     Volume Cache Mode     Write Back        Information     Tagged Command Queuing     Enabled        System Information     SAS Port:LUN Base:LUN     0 × : 0 × : 0 ×	Delete Volume Set     Oddfy Volume Set     Schedule Volume Check     Schedule Volume Check	
Modify Volume Set     Select Volume Capacity     60012     GB       Check Volume Set     Greater Two TB Volume Support     No       System Controls     Volume Initialization Mode     Foreground Initialization       System Controls     Volume Stipe Size     64 × KBytes       Volume Set Hierarchy     Sased Command Queuing     Enabled       And Set Hierarchy     SAS Port:LUN Base:LUN     0 • • : 0 • : 0 •	→     Modify Volume Set     Select Volume Capacity     6001.2     GB       →     Check Volume Set     Greater Two TB Volume Support     No     •       →     Schedule Volume Check     Volume Initialization Mode     Foreground Initialization	
Check Volume Set       Greater Two TB Volume Support       No         Schedule Volume Check       Yolume Initialization Mode       Foreground Initialization         Physical Drives       Volume Stripe Size       64 × KBytes         System Controls       Volume Cache Mode       Write Back         No       No       Information         ARID Set Hierarchy       Yolume Cache Mode       Write Back         System Information       Tagged Command Queuing       Enabled         SAS Port:LUN Base:LUN       O       • : 0 • : 0 •	Check Volume Set     Schedule Volume Check     Stop Volume Check     Volume Initialization Mode     Foreground Initialization	
Stop Volume Check     Volume Initialization Mode     Foreground Initialization       Physical Drives     Volume Stripe Size     64 • KBytes       Output     Volume Cache Mode     Write Back •       Particular     Tagged Command Queuing     Enabled •       System Information     SAS Port:LUN Base:LUN     0 • • : 0 • : 0 •	Stop Volume Check Volume Initialization Mode Foreground Initialization	
Physical Drives     Volume Stripe Size     64 、 KBytes       System Controls     Volume Cache Mode     Write Back 、       RAID Set Hierarchy     Tagged Command Queuing     Enabled 、       SAS Port:LUN Base:LUN     • • • • • • • • • • • • • • • • • • •		
Information     Volume Cache Mode     Write Back       RAID Set Hierarchy     System Information       Hardware Monitor     SAS Port:LUN Base:LUN		
RAID Set Hierarchy     Tagged Command Queuing     Enabled •       System Information     SAS Port:LUN Base:LUN     0 • • : 0 • : 0 •		
A Hardware Monitor	RAID Set Hierarchy	
		: 0 -
Confirm The Operation	Confirm The Operation	
Submit Reset	Submit Reset	

#### Volume Name:

The default Volume Set name will appear as "Volume---VOL#XXX". You can rename the Volume Set name provided it does not exceed the 16 characters limit.

#### Raid Level:

Set the RAID level for the Volume Set. Click the down-arrow in the drop-down list. The available RAID levels for the current Volume Set are displayed. Select the preferred RAID level.

#### Capacity:

The maximum Volume Set size is displayed by default. If necessary, change the Volume Set size appropriate for your application.

#### Greater Two TB Volume Support:

If the Volume Set size is over 2TB, an option "Greater Two TB Volume Support" will be automatically provided in the screen as shown in the example above. There are three options to select: "No", "64bit LBA", and "4K Block").

**No**: Volume Set size is set to maximum 2TB limitation.

**64bit LBA**: Use this option for UNIX, Linux kernel 2.6 or later, and Windows Server 2003 + SP1 or later versions. The maximum Volume Set size is up to 512TB.

**4K Block**: Use this option for Windows OS such as Windows 2000, 2003, or XP. The maximum Volume Set size is 16TB. Just use the Volume as "Basic Disk". Volume can't be used as "Dynamic Disk"; also can't be used in 512Bytes block service program.

#### Initialization Mode:

Set the Initialization Mode for the Volume Set. Initialization in Foreground mode is completed faster but must be completed before Volume Set becomes accessible. Background mode makes the Volume Set instantly available but the initialization process takes longer. No Init (To Rescue Volume) is used to create a Volume Set without initialization; normally used to recreate Volume Set configuration to recover data.

#### Stripe Size:

This parameter sets the size of the stripe written to each disk in a RAID 0, 1, 10, 5 or 6 Volume Set. You can set the stripe size to 4 KB, 8 KB, 16 KB, 32 KB, 64 KB, or 128 KB.

A larger stripe size produces better-read performance, especially if your computer does mostly sequential reads. However, if you are sure that your computer does random reads more often, select a small stripe size.



NOTE Stripe Size in RAID level 3 can't be modified.

#### Cache Mode:

The RAID subsystem supports two types of write caching: Write-Through and Write-Back.

Write-Through: data are both written to the cache and the disk(s) before the write I/O is acknowledged as complete.

Write-Back: when data is written to cache, the I/O is acknowledged as complete, and some time later, the cached data is written or flushed to the disk(s). This provides better performance but requires a battery module support for the cache memory, or a UPS for the subsystem.

#### Tagged Command Queuing:

When this option is enabled, it enhances the overall system performance under multi-tasking operating systems by reordering tasks or requests in the command queue of the RAID system. This function should normally remain enabled.

#### SAS Port/LUN Base/LUN:

- SAS Port: Each RAID controller has two 6Gbps SAS Host Channels (ports). Select the SAS port where to map the LUN (Volume Set). Options are: 0, 1 and 0&1 Cluster. 0&1 Cluster will make the LUN visible on both SAS ports.
- LUN Base: The base LUN number. Each LUN Base supports 8 LUNs.
- **LUN:** Each Volume Set must be assigned a unique LUN ID number. A SAS Port can connect up to 128 devices (LUN ID: 0 to 127). Select the LUN ID for the Volume Set.
- **Volumes To Be Created**: Use this option to create several Volume Sets with the same Volume Set attributes. Up to 128 Volume Sets can be created.

### 5.3.2 Create Raid 30/50/60

To create a Raid30/50/60 Volume Set, move the mouse cursor to the main menu and click on the **Create Raid30/50/60** link. The **Select Multiple RaidSet For Raid30/50/60** screen will show all Raid Sets. Tick on the Raid Sets that you want to include in the creation and then click on the **Submit** button.



NOTE: Maximum of 8 Raid Sets is supported. All Raid Sets must contain the same number of disk drives.

open all close all						
Raid System Console	- Sel	ect Multiple RaidS	et For Raid	30/50/60 (Max 8 Ra	idSet Supported)	
Quick Function		Raid Set # 000	3	3000.0GB	3000.0GB	
Call RAID Set Functions	V	Raid Set # 001	3	3000.0GB	3000.0GB	
Create Raid30/50/60 Delete Volume Set Check Volume Set Check Volume Check Stop Volume Check Physical Drives Check Volume Check Volume Check Check Volume Check Volume Check Check Volume Check Volum	1					

Configure the Volume Set attributes (refer to previous section for the Volume Set attributes). When done, tick **Confirm The Operation** and click on **Submit** button.

open all close all	<u> </u>	
Raid System Console	Enter The Volume Attribute	
Carlon Quick Function	Volume Name	VolumeVOL#000
Call RAID Set Functions	Member Disks	2x3
Create Volume Set	Volume Raid Level	50 💌
Create Raid30/50/60	Max Capacity Allowed	4000.0 GB
Delete Volume Set	Select Volume Capacity	4000.0 GB
Check Volume Set     Schedule Volume Check	Greater Two TB Volume Support	No
Schedule Volume Check	Volume Initialization Mode	Foreground Initialization
Physical Drives	Volume Stripe Size	64 💌 KBytes
□ System Controls □ □ Information	Volume Cache Mode	Write Back
	Tagged Command Queuing	Enabled 💌
	SAS Port:LUN Base:LUN	0
	Volumes To Be Created	1
	Volumes To Be Created  Confirm The Operation Submit Reset	

### 5.3.3 Delete Volume Set

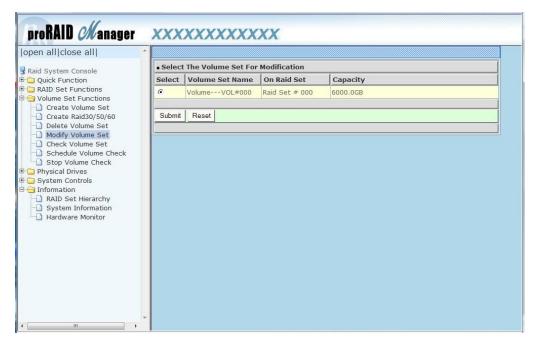
To delete a Volume Set, select the Volume Set Functions in the main menu and click on the **Delete Volume Set** link. The **Select The Volume Set To Delete** screen will show all available Raid Sets. Tick on a Raid Set and check the **Confirm The Operation** option and then click on the **Submit** button to show all Volume Sets in the selected Raid Set. Tick on a Volume Set and check the **Confirm The Operation** option. Click on the **Submit** button to delete the Volume Set.

proRAID <i>M</i> anager	xxx	xxxxxx	xx		
open all close all					
😨 Raid System Console	• Selec	t The Volume Set To	Delete		
🖻 🧀 Quick Function	Select	Volume Set Name	On Raid Set	Capacity	
RAID Set Functions     G Set Functions     G Set Functions     G Set Volume Set		VolumeVOL#000	Raid Set # 000	2000.0GB	
Create Raid30/50/60  Delete Volume Set  Modify Volume Set  Check Volume Set  Schedule Volume Check  Stop Volume Check	Submit	firm The Operation Reset			
<ul> <li>☐ Physical Drives</li> <li>☐ System Controls</li> <li>☐ Information</li> </ul>					

### 5.3.4 Modify Volume Set

Use this function to modify Volume Set configuration.

1. Click on the Modify Volume Set link.



2. Tick from the list the Volume Set you want to modify. Click on the **Submit** button.

The following screen appears.

ppen all close all	*		
Raid System Console	Enter The Volume Attribute		
Quick Function	Volume Name	VolumeVOL#000	
RAID Set Functions Volume Set Functions	Max Capacity Allowed	7001.4 GB	
Create Volume Set	Volume Capacity	6000.0 GB	
Create Raid30/50/60     Delete Volume Set	Volume Initialization Mode	Foreground Initialization -	
- Modify Volume Set	Volume Raid Level	Raid 5 💌	
Check Volume Set     Schedule Volume Check	Volume Stripe Size	64 - KBytes	
Stop Volume Check	Volume Cache Mode	Write Back	
Physical Drives System Controls	Tagged Command Queuing	Enabled -	
Information	SAS Port:LUN Base:LUN	0 • : 0 • : 0 •	
System Information     Hardware Monitor	Confirm The Operation Submit Reset		

To modify Volume Set attribute values, select an attribute item and click on the attribute value. After completing the modification, tick on the **Confirm The Operation** option and click on the **Submit** button to save the changes.

### 5.3.4.1 Volume Set Expansion

Volume Capacity (Logical Volume Concatenation Plus Re-stripe)

Use the Expand Raid Set function to expand a Raid Set when a disk is added to your subsystem. (Refer to Section 5.2.3)

The expanded capacity can be used to enlarge the Volume Set size or create another Volume Set. Use the Modify Volume Set function to expand the Volume Set capacity. Select the Volume Set and move the cursor to the **Volume Set Capacity** item and enter the capacity size.

Tick on the **Confirm The Operation** and click on the **Submit** button to complete the action. The Volume Set starts to expand.

en all close all	*	
aid System Console	Enter The Volume Attribute	
Quick Function	Volume Name	VolumeVOL#000
RAID Set Functions	Max Capacity Allowed	7001.4 GB
🗋 Create Volume Set	Volume Capacity	6000.0 GB
Create Raid30/50/60	Volume Initialization Mode	Foreground Initialization 💌
Modify Volume Set	Volume Raid Level	Raid 5 🔻
Check Volume Set Schedule Volume Check	Volume Stripe Size	64 VKBytes
Stop Volume Check	Volume Cache Mode	Write Back
Physical Drives System Controls	Tagged Command Queuing	Enabled -
RAID Set Hierarchy	SAS Port:LUN Base:LUN	0 • : 0 • : 0 •
<ul> <li>Bystem Information</li> <li>Hardware Monitor</li> </ul>	Confirm The Operation Submit Reset	



NOTE: The Volume Set capacity of Raid30/50/60 cannot be expanded.

#### 5.3.4.2 Volume Set Migration

Migration occurs when a Volume Set migrates from one RAID level to another, a Volume Set stripe size changes, or when a disk is added to a Raid Set. Migrating status is displayed in the Volume Set status area of the RaidSet Hierarchy screen during migration.



NOTE: The Stripe Size of a Raid30/50/60 Volume Set cannot be modified.

### 5.3.5 Check Volume Set

Use this function to perform Volume Set consistency check, which verifies the correctness of redundant data (data blocks and parity blocks) in a Volume Set. This basically means computing the parity from the data blocks and comparing the results to the contents of the parity blocks, or computing the data from the parity blocks and comparing the results to the contents of the contents of the data blocks.

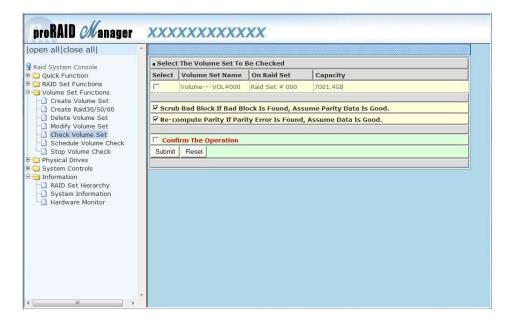


NOTE: The Volume Set state must be Normal in order to perform Check Volume Set. Only RAID levels with parity (redundant data) such as RAID Levels 3, 5, 6, 30, 50 and 60, support this function.

To perform Check Volume Set function:

1. Click on the Check Volume Set link.

2. Tick from the list the Volume Set you want to check. Select the Check Volume Set options.



Check Volume Set Options:

- Scrub Bad Block If Bad Block Found, Assume Parity Data is Good
- Re-compute Parity if Parity Error, Assume Data is Good



NOTE: When the 2 options are not selected, it will only check for errors. It is recommended to perform Check Volume Set with the 2 options unselected at first. If the result shows error, the two options can be selected and redo Check Volume Set to correct the errors.

3. Tick on **Confirm The Operation** and click on the **Submit** button. The Checking process will be started.

The checking percentage can also be viewed by clicking on RaidSet Hierarchy in the Information menu.

open all close all	*					
Raid System Console	□ Stop /	Auto Refresh				
🔁 Quick Function	RaidSe	t Hierarchy			- 10	
RAID Set Functions Volume Set Functions	RAID Set	Device	s Vol	ume Set(Port/Lun)	Volume State	Capacity
Physical Drives	Raid Set :	# 000 E#1Slot	#1 Volu	meVOL#000(0/0)	Checking(0.0%)	7001.4GB
System Controls		E#1Slot	#2			
Information		E#1Slot				
RAID Set Hierarchy     System Information		E#1Slot				
Hardware Monitor		E#1Slot				
		E#1Slot				
		E#1Slot E#1Slot				
	anananannan Derananannan	l constantinitation constantinitation				
	Enclosu	re#1 : SAS RAI	D Subsyste	n V1.0	le de provincio de la ferra conserva de la provinció de la pro	
	Device	Usage	Capacity	Model		
	Device <u>Slot#1</u> (0:2)	Usage       Raid Set # 000		Model Hitachi HDE721010SL4	4330	
	<u>Slot#1</u>		1000.2GB			
	<u>Slot#1</u> (0:2) Slot#2	Raid Set # 000	1000.2GB 1000.2GB	Hitachi HDE721010SL4	A330	
	<u>Slot#1</u> (0:2) <u>Slot#2</u> (0:C) <u>Slot#3</u>	Raid Set # 000 Raid Set # 000	1000.2GB 1000.2GB 1000.2GB	Hitachi HDE721010SLA Hitachi HDE721010SLA	\330 \330	

### 5.3.6 Schedule Volume Check

To perform Check Volume Set by schedule, follow these steps:

- 1. Click on the Schedule Volume Check link.
- 2. Select the desired schedule that you wish the Check Volume Set function to run. Tick on **Confirm The Operation** and click on the **Submit** button.
- Scheduler: Disabled, 1Day (For Testing), 1Week, 2Weeks, 3Weeks, 4Weeks, 8Weeks, 12Weeks, 16Weeks, 20Weeks and 24Weeks.
- **Check After System Idle**: No, 1 Minute, 3 Minutes, 5 Minutes, 10 Minutes, 15 Minutes, 20 Minutes, 30 Minutes, 45 Minutes and 60 Minutes.

open all close all	*				
Raid System Console	Scheduled Volume Checking				
Quick Function	Scheduler : Disabled				
RAID Set Functions Volume Set Functions	Checking After System Idle : No				
Create Volume Set	🔽 Scrub Bad Block If Bad Block Is Found, Assume Parity Data Is Good.				
Create Raid30/50/60     Delete Volume Set	Re-compute Parity If Parity Error Is Found, Assume Data Is Good.				
Modify Volume Set     Check Volume Set     Schedule Volume Check     Stop Volume Check	Confirm The Operation Submit Reset				
Physical Drives     System Controls     Grownation     RAID Set Hierarchy     System Information     Hardware Monitor					



NOTE: To verify the Volume Check schedule, go to Information -> RAID Set Hierarchy -> select the Volume Set -> the Volume Set Information will be displayed.

Volume Set Name	VolumeVOL#000	
Raid Set Name	Raid Set # 000	
Volume Capacity	7001.4GB	
SAS Port/Lun	0/0	
Raid Level	Raid 5	
Stripe Size	64KBytes	
Block Size	512Bytes	
Member Disks	8	
Cache Mode	Write Back	
Tagged Queuing	Enabled	
Volume State	Normal	
Time To Volume Check	0:23:59:6	

## 5.3.7 Stop Volume Check

Use this option to stop current running Check Volume Set process.

open all close all	
Raid System Console Quick Function RAID Set Functions Create Volume Set Create Volume Set Delete Volume Set Check Volume Set Check Volume Set Schedule Volume Check Stop Volum	Do You Want To Stop All Volume Consistency Checking?      Confirm The Operation     Submit Reset

### 5.4 Physical Drive

Choose this option from the Main Menu to select a disk drive and to perform the functions listed below.

### 5.4.1 Create Pass-Through Disk

A Pass-Through Disk is a disk drive not controlled by the internal RAID subsystem firmware and thus cannot be a part of a Volume Set. A Pass-Through disk is a separate and individual Raid Set. The disk is available to the host as an individual disk. It is typically used on a system where the operating system is on a disk not controlled by the RAID firmware.

To create pass-through disk, click on the **Create Pass-Through** link under the Physical Drives main menu. The setting function screen appears.

Select the disk drive to be made as Pass-Through Disk and configure the Pass-Through Disk attributes, such as the Cache Mode, Tagged Command Queuing, and SAS Port/LUN Base/LUN for this volume.

open all close all			xxx		
🖁 Raid System Console	Select the IDE drive For Pass Through     Enclosure#1 : SAS RAID Subsystem V1.0				
Quick Function     AID Set Functions     Volume Set Functions     Physical Drives     Create Pass-Through Disk     Modify a Pass-Through Disk     Delete Pass-Through Disk					
	Slot#8	• Slot#8 1000.2GB WDC WD10EARS-00Y5B1		RS-00Y5B1	
	Enter Pass Through Disk Attribute				
	Volume Cache Mode			Write Back 💌	
	Tagged Command Queuing			Enabled V	
Identify Enclosure	SAS Port:LUN Base:LUN			0	
🗉 🔁 System Controls					
🗄 🗀 Information	Confirm The Operation				
	Submit Re:	set			

### 5.4.2 Modify a Pass-Through Disk

Use this option to modify the attribute of a Pass-Through Disk. User can modify the Cache Mode, Tagged Command Queuing, and SAS Port/LUN Base/LUN on an existing Pass-Through Disk.

To modify the Pass-Through drive attribute from the Pass-Through drive pool, click on the **Modify a Pass-Through Disk** link. The "Select The Pass-Through Disk For Modification" screen appears. Tick on the Pass-Through Disk from the Pass-Through drive pool and click on the **Submit** button to select the drive.

The Enter Pass-Through Disk Attribute screen appears. Modify the drive attribute values as you want.

open all close all					
Raid System Console	Select The Pass Through Disk For Modification				
🗄 🧰 Quick Function	Enclosure#1 : SAS RAID Subsystem V1.0				
RAID Set Functions     Volume Set Functions     Physical Drives     Modify a Pass-Through Disk     Delete Pass-Through Disk     Delete Pass-Through Disk     Identify Enclosure     Identify Drive     System Controls     Information	Submit Res	1000.2GB	WDC WD10EARS-00Y5B1		

### 5.4.3 Delete Pass-Through Disk

To delete Pass-Through Disk from the Pass-Through drive pool, click on **Delete Pass-Through** link. Select a Pass-Through Disk, tick on the **Confirm The Operation** and click the **Submit** button to complete the delete action.

open alliclose alli	XXXXXXXXXXX				
lopen anifciose ani					
Raid System Console	Select The Pass Through Disk To Delete				
🛛 🗀 Quick Function	Enclosure#1 : SAS RAID Subsystem V1.0				
Call Set Functions	Slot#8         1000.2GB         WDC WD10EARS-00Y5B1				
Hysical Drives     Create Pass-Through Disk     Modify a Pass-Through Disk     Delete Pass-Through Disk	Confirm The Operation				
	Submit Reset				
Identify Enclosure Identify Drive System Controls					

## 5.4.4 Identify Enclosure

To identify an Enclosure, move the mouse cursor and click on **Identify Enclosure** link. The **Select The Enclosure For Identification** screen appears. Tick on the enclosure from the list of enclosures, then click on the **Submit** button to identify the selected enclosure. All disk drives' Status LEDs in an enclosure will be blinking when a particular enclosure is selected.

proRAID Manager	XXXXXXXXXXXX
Iopen all close all         Raid System Console         Quick Function         Raid Set Functions         Raid Set Functions         Physical Drives         Create Pass-Through Disk         Identify Enclosure         Identify Enclosure         System Controls         Information         RAID Set Hierarchy         System Information         Hardware Monitor	Select The Enclosure For Identification     Enclosure#1 : SAS RAID Subsystem V1.0     Submit Reset
-	

### 5.4.5 Identify Selected Drive

Use this option to physically locate a selected drive to prevent removing the wrong drive. When a disk drive is selected using the **Identify Drive** function, the Status LED of the selected disk drive will be blinking Red.

To identify a selected drive from the drives pool, click on the **Identify Drive** link. The "Select The IDE Device For identification" screen appears. Tick on the IDE device from the drives list. After completing the selection, click on the **Submit** button to identify selected drive.

open all close all						
Raid System Console	Select The Device For Identification					
🖳 Quick Function		■ Enclosure#1 : SAS RAID Subsystem V1.0				
- RAID Set Functions	œ	Slot#1	1000.2GB	WDC WD10EARS-00Y5B1		
Physical Drives	C	Slot#2	1000.2GB	WDC WD10EARS-00Y5B1		
Create Pass-Through Disk	C	Slot#3	1000.2GB	WDC WD10EARS-00Y5B1		
Modify a Pass-Through Disk     Delete Pass-Through Disk     Identify Enclosure	C	Slot#4	1000.2GB	WDC WD10EARS-00Y5B1		
	C	Slot#5	1000.2GB	WDC WD10EARS-00Y5B1		
Identify Drive	C	Slot#6	1000.2GB	WDC WD10EARS-00Y5B1		
🖳 System Controls 🖳 Information	C	Slot#7	1000.2GB	WDC WD10EARS-00Y5B1		
	C	Slot#8	1000.2GB	WDC WD10EARS-00Y5B1		

## 5.5 System Controls

### 5.5.1 System Configuration

To set the RAID subsystem system configuration options, click the **System Configuration** link under the **System Controls** menu. The System Configurations screen will be shown. Set the desired system option as needed.

- Delete Volume Set					
Modify Volume Set Check Volume Set	<ul> <li>System Configurations</li> </ul>				
🝈 Schedule Volume Check	System Beeper Setting	Enabled 💌			
Stop Volume Check Physical Drives	Background Task Priority	High(80%)			
System Controls	JBOD/RAID Configuration	RAID 💌			
System Configuration Hdd Power Management	SATA NCQ Support	Enabled 💌			
Hud Power Management EtherNet Configuration	HDD Read Ahead Cache	Enabled 💌			
Alert By Mail Configuration	Volume Data Read Ahead	Normal			
SNMP Configuration NTP Configuration	HDD Queue Depth	32 💌			
🚺 View Events/Mute Beeper	Slot1-4 Max Speed	6G 💌			
Generate Test Event Clear Event Buffer	Slot5-8 Max Speed	6G 💌			
🗋 Modify Password	Host PortO Max Speed	6G 💌			
Upgrade Firmware Shutdown Controller	JBOD Port/Host Port1 Max Speed	6G 💌			
🚺 Restart Controller	SAS Port1 Configuration	Host Port 🗹			
Information AID Set Hierarchy	Disk Write Cache Mode	Enabled 💌			
System Information	Disk Capacity Truncation Mode	Multiples Of 1G 🛛 🕙			

#### System Beeper Setting:

This option is used to Disable or Enable the system's RAID controller alarm beeper.

#### Background Task Priority:

The Background Task Priority indicates how much time and system resource the RAID controller devotes to a background task, such as a rebuild operation. The RAID subsystem allows user to choose the background task priority (High 80%, Medium 50%, Low 25%, and Ultra Low 5%) to balance between background task process and Volume Set access. For high RAID subsystem performance, specify a low value.

#### Expansion/RAID Configuration:

The RAID subsystem supports Expansion and RAID configuration.

#### SATA NCQ Support:

NCQ is a command protocol in Serial ATA that can only be implemented on native Serial ATA hard drives. It allows multiple commands to be outstanding within a drive at the same time. Drives that support NCQ have an internal queue where outstanding commands can be dynamically rescheduled or re-ordered, along with the necessary tracking mechanisms for outstanding and completed portions of the workload. Disabled or Enable the SATA NCQ function.

#### HDD Read Ahead Cache:

This option allows the users to disable the cache of the HDDs on the RAID subsystem. In some HDD models, disabling the cache in the HDD is necessary to prove the RAID subsystem functions correctly.

#### Volume Data Read Ahead:

This option allows the users to set the Volume Data Read Ahead function. Options are: Normal, Aggressive, Conservative, and Disabled.

#### HDD Queue Depth:

The queue depth is the number of I/O operations that can be run in parallel on a disk drive. HDD Queue Depth options are 1, 2, 4, 8, 16, and 32.

**Slot 1-4 Max Speed**: Select the maximum speed for disk slots 1 to 4. Options are: 6G (default), 3G.

**Slot 5-8 Max Speed:** Select the maximum speed for disk slots 5 to 8. Options are: 6G (default), 3G.

**Host PortO Max Speed:** Select the maximum speed for Host PortO (Channel A). Options are: 6G (default), 3G.

**Expansion Port/Host Port1 Max Speed:** Select the Host Port1, Expansion Port max speed. Options are: 6G (default), 3G.

**SAS Port1 Configuration**: Select whether to set SAS Port as Host Port (default) for Channel B, or use SAS Port as Expansion Port.

#### Disk Write Cache Mode:

The RAID subsystem supports Disk Write Cache Mode options: Auto, Enabled, and Disabled. If the RAID subsystem has BBM (battery backup module), selecting the Auto option will automatically enable Disk Write Cache. On the other hand, if there is no BBM, the Auto option will disable Disk Write Cache.

#### Disk Capacity Truncation Mode:

The RAID subsystem use drive truncation so that drives from different vendors are more likely to be able to be used as spares for each other. Drive truncation slightly decreases the usable capacity of a drive that is used in redundant units. Options are:

**Multiples Of 10G**: If you have several 120GB drives from different vendors, chances are that the capacity varies slightly. For example, one drive might be 121.1 GB, and the other 120.4 GB. This drive truncation mode makes the 121.1 GB and 120.4 GB drives same capacity as 120 GB so that one could replace the other.

**Multiples Of 1G**: If you have 120 GB drives from different vendors, chances are that the capacity varies slightly. For example, one drive might be 121.1 GB, and the other 121.4 GB. This drive truncation mode makes the 121.1 GB and 121.4 GB drives same capacity 121 GB so that one could replace the other.

No Truncation: The capacity of the disk drive is not truncated.

### 5.5.2 HDD Power Management

MAID (Massive Array of I dle Disks) is a storage technology that employs a large group of disk drives in which only those drives in active use are spinning at any given time.

This reduces power consumption and prolongs the lives of the drives. MAID is designed for Write Once, Read Occasionally (WORO) applications such as Data Backup, Document, Mail server, and so on.

MAID technology focuses on "Green Storage Concept" to save power consumption and enhance disk drives effective usage, i.e., "disk drives are spun down when there is no activity or I/O on the drives".

In the RAID subsystem, MAID is implemented in the **HDD Power Management** menu. Using the **Advanced Power Management (APM)** function of disk drives, HDD Power Management has three options (MAID Levels): (Level 1) Place idle drives in Lower Power Mode, where the drives' heads are unloaded; (Level 2) Place idle drives in Low RPM Mode, where drives' heads are unloaded and slows down to around 4000 RPM; and (Level 3) Spin down idle drives, where drives stops spinning and goes into sleep mode.

open all close all		
😨 Raid System Console	Hdd Power Management	
⊕ 🗀 Quick Function ⊕ 🗀 RAID Set Functions	Stagger Power On Control	0.7 💌
Garage Set Functions     Garage Set Functions	Time To Hdd Low Power Idle	Disabled 💌
🖲 🧰 Physical Drives	Time To Hdd Low RPM Mode	Disabled 💌
🖻 😁 System Controls	Time To Spin Down Idle HDD	Disabled 🔽
Fibre Channel Config EtherNet Configuration Alert By Mail Configuration NTP Configuration View Events/Mute Beeper Generate Test Event Clear Event Buffer Modify Password Upgrade Firmware Shutdown Controller Restart Controller Information	Confirm The Operation	

#### **Stagger Power On Control:**

This option allows the RAID subsystem's power supply to power up in succession each HDD in the RAID subsystem. In the past, all the HDDs on the RAID subsystem are powered up altogether at the same time. This function allows the power transfer time (lag time) from the last HDD to the next one be set within the range of 0.4 to 6.0 seconds. Default is 0.7 seconds.

#### Time to HDD Low Power Idle: (MAID Level 1)

This option enables the RAID subsystem to place idle HDDs of a Raid Set in Low Power Mode, where drives' heads are unloaded. The power consumption of the Idle HDD saving is around 15% to 20%. Recovery time is under a second. Options are: Disabled, 2, 3, 4, 5, 6, and 7 (Minutes).

#### Time to HDD Low RPM Mode: (MAID Level 2)

This option enables the RAID subsystem to place idle HDDs of a Raid Set in Low RPM Mode, where drives' heads are unloaded and drive platters speed is reduced to around 4000 RPM. The power consumption of the Idle HDD saving is from 35% to 45%. Recovery time is 15 seconds.

Options are: Disabled, 10, 20, 30, 40, 50, and 60 (Minutes).

#### Time to Spin Down Idle HDD: (MAID Level 3)

This option enables the Raid subsystem to spin down HDDs of a Raid Set after they become idle after a preset period of time. In this level, the drives stop spinning and go into sleep mode. The power consumption of the Idle HDD saving is from 60% to 70%. Recovery time is 30 to 45 seconds.

Options are: Disabled, 1 (For Test), 3, 5, 10, 15, 20, 30, 40, and 60 (Minutes).



NOTE: To verify if the disk drive you use supports MAID or APM, select "RaidSet Hierarchy" and click the disk drive (E# Slot#) link. Check in the Device Information screen if the Disk APM Support shows "Yes".

## 5.5.3 EtherNet Configuration

To set the Ethernet configuration, click the **EtherNet Configuration** link under the System Controls menu. The RAID subsystem EtherNet Configuration screen will be shown. Set the desired configuration. Once done, tick on the **Confirm The Operation** and click the **Submit** button to save the settings.

open all close all	2					
Raid System Console	Ether Net Configurations					
- 🔁 Quick Function	DHCP Function	Enabled 💙				
Call Set Functions	Local IP Address (Used If DHCP Disabled)	192 . 168 . 1 . 100				
- Physical Drives	Gateway IP Address (Used If DHCP Disabled)	192 .168 .1 .1				
System Controls	Subnet Mask (Used If DHCP Disabled)	255 .255 .0				
🗋 Hdd Power Management	HTTP Port Number (71688191 Is Reserved)	80				
EtherNet Configuration     Alert By Mail Configuration	Telnet Port Number (71688191 Is Reserved)	23				
SNMP Configuration     NTP Configuration	SMTP Port Number (71688191 Is Reserved)	25				
View Events/Mute Beeper	Current IP Address	192.168.1.100				
Generate Test Event     Clear Event Buffer	Current Gateway IP Address	192.168.1.1 255.255.255.0				
	Current Subnet Mask					
Modify Password     Upgrade Firmware	Ether Net MAC Address	00.1B.4D.01.50.3F				
Shutdown Controller Restart Controller	Confirm The Operation					
🗉 🧰 Information	Submit Reset					



NOTE: If HTTP, Telnet and SMTP Port Number is set to "0", the service is disabled.

## 5.5.4 Alert By Mail Configuration

To set the Event Notification function, click on the **Alert By Mail Configuration** link under the System Controls menu. The RAID subsystem Event Notification configuration screen will be shown. Set up the desired function and option. When an abnormal condition occurs, an error message will be emailed to the email recipient(s) that a problem has occurred. Events are classified into 4 levels (Urgent, Serious, Warning, and Message).

n all close all  🗕						
System Console	SMTP Server Configuration					
Quick Function SMTP Server IP Add	dress 0 .0 .0 .0					
AID Set Functions	Mail Address Configurations					
Physical Drives Sender Name :	Mail Address :					
System Controls           System Configuration         Account :	Password :					
Hdd Power Management MailTo Name1 :	Mail Address :					
Alert By Mail Configuration MailTo Name2 :	Mail Address :					
SNMP Configuration MailTo Name3 :	Mail Address :					
View Events/Mute Beeper MailTo Name4 :	Mail Address :					
	Event Notification Configurations					
Modify Password 📀 Disable Event N	Iotification No Event Notification Will Be Sent					
OUrgent Error No	tification Send Only Urgent Event					
Restart Controller	otification Send Urgent And Serious Event					
nformation O Warning Error N	lotification Send Urgent, Serious And Warning Event					
C Information Not	ification Send All Event					
🗖 Notification For	No Event Notify User If No Event Occurs Within 24 Hours					



NOTE: If Event Notification by email is enabled, every 30 of event log will be sent to the email recipient(s) as one package log.

## 5.5.5 SNMP Configuration

The SNMP gives users independence from the proprietary network management schemes of some manufacturers and SNMP is supported by many WAN and LAN manufacturers enabling true LAN/ WAN management integration.

To set the SNMP function, move the cursor to the main menu and click on the **SNMP Configuration** link. The RAID subsystem's SNMP Configurations screen will be shown. Select the desired function and set the preferred option.

pen all close all						
Raid System Console	SNMP Trap Configurations					
Quick Function RAID Set Functions Volume Set Functions	SNMP Trap IP Address #1		o <u>.</u> 0.	Port#	162	
Ohysical Drives     System Controls     System Configuration     Hdd Power Management     EtherNet Configuration	SNMP Trap IP Address #2	0.	0,0.	Port#	162	
	SNMP Trap IP Address #3	0	0	Port#	162	
Alert By Mail Configuration     SNMP Configuration	SNMP System Configurations					
NTP Configuration     View Events/Mute Beeper	Community					
- 🗋 Generate Test Event	sysContact.0					
Clear Event Buffer     Modify Password	sysName.0					
🗋 Upgrade Firmware	sysLocation.0					
Shutdown Controller     Restart Controller	SNMP Trap Notification Configurations					
Information	Disable SNMP Trap		No SNMP Trap Will Be Sent			
	O Urgent Error Notification	Se	Send Only Urgent Event			
	C Serious Error Notification	Se	Send Urgent And Serious Event			
	O Warning Error Notification		nd Urgent, Serious	And Warning E	Event	
	O Information Notification		Send All Event			

**SNMP Trap Configurations**: Type in the SNMP Trap IP Address box the IP address of the host system where SNMP traps will be sent. The SNMP Port is set to 162 by default.

#### SNMP System Configuration:

**Community**: Type the SNMP community. The default is public.

(1) **sysContact.O**, (2) **sysLocation.O**, and (3) **sysName.O**: SNMP parameter (31 bytes max). If these 3 categories are configured and when an event occurs, SNMP will send out a message that includes the 3 categories within the message. This allows user to easily define which RAID unit is having problem.

SNMP Trap Notification Configurations: Select the desired option.

After completing the settings, tick on the **Confirm The Operation** and click on the **Submit** button to save the configuration.

SNMP also works in the same as Alert By Mail when sending event notifications.

## 5.5.6 NTP Configuration

NTP stands for **Network Time Protocol**. It is an Internet protocol used to synchronize the clocks of computers to some time reference. Type the NTP Server IP Address to enable the RAID subsystem to synchronize with it.

To set the NTP function, move the cursor to the main menu and click on the **NTP Configuration** link. The RAID subsystem's NTP Configuration screen will be displayed. Select the desired function and configure the necessary option.

After completing the settings, tick on the **Confirm The Operation** and click on the **Submit** button to save the configuration.

open all close all	
Raid System Console         Raid System Console         Quick Function         RAID Set Functions         Physical Drives         System Configuration         Hd Power Management         EtherNet Configuration         Alert By Mail Configuration         NTP Configuration         View Events/Mute Beeper         Generate Test Event         Clear Event Buffer         Modify Password         Upgrade Firmware         Shutdown Controller         Restart Controller         Information	NTP Server Configurations   NTP Server IP Address #1   D   O </th
4	

## 5.5.7 View Events / Mute Beeper

To view the RAID subsystem's event log information, move the mouse cursor to the System Controls menu and click on the **View Events/Mute Beeper** link. The Raid Subsystem's System Events Information screen appears.

The System Events Information screen will show: Time, Device, Event type, Elapse Time and Errors.

open all close all  🛛 🖆	S					
Raid System Console	System Events Information					
Carlo Quick Function	Time	Device	Event Type	Elapse Time	Errors	
AAD Set Functions     Volume Set Functions     Physical Drives     System Controls     Hdd Power Management     Hdd Power Management     Alert By Mail Configuration     NTP Configuration     NTP Configuration     NTP Configuration     NTP Configuration     Office Events/Mute Beeper     Generate Test Event     Clear Event Buffer     Modify Password     Upgrade Firmware     Shutdown Controller     Restart Controller	2010-05-25 13:22:05	Enc#1 Slot#8	PassThrough Disk Created			
	2010-05-25 13:14:28	VolumeVOL#000	Start Initialize			
	2010-05-25 13:14:26	VolumeVOL#000	Create Volume			
	2010-05-25 12:00:30	Raid Set # 001	Create RaidSet			
	2010-05-25 12:00:24	Raid Set # 000	Create RaidSet			
	2010-05-25 12:00:16	Raid Set # 000	Delete RaidSet			
	2010-05-25 11:58:04	Raid Set # 000	Create RaidSet			
	2010-05-25 11:57:50	Raid Set # 000	Delete RaidSet			
	2010-05-25 11:56:49	Raid Set # 000	Create RaidSet			
	2010-05-25 11:56:42	Raid Set # 000	Delete RaidSet			
	2010-05-25 11:43:11	Raid Set # 000	Expand RaidSet			
	2010-05-25 11:42:40	Raid Set # 000	Create RaidSet			
3	2010-05-25	Raid Set # 000	Delete RaidSet			

This function is also used to silence the beeper alarm.

## 5.5.8 Generate Test Event

If you want to generate test events, move the cursor bar to the main menu and click on the **Generate Test Event** Link. Tick on the **Confirm The Operation** and click on the **Submit** button. Then click on the **View Events/Mute Beeper** to view the test event.

nroRAID Manager	CXXXXXXXXXXX
Quick Function	Do You Want To Generate Test Event?      Confirm The Operation      Submit Reset
× ×	

## 5.5.9 Clear Event Buffer

Use this feature to clear the RAID subsystem's System Events Information buffer.

open all(close all)	XXXXXXXXXXX
Raid System Console     Quick Function     RAID Set Functions     Volume Set Functions     System Configuration     Hdd Power Management     EtherNet Configuration     Alter By Mail Configuration     NTP Configuration     NTP Configuration     NTP Configuration     View Events/Mute Beeper     Generate Test Event     Clear Event Buffer     Modify Password     Upgrade Firmware     Shutdown Controller     Restart Controller     Information	Do You Want To Clear The Event Buffer?      Confirm The Operation      Submit Reset

## 5.5.10 Modify Password

To change or disable the RAID subsystem's admin password, click on the **Modify Password** link under the **System Controls** menu. The Modify System Password screen appears.

The factory-default admin password is set to **00000000**. Once the password has been set, the user or administrator can only monitor and configure the RAID subsystem by providing the correct password.

The password is used to protect the RAID subsystem's configuration from unauthorized access. The RAID controller will check the password only when entering the Main Menu from the initial screen. The RAID subsystem will automatically go back to the initial screen when it does not receive any command after sometime.

To disable the password, enter only the original password in the Enter Original Password box, leave both the Enter New Password and Re-Enter New Password boxes blank. After selecting the Confirm The Operation option and clicking the Submit button, the system password checking will be disabled. No password checking will occur when entering the main menu from the starting screen.

open all close all	
🕄 Raid System Console	Modify System Password
■ Quick Function ■ C RAID Set Functions	Enter Original Password
🗉 🧰 Volume Set Functions	Enter New Password
🗄 🛄 Physical Drives 🖻 🕣 System Controls	Re-Enter New Password
System Configuration	
Hdd Power Management	Submit Reset
Alert By Mail Configuration	
View Events/Mute Beeper     Generate Test Event	
- Shutdown Controller	
□ └── Restart Controller 판	



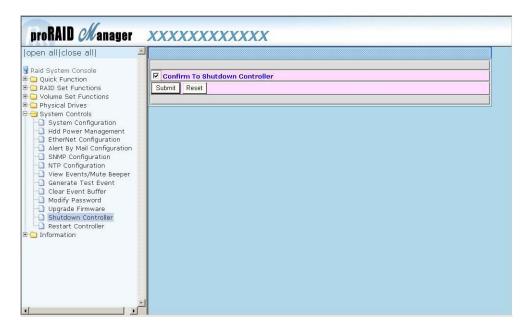
NOTE: The admin Password characters allowed are 'A' – 'Z', 'a' – 'z', and '0' – '9'. The minimum number of Password characters is null/empty (Password is disabled) and maximum number of Password characters is 15.

### 5.5.11 Upgrade Firmware

Please refer to Section 6.2 for more information.

## 5.5.12 Shutdown Controller

Use this function to shutdown the RAID Controller. This is normally used to make sure the data in the cache memory are flushed to the disk drives before turning off the RAID subsystem.



proRAID Manager XXXXXXXXXXX
Iopen all/close all/         Raid System Console         Quick Functions         P Physical Divises         P System Configuration         H dd Power Management         E therNet Configuration         Alert By Mail Configuration         NTP Configuration         Vipgrade Firmware         Shufform Controller         Restart Controller



After shutting down the controller and still want to use the RAID subsystem, you must restart the controller either by Restart Controller function or by Power On/Off switch.

## 5.5.13 Restart Controller

Use this function to restart the RAID Controller. This is normally used after upgrading the RAID controller's firmware.

proRAID Manager x	XXXXXXXXXXX
Culck Function	

		1000
Raid System Console         Quick Function         RAID Set Functions         Volume Set Functions         Physical Drives         System Configuration         Hdd Power Management         EtherNet Configuration         Alert By Mail Configuration         NTP Configuration         View Events/Mute Beeper         Celear Event Buffer         Modify Password         Upgrade Firmware         Shutdown Controller         Restart Controller         Information	Make Sure To Restart Controller         Submit       Reset	

## 5.6 Information Menu

## 5.6.1 RAID Set Hierarchy

Use this feature to view the RAID subsystem's existing Raid Set(s), Volume Set(s) and disk drive(s) configuration and information. Select the **RAID Set Hierarchy** link from the **Information** menu to display the Raid Set Hierarchy screen.

pen all close all									
<ul> <li>Raid System Console</li> <li>Quick Function</li> <li>RAID Set Functions</li> <li>Volume Set Functions</li> <li>Physical Drives</li> <li>System Controls</li> <li>Information</li> <li>RAID Set Hierarchy</li> <li>System Information</li> <li>Hardware Monitor</li> </ul>	RaidSet F	RaidSet Hierarchy							
	RAID Set	Devices	vo	lume Set(Port/Lun)	Volume State	Capacity			
	Raid Set #	000 <u>E#1Slot</u> :	#1 Vol	umeVOL#000(1/0)	Normal	511.0GB			
		E#1Slot:	<u>#2</u>						
		E#1Slot:	#3						
		E#1Slot:	#4						
		E#1Slot#5							
		E#1Slot:	<u>#6</u>						
		E#1Slot	<u>#7</u>						
		E#1Slot:	#8						
	Enclosure	Enclosure#1 : SAS RAID Subsystem V1.0							
	Device	Usage	Capacity	Model					
		Raid Set # 000	73.5GB	FUITSU MBA3073RC					
	<u>Slot#1(11)</u>	Raid Set # 000	13.300	1 OJI I JO INDAJO/JIC					
		Raid Set # 000	73.5GB	FUJITSU MBA3073RC					
	<u>Slot#2(12)</u>		2. C. C. C. C. C.						
	<u>Slot#2(12)</u> <u>Slot#3(13)</u>	Raid Set # 000	73.5GB	FUJITSU MBA3073RC					
	Slot#2(12) Slot#3(13) Slot#4(14)	Raid Set # 000 Raid Set # 000	73.5GB 73.5GB	FUJITSU MBA3073RC FUJITSU MBA3073RC					
	Slot#2(12) Slot#3(13) Slot#4(14) Slot#5(15)	Raid Set # 000 Raid Set # 000 Raid Set # 000	73.5GB 73.5GB 73.5GB	FUJITSU MBA3073RC FUJITSU MBA3073RC FUJITSU MBA3073RC					
	<u>Slot#2(12)</u> <u>Slot#3(13)</u> <u>Slot#4(14)</u> <u>Slot#5(15)</u> <u>Slot#6(16)</u>	Raid Set # 000 Raid Set # 000 Raid Set # 000 Raid Set # 000	73.5GB 73.5GB 73.5GB 73.5GB 73.5GB	FUJITSU MBA3073RC FUJITSU MBA3073RC FUJITSU MBA3073RC FUJITSU MBA3073RC					

To view the Raid Set information, click the **Raid Set** # link from the Raid Set Hierarchy screen. The Raid Set Information screen appears.

open all close all	*						
Raid System Console	Raid Set Information	Raid Set Information					
Quick Function	Raid Set Name	Raid Set # 000					
AID Set Functions	Member Disks	8					
🗀 Volume Set Functions	Total Raw Capacity	8001.6GB					
Physical Drives	Free Raw Capacity	0.0GB					
Controls	Min Member Disk Size	1000.2GB					
RAID Set Hierarchy	Raid Set Power State	Operating					
System Information	Raid Set State	Normal					

To view the disk drive information, click the **Slot#** link from the Raid Set Hierarchy screen. The Disk Information screen appears. This screen shows various information such as timeout count, media error count, and SMART information.

ppen all close all				
Raid System Console	Device Information			
Quick Function	Device Type	SATA(5001B4D000990001)		
RAID Set Functions	Device Location	Enclosure#1 SLOT 01		
Colume Set Functions	Model Name	ST3250620NS		
Physical Drives	Serial Number	9QE6T6P6		
<ul> <li>System Controls</li> <li>Information</li> <li>Information</li> <li>System Information</li> <li>System Information</li> <li>Hardware Monitor</li> </ul>	Firmware Rev.	3.AEG		
	Disk Capacity	250.1GB		
	Current SATA Mode	SATA300+NCQ(Depth16)		
	Supported SATA Mode	SATA300+NCQ(Depth16)		
	Disk APM Support	Yes		
	Device State	Normal		
	Timeout Count	0		
	Media Error Count	0		
	Device Temperature	44 °C		
	SMART Read Error Rate	108(6)		
	SMART Spinup Time	96(0)		
	SMART Reallocation Count	100(36)		
	SMART Seek Error Rate	86(30)		
	SMART Spinup Retries	100(97)		
	SMART Calibration Retries	N.A.(N.A.)		

To view the Volume Set information, click the **Volume---VOL**# link from the Raid Set Hierarchy screen. The Volume Set Information screen appears.

	open all close all	•						
Quick Function     Volume Set Name     VolumeVOL#000       RAID Set Functions     Raid Set Name     Raid Set # 000       Volume Sat Functions     Volume Capacity     7001.4GB       Physical Drives     SAS Port/Lun     0/0       System Controls     Raid Level     Raid S       Information     Stipe Size     64KBytes       System Information     Block Size     S12Bytes       Hardware Monitor     Cache Mode     Write Back       Tagged Queuing     Enabled	Raid System Console	Volume Set Information						
Volume Set Functions       Volume Capacity       7001.4GB         Physical Drives       SAS Port/Lun       0/0         System Controls       Raid Level       Raid 5         Information       Stripe Size       64KBytes         System Information       Block Size       512Bytes         Hardware Monitor       Member Disks       8         Cache Mode       Write Back       Tagged Queuing	Quick Function	Volume Set Name	VolumeVOL#000					
Physical Drives     SAS Port/Lun     O/0     SAS Port/Lun     O/0     Raid Level     Raid 5     Raid Level     Raid 5     Stripe Size     G4KBytes     Stripe Size     St2Bytes     Block Size     S12Bytes     Member Disks     Cache Mode     Write Back     Tagged Queuing     Enabled	RAID Set Functions	Raid Set Name	Raid Set # 000					
System Controls     Sis 500 (Cull     0/0       Information     Raid Level     Raid 5       System Information     Stripe Size     64KBytes       Block Size     512Bytes       Member Disks     8       Cache Mode     Write Back       Tagged Queuing     Enabled		Volume Capacity	7001.4GB					
Information     Raid Level     Raid 5       RAID Set Hierarchy     Stripe Size     64KBytes       System Information     Block Size     512Bytes       Hardware Monitor     Member Disks     8       Cache Mode     Write Back       Tagged Queuing     Enabled		SAS Port/Lun	0/0					
RAID Set Hierarchy     Stripe Size     64KBytes       System Information     Block Size     512Bytes       Hardware Monitor     Member Disks     8       Cache Mode     Write Back       Tagged Queuing     Enabled		Raid Level	Raid 5					
Biock Size     512Bytes       Hardware Monitor     Member Disks       Cache Mode     Write Back       Tagged Queuing     Enabled		Stripe Size	64KBytes					
Hardware Monitor         Member Disks         8           Cache Mode         Write Back           Tagged Queuing         Enabled		Block Size	512Bytes					
Tagged Queuing Enabled		Member Disks	8					
55 2 5		Cache Mode	Write Back					
Volume State Normal		Tagged Queuing	Enabled					
		Volume State	Normal					

## 5.6.2 System Information

To view the RAID subsystem's controller information, click the **System Information** link from the **Information** menu. The Raid Subsystem Information screen appears.

open all close all						
Raid System Console	Raid Subsystem Information					
Quick Function     Quick Functions     RAID Set Functions     Physical Drives     Physical Drives     System Controls     Information     RAID Set Hierarchy     System Information     Hardware Monitor	Controller Name	Proware				
	Firmware Version	V1.48 2010-10-21				
	BOOT ROM Version	V1.48 2010-09-01				
	PL Firmware Version	7.0.50.219				
	Serial Number	A040AHBWPR200002				
	Unit Serial #					
	Main Processor	800MHz PPC440				
	CPU ICache Size	32KBytes				
	CPU DCache Size	32KBytes/Write Back				
	System Memory	512MB/800MHz/ECC				
	Current IP Address	192.168.15.121				
	SAS Address	5001B4D01770C800				
	SAS Port0 Link Status	Not Linked				
	SAS Port1 Link Status	Not Linked				

The Controller Name, Firmware Version, Boot ROM version, PL Firmware Version, Serial Number, Unit Serial #, Main Processor, CPU ICache Size, CPU DCache Size, System Memory, Current IP Address, SAS Address, SAS Port0 Link Status, and SAS Port1 Link Status appear in this screen.

### 5.6.3 Hardware Monitor

To view the RAID subsystem's hardware information, click the **Hardware Monitor** link from the **Information** menu. The Hardware Monitor Information screen appears.

-Delete Volume Set	▲	
-D Modify Volume Set	Stop Auto Refresh	
-0 Schedule Volume Check	Controller H/W Monitor	
	CPU Temperature	54 °C
Physical Drives	Controller Temp.	28 °C
System Controls	12V	11.795 V
System Configuration     Hdd Power Management	57	5.134 V
EtherNet Configuration     Alert By Mail Configuration     SNMP Configuration     NTP Configuration     View Events/Mute Beeper	3.3V	3.360 V
	DDR-II +1.8V	1.824 V
	CPU +1.8V	1.824 V
	CPU +1.2V	1.248 V
	CPU +1.0V	1.024 V
Generate Test Event	DDR-II +0.9V	0.912 V
Clear Event Buffer           Modify Password	RTC 3.0V	3.264 V
Upgrade Firmware	Battery Status	Not Installed
	Enclosure#1 : SAS RAID Subsystem \	V1.0
Restart Controller ⊦ Information	Fan#1	1776 RPM
	Fan#2	1776 RPM
AID Set Hierarchy     System Information     Hardware Monitor		

The Hardware Monitor Information provides the temperature, fan speed (chassis fan) and voltage levels of the RAID subsystem. All items are also unchangeable. When the threshold values are surpassed, warning messages will be indicated through the LCD, LED and alarm buzzer.

Item	Warning Condition
CPU Temperature	> 90 Celsius
Controller Temperature	> 70 Celsius
Controller Fan Speed	< 1500 RPM
Power Supply +12V	< 10.5V or > 13.5V
Power Supply +5V	< 4.7V or > 5.4V
Power Supply +3.3V	< 3.0V or > 3.6V
DDR Supply Voltage +2.5V	< 2.25V or > 2.75V
CPU Core Voltage +1.3V	< 1.17V or > 1.43V
DDR Termination Power +1.25V	< 1.125V or > 1.375V

# Chapter 6 System Maintenance

## 6.1 Upgrading the RAID Controller's Firmware

#### Upgrading Firmware Using Flash Programming Utility

Since the RAID subsystem's controller features flash firmware, it is not necessary to change the hardware flash chip in order to upgrade the controller firmware. User can simply re-program the old firmware through the RS-232 port. New releases of the firmware are available in the form of binary file at vendor's FTP. The file available at the FTP site is usually a self-extracting file that contains the following:

**XXXXVVV.BIN** Firmware Binary (where "XXXX" refers to the model name and "VVV" refers to the firmware version)

**README.TXT** It contains the history information of the firmware change. Read this file first before upgrading the firmware.

These files must be extracted from the compressed file and copied to one directory in the host computer.

#### Establishing the Connection for the RS-232

The firmware can be downloaded to the RAID subsystem's controller using an ANSI/VT-100 compatible terminal emulation program or web browser-based RAID Manager remote management page.

With terminal emulation program, you must complete the appropriate installation and configuration procedure before proceeding with the firmware upgrade. Whichever terminal emulation program is used must support the ZMODEM file transfer protocol.

Web browser-based RAID Manager can be used to update the firmware. A web browser must have been setup before proceeding with the firmware upgrade.

### Upgrading Firmware Through ANSI/VT-100 Terminal Emulation

Get the new version firmware for your RAID subsystem controller. For Example, download the bin file from your vendor's web site into the local directory.



NOTE: When there is new boot ROM firmware that needs to be upgraded, upgrade first the boot ROM firmware. Then repeat the process (steps 1 to 9) to upgrade the firmware code after which a RAID controller restart will be necessary.

- 1. From the Main Menu, scroll down to "Raid System Function"
- 2. Choose the "Update Firmware". The Update The Raid Firmware dialog box appears.

3. Go to the menu bar and click **Transfer**. Select **Send File**.

餐 Raid - HyperTerminal	_ 🗆 🗵
File Edit View Call Transfer Help	
Capture to Printer  Captu	
Main Menu	
Qu Ra Raid System Function Wo Ph Ratert B Change Vi JB0D/RA Clange Vi JB0D/RA Clange Vi JB0D/RA Clange Ha Maxinum Sy Termina Update Restart Controller ArrowKey Or AZ:Move Cursor, Enter:Select, ESC:Escape, L:Line Draw, X:Redraw Sends affe to the remote system	

4. Select "ZMODEM modem" under Protocol to set ZMODEM as the file transfer protocol of your terminal emulation software.

5. Click Browse. Look in the location where the firmware file was saved. Select the firmware file name "XXXXXXX.BIN" and click Open.

Raid-HyperTerminal File Edt. View Call Transfer Help Main Menu Qu Ra Raid Syster Vo Mute The A Alert B Et Change Vi JBOD/RA RAID Re Ha Ha Maximum Sy Termina Update Restart Con	Pelenane: [C\S160FIRM0527.BIN Browre Protocolt Zmodem Send Close Cancel
	ursor, Enter:Select, ESC:Escape, L:Line Draw, X:Redraw

6. Click Send to send the firmware binary file to the RAID controller.

			{	Model N	ame} RA	ID Contr	oller		
Γ			Zmodem fi	e send for R	aid				
-	Main	Menu	Sending:	C:\6160FIRI	M0627.BIN				
	Qu Ra	Raid S	Last event:	Sending			Files:	1 of 1	
	Vo – Ph Ra	Mute T Alert	Status:	Sending			Retries:	0	
	Et Vi	Change JB0D/R	File:				35k of 240k	<	
	C1 Ha	RAID R Maximu	Elapsed:	00:00:03	Remaining	00:00:17	Throughput	11946 cps	
l		Termin Update				Г	Cancel	cps/bps	
		Restar							

7. When the firmware downloading is completed, the confirmation screen appears. Select Yes to start programming the flash ROM.

2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	
Main Menu       Qu       Ra       Vo       Ph       Mute The Alert Beeper       Alert Beeper Setting       Et     Change Password       Vi     JBD0/RHID Function       Vi     JBD0/RHID Function       Cl     RAID Rebuild Priority       Ha     Maximum ATA Mode	
Sy Jerminal Port Config Update FirmWare Restart Controller ArrowKey Or AZ:Move Cursor, Enter:Select, ESC:Escape, L:Line Draw, X:Redraw	

8. When the Flash programming starts, a message will show "Start Updating Firmware. Please Wait".

Raid - HyperTerminal	_ 🗆 🗙
Image: Start Updating Firmware, Please Wait         ArrowKey Or AZ: Move Cursor, Enter:Select, ESC:Escape, L:Line Draw, X:Redraw	
Connected 0:05:55 VT100 115200 8-N-1 SCROLL CAPS NUM Capture Print echo	//.

9. The firmware upgrade will take approximately thirty seconds to complete.

10. After the firmware upgrade is complete, a message will show "Firmware Has Been Updated Successfully". Restarting the RAID controller is required for the new firmware to take effect.

Raid - HyperTerminal	<u>_                                    </u>
D <b>2 93 D</b> B 2	
(Model Name) RAID Controller         Main Menu       Qu         Raid System Function         Yo         Mute The Alert Beeper         Alert Beeper Setting         Et Change Password         Vi         JB0D/RAID Function         C1         RAID Rebuild Priority         Ha Maximum         Sv         Dedate         Restart Controller	
Connected 0:06:22 VT100 115200 8-N-1 SCROLL CAPS NUM Capture Print echo	

Raid - HyperTerminal File Edit Wew Cal Transfer Help	<u>_                                    </u>
{Model Name} RAID Controller         Main Menu       Qu         Raid System Function         Yo         Mute The Alert Beeper         Raid System Function         Et Change Password         Vi         JB0D/RAID Function         Cl RAID Rebuild Priority         Restart Controller Is Required For New Firmware To Take Effect         Restart Controller         ArrowKey Or AZ: Move Cursor, Enter:Select, ESC:Escape, L:Line Draw, X:Redraw	
Connected 0:06:52 VT100 115200 8-N-1 SCROLL CAPS NUM Capture Print echo	//.

### Upgrading Firmware Through Web Browser

Get the new version of firmware for your RAID subsystem controller.



NOTE: When there is new boot ROM firmware that needs to be upgraded, upgrade first the boot ROM firmware. Then repeat the process (steps 1 to 3) to upgrade the firmware code after which a RAID controller restart will be necessary.

- 1. To upgrade the RAID subsystem firmware, click the **Upgrade Firmware** link under **System Controls** menu. The Upgrade The Raid System Firmware Or Boot Rom screen appears.
- 2. Click **Browse**. Look in the location where the firmware file was saved. Select the firmware file name "XXXXXXX.BIN" and click Open.
- 3. Select the **Confirm The Operation** option. Click the **Submit** button.

proRAID Manager	XXXXXXXXXXXX
open all close all  *	
Image: Second	Upgrade The Raid System Firmware Or Boot Rom Enter The BootRom Or Firmware File Name      Confirm The Operation Submit Reset
*	

4. The Web Browser begins to download the firmware binary to the controller and start to update the flash ROM.

5. After the firmware upgrade is complete, a message will show "Firmware Has Been Updated Successfully". Restarting the RAID controller is required for the new firmware to take effect.

