USB and eSATA to SATA II Tower RAID Subsystem

Installation and User Manual

Revision 1.2

P/N: PW002000000329

Preface

About this manual

This manual provides information regarding the quick installation and hardware features of the **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 topics 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 to prevent damage to the equipment and 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 to the following safety guidelines. Notes about the subsystem's controller configuration and the product packaging and delivery are also included.

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.
- 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.

Packaging, Shipment and Delivery

- Before removing the subsystem from the shipping carton, you should visually inspect the physical condition of the shipping carton.
- Unpack the subsystem and verify that the contents of the shipping carton are all there 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 Subsystem

The package contains the following items:

	RAID Subsystem Unit
	One (1) power cord
	One (1) RJ45 Ethernet cable
And the second sec	One (1) external serial cable RJ11-to-DB9
	One external SATA cable
and the Contraction of the Contr	One USB cable
2002 H 16 16 16 2002	User Manual

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

Chapter 1 Introduction



The RAID Subsystem

1.1 Key Features

Subsystem Features:

- Features a 400MHz RISC I/O processor
- Built-in 128MB cache memory
- Serial ATA, USB 2.0 host port
- Supports up to Four (4) 1" hot-swappable SATA II hard drives
- Supports over-2TB volume
- Excellent user friendly operation: One Step Setup
- High quality advanced cooling fan
- Local audible event notification alarm
- Supports password protection
- Real time drive activity and status indicators

RAID Function Features:

- Supports RAID levels 0, 1, 1+0, 3, 5, JBOD, and Pass-Through
- Supports hot spare and automatic hot rebuild
- Allows online capacity expansion within the enclosure
- Transparent data protection for all popular operating systems
- Bad block auto-remapping
- Array roaming
- Online RAID level migration

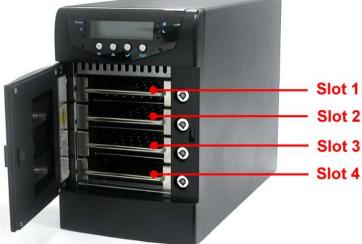
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1.2 Identifying Parts of the RAID Subsystem

The illustrations below identify the various parts of the subsystem.

1.2.1 Front View







WARNING: The disk drive door should be opened in a careful and gentle way (maximum of 95 degrees only) to smoothly slide out the trays.

1. HDD Status Indicator

There are two LED indicators for each disk drive.

Part	Function	
HDD Status LED	No LED light indicates power is on and hard drive status is good for this slot. Red means no disk drive inserted or disk drive is Faulty.	
HDD Access LED	LED will blink blue when the hard drive is being accessed.	

2. Lock Indicator

Every Drive Tray is lockable inside the slots. Open the door lock. When the lock indicator is in vertical position (arrow points downwards), the drive tray is unlocked. When the lock indicator is in horizontal position (arrow points to the left), the drive tray is locked. To lock a drive tray, use a special key and turn the lock indicator.





WARNING: The disk drive door should be opened in a careful and gentle way (<u>maximum of 95 degrees only</u>) to smoothly slide out the trays.

3. Front Panel LED

Part	Function	
Power LED	Green LED indicates power is on. Orange blinking LED indicates subsystem is busy of data is being accessed.	
Busy LED		
Fault LED	Red blinking LED indicates a problem within the internal subsystem, such as over temperature.	
Sleep Mode LED	Orange LED is normal and subsystem is not in sleep mode. Orange blinking LED means subsystem is in sleep mode (spin down idle HDD).	

1.2.2 Rear View



1. Monitor Port

The subsystem is equipped with a serial monitor port allowing you to connect a PC or terminal.

2. R-Link Port: Remote Link through RJ-45 Ethernet for remote management

The subsystem is equipped with one 10/100 Ethernet RJ45 LAN port. You use a web browser to manage the RAID subsystem through Ethernet for remote configuration and monitoring.

Link LED: Green LED indicates Ethernet is linking. **Access LED**: The LED will blink orange when the 100Mbps Ethernet is being accessed.

3. USB Port

The subsystem has one USB 2.0 port for connecting to the host system or server.

4. eSATA Port

The subsystem has one external SATA II port for connecting to the host system or server.

1.3 Technical Specifications

Features	Specification
RAID processor	400MHz storage I/O processor
RAID level	0, 1, 1+0, 3, 5 and JBOD
Cache memory	128MB
No. of channels (host and drive)	2 and 4
Host bus interface	USB 2.0 / eSATAII
Drive bus interface	SATAII (Up to 3.0Gbps)
Data transfer rate	Up to 480Mbits (USB 2.0) / Up to 3.0Gbps (eSATAII)
Hot-swap drive trays	Four (4) 1-inch trays
Cooling fan	1
Password protection	Yes
Audible alarm	Yes
Failed drive indicators	Yes
Failed drive auto rebuild	Yes
Online consistency check	Yes
Online expansion	Yes
Array Roaming	Yes
Online RAID level/ stripe size migration	Yes
Instant availability and background initialization	Yes
Environment monitor	Yes
Auto spare support	Yes
Bad block auto-remapping	Yes
Power supply	180W w/PFC
Power requirements	AC 90V ~ 264V 3A ~ 5A, 60Hz-50Hz
Environmental Relative Humidity: Operating Temp:	20% ~ 85% Non-condensing 10°C ~ 40°C (50°F ~ 104°F)
Physical Dimensions:	226(H) x 149(W) x 322(D)mm 8.90(H) x 5.87(W) x 12.68(D)inches
Weight	8.0kg / 17.64lbs (without drives)

1.4 RAID Concepts

RAID Fundamentals

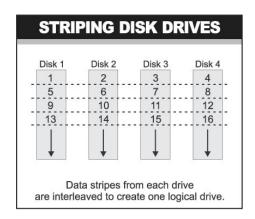
The basic idea of RAID (Redundant Array of Independent Disks) is to combine multiple inexpensive disk drives into an array of disk drives to obtain performance, capacity and reliability that exceeds that of a single large drive. The array of drives appears to the host computer as a single logical drive.

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.

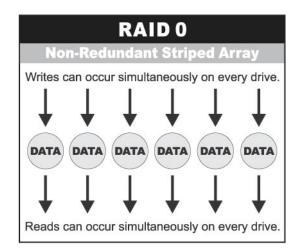
Most operating systems today support concurrent disk I/O operations across multiple drives. However, in order to maximize throughput for the disk subsystem, the I/O load must be balanced across all the drives so that each drive can be kept busy as much as possible. In a multiple drive system without 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.



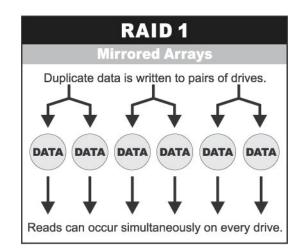
By striping the drives in the array with stripes large enough so that each record falls entirely within one stripe, most records can be evenly distributed across all drives. This keeps all drives in the array busy during heavy load situations. This situation allows all drives to work concurrently on 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

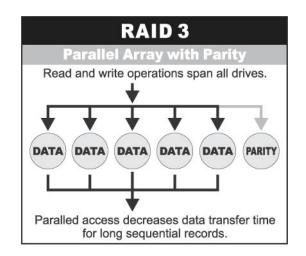
RAID O is typically defined as a group of striped disk drives without parity or data redundancy. RAID 0 arrays can be configured with large stripes for multi-user environments or small stripes for single-user systems that access long sequential records. RAID 0 arrays deliver the best data storage efficiency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



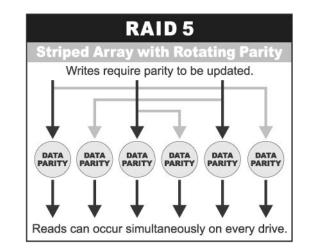
RAID 1, also known as disk mirroring, is simply a pair of disk drives that store duplicate data but appear to the computer as a single drive. Although striping is not used within a single mirrored drive pair, multiple RAID 1 arrays can be striped together to create a single large array consisting of 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 to 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 and the increased read performance inherent in disk striping (RAID 0). These arrays are sometimes referred to as RAID 0+1 or 1+0.

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 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
0	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.	
1 + 0	Combination of RAID levels 0 and 1. This level provides redundancy through mirroring and 4 striping.	

1.5 Array Definition

1.5.1 Raid Set

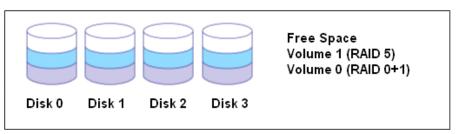
A Raid Set is a group of disk drives containing one or more logical volumes called Volume Sets. It is not possible to have multiple Raid Sets on the same disk drives.

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.

1.5.2 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 0+1 level.



RAID Set 1 (4 Individual Disks)

1.5.3 Easy to Use Features

1.5.3.1 Instant Availability/Background Initialization

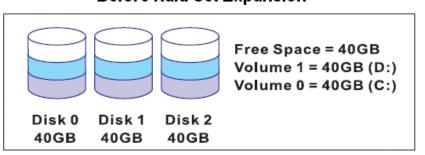
RAID 0 and RAID 1 Volume Set can be used immediately after the creation. But the RAID 3, 5 and 6 Volume Sets must be initialized to generate the parity. In the Background Mode initialization, the initialization proceeds as a background task, the Volume Set is fully accessible for system reads and writes. The operating system can instantly access to the newly created Volume Sets without waiting for the initialization to be completed. One disadvantage of this is that the initialization process takes longer time. In Foreground Mode initialization, the initialization process is faster but must be completed first before the Volume Set is ready for system access.

1.5.3.2 Array Roaming

The RAID subsystem stores configuration information both in NVRAM and on the disk drives. This protects the configuration settings in the case of a disk drive or controller failure. Array roaming allows the administrator the ability to move a complete Raid Set to another system without losing RAID configuration and data on that Raid Set. If a RAID enclosure fails to work, the Raid Set disk drives can be moved to another enclosure and inserted in any order.

1.5.3.3 Online Capacity Expansion

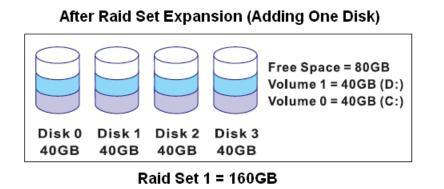
Online Capacity Expansion makes it possible to add one or more physical drives to a Raid Set, while the server is in operation, eliminating the need to backup and restore after reconfiguring the Raid Set. When disks are added to a Raid Set, unused capacity is added at the end of the Raid Set. Data on the existing Volume Sets residing on that Raid Set is redistributed evenly across all the disks. A contiguous block of unused capacity is made available on the Raid Set. The unused capacity can be used to create additional Volume Set. The expansion process is illustrated as follows.



Before Raid Set Expansion

Raid Set 1 = 120GB

The RAID subsystem controller redistributes the original Volume Set over the original and newly added disks, using the same RAID level configuration. The unused capacity on the expand Raid Set can then be used to create an additional Volume Sets, with a different RAID level setting as needed by user.



1.3.3.4 Online RAID Level and Stripe Size Migration

User can do migration on both the RAID level and Stripe Size of an existing Volume Set while the server is online and the Volume Set is in use. Online RAID level/stripe size migration can prove helpful during performance tuning activities as well as in the event those additional physical disks are added to the RAID subsystem. For example, in a system using two drives in RAID level 1, you could add capacity and retain fault tolerance by adding one drive. With the addition of third disk, you have the option of adding this disk to your existing RAID logical drive and migrating from RAID level 1 to 5. The result would be parity fault tolerance and double the available capacity without taking the system off.

1.5.4 High availability

1.5.4.1 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, 0+1, 3, 5 or 6 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.

1.5.4.2 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.

1.3.4.3 Hot-Swap Disk Rebuild

The Hot-Swap feature can be used to rebuild Raid Sets with data redundancy such as RAID level 1, 0+1, 3, 5 and 6. 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 Getting Started

2.1 Preparing the Subsystem and Powering On

Here are the basic 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 USB cable / eSATA cable to the USB port / eSATA port of the RAID subsystem and to the host system or server that will use the storage.
- 3. Connect the power cord to the AC input socket. Plug the other end of power cord to the power source.
- 4. Press the power on switch at the rear of the subsystem.

2.2 Installing Hard Drives

This section describes the physical locations of the hard drives supported by the subsystem and gives 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.

Here are the steps:

- 1. Open the drive door by pressing the door lock downwards.
- 2. If the drive tray is locked, open the drive tray lock. (You may refer to Section 1.2.1 Item 2 Lock Indicator).



- 3. Remove one drive tray.
- 4. Place the disk drive in the drive tray. Make sure the holes of the disk drive align with the holes of the drive tray.
- 5. Install the mounting screws to secure the disk drive into the drive tray.
- 6. Insert the drive tray into the slot. If the RAID subsystem is powered on, the HDD Status LED will change from red into "no light" which means the drive has been detected.

Chapter 3 RAID Configuration

The subsystem has a setup configuration utility built in containing important information about the configuration as well as settings for various optional functions in the subsystem. This chapter explains how to use and make changes to the setup utility.

Configuration Methods

There are three methods of configuring the subsystem. You may configure through the following methods:

- VT100 terminal connected through the controller's serial port
- Front panel touch-control keypad
- Web browser-based Remote RAID management via the R-Link Ethernet port



IMPORTANT! The subsystem allows you to access the utility using only one method at a time. You cannot use more than one method at the same time.

3.1 Configuring Through a Terminal

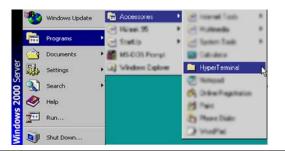
Configuring through a terminal will allow you to use the same configuration options and functions that are available from the LCD panel. To start-up:

1. Connect a VT100 compatible terminal or a PC operating in an equivalent terminal emulation mode to the monitor port located at the rear of the subsystem.



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

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



Connection Description	?×
New Connection	
Enter a name and choose an icon for the conne	ction:
Name:	
RAID	
Icon:	
OK	Cancel
Connect To	? ×
RAID	
Enter details for the phone number that you v	want to dial:
Country code: United States of America (1	1) 💌
Ar <u>e</u> a code: 02	
Phone number:	

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

0K.

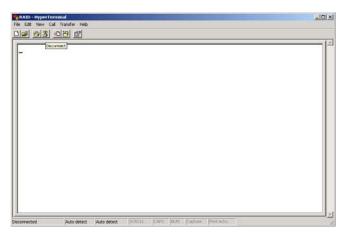
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Cancel

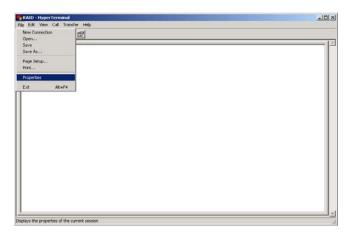
Connect using: Direct to Com1

Bits per second	115200	
<u>D</u> ata bits:	8	•
Parity:	None	*
<u>S</u> top bits:	1	*
Elow control:	None	•

5. Click 🔏 disconnect button.



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



7. Open the Settings Tab.

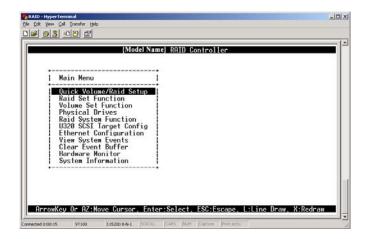
RAID Properties	<u>?!×</u>	
Connect To Settings		
RAID Change	lcon	
Country/region: United States of America (1)	-	
Enter the area code without the long-distance	prefix.	
Area code: 02		
Phone number		
Connect using: DOM		
Configure		
We country/reperiode and new order		
F Redal on busy		
OK	Cancel	

8.

Configure the settings are 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	IX	
Connect To Settings		
Function, arrow, and otl keys act as		
Backspace key sends C Dd+H C Del C Dh+H, Space, Od+H		
Emulation		
Terminal Setup		
Telnet terminal ID: VT100	-	
Backscroll buffer lines: 500	a li	
F Play sound when connecting or disconnecting		
Input Translation ASCII Setup		
OK.	Cancel	

- 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.



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.

Main Menu Duick Volume/Raid Setup	
Raid Set Function Volume Set Function Physical Drives	
Raid System Function U320 SCSI Target Config	Verify Password
Ethernet Configuration View System Events Clear Event Buffer	
Hardware Monitor System Information	
•••••••••••••••••••••••••	



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 3.3. The configuration utility main menu options are:

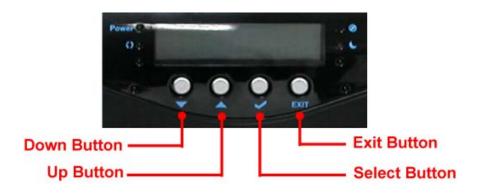
Option	Description
Quick Volume And Raid Set Setup	Create a RAID configuration which consists of all physical disks installed
Raid Set Functions	Create a customized Raid Set
Volume Set Functions	Create a customized Volume Set
Physical Drive Functions	View individual disk information
Raid System Functions	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

3.2 Configuring Using the LCD Panel

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

Front Panel Function Keys

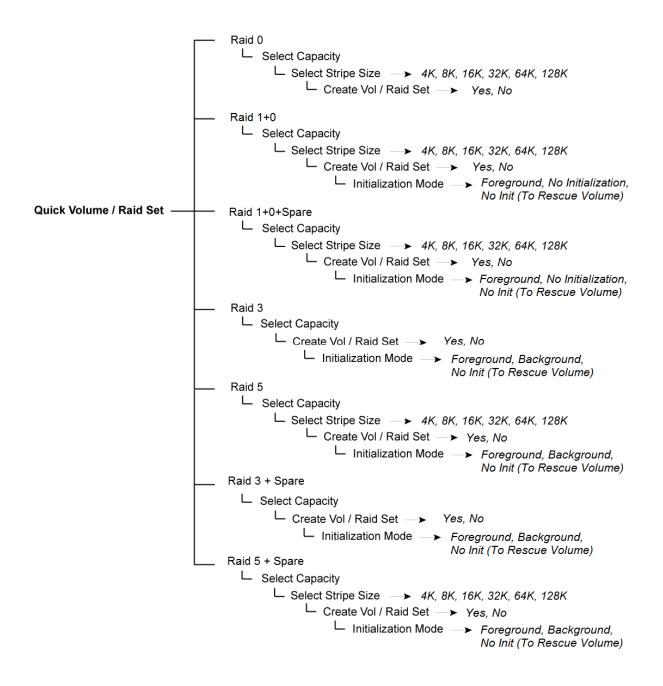
The four function keys at the top of the front panel perform the following functions:

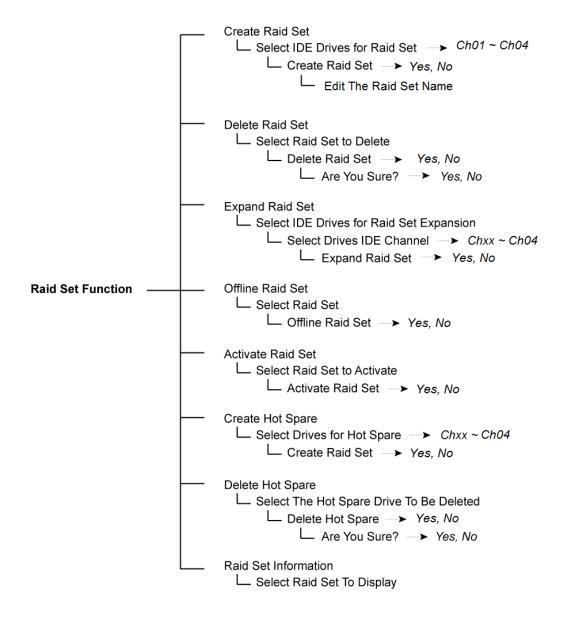


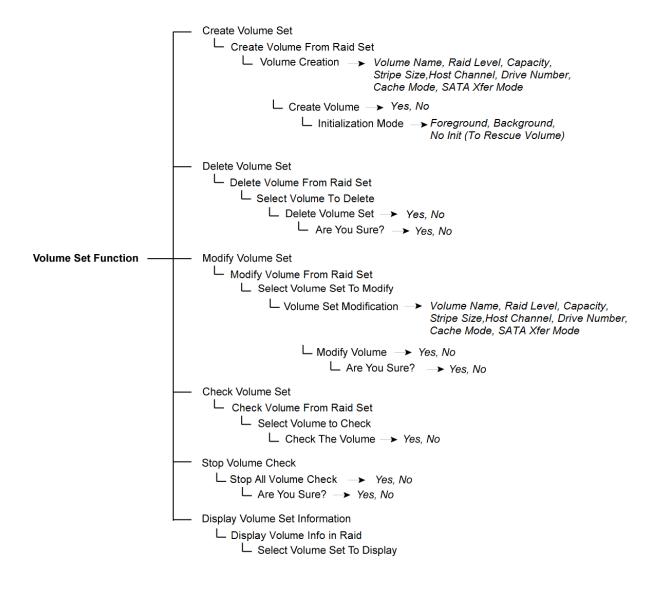
Parts	Function
Up and Down Arrow buttons	Use the Up or Down arrow keys to go through the information on the LCD screen. This is also used to move between each menu when you configure the subsystem.
Select button	This is used to enter the option you have selected.
	Press this button to return to the previous menu.
Exit button EXIT	NOTE: This button can also be used to reset the alarm beeper. For example, if one power supply fails, pressing this button will mute the beeper.

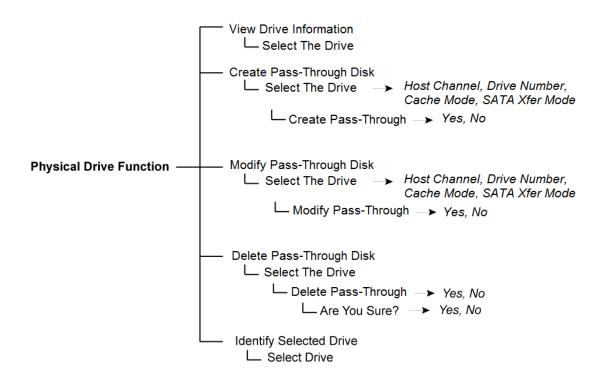
3.3 Menu Diagram

The following tree diagram is a summary of the various configurations and setting functions that can be accessed through the terminal monitor. Also, almost the same menu can be accessed through the LCD panel.

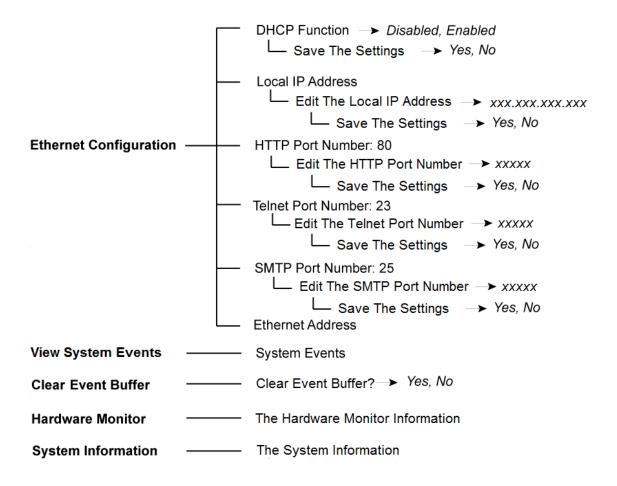








Alert Beeper Setting -> Disabled, Enabled └── Save The Settings → Yes, No Change Password Enter New Password Re-Enter Password └── Save The Password → Yes, No JBOD / RAID Mode Configuration Configure as RAID or JBOD └── Save The Settings → Yes, No Raid Rebuild Priority \rightarrow UltraLow(5%), Low(20%) Medium(50%), High(80%) └── Save The Settings → Yes, No Maximum SATA Mode Supported -> SATA150, SATA150+NCQ SATA300, SATA300+NCQ Host NCQ Mode Setting -> Disabled, ESB2/MACPro/SiliconImage, ICH, Marvell 6145, nVidia └── Save The Settings → Yes, No HDD Read Ahead Cache -> Enabled, Disable Maxtor, Disabled └── Save The Settings → Yes, No Volume Data Read Ahead -> Normal, Disabled, **Raid System Functions -**Conservative, Aggressive └── Save The Settings → Yes, No Stagger Power On -> 0.4, 0.7, 1.0, 1.5, 2.0, 2.5, 3.0, 3.5, 4.0, 4.5, 5.0, 5.5, 6.0 └── Save The Settings → Yes, No 20, 30, 40, 60 L Save The Settings → Yes, No Empty HDD Slot LED Control -> ON / OFF └── Save The Settings → Yes, No HDD Smart Status Polling → Disabled, Enabled └── Save The Settings → Yes, No Auto Activate Raid Set -> Disabled, Enabled └── Save The Settings → Yes, No Capacity Truncation \rightarrow Multiples of 10G. Mulitples of 1G, No Truncation └── Save The Settings → Yes, No Terminal Port Configuration L Baud Rate → 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 └── Save The Settings → Yes, No \square Stop Bits \rightarrow 1 bit, 2 bits └── Save The Settings → Yes, No Update Firmware Restart Controller └─ Restart Controller? → Yes, No L Are You Sure -> Yes, No





NOTE: This subsystem can detect up to 4 Volume Sets in each Host Channel (total 8 Volume Sets). The Volume Set size can be over 2 Terabytes. Use OS: Windows 2003 SP1 or later, Windows XP SP1 or later, Windows Vista, Mac OS 10 or later, and Linux kernel 2.6 or later.

3.4 Web browser-based Remote RAID management via R-Link Port

The RAID subsystem can be configured with RAID Manager, a web browser-based application which utilizes the web browser installed on your operating system. The web browser-based RAID Manager can be used to manage all the RAID function.

To configure the RAID subsystem on a remote machine, you need to know its IP Address. Launch your web browser by entering http://[IP Address] in the remote web browser.



IMPORTANT! The Ethernet default IP is "192.168.001.100". DHCP function is "Enabled". You can configure the correct IP Address through the LCD panel or the terminal "Ethernet Configuration" menu.

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

	Raid Set	IDE C	hannels V	olume Set(Ch/Drv#)	Volume State	Capacity
	Channels	Usage	Capacity		Model	
Ch0			82.3GB	HDS728080PLA380		
Ch0 Ch0			82.3GB 82.3GB	HDS728080PLA380 HDS728080PLA380		
Ch0			N.A.	HD5728080PLA580		

Main Menu

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

Individual	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
Physical Drives	Create pass through disks and allow modification of parameters of existing pass through drives. This also provides a function to identify a respective disk drive.
System Controls	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.

Configuration Procedures

Below are a few practical examples of concrete configuration procedures.

3.5 Quick Create

Outch Function	RAID Manager	XXXXXXX	•
@RaidSet Functions			•
Over the set Functions	Quick Create Raid/Volume Set		
@Physical Drives	Total Number Of Disks	4	
⊕System Controls	Select Raid Level	Raid 5	
@Information	Maximum Capacity Allowed	3000 GB	
	Select Capacity	3000 GB	
	Greater Two TB Volume Support	No	
	Volume Initialization Mode	Foreground Initialization	
	Select Stripe Size	64 🛩 KBytes	
	Confirm The Operation Submit Reset		

The number of physical drives in the RAID subsystem determines the RAID levels that can be implemented within the Raid Set. You can create a Raid Set associated with exactly one Volume Set. The user can change the RAID level, Capacity, Volume Initialization Mode and Stripe Size. A hot spare option is also created depending upon the existing configuration. Tick on the **Confirm The Operation** and click on the **Submit** button in the Quick Create screen, the Raid Set and Volume Set will start to initialize.

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 above example. There are two options to select: "No" and "Yes".

Greater Two TB Volume Support:

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

Yes: Volume Set capacity can be set over 2TB.



NOTE: In Quick Create, the 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 your Raid Set and Volume Set.



NOTE: When Quick Create is used, the Volume Set will be mapped by default to both host channels "SATA&USB/0". After the initialization done, please use the Volume Set function to modify the host channel as you need.

3.6 Raid Set Functions

Use the Raid Set Function and Volume Set Function if you prefer to customize your system. User can manually configure and has full control of the Raid Set and Volume Set setting, but it will take longer to set up than when using the Quick Create function. 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. The maximum number of RAID Sets that can be created depends on the number of disk channels in the RAID subsystem. For 4-bay RAID subsystem, four Raid Sets can be created.

3.6.1 Create Raid Set

@Quick Function	D	RAID O	Nananar	XXXXXXXX
©RaidSet Functions Create Raid Set	U M	RAID C	wallayei	·
Delete Roid est	_			
Expand Raid Set	Select	The IDE Driv	es For RAID	Set
Offline Raid set		1		
Activate Raid Set	Select		Capacity	Model
Create Hot Spare Delete Hot Spare	5	IDE Ch01	82.3GB	HDS728080PLA380
Rescue Raid Set	5	IDE Ch02	82.3GB	HDS728080PLA380
	1	IDE Ch03	82.3GB	HDS728080PLA380
@VolumeSet Functions	Raid S	et Name	Raid Set#00	
@Physical Drives				
⊕System Controls	☑ C₀	nfirm The Opera	ation	
	Subm	it Reset		
OInformation	ouom	10000		

To create a Raid Set, click on the **Create Raid Set** link. A "Select The IDE Drives For RAID Set" screen is displayed showing the IDE drives in the RAID subsystem. Check the "Select" option to include a physical drive to the current Raid Set. Enter the preferred Raid Set Name (1 to 15 alphanumeric characters) to define a unique identifier for the Raid Set. The default Raid Set name will always appear as Raid Set # 00 for first Raid Set.

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

3.6.2 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 current subsystem. Check the Raid Set number you want to delete in the Select column.

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

Select The Raid Set To Delete Select The Raid Set Name Member Disks Raid State Ca Raid Set # 00 3/3 Normal 247.0GB Confirm The Operation, VolumeSet In This RaidSet Will Also Be Deleted Submit Reset	Capacity
metions Raid Set # 00 3/3 Normal 247.0GB Image: Submit Reset Submit Reset	
Inctions Include: Section (Section (Sec	
anctions Confirm The Operation, VolumeSet In This RaidSet Will Also Be Deleted Submit Reset	
unctions Submit Reset	
Submit Reset	
ols	

3.6.3 Expand Raid Set

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

dSet Functions Raid Set Raid set		RAID <i>M</i> anag	jei		
d Raid Set Raid set		e Raid Set For Raid	-	D 1161 1	a
te Raid Set Hot Spare	Select	Raid Set Name	Member Disks	Raid State	Capacity
Hot Spare	•	Raid Set # 00	3/3	Normal	247.0GB
e Raid Set	Submit	Reset			
umeSet Functions					
sical Drives					
tem Controls					
ormation					

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.

⊕Quick Function ⊗RaidSet Functions	R	RAID O	Manager	XXXXXXXX	-
Create Raid Set					-
Delete Raid set					
Expand Raid Set	PATD	F	. Data Set # 00	0 ; Member Disks : 3	
Offline Raid set	IAD	Expansion on	: Raid Set # 00	; Wember Disks : 5	
Activate Raid Set					
Create Hot Spare	Select	Channel	Capacity	Model	
Delete Hot Spare	Select	Chaimei	Capacity	Iviouei	
Rescue Raid Set	V	IDE Ch04	82.3GB	HDS728080PLA380	
⊕VolumeSet Functions					
@Physical Drives @System Controls @Information	Submi	nfirm The Opera	ation		

⊕Quick Function	RAID CA	ananar XXX	XXXXX	
©RaidSet Functions	W RAID CA	anayer		
Create Raid Set				
Delete Raid set	Raid Set # 00 : Total I) Disks = 4, Disks Before E	rpansion = 3	
Expand Raid Set Offline Raid set				
Activate Raid Set	Change The Volume A	ttribute During Raid Expa	insion ?	
Create Hot Spare		1		
Delete Hot Spare	Volume Name	Raid Level	Stripe Size	
Rescue Raid Set	VolumeVOL#00	Raid 5 💌	64 💌 KBytes	
Over the set of the	VolumeVOL#01	Raid 5 💌	64 🔽 KBytes	
	VolumeVOL#02	Raid 5 💌	64 KBytes	
 	VolumeVOL#03	Raid 5 V	64 V KBytes	
⊕System Controls				
#Information	YES NO Reset			
Willormation				

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.

3.6.4 Offline Raid Set

If user wants to offline (and move) a Raid Set while the RAID subsystem is powered on, use the Offline Raid Set function. After completing the function, the HDD state will change to "Offlined" Mode.

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 to offline the selected Raid Set.

@Quick Function	D	RAID Mana	aar XXX	XXXXX		<u> </u>
©RaidSet Functions	Am -	KAID Chana	ger			
Create Raid Set						-
Delete Raid set						
Expand Raid Set	Select Th	e Raid Set To Offlin	e			
Offline Raid set						
Activate Raid Set	Select	Raid Set Name	Member Disks	Raid State	Capacity	
Create Hot Spare	e	Raid Set # 00	3/3	Normal	247.0GB	
Delete Hot Spare					1	
Rescue Raid Set	Confin	m The Operation Volu	umeSet In This RaidSe	t Will Also Be Offline	đ	
Over the set of the		in the operation, +or	ancoct in this reade	t will have be childe	4	
	Submit	Reset				
 						
⊕System Controls						
@Information						

Quick Function			,	v	vvvvvv		
RaidSet Functions	$R_{\rm m} = 1$	RAID Ma	anager	$\mathbf{\Lambda}_{2}$	XXXXXXX		
eate Raid Set			-				
lete Raid set	Raid Set Hi						
and Raid Set	Raid Set Fi	erarchy					
<u>line Raid set</u> ivate Raid Set							
ate Hot Spare	Raid	Set II	DE Channels	1	/olume Set(Ch/Lun)	Volume State	Capacity
ete Hot Spare							
cue Raid Set							
olumeSet Functions	IDE Chann	els					
hysical Drives	Channel	Usage	e Capac	ity		Model	
ystem Controls	<u>Ch01</u>	Offlined	82.3GB		HDS722580VLSA80		
	Ch02	Offlined	82.3GB		HDS728080PLA380		
formation	Ch03	Offlined	82.3GB		HDS728080PLA380		
1Set Hierarchy tem Information	Ch04	N.A.	N.A.		N.A.		

3.6.5 Activate Incomplete Raid Set

When one disk drive is removed or failed in power off state and the RAID subsystem is powered on, the Raid Set State will change to Incomplete. If it is needed to access the Volume Set, use the Activate Raid Set option to active the Raid Set. After selecting this function, the Raid Set State will change to Degraded.

To activate the incomplete the Raid Set, click on the **Activate 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 which you want to activate in the Select column.

@Quick Function	P .	RAID Manag	nor XXX	XXXXX		-
©RaidSet Functions Create Raid Set	N	MAID ON allay	jei			
Delete Raid set						
Expand Raid Set	Select Th	e Raid Set To Activa	ate			
Offline Raid set Activate Raid Set	Select	Raid Set Name	Member Disks	Raid State	Capacity	
Create Hot Spare Delete Hot Spare	e	Raid Set # 00	2/3	Incomplete	247.0GB	
Rescue Raid Set	Submit	Reset				
Over the set of the						
 						
@System Controls						
⊕Information						

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.

tions Raid Set I	lierarchy				
Raio	Raid Set IDE Channels		/olume Set(Ch/Drv#)	Volume State	Capacity
Raid Set #		Volur	neVOL#00 (1/0)	Degraded	50.0GB
	Ch02	Volur	neVOL#01 (1/1)	Degraded	40.0GB
	Failed	Volur	neVOL#02 (0/0)	Degraded	40.0GB
		Volue	neVOL#03 (0/1)	Degraded	34.7GB
IDE Chan					
IDE Chan Channel		Capacity		Model	
			HDS728080PLA380		
Channel	Usage	Capacity			
Channel Ch01	Usage Raid Set # 00	Capacity 82.3GB	HDS728080PLA380		

3.6.6 Create Hot Spare

The Create Hot Spare option gives you the ability to define a global 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. Tick on the **Confirm The Operation** and click on the **Submit** button to create hot spare drive(s).

⊕Quick Function ⊗RaidSet Functions	R	RAID C	Manager	XXXXXXXX			
<u>Create Raid Set</u> Delete Raid set Expand Raid Set	Select	Select The IDE Drives For Hot Spare					
<u>Offline Raid set</u> <u>Activate Raid Set</u> <u>Create Hot Spare</u> Delete Hot Spare	Select	Channel	Capacity	Model			
Rescue Raid Set		IDE Ch04	82.3GB	HDS728080PLA380			
⊕VolumeSet Functions		firm The Oper	ation		_		
@Physical Drives	Submit				_		
@System Controls	Submit	Meset					
@Information							

3.6.7 Delete Hot Spare

Use this option to remove the Hot Spare function from a disk drive.

Click the Delete Hot Spare function then select the Hot Spare Disk. Tick on the **Confirm The Operation**, and click on the **Submit** button in the screen to delete the hot spare disk.



3.6.8 Rescue Raid Set

If you need to rescue a missing Raid Set, please contact our support engineer for assistance.

⊕Quick Function	RAID Manager XXXXXXXX
	INTE Chanager
Create Raid Set	
Delete Raid set	
Expand Raid Set	Try To Rescue Missing RAIDSET
Offline Raid set	Enter 'RESCUE' To Try To Recover Missing RaidSet Enter 'SIGNAT' To Regenerate RaidSet Signature If RaidSet Is Recovered
Activate Raid Set Create Hot Spare	Enter STOTAAT TO Kegenerate Kaldber Signature II Kaldber is Recovered
Delete Hot Spare	Enter The Keyword
Rescue Raid Set	Line The Keyword
	Confirm The Operation
Over the set of the	
@Physical Drives	Submit Reset
⊕System Controls	
@Information	

3.7 Volume Set Function

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.

3.7.1 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 16 Volume Sets in a Raid Set can be created by the RAID subsystem controller. But only 4 Volume Sets can be mapped in each host channel (total 8 Volume Sets can be mapped).

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 Volume 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.

Configure the Volume Set name, Capacity, RAID level, Stripe Size, Cache Mode, Initialization Mode (if needed), SATA Data Xfer Mode, and Channel/Drive#.

@Quick Function	RAID Manag	XXX	XXXXX		
	KAID Owanag	jer			-
©VolumeSet Functions Create Volume Set Delete Volume Set	Select The Raid Set To Creat	e Volume On It			
Modify Volume Set Check Volume Set	Select Raid Set Name	Member Disks	Raid State		Capacity
Stop Volume Set Check	Raid Set # 00	4/4	Normal	4000.0GB	
@Physical Drives	Submit Reset				
⊕System Controls					
@Information					

ΦQuick Function ΦRaidSet Functions	RAID Manager	XXXXXXXX	Î
			1
Over the set of the se			
Delete Volume Set	Enter Volume Attribute On Raid Set # 0	0	
Modify Volume Set			
Check Volume Set	Volume Name	Volume-VOL#00	
Stop Volume Set Check	Member Disks	6	
@ Physical Drives	Volume Raid Level	Raid 5	
⊕System Controls	Max Capacity Allowed	2500.5 GB	
	Select Volume Capacity	2500.5 GB	
@Information	Greater Two TB Volume Support	No	
	Volume Initialization Mode	Foreground Initialization	
	Volume Stripe Size	64 💌 KBytes	
	Volume Cache Mode	Write Back	
	SATA Data Xfer Mode	SATA300+NCQ -	
	Channel:Drive#	SATA V:0 V	
		71	
	Drv#0~3: eSATA:Port Multiplier Emulation DEV#0~3	2 #4 \st 150 accessed	
	USB:LUN#0~3, #4~#15:Reserved	, #4>#1Dixeserved	
	Confirm The Operation		
	Submit Reset		

Volume Name:

The default Volume Set name will always appear as Volume---VOL#00. You can rename the Volume Set name provided it does not exceed the 15 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 above example. There are two options to select: "No" and "Yes".

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

Yes: Volume Set capacity can be set over 2TB.

Initialization Mode:

Set the Initialization Mode for the Volume Set. Foreground mode is completed faster but Volume Set but be completed before it becomes accessible. Background mode makes the Volume Set available instantly but the initialization process takes longer.

Stripe Size:

This parameter sets the size of the stripe written to each disk in a RAID 0, 1, 1+0, 3, and 5 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 the host server does mostly sequential reads. However, if you are sure that the host server 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 Write-Through Cache and Write-Back Cache.

SATA Data Xfer Mode

The RAID subsystem supports SATA150, SATA150+NCQ, SATA300, and SATA300+NCQ data transfer mode.

Channel

Select the Host Channel for mapping the Volume Set. Options are: SATA, USB, and SATA&USB.

Drive

Drive # options are: 0, 1, 2, and 3. Each Host Channel can support maximum 4 Volume Sets. eSATA: Port Multiplier Emulation: DEV# 0 ~ 3 (#4 ~ #15: Reserved) USB: LUN# 0 ~ 3 (#4 ~ #15: Reserved)

3.7.2 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.

O Quick Function	Ro	RAID <i>M</i> anager	XXXXX	XXXX		Ĩ
⊗VolumeSet Functions <u>Create Volume Set</u> Delete Volume Set	Select The	e Volume Set To Delete				_
Modify Volume Set	Select	Volume Set Name	On Raid Set		Capacity	
Check Volume Set Stop Volume Set Check	o	VolumeVOL#00	Raid Set # 00	164.7GB		
⊕ Physical Drives	Confirm	n The Operation				
⊕System Controls	Submit	Reset				
@Information						

3.7.3 Modify Volume Set

Use this function to modify Volume Set configuration.

To modify the attributes of a Volume Set:

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.

a				
meSet Functions Volume Set	Salast Th	e Volume Set For Modif	faction	
Volume Set	Select II	le volume set for mou	ncanon	
Volume Set	Select	Volume Set Name	On Raid Set	Capacity
<u>Volume Set</u> olume Set Check	•	VolumeVOL#00	Raid Set # 00	50.0GB
	С	VolumeVOL#01	Raid Set # 00	40.0GB
ical Drives	0	VolumeVOL#02	Raid Set # 00	40.0GB
em Controls mation	C Submit	VolumeVOL#03	Raid Set # 00	34.7GB

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.

@ Quick Function	RAID Manager	XXXXXXXX
⊕RaidSet Functions	in the second second	
©VolumeSet Functions		
<u>Dreate Volume Set</u>	Enter Volume Attribute On Raid Set	# 00
<u>Velete Volume Set</u> Modify Volume Set		
heck Volume Set	Volume Name	Volume-VOL#00
top Volume Set Check	Member Disks	3
Physical Drives	Volume Raid Level	Raid 5 💌
BSystem Controls	Max Capacity Allowed	164.7 GB
-	Select Volume Capacity	164.7 GB
DInformation	Volume Initialization Mode	Foreground Initialization
	Volume Stripe Size	64 KBytes
	Volume Cache Mode	Write Back
	SATA Data Xfer Mode	SATA300+NCQ -
	Channel:Drive#	SATA : 0 .
	Drv#0-3: eSATA-Port Multiplier Emulation DEV# USB-LUN#0-3, #4-#15Reserved IF Confirm The Operation Submit Reset	0~3, #4>#15Reserved

3.7.3.1 Volume 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 3.6.3)

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.

3.7.4 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.

eSet Functions	Raid Set Hi	erarchy				
al Drives	Raid S	THE TOP OF	hannels	Volume Set(Ch/Drv#)	Volume State	Capacity
ntrols	Raid Set # 0			meVOL#00 (0/0)	Volume State Migrating(1.4%)	50.0GB
	I I I I I I I I I I I I I I I I I I I	Ch02		meVOL#01 (0/1)	Need Migrate	40.0GB
		Ch03		meVOL#02 (1/0)	Need Migrate	40.0GB
		 Ch04←		meVOL#03 (1/1)	Need Migrate	34.7GB
	IDE Channe		Conscitu		Madal	
	IDE Channel	Usage	Capacity		Model	
			Capacity 82.3GB	HDS728080PLA380	Model	
	Channel	Usage		HDS728080PLA380 HDS728080PLA380	Model	
	Channel Ch01	Usage Raid Set # 00	82.3GB		Model	

3.7.5 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.

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

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: If none of the 2 options is selected, this function will only check for error. If an error is found, it will not be corrected.

Mir Volume Set Select Volume Set Name On Raid Set Capacity K. Volume Set Volume Set Name On Raid Set # 00 50.00B Volume Set Obsek Volume-VOL400 Raid Set # 00 40.03B Image: Set Volume Set Name Volume-VOL400 Raid Set # 00 40.03B Volume Set Name Volume-VOL400 Raid Set # 00 40.03B Image: Volume-VOL400 Raid Set # 00 50.003B Volume Set Name Volume-VOL400 Raid Set # 00 40.03B Image: Volume-VOL400 Raid Set # 00 50.004 60.03B Image: Volume-VOL400 Raid Set # 00 50.004 60.04B Image: Volume-VOL400 Raid Set # 00 50.004 60.04B Image: Volume-VOL400 Raid Set # 00 50.004 60.04B Image: Volume Set Volume-Volume Set Wolume Set # Set # 00 50.004 60.04B Image: Volume Set Volume Set Volume Set Wolume Set # Set # 00 50.004 60.04B Image: Volume Set Vo	lumeSet Functions te Volume Set te Volume Set	Select Th	e Volume Set To Be Ch	ecked		
Volume Set Check IP Volume VOL400 Raid Set # 00 50.0GB ysical Drives IP Volume VOL400 Raid Set # 00 40.0GB IP Volume VOL400 Raid Set # 00 34.7GB isomation IP Serub Bad Block IF Bad Block IF Found, Assume Parity Data Is Good. IP Confirm The Operation IP	fy Volume Set	Select	Volume Set Name	On Raid Set	Capacity	
rsical Drives		R	VolumeVOL#00	Raid Set # 00	50.0GB	
Image: Controls Image: Contred: Contred: Controls Image: Controls			VolumeVOL#01	Raid Set # 00	40.0GB	
formation Formation	ysical Drives		VolumeVOL#02	Raid Set # 00	40.0GB	
Scrub Eado Bolock II Pado Bolock II Politic, Assume Pathy Data II Good. Re-compute Parity IP raity Error Is Found, Assume Data Is Good. [2] Confirm The Operation	stem Controls		VolumeVOL#03	Raid Set # 00	24 7 GP	
		Re-con	npute Parity If Parity Error	Found, Assume Parity I	Data Is Good.	

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

Raid						
	Set	IDE Channels	1	/olume Set(Ch/Drv#)	Volume State	Capacity
Raid Set # 0	10 İC	Ch01	Volun	seVOL#00 (1/0)	Checking(1.7%)	50.0GB
	6	7h02	Volun	xVOL#01 (1/1)	Normal	40.0GB
	9	7h03	Volu	xVOL#02 (0/0)	Normal	40.0GB
			Volun	seVOL#03 (0/1)	Normal	34.7GB
				HDS728080PL 4380	210461	
				UTxC72900001 A 200	Model	
Ch02	Raid Set (#00 82.3G	в	HDS728080PLA380		
Ch03	Raid Set (Ø 00 82.3G	в	HDS728080PLA380		
Ch04	Free	82.3G	в	HDS728080PLA380		
	IDE Channel Channel Cho2 Cho2 Cho3	IDE Channels IDE Channel Us: Channel Us: Channel Chann	Ch02 Ch03 IDE Channels Ch01 Raid Set # 00 Ch02 Raid Set # 00 Ch03 Raid Set # 00	Chú2 Volu Chú2 Volu Chú2 Volu Usage Capacity Channel Usage Channel 0 Chú2 Cápacity Chú2 Raid Set # 00 Chú2 Raid Set # 00 Chú2 Raid Set # 00 Chú2 Raid Set # 00	Ch02 VolumeVOL#01 (1/1) Ch03 VolumeVOL#02 (0/0) VolumeVOL#03 (0/1) VolumeVOL#03 (0/1) IDE Channels Ch01 Raid Set # 00 82 3GB Ch02 Ruid Set # 00 82 3GB HDS728080PLA380 Ch03 Ruid Set # 00 82 3GB HDS728080PLA380	Ch02 VolumeVCL#01 (1/1) Normal Ch03 VolumeVCL#02 (00) Normal VolumeVCL#03 (0/1) Normal IDE Channels IDE Channel (Usage Capacity Model Ch01 Raid Set # 00 82.3GB IDDS 720000PLA380 Ch03 Ch03 Raid Set # 00 82.3GB

3.7.6 Stop Volume Set Check

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

3.8 Physical Drive

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

3.8.1 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, IDE Data Xfer Mode and IDE Channel/IDE Drive# for this volume.

⊕Quick Function	R. RAID	Managor	XXXXX	XXXX	î
⊕RaidSet Functions	M KAID	wanayer			-
Over the set of the	Select the IDE driv	o For Pass Thre	ngh		
©Physical Drives Create Pass Through Modify Pass Through Delte Pass Through Identify Drive @System Controls	Select Channel	Capacity 82.3GB	HDS728080PLA3	Model	
©Information RadSet-Hierarchy System Information Hardware Monitor	Enter Pass Throng Volume Cache Mod SATA Data Xier M Channel Drive# Drv#0-3; eSATAP ort Multph USB LUN#0-3, 44- If Confirm The Op Submit Reset	e ode er Emulation DEV #15:Reserved		Wite Back ATA300-NCO ATA : 2 erved	

3.8.2 Modify Pass-Through Disk

Use this option to modify the Pass-Through Disk attributes. User can modify the Cache Mode, Tagged Command Queuing, IDE Data Xfer Mode and IDE Channel/IDE Drive#.

To modify the Pass-Through drive attribute from the Pass-Through drive pool, click on the **Modify Pass-Through** 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.

⊕Quick Function ⊕RaidSet Functions	R RAID C	Manager	XXXXXXXX	-
				-
@VolumeSet Functions	Select The Pass Thr	ough Disk For	Modification	1
©Physical Drives		- ug	A THE OWNER OF THE OWNER	
Create Pass Through Modify Pass Through Delete Pass Through	Select Channel	Capacity	Model	
Identify Drive	© IDE Ch04	82.3GB	HDS728080PLA380	
@System Controls				
©Information RaidSet Hierarchy System Information Hardware Monitor	Submit Reset			

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

⊕Quick Function	RAID Manager	XXXXXXXX	Î
⊕RaidSet Functions	M RAID Owanayer		-
Our Set Functions			
ØPhysical Drives	Enter Pass Through Disk Attribute		
Create Pass Through			
Modify Pass Through	Ch04 82.3GB HDS728080PLA380		
Delete Pass Through	-		
Identify Drive	Volume Cache Mode	Write Back	
⊕System Controls	SATA Data Xfer Mode	SATA300+NCQ V	
Sinformation	Channel:Drive#	SATA • : 2 •	
RaidSet Hierarchy		, <u> </u>	
System Information	Drv#0~3:		1
Hardware Monitor	eSATA:Port Multiplier Emulation DEV	#0~3, #4>#15:Reserved	
	USB:LUN#0~3, #4~#15:Reserved		
	Confirm The Operation		
	Submit Reset		
	Submit Reset		

To save changes, tick on Confirm The Operation and click on the Submit button.

3.8.3 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.

Quick FunctionRaidSet Functions	R	RAID C	Manager	XXXXXXXX	, ,
@VolumeSet Functions	Select T	he Pass Thr	ough Disk To	Delete	1
©Physical Drives Create Pass Through					
<u>Modify Pass Through</u> <u>Delete Pass Through</u> Identify Drive	Select	Channel	Capacity	Model	
OSystem Controls	© I	DE Ch04	82.3GB	HDS728080PLA380	
©Information RaidSet Hierarchy System Information <u>Hardware Monator</u>		im The Oper.	ation		

3.8.4 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 LED of the selected disk drive will light.

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 disk drive from the drives list. After completing the selection, click on the **Submit** button to identify selected drive.

		Manager				
Salact						
Select The IDE Device For Identification						
Select	Channel	Capacity	Model			
•	IDE Ch01	82.3GB	HDS728080PLA380			
0	IDE Ch02	82.3GB	HDS728080PLA380			
0	IDE Ch03	82.3GB	HDS728080PLA380			
	© 0	© IDE Ch01 C IDE Ch02	© IDE Ch01 82.3GB C IDE Ch02 82.3GB C IDE Ch03 82.3GB	© IDE Ch01 82.3GB HDS725030PLA380 C IDE Ch02 82.3GB HDS728080PLA380 C IDE Ch03 82.3GB HDS728080PLA380		

3.9 System Controls

3.9.1 System Configuration

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

Quick Function	RAID Manager	XXXXXXXX	ĺ
⊕VolumeSet Functions			1
@ Physical Drives	System Configurations		1
System Controls	System Beeper Setting	Enabled T	1
System Config EtherNet Config	Background Task Priority	High(80%)	Ť.
Alert By Mail Config	Terminal Port Configuration	Baud Rate 115200 - , Stop Bits 1 -	1
SNMP Configuration NTP Configuration	JBOD/RAID Configuration	RAID V	5
View Events/Mute Beeper	Max SATA Mode Supported	SATA300+NCQ -	í.
Generate Test Event	Host NCQ Mode Setting	ESB2/MACPro/SiliconImage	÷
Clear Event Buffer Modify Password	HDD Read Ahead Cache	Enabled	÷
Upgrade Firmware	Volume Data Read Ahead	Normal	1
Restart Controller	Stagger Power On Control	0.7 -	÷.
@Information	Spin Down Idle HDD (Minutes)	Disabled 💌	÷.
	Empty HDD Slot LED	ON I	÷
	HDD SMART Status Polling	Disabled -	÷
	Auto Activate Incomplete Raid	Disabled 💌	÷.
	Disk Capacity Truncation Mode	No Truncation	ř.
		7.	2
	Confirm The Operation		1
	Submit Reset		

System Beeper Setting:

This option is used to Disabled or Enable the subsystem'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.

Terminal Port Configuration:

Baud Rate setting values are 1200, 2400, 4800, 9600, 19200, 38400, 57600, and 115200. Use 115200 for the RAID subsystem terminal port speed setting.

Stop Bits values are 1 bit and 2 bits. Use 1 bit for the RAID subsystem stop bit setting.

Note: Parity value is fixed at "None". Data Bits value is fixed at 8 bits.

JBOD/RAID Configuration

The RAID subsystem supports JBOD and RAID configuration.

Maximum SATA Mode Supported:

The 4 SATA drive channel can support up to SATA II, which runs up to 300MB/s. 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. RAID subsystem allows user to choose the SATA Mode: SATA150, SAT150+NCQ, SAT300, SATA300+NCQ.

Host NCQ Mode Setting:

This option allows the users to select the supported Host NCQ Mode or to disable it. Options are: ESB2/MACPro/SiliconImage, Marvell 6145, ICH, nVidia, and Disabled.

HDD Read Ahead Cache:

This option allows the users to disable the cache of the disk drives in 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.

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.

Spin Down Idle HDD (Minutes):

This option enables the hard drives to spin down after they become idle after a preset period of time. Options are: Disabled, 1 (For Test), 3, 5, 10, 15, 20, 30, 40, and 60.

Empty HDD Slot LED:

Use this option to turn ON or OFF the LED of a slot with no HDD.

HDD SMART Status Polling:

The RAID subsystem can read HDD SMART information through this function. This function is enabled by default.

Auto Activate Incomplete Raid:

Use this option to automatically activate an Incomplete Raid Set. Note that the Raid Set status becomes Incomplete when one disk is removed or failed in power off state. After activated, the Volume Set(s) in the Raid Set will be in Degraded mode.

Disk Capacity Truncation Mode:

This 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.

3.9.2 EtherNet Config

To set the Ethernet configuration, click the **EtherNet Config** 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.

ΦRaidSet Functions ΦVolumeSet Functions	RAID Wanager XXXX	
⊕VolumeSet Functions		
₽Physical Drives	Ether Net Configurations	
System Controls	DHCP Function	Disabled 💌
ystem Config therNet Config	Local IP Address (Used If DHCP Disabled)	192 . 168 . 15 . 101
lert By Mail Config	Gateway IP Address (Used If DHCP Disabled)	192 . 168 . 1 . 1
NMP Configuration TP Configuration	Subnet Mask (Used If DHCP Disabled)	255
iew Events/Mute Beeper	HITP Port Number (71688191 Is Reserved)	80
enerate Test Event	Telnet Port Number (71688191 Is Reserved)	23
lear Event Buffer Iodify Password	SMTP Port Number (71688191 Is Reserved)	25
pgrade Firmware	Current IP Address	192.168.15.101
estart Controller	Current Gateway IP Address	192.168.1.1
Information	Current Subnet Mask	255.255.255.0
	Ether Net MAC Address	00.1B.4D.00.B3.CA

3.9.3 Alert By Mail Config

To set the Event Notification function, click on the **Alert By Mail Config** link under the System Controls main 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 Information).

@Quick Function	RAID Manager	XXXXXXXX	<u>^</u>
@RaidSet Functions			- -
⊕VolumeSet Functions	SMTP Server Configuration		^
⊕Physical Drives	SMTP Server IP Address	0.00.00	
©System Controls			
System Config	Mail Address Configurations		
EtherNet Config			
Alert By Mail Config SNMP Configuration	Sender Name :	Mail Address :	
NTP Configuration	Account :	Password :	
View Events/Mute Beeper			
Generate Test Event	MailTo Name1 :	Mail Address :	
Clear Event Buffer		Mail Address :	
Modify Password	MailTo Name2 :		
Upgrade Firmware	MailTo Name3 :	Mail Address :	
Restart Controller	MailTo Name4 :	Mail Address :	
@Information			
	Event Notification Configurations		
	Disable Event Notification	No Event Notification Will Be Sent	
	C Urgent Error Notification	Send Only Urgent Event	
	C Serious Error Notification	Send Urgent And Serious Event	
	C Warning Error Notification	Send Urgent, Serious And Warning Event	
	C Information Notification	Send All Event	-

3.9.4 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.

Quick Function	RAID Manag	XXXX	XXXX			
PRaidSet Functions		Jei				
VolumeSet Functions	SNMP Trap Configurations					
Physical Drives	SNMP Trap IP Address #1	0.0.0	. 0	Port#	162	
System Controls	SNMP Trap IP Address #2	0.0.0	. 0	Port#	162	
stem Config nerNet Config	SNMP Trap IP Address #3	0.0.0	. 0	Port#	162	
ert By Mail Config IMP Configuration IP Configuration	SNMP System Configurations					
ew Events/Mute Beeper merate Test Event	Community					
ear Event Buffer	sysContact.0					
odify Password	sysName.0		_			
ograde Firmware start Controller	sysLocation.0					
Information	SNMP Trap Notification Conf	igurations				
	Disable SNMP Trap	No SNM	P Trap Will Be	Sent		
	O Urgent Error Notification	Send Only	7 Urgent Event			
	C Serious Error Notification	Send Urg	ent And Serious	Event		
	C Warning Error Notification	Send Urg	ent, Serious And	d Warning Event	:	
	C Information Notification	Send All	went			

SNMP Trap Configurations: Type the SNMP Trap IP Address. The SNMP Port is set to 162 by default.

SNMP System Configuration:

Community: The default is Public.

(1)sysContact.0; (2)sysLocation.0; (3)sysName.0: SNMP parameter (31 bytes max). If these 3 categories are configured and when an error 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.

3.9.5 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**. 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.

⊕Quick Function	R RAID Manager XXXXXXXX
⊕RaidSet Functions	· NAID Owallager
@VolumeSet Functions	NTP Server Configurations
 	
©System Controls	NTP Server IP Address #1 0 . 0 . 0
System Config	NTP Server IP Address #2 0 . 0 . 0
EtherNet Config	
Alert By Mail Config	Time Zone Configuration
SNMP Configuration NTP Configuration	
View Events/Mute Beeper	Time Zone : (GMT+08:00)Taipei
Generate Test Event	Automatic Daylight Saving : Enabled
Clear Event Buffer	Current Time : 2008/6/30 14:58:48
Modify Password	
Upgrade Firmware	NTP Server Not Set
Restart Controller	Confirm The Operation
@Information	
	Submit Reset

3.9.6 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 System Information 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. The RAID system does not have built-in real time clock. When the RAID manager GUI is opened from a host system via R-Link connection, the RAID system's time will be referenced to the time of the host system. When not connected to the RAID Manager GUI via R-Link connection, the time information is the relative to the time when the RAID subsystem was powered on.

This function can also be used to silence the alarm beeper.

Ouick Function	RAID O	Vananar XX	XXXXXX		
PRaidSet Functions	2008-6-27 19:2:50	VolumeVOL#00	Start Initialize		
VolumeSet Functions	2008-6-27 19:2:50	VolumeVOL#00	Create Volume		
Physical Drives	2008-6-27 19:0:29	Raid Set # 00	Create RaidSet		
System Controls	2008-6-27 18:59:55	Raid Set # 00	Delete RaidSet		
vstem Controis	2008-6-27 18:59:55	VolumeVOL#00	Abort Initialization	000:00:36	
herNet Config	2008-6-27 18:59:19	VolumeVOL#00	Start Initialize		
ert By Mail Config	2008-6-27 18:59:18	VolumeVOL#00	Create Volume		
IMP Configuration P Configuration	2008-6-27 18:59:18	Raid Set # 00	Create RaidSet		
w Events/Mute Beeper	2008-6-27 18:48:32	IDE Channel 3	Device Inserted		
erate Test Event	2008-6-27 18:47:32	IDE Channel 2	Device Inserted		
<u>ar Event Buffer</u> dify Password	2008-6-27 18:46:4	IDE Channel 1	Device Inserted		
zrade Firmware	2008-6-27 18:45:8	192.168.015.016	HTTP Log In		
tart Controller	2008-6-27 18:44:20	H/W Monitor	Raid Powered On		
nformation	2008-6-27 18:43:19	RS232 Terminal	VT100 Log In		
	2008-6-27 18:41:20	192.168.015.016	HTTP Log In		
	2008-6-27 18:37:39	H/W Monitor	Raid Powered On		
	2008-6-27 18:36:58	IDE Channel 1	Device Inserted		
	2008-6-27 18:13:17	IDE Channel 1	Device Removed		
	2008-6-27 18:11:45	IDE Channel 1	Device Inserted		
	2008-6-27 18:11:27	IDE Channel 1	Device Removed		
	2008-6-27 18:10:42	IDE Channel 1	Device Inserted		

3.9.7 Generate Test Event

If you want to generate test events, move the mouse cursor to the main menu and click on the **Generate Test Events** 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.

⊕Quick Function	RAID Manager XXXXXX	XX
@RaidSet Functions	KAID Challagel	
⊕VolumeSet Functions		
⊕Physical Drives	Do You Want To Generate Test Event?	
System Controls System Config SherNet Config Alert By Mail Config NIMP Configuration VIPW Configuration VIPW Configuration VIPW Configuration VIew Events/Mathe Beeper Senterate Test Event Clear Event Buffer Modify Password Upgrade Firmware Restart Controller	Online The Operation Submit	
⊕Information		

Time Device Event Type ØVolumeSet Functions System Events Information ØVolumeSet Functions System Events Information ØVolumeSet Functions Image: System Event ØvolumeSet Functions <th></th> <th></th> <th>XXXXXXX</th> <th>Nananar XX</th> <th>PAID O</th> <th>@Quick Function</th>			XXXXXXX	Nananar XX	PAID O	@Quick Function
Time Device Event Type Elapse Time ØSystem Controls 2008-6-30 15354 H/W Monitor Test Event 2008-6-30 15354 System Config 0 0 0 0 EtherNet Config 0 0 0 0 Mart Ey Mail Config 0 0 0 0 System Configuration 0 0 0 0 View Event/Mate Beeperd 0 0 0 0 Sparade Firmware 0 0 0 0 Restart Controller 0 0 0 0				wallayer	KAID C	@RaidSet Functions
System Controls 2008-6-30 15.3.54 H/W Monitor Test Event System Config Image: Config Config Image: Config Config Apert By Mail Config Image: Config Config Config Image: Config Config Config SNMP Configuration Image: Config C			@VolumeSet Functions			
ØSystem Controls 2008-6-30 15.3.54 H/W Monitor Test Event System Config Image: Config Image: Config Alert By Mail Config Image: Config Image: Config SNMP Configuration Image: Config Image: Config NTP Configuration Image: Config Image: Config SNMP Configuration Image: Config Image: Config New Events/Mate Brend Image: Config Image: Config Semanter Dest Event Image: Config Image: Config Char Event Buffer Image: Config Image: Config Modify Pasword Image: Config Image: Config Dygrade Firmware Image: Config Image: Config Binformation Image: Config Image: Config Image: Config Image: Config Image: Config Image: Controller Image: Config Image: Config Image: Config Image: Config Image: Config Image: Config Image: Config Image: Config Image: Config	Errors	Elapse Time	Event Type	Device	Time	Physical Drives
System Config EtherNet Config Actt Py Mail Config SNMP Configuration NTP Configuration Vew Event/Nutice Beeperd Generate Test Event Cear Event Euffer Modify Password Upgrade Firmware Restart Controller			Test Event	H/W Monitor	2008-6-30 15:3:54	©System Controls
Mert By Mail Configuration Image: Configuration IP Configuration Image: Configuration Irew Events/Mute Deeperd Image: Configuration Sterrate Test Event Image: Configuration Janz Fourth State Image: Configuration Odify Parsword Image: Configuration Opgrade Frankware Image: Configuration Restart Controller Image: Configuration						
SNMP Configuration Image: Configuration VTP Configuration Image: Configuration VTP configuration Image: Configuration Generate Test Event Image: Configuration Star Event Buffer Image: Configuration Ondry Parsword Image: Configuration Jpgrade Firmware Image: Configuration Restart Controller Image: Configuration						
NTP Configuration	_					
Arew Events/Mute Beeper	_					
Senerate Test Event Sear Event Sear Event Buffer Sear Event Buffer Joggrade Firmware Lestart Controller						
Dear Event Buffer						
Modify Parsword Upgrade Firmware Restart Controller						
Upgrade Firmware Restart Controller						
Restart Controller						
#Information Image: Control of the second seco						Restart Controller
						∌Information

3.9.8 Clear Event Buffer

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

3.9.9 Modify Password

To change or disable the RAID subsystem's admin password, click on the **Change 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.

@Quick Function	R RAID Manager XXXXXXXX	Ê
⊕RaidSet Functions	(m) hald challager	*
Over the set of the	Modify System Password	
 	Enter Original Password	
⊗System Controls	Enter New Password	
System Config EtherNet Config	Re-Enter New Password	
Alert By Mail Config SNMP Configuration	Confirm The Operation	
<u>NTP Configuration</u> View Events/Mute Beeper	Submit Reset	
Generate Test Event Clear Event Buffer		
Modify Password		
Upgrade Firmware Restart Controller		
@Information		

3.9.10 Upgrade Firmware

Please refer to Section 3.12 for more information.

3.10 Information Menu

3.10.1 RaidSet Hierarchy

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

eSet Functions	Raid Set Hi	erarchy				
olume Set	Raid S	Set IDE C	hannels	Volume Set(Ch/Drv#)	Volume State	Capacity
ume Set me Set Check	Raid Set # 0	0 Ch01	Vo	umeVOL#00 (1/0)	Normal	50.0GB
		Ch02	Vo	umeVOL#01 (1/1)	Normal	40.0GB
Drives		Ch03	Vo	umeVOL#02 (0/0)	Normal	40.0GB
ls			Vo	umeVOL#03 (0/1)	Normal	34.7GB
tion erarchy ormation Monitor	DE Channe		<i>a</i>			
tion tor	Channel	Usage	Capacit		Model	
		Usage Raid Set # 00	82.3GB	HDS728080PLA380	Model	
	Channel	Usage			Model	
	Channel <u>Ch01</u>	Usage Raid Set # 00	82.3GB	HDS728080PLA380	Model	

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

@Quick Function	RAID Man	anor XXXXXXXXX	
@RaidSet Functions	M RAID Civali	ayei	•
©VolumeSet Functions	Raid Set Information		
Create Volume Set	D. 110.00	Raid Set # 00	
Delete Volume Set	Raid Set Name		
Modify Volume Set	Member Disks	3	
Check Volume Set	Total Raw Capacity	247.0GB	
Stop Volume Set Check	Free Raw Capacity	95.5GB	
 	Min Member Disk Size	82.3GB	
@System Controls	Raid Set Power State	Operating	
®Information	Raid Set State	Normal	
Rad/Set Hierarchy System Information Hardware Monitor			

To view the disk drive information, click the **CHO**# 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.

The SMART information shows two numbers, one on the left (attribute value) and one on the right enclosed in parentheses (threshold). The higher the attribute value is compared to the threshold value, the better. If the attribute value becomes smaller than the threshold value, the disk is in unstable state.

PRaidSet Functions	RAID Manage	
VolumeSet Functions	IDE Drive Information	
Create Volume Set		
elete Volume Set	IDE Channel	1
Iodify Volume Set	Model Name	HDS728080PLA380
neck Volume Set	Serial Number	PFDB32S7S8Z11M
op Volume Set Check	Firmware Rev.	PF2OA6BA
Physical Drives	Disk Capacity	82.3GB
System Controls	Current SATA Mode	SATA300+NCQ(Depth32)
Information	Supported SATA Mode	SATA300+NCQ(Depth32)
aidSet Hierarchy	Device State	Normal
ystem Information	Timeout Count	0
lardware Monitor	Media Error Count	0
	SMART Read Error Rate	100(16)
	SMART Spinup Time	109(24)
	SMART Reallocation Count	100(5)
	SMART Seek Error Rate	100(67)
	SMART Spinup Retries	100(60)
	SMART Calibration Retries	N.A.(N.A.)

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

⊕Quick Function	RAID Mar	AND XXXXXXXX			
@RaidSet Functions	Mail Wallager				
⊕VolumeSet Functions	Volume Set Information	Valuma Sat Information			
 					
⊕System Controls	Volume Set Name	VolumeVOL#05			
SInformation	Raid Set Name	Raid Set # 00			
RaidSet Hierarchy	Volume Capacity	15.0GB			
System Information	Channel/Drv#	USB/1			
Hardware Monitor	Raid Level	Raid 5			
	Stripe Size	64KBytes			
	Member Disks	3			
	Cache Mode	Write Back			
	SATA Data Xfer Mode	SATA300+NCQ			
	Current USB Xfer Mode	480Mbps			
	Volume State	Normal			

3.10.2 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.

RaidSet Functions	RAID Ma		
VolumeSet Functions Raid	Raid Subsystem Information		
eate Volume Set			
tere volume ber	oller Name		
	zare Version	V1.45 2008-06-23	
eck Volume Set pp Volume Set Check	T ROM Version	V1.45 2008-3-14	
Serial	Number	A819TEAJAR100001	
Physical Drives Unit S	erial #		
System Controls Main	Processor	400MHz 88F5182	
CPU	ICache Size	32KBytes	
	DCache Size	32KBytes/Write Back	
	m Memory	128MB/400MHz	
rdware Monitor Curre	nt IP Address	192.168.15.101	

The controller name, firmware version, serial number, main processor, CPU data/instruction cache size and system memory size/speed appear in this screen.

3.10.3 Hardware Monitor

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

Quick Function	RAID Manager	XXXXXXXX		
RaidSet Functions				
VolumeSet Functions	Hardware Monitor Information	Hardware Monitor Information		
hysical Drives				
System Controls	Enc Temp.	39 °C		
•	Enc Fan	2327		
nformation	Enc +12V	12.342 V		
dSet Hierarchy tem Information	Enc +5V	5.053 V		
dware Monitor	Enc +3.3V	3.424 V		
	Enc +1.2V	1.184 V		
	Hdd#1 Temperature	38 °C		
	Hdd#2 Temperature	40 °C		
	Hdd#3 Temperature	40 °C		
	Hdd#4 Temperature	40 °C		

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 exceeded, warning messages will be indicated through the LCD, LED and alarm buzzer.

Item	Warning Condition
Controller Board Temperature	> 60 Celsius
HDD Temperature	> 60 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

3.11 Creating New Raid Set or Reconfiguring an Existing Raid Set

You can configure Raid Sets and Volume Sets using **Quick Create** or **Raid Set Functions/Volume Set Functions** configuration method. Each configuration method requires a different level of user input. The general flow of operations for Raid Set and Volume Set configuration is:

Step	Action
1	Designate hot spare disk/pass-through disk (optional).
2	Choose a configuration method.
3	Create Raid Set using the available physical drives.
4	Define Volume Set using the available raw capacity in the Raid
5	Initialize the Volume Set. Then use Volume Set in the Host OS.

3.12 Upgrading the 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 installed and setup before proceeding with the firmware upgrade.

Upgrading Firmware Through ANSI/VT-100 Terminal Emulation

Get the new firmware version 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.

	- 🗆 ×
Ele Edit Vew Call Transfer Help	
<u>D</u> # 98 <u>D</u>	1.51
Andel Name; Raid Controller Qu Qu Raid System Function Vo Ph Mute The Alert Beeper Alert B Vo Ph Mute The Alert Beeper Alert B Update The Raid FirmWare JBOURR Iransfer File From Terminal Maximum Emulator By Zmodem Protocol Sy Irermina Update Restart Controller	
Connected 0:01:39 VT100 115200 8-N-1 SCROLL CAPS NUM Capture Print echo	//.

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

😵 Raid - HyperTerminal	×
File Edit View Call Transfer Help	
Capture to Printer Capture to P	-
Main Menu	
Qu Ra No Ph Mute The Alert Beeper Alert B Et Change Vi JBOD/RA Cl RAID Re Ha Maximum Emulator By Zmodem Protocol Termina Sy Update Restart Controller	
ArrowKey Or AZ:Move Cursor, Enter:Select, ESC:Escape, L:Line Draw, X:Redraw	•

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.

Hie Edt Wew Cal 1		
ArrowKey	RAID Re Maximum Lermina Urdate Send Cloce Cancel Urdate Controller Or AZ:Move Cursor, Enter:Select, ESC:Escape, L:Line Draw, X:Redra WID0 LISSOD 8N-1 SCROLL CAPE Pure etho	11

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

Raid - HyperTerminal File Edit View Call Transfer Help			<u>_ </u>
	{Model Name} RAI	ID Controller	
Main Menu	nodem file send for Raid iending: C:\6160FIRM0627.BIN		
Qu Ra Raid S Vo	ast event: Sending	Files: 1 of 1	
Ph Mute T Re Alert	itatus: Sending	Retries: 0	
Et Change Vi JBOD/R Cl RAID R	ile:	35k of 240K	
Ha Maximu Sy Termin	lapsed: 00:00:03 Remaining:	00:00:17 Throughput: 11946 cps	
<u>Update</u> Restar		Cancel cps/bps	
ArrowKey Or AZ:Mo	e Cursor, Enter:Sele	ect, ESC:Escape, L:Line Dra	aw, X:Redraw
Connected 0:04:26 VT100	115200 8-N-1 SCROLL CAPS	NUM Capture Print echo] •

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

🗞 Raid - HyperTerminal	_D×
File Edit View Call Transfer Help	
Image: Second state of the second s	
Connected 0:04:57 VT100 115200 8-N-1 SCROLL CAPS NUM Capture Print echo	1.

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

-	
File Edit View Call Transfer Help	
{Model Name} RAID Controller	
	-
Main Menu	
Qu Ra Raid System Function	
Vo	
Ph Mute The Alert Beeper	
Ra Alert Beeper Setting Et Change Password	
Vi JBODŽRAID Function	
Cl RAID Rebuild Priority Ha Maximum	
Sy Terminal Start Updating Firmware, Please Wait	
Update F	
Restart Controller	
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	
Connected 0:05:55 VT100 /115200 8-N-1 SCROLL CAPS /NUM Capture Print edin	<u>-</u> ∥

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>_ X</u>
File Edit View Call Transfer Help	
<u> </u>	
(Model Name) RAID Controller Qu Qu Raid System Function Vo Ph Mute The Alert Beeper Ra Alert Beeper Setting Et Change Password Vi JB0D/RAID Function C1 RID Rebuild Priority Ha Maxinum Sy Update Restart Controller ArrowKey Or AZ: Move Cursor, Enter:Select, ESC:Escape, L:Line Draw, X:Redraw	
Connected 0:06:22 VT100 115200 8-N-1 SCROLL CAPS NUM Capture Print echo	

🗞 Raid - HyperTerminal	_ 🗆 ×
File Edit View Call Transfer Help	
{Model Name} RAID Controller Qu Raid System Function Qu Raid System Function Yo Ph Mute The Alert Beeper Ra Alert Beeper Setting Et Change Password Yi JB0D/RAID Function Cl RAID Rebuild Priority Restart Controller Is Required For New Firmware To Take Effect Restart Controller	
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.

@Quick Function	RAID Manager XXXXXXXX	1
⊕RaidSet Functions	in in its offender	-
@VolumeSet Functions	Upgrade The Raid System Firmware Or Boot Rom	
@Physical Drives	Enter The BootRom Or Firmware File Name Browse	
OSystem Controls System Controls System Config EtherNet Config EtherNet Config ShAP Configuration NTP Configuration NTP Configuration NTP Configuration NTP Configuration Uper NeutriANde Beeper Generate Test Event Clear Event Eufer Moddy Paszword Upgrade Firmware Restart Controller Olnformation	Confirm The Operation Submit Reset	

3. Select the **Confirm The Operation** option. Click the **Submit** button.

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.

⊕Quick Function ⊕RaidSet Functions	RAID Manager XXXXXXXX	1
@VolumeSet Functions		2
@Physical Drives		
OSystem Controls System Controls System Config EtherNet Config EtherNet Config SINDP Configuration NTP Configuration NTP Configuration NTP Configuration NTP Configuration MTP Configuration MTP Configuration User Events/Mate Beeper Generate Test Event Clear Events/Mate Beeper Generate Controller Old Statement Output Definition	Frimware Has Been Updated Successfully Restart Controller Is Required For New Firmware To Take Effect	