# RAID FIBRE TO S-ATA/SAS

# Installation Reference Guide

**Revision 1.0** 

P/N: PW002000000263

# Copyright

No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without the prior written consent.

#### Trademarks

All products and trade names used in this document are trademarks or registered trademarks of their respective holders.

#### Changes

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

## **FCC Compliance Statement**

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in residential installations. This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is not guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television equipment reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- 1. Reorient or relocate the receiving antenna
- 2. Move the equipment away from the receiver
- 3. Plug the equipment into an outlet on a circuit different from that to which the receiver is powered.
- 4. Consult the dealer or an experienced radio/television technician for help

All external connections should be made using shielded cables.

F© (€

# About This Manual

Welcome to your **R**edundant **A**rray of **I**ndependent **D**isks System User's Guide. This manual covers everything you need to know in learning how to install or configure your RAID system. This manual also assumes that you know the basic concepts of RAID technology. It includes the following information :

#### Chapter 1 Introduction

Introduces you to Disk Array's features and general technology concepts.

#### Chapter 2 Getting Started

Helps user to identify parts of the Disk Array and prepare the hardware for configuration.

#### Chapter 3 Configuring

#### Quick Setup

Provides a simple way to setup your Disk Array.

#### Customizing Setup

Provides step-by-step instructions to help you to do setup or re-configure your Disk Array.

#### Chapter 4 Array Maintenance

#### Adding Cache Memory

Provides a detailed procedure to increase cache memory from the default amount of 256MB to higher. **Updating Firmware** 

Provides step-by-step instructions to help you to update the firmware to the latest version.

#### Hot Swap Components

Describes all hot swap modules on Disk Array and provides the detailed procedure to replace them.

# **Table of Contents**

## Chapter 1 Introduction

	1.1	Key Features	1-2
	1.2	RAID Concepts	1-2
	1.3	Fibre Functions	1-10
		1.3.1 Overview	1-10
		1.3.2 Three ways to connect (FC Topologies)	1-10
		1.3.3 Basic elements	1-12
		1.3.4 LUNMasking	
	1.4	ArrayDefinition	1-13
		1.4.1 RAID set	1-13
		1.4.2 Volume Set	1-14
		1.4.3 Easy of Use features	
		1.4.4 High Availability	1-17

#### Chapter 2 Getting Started

2.1	Unpacking the subsystem	2-1
2.2	Identifying Parts of the subsystem	
	2.2.1 Front View	
	2.2.2 Rear View	
2.3	Connecting to Host	
2.4	Powering-on the subsystem	
2.5	Install Hard Drives	2-11

#### Chapter 3 Configuring

3.1	Configuring through a Terminal	3-1
3.2	Configuring the Subsystem Using the LCD Panel	3-9
3.3	Menu Diagram	3-10
3.4	Web browser-based Remote RAID management via R-Link ethernet	3-15
3.5	Quick Create	3-17
3.6		3-19
	3.6.1 Create Raid Set	3-19
	3.6.2 Delete Raid Set	3-20
	3.6.3 Expand Raid Set	3-22
	3.6.4 Activate Incomplete Raid Set	3-25
	3.6.5 Create Hot Spare	3-27
	3.6.6 Delete Hot Spare	3-27
	3.6.7 Rescue Raid Set	
3.7	Volume Set Function	3-29
	3.7.1 Create Volume Set	3-29

	3.7.2 Create Raid30/50/60	3-32
	3.7.3 Delete Volume Set	3-33
	3.7.4 Modify Volume Set	3-34
	3.7.4.1 Volume Expansion	
	3.7.5 Volume Set Migration	3-36
	3.7.6 Check Volume Set	3-37
	3.7.7 Scheduled Volume Checking	3-38
	3.7.8 Stop Volume Set Check	3-39
	3.7.9 Volume Set Host Filters	3-39
3.8	Physical Drive	3-40
	3.8.1 Create Pass-Through Disk	3-40
	3.8.2 Modify Pass-Through Disk	3-41
	3.8.3 Delete Pass-Through Disk	3-42
	3.8.4 Identify Enclosure	3-42
	3.8.5 Identify Selected Drive	3-43
3.9	System Configuration	3-44
	3.9.1 System Configuration	3-44
	3.9.2 Fibre Channel Configuration	3-47
	3.9.2.1 View/Edit Host Name List	3-48
	3.9.2.2 View/Edit Volume Set Host Filters	3-50
	3.9.3 EthernetConfig	3-54
	3.9.4 Alert By Mail Config	3-55
	3.9.5 SNMP Configuration	3-56
	3.9.6 NTP Configuration	3-58
	3.9.7 View Events	3-59
	3.9.8 Generate Test Events	3-60
	3.9.9 Clear Events Buffer	3-61
	3.9.10 Modify Password	3-61
	3.9.11 Upgrade Firmware	3-62
	3.9.12 Restart Controller	3-62
3.10	Information Menu	3-63
	3.10.1 RaidSet Hierarchy	3-63
	3.10.2 System Information	3-64
	3.10.3 Hardware Monitor	
3.11	Creating a new RAID or Reconfiguring an Existing RAID	3-66

## Chapter 4 Array Maintenance

4.1	Memory Upgrades	4-1
	4.1.1 Installing Memory Module	4-2
4.2	Upgrading the Firmware	4-3
4.3	Hot Swap components	4-10
	4.3.1 Replacing a disk	4-10
	4.3.2 Replacing a Power Supply	4-11
	4.3.3 Replacing a Fan	4-12
Appendix A	Technical Specification	Δ_1

A-1

# **Chapter 1**

# Introduction

The RAID subsystem is a Fibre channel-to-SAS / SATA II RAID (Redundant Arrays of Independent Disks) disk array subsystem. It consists of a RAID disk array controller and sixteen (16) disk trays.

The subsystem is a "Host Independent" RAID subsystem supporting RAID levels 0, 1, 0+1, 3, 5, 6, 30, 50, 60 and JBOD. Regardless of the RAID level the subsystem is configured for, each RAID array consists of a set of disks which to the user appears to be a single large disk capacity.

One unique feature of these RAID levels is that data is spread across separate disks as a result of the redundant manner in which data is stored in a RAID array. If a disk in the RAID array fails, the subsystem continues to function without any risk of data loss. This is because redundant information is stored separately from the data. This redundant information will then be used to reconstruct any data that was stored on a failed disk. In other words, the subsystem can tolerate the failure of a drive without losing data while operating independently of each other.

The subsystem is also equipped with an environment controller which is capable of accurately monitoring the internal environment of the subsystem such as its power supplies, fans, temperatures and voltages. The disk trays allow you to install any type of 3.5-inch hard drive. Its modular design allows hot-swapping of hard drives without interrupting the subsystem's operation.

# 1.1 Key Features

#### Subsystem Features:

- Features an Intel IOP341 800Mhz 64-BIT RISC I/O processor
- Build-in 256MB cache memory, expandable up to 2GB
- ✤ 4Gb Fibre channel, dual loop optical SFP LC (short wave) host port
- Smart-function LCD panel
- Supports up to sixteen (16) 1" hot-swappable SAS / SATA II hard drives
- Redundant load sharing hot-swappable power supplies
- High quality advanced cooling fans
- Local audible event notification alarm
- Supports password protection and UPS connection
- Built-in R-Link LAN port interface for remote management & event notification
- Dual host channels support clustering technology
- Real time drive activity and status indicators

## **RAID Function Features:**

- Supports RAID levels 0, 1, 0+1, 3, 5, 6, 30, 50, 60 and JBOD
- Supports hot spare and automatic hot rebuild
- Allows online capacity expansion within the enclosure
- Support spin down drives when not in use to extend service (MAID)
- Transparent data protection for all popular operating systems
- Bad block auto-remapping
- Supports multiple array enclosures per host connection
- Multiple RAID selection
- Array roaming
- Online RAID level migration

# 1.2 RAID Concepts

# **RAID Fundamentals**

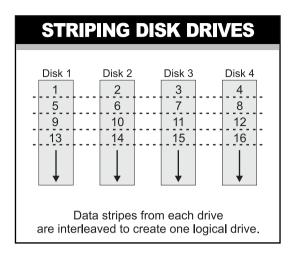
The basic idea of RAID (Redundant Array of Independent Disks) is to combine multiple inexpensive disk drives into an array of disk drives to obtain performance, capacity and reliability that exceeds that of a single large drive. The array of drives appears to the host computer as a single logical drive.

Six types of array architectures, RAID 1 through RAID 6, 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 array.

# **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.

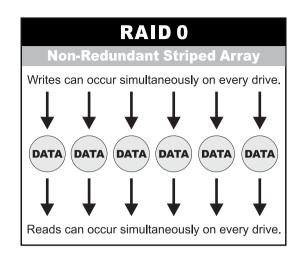
Most operating systems today support concurrent disk I/O operations across multiple drives. However, in order to maximize throughput for the disk subsystem, the I/O load must be balanced across all the drives so that each drive can be kept busy as much as possible. In a multiple drive system without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



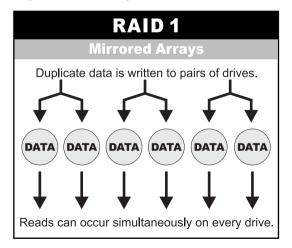
By striping the drives in the array with stripes large enough so that each record falls entirely within one stripe, most records can be evenly distributed across all drives. This keeps all drives in the array busy during heavy load situations. This situation allows all drives to work concurrently on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

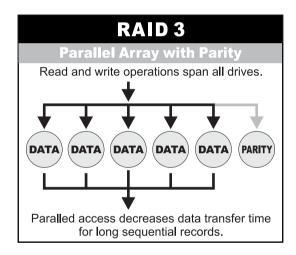
**RAID 0** is typically defined as a group of striped disk drives without parity or data redundancy. RAID 0 arrays can be configured with large stripes for multi-user environments or small stripes for single-user systems that access long sequential records. RAID 0 arrays deliver the best data storage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



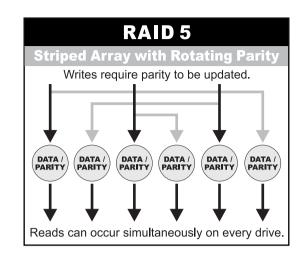
**RAID 1**, also known as disk mirroring, is simply a pair of disk drives that store duplicate data but appear to the computer as a single drive. Although striping is not used within a single mirrored drive pair, multiple RAID 1 arrays can be striped together to create a single large array consisting 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.



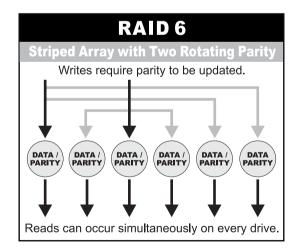
**RAID 3** sector-stripes data across groups of drives, but one drive in the group is dedicated to storing parity information. RAID 3 relies on the embedded ECC in each sector for error detection. In the case of drive failure, data recovery is accomplished by calculating the exclusive OR (XOR) of the 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.



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



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

In summary:

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

# RAID Management

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

RAID Level	Description	Min Drives
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.	3
6	Data is striped across several physical drives. Parity protection is used for data redundancy. Requires N+2 drives to implement because of two-dimensional parity scheme	4
0 + 1	Combination of RAID levels 0 and 1. This level provides striping and redundancy through mirroring.	4
30	Combination of RAID levels 0 and 3. This level is best implemented on two RAID 3 disk arrays with data striped across both disk arrays.	6
50	RAID 50 provides the features of both RAID 0 and RAID 5. RAID 50 includes both parity and disk striping across multiple drives. RAID 50 is best implemented on two RAID 5 disk arrays with data striped across both disk arrays.	6
60	RAID 60 combines both RAID 6 and RAID 0 features. Data is striped across disks as in RAID 0, and it uses double distributed parity as in RAID 6. RAID 60 provides data reliability, good overall performance and supports larger volume sizes. RAID 60 also provides very high reliability because data is still available even if multiple disk drives fail (two in each disk array)	8

# 1.3 Fibre Functions

## 1.3.1 Overview

Fibre Channel is a set of standards under the auspices of ANSI (American National Standards Institute). Fibre Channel combines the best features from SCSI bus and IP protocols into a single standard interface, including high-performance data transfer (up to 400 MB per second), low error rates, multiple connection topologies, scalability, and more. It retains the SCSI command-set functionality, but use a Fibre Channel controller instead of a SCSI controller to provide the network interface for data transmission. In today's fast-moving computer environments, Fibre Channel is the serial data transfer protocol choice for high-speed transportation of large volumes of information between workstation, server, mass storage subsystems, and peripherals.

Physically, the Fibre Channel can be an interconnection of multiple communication points, called N\_Ports. The port itself only manages the connection between itself and another such end-port which, which could either be part of a switched network, referred to as a Fabric in FC terminology, or a point-topoint link. The fundamental elements of a Fibre Channel Network are Port and node. So a node can be a computer system, storage device, or Hub/Switch. This chapter describes the Fibre-specific functions available in the Fibre channel RAID controller. Optional functions have been implemented for Fibre channel operation only available in the Web browser-based RAID manager. The LCD and VT-100 can't configure the options available for Fibre channel RAID controller.

# 1.3.2 Three ways to connect (FC Topologies)

A topology defines the interconnection scheme. It defines the number of devices that can be connected. Fibre Channel supports three different logical or physical arrangements (topologies) for connecting the devices into a network:

- Point-to-Point
- Arbitrated Loop(AL)
- Switched (Fabric)

The physical connection between devices varies from one topology to another. In all of these topologies, a transmitter node in one device sends information to a receiver node in another device. Fibre Channel networks can use any combination of point-to-point, arbitrated loop(FC\_AL), and switched fabric topologies to provide a variety of device sharing options.

# Point-to-point

A point-to-point topology consists of two and only two devices connected by Nports of which are connected directly. In this topology, the transmit Fibre of one device connects to the receiver Fibre of the other device and vice versa. The connection is not shared with any other devices. Simplicity and use of the full data transfer rate make this Point-to-point topology an ideal extension to the standard SCSI bus interface. The point-to-point topology extends SCSI connectivity from a server to a peripheral device over longer distances.

# Arbitrated Loop

The arbitrated loop (FC-AL) topology provides a relatively simple method of connecting and sharing resources. This topology allows up to 126 devices or nodes in a single, continuous loop or ring. The loop is constructed by daisy-chaining the transmit and receive cables from one device to the next or by using a hub or switch to create a virtual loop. The loop can be self-contained or incorporated as an element in a larger network. Increasing the number of devices on the loop can reduce the overall performance of the loop because the amount of time each device can use the loop is reduced. The ports in an arbitrated loop are referred as L-Ports.

# Switched Fabric

A switched fabric a term is used in a Fibre channel to describe the generic switching or routing structure that delivers a frame to a destination based on the destination address in the frame header. It can be used to connect up to 16 million nodes, each of which is identified by a unique, world-wide name. In a switched fabric, each data frame is transferred over a virtual point-to-point connection. There can be any number of full-bandwidth transfers occurring through the switch. Devices do not have to arbitrate for control of the

network; each device can use the full available bandwidth.

A fabric topology contains one or more switches connecting the ports in the FC network. The benefit of this topology is that many devices (approximately 2-24) can be connected. A port on a Fabric switch is called an F-Port (Fabric Port). Fabric switches can function as an alias server, Multicast server, broadcast server, quality of service facilitator and directory server as well.

# 1.3.3 Basic elements

The following elements are the connectivity of storages and Server components using the Fibre channel technology.

#### Cables and connectors

There are different types of cables of varies lengths for use in a Fibre Channel configuration. Two types of cables are supported : Copper and optical (fiber). Copper cables are used for short distances and transfer data up to 30 meters per link. Fiber cables come in two distinct types: Multi-Mode fiber (MMF) for short distances (up to 2km), and Single-Mode Fiber(SMF) for longer distances (up to 10 kilometers). The controller default supports two short wave multi-mode fibre optical SFP connector.

## Fibre Channel Adapter

Fibre Channel Adapter is devices that connect to a workstation, or server and control the electrical protocol for communications.

#### Hubs

Fibre Channel hubs are used to connect up to 126 nodes into a logical loop. All connected nodes share the bandwidth of this one logical loop. Each port on a hub contains a Port Bypass Circuit(PBC) to automatically open and close the loop to support hot pluggability.

## Switched Fabric

Switched fabric is the highest performing device available for interconnecting large numbers of devices, increasing bandwidth, reducing congestion and providing aggregate throughput.

Each device connected to a port on the switch, enabling an on-demand con-

nection to every connected device. Each node on a Switched fabric uses an aggregate throughput data path to send or receive data.

# 1.3.4 LUN Masking

LUN masking is a RAID system-centric enforced method of masking multiple LUNs behind a single port. By using World Wide Port Names (WWPNs) of server HBAs, LUN masking is configured at the RAID-array level. LUN masking also allows disk storage resource sharing across multiple independent servers. A single large RAID device can be sub-divided to serve a number of different hosts that are attached to the RAID through the SAN fabric with LUN masking. So that only one or a limited number of servers can see that LUN, each LUN inside the RAID device can be limited.

LUN masking can be done either at the RAID device (behind the RAID port) or at the server HBA. It is more secure to mask LUNs at the RAID device, but not all RAID devices have LUN masking capability. Therefore, in order to mask LUNs, some HBA vendors allow persistent binding at the driver-level.

# 1.4 Array Definition

## 1.4.1 RAID Set

A RAID Set is a group of disks containing one or more volume sets. It has the following features in the RAID subsystem controller:

- 1. Up to 128 RAID Sets are supported per RAID subsystem controller.
- 2. It is impossible to have multiple RAID Sets on the same disks.

A Volume Set must be created either on an existing RAID set or on a group of available individual disks (disks that are not yet a part of an raid set). If there are pre-existing raid sets with available capacity and enough disks for specified RAID level desired, then the volume set will be created in the existing raid set of the user's choice. If physical disks 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.

# 1.4.2 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 disk 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 of operation while Volume 0 might be assigned a RAID 0+1 level of operation.

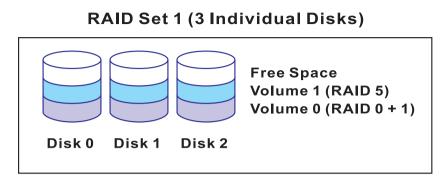
# 1.4.3 Easy of Use features

#### 1.4.3.1 Instant Availability/Background Initialization

RAID 0 and RAID 1 volume set can be used immediately after the creation. But the RAID 3, 5, 6, 30, 50 and 60 volume sets must be initialized to generate the parity. In the Normal 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 arrays without requiring a reboot and waiting the initialization complete. Furthermore, the RAID volume set is also protected against a single disk failure while initialing. In Fast Initialization, the initialization proceeds must be completed before the volume set ready for system accesses.

## 1.4.3.2 Array Roaming

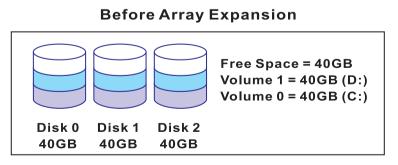
The RAID subsystem stores configuration information both in NVRAM and on the disk drives It can protect the configuration settings in the case of a disk drive or controller failure. Array roaming allows the administrators the ability to move a completely raid set to another system without losing RAID configura-



tion and data on that raid set. If a server fails to work, the raid set disk drives can be moved to another server and inserted in any order.

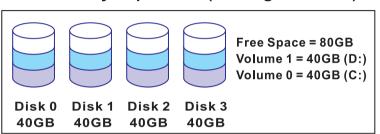
# 1.4.3.3 Online Capacity Expansion

Online Capacity Expansion makes it possible to add one or more physical drive to a volume set, while the server is in operation, eliminating the need to store and restore after reconfiguring the raid set. When disks are added to a raid set, unused capacity is added to 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 create additional volume set. The expansion process is illustrated as following figure.



Array - A 120GB

The RAID subsystem controller redistributes the original volume set over the original and newly added disks, using the same fault-tolerance configuration. The unused capacity on the expand raid set can then be used to create an additional volume sets, with a different fault tolerance setting if user need to change.



After Array Expansion (Adding One Disk)



## 1.4.3.4 Online RAID Level and Stripe Size Migration

User can migrate 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 that 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.

# 1.4.4 High availability

# 1.4.4.1 Creating Hot Spares

A hot spare drive is an unused online available drive, which is ready for replacing the failure disk drive. In a RAID level 1, 0+1, 3, 5, 6, 30, 50 or 60 raid set, any unused online available drive installed but not belonging to a raid set can define as a hot spare drive. Hot spares permit you to replace failed drives without powering down the system. When RAID subsystem detects a hard drive failure, the system will automatic and transparent rebuilds using hot spare drives. The raid set will be reconfigured and rebuilt in the background, while the RAID subsystem continues to handle system request. During the automatic rebuild process, system activity will continue as normal, however, the system performance and fault tolerance will be affected.



## Important:

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

# 1.4.4.2 Hot-Swap Disk Drive Support

The RAID subsystem has built the protection circuit to support the replacement of UDMA hard disk drives without having to shut down or reboot the system. The removable hard drive tray can deliver "hot swappable," faulttolerant RAID solutions at prices much less than the cost of conventional SCSI hard disk RAID subsystems. We provide this feature for subsystems to provide the advanced fault tolerant RAID protection and "online" drive replacement.

# 1.4.4.3 Hot-Swap Disk Rebuild

A Hot-Swap function can be used to rebuild disk drives in arrays with data redundancy such as RAID level 1, 0+1, 3, 5, 30, 50 and 60. If a hot spare is not available, the failed disk drive must be replaced with a new disk drive so that the data on the failed drive can be rebuilt. If a hot spare is available, the rebuild starts automatically when a drive fails. The RAID subsystem auto-

matically and transparently rebuilds failed drives in the background with userdefinable rebuild rates. The RAID subsystem will automatically restart the system and the rebuild if the system is shut down or powered off abnormally during a reconstruction procedure condition. When a disk is Hot Swap, although the system is functionally operational, the system may no longer be fault tolerant. Fault tolerance will be lost until the removed drive is replaced and the rebuild operation is completed.

# **Chapter 2**

# **Getting Started**

Getting started with the subsystem consists of the following steps:

- Unpack the storage subsystem.
- Identifying Parts of the subsystem.
- Connect the Fibre Cables.
- Power on the subsystem.
- Install Hard Drives.

# 2.1 Unpacking the Subsystem

Before continuing, first unpack the subsystem and verify that the contents of the shipping carton are all there and in good condition. Before removing the subsystem from the shipping carton, visually inspect the physical condition of the shipping carton. 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 the subsystem was purchased for further instructions. The package contains the following items:

- RAID subsystem unit
- Two power cords
- Two external Fibre optical cables
- One external null modem cable
- One external UPS cable
- One RJ-45 ethernet cable
- Installation Reference Guide
- Spare screws, etc.

If any of these items are missing or damaged, please contact your dealer or sales representative for assistance.

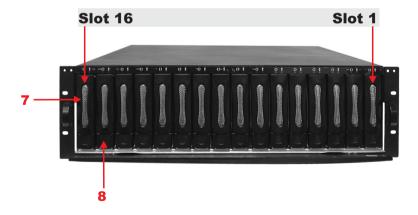


# 2.2 Identifying Parts of the subsystem

The illustrations below identify the various features of the subsystem. Get yourself familiar with these terms as it will help you when you read further in the following sections.

#### 2.2.1 Front View





#### 1. HDD status Indicator



Parts	Function
HDD Status LEDs	Green LED indicates power is on and hard drive status is good for this slot. If there is no hard drive, the LED is red. If hard drive defected in this slot or the hard drive is failure, the LED is orange.
HDD access LEDs 🧔	These LED will blink blue when the hard drive is being accessed.

## 2. HDD trays 1 ~ 16 (From right to left)

#### 3. Smart Function Panel - Function Keys

Parts	Function
Activity LED	Blue blinking LED indicates controller is activity.

## 4. LCD display panel

#### 5. Smart Function Panel - Function Keys for RAID configuration

The smart LCD panel is where you will configure the RAID subsystem. If you are configuring the subsystem using the LCD panel, please press the controller button to configure your RAID subsystem.

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	<b>&gt;</b>	This is used to enter the option you have selected.
Exit button	EXIT	Press this button to return to the previous menu.

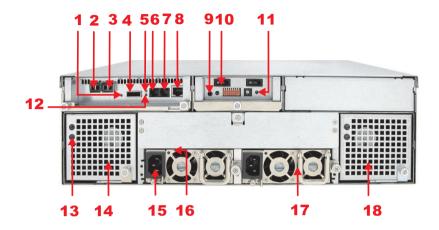
#### 6. Environment status

Parts	Function
Voltage warning LED	An alarm will sound warning of a voltage abnormality and this LED will turn red.
Over temp LED	If temperature irregularity in these systems occurs (HDD slot temperature over 65°C), this LED will turn red and an alarm will sound.
Fan fail LED 🗼	When a fan's rotation speed is lower than 1500rpm, this LED will turn red and an alarm will sound.
Power fail LED 🛞	If a redundant power supply fails, this LED will turn red and an alarm will sound.
Power LED	Green LED indicates power is on.

## 7. Tray Lever

8. Tray Latch

## 2.2.2 Rear View



#### 1. Expander Activity LED

Green LED indicates expander is connected. When there is activity on the expander, the LED is Blue.

#### 2. Host Channel B

The subsystem is equipped with 2 host channels (Host channel A and Host channel B). Each host channel with one optical LC Fibre connectors at the rear of the subsystem for connect to Fibre Hub/Switch or Server's fibre interface.

#### 3. Host Channel A

Connect to Host's Fibre adapter.

#### 4. Expansion Port

- 5. Hot bit LED (Green)
- 6. Debug Port
- 7. Monitor Port

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

# 8. 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 web-based browser to management 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.

#### 9. Uninterrupted Power Supply (UPS) Port

The subsystem may come with an optional UPS port allowing you to connect a UPS device. Connect the cable from the UPS device to the UPS port located at the rear of the subsystem. This will automatically allow the subsystem to use the functions and features of the UPS.

#### 10. Power Supply Unit on / off switch

#### 11. System Power On Indicator

Green LED indicates power is on.

#### 12. Controller Fail indicator

If a controller fails, this LED will blink red.

#### 13. Fan Fail indicator

If a fan fails, this LED will turn red.

#### 14. Cooling Fan module 1 ~ 2

Two blower fans are located at the rear of the subsystem. They provide sufficient airflow and heat dispersion inside the chassis. In case a fan fails to function, the " $\rightarrow$ " Fan fail LED will turn red and an alarm will sound.

# 15. AC power input socket 1 ~ 2 (From left to right)

## 16. Power Supply Power On Indicator

Green LED indicates power is on.

## 17. Power Supply Unit 1 ~ 2 (From left to right)

Two power supplies (power supply 1 and power supply 2) are located at the rear of the subsystem. Turn on the power of these power supplies to power-on the subsystem. The "power" LED at the front panel will turn green.

If a power supply fails to function or a power supply was not turned on, the "⊗" Power fail LED will turn red and an alarm will sound.

#### 18. Cooling Fan module 3 ~ 4

# 2.3 Connecting to Fibre HBA

The subsystem supports fibre interface which provides fast 400MB data transfer rate using fibre. This section describes the location of the host channels and instructions on connecting external fibre devices.

- 1. Configure the Loop ID of subsystem or use dynamic LIP.
- 2. The package comes with two fibre optical cables. For every pair of host channel fibre connector at the rear of the subsystem, attach one end of the fibre optical cable to one of the fibre connectors and the other end to the host adapter's external fibre connector or to the fibre Hub/Switch. (The host adapter is installed in your Host subsystem.)
- 3. Connect the other host system using the other fibre optical cable if you want to configure subsystem into multi-host attachment.





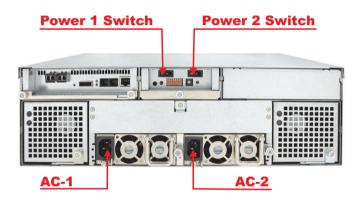
#### Note:

For safety reasons, make sure the Disk Array and Host Computer are turned off when you plug-in the Fibre cable.

# 2.4 Powering-on the Subsystem

When you connect the Disk Array to the Host computer, you should press the ON/OFF Power Supply Switch on both of the power supply units. It will turn the Disk Array on and the Self-Test will be started automatically.

1. Plug in all the power cords or power connectors located at the rear of the subsystem.

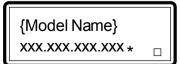




#### Note:

The subsystem is equipped with redundant PFC (power factor correction), Full Range power supplies. The subsystem will automatically selector voltage.

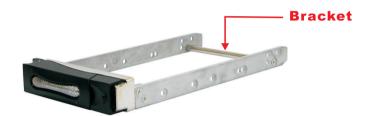
- 2. Turn on the power.
- The "Power" LED on the front panel will turn green. After a few moments the LCD should display the following message: "\*" detecting the Ethernet cable connect well.



# 2.5 Install 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.

- 1. Pull out an empty disk tray. (You can install in any available slot.)
- 2. Take off the bracket before installing hard drive.



- 3. Place the hard drive in the disk tray.
- 4. Install the mounting screws on each side to secure the drive in the mobile rack.



#### Note:

Insert screws through the front sides of the mounting holes.



- 5. Slide the tray into a slot until it clicks into place. The HDD status LED will turn green on front panel.
- 6. Press the lever in until you hear the latch click into place.
- 7. If the HDD power LED did not turn green, check the hard drive is in good condition.
- 8. If the hard drive is not being accessed, the HDD access LED will not illuminate. The LED blinks only when being accessed.

# **Chapter 3**

# Configuring

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 both methods 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:

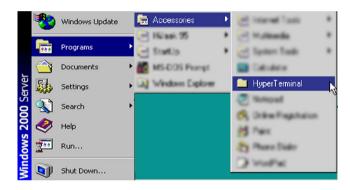
1. Connect a VT100 compatible terminal or a PC operating in an equivalent terminal emulation mode to the monitor port located at the rear of the subsystem.



#### 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.





Connect To	<u>?×</u>
🦓 RAID	
Enter details for t	he phone number that you want to dial:
Country code:	United States of America (1)
Ar <u>e</u> a code:	02
Phone number:	
Connect using:	Direct to Com1
	OK Cancel

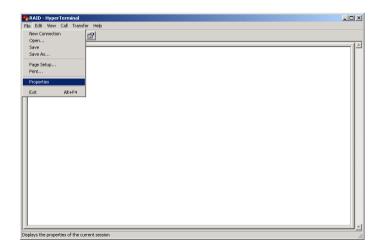
4. The default setting of the monitor port is 115200 baud rate, 8 data bit, non-parity, 1 stop bit and no flow control.

COM1 Properties	? ×
Port Settings	
,	
Bits per second: 115200	
Data bits: 8	
Parity: None	
Stop bits: 1	
Elow control: None	
Advanced <u>R</u> estore Default	s
OK Cancel Ap	oply

5. Click <u> </u>disconnect button.

<b>RAID - HyperTerminal</b> File Edit View Call Transfer Help						<u>_0×</u>
De 93 98 8						
Deconnect						*
Disconnected Auto detect	Auto detect	SCROLL G	APS NUM	Capture	Print echo	

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



7. Open the Settings Tab.

🎨 RAID - HyperTerminal		×
File Edit View Call Transfer Help		
D 🚅 🧑 🐉 🖻 🗃		
	RAID Properties Connect To Settings	?X
	RAID     Change Icon.      Country/hegion: United States of America (1)     Enter the areas code without the long-distance prefix.      Area code:      Phone number:      Connect using:      Configure	
	Use country/region code and area code Redial on busy	ncel
Disconnected Auto detect Au	o detect SCROLL CAPS NUM Capture Print	echo //

8. Open the Settings Tab. Function, arrow and ctrl keys act as: Terminal Keys, Backspace key sends: Crtl+H, Emulation: VT100, Telnet terminal: VT100, Back scroll buffer lines: 500. Click OK.

RAID Properties	? ×	
Connect To Settings		
Function, arrow, and ctrl keys act as		
<ul> <li>Terminal keys</li> <li>Windows keys</li> </ul>	÷	
Backspace key sends Ctrl+H C Del C Ctrl+H, Space,	<u></u>	
	, UM+H	
Emulation: VT100 Terminal	Setur	
Telnet terminal ID: VT100		
Backscroll buffer lines: 500		
Play sound when connecting or disconne	icting	
Input Translation ASCII 5	Setup	
0K	Cancel	

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

RAID - HyperTerminal File Edit View Call Iransfe	Help					
D# 03 00						
Main Me Ouriek V Raid Se Volume Physica Raid Sy Fibre C Etherne View Sy Clear E Hardwar	{Mo	tup	AID Control	ler		
ArrowKey Or F			lect, ESC:E		ine Draw, X:Re	draw.

#### **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.

{Model Name} }	AID Controller
Main Menu Ouick Volume/Raid Setup Raid Set Function Volume Set Function Physical Drives Raid System Function Fibre Channel Config Ethernet Configuration View System Events Clear Event Buffer Hardware Monitor System Information	Verify Password



#### 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 internal RAID subsystem from unauthorized entry. 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 password is default setting at **00000000** by the manufacture.

### 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 explained on the section 3.3. The configuration utility main menu options are:

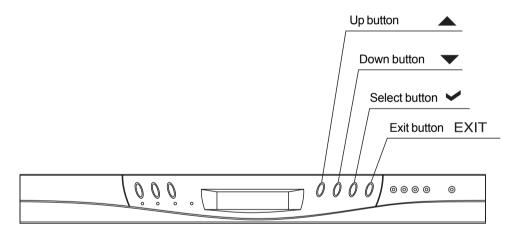
Option	Description
Quick Volume And Raid Set Setup	Create a RAID configurations which is consist of the number of physical disk installed
Raid Set Functions	Create a customized raid set
Volume Set Functions	Create a customized volume set
Physical Drive Functions	View individual disk information
Raid System Functions	Setting the raid system configurations
Fibre Channel Config	Setting the Fibre Channel 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 the Subsystem 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 configuration 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 password is default setting at **00000000** by the manufacture.

#### **Function Key Definitions**

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

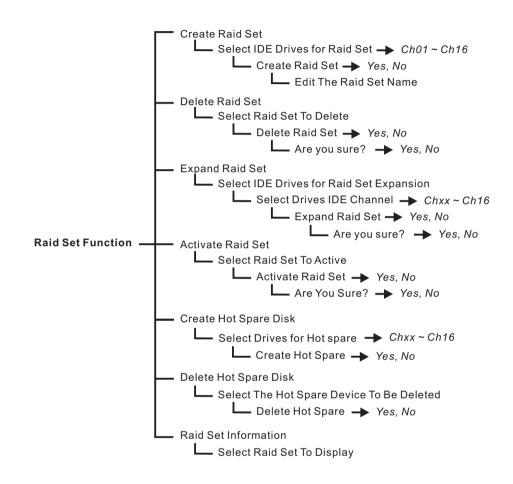


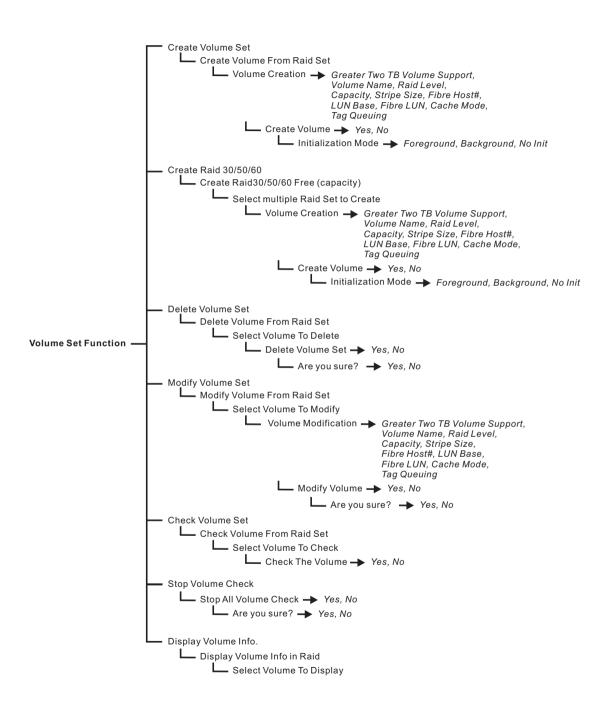
Parts		Function
Up or Down arrow buttons	▲ ▼	Use the Up or Down arrow keys to go through the information on the LCD screen. This is also used to move between each menu when you configure the subsystem.
Select button	$\checkmark$	This is used to enter the option you have selected.
Exit button	EXIT	Press this button to return to the previous menu.

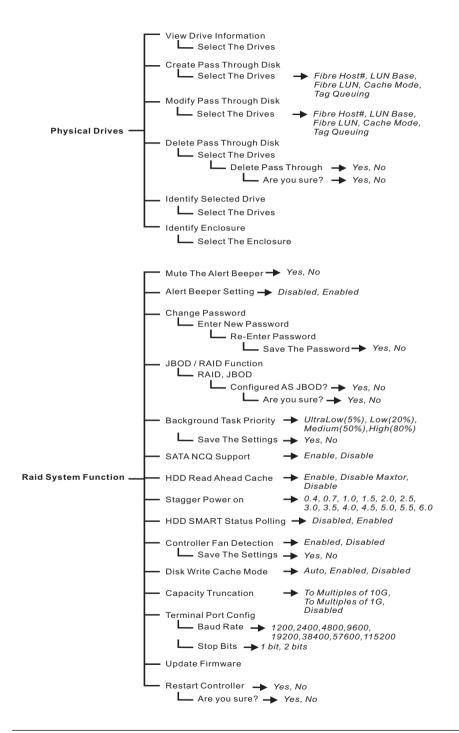
# 3.3 Menu Diagram

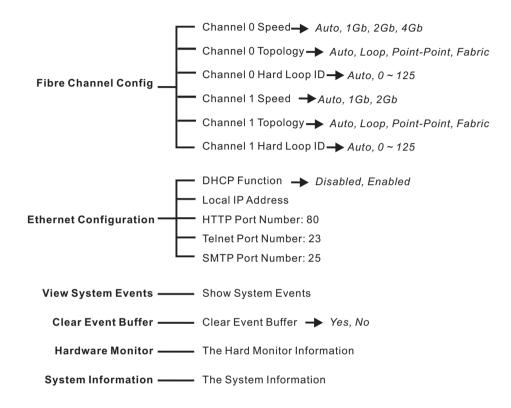
The following tree diagram is a summary of the various configuration and setting functions that can be accessed through the LCD panel menus or the terminal monitor.











# 3.4 Web browser-based Remote RAID management via R-Link ethernet port

Configuration of the internal RAID subsystem with remote RAID management is a web browser-based application, which utilizes the browser installed on your operating system. Web browser-based remote RAID management can be used to manage all the raid function.

To configure internal 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" and DHCP function is "enable". You can configure 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".

the DR sizer furnities limits B	4					
Qast + () - 🕑 🖉 🚭 🖉 s	ands 🏫 Facalitas 🕴	B (0+3) (0)				
COMPARTMENT IN LU						- 🖬 🛶 🛛
proRAID Manage	r xxxx	xxxxx	xxx			
upen altidose alti						1000000000
Rad Bucters Cantole	+RoldSet	Hierercity				
Quick Function	RAID Set	Device	s Vol	arm Set(Ch/Lae)	Volume State	Gapacity
Matther Functions (a) Volume test Paractions	Tatl Set 4			INF YOLABOD(3LD)	Mermal	2300.665
Protical Devec		DATIZION				
The the controls		E#15lot				
acitamente 🔁 🕈		DATISIO				
		041504				
	-	C#15lot				
		C#15lot	#D.			
	a finalosa	eef1 : DAN RAID	Taboycters	VI.8		
	Device	Usego	Copecity	Hodel		
	10.11 10.11	Raid Set # 080	300.168	Maxtor 64/30040		
	Slot#2 (0:1)	maid mit # cost	000.1km	Mador 6/300R0		
	Sicr#2 USLRJ	Red Set # 080	300 LG8	Marice 6/300P0		
	micere 10.41	Raid Set # 080	300.1GB	Hastor 64/30040		
	- ULL	Field Balt # 080	800.108	PRACOF BY BODRO		
	Slotvo	The d ward of which		Address of the second		

#### Main Menu

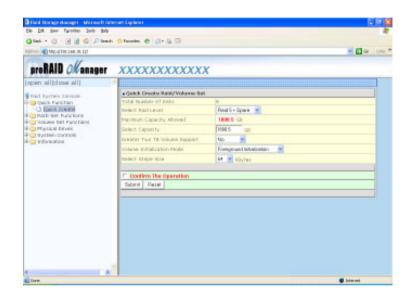
The main menu shows all function that enables the customer to execute actions by clicking on the appropriate link.

Individual Category	Description
Quick Function	Create a RAID configuration, which is consist of the number of physical disk installed; it can modify the volume set Capacity, Raid Level, and Stripe Size.
Raid Set Functions	Create a customized raid set.
Volume Set Functions	Create customized volume sets and modify the existed volume sets parameter.
Physical Drives	Create pass through disks and modify the existed pass through drives parameter. It also provides the function to identify the respect disk drive.
System Controls	Setting the raid system configurations
Information	View the controller and hardware monitor information. The Raid Set Hierarchy can also view through the RaidSet Hierarchy item.

# **Configuration Procedures**

Below are a few practical examples of concrete configuration procedures.

# 3.5 Quick Create



The number of physical drives in the raid subsystem determines the RAID levels that can be implemented with 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.

If volume size over 2TB, it will be provided one option "Creater TwoTB Volume Support" Automatically as above menu. There are three model for option "No", "64bit LBA", "4K Block".

#### Greater Two TB Volume Support:

No: still keep the volume size with max. 2TB limitation.

64bit LBA: the max. size 512TB, for Unix or Linux.

4K Block: the max. size 16TB , just use with " basic disk manager " under OS Window 2000, 2003 or XP. Noted that can't be used by with dynamic disk manager.

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.

After you complete the Quick create function, you should refer to section **3.9.2 Fibre channel configuration** to complete RAID configuration. Then you can use **RaidSet Hierarchy** feature to view the fibre channel volume set host filters information (refer to section 3.10.1).

Note: In Quick Create your volume 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 system.

# 3.6 Raid Set Functions

Use the Raid Set Function and Volume Set Function if you prefer to customize your system. User manual configuration can full control of the raid set setting, but it will take longer to complete than the Quick Volume/Raid Setup configuration. Select the Raid Set Function to manually configure the raid set for the first time or deletes existing raid set and reconfigures the raid set. A raid set is a group of disks containing one or more volume sets.

#### 3.6.1 Create Raid Set

Contract of the set of the s	the fift year sponter you may					11
Profile Consequence Conse	Q test - () - (2 🖉 🐔 🖉 testi	1100	min e D	- 2.00		
Profile Consequence Conse	UT					- 🖬 🖙 (
Inpern all (close all)	and the second se					
Inpern all (close all)	proBAID Offanager	X	XXXXX	XXXX	XX	
dec a function for a finite field of the field of th		T				nananananananananan
Operation         Enclosure 1: INERTIFIE INFOCUSE VLE           Image: Internet for an internet in			islast The Ori	vos Por Ital	D Set	
• Developmental provide         > Developmental provide           • D	Quick Function	•1	nolocare#1:	BAR BAID I	ubsystem VLB	
O basket was the         F         54194         200.056         Pearlier PX00F0           O basket was the         F         10197         200.056         Pearlier PX00F0           O creater was tappede         F         54194         200.106         Pearlier PX00F0           O creater was tappede         F         54194         200.106         Pearlier PX00F0           O creater was tappede         F         54194         200.106         Pearlier PX00F0           O basket was tappede         F         54194         200.106         Pearlier PX00F0           O volume tant transchart         F         54194         200.106         Pearlier PX00F0           O volume tant transchart         F         54194         200.106         Pearlier PX00F0           O volume tant transchart         F         54194         200.106         Pearlier PX00F0           O volume tant transchart         F         54194         200.106         Pearlier PX00F0           O volume tant transchart         F         540.106         Pearlier PX00F0         Pearlier PX00F0           O volume tant transchart         F         540.506         F         540.506         Pearlier PX00F0           O volume tant transchart         F         540.506         F </td <td></td> <td>C.</td> <td>Shri#3</td> <td>300.108</td> <td>Marker #V308Y0</td> <td></td>		C.	Shri#3	300.108	Marker #V308Y0	
Continue incardiate state is     Continue incardiate incardiate incardiate incardiate     Continue incardiate     Continue incardiate     Continue incardiate     Continue incardiate     Continue incardiate     Continue incardiate		F	59142	300,168	Haxter EX308F0	
Constant wat space     Series     Detres     Detretres     Detres     Detretres     Detres     Detres     Detres		C	10191	100.1108	Hadar system	
Consistent Accordinate     Construct Transformer		I.C.	Shiai	300.108	Mariter #V308PD	
Ordenan set success     Ordenan     Ordenan     Ordenan     Ordenan     Ordenan     Ordenan     Ordenan     Ordenan     Ordenan	Delets Hot makes	E	58185	300.168	Header EX208FD	
Competition brains Competition controls Competition Co		IC.	20178	300.108	Mastar excernic	
Confirm The Operation	🗧 🛄 Physical Deives	1.1	id bot Maren	Faid Set	808	
Confirm The Operation						1
Short Peart		E	Confirm The	Operation	24	
		5	ubinit Fallet			

To create a raid set, click on the **Create Raid Set** link. A "*Select The Drive For RAID Set*" screen is displayed showing the drive connected to the current controller. Click on the selected physical drives with the current raid set. Enter 1 to 15 alphanumeric characters to define a unique identifier for a raid set. The default raid set name will always appear as Raid Set. #.

Tick on the **Confirm The Operation** 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 set existing in the current controller. Click the raid set number you which to delete in the select column to delete screen.

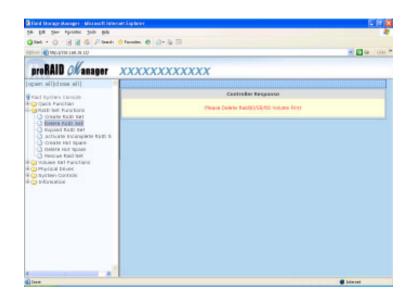
Tick on the **Confirm The Operation** and click on the **Submit** button in the screen to delete it.

Cand Storage Manager - Microsoft Tarter	raet Replete	н			
De fig lies allesges lies Rep.					
Q tes - () - 🕑 🗿 🚭 🖉 testi	The sales	e 0-20			
HER ALL ALL ALL ALL ALL ALL ALL ALL ALL AL					🖛 🚺 🖨 🛛 Linka 🏁
proRAID Manager	xxx	xxxxxx	xxx		
(per all)dose all)		10000000000		апалалалалалала	20101010101010101010101010
Rad Rotters candole	+ tieled	t The Hald Set To (	lekto		
R Quick Function	Select	Rold Set Name	Member Disks	Copocity	
RATE BAT BAT FLATER	5	ruaid mer # 000	1	1800.808	
C Detern Fuzz met	e	Red Set # 003	1	383.398	
- mpand RAELERT - activate Excercente RaELE	-			This Roldbert Will Also Be Dat	
- Create Hat spare		etee			
<ul> <li>Deleta Hot spiles</li> <li>Percue Raid Set</li> </ul>	- Secret	Fasat			
Weise tet Perciait					
🗟 🔄 Physical Drives					
<ul> <li>Trysteen controls</li> <li>Tribineutrice</li> </ul>					
4					
E Darte					👹 binveri



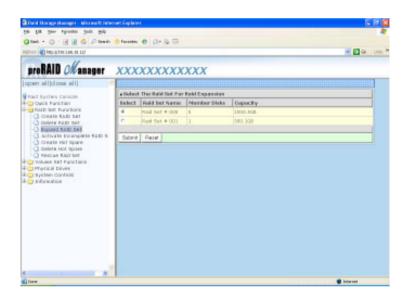
#### Note:

Cannot delete RaidSet when contains Raid30/50/60 volume. You must delete Raid30/50/60 volume first.



### 3.6.3 Expand Raid Set

Use this option to expand a raid set, when a disk is added to your system. This function is active when at least one drive is available.



To expand a raid set, click on the **Expand Raid Set** link. Select the target raid set, which you want to expand it.

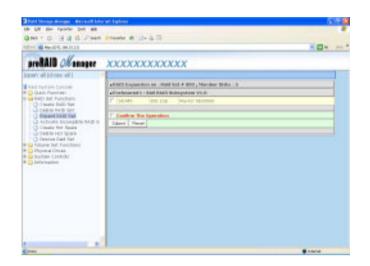
Tick on the available disk and **Confirm The Operation**, and then click on the **Submit** button in the screen to add disks to the raid set.

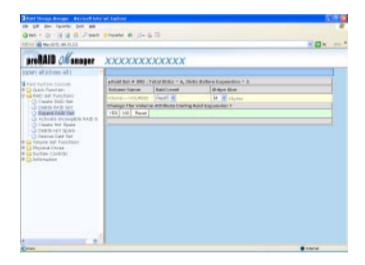


#### Note:

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

2. 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 completes.

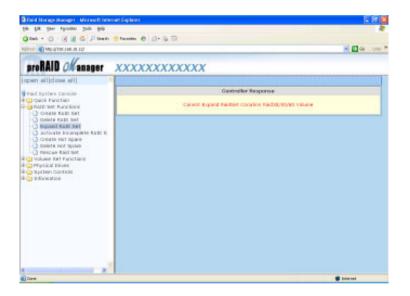




Migrating occurs when a disk is added to a raid set. Migration status is displayed in the raid status area of the Raid Set information when a disk is added to a raid set. Migrating status is also displayed in the associated volume status area of the volume set Information when a disk is added to a raid set.

#### Note:

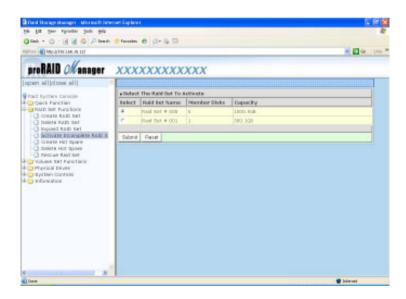
Cannot expand RaidSet when contains Raid30/50/60 volume.



### 3.6.4 Activate Incomplete Raid Set

When one of the disk drive is removed in power off state, the raid set state will change to Incomplete State. If user wants to continue to work, when the RAID subsystem is power on. User can use the Activate Raid Set option to active the raid set. After user complete the function, the Raid State will change to Degraded Mode.

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 raid set existing in the current controller. Click the raid set number you which to activate in the select column.



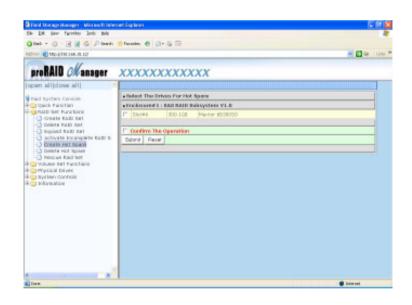
Click on the **Submit** button in the screen to activate the raid set that has removed one of disk drive in the power off state. The RAID subsystem will continue to work in degraded mode.

proRAID Manager									
nroBAID Manager								- 0 -	
promine on anager	XXX	xxx	αx.	xxx				10/10/01	
open all/close all	100000								
Paid Byrtwy Cansole B 😋 Qeck Panctian	RoldSat Hierenty								
	RAID SHI	RAID Set Devices		• V	Volume Set(Ch/Lan)		Volume State	Departy	
MAD BE Functions	Tatl Set	Red Set 4.080 DALSION		41. M	Volana		Degradeli	1200.408	
Create EAE 181		DALSIote							
Impland RAID BW1	EX1Sbb								
<ul> <li>Activate incariplete Kalti II</li> <li>Create est spare</li> </ul>	Existent Fulled		EL.						
Chelefa Hot Toller			D#15lots	eth. Weisster-Will & BOLLETT		Herend	380.328		
Plescue Raid tet Volume tet Pariotipio	1000								
i 🔄 Physical Deives	and the second	A second s							
2 system controls 2 show the second secon	Constructions	Inclosure#1 : BAR BalD Balkoystees VLB							
C PRIMA	Device	Usege		Cepecity	y Hostel				
	ID:31	Reid Se	1 # 080	300.1GB	Martor	éA/900E0			
	10.10	Taid test # DBD		0000 Line.	Phantor	PRIME IN BUILDING			
	Slot#2 LB.XI	Faid Set # 080		900 LGB	Markov	Markot 64300P0			
	microret 10:El	Red Se	1 # 080	300.1GE	Hantor	Hantor 6/30040			
	theory .								
	Slotets (0:4)	raid to	100.51	1000.4408	Philippin	100000			
	E LIGHT								
	Jact #1								

### 3.6.5 Create Hot Spare

When you choose the **Create Hot Spare** option in the Raid Set Function, all unused physical devices connected to the current controller appear: Select the target disk by clicking on the appropriate check box. Tick on the **Confirm The Operation**, and click on the **Submit** button in the screen to create the hot spares.

The create Hot Spare option gives you the ability to define a global hot spare.



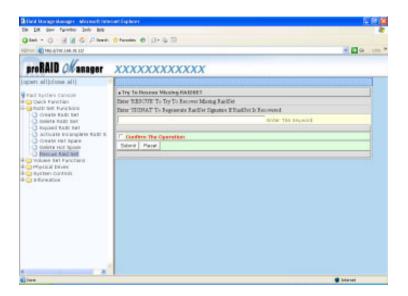
#### 3.6.6 Delete Hot Spare

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

Tick on the **Confirm The Operation**, and click on the **Submit** button in the screen to delete the hot spares.

#### 3.6.7 Rescue Raid Set

If you try to Rescue Missing RAID Set, please contact our engineer for assistance.



# 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 disk 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 is the volume set features:

1. Volume sets of different RAID levels may coexist on the same raid set.

2.Up to 128 volume sets in a raid set can be created by the RAID subsystem controller.

To create volume set from raid set system, move the cursor bar to the main menu and click on the **Create Volume Set** link. The **Select The Raid Set To Create On It** screen will show all raid set number. **Tick** on a raid set number that you want to create and then **click** on the Submit button.

The new create volume set allows user to select the Volume name, capacity, RAID level, strip size, Fibre channel/LUN, Cache mode, and tag queuing.

Den Molaterian. II. CO		💌 🚺 🐼 (au 1					
proRAID Manager	XXXXXXXXXXXXX						
open alticione alti	signanananananananan	anananananananananananananananananana					
Faid Rottwy Cantoll-	+ Enter The Velore Attribute						
Ouch Function	Volane Nate	Volume-VOL800					
MAD bet Functions wokees tell Pariotians	Hender Daks	1					
Create Values tet	Yolanse Raid Lavel	STATION -					
<ul> <li>Create Exided/EX/EX/ED</li> <li>Create Volume Inst.</li> </ul>	Hav Capacity Moved	2108.8 58					
- Ptod 5y Volume Bet	Select Volume Capacity	2108.0 m					
Credit Volume Bart Druchdlaw Volume Credit Druchdlaw Volume Credit Volume Bart Hold Filters Reg Pryclask Device Reg Tryclask Controls Reg Tryclask Control	Greater Two TE Volume Seppert	New					
	Volane Initialization Hode	Poregraund Infeliation					
	Volane Stripe Size	64 M Hortes					
	Volane Cache Mode	Whe Back M					
	Tagged Command Quality	Crabled #					
	Fibre Charriel U/N & also U/N	0					
	Volament Ta Be constand						
	A second s						
	E confine the operation						
	Salard Reide						

#### Volume Name:

The default volume name will always appear as Volume ---VOL#. You can rename the volume set name providing it does not exceed the 15 characters limit.

#### Raid Level:

Set the RAID level for the Volume Set. Highlight *Raid Level* and press Enter.

The available RAID levels for the current Volume Set are displayed. Select a RAID level and press **Enter** to confirm.

#### Capacity:

The maximum volume size is default in the first setting. Enter the appropriate volume size to fit your application.

**Greater Two TB Volume Support:** If volume size over 2TB, it will be provided one option "Creater TwoTB Volume Support" Automatically.

No: still keep the volume size with max. 2TB limitation.

64bit LBA: the max. size 512TB, for Unix or Linux.

4K Block: the max. size 16TB , just use with " basic disk manager " under OS Window 2000, 2003 or XP. Noted that can't be used by with dynamic disk manager.

#### Initialization Mode:

Set the Initialization Mode for the Volume Set. Foreground mode is faster completion and background is instant available. No init mode is for rescuing volume. If you try to Rescue Missing volume set, please contact our engineer for assistance.

#### Strip Size:

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

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

Note: RAID level 3 can't modify strip size.

#### Cache Mode:

The RAID subsystem supports Write-Through Cache and Write-Back Cache.

#### Tag Queuing:

The Enabled option is useful for enhancing overall system performance under multi-tasking operating systems. The Command Tag (Drive Channel) function controls the Fibre command tag queuing support for each drive channel. This function should normally remain enabled. Disable this function only when using older Fibre drives that do not support command tag queuing

#### Fibre Channel/LUN Base/LUN:

**Fibre Channe**I: Two 4Gbps Fibre channel can be applied to the internal RAID subsystem. Choose the Fibre Host# option **0**, **1** and **0&1 cluster**.

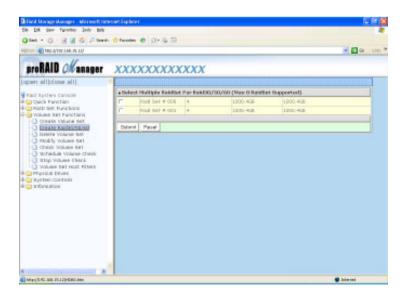
**LUN Base**: Each fibre device attached to the Fibre card, as well as the card itself, must be assigned a unique fibre ID number. A Fibre channel can connect up to 126 (0 to 125) devices. The RAID subsystem is as a large Fibre device. We should assign an LUN base from a list of Fibre LUNs.

**LUN:** Each Fibre LUN base can support up to 8 LUNs. Most Fibre Channel host adapter treats each LUN like a Fibre disk.

**Volumes To Be Created:** use this option to create the same attribution volume. Up to 128 volume sets can be created.

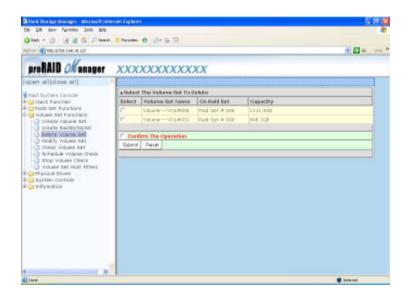
#### 3.7.2 Create Raid30/50/60

To create RAID 30/50/60 from raid set system, move the cursor bar to the main menu and click on the **Create Raid30/50/60** link. The **Select Multiple RaidSet For Raid30/50/60** screen will show all raid set number. **Tick** on a raid set number that you want to create and then **click** on the Submit button. **Max 8 RaidSet Supported.** 



#### 3.7.3 Delete Volume Set

To delete Volume from raid set system function, move the cursor bar to the main menu and click on the **Delete Volume Set** link. The **Select The Volume Set To Delete** screen will show all raid set number. **Tick** on a raid set number and the Confirm The Operation and then **click** on the Submit button to show all volume set item in the selected raid set. **Tick** on a volume set number and the Confirm The Operation and then **click** on the **Submit** button to show all volume set item in the selected raid set. **Tick** on a volume set number and the Confirm The Operation and then **click** on the **Submit** button to delete the volume set.



#### 3.7.4 Modify Volume Set

To modify a volume set from a raid set:

(1). Click on the Modify Volume Set link.

(2). Tick on the volume set from the list that you wish to modify. Click on the **Submit** button.

The following screen appears.

Use this option to modify volume set configuration. To modify volume set attribute values from raid set system function, move the cursor bar to the volume set attribute menu and click on it. The modify value screen appears. Move the cursor bar to an attribute item, and then click on the attribute to modify the value. After you complete the modification, tick on the **Confirm The Operation** and click on the **Submit** button to complete the action. User can modify all values except the capacity.

#### 3.7.4.1 Volume Expansion

Volume Capacity (Logical Volume Concatenation Plus Re-stripe)

Use this raid set expands to expand a raid set, when a disk is added to your system. (refer to section 3.6.3)

The expand capacity can use to enlarge the volume set size or create another volume set. The modify volume set function can support the volume set expansion function. To expand volume set capacity value from raid set system function, move the cursor bar to the volume set **Volume capacity** item and entry the capacity size.

Tick on the **Confirm The Operation** and click on the **Submit** button to complete the action. The volume set start to expand.

Q tet - 0 - 12 2 6 / 100	6. 1 fannin 🙃 👔 - 🎠 💬				
HER BELLEVILLE			🖬 🛶 🕴		
proBAID Manager	***		-		
open alticione alti	signanananananananananananananananananana	nanananananananananananananananana	111111		
Rad Retary Cantole	+Enter The Volume Attribute				
R 😳 Quick Function	Volame Name	Velump-VOL808			
Registration for the section in the section of t	Max Capacity Allowed	588.7 12			
- Create values set	Volene Capacity	[103] IA			
<ul> <li>Create Kaidtd/KE/KD</li> <li>Delete Volave test.</li> </ul>	Volane Initialization Mode	Comparative and in			
Plod 5, Volume 141	Molaree Raid Level	Faids M			
Check voluee tet	Volate Stripe Size	64 M HBetes			
🔄 stop Volume black	Volgte Cache Mode	With Dack M			
- Volume Bat Host Filters Representation Deves	Tagged Command Queuing	Crabled =			
# United Controls	Fibre Charmel LUN Resectors	0			
🗟 🔄 anfonsation	Encountries and the state				
	Confirm The Operation				
	Dibrit Peret				
	-				



### Note:

Cannot expand volume capacity in Raid30/50/60 volume.

#### 3.7.5 Volume Set Migration

Migrating occurs when a volume set is migrating from one RAID level to another, a volume set strip size changes, or when a disk is added to a raid set. Migration status is displayed in the volume status area of the RaidSet Hierarchy screen when one RAID level to another, a Volume set strip size changes or when a disk is added to a raid set.

01-0 (C) MC-0110-140. IL CO		e 0-2 =				- 00		
proRAID Manager	XXXX	XXXXXX	XXX	nanananananan	nanananananan	nononona		
Rad Rotten cantole	• RoldSet	+RoldSat Hierarchy						
Register Function	RAID SHI	RAID Set Devices		ame Set(Ch/Lan)	Volume Shato	Gapacity		
Oraclase Bat Parcelaire     Oraclase Rat Parcelaire     Oraclase Rationgly (b)     Oraclase Rationgly (b)     Tobole Volume Bat     Oracla Volume Bat     Oracla Volume Bat     Oracla Volume Check     Top Volume Check	1	DALSION DALSION DALSION		VolamVLABOO(200) Wyrefryl (194)				
The stop Volume these	Consecution of the local division of the loc	WEFT : BAILRAID	and the second se					
Itop Volume theck     Volume tet Host Filters     Physical brives     Trycles Contails	<ul> <li>Inclose</li> <li>Device</li> <li>States</li> <li>States</li> <li>States</li> </ul>	Dvege Red Set # 000	Cepecity	Martor 6430060				
Itop Volume Eleck     Volume Bat Host Filters     Wolume Bat Host Filters     Wystee Controls	Device	Usega	Cepecity 200.1.Gl	Flodel				
Itop Voluee theck     Voluee tetroit     Voluee tetroit Filters     Wystee controls	Device 10:073 10:13 20:072 10:13 50:072 10:13 10:10 10:10	Dreger Reid Set # 000	Copecity 300.1.GB 300.1.GB	Martor 5430040				
Itop Voluee theck     Voluee tetroit     Voluee tetroit Filters     Wystee controls	Device States States States States States	Drage Red Set # 080 Maid net # 080	Cepecity 200.148 300.148 300.148	Martor \$420040 Martor \$420040 Martor #420040				
The stop volume these	Devices 102.01 102.11 102.11 102.0	Usego Rad Set # 000 Rad Set # 000 Rad Set # 000	Cepecity 200.148 300.148 300.148	Hooled milator 5430040 milator 6430040 Markor 6430040				
Itop Volume Eleck     Volume Bat Host Filters     Wolume Bat Host Filters     Wystee Controls	Devices Shot #3 (D.13) Shot #2 (D.13) Shot #2 (D.13) Shot #2 (D.14) Shot #2 (D.14) Shot #2 (D.14) Shot #3	Usege Red Set # 000 Red Set # 000 Red Set # 000 Red Set # 000	Copecity 200.1GB 200.1GB 200.1GB 200.1GB	Model Plantor 6/30040 Plantor				
Itop Voluee Lieck     Voluee Leck     Voluee Let Host Filterk     Physical Devec      Trystee controls	Devices 102.01 102.11 102.11 102.0	Usege Raid Set # 080 Raid Set # 080 Raid Set # 080 Raid Set # 080 Paint Set # 080	Cepecity 200.148 200.148 200.148 200.148	Plocket Marcor 6/30043 Reador 6/30043 Marcor 6/30043 Marcor 6/30040 Plactor 6/30040				



#### Note:

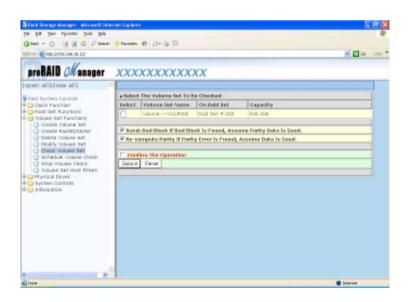
Cannot modify RAID level and stripe size in Raid30/50/60 volume.

## 3.7.6 Check Volume Set

To check a volume set from a raid set:

(1). Click on the Check Volume Set link.

(2). **Tick** on the volume set from the list that you wish to check. Tick on Confirm The Operation and click on the **Submit** button.



Use this option to verify the correctness pf the redundant data in a volume set. For example, in a system with dedicated parity, volume set check means computing the parity of the data disk drives and comparing the results to the contents of the dedicated parity disk drive. The checking percentage can also be viewed by clicking on RaidSet Hierarchy in the main menu.

Daid Marage Manager - Microsoft Do DR Saw Tyrothe John Bo											
0 test = (0 - (2 10 (2 10		0-5.00									
CONTRACTOR DE LO						- 04 1					
proRAID Manager	XXXX	XXXXX	XXX								
[lis emb]idone all	-										
Field Rycters Cansold Reg Oach Panctian	+ RoldSet	RoldSet Histority									
	RAID Set	Orvices	e Vol	arm Set(Ch/Lae)	Volume State	Copecity					
That her have bone	Tatl Set 4	Tatl Set # 080 C#15lot		INCOMPOSITION INCOMPOSITION	checking(#.2%)	11300.605					
2 Volume tet Pariotiana 2 O Physical Devec		DATOION									
The source of the second secon		D#15kt									
- suformation		E#15kb				-					
Best Net Heradold     System Information     Hardware Monital		CALSING									
		DelShite									
		D#15lob	40.								
	+ trackets	Inclosure#1 : BAD Ballo Balloyclers VI.0									
	Device	Usego	Cepecity	r Plodel							
	101471 (D.II)	Read Set # 080	300 i.GB	Maxtor 6430080							
	53ob#2 (0:5)	maid mat # cost	800.108	Mador 6/300PG							
	SACRAGE LISLAL	Red Set # 080	300 LG8	Martor 6/300P0		_					
	mionee 100-61	Reid Set # 080	300,8GB	Martor 6430040							
	- ULU	Field 8.81 P (100)	900.108	PRANTOR BY BODRO							
	Slotvo										

## 3.7.7 Scheduled Volume Checking

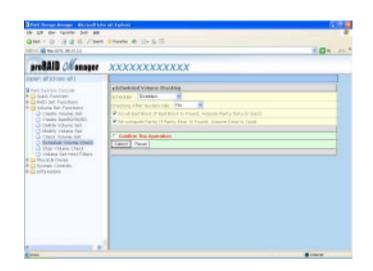
To check a volume set by schedule :

#### (1). Click on the Scheduled Volume Checking link.

(2). Select desired schedule that you wish to check volume set. Tick on Confirm The Operation and click on the **Submit** button.

**Scheduler:** Disabled, 1 Day(For Testing), 1Week, 2Weeks, 3Weeks, 4Weeks, 8Weeks, 12Weeks, 16Weeks, 20Weeks and 24Weeks.

**Check After System Idle:** No, 1 Minute, 3 Minutes, 5 Minutes, 10 Minutes, 15 Minutes, 20 Minutes, 30 Minutes, 45 Minutes and 60 Minutes.

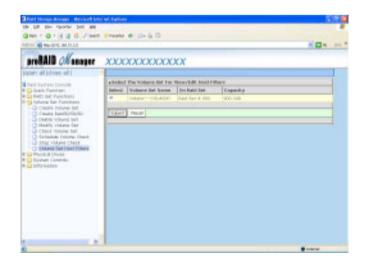


## 3.7.8 Stop VolumeSet Check

Use this option to stop the Check Volume Set function.

## 3.7.9 Volume Set Host Filters

Use this option to View/Edit Host Filters. Refer to section **3.9.2.2 View/Edit Volume Set Host Filters** for more information. You should complete the *Fibre Channel Configuration* first before you use this option.



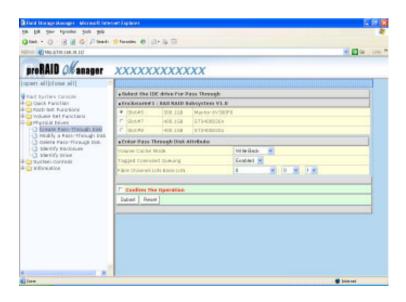
## 3.8 Physical Drive

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

## 3.8.1 Create Pass-Through Disk

To create pass-through disk, move the mouse cursor to the main menu and click on the **Create Pass-Through** link. The relative setting function screen appears.

Disk is no controlled by the internal RAID subsystem firmware and thus cannot be a part of a volume set. The disk is available to the operating system 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. User can also select the cache mode, Tagged Command Queuing and Fibre channel/LUN Base/LUN for this volume.

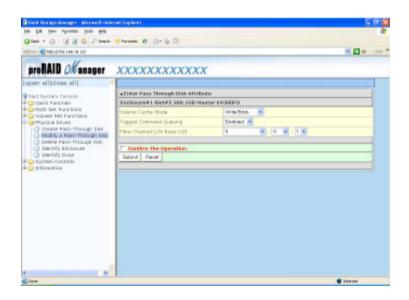


## 3.8.2 Modify Pass-Through Disk

Use this option to modify the Pass-Through Disk Attribute. User can modify the cache mode, Tagged Command Queuing and Fibre channel/LUN Base/LUN on an existed pass through disk.

To modify the pass-through drive attribute from the pass-through drive pool, move the mouse cursor bar to click on **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 drive.

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



## 3.8.3 Delete Pass-Through Disk

To delete pass-through drive from the pass-through drive pool, move the mouse cursor bar to the main menus and click on **Delete Pass Through** link. After you complete the selection, tick on the **Confirm The Operation** and click on the **Submit** button to complete the delete action.

## 3.8.4 Identify Enclosure

To identify the Enclosure, move the mouse cursor bar to click on **Identify Enclosure** link. The Select The Enclosure For identification screen appears tick on the enclosure from the enclosure pool and Flash method. After completing the selection, click on the **Submit** button to identify selected enclosure. All of the disk LED will Flash when the enclosure is selected

Rend Storage Manager - Microsoft Tarte	nart Septemer
the Life saw furnities limits this	
Q tet - 0 - 2 2 5 / Seet	🕐 fession 😧 🔯 - 🔯 🗇
HER-10 MIL-10 THE LAM. PL LLD	🖬 🔂 Gar Louis
proKAIU () anager	XXXXXXXXXXXX
[upen all[done all]	
Rad Rutters cantole	+ Gelect The Enclosure For DirectRicetion
R Quick Function	Enclosure#1 : SAS RAID Extravelien VI. 8
Filitzi Ibet, Functione Convoluese text Paractione	
🖓 🥶 Přecial bevec	Sabrit Field
Create Rass-Through bisk	
- Deleta Pata-Tiwa-gé Didi	
C ROBORTA RECEDURE	
<ul> <li>atentify trise</li> <li>atentify trise</li> </ul>	
🗟 😋 Information	
8 ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) (	
0	Contract 🖉 Marcel

## 3.8.5 Identify Drive

To prevent removing the wrong drive, the selected disk LED will light for physically locating the selected disk when the *Identify Drive* is selected.

To identify the selected drive from the drives pool, move the mouse cursor bar to click on **Identify Drive** link. The Select The Device For identification screen appears tick on the device from the drives pool and Flash method. After completing the selection, click on the **Submit** button to identify selected drive.

The best storage damager Microsoft tarter Sk DR Sev Fyrates Jack Bds	and A	splanar			000						
Qint - Q - R R & Pinet	12										
HERE AND A THE AM IN CO.			ar 14 11		- 🖬 🛶 🗤 💌						
ALTER A MC STRIM. R ID											
proBAID Manager	X	xxxx	XXXXX	(XX							
upen all done all			00000000	nananananananananananan	291212121212121212121212121212121212121						
Rad Retare Candole		+ Solect. The Device For Identification									
Quick Function	.1										
- HAD BER Functions		20042	258.0.68	NDC N0250045-80Y080							
Volume tet Parchane     Phone tet Parchane     Phone tet Parchane     Constant Rest-Through Dela	10	Slob#4	258.168	HDC HD29005-08Y091							
Create Rass-Through Disk Modify a Rass-Through Disk	(C	stot#6	218.118	NDC ND3500/8-33/8-83							
<ul> <li>Delete Paco-Through Did.</li> </ul>	1.	50048	258-158	NDC ND250065-80H080							
<ul> <li>3dentify Baclosuse</li> </ul>	1	Slot#10	258.158	NDC N025003-08H88							
<ul> <li>Alexandria branti</li> <li>Taystee's controls</li> </ul>	C	1801912	218.118	NDC NO2500-22F8-83							
a 🔄 information	1	000414	408.108	5734085334							
	2	Sotett	401.158	673-6080324							
	9	danit Rei	*								
4	1										
a)	-				Carlos Ca						

## 3.9 System Configuration

## 3.9.1 System Configuration

To set the raid system function, move the cursor bar to the main menu and click on the **Raid System Function** link. The Raid System Function menu will show all items. Select the desired function.

Q 246 - () - 🕑 🕷 🚭 🖉 2444	Taradas 🙆 🔝 🕫 🔤						
01 🜒 MC-3/187.346.16.00		🛒 🛄 👾 👘					
proRAID Manager	<i>xxxxxxxx</i>	x					
(the each(the requ	<ul> <li>Friedrichten einen eine einen einen</li></ul>						
Rad Ructwy Candole	System Configurations						
Quick Function	System Seeper Setting	Evolved M					
C MAD BH: Functions	Background Task Priority	HgR0DQ H					
Propagation Delivers     Section Constitute     Optimized Section	3600/P430 Configuration	IND H					
	SATA MCO Seppert	Exobled #					
Pikes Charlesi Cardig	HOD Read Afreed Cache	Exched ·					
<ul> <li>atherest configuration</li> <li>alext by Mail configuration</li> </ul>	HDD Duwue Depth	R +					
<ul> <li>aver configuration</li> </ul>	Shapper Prevet On Central	LT =					
<ul> <li>NTP carriguration</li> <li>View towns/hute beaper</li> </ul>	HOD SMART Status Palling	Enabled M					
anneuts text event	Dok Write Cache Hede	Enobled in					
Class fueld further     Todaty Pacewood     Gogo Parents     Todaty Pacewood     Gogo Parents     Todaty     Todaty	Diali Capacity Truncation Moria	No Transition -					
	Confirm The Operation     Saturd   Recel						

## System Beeper Setting:

The Alert Beeper function item is used to Disabled or Enable the RAID subsystem controller alarm tone generator.

#### Background Task Priority:

The Raid Rebuild Priority is a relative indication of how much time the controller devotes to a rebuild operation. The RAID subsystem allows user to choose the rebuild priority (ultraLow, Low, Medium, High) to balance volume set access and rebuild tasks appropriately. For high array performance, specify a Low value.

## JBOD/RAID Configuration

The RAID subsystem supports JBOD and RAID configuration.

## SATA NCQ Support:

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

## HDD Read Ahead Cache:

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

## HDD Queue Depth:

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

## Stagger Power On Control:

This option allows the power supplier to power up in order each HDD on the RAID subsystem. In the past, all the HDDs on the RAID subsystem are powered up altogether at the same time. The power transfer time (lag time) from the last HDD to the next one can be set within the range of 0.4 to 6.0.

## HDD SMART status polling:

The SATA/SAS HDD has built the S.M.A.R.T. information in the disk. The controller can read it through the SMART function. Click on RaidSet Hierarchy in the main menu to view the information.

## Disk Write Cache Mode:

The RAID subsystem supports auto, enabled and disabled. When the RAID subsystem with BBM (battery backup module) the auto option will Enable disk write cache. Contrariwise, the auto option will Disable disk write cache.

#### **Disk Capacity Truncation Mode:**

This RAID subsystem use drive truncation so that drives from differing 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.

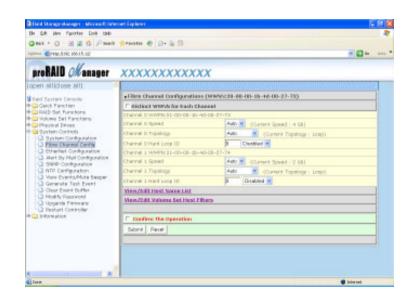
**Multiples Of 10G**: If you have 120 GB drives from different vendors; chances are that the capacity varies slightly. For example, one drive might be 123.5 GB, and the other 120 GB. This drive Truncation mode **Multiples Of 10G** uses the same capacity for both of these drives so that one could replace the other.

**Multiples Of 1G:** If you have 123 GB drives from different vendors; chances are that the capacity varies slightly. For example, one drive might be 123.5 GB, and the other 123.4 GB. This drive Truncation mode **Multiples Of 1G** uses the same capacity for both of these drives so that one could replace the other.

No Truncation: It does not truncate the capacity.

## 3.9.2 Fibre Channel Config

To set the Fibre Channel function, move the cursor bar to the main menu and click on the **Fibre Channel Config**. The Raid System Fibre Channel Function menu will show all items. Select the desired function.



#### **Distinct WWNN for Each Channel**

Use this option to enable dual channel support on Mac machines.

#### WWNN (World Wide Node Name)

The WWNN of the FC RAID is shown at top of the Config Frame. This is an eightbyte unique address factory assigned to the FC RAID, common to both FC channels.

#### WWPN (World Wide Port Name)

Each FC channel has its unique WWPN, which is also factory assigned. Usually, the WWNN:WWPN tuple is used to uniquely identify a port in the Fabric.

## Channel Speed

Each FC Channel can be configured as 1 Gbps/sec, 2 Gbps/sec, 4 Gbps/sec or use "Auto" option for auto speed negotiation between 1G/4G. The controller default is "Auto", which should be adequate under most conditions. The Channel Speed setting takes effect for the next connection. That means a link down or bus reset should be applied for the change to take effect. The current connection speed is shown at end of the row. You have to click the "Fibre Channel Config" link again from the Menu Frame to refresh display of current speed.

## **Channel Topology**

Each FC Channel can be configured as Fabric, Point-to-Point, Loop or Auto Topology. The controller default is "Auto" topology, which takes precedence of Loop topology. Firmware restart is needed for any topology change to take effect. The current connection topology is shown at end of the row. You have to click the "Fibre Channel Config" link again from the Menu Frame to refresh display of current topology. Note that current topology is shown as "None" when no successful connection is made for the channel.

#### Hard Loop ID

This setting is effective only under Loop topology. When enabled, you can manually set the Loop ID in the range from 0 to 125. Make sure this hard assigned ID is not conflicted with any other devices on the same loop; otherwise the channel will be disabled. It is a good practical to disable the hard loop ID and let the loop itself auto arrange the Loop ID.

## 3.9.2.1 View/Edit Host Name List

To set up LUN masking for each volume, a host list should be established at first. This is done by clicking "View/Edit Host Name List" link at bottom of "Fibre Channel Config" page (refer to section 3.9.2). Only hosts that will be used as include/ exclude filters are necessary to be added.

The subsystem provides two way to add a host to the list:

1. Select WWN From Detected Host.

2. Key in: first enter the WWPN (exact 16 hex digits) of the host in the "Host WWN" text field. Optional host nick name (up to 23 ASCII characters) can be given for descriptive purpose.

Choose "Add" operation, then Confirm/Submit to complete the add operation.

The added host will be shown in the upper half of the Config Frame. Up to 20 hosts can be added.

To delete a host from the list, select the radio button in front of the host list. Choose "Delete" operation, then Confirm/Submit to complete the delete operation.

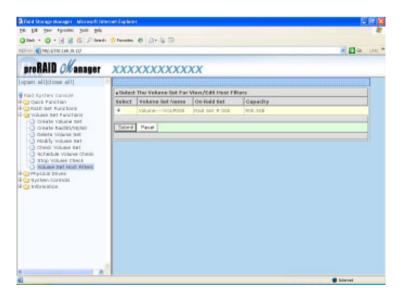
Once volumes are created and the host name list is established, Volume Set Host Filters can be specified by clicking "View/Edit Volume Set Host Filters" link at bottom of "Fibre Channel Config" page. Volume Set Host Filters can also be specified by clicking "Volume Set Functions"  $\rightarrow$  "Volume Set Host Filters" from the Menu Frame. Select the volume for LUN masking and then click the submit button.

Be GR ites favotes Date tab									
Qast + O B # & Paul	Phote @ D· & D								
2464mia 200412182 00015-12			- C to and -						
proBAID Manager	<i>xxxxxxxxxxx</i>								
lopen allidose alli	<ul> <li>Prostantantantantanta</li> </ul>	deteletetetetetetetetetetetetetetete							
Red Sectors Denote	• Fibre Charged Heat Name List								
Add Spatian Candol Order Franction Debuge Set Transition Debuge Set Transition Debuge Set Transition Debuge Set Transition Debuge Set Transition Debuge Set Configuration Debuge Set Configuration D									
	and the second se	- Dates							
	NOW I HOLE INNES I Mick Hame I	P Charmed II							
	and the second se								
AND Set Functions     Waters Set Transmiss     Project Drives     Strates Configuration     Strates Configuration     Drives Configuration     Meet Set Mill Configuration     Meet Set Mill Configuration     Mill Configuratio	Confirm The Operation								
Pestart Controller	Sabert Parad								
	-								
4. A									
Core			🙂 biarat						

#### 3.9.2.2 Volume Set Host Filters

Volume Set Host Filters can be specified by clicking "View/Edit Volume Set Host Filters" link at bottom of "Fibre Channel Config" page. Volume Set Host Filters can also be specified by clicking "Volume Set Functions"  $\rightarrow$  "Volume Set Host Filters" from the Menu Frame.

Field Storage Manager – Microsoft Int	enset Explaner	58						
the Galt plan Parovise Dark theb-								
Ons - 0 - 2 2 6 Past	******** @ D+ & D							
Automa CPR02.8182.00045.10								
BAID off		200						
profAID (Manager	XXXXXXXXXXX	X						
open allidose alli	A STREET HOUSE HERE	in de la company de la comp						
Raid Sectors Descole	• Films Channel Configuration	(MWW):29-60-00-15-46-00-27-79)						
# 🛄 Qalok Fanotien	C distinct www.coenach.channel							
# 🛄 RALD Set Functions # 🛄 Volume Set Fanctions	channel o www.bl.b1-op-op-op-	KI-08-27-73						
Dheste al Deves	channel o typeed	Auto 💘 (Ourrent Speed ( 4 68)						
System Controls System Configuration	channel tritopelogy	Auto (Current Topeloge : Loep)						
C Fitter Charmed Carding	Channel D Hart Loop (D	Classified #						
Cheffet Configuration	Channel 1 WWPht31-00-08-ds-ed-08-37-74							
Alert By Mail Configuration     SWAP Configuration	Channel 1 Speed	Auto 💌 (Ourrent Speed : 2 68)						
Carrie Centry ration	Channel 1 Topeloge	Auto 🖉 (Ournernt Toppeloger : Longi)						
Were Events/Muta Seeper Generata Test Event	channel 3 Hard Loop ID	Disabled M						
Clear Event Suffer	View/Edit Hest Note List							
Most ty Password     Most ty Password	View/Edit Valuese Set Fiest Filtura							
Pestart Cottroller								
# 🛄 Information	E continue the operation							
	Sidonit Revet							
	annound constant.							
a a a a a a a a a a a a a a a a a a a		Direct						



To add a host filter entry, first select the host to be include/exclude from Host WWN list.

Adjust Range Mask, Filter Type, Access Mode fields. Choose "Add" operation, then Confirm/Submit to complete the add operation. The added host filter entry will be shown in the upper half of the Config Frame. Up to 8 host filter entries can be added.

To delete a host filter entry from the list, select the radio button in front of the host entry.

Choose "Delete" operation, then Confirm/Submit to complete the delete operation.

Cand Storage Manager - Microsoft Inc	nervet Replacer	
the fift year spreader your man		
Quel - () - 🕑 🖉 🕼 🖉 text	n 👘 Faradan 🔿 🔝 - 🍇 🔛	
401-00 MIC-0718-148. IL LU		- 🖸 😂 (1940 <sup>- 1</sup>
Bain all		H 12/70/00/10/00/10
proNAIU (Manager	XXXXXXXXXXXX	
[upen all]close all]	sananananananananananananananananananan	connnnnnn
Rad Retare Candole	+Pfline Chonnel Volame Set Hest Pilkers (Ch6/USN:8)	
R Quick Function	10.00	
Contract test Punctions	Add or Delete Releated Host Filter Inday	
Create values set	P Select WWN Free Hest Nerve List	
<ul> <li>Create Raddd/st/st</li> <li>Cleater Volume tet:</li> </ul>	max/bit Hest Name List	
Deserve volume ter	Hept Wildle 🔹	
Check Volume East     Schedule Volume check	Parige Mark : # -# -# -# -# -# -# -# +en	
The stop voluee theck	Pitter Type : Tackado 🤒	
Incluses that Host Filters:	dopeet mode   Read/Wite H	
R 😋 Physical Develo R 🥶 Bysteek controls	Operation Add M	
a 🔄 anformation	Confirm The Operation	
	Submit Parat	
	2	
0		a bimtei

#### **Range Mark**

Some times it is convenient to combine some corelated WWNs into one ID range as a single filter entry. This ID range is obtained by "AND'ing" the host WWN and the Range Mask (which are both 64-bit entities). For example, if hosts 0x210000e0\_8b03dc84 and 0x210000e0\_8b03dc85 have the same access control,

#### Filter Type

Each filter entry can be set to include or exclude certain host(s) from data access.

If a node's WWN falls in an ID range specified as Exclude, the related volume set will be "invisible" to this node and no data access is possible.

If a node's WWN falls in an ID range specified as Include and does not fall in any ID range specified as Exclude, this node will be allowed to access the data of the related volume set.

The access mode can be specified as normal "Read/Write" or restricted "Read Only".

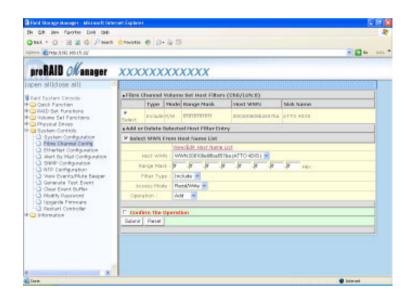
If a node's WWN falls in none of the ranges and there is at least one Include-type entry specified, this node is considered as Excluded; otherwise, it is considered as Included.

Note that when no Filter Entries are specified for a volume set, any node can access the volume set as there is no LUN masking.

#### Access mode

For certain applications, it is desired to limit the data access as "Read Only" such that the data on the volume won't be accidentally modified. This can be done by setting the Access Mode of the Included ID range as "Read Only". However, some Operating Systems (e.g. Linux) may ignore this "Write Protect" attribute and still issue write commands to the protected volumes.

"Data Protected" error will be response to these write commands then. It is suggested to mount the volumes as "Read Only" for a consistent behavior, if possible.



the fast plan Parovise Dank theb	raet Explore						- 12	
0 MA + 0 - 2 # 6 Paul	+ raote		2.0	1				
1000 - 1000 - 1000 - 1000 - 1000			-					
and the second se	100.001	100101		en contraré i l				
proRAID Manager	XXX	XXX	XX	XXXX				
open allidose alli							annaaanna -	
Paid Sectors Consols	.Fibra I	Charmel	Volur	w Bet Hast Filters	(010/10/10)			
Calck Panoten	100000	Type	Hode	Honge Mask	HOLD WINN	Nick Nation		
<ul> <li>BAD Set Functions</li> <li>Volume Set Functions</li> <li>Others at Drives</li> </ul>	Select	Piclade	10,100	1000000	200300w0Hatsrba	ATTO 4258		
System Controls	e miace	Include	0,44	******	200000w00007w3a7	QLA2348		
Pibre Charmel Carify	Add or Delete Releated Nost Filter Potry							
EtherNet Configuration     Airt By Mail Configuration	P Salect MWN Press Host Name List							
- SVP Configuration	shaws/Edit. Hirst flatter List							
<ul> <li>Write Configuration</li> <li>Write Events/Muta Seeper</li> </ul>	Hest Willin WWW.200108v88ba551ba (AJTO 4545)							
Generate Test Event	- R	ange this	ko 🖛	4 4 4	- <del>1</del> <del>1</del> <del>1</del>	At they		
Clear Event Suffer	1.1	eithis typ	0.1 11	clude w				
Modify Resorated     Modify Resorated	44	page rand	A I A	and,Webs w				
Deskart Controller	Can	ation (	٨	da 🤘				
	Confirm The Operation							
	Sdorvi Petet							

## 3.9.3 EtherNet Config

To set the EtherNet function, move the cursor bar to the main menu and click on he **EtherNet Config**. The Raid System EtherNet Function menu will show all items. Select the desired function.

10-00 MC-8797.146.76.10			GR (114)								
proRAID Manager	<i>xxxxxxxxxx</i>										
pen all/done all!											
Rad Retters Cantole	+Ether Net Cashpurations										
<ul> <li>Quick Function</li> <li>Quick Functions</li> <li>Quickee test Functions</li> <li>Quickee test Functions</li> <li>Quickee test Functions</li> </ul>	DHEP PLACTICS	Examples -									
	Local TP Artifrates (Used IF 0HOP Deathers)	THE 110 3 100									
	manyong 19 Address (used 2' metry picalised)	102 114 5 11									
Type the controls	Subret Hask (Used 2'0402 Deabled)	253 255 255 8									
- Files thated taring	HTTE Port Number (1305, 832), is Reperved)	80									
Bitherteet configuration     Jiert by Mail configuration	Talent Port Particle (TIBE HIRL I: Perserved)	10									
<ul> <li>anim configuration</li> <li>anim configuration</li> </ul>	SMITE Part Municer (7154_815) In Reserved)	15									
View Exerciplication	current t# Add/ext	182 340 13 12									
C Generale Text Event	current taxtensis te address	182, 398, 1, 1									
Class built builtin	CLARKET SLAVER MARK	210.0.200.200.0									
<ul> <li>Modify Passevoid</li> <li>Mogarde Pierevaré</li> </ul>	other net Mac Address	08.18.40.00.01.19									
<ul> <li>Prestart controller</li> <li>Prestart controller</li> </ul>	Y Confirm The Operation										
	Sidmit Perat		_								
			_								

## 3.9.4 Alert By Mail Config

To set the Event Notification function, move the cursor bar to the main menu and click on the **Alert By Mail Config**. The Raid System Event Notification Function menu will show all items. Select the desired function. When an abnormal condition occurs, an error message will be email to administrator that a problem has occurred. Events are classified to 4 levels (urgent, serious, warning, message).

1846 - 🕕 - 💽 🖉 🖉 🖉 Stand	i 👘 Facadasi 💩 🔝 🕬 🔛							
MIC-&THE LAR. IL LU			- 🛄 Gar Lana P					
proRAID <i>M</i> anager	xxxxxxxxxx	C						
pen alt)dose alt]	<ul> <li>Isananananananananan</li> </ul>		ananan -					
Frad Rystews Cavicale Conjugate Paratian Constant Residence Constant Residence	+ SHIP Server Configuration							
	SMITE Server LE Address	1152 1165 11 2200						
	Holl Address Configurations							
Physical Devec	Sender Hema : Provise	Mail Address   Provestilliprovestion for						
Tysten controls	ACRONAT (	Patrend :						
Fibes Chineel Caving     Sthemast configuration	HallTo Manual :	Mail Address : Provide Operation to						
- Jant by Mail Configuration	Matto Manual I	Mail Address :						
sweet configuration	trial to topied (	Philip Address (						
View Events/Mute Beoper	HalTo Mane+ :	Phal Address 1						
Generalize Text Event     Generalize Text Event	+Event NetRoston Configurations							
- Modify Pastword	C picable nowit textification	No Event Notification Hill Be Sent						
<ul> <li>Apgarde Pinevaré</li> <li>Piettárt controller</li> </ul>	C. Urgank Brear Mathleaston	Bend strily ungest, event						
🔁 andorecation	Contact Enter Notification	Send Organit And Santaux Event						
	Warvieg aver textilization.	Send Urgent, Sensue And Marring Event						
	<ul> <li>Information Notification</li> </ul>	mend all lover1						
	Pitotrication Far Ma Event	Notify User IF No Event Occurs Within 24 Hours						
	Confirm The Operation							

## 3.9.5 SNMP Configuration

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

To set the SNMP function, move the cursor bar to the main menu and click on he **SNMP Configuration**. The Raid System SNMP Function menu will show all items. Select the desired function.

Q link - () - 🕑 🗿 🚭 🖉 lined	franke 🙆 🗋 r 3	10 C											
Allen Michard Michael M. H. LU			_	_	_		_		- 🖸 e	URAL *			
proRAID Manager	XXXXXXX	xxx	xx										
open alticione alti													
Faid Bactery Cantol     Guick Paristan     Guick Paristan     Guick Paristan     Guick Paristan     Guickee Bat Paristan     Guickee Bat Paristan     Guickee Bat Paristan     Guickee Bat     Guickee Bat	+ SWHF Trag Configurations												
	STAR THE PARTY	29 #L	192	185		. 200	Partie	112					
	table trap in padde	11.92					FortiP	762					
	SNIP# Trap IP Addre	11 #2					Rort#	162					
Itysten configuration	a 1994 Eysten Configurations												
<ul> <li>Pible chanel caving</li> <li>atherest configuration</li> </ul>	coeverality.	pater	_										
<ul> <li>Alert by Mail configuration</li> </ul>	ry#Contact. 8												
<ul> <li>Inversion/Iguation</li> <li>Interconfiguration</li> </ul>	systeme 0												
<ul> <li>View toywitc/Muta Baepar</li> <li>Generata Test Event</li> </ul>	sysacation #												
Class baied Buffer	+ 5948 Trap Notification Configurations												
- Modify Paececed Associate Filmerane	C picalile searce m	44		No SAMP Trap will be Sent									
Westiart controller	C Urgant Brist Mat			land only unged aveat									
k 🔁 triformation	P. Serbius Erfor No.			Send Urgent And Senteux Exent									
	F warning ever to			Send Urgeht, Sensue And Marring Event									
	· Information Note	Catatri		and a									
	C Confirm The Op	eretion	_	_	_								
	Sabarat Perset												

**SNMP Trap Configurations:** Type the SNMP Trap IP Address. The Port default is 162.

#### SNMP System Configuration:

Community: The default is Public.

(1)sysContact.0; (2)sysLocation.0; (3)sysName.0: SNMP parameter (31 bytes max). If this 3 categories are selected during initial setting then 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. Once this setting is done, alert by mail configuration will also work in the same way.

**SNMP Trap Notification Configurations:** Select the desired function.

After you complete the addition, tick on the **Confirm The Operation** and click on the **Submit** button to complete the action.

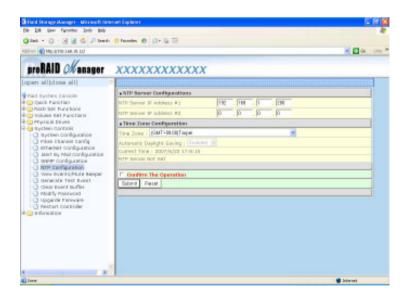
## 3.9.6 NTP Configuration

NTP stands for *Network Time Protocol*, and it is an *Internet* protocol used to synchronize the clocks of computers to some time reference. NTP is an *Internet* standard protocol. You can directly type your NTP Server IP Address to have the RAID subsystem can work with it.

To set the NTP function, move the cursor bar to the main menu and click on he **NTP Configuration**. The Raid System NTP Function menu will show all items. Select the desired function.

Key in NTP server IP , select Time Zone , get NTP time. Setting Automatic Daylight Saving by the region. "NTP Time Got At" is NTP got last time.

After you complete the addition, tick on the **Confirm The Operation** and click on the **Submit** button to complete the action.



#### 3.9.7 View Events

To view the RAID subsystem controller's information, move the mouse cursor to the main menu and click on the **System Information** link. The Raid Subsystem events Information screen appears.

Choose this option to view the system events information: Timer, Device, Event type, Elapse Time and Errors.

DR DR Saw Farmer John Brb											
Q Set - () - 🕑 🖉 🚭 🖉 Seek	frank e	0-20									
-11 MIC-2/THE 2 MIL TR. 127					- 🖸 🛶 🛛 🛤						
proBAID Manager	xxxx	xxxxxx									
open alticione alti											
Field Ruthers Carstolle	+ Oystem Events Information										
grack Parcian     Grack Parcian     Grack Revealed     Fore starved configuration     Grack Revealed	Tires	Device	Event Type	Elepse Tires	Emars						
	17:1:21	International Statement	Paterthrough pick beenhad								
	2907-6-21 1711/18	Red Set # 008	Ovivite FaidSet								
	2807-6-35 17:1/0	Anit Get # 001	Deleta FoldSet								
<ul> <li>athertext configuration</li> <li>alert by Mail configuration</li> </ul>	17:0:51	112.140.815.213	HTTP LOG IN								
ster configuration     ster canfiguration	2907-6-22 17 III-48	Dre#1 Stot#6	Oeves Inserted								
Generate Text Event     Generate Text Event     Generate Text Event	21077-0-22 17-0-45	FC Channel 1	PC Link Daven								
Color Event Burley     Color Sy Password     Color Sy Password     Color Sy Password	2007-6-22	PC Chaneol B	PC Link Devin								
<ul> <li>Prestart costroller</li> </ul>	2807-6-21 17 (2.4)	H/W Nomion	Hatt Provened On								
C trácenation	2807-6-32 18(57)25	Enc#1 Sibt#6	Oevice Inserted								
	18-17-1	PC DAMAGE	PC Link Dewn								
	2907-6-29 18:56:97	PC Charmel 8	PC Link Deven								
	18156:57	4/W Monitor	Rait Prested Cr								
	2807-6-22										

#### 3.9.8 Generate Test Events

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

Child Storage Manager - Microsoft Ten	eraet Suplicar	- E E 🖬
the Life time furnities limits to be		
Quet - () - 🗟 🗿 🚭 🖉 Seed		
HER-10 MIC-1/191 LAN. 19. 12/		🖸 🖬 🛛 Unit 🏴
proRAID Manager	XXXXXXXXXXXX	
[lik emb]ik requi		ananar
Rad Rysten Cantole	+Da You Work To Generate Test Exent?	
<ul> <li>Quick Panctian</li> <li>Quick Panctions</li> <li>Quick Set Panctions</li> <li>Quickes tel Panctions</li> </ul>	E confirm the Operation	_
R C Physical Delves	Submit Farret	
wysten controls     wysten configuration     wysten configuration     when stanen carring     with statest configuration		
<ul> <li>Mert by Mail configuration</li> <li>Brain configuration</li> </ul>		
- RTP Carfiguration		
<ul> <li>View Investighture Earper</li> <li>Dermitter Test Event</li> </ul>		
<ul> <li>Clear buend buffer</li> <li>Modify Paceword</li> </ul>		
Apgarde Pierevanie		
Workers controller		
	g	
Dara		e se i

Could in unitian	Counts Information Director N/W Planter	Event Type Text Event	Elapte Tiree	Empis
Pack Systems Canada Canada Systems Canada Canada Ser Amartina Canada Ser Amartina Ser Amartina Canada Ser Amartina Ser Amartina Canada Ser Amartina Ser Ama	Device		They in the	Zorges.
Could in unitian	Device		Elipse Tirre	Empril 1
Anthe Sec Auctions			Elapte Tirce	Engra
Volume test Parchine     Volume test Parchine     Projectul Drive     Typeten configuration     Typeten configuration     Typeten configuration     Typeten configuration	H/W NowYor	Test Event		
Jer ny real configuration     more configuration     more configuration     more configuration     view newschasts ender     Generation Descended     configuration     modify macrosof     median controlem     median controlem     median controlem				

#### 3.9.9 Clear Events Buffer

Use this feature to clear the entire events buffer information.

## 3.9.10 Modify Password

To set or change the RAID subsystem password, move the mouse cursor to **Raid System Function** screen, and click on the **Change Password** link. The Modify System Password screen appears. 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 internal RAID subsystem from unauthorized entry. 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 ten seconds.

To disable the password, press **Enter** key only in both the **Enter New Password** and **Re-Enter New Password** column. Once the user confirms the operation and clicks the **Submit** button. The existing password will be cleared. No password checking will occur when entering the main menu from the starting screen.

Card Storage Manager - Microsoft Terr	eroet Explaner		E 8 🖬
Die Dit sier funnten linfe mit			
HOLE COMPATINIAL IN CO	Transie (B) (B) (B)		- 🗖 👄 🛛 🖛 🎽
proBAID Manager	xxxxxxxx	xxx	
(open all)close all)	· denenenenenen		201212121212121212121212121212121212121
Rad Retare Cantole	. Hodily System Possers	ed .	
R C Quick Punction	Enter Original Passward		
Reg Math test Punctions Reg Volume test Pariotiens	matter rates possibled		
🗟 🛄 Připtičké beivek	Fa-Enter New Paceward		
systee controls     systee configuration			
- Pibes Charles Caving	C. Confirm The Operation	0	
<ul> <li>athertex configuration</li> <li>alext by Mail configuration</li> </ul>	Submit Reset		
aver configuration			
<ul> <li>ATP Carliguration</li> <li>Were Description Response</li> </ul>			
annenda Test Event			
Class buend buffer			
Mod 5/ Placenced     Juccarde Placenced			
<ul> <li>Restart costroller</li> </ul>			
Real automation			
4	14		
Care .			😫 bimmi

## 3.9.11 Upgrade Firmware

Please reference the section 4.2 for more information.

## 3.9.12 Restart Controller

## 3.10 Information Menu

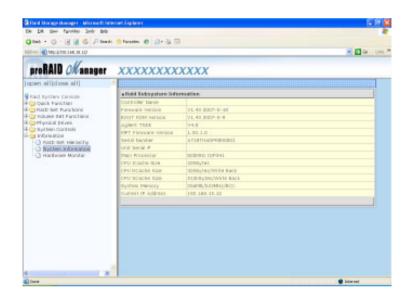
## 3.10.1 RaidSet Hierarchy

Use this feature to view the internal raid subsystem current raid set, current volume set and physical disk configuration. Click the volume set number you which to View in the select column. Then you can view the Volume Set Information and Fibre Channel Volume Set Host Filters.

Faid Manage Manager Microsoft Se Dit See Tyrother Jank Be							
0mi - 0 - R R 6 / Am	webs of Facestines 1	0-20					
CITER OF MICHAER IN CO						- 🖬 🛶 🗤	
proRAID Manager							
proneit (Coranager			***		nanananananan	unananana B	
	- Holding	Hierorely				1	
Faid Bysters Cantole	RAID Set	Device	* [Yo	ame Set(Ch/Lan)	Volume State	Capacity	
That her functions	Tank Set 4	DB0 Calific		THE WOLABOOLE OF	Vernal	17300.405	
Volume test Paractions Physical Devec		DALSIDAR					
The second secon		E#15bb#					
- anformation		EXIStotes					
Berg and Heradow     Wysten adorkation     Hardware Monital		CALSED CALSED					
		DelSto					
		D#15lob#					
	*TrickGare#1 : BAITRAID Baboyclers VI.B						
	Device	Usege	Cepecity	Flodel			
	10.171 101.111	Reid Set # D80	300.168	Hastor \$4300F0			
	Slote:	maid mat # cost	810.118	Mador 6/300R0			
	LBLRJ	Red Set # 080	300.168	Markov 6/300P0			
	micore LDL-61	Reid Set # 080	300.8GB	Mastor 6430040			
	- ULU	Faid test # DEC	800.108	Makor events			
	Slotvo	The R Park of Table	and the	Manhard & Brandson			

## 3.10.2 System Information

To view the RAID subsystem controller's information, move the mouse cursor to the main menu and click on the **System Information** link. The Raid Subsystem Information screen appears.



Use this feature to view the raid subsystem controller's information. 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 controller's hardware monitor information, move the mouse cursor to the main menu and click the **Hardware Monitor** link. The Hardware Information screen appears.

topen all (done all )			
And Switzen Concess	+Cost and to 14/W Nexet or		
<ul> <li>Gant Panitan</li> <li>Gant Bar, Function)</li> </ul>	CHU TERDARINE	106 102	
	Contration Name	27 4C	
🖌 🔛 tolona Bat Punntann	alty	14.407 G	
Myrica Cityes		a list to	
Contrain Contrain	1.00	1.128.4	
1 fall fat reserve	CONTRACTOR OF A	1.808.9	
Tyribis bity holos	10mm 135	1.102-6	
C Excitación Internation	100-0.00	30.262.9	
	P PC 9.897	0.000 0	
	Autory Status	Charged 200%	
	edited being and 2. Mar. PART No.		
	210F308-FT		
	-CRIMART	+ 388 1	
	ind age of 1	11.7%5	
	Farth.	1000a Alfred	
	P (14) P (14)	about land	
	19173	27209 4840	
	Party.	2122.699	
	in a substra	148	
	PERSONAL PROPERTY.	10	
	PERMIT	18	
	Temperature#1.	30 K	
	Tampa stora 42	11.60	
	Torgin stund 1	10.10	
	Torona Distance -	11.5	
	Tanget storert:	34 10	
	Larger should	14. W	
	Terton charaft	21.52	
	Panam physics	18 S	
	Tangan adapted 1	26.40	
	a latte stoatti	26.40	

The Hardware Monitor Information provides the temperature, fan speed (chassis fan) and voltage of the internal RAID subsystem. All items are also unchangeable. The warning messages will indicate through the LCD, LED and alarm buzzer.

Item	Warning Condition
Controller Board Temperature	> 70 Celsius
HDD Temperature	> 65 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 a New RAID or Reconfiguring an Existing RAID

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 spares/pass-through (optional).
2	Choose a configuration method.
3	Create raid set using the available physical drives.
4	Define volume set using the space in the raid set.
5	Initialize the volume set and use volume set in the HOST OS.

## **Chapter 4**

## **Array Maintenance**

This chapter describes more information about your Disk Array. The following items are describes in detail.

- Memory Upgrades
- Updating Firmware
- Hot Swap Components

## 4.1 Memory Upgrades

The subsystem is equipped with one DDRII SDRAM socket. By default, your Disk Array comes with 256MB of memory that is expandable to a maximum of 2GB.

These expansion memory module can be purchased from your dealer.

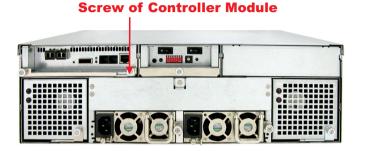
Memory Type : 1.8V PC5300/4200 DDR2 SDRAM 240pin ECC.

Memory Size : Supports 240pin DDRII of 256MB, 512MB, 1GB, or 2GB.



## 4.1.1 Installing Memory Module:

1. Unscrew and pull out the controller Module.



- 2. Unscrew and take off the cover of controller Module.
- 3. Remove the DIMM Memory from the RAM socket. Then Press the memory module firmly into socke, make sure that all the contacts are aligned with the socket. Push the memory module forward to a horizontal position.

## 4.2 Upgrading the Firmware

## Upgrading Flash Firmware Programming Utility

Since the RAID subsystem controller features flash firmware, it is not necessary to change the hardware flash chip in order to upgrade the RAID firmware. The user can simply re-program the old firmware through the RS-232 port. New releases of the firmware are available in the form of a DOS file at OEM'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 drive A or C.

## Establishing the Connection for the RS-232

The firmware can be downloaded to the RAID subsystem controller by using an ANSI/VT-100 compatible terminal emulation program or Remote web browser management. You must complete the appropriate installation procedure before proceeding with this firmware upgrade. Whichever terminal emulation program is used must support the ZMODEM file transfer protocol.

Configuration of the internal RAID subsystem web browser-based remote RAID management. Web browser-based RAID management can be used to update the firmware. You must complete the appropriate installation procedure before proceeding with this firmware upgrade.

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

Get the new version firmware for your RAID subsystem controller. For Example, download the bin file from your OEM's web site onto the c:

1. From the Main Menu, scroll down to "Raid System Function"

2. Choose the "Update Firmware", The Update The Raid Firmware dialog box appears.

Raid - HyperTerminal	<u> </u>
(Model Name) RAID Controller         Main Menu       Qu         Qu       Raid System Function         Yo       Mute The Alert Beeper         Alert B       Change         Update The Raid FirmWare       Update The Raid FirmWare         Vi       JBOD RA         Cl RAID Report       Transfer File From Terminal         Sv       Terminal         Gotter       Change         Update Colspan="2">Update The Raid FirmWare         Vi       JBOD RA         Cl Hall Re       Transfer File From Terminal         Sv       Terminal         Westart Controller       Restart Controller	
Connected 0:01:39 VT100 115200 8-N-1 SCROLL CAPS NUM Capture Print echo	11.

3. Go to the tool bar and select Transfer. Open Send File.

🇞 Raid - HyperTerminal	- 🗆 🗵
File Edit View Call Transfer Help	
Image: Source File         Sector File           Copbure to File         Copbure to File           Copbure to File         Copbure to File	
Main Menu	
Qu       Raid System Function         Wo       Mute The Alert Beeper         Alert B       Update The Raid FirmWare         Fit       Change       Update The Raid FirmWare         Vi       JBOD/RA       Transfer File From Terminal         Raid       Harming       Sy         Ierming       Cluster       Cluster         Maximum       Emulator By Zmodem Protocol         Immite       Cluster       Cluster         Restart Controller       Restart Controller         ArrowKey Or AZ:Move Cursor, Enter:Select, ESC:Escope, L:Line Draw, X:Redraw	
Sends a file to the remote system	11.

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

5. Click Browse. Look in the location where the Firmware upgrade software is located. Select the File name:

"8660FIRM.BIN" and click open.

Main Menu Qu Ra Raid St Vo Ph Mute T Ra Riorts KibBOD/R Vi BODO R Ha Maximu Sv Jurdate	Si Send File Ster Folder CA Filename [Cv6100FIRM0527 Filename I Protocol Zmodem	ne) RAID Control	TX Biowee	
ArrowKey Or AZ: Not	t Controller ve Cursor, Ente	r:Select, ESC:E	Scape, L:Line Dra	aw, X:Redraw

6. Click Send. Send the Firmware Binary to the controller

Raid-HyperTerminal Fie Edit View Call Transfer Help	{Model Name} RAID Controller	×
Main Menu Qu Ra Raid S Ph Hute T Ra Alert Change Vi JBOU/R Cl RAID R Ha Maximu Sy Jermin Update Restar	Statur:         Sending         Retree:         0           File:         11111         25k of 240K.         240K.           Elapoed         00:00:00         Remaining:         00:00:17         Throughout:         11546 cpst           Cancel         op/dop         Cancel         op/dop         0         0         0	w. X:Redraw
Connected 0:04:26 VT100	115200 8-N-1 SCROLL CAPS NUM Capture Print echo	

7. When the Firmware completes downloading, the confirmation screen appears. Press **Yes** to start program the flash ROM.

Raid - HyperTerm Fie Edit View Call	Transfer Help	{Model Na	ne} RA1	D Control	ler		
Qu Ra Vo Ph Et Vi C1 Ha Sy	Raid Syste Mute The F Alert Beer Change Pas JBOD/RAID RAID Rebui Maximum Al	Function ld Priority A Mode ort Config pWare		Update	The Firmw Yes No	are	
Connected 0:04:57		oosaala (Scroll		NUM Capture	scape, L:	Line Draw, X:	Redraw

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

Main Menu Qu Ra Ph Mute The Alert Beeper Alert Beeper Setting Change Password JBOURAND Function Cl RID Rebuild Priority Maximum Alert Maximum	} RAID Controller ] Firmware, Please Wait	
Sy <u>Terminal</u> Start Updating	Firmware, Please Wait	

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

10. After the Firmware upgrade is complete, a bar indicator will show "Firmware Has Been Updated Successfully".

🎨 Raid - HyperTerminal				
File Edit View Call Transfer Help				
De 08 08 6				
(Model Name) R010 Controller         Main Menu         Qu         Raid System Function         Vo         Ph         Mute The Alert Beeper         R1 Pri Beeper Setting         Ei Clange Password :         Vi Brain Mehuid Priority         Ha         Sy         Terming         Vi Brain Mehuid Priority         Restart Controller         ArrowKey Or AZ: Move Cursor, Enter: Select, ESC: Escape, L:Line Draw, X:Redrometer				
Connected 0:06:22 VT100 115200 8:44-1 SCROLL CAPS [NUM Capture Print echo	•			

Qu Ra Vo Ph Ra Et Vi Ci		
ArrowKey	Dr AZ:Move Cursor, Enter:Select, ESC:Escope, L:Line Draw, X:Redra	aw



## NOTE:

The user has to reconfigure all of the settings after the firmware upgrade is complete, because all of the settings will default to the original default values.

## Upgrading Firmware Through Web Browser Management

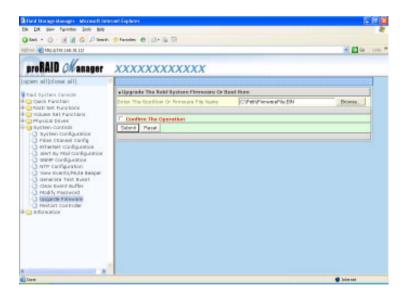
Get the new version firmware for your RAID subsystem controller.

1. To upgrade the RAID subsystem firmware, move the cursor to **Upgrade Firm**ware link. The **Upgrade The Raid System Firmware** screen appears.

2. Click Browse. Look in the location where the Firmware upgrade software is located. Select the File name:

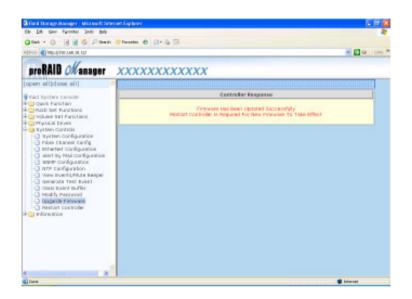
"8660FIRM.BIN" and click open.

3.Click the **Confirm The Operation** and press 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 bar indicator will show "Firmware Has Been Updated Successfully"



## 4.3 Hot Swap Components

The disk array supports hot-swappable disk trays, power supply modules and cooling fan unit. The following sections describe how to remove and install the "Hot-Swap" parts without interrupting the data access while the disk array is on.

## 4.3.1 Replacing a disk

To replace a disk, perform the following steps (Refer to 2.5 Installing hard disks)

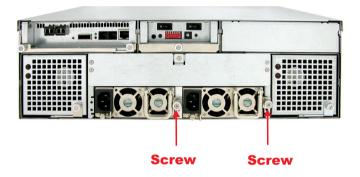
1. Open the tray lever by sliding the latch and wait for the drive to spin down. The disk LED on the front panel will turn from green to red indicate the disk is powered down.



- 2. Lift the lever to disengage the disk tray from the slot.
- 3. Gently pull the disk tray out of the slot.
- 4. Replace the HDD.
- 5. Slide the tray into a slot until it clicks into place. The HDD status LED will turn green on front panel.
- 6. Press the lever in until you hear the latch click into place.

## 4.3.2 Replacing a Power Supply

1. Remove the screws located at the corners of the power supply. Place the screws in a safe place as you will need them later when you install a new power supply.



- 2. Use the handle to pull out the defective power supply.
- 3. Replace it with a 460W power supply.
- 4. Slide the new power supply in until it clicks into place.
- 5. Replace the screws you removed in step 1.

## 4.3.3 Replacing a Fan

1. Unscrew the fan holder.



- 2. Disconnect the fan cable connects between the backplane and the fan.
- 3. The fans are attached to the fan holder. Remove the screws on the corners of the defective fan. Place the screws on a safe place as you will need them later when you install a new fan.



#### Note:

We recommend that you remove the fan holder from the subsystem. This allows easy installation and unlimited workspace when replacing the fan.

- 4. Install a new fan using the screws you removed in step 3.
- 5. Replace the fan holder.
- 6. Reconnect the fan cable connects.

## Appendix A

## **Technical Specification**

RAID processor	Intel IOP341 RISC
RAID level	0, 1, 0+1, 3, 5, 6, 30, 50, 60 and JBOD
Cache memory	256MB~2GB DDR2 ECC SDRAM
No. of channels (host+disk)	2+16
Host bus interface	FC-AL (4Gb/s * 2)
Data transfer	Up to 400MB / sec
Drive bus interface	SAS or 3Gb/s S-ATA II
Hot swap disk bays	16
Hot swap power supply	460W * 2 w/PFC
Cooling fan	4
On-line expansion	Yes
Multiple RAID selection	Yes
Failed disk auto rebuild	Yes
Array Roaming	Yes
Bad block auto-remapping	Yes
Online RAID level migration	Yes
Audible alarm	Yes
Host Independent	Yes
Failed drive indicators	Yes