

Alnico Gen 2 Subsystem 3 Series
AN-312 / AN-316
Software Operation Manual
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About This Software Operation Manual

This manual contains all the information you need to initially configuring and monitoring the Alnico RAID.

Task Map

1. Prepare

Refer to Software Operation Manual and Hardware Installation Guide, let yourself with the features, capabilities of Alnico RAID and make sure you have everything on hand.

2. Install Hardware

Install the Alnico RAID subsystem. Refer to :
Hardware Installation Guide

3. Configuration

To create a RAID set and define a volume set via LCD display front panel, remote utility or 10/100 base-T Ethernet.

4. Make a Record

Be sure to clear wrote down every items of the configuration, it will help you to rescue the data back in the case of RAID fail up.

Symbols in Text

These symbols may be found in the text of this guide. They have the following meanings.



Caution

Caution

This icons indicates that failure to follow directions could result in personal injury, damage to your equipment or loss of information.



Note

This icon presents commentary, sidelights, or interesting points of information. .

Important terms, commands and programs are put in **Boldface** font.

Screen text is given in **screen** font.

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Chapter 1. INTRODUCTION

This chapter provides a brief introduction of Array Definition and RAID concept.

1.1 Array Definition

1.1.1 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 :

1. Up to 6/ 8/12/16 Raid Sets (depend on Model) are supported per RAID subsystem controller.
2. From one to eight/twelve/sixteen (depend on Model) drives can be included in an individual Raid Set.
3. It is impossible to have multiple Raid Sets on the same disks.

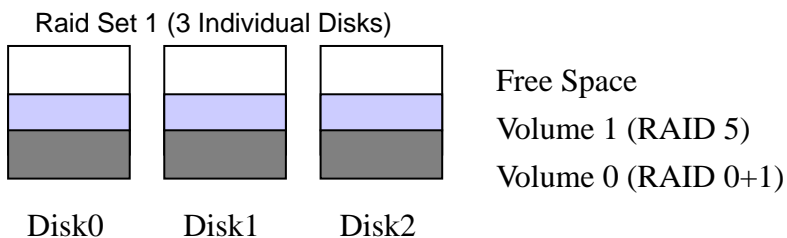
A Volume Set must be created either on an existing raid set or on a group of available individual disks (disks that are not yet a part of an raid set). If there are pre-existing raid sets with available capacity and enough disks for specified RAID level desired, then the volume set will be created in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

1.1.2 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.

1. Volume Sets of different RAID levels may coexist on the same Raid Set.
2. The maximum addressable size of a single volume set can be exceeded than 2 TB.
3. Up to sixteen volume sets can be created in a 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.



1.1.3 Initialization Mode

RAID 0 and RAID 1 volume set can be used immediately after the creation. But the RAID 3, 5 and 6 volume sets must be initialized to generate the parity. There are three options (Foreground\ Background\No Init (To Rescue Volume)f) for RAID 3,5 and 6. As for RAID 0+1, one more option “No Initialization .” Foreground is the default initialization mode that is not instantly available.

Background offers instant availability that the created volumes can be direct used without waiting for the end of RAID Level Initializing. No Initialization can be chosen only when the RAID 0+1 is the going-to-be-initialized volumes. The final option “No Init (To Rescue Volume)” allows the failed volume to be rescued back. When there is failed volume, try “No Init (To Rescue Volume)” to restore your failed volumes to the normal status. When failed volume happens, do not remove any hard drive, directly delete the failed volume, then create a new volume that is complete same in all the volume attributes with the failed volume by choosing No Init(To Rescue Volume). By doing so, the formerly failed volume supposedly will be back with everything going back to normal status. But if the hard drives causing the volume to become failed really malfunction, no way you can bring back a normal volume by No Init (To Rescue Volume).

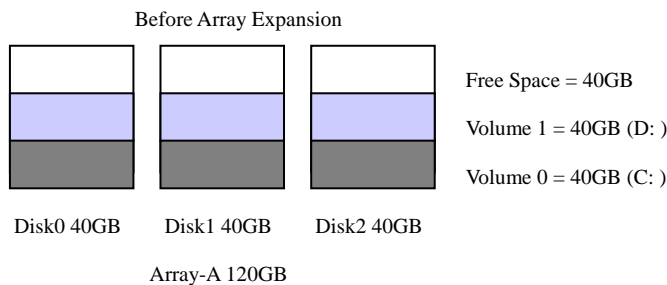
1.1.4 Array Roaming

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 configuration 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.

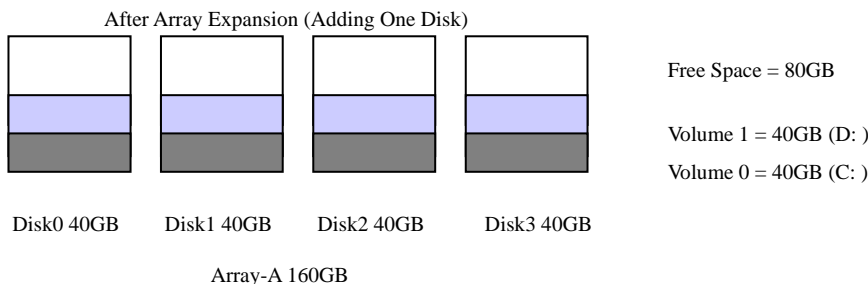
1.1.5 Online Capacity Expansion

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.



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.



1.1.6 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. Before the invention of RAID level and stripe size migration, changing the RAID level and stripe size of a RAID system meant backing up all data in the disk array, re-creating disk array configuration with new RAID level and stripe size, and then restoring data back into RAID system. 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.

1.1.7 Hot Spares

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



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

1.1.8 Hot-Swap Disk Drive Support

The RAID subsystem has built the protection circuit to support the replacement of SATA hard disk drives without having to shut down or reboot the system. The removable hard drive tray can deliver “hot swappable,” fault-tolerant 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.

1.1.9 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, and 6. If a hot spare is not available, the failed disk drive must be replaced with a new disk drive so that the data on the failed drive can be rebuilt. If a hot spare is available, the rebuild starts automatically when a drive fails. The RAID subsystem automatically and transparently rebuilds failed drives in the background with user-definable rebuild rates. The RAID subsystem will automatically 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.

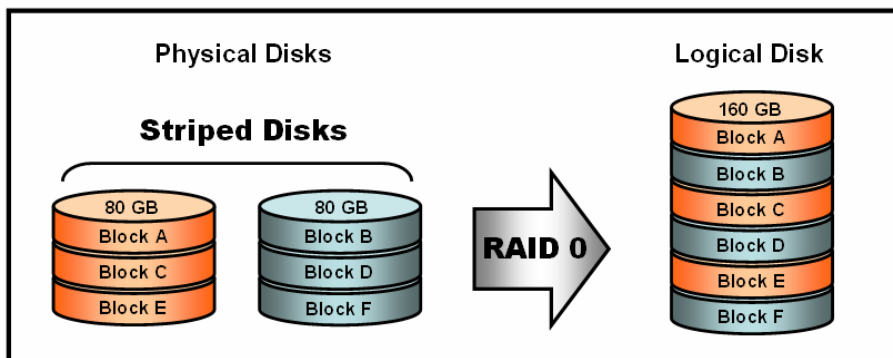
1.2 RAID Concept

RAID is an acronym for Redundant Array of Independent Disks. It is an array of multiple independent hard disk drives that provide high performance and fault tolerance. The RAID subsystem controller implements several levels of the Berkeley RAID technology. An appropriate RAID level is selected when the volume sets are defined or created. This decision is based on disk capacity, data availability (fault tolerance or redundancy), and disk performance. The following is the RAID level, which support in the RAID subsystem.

The RAID subsystem controller makes the RAID implementation and the disks' physical configuration transparent to the host operating system. This means that the host operating system drivers and software utilities are not affected, regardless of the RAID level selected. Correct installation of the disk array and the controller requires a proper understanding of RAID technology and the concepts.

1.2.1 RAID 0

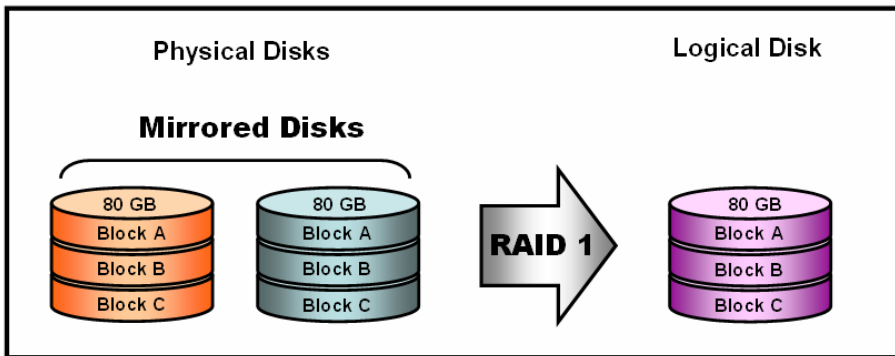
RAID 0, also referred to as striping, writes stripping of data across multiple disk drives instead of just one disk drive. RAID 0 does not provide any data redundancy, but does offer the best high-speed data throughput. RAID 0 breaks up data into smaller blocks and then writes a block to each drive in the array. Disk striping enhances performance because multiple drives are accessed simultaneously; but the reliability of RAID Level 0 is less than any of its member disk drives due to its lack of redundancy.



1.2.2 RAID 1

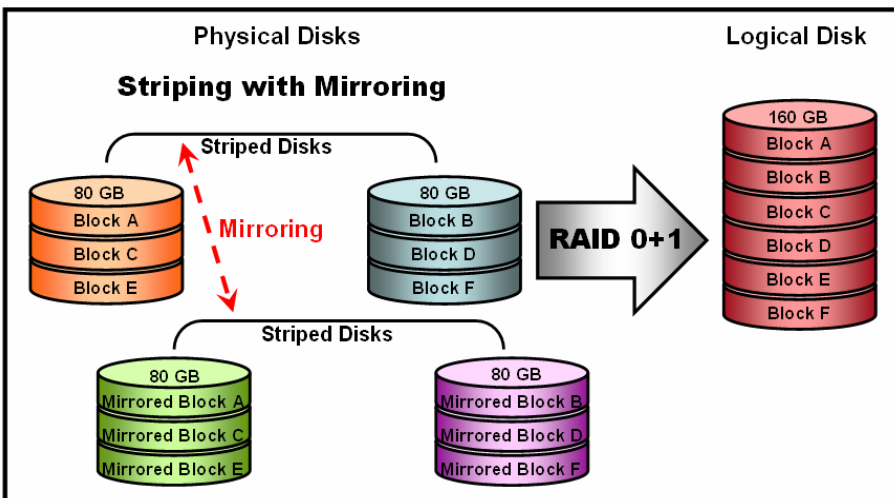
RAID 1 also known as "disk mirroring", data written to one disk drive is simultaneously written to another disk drive. Read performance may be enhanced if the array controller can parallel accesses both members of a mirrored pair. During writes, there will be a minor performance penalty when compared to writing to a single disk. If one drive fails, all data (and software

applications) are preserved on the other drive. RAID 1 offers extremely high data reliability, but at the cost of doubling the required data storage capacity.



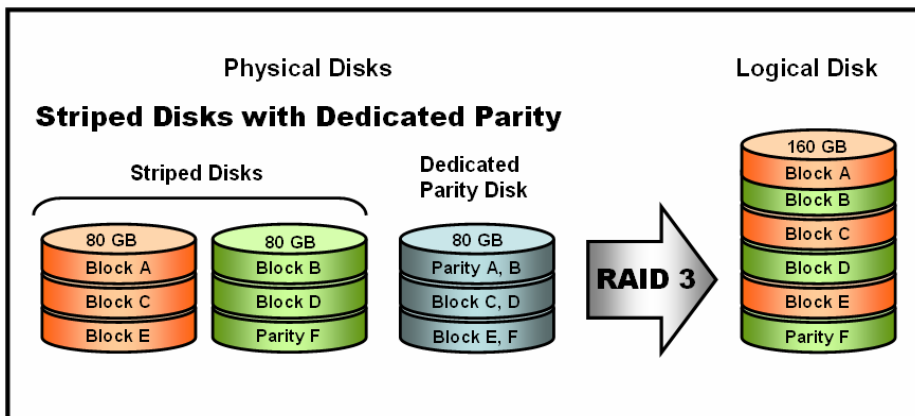
1.2.3 RAID 0+1

RAID 0+1 is a combination of RAID 0 and RAID 1, combining striping with disk mirroring. RAID Level 10 combines the fast performance of Level 0 with the data redundancy of Level 1. In this configuration, data is distributed across several disk drives, similar to Level 0, which are then duplicated to another set of drive for data protection. RAID 0+1 provides the highest read/write performance of any of the Hybrid RAID levels, but at the cost of doubling the required data storage capacity.



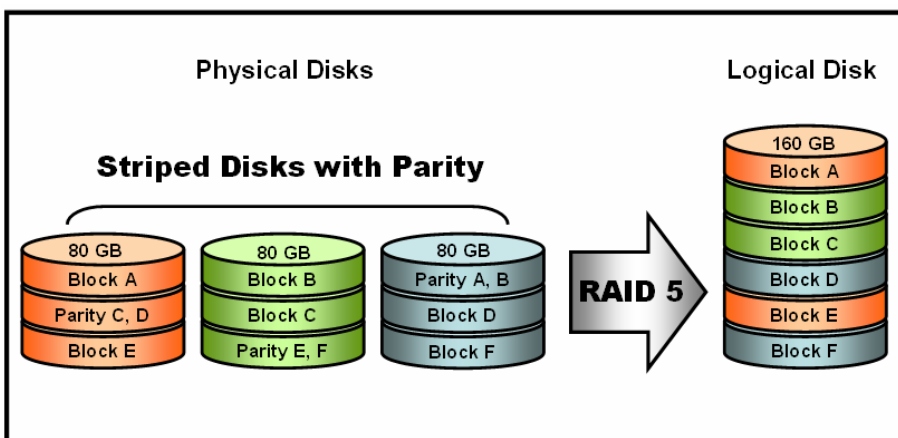
1.2.4 RAID 3

RAID 3 provides disk striping and complete data redundancy through a dedicated parity drive. RAID 3 breaks up data into smaller blocks, calculates parity by performing an exclusive-or on the blocks, and then writes the blocks to all but one drive in the array. The parity data created during the exclusive-or is then written to the last drive in the array. If a single drive fails, data is still available by computing the exclusive-or of the contents corresponding strips of the surviving member disk. RAID-3 is best for applications that require very fast data- transfer rates or long data blocks



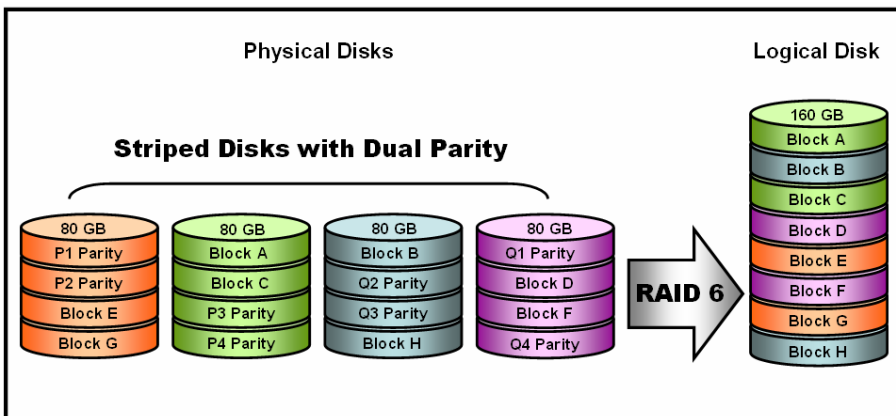
1.2.5 RAID 5

RAID 5 is sometimes called striping with parity at block level. In RAID 5, the parity information is written to all of the drives in the subsystems rather than concentrated on a dedicated parity disk. If one drive in the system fails, the parity information can be used to reconstruct the data from that drive. All drives in the array system can be used to seek operation at the same time, greatly increasing the performance of the RAID system.



1.2.6 RAID 6

A RAID 6 array is essentially an extension of a RAID 5 array with a second independent distributed parity scheme. Data and parity are striped on a block level across multiple array members, just like in RAID 5, and a second set of parity is calculated and written across all the drives. As larger disk arrays are considered, it is desirable to use stronger codes that can tolerate multiple disk failure. When a disk fails in a parity protected disk array, recovering the contents of the failed disk requires successfully reading the contents of all no-failed disks. RAID 6 provides an extremely high fault tolerance, and can sustain two simultaneous drive failures without downtime or data loss. This is a perfect solution when data is mission-critical.



1.2.7 Summary of RAID Levels

RAID subsystem supports RAID Levels 0, 1(0+1), 3, 5 and 6. The following table provides a summary of RAID levels.

| Summary of RAID Levels | | | | | |
|------------------------|--|--------------------------|-----------------------|--------------------|--|
| RAID Level | Description | Disks requirement (Cost) | Data Reliability | Data Transfer Rate | I/O Request Rates |
| 0 | Also known as striping. Data distributed across multiple drives in the array. There is no data protection | N | * No data Protection. | * Very High | * Very High for Both Reads and Writes. |

| | | | | | |
|-----|--|---------|--|--|--|
| 1 | Also known as mirroring. All data replicated on N Separated disks. N is almost always 2. This is a high availability Solution, but due to the 100% duplication, it is also a costly solution. | 2 | * Lower than RAID 6. * Higher than RAID 3,5. | * Reads are higher Than a single disk. * Writes similar to a single disk. | * Reads are twice faster than a single disk. * Write are similar to a single disk. |
| 0+1 | Also known Block-Interleaved Parity. Data and parity information is subdivided and distributed across all disk. Parity must be the equal to the smallest disk capacity in the array. Parity information normally stored on a dedicated parity disk. | N (N>2) | * Lower than RAID 6. * Higher than RAID 3,5. | * Transfer rates more similar to RAID 1. | * Reads are twice faster than a single disk. * Writes are similar to a single disk. |
| 3 | Also known Bit-Interleaved Parity. Data and parity information is subdivided and distributed across all disk. Parity must be the equal to the smallest disk capacity in the array. Parity information normally stored on a dedicated parity disk. | N+1 | * Lower than RAID 1, 10, 6; * Higher than a single drive. | * Reads are similar to RAID 0; * Writes are slower than a single disk. | * Reads are similar twice faster than a single disk. * Writes are similar to a single disk. |
| 5 | Also known Block-Interleaved Distributed Parity. Data and parity information is subdivided and distributed across all disk. Parity must be the equal to the smallest disk capacity in the array. Parity information normally stored on a dedicated parity disk. | N+1 | * Lower than RAID 1, 10, 6. * Higher than a single drive. | * Reads are similar to RAID 0. * Writes are slower than a single disk. | * Reads are similar to RAID 0. * Writes are slower than a single disk. |
| 6 | AS RAID level 5, but with additional independently computed redundant information | N+2 | * Highest of all listed alternatives. | * Reads are similar to RAID 0. * Writes are slower than RAID 5. | * Reads are similar to RAID 0. * Writes are slower than a RAID 5. |

Chapter 2.

Configuration Methods

2.1 Overview

After the hardware installation, the SATA disk drives installed to the RAID must be configured and the volume set units initialized before they are ready to use. This can be accomplished by one of the following methods:

- Front panel touch-control keypad
- Remote utility connected through the controller's serial port (VT-100 or Hyper terminal)
- Using HTTP Proxy through the controller's serial port to access web browser-based RAID manager in Windows and Linux system.
- Firmware-embedded TCP/IP & web browser-based RAID manager via the controller's 10/100 Ethernet LAN port.

Those user interfaces can access the built-in configuration and administration utility that resides in the controller's firmware. They provide complete control and management of the controller and disk arrays, eliminating the need for additional hardware or software.



The RAID subsystem allows only one method to access menus at a time.

2.2 Using local front panel touch-control keypad

The front panel keypad and liquid crystal display (LCD) is the primary user interface for the RAID subsystem. All configuration and management of the RAID and its properly connected disk arrays can be performed from this interface.

The front panel keypad and LCD are connected to the RAID subsystem to access the built-in configuration and administration utility that resides in the controller's firmware. Complete control and management of the array's physical

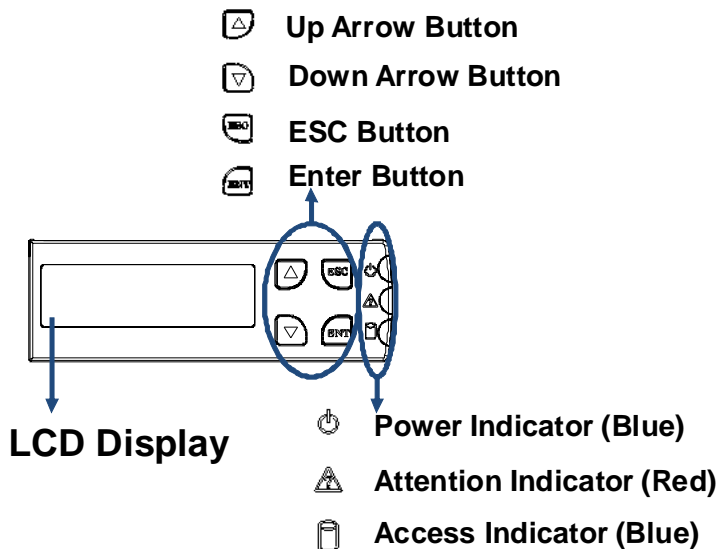
drives and logical units can be performed from the front panel, requiring no additional hardware or software drivers for that purpose.

This Chapter provides, in quick reference form, procedures that use the built-in LCD panel to configure and operate the controller.

A touch-control keypad and a liquid crystal display (LCD) mounted on the front panel of the RAID subsystem is the primary operational interface and monitor display for the disk array controller. This user interface controls all configuration and management functions for the RAID subsystem controller and for all SATA disk array subsystems to which it is properly connected.

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 Initial screen is as following:



2.2.1 Function Key Definitions

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

| Key | Function |
|-------------------|--|
| Up Arrow | Use to scroll the cursor Upward / Rightward |
| Down Arrow | Use to scroll the cursor Downward / Leftward |
| ENT Key | Submit Select ion Function (Confirm a selected item) |

| | |
|----------------|--|
| ESC Key | Return to Previous Screen (Exit a selection configuration) |
|----------------|--|

There are three of LED indicators on the front panel. Following table provides a summary of the means of these LED indicators:

| LED Indicator | Normal Status | Problem Indication |
|------------------------------|---|--|
| Power On indicator | Bright Blue | This LED does not light up after power switched on |
| Fail Indicator | LED never light up | LED light up as Red. |
| Data Access Indicator | Blink blue during host computer accessing the RAID subsystem. | LED never flickers |

For additional information on using the LCD panel and keypad to configure the RAID see "LCD Panel Configuration" on Chapter 3.

2.3 Using the controller's serial port

The serial port on the RAID subsystem's back panel can be used in Remote manage mode. The provided interface cable converts the RS232 signal on the RAID subsystem into a 9-pin D-Sub male connector. The firmware-based terminal array management interface can access the array through this RS-232 port. You can attach a VT-100 compatible terminal or a PC running a "Hyper terminal" program to the serial port for accessing the text-based Setup Menu.

RAID subsystem RS-232C Port Pin Assignment

To ensure proper communications between the RAID subsystem and the VT-100 Terminal Emulation, Please configure the VT100 terminal emulation settings to the values shown below:

| Terminal requirement | |
|----------------------|------------------|
| Connection | Null-modem cable |
| Baud Rate | 115,200 |
| Data bits | 8 |
| Stop | 1 |
| Flow Control | None |

The RAID Subsystem's RJ-11 connector's pin assignments are defined as below :

| RS-232C Pin Assignments | | | |
|--------------------------------|-------------|-----|-------------|
| Pin | Description | Pin | Description |
| 1 | N/C | 6 | NC |
| 2 | GND | | |
| 3 | RX | | |
| 4 | TX | | |
| 5 | CTS | | |

2.3.1 Keyboard Navigation

The following definition is the VT-100 RAID configuration utility keyboard navigation:

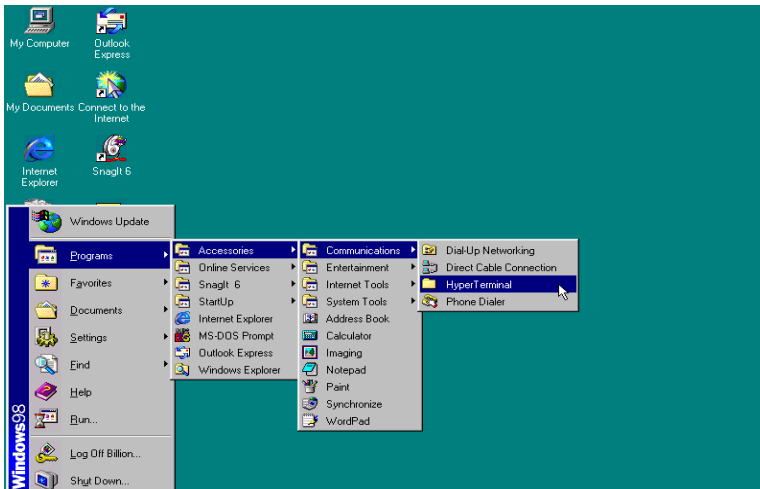
| Key | Function |
|------------------|---------------------------|
| Arrow Key | Move cursor |
| Enter Key | Submit selection function |
| ESC Key | Return to previous screen |
| L Key | Line draw |
| X Key | Redraw |

2.3.2 Start-up VT100 Screen

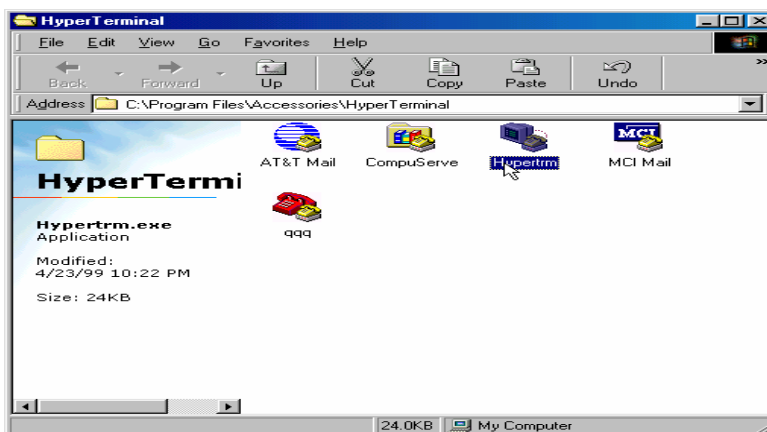
By connecting a VT100 compatible terminal, or a PC operating in an equivalent terminal emulation mode, all RAID subsystem monitoring, configuration and administration functions can be exercised from the VT100 terminal.

There are a wide variety of Terminal Emulation packages, but for the most part they should be very similar. The following setup procedure is an example Setup VT100 Terminal in Windows XP system using Hyper Terminal use Version 3.0 or higher.

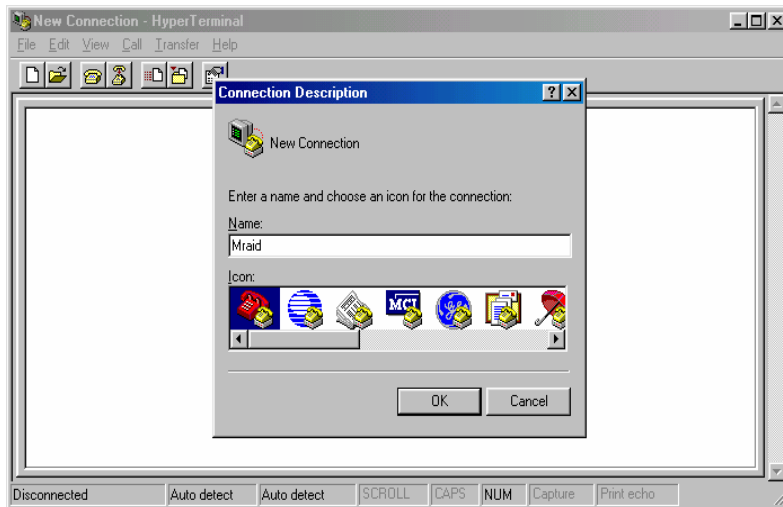
Step 1. From the Desktop open the Start menu. Pick Programs, Accessories, Communications and Hyper Terminal. Open Hyper Terminal (requires version 3.0 or higher)



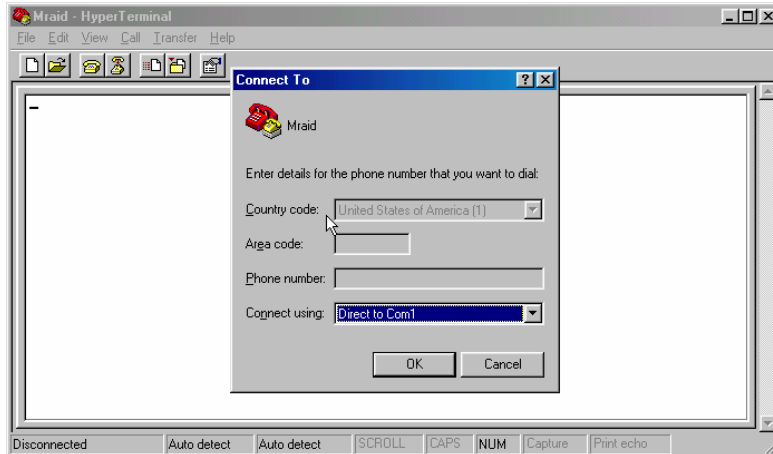
Step 2. Open HYPERTRM.EXE.



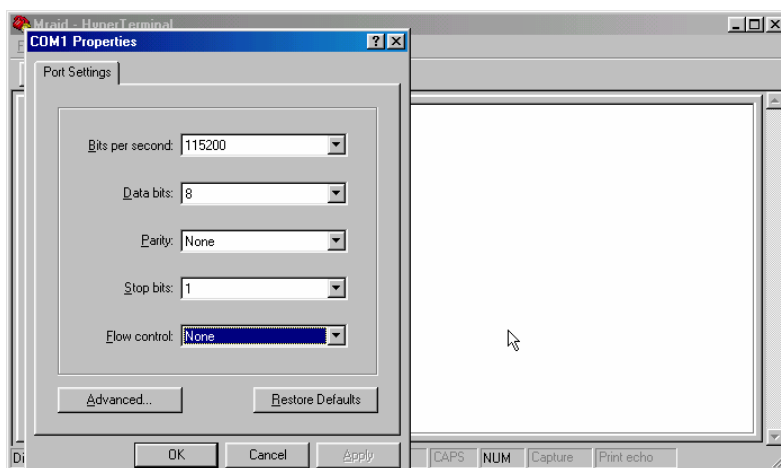
Step 3. Enter a name for your Terminal. Click OK.



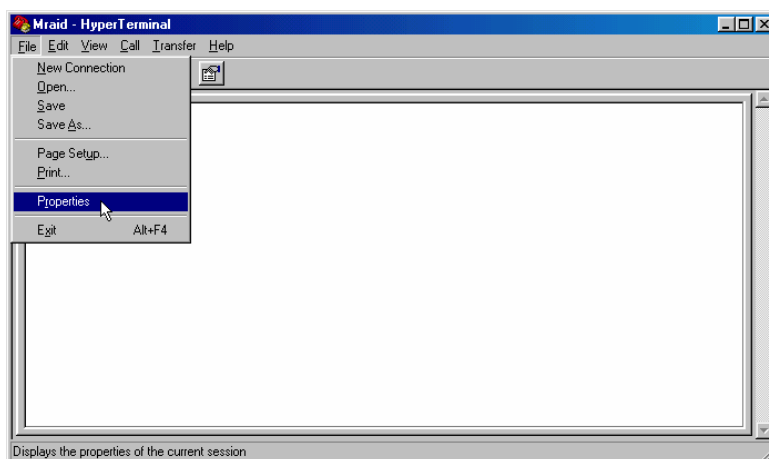
Step 4. Select an appropriate connecting port in your Terminal. Click OK



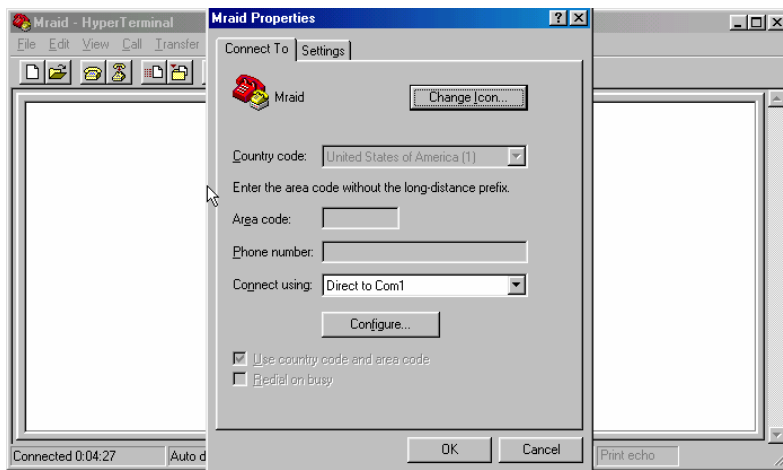
Step 5. Configure the port parameter settings. Bits per second: "115200", Data bits: "8", Parity: "None", Stop bits: "1", Flow control: "None". Click OK



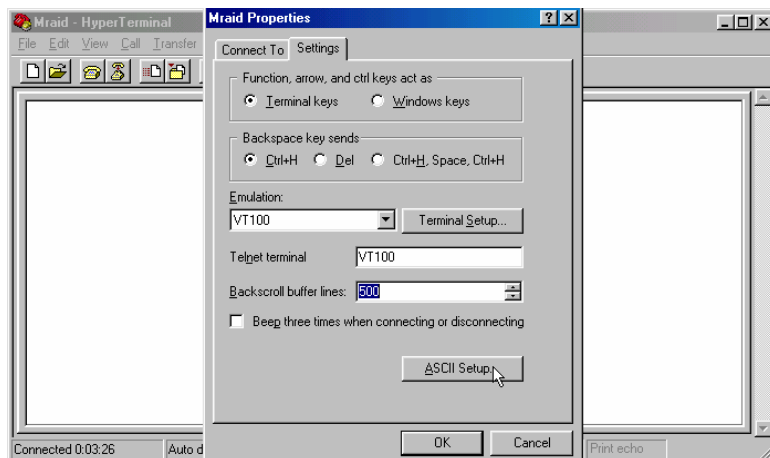
Step 6. Open the File menu, and then open Properties.



Step 7. Open the Settings Tab.



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



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.

2.4 Firmware-embedded TCP/IP & web browser-based RAID manager (using the controller's 10/100 Ethernet LAN port)

To ensure proper communications between the RAID subsystem and Web browser-based RAID management, Please connect the RAID system Ethernet LAN port to any LAN switch port.

The controller has embedded the TCP/IP & Web Browser-based RAID manager in the firmware. User can remote manage the RAID system without adding any user specific software (platform independent) via standard web browsers directly connected to the 10/100 Ethernet RJ45 LAN port.

Raid Set Hierarchy

| Raid Set | IDE Channels | Volume Set(Ch/Lun) | Volume State | Capacity |
|---------------|--------------|-----------------------|--------------|----------|
| Raid Set # 00 | Ch01 | Volume Set # 00 (0/0) | Normal | 60.0GB |
| | Ch02 | Volume Set # 01 (0/1) | Normal | 63.0GB |
| | Ch03 | | | |
| | Ch04 | | | |

IDE Channels

| Channel | Usage | Capacity | Model |
|---------|---------------|----------|----------------|
| Ch01 | Raid Set # 00 | 61.5GB | Maxtor 6Y060M0 |
| Ch02 | Raid Set # 00 | 61.5GB | Maxtor 6Y060M0 |
| Ch03 | Raid Set # 00 | 61.5GB | Maxtor 6Y060M0 |
| Ch04 | Raid Set # 00 | 61.5GB | Maxtor 6Y060M0 |
| Ch05 | N.A. | N.A. | N.A. |
| Ch06 | N.A. | N.A. | N.A. |
| Ch07 | N.A. | N.A. | N.A. |
| Ch08 | N.A. | N.A. | N.A. |
| Ch09 | N.A. | N.A. | N.A. |
| Ch10 | N.A. | N.A. | N.A. |
| Ch11 | N.A. | N.A. | N.A. |

To configure RAID subsystem on a local or remote machine, you need to know its IP Address. The IP address will default show in the LCD screen. Launch your firmware-embedded TCP/IP & Web Browser-based RAID manager by entering `http://[IP Address]` in the web browser.

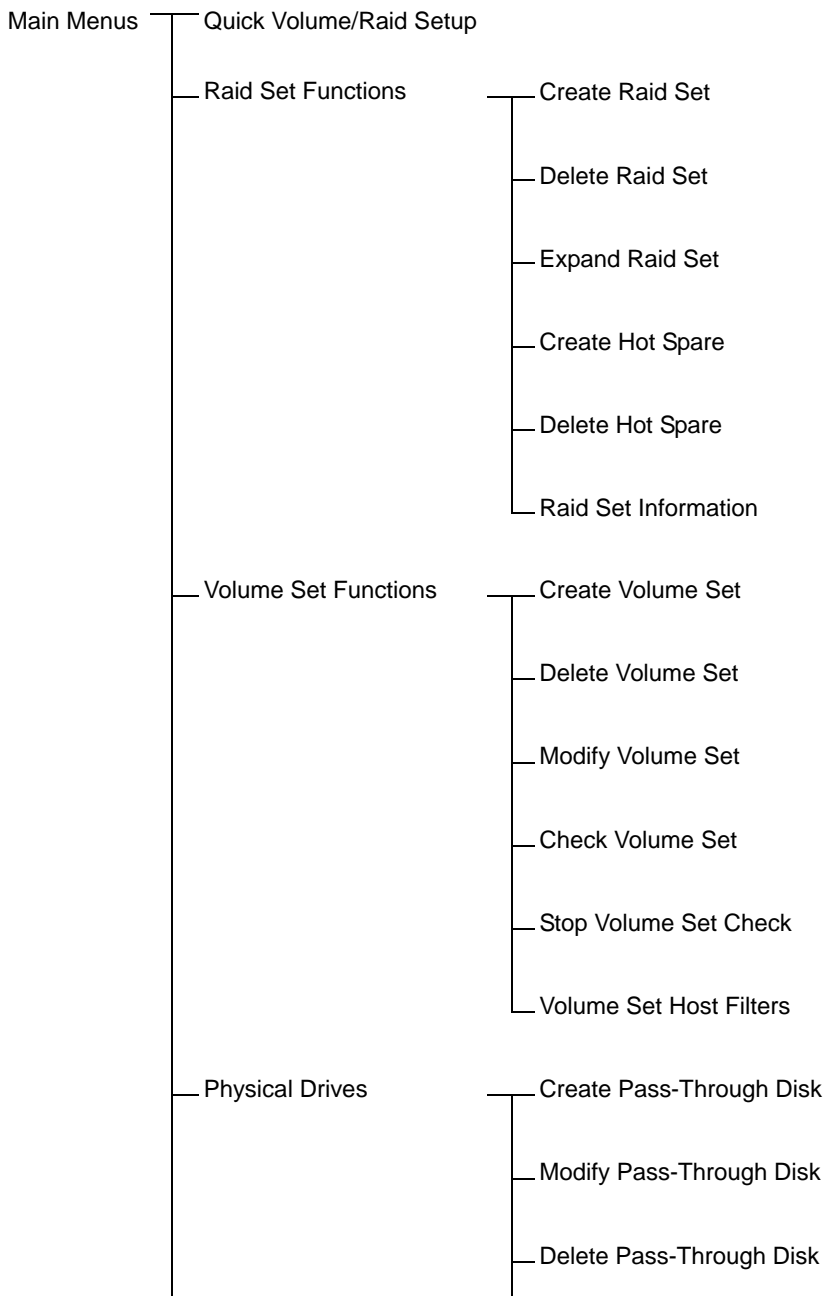
Note that you must be logged in as administrator with local admin rights on the remote machine to remotely configure it. The RAID subsystem controller default User Name is **"admin"** and the Password is **"0000"**.

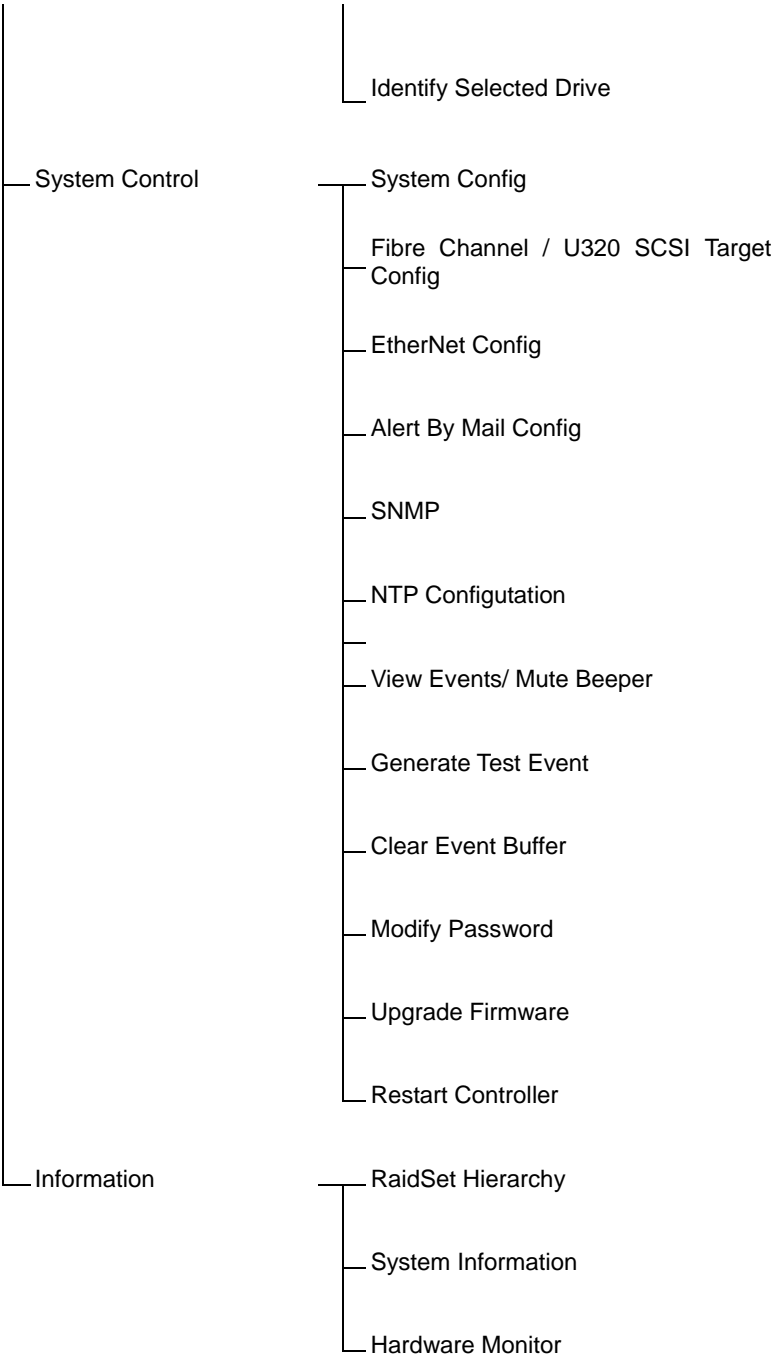


*The RAID subsystem controller default User Name is **"admin"** and the Password is **"0000"**. Please change the Password when you first log-in.*

2.5 Configuration Menu Tree

The following is an expansion of the menus in configuration Utility that can be accessed through the LCD panel, RS-232 serial port and Ethernet LAN port.





Chapter 3.

LCD Panel Configuration

The Alnico RAID's LCD configuration panel is a character-based that you can use after powering the unit. Use LCD Configuration panel to:

- Create raid set,
- Expand raid set,
- Define volume set,
- Add physical drive
- Modify volume set
- Modify RAID level/stripe size,
- Define pass-through disk drives,
- Modify system function and
- Designate drives as hot spares.

The LCD display front panel function keys are the primary user interface for the RAID subsystem. Except for the "Firmware update", all configurations can be performed through this interface.

3.1 Starting LCD Configuration Utility

The main menu appears on the LCD screen, as shown below:

Use the up and down arrow buttons to move left and right to select a menu item. Press **ENT** to select the item. Press the **UP/DOWN** to browse the selection. Press **ESC** to return to the previous screen.

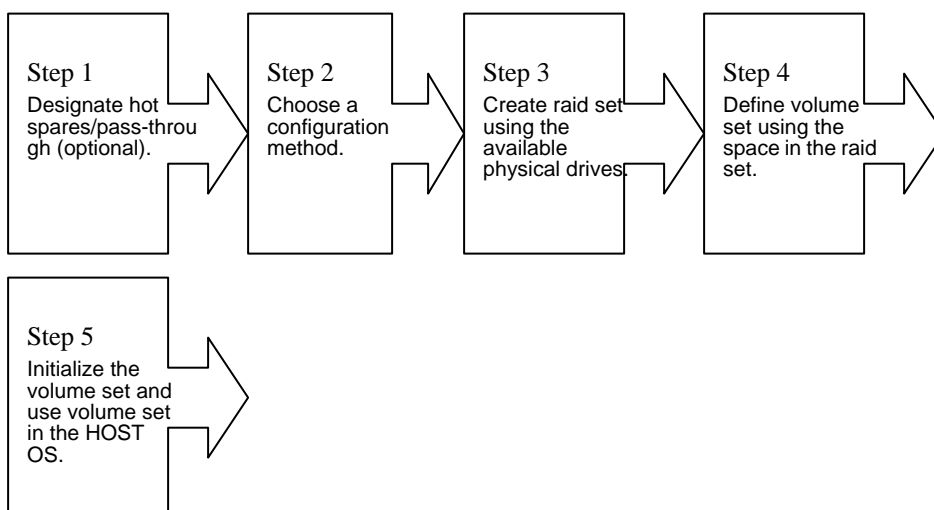
3.2 LCD Configuration Utility Main Menu Options

Select an option and the related information or submenu items display beneath it. The submenus for each item are explained on the following sections. The configuration utility main menu options are:

| Option | Description |
|---|---|
| Quick Volume And Raid Set Setup | Create a default configurations which are based on 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 |
| * U320 SCSI Target Config * Fibre Channel Config | Enable or disable QAS and Auto Speed Down. And select 12/16Bytes CDB (Avail with SCSI models only) To set the Fibre channel config function (Avail with Fibre models only) |
| Ethernet Configuration | Setting Local IP Address |
| Show System Events | Record all system events in the buffer |
| Clear All Event Buffers | Clear all event buffer information |
| Hardware Monitor Information | Show all system environment status |
| Show System Information | View the controller information |

3.3 Configuring Raid Sets and Volume Sets

You can configure raid sets and volume sets either using “Quick Volume And Raid Set Setup” automatically or “Raid Set Functions/Volume Set Functions” manually 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:



3.4 Designating Drives as Hot Spares

To designate drives as hot spares, press **ENT** to enter the Main menu. Press **UP/DOWN** to select the **Raid Set Functions** option and then press **ENT**. All raid set functions will be displayed. Press **UP/DOWN** to select the **Create Hot Spare Disk** option and then press **ENT**. The first unused physical device connected to the current controller appears: Press **UP/DOWN** to scroll the unused physical devices and select the target disk to assign as a Hot Spare and press **ENT** to designate it as a hot spare.

3.5 Using Quick Volume and Raid Set Setup

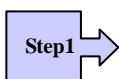
In Quick Volume And Raid Setup Configuration, it collects all drives in try and include them in a raid set. The raid set you create is associated with exactly one volume set, and you can modify the RAID level, stripe size, and capacity. Designating Drives as Hot Spares will also combine with raid level in this setup.

The volume set default settings will be:

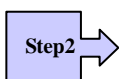
| Parameter | Setting |
|--|----------------------------------|
| Volume Name | Volume Set # 00 |
| SCSI Channel / SCSI ID / LUN | 0/0/0 |
| Fibre Channel / Fibre LUN Base / Fiber LUN | 0/0/0 |
| SAS Port / SAS LUN Base / SAS LUN | 0/0/0 |
| Cache Mode | Write Back |
| Tag Queuing | Yes |
| Max Sync Rate | Depend your host adapter setting |

The default setting values can be changed after configuration is complete.

Follow the steps below to create raid set using Quick Volume And Raid Setup Configuration:



Choose Quick Volume And Raid Setup from the main menu. The available RAID levels and associated Hot Spare for the current volume set drive are displayed.



RAID Level Try to use drives of the same capacity in a specific array. If you use drives with different capacities in an array, all the drives in the array is treated as though they have the capacity of the *smallest* drive in the array.

The number of physical drives in a specific array determines the RAID levels that can be implemented with the array.

RAID 0 requires one or more physical drives,

RAID 1 requires at least 2 physical drives,

RAID 1+ Spare requires more than 2 physical drives,

RAID 3 requires at least 3 physical drives,

RAID 5 requires at least 3 physical drives,

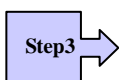
RAID 6 requires at least 4 physical drives,

RAID 3+ Spare requires at least 4 physical drives, and

RAID 5 + Spare requires at least 4 physical drives.

RAID 6 + Spare requires at least 5 physical drives.

Using the UP/DOWN key to select the RAID for the volume set and presses ENT to confirm it.



Available Capacity Set the capacity size for the volume set. After select *RAID level* and press ENT.

The selected capacity for the current volume set is displayed. Using the UP/DOWN to create the current volume set capacity size and press ENT to confirm it. The available stripe sizes for the current volume set are displayed.



Select Stripe size This parameter specifies the size of the stripes written to each disk in a RAID 0, 1(0+1), 5or 6 Volume Set. You can set the stripe size to 4 KB, 8 KB, 16 KB, 32 KB, 64 KB, or 128 KB. A larger stripe size provides better-read performance, especially if your computer does mostly sequential reads. However, if you are sure that your computer does random read requests more often, choose a small stripe size. Using the UP/DOWN to select stripe size and press ENT to confirm it.



When you are finished defining the volume set, press ENT to confirm the Quick Volume And Raid Set Setup function.

-
- Step6** → *Fast Initialization* Press ENT to define fast initialization and ESC to normal initialization. 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. In Fast Initialization, the initialization proceeds must be completed before the volume set ready for system accesses.
-
- Step7** → The controller will begin to Initialize the volume set you have just configured.
-
- Step8** → If you need to add additional volume set using main menu Create Raid Volume Set function.
-

3.6 Using Raid Set and Volume Set Functions

In Raid Set Function, you can use the **Create Raid Set** function to generate the new raid set. In Volume Set Function, you can use the **Create Volume Set** function to generate its associated volume set and parameters.

If the current controller has unused physical devices connected, you can choose the *Create Hot Spare* option in the Raid Set Function to define a global hot spare.

Select this method to configure new raid sets and volume sets. This configuration option allows you to associate volume set with partial and full raid set.

-
- Step1** → To setup the Hot Spare (option), choose Raid Set Functions from the main menu. Select the Create Hot Spare Disk to set the Hot Spare.
-
- Step2** → Choose Raid Set Function from the main menu. Select the Create A New Raid Set.
-
- Step3** → A Select Drive IDE Channel in the next displayed showing the IDE drive connected to the current controller.
-
- Step4** → Press the UP/ DOWN to select specific physical drives. Press the ENT to associate the selected physical drive with the current raid set.
-
- Try to use drives of the same capacity in a specific raid set. If you use drives with different capacities in an array, all the drives in the array is treated as
-

though they have the capacity of the *smallest* drive in the array.

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

RAID 0 requires one or more physical drives per raid set.

RAID 1 requires at least 2 physical drives per raid set.

RAID 1 + Spare requires at least 3 physical drives per raid set.

RAID 3 requires at least 3 physical drives per raid set.

RAID 5 requires at least 3 physical drives per raid set.

RAID 6 requires at least 4 physical drives per raid set.

RAID 3 + Spare requires at least 4 physical drives per raid set.

RAID 5 + Spare requires at least 4 physical drives per raid set.

RAID 6 + Spare requires at least 5 physical drives per raid set.

Step5



After adding physical drives to the current raid set as desired, press ESC to confirm the Select Drive IDE Channel function.

Step6



Press ENT when you are finished creating the current raid set. To continue defining another raid set, repeat step 3. To begin volume set configuration, go to step 7.

Step7



Choose Volume Set Functions from the main menu. Select the Create Raid Volume Set and press ENT.

Step8



Choose one raid set from the Select Raid Set screen. Press ENT to confirm it.

Step9



The volume set attributes screen appears:

The volume set attributes screen shows the volume set default configuration value that is currently being configured. The volume set attributes are:

Large than 2TB : (64bit LBA, 4K Block)

The Raid Level,

The Capacity (Not supported via LCD Panel.)

The Stripe Size,

The SCSI Channel / SCSI ID / LUN ;

Fibre Channel / Fibre LUN Base / Fibre LUN ;

SAS Port / SAS LUN Base / SAS LUN

The Cache Mode,

The Tagged Queuing,

The SCSI Max Rate, and

The Volume Name (number).

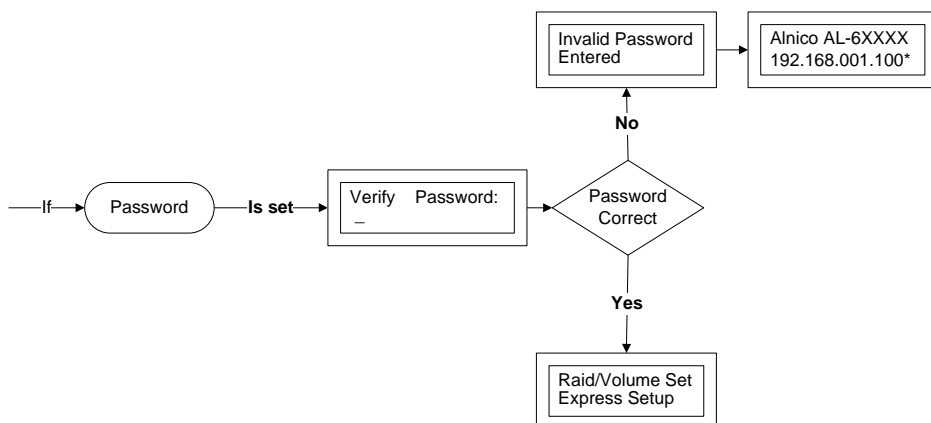
All value can be changing by the user. Press the UP/ DOWN to select the attributes. Press the ENT to modify each attribute of the default value. Using the UP/DOWN to select attribute value and press the ENT to accept the default value

Step10 → After user completes modifying the attribute, press the ESC to enter the Select Capacity for the volume set. Using the UP/DOWN to set the volume set capacity and press ENT to confirm it.

Step11 → When you are finished defining the volume set, press ENT to confirm the Create function.

Step12 → Press ENT to define fast initialization and ESC to normal initialization. The controller will begin to Initialize the volume set you have just configured. If space remains in the raid set, the next volume set can be configured. Repeat steps 7 to 12 to configure another volume set.

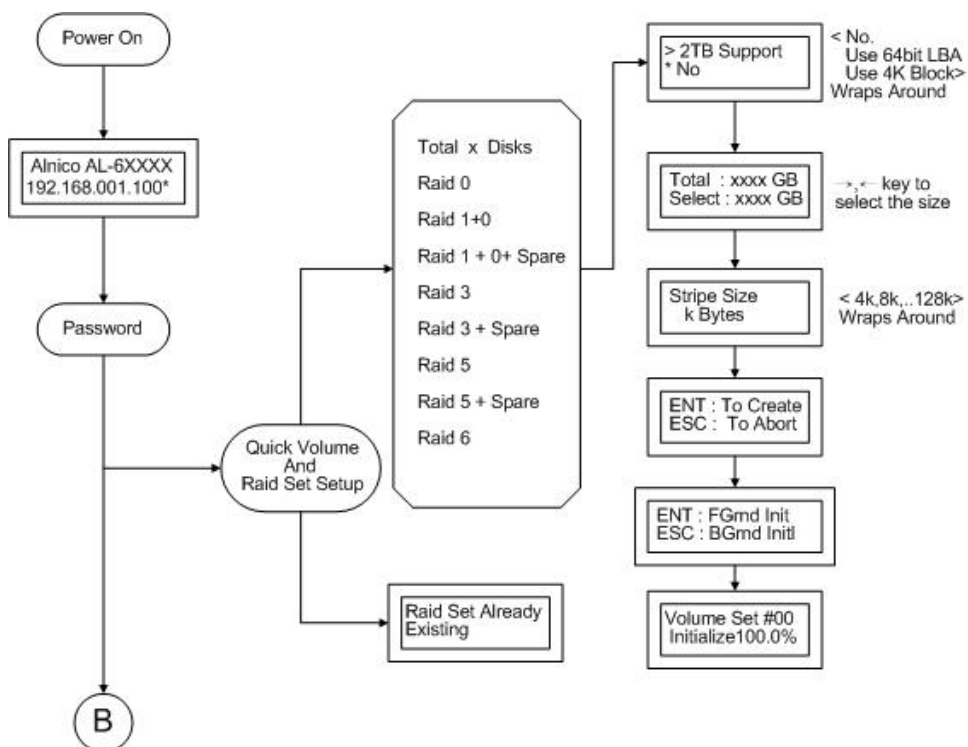
3.7 Navigation Map of the Configuration



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 0000 by the manufacture.

3.7.1 Quick Volume/Raid Setup

Quick Volume And Raid Setup is the fastest way to prepare a raid set and volume set. It only needs a few keystrokes to complete it. Although disk drives of different capacity may be used in the raid set, it will use the smallest capacity of the disk drive as the capacity of all disk drives in the raid set. The Quick Volume And Raid Setup option creates a raid set with the following properties:



1. All of the physical disk drives are contained in a raid set.
2. The raid levels associated with hot spare, capacity, and stripe size are selected during the configuration process.
3. A single volume set is created and consumed all or a portion of the disk

capacity available in this raid set.

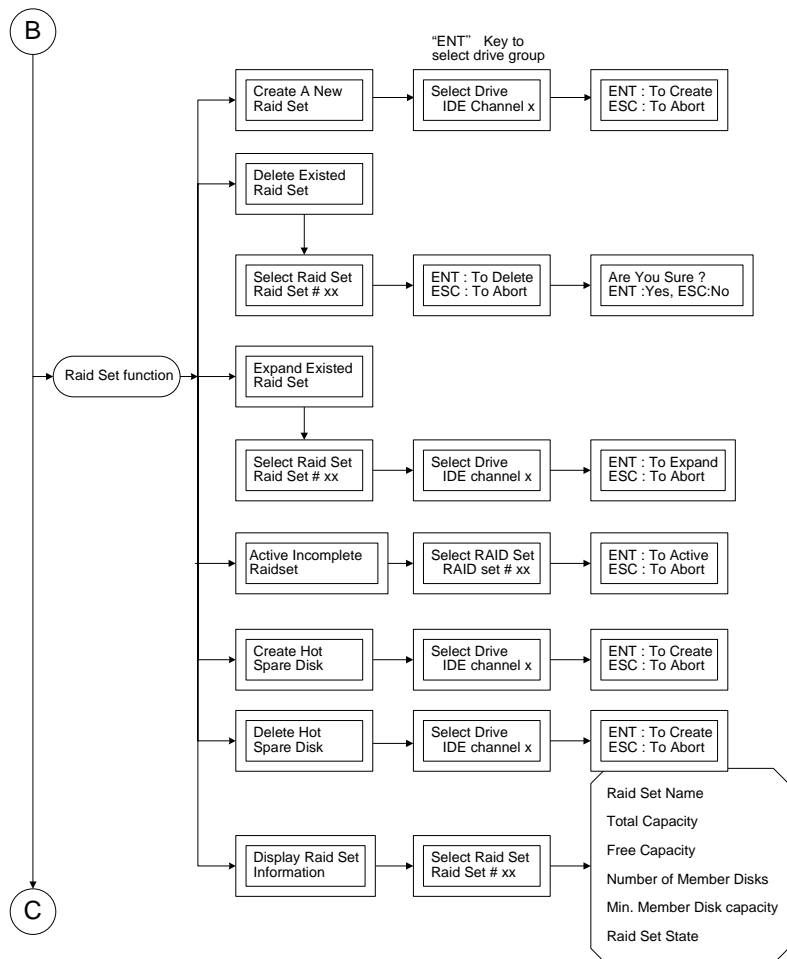
4. If you need to add additional volume set, using main menu **Volume Set functions**.

Detail procedure references to this chapter's section : **Using Raid Set and Volume Set Functions**

3.7.2 Raid Set Function

User manual configuration can complete control of the raid set setting, but it will take longer time to complete than the Quick Volume And 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.

To enter a Raid Set Functions, press **ENT** to enter the Main menu. Press **UP/DOWN** to select the **Raid Set Functions** option and then press **ENT** to enter further submenus. All raid set submenus will be displayed.



3.7.2.1 Create A New Raid Set

Detail procedure references to this chapter's section : **Using Raid Set and Volume Set Functions**

3.7.2.2 Delete Existed Raid Set

Press **UP/DOWN** to choose the **Delete Existed Raid Set** option. Using **UP/DOWN** to select the raid set number that user want to delete and then press **ENT** to accept the raid set number. The Confirmation screen appears, then press **ENT** to accept the delete existed raid set function. The double confirmation screen appears, then press **ENT** to make sure of the delete existed

raid set function

3.7.2.3 Expand Existed Raid Set

Instead of deleting a raid set and recreating it with additional disk drives, the Expand Existed Raid Set function allows the user to add disk drives to the raid set that was created.

To expand existed raid set, press **UP/DOWN** to choose the **Expand Existed Raid Set** option. Using **UP/DOWN** to select the raid set number that user want to expand and then press **ENT** to accept the raid set number. If there is an available disk, then the **Select Drive IDE Channel x** appears. Using **UP/DOWN** to select the target disk and then press **ENT** to select it. Press **ENT** to start expanding the existed raid set.

The new add capacity will be define one or more volume sets. Follow the instruction presented in the Volume Set Function to create the volume sets.



NOTE

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

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.

3.7.2.4 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 Incomplete RaidSet** option to active the raid set. After user complete the function, the Raid State will change to Degraded Mode.

3.7.2.5 Create Hot Spare Disk

Please reference this chapter : **Designating Drives as Hot Spares**.

3.7.2.6 Delete Hot Spare Disk

To delete hot spare, press **UP/DOWN** to choose the **Delete Hot Spare Disk** option. Using **UP/DOWN** to select the hot spare number that user want to delete and then press **ENT** to select it. The confirmation screens appear and press **ENT** to delete the hot spare.

3.7.2.7 RAID Set Information

Using **UP/DOWN** to choose the **Display Raid Set Information** option and press **ENT**. Using **UP/DOWN** to select the raid set number that user want to display. The raid set information will be displayed.

Using **UP/DOWN** to scroll the raid set information, it shows Raid Set Name, Total Capacity, Free Capacity, Number of Member Disks, Min. Member Disk Capacity and Raid Set State.

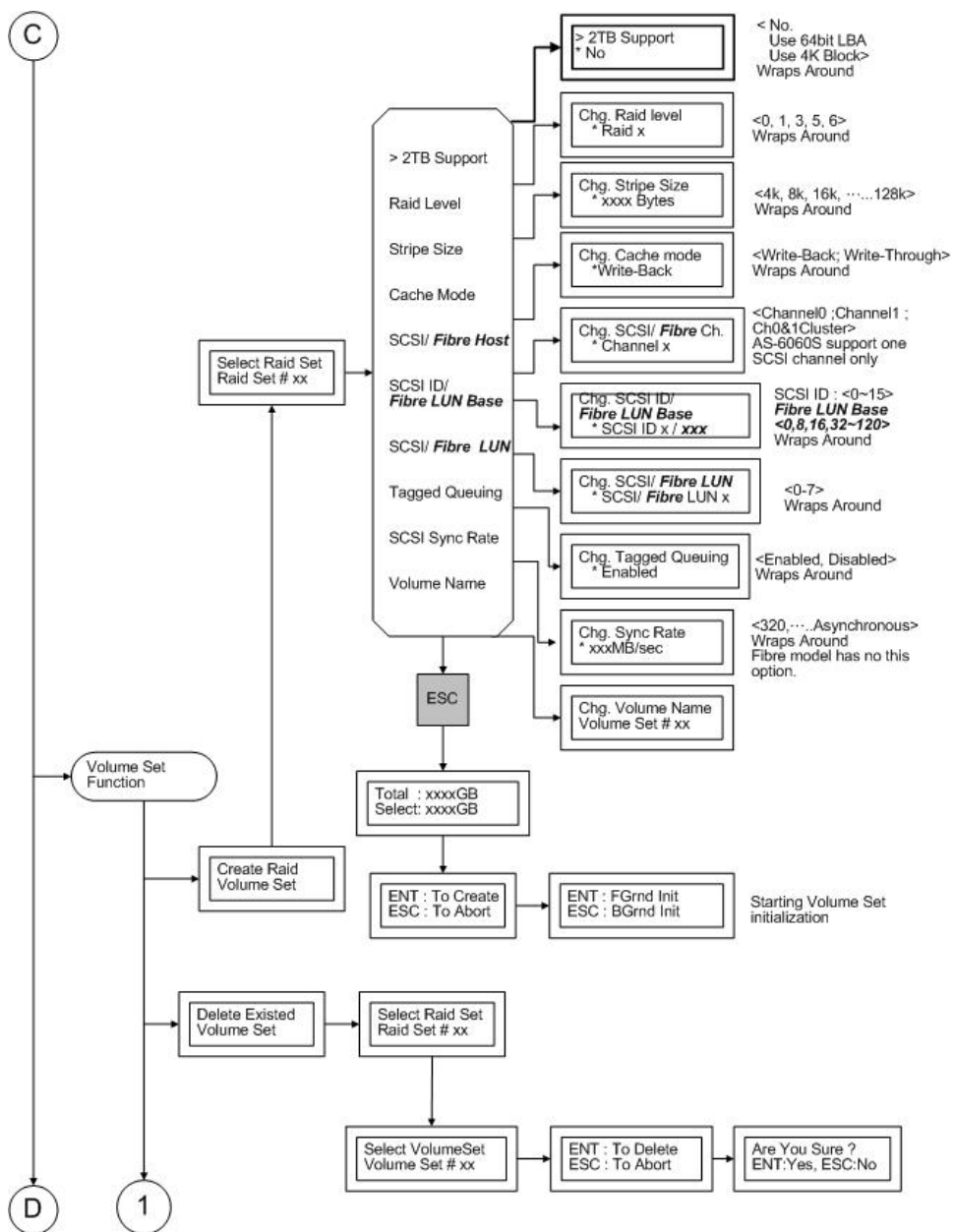
3.7.2.8 Offline Raid Set

This function allows the user to move the whole created Raid Set to another Alnico RAID subsystem without turning off power. "Active Raid Set" can resume the offline-Raid Set to online status.

3.7.3 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.

To enter a Volume Set Functions, press **ENT** to enter the main menu. Press **UP/DOWN** to select the **Volume Set Functions** option and then press **ENT** to enter further submenus. All volume set submenus will be displayed.



3.7.3.1 Create Raid Volume Set

To create a volume set, Please reference this chapter section 4.6: Using Raid Set and Volume Set Functions. The volume set attributes screen shows the volume set default configuration value that is currently being configured. The attributes are Raid Level, Stripe Size, Cache Mode, SCSI Channel, SCSI ID,

SCSI LUN, Fibre Channel, Fibre LUN Base, Fibre LUN, SAS Port, SAS LUN Base, SAS LUN, Tagged Queuing, SCSI Max Rate, and Volume Name (number).

All value can be changing by the user. Press the **UP/DOWN** to select attribute. Press the **ENT** to modify the default value. Using the **UP/DOWN** to select attribute value and press the **ENT** to accept the default value. The following is the attributes descriptions. Please reference this chapter section 4.6 Using Raid Set and Volume Set Functions to complete the create volume set function.

3.7.3.1.1 > 2TB Support

When the RAID set capacity of per volume is over 2TB, a special selection will appear on the LCD panel, please make a choice according to your O.S.:

Use 64bit LBA: for Linux, Unix Windows 2003 SP1 (or later) and etc...

Use 4K Block : Windows 2000, XP, enlarge block size from 512Byte to 4K.

No. :Disabled greater than 2TB feature.

Using the **UP/DOWN** to select attribute value and press the **ENT** to accept the default value.

3.7.3.1.2 Capacity

The maximum volume size is default in the first setting. Enter the appropriate volume size to fit your application. The capacity can also increase or decrease by the .UP and DOWN arrow key. Each volume set has a selected capacity which is less than or equal to the total capacity of the raid set on which it resides.

3.7.3.1.2 Raid Level

RAID subsystem can support raid level 0,1(0+1), 3, 5 and 6.

3.7.3.1.4 Strip Size

This parameter sets the size of the segment written to each disk in a RAID 0, 1, 0+1, 5 or 6 logical drives. 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.

3.7.3.1.5 Volume Name

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

3.7.3.1.6 SCSI Channel / Fibre Channel / SAS Port

RAID subsystem supports dual Ultra 320 SCSI channels (AL-6060S supports only single Ultra 320 SCSI channel) or dual 4Gbps Fibre channels or dual SAS ports.

SCSI Channel : SCSI to SATA supports dual Ultra 320 SCSI channels.

Fibre Channel : Dual 4Gbps Fibre channels can be applied. Choose the Fibre channel from 0, or, 1, or 0&1 For Cluster.

SAS Port : SAS to SATA supports dual miniSAS (2 x 3Gb) ports.

3.7.3.1.7 SCSI ID / Fibre LUN Base / SAS LUN Base

SCSI ID : Each SCSI device attached to the SCSI card, as well as the SCSI HBA itself, must be assigned a unique SCSI ID number. A Wide SCSI channel can connect up to 15 devices. RAID subsystem is as a large SCSI device. We should assign an ID from a list of SCSI IDs.

Fibre LUN Base : Each fibre device attached to the Fibre card, as well as the Fibre HBA itself, must be assigned a unique LUN number. A Fibre channel can connect up to 128(0 to 127) devices. The RAID subsystem is as a large Fibre device. We should assign an LUN base from a list of Fibre LUN Bases.

SAS LUN Base : Each SAS device attached to the SAS HBA card, as well as the card itself, must be assigned a unique LUN number. A SAS port can connect up to 128(0 to 127) devices. The RAID subsystem is as a large SAS device. We should assign one LUN base from a list of SAS LUN Bases.

3.7.3.1.8 SCSI LUN /Fibre LUN/ SAS LUN

SCSI LUN : Each SCSI ID can support up to 8 LUNs. The SCSI HBA treats each LUN like a SCSI device.

Fibre LUN: Each Fibre LUN base can support up to 8 LUNs. The Fibre HBA treats each LUN like a Fibre device.

SAS LUN: Each SAS LUN base can support up to 8 LUNs. The SAS HBA treats each LUN like a SAS device.

3.7.3.1.9 Cache Mode

User can set the cache mode as Write-Through Cache or Write-Back Cache.

3.7.3.1.10 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 SCSI command tag queuing support for each drive channel. This function should normally remain enabled. Disable this function only when using older SCSI drives that do not support command tag queuing.

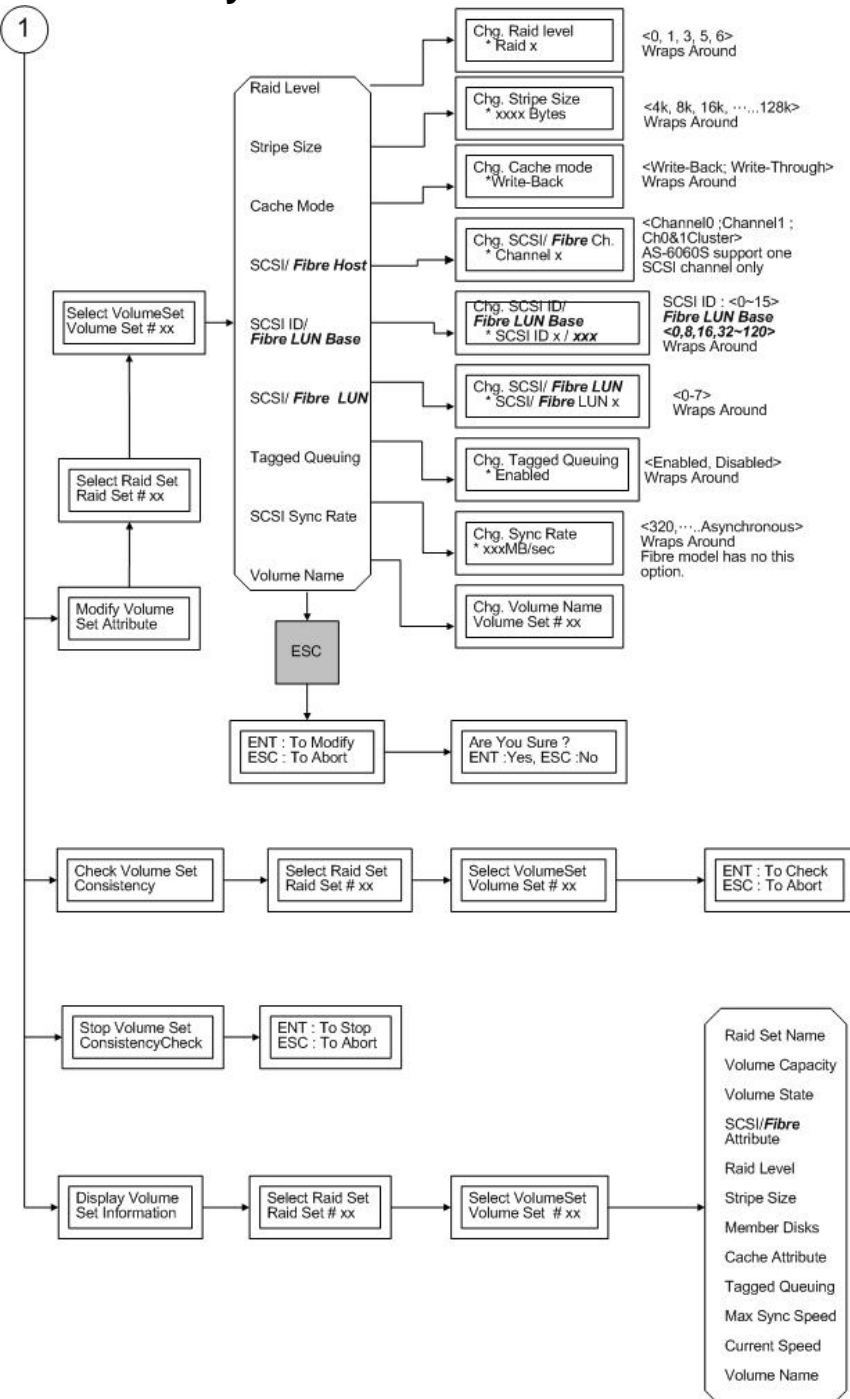
3.7.3.1.11 SCSI Max Sync Rate

The RAID subsystem supports 320MB/sec as the highest data transfer rate.

3.7.3.2 Delete Volume Set

Press **UP/DOWN** to choose the **Delete Existed Volume Set** option. Using **UP/DOWN** to select the raid set number that user want to delete and press **ENT**. Scrolling the **UP/DOWN** to select the volume set number that user want to delete and press **ENT**. The Confirmation screen appears, and then press **ENT** to accept the delete volume set function. The double confirmation screen appears, then press **ENT** to make sure of the delete volume set function.

3.7.3.3 Modify Volume Set



Use this option to modify volume set configuration. To modify volume set attributes from raid set system function, press **UP/DOWN** to choose the **Modify Volume Set Attribute** option. Using **UP/DOWN** to select the raid set number that user want to modify and press **ENT**. Scrolling the **UP/DOWN** to select the volume set number that user want to modify and press **ENT**. Press **ENT** to select the existed volume set attribute. The volume set attributes screen shows the volume set setting configuration attributes that was currently being configured. The attributes are Raid Level, Stripe Size, Cache Mode, SCSI Channel, SCSI ID, SCSI LUN, Fibre Channel, Fibre LUN Base, Fibre LUN, SAS Port, SAS LUN Base, SAS LUN , Tagged Queuing, SCSI Max Rate, and Volume Name (number).

All value can be modifying by the user. Press the **UP/DOWN** to select attribute. Press the **ENT** to modify the default value. Using the **UP/DOWN** to select attribute value and press the **ENT** to accept the selection value. Choose this option to display the properties of the selected Volume Set; you can modify all values except the capacity.

3.7.3.4 Check Volume Set Consistency

Use this option to check volume set consistency and scrub the bad blocks. To check volume set consistency from volume set system function, press **UP/DOWN** to choose the **Check Volume Set Consistency** option. Using **UP/DOWN** to select the raid set number that user want to check and press **ENT**. Scrolling the **UP/DOWN** to select the volume set number that user want to check and press **ENT**. The Confirmation screen appears, press **ENT** to start the check volume set consistency.

3.7.3.5 Stop Volume Set Consistency Check

Use this option to stop volume set consistency check and scrub. To stop volume set consistency check from volume set system function, press **UP/DOWN** to choose the **Stop Volume Set Consistency Check** option and then press **ENT** to stop the check volume set consistency.

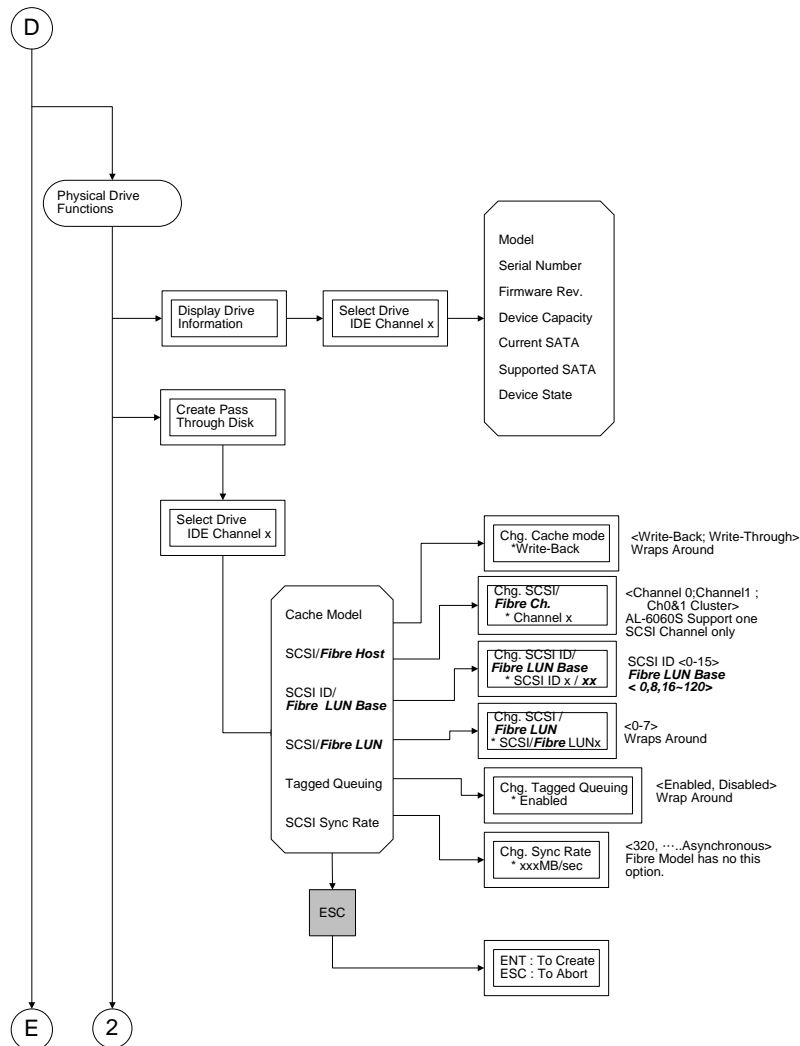
3.7.3.6 Display Volume Set Information

Use this option to display volume set information. To display volume set information from Volume set system function, press **UP/DOWN** to choose the **Display Volume Set Information** option. Using **UP/DOWN** to select the raid set number that user wants to show and press **ENT**. Scrolling the **UP/DOWN** to select the volume set number that user want to display and press **ENT**. The volume set attributes screen shows the volume set setting configuration value that was currently being configured. The attributes are Raid Level, Stripe Size, Cache Mode, SCSI Channel, SCSI ID, SCSI LUN, Fibre Channel, Fibre LUN Base, Fibre LUN, SAS Port, SAS LUN Base, SAS LUN, Tagged Queuing, SCSI Max Rate, and Volume Name (number). All value cannot be modifying by this

option.

3.7.4 Physical Drive

Choose this option from the Main Menu to select a physical disk and to perform the operations listed below. To enter a Physical Drive Functions, press **ENT** to enter the main menu. Press **UP/DOWN** to select the **Physical Drive Functions** option and then press **ENT** to enter further submenus. All physical drive submenus will be displayed.



3.7.4.1 Create Pass-Through Disk

Disk is no controlled by the RAID subsystem firmware and thus cannot be a part

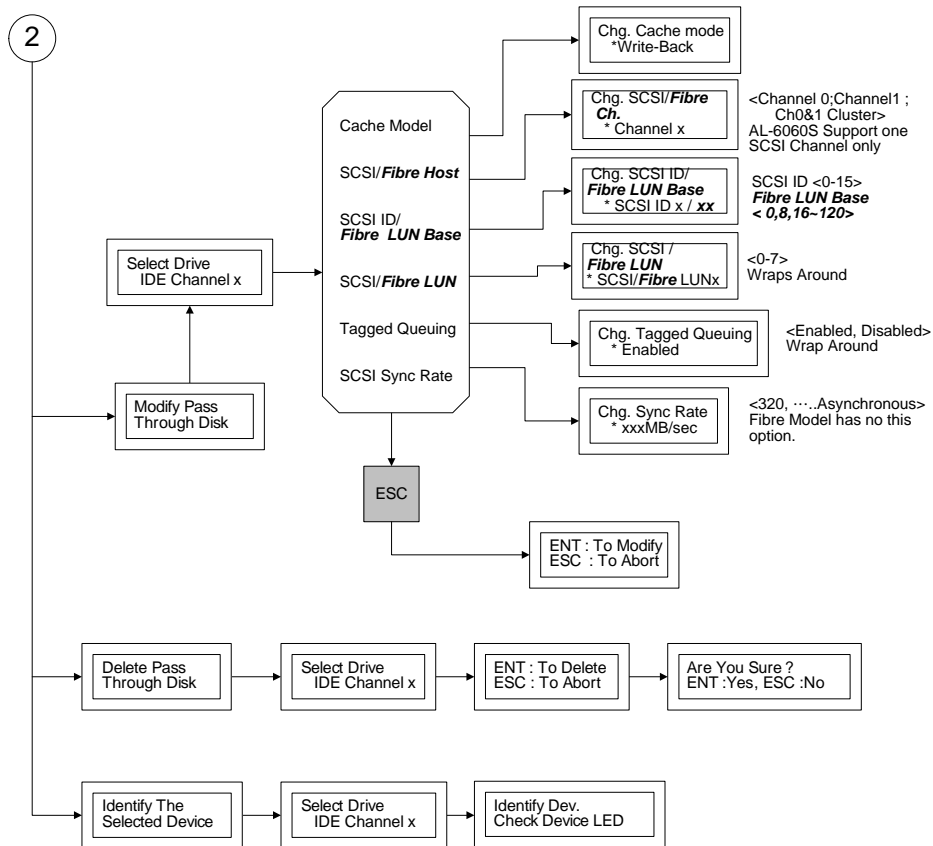
of a raid set. The disk is available to the operating system as an individual disk. It is typically used on a system where the operating system is on a disk not controlled by the RAID subsystem firmware.

Using **UP/DOWN** to choose the **Create Pass-Through Disk** option and press **ENT**. Using **UP/DOWN** to select the drive IDE number that user want to create. The drive attributes will be displayed. The drive attributes show the Cache Model, SCSI Channel, SCSI ID, SCSI LUN, Fibre Channel, Fibre LUN Base, Fibre LUN, SAS Port, SAS LUN Base, SAS LUN, Tagged Queuing, and SCSI Sync Rate.

All values can be changing by the user. Press the **UP/DOWN** to select attribute and then press the **ENT** to modify the default value. Using the **UP/ DOWN** to select attribute value and press the **ENT** to accept the selection value.

3.7.4.2 Modify Pass-Through Disk

Use this option to modify the Pass-Through Disk attributes. To modify Pass-Through Disk attributes from Pass-Through Disk pool, press **UP/DOWN** to choose the **Modify Pass-Through Drive** option, and then press **ENT** key. The Select Drive Function menu will show all Pass-Through Drive number items. Using **UP/DOWN** to select the Pass-Through Disk that user wants to modify and press **ENT**. The attributes screen shows the Pass-Through Disk setting value that was currently being configured. The attributes are Cache Mode, SCSI Channel, SCSI ID, SCSI LUN, Fibre Channel, Fibre LUN Base, Fibre LUN, SAS Port, SAS LUN Base, SAS LUN, Tagged Queuing, and SCSI Max Rate.



All value can be modifying by the user. Press the **UP/DOWN** arrow keys to select attribute. Press the **ENT** to modify the default value. Using the **UP/DOWN** key to select attribute value and press the **ENT** to accept the selection value. After completing the modification, press **ESC** to enter the confirmation screen and then press **ENT** to accept the Modify Pass-Through Disk function.

3.7.4.3 Delete Pass-Through Disk

To delete pass-through drive from the pass-through drive pool, press **UP/DOWN** to choose the **Delete Pass-Through Drive** option, and then press **ENT**. The Select Drive Function menu will show all Pass-Through Drive number items. Using **UP/DOWN** to select the Pass-Through Disk that user want to delete and press **ENT**. The Delete Pass-Through confirmation screen will appear, presses **ENT** to delete it.

3.7.4.4 Identify The Selected Drive

To prevent removing the wrong drive, the selected disk HDD LED Indicator will

light for physically locating the selected disk when the Identify Selected Drive function is selected..

To identify selected drive from the physical drive pool, press **UP/DOWN** to choose the **Identify Drive** option, then press **ENT** key. The Select Drive function menu will show all physical drive number items. Using **UP/DOWN** to select the Disk that user want to identify and press **ENT**. The selected disk HDD LED indicator will flash.

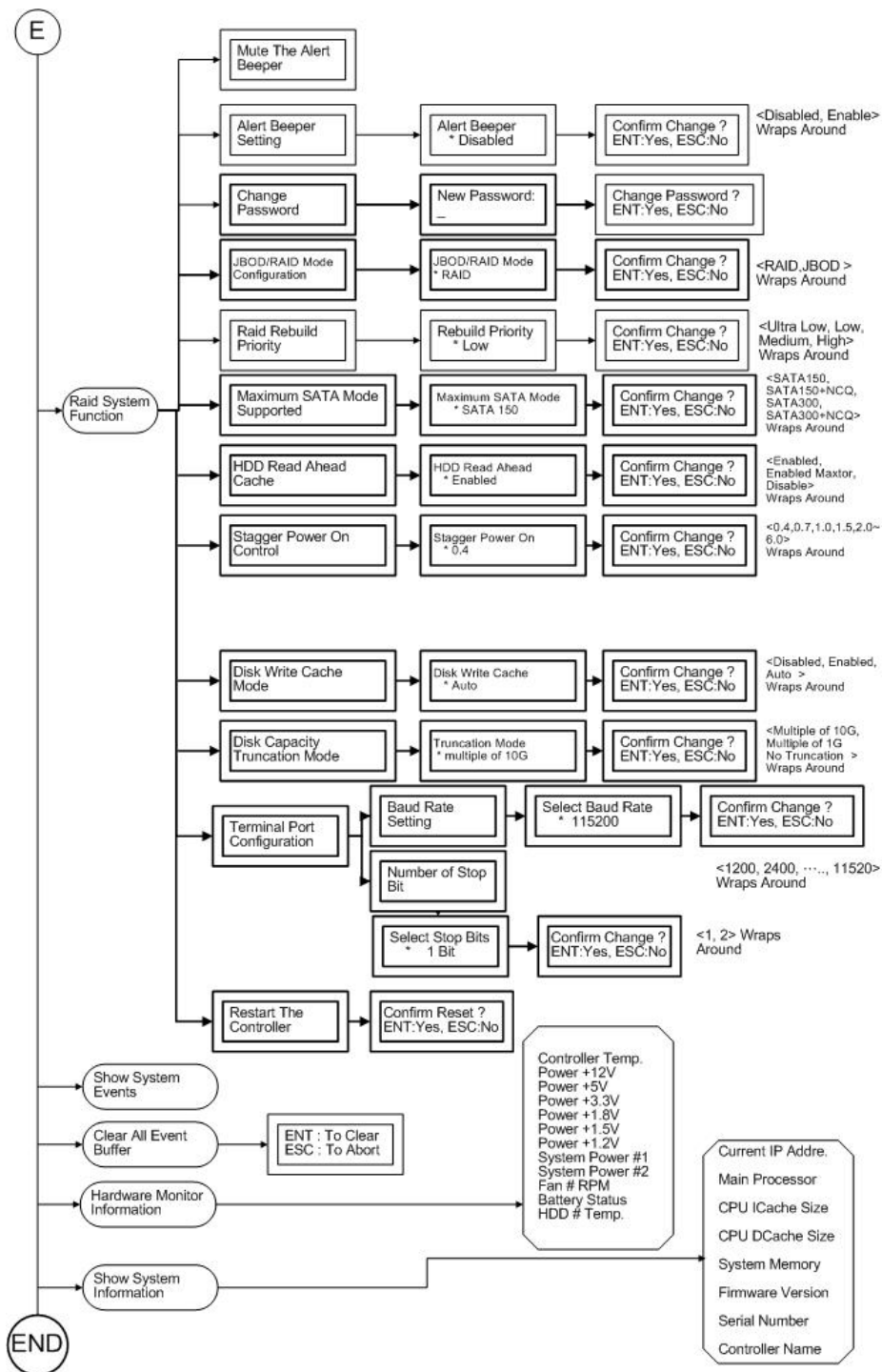
3.7.4.5 Display Drive Information

To display all information about HDDs, includes brand, model, serial number, firmware version and so on.

Press **UP/DOWN** to choose the **Display Drive** Information option, then press **ENT** key. This menu will show all physical drive number items. Using **UP/DOWN** to select the Disk that user want to display and press **ENT**, then Press **UP/DOWN** to browse the HDD's information.

3.7.5 RAID System Function

To enter a "System Control", press **ENT** to enter the Main menu. Press **UP/DOWN** to select the **Raid System Function** option and then press **ENT** to enter further submenus. All raid system submenus will be displayed. Using **UP/DOWN** to select the submenus option and then press **ENT** to enter the selection function.



3.7.5.1 Mute The Alert Beeper

The Mute The Alert Beeper function item is used to control the RAID subsystem Beeper. Select the “No” and press **Enter** key in the dialog box to turn the beeper off temporarily. The beeper will still activate on the next event.

3.7.5.2 Alert Beeper Setting

The Alert Beeper function item is used to Disabled or Enable the RAID subsystem controller alarm tone generator. Using the **UP/DOWN** to select alert beeper and then press the **ENT** to accept the selection. After completing the selection, the confirmation screen will be displayed and then press **ENT** to accept the function

Select the **Disabled** and press **Enter** key in the dialog box to turn the beeper off temporarily. The beeper will still activate on the next event.

3.7.5.3 Change Password

To set or change the RAID subsystem password, press the UP/DOWN to select Change Password and then press the ENT to accept the selection. The New Password: screen appears and enter new password that user want to change.

Using the UP/DOWN to set the password value. After completing the modification, the confirmation screen will be displayed and then press ENT to accept the function.

To disable the password, presses ENT only in the New Password: column. The existing password will be cleared. No password checking will occur when entering the main menu from the starting screen.

3.7.5.4 JBOD /RAID Mode Configuration

To set or change the RAID Mode of RAID subsystem, press the **UP/ DOWN** to select **JBOD/RAID Mode Configuration** and then press the **ENT** to accept the selection. The RAID mode selection screen appears and uses the **UP/DOWN** to set RAID mode. After completing the modification, the confirmation screen will be displayed and then press **ENT** to accept the function.

3.7.5.5 RAID Rebuild 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 (low, normal, high) to balance volume set access and rebuild tasks appropriately.

To set or change the RAID subsystem RAID Rebuild Priority, press the **UP/DOWN** to select **RAID Rebuild Priority** and press the **ENT** to accept the selection. The rebuild priority selection screen appears and uses the **UP/DOWN** to set the rebuild value. After completing the modification, the

confirmation screen will be displayed and then press **ENT** to accept the function.

3.7.5.6 Max SATA-Mode Support

Alnico Lite supports SATA-II (3.0Gps) and NCQ (Native command queuing), user can use this option to change the speed of SATA interface according to the HDD speed. There are 4 selections : SATA 150, SATA150+NCQ, SATA 300, SATA 300+NCQ.

To set or change the configuration, press the **UP/ DOWN** to select **SATA-Mode** and then press the **ENT** to accept the selection.

3.7.5.6.2 HDD Read Ahead Cache

HDD Read Ahead Cache allows the users to disable or enable the cache memory of the hard drives. Besides, The option "Disable Maxtor" can get Maxtor hard drives running more smoothly on Alnico RAID Subsystem.

To set or change the configuration, press the **UP/ DOWN** to select **HDD Read Ahead Cache** and then press the **ENT** to accept the selection.

3.7.5.6.3 Stagger Power On Control

"Stagger Power On Control" is a new item available on the setting page of System Configurations; that allows the power module to power up every hard drive orderly on Alnico RAID Subsystem. Before V1.39 firmware, all the hard drives are powered up altogether at the same time. The lag time from the last hard drive powered up to the next one to be powered up can be set within the lag time ranging from 0.4 sec to 5.0 sec.

To set or change the configuration, press the **UP/ DOWN** to select **Stagger Power On Control** and then press the **ENT** to accept the selection.

3.7.5.7 Disk Write Cache Mode

Disk cache can be turned off to prevent data lost, turned on to increase the performance of the machine. The following is the reason why a user might wants to turn off the cache. In case of power failure, the data stored in the disk cache waiting to be process might be lost. The disadvantage to turn off the disk cache is that performance will decrease dramatically.

Auto : Disk cache's setting will according to the installation of battery back up. When battery back up installed, Disk cache is disable. No battery back up installed, Disk cache is enable.

To set or change the configuration, press the **UP/ DOWN** to select "**Disk Write Cache Mode**" and then press the **ENT** to accept the selection.

3.7.5.8 Disk Capacity Truncation Mode

This function is used for cutting down the reminder or decimal to allow the storage space to be as a whole number.

For example:

It is rarely that the actual size of the Hard Drive is a whole number. Let's take a 40GB HDD for example, the actual size read by the controller maybe 40.55GB. This function "capacity truncation" can be used to trim down the capacity to 40.00 GB. This function is useful because in the future the 40.55HDD might go bad, and the user can't locate another 40GB drive which contains 40.55GB in the actual capacity, then that particular user will have to buy another drive with bigger capacity to rebuild the raid volume.

To set or change the configuration, press the **UP/ DOWN** to select "**Disk Capacity Truncation Mode**" and then press the **ENT**

3.7.5.9 Terminal Port Configuration

Parity value is fixed at None.

Handshaking value is fixed at None.

Speed setting values are 1200, 2400, 4800, 9600, 19200, 38400, 57600, and 115200.

Stop Bits values are 1 bit and 2 bits.

To set or change the RAID subsystem **Terminal Port** configuration, press the **UP/ DOWN** to select **Terminal Port Configuration** and then press the **ENT** to accept the selection. The baud rate setting or number of stop bit screen appears and uses the **UP/DOWN** select the setting function. The respect selection screen appears and uses the **UP/DOWN** arrow to set the value. After completing the modification, the confirmation screen will be displayed and then press **ENT** to accept the function.

3.7.5.10 Restart Controller

Use the Restart Controller to reset the entire configuration from the RAID subsystem controller non-volatile memory. To reset the RAID subsystem, press the **UP/ DOWN** to select **Restart Controller** and then press the **ENT** to accept the selection. The confirmation screen will be displayed and then press **ENT** to accept the function.

3.7.5.11 MAC Over Two TB

Make use of this item to have the created volume (larger than 2TB) successfully recognized on MAC systems.

**NOTE**

It can only work properly at Host and Drive without any activity.

3.7.5.12 Spin Down Idle HDD

“Spin Down” is mainly designed to save the power consumption taken by the idle hard drives. When Spin Down is invoked, the SMART status of each hard drive will be marked as “N/A” to signify the hard drive has been at non-spin mode. As soon as data access is requested again, all the idle hard drives will be automatically waken up by the RAID controller.

To set or change the configuration, press the **UP/ DOWN** to select **value** and then press the **ENT** to accept the selection.

**NOTE**

It can only work properly at Host and Drive without any activity.

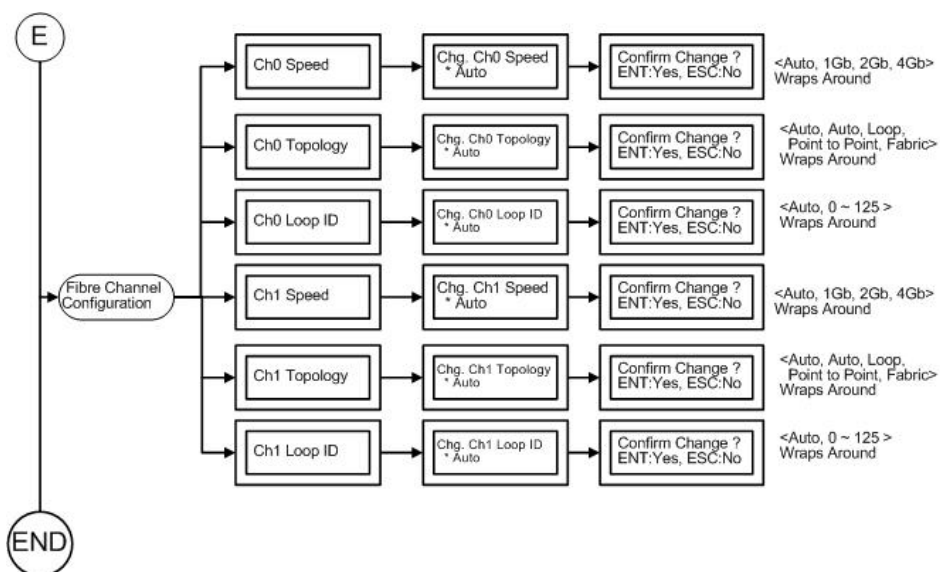
3.7.6 U320 SCSI Target Config / Fibre Channel Config

AN-308SC, AN-312SC, AN-316SC : U320 SCSI Target Config

Use to enable or disable QAS and Down To U160 If U320 Unstable or select 12/16Bytes CDB. 12 Bytes CDB allows the RAID subsystem to support Over-2TB under Windows Server 2003 (Must be coupled with SP1 and Alnico MPIO driver) and Linux (Must be coupled with Alnico Linux patch). 16Bytes CDB allows the RAID subsystem to fully support Over-2TB without any extra files or drivers pre-installed

AN-308F4, AN-312F4, AN-316F4 : Fibre Channel Config

Use to configure the fibre channel function. Press the **UP/ DOWN** to select **Fibre Channel Config** and then press the **ENT** to accept the selection. Press **UP/ DOWN** to select **Channel** and then press the **ENT** to accept the selection.



3.7.6.1 Fibre Speed

Press the **UP/ DOWN** to select **Ch0 Speed** and then press the **ENT** to accept the selection. Press **UP/ DOWN** to select speed (**Auto, 1Gbps, 2Gbps or 4Gbps for 6160FA**) Then press **ENT** to accept the selection. The confirmation screen will be displayed and then press **ENT** to accept the change.

3.7.6.2 Fibre topology

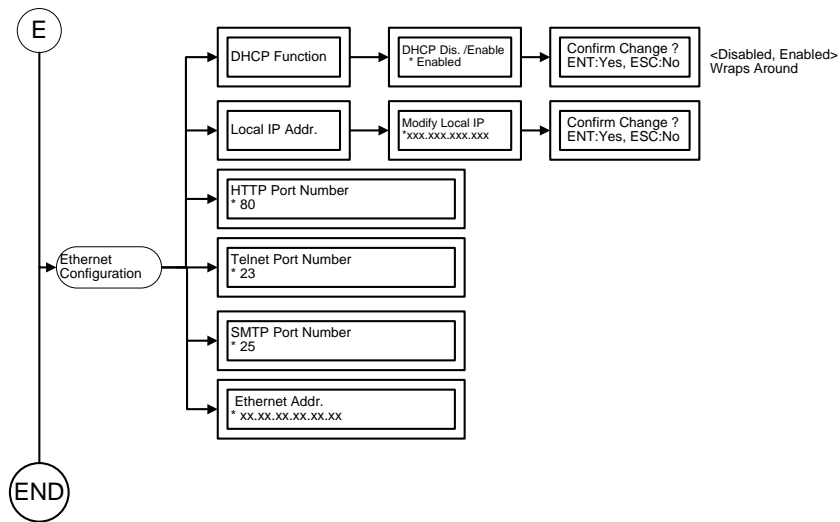
Press the **UP/ DOWN** to select **Chg Ch0 Topology** and then press the **ENT** to accept the selection. Press **UP/ DOWN** to select speed (**Auto, Point-Point , Loop**) Then press **ENT** to accept the selection. The confirmation screen will be displayed and then press **ENT** to accept the change.

3.7.6.3 Hard Loop

This setting is effective only under the setting is "Loop topology". When enabled, you can manually set the Loop ID in the range from 0 to 125. Press the **UP/ DOWN** to select **Hard Loop** and then press the **ENT** to accept the selection. Then press **UP/ DOWN** to select **Loop ID** and then press the **ENT** to accept the selection.

3.7.7 Ethernet Configuration

Use to configure the Ethernet port of RAID subsystem.



3.7.7.1 DHCP Function

Use to Enable or Disable the DHCP function.

Press the **UP/ DOWN** to select **DHCP Function** and then press the **ENT** to accept the selection. The confirmation screen will be displayed and then press **ENT** to accept the change.

3.7.7.2 Local IP Address

Use to Modify the Local IP Address.

press the **UP/ DOWN** to select **Local IP Address** and then press the **ENT** to accept the selection. Then enter the number of Local IP Address. The confirmation screen will be displayed and then press **ENT** to accept the change.

3.7.7.3 Ethernet information

Display all information of Ethernet.

press the **UP/ DOWN** to display **EtherNetAddr**, **SMTP Port**, **Telnet Port** and **HTTP port**.

3.7.8 Show System Events

To view the RAID subsystem events, press **ENT** to enter the Main menu. Press **UP/DOWN** key to select the **Show System Events** option, and then press **ENT**. The system events will be displayed. Press **UP/DOWN** to browse all the system events.

3.7.9 Clear all Event Buffers

Use this feature to clear the entire events buffer information.

To clear all event buffers, press **ENT** to enter the main menu. Press **UP/DOWN** to select the **Clear all Event Buffers option**, and then press **ENT**. The confirmation message will be displayed and press the **ENT** to clear all event buffers or **ESC** to abort the action.

3.7.10 Hardware Monitoring Information

To view the RAID subsystem controller's hardware monitor information, press **ENT** to enter the main menu. Press **UP/DOWN** to select the **Hardware Information** option, and then press **ENT**. All hardware information will be displayed. Press **UP/DOWN** to browse all the hardware information.

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

| Item | Warning Condition |
|------------------------------|----------------------|
| Controller Board Temperature | > 60 Celsius |
| Controller Fan Speed | < 1500 RPM |
| Power Supply +12V | < 10.8V or > 13.2V |
| Power Supply +5V | < 4.75V or > 5..25V |
| Power Supply +3.3V | < 3.135V or > 3.465V |
| DDR Supply Voltage +2.5V | < 2.375V or > 2.625V |
| CPU Core Voltage +1.3V | < 1.235V or > 1.365V |
| SATA Chip +1.25V | < 1.188V or > 1.313V |
| HDD temperature | > 55 Celsius |

3.7.11 Show System Information

Choose this option to display Main processor, CPU Instruction cache/ and data cache size, firmware version, serial number, controller model name, and the cache memory size. To check the system information, press **ENT** to enter the main menu. Press **UP/DOWN** to select the **Show System Information** option, and then press **ENT**. All major controller system information will be displayed. Press **UP/DOWN** to browse all the system information.

Chapter 4. Web Browser- Based Configuration

The RAID subsystem web browser-based configuration utility is firmware-based and uses to configure raid sets and volume sets. Use this utility to:

- Create raid set,
- Expand raid set,
- Define volume set,
- Add physical drive,
- Modify volume set,
- Modify RAID level/stripe size,
- Define pass-through disk drives,
- Update firmware,
- Modify system function, and
- Designate drives as hot spares.

If you need to boot the operating system from a RAID system, you must first create a RAID volume by using front panel touch-control keypad, Web Browser through Ethernet LAN, or VT-100 terminal.

4.1 Firmware-embedded TCP/IP & web browser-based RAID manager (using the controller's 10/100 Ethernet LAN port)

To ensure proper communications between the RAID subsystem and Web browser-based RAID management, Please connect the RAID system Ethernet LAN port to any LAN switch port.

The controller has embedded the TCP/IP & Web Browser-based RAID manager in the firmware. User can remote manage the RAID system without adding any user specific software (platform independent) via standard web browsers directly connected to the 10/100 Ethernet RJ45 LAN port.

To configure External RAID subsystem on a local or remote machine, you need to know its IP Address. The IP address will default show in the LCD screen. Launch your firmware-embedded TCP/IP & Web Browser-based RAID manager by entering `http://[IP Address]` in the web browser.

Note that you must be logged in as administrator with local admin rights on the

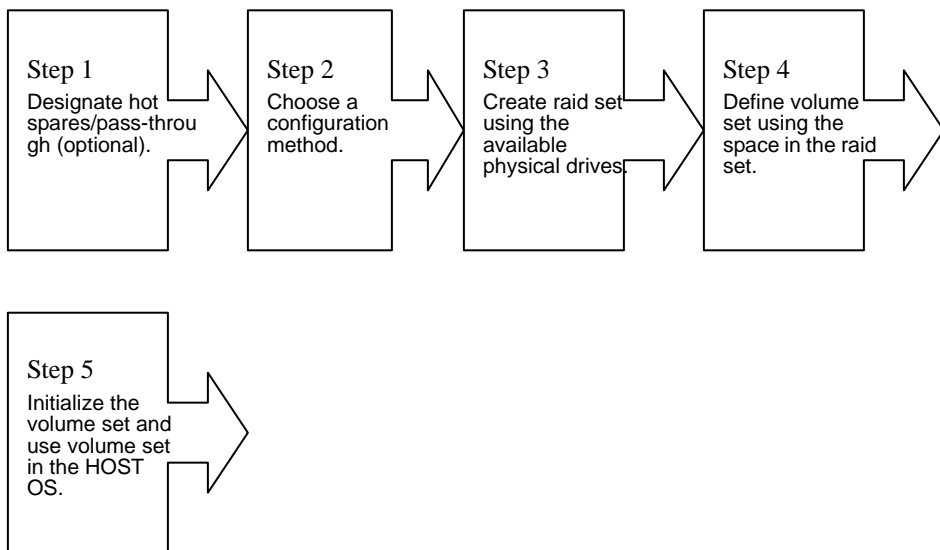
remote machine to remotely configure it. The RAID subsystem controller default User Name is “**admin**” and the Password is “**0000**”.



*The RAID subsystem controller default User Name is “**admin**” and the Password is “**0000**”. Please change the Password when you first log-in.*

4.2 Configuring Raid Sets and Volume Sets

You can configure raid sets and volume sets with VT-100 terminal function using Quick Volume/Raid Setup automatically, or Raid Set/Volume Set Function manually 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:



4.3 Designating Drives as Hot Spares

All unused disk drive that is not part of a raid set can be created as a Hot Spare. The Quick Volume/Raid Setup configuration will automatically add the spare disk drive with the raid level for user to select. For the Raid Set Function configuration, user can use the **Create Hot Spare** option to define the hot spare disk drive.

A Hot Spare disk drive can be created 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.

Press the **Enter** key to select a disk drive, and press **Yes** in the Create Hot Spare to designate it as a hot spare.

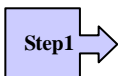
4.4 Using Quick Volume /Raid Setup Configuration

In Quick Volume /Raid Setup Configuration, it collects all drives in the tray and include them in a raid set. The raid set you create is associated with exactly one volume set, and you can modify the default RAID level, stripe size, and capacity of the volume set. Designating Drives as Hot Spares will also show in the raid level selection option. The volume set default settings will be:

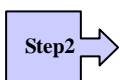
| Parameter | Setting |
|--|----------------------------------|
| Volume Name | Volume Set # 00 |
| SCSI Channel / SCSI ID / SCSI LUN | 0/0/0 |
| Fibre Channel / Fibre LUN Base / Fibre LUN | 0/0/0 |
| SAS Port / SAS LUN Base / SAS LUN | 0/0/0 |
| Cache Mode | Write Back |
| Tag Queuing | Yes |
| Max Sync Rate | Depend your host adapter setting |

The default setting values can be changed after configuration is complete.

Follow the steps below to create arrays using Quick Volume /Raid Setup Configuration:



Choose Quick Volume And Raid Setup from the main menu. The available RAID levels and associated Hot Spare for the current volume set drive are displayed.



RAID Level Try to use drives of the same capacity in a specific array. If you use drives with different capacities in an array, all the drives in the array is treated as though they have the capacity of the *smallest* drive in the array.

The number of physical drives in a specific array determines the RAID levels that can be implemented with the array.

RAID 0 requires one or more physical drives,

RAID 1 requires at least 2 physical drives,

RAID 1+ Spare requires more than 2 physical drives,

RAID 3 requires at least 3 physical drives,

RAID 5 requires at least 3 physical drives,

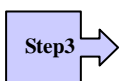
RAID 6 requires at least 4 physical drives,

RAID 3+ Spare requires at least 4 physical drives, and

RAID 5 + Spare requires at least 4 physical drives.

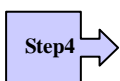
RAID 6 + Spare requires at least 5 physical drives.

Using the UP/DOWN key to select the RAID for the volume set and presses ENT to confirm it.

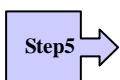


Available Capacity Set the capacity size for the volume set. After select *RAID level* and press ENT.

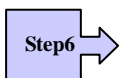
The selected capacity for the current volume set is displayed. Using the UP/DOWN to create the current volume set capacity size and press ENT to confirm it. The available stripe sizes for the current volume set are displayed.



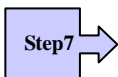
Select Stripe size This parameter specifies the size of the stripes written to each disk in a RAID 0, 1(0+1), 5or 6 Volume Set. You can set the stripe size to 4 KB, 8 KB, 16 KB, 32 KB, 64 KB, or 128 KB. A larger stripe size provides better-read performance, especially if your computer does mostly sequential reads. However, if you are sure that your computer does random read requests more often, choose a small stripe size. Using the UP/DOWN to select stripe size and press ENT to confirm it.



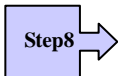
When you are finished defining the volume set, press ENT to confirm the Quick Volume And Raid Set Setup function.



Fast Initialization Press ENT to define fast initialization and ESC to normal initialization. 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. In Fast Initialization, the initialization proceeds must be completed before the volume set ready for system accesses.



The controller will begin to Initialize the volume set you have just configured.

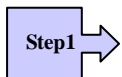


If you need to add additional volume set using main menu Create Raid Volume Set function.

4.5 Using Raid Set/Volume Set Function Method

In Raid Set Function, you can use the **Create Raid Set** function to generate the new raid set. In Volume Set Function, you can use the **Create Volume Set** function to generate its associated volume set and parameters.

If the current controller has unused physical devices connected, you can choose the Create Hot Spare option in the Raid Set Function to define a global hot spare. Select this method to configure new raid sets and volume sets. The **Raid Set/Volume Set Function** configuration option allows you to associate volume set with partial and full raid set.



To setup the Hot Spare (option), choose Raid Set Functions from the main menu. Select the Create Hot Spare Disk to set the Hot Spare.



Choose Raid Set Function from the main menu. Select the Create A New Raid Set.



A Select Drive IDE Channel in the next displayed showing the IDE drive connected to the current controller.



Press the UP/ DOWN to select specific physical drives. Press the ENT to associate the selected physical drive with the current raid set.

Try to use drives of the same capacity in a specific raid set. If you use drives with different capacities in an array, all the drives in the array is treated as though they have the capacity of the *smallest* drive in the array.

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

RAID 0 requires one or more physical drives per raid set.

RAID 1 requires at least 2 physical drives per raid set.

RAID 1 + Spare requires at least 3 physical drives per raid set.

RAID 3 requires at least 3 physical drives per raid set.

RAID 5 requires at least 3 physical drives per raid set.

RAID 6 requires at least 4 physical drives per raid set.

RAID 3 + Spare requires at least 4 physical drives per raid set.

RAID 5 + Spare requires at least 4 physical drives per raid set.

RAID 6 + Spare requires at least 5 physical drives per raid set.

Step5

After adding physical drives to the current raid set as desired, press ESC to confirm the Select Drive IDE Channel function.

Step6

Press ENT when you are finished creating the current raid set. To continue defining another raid set, repeat step 3. To begin volume set configuration, go to step 7.

Step7

Choose Volume Set Functions from the main menu. Select the Create Raid Volume Set and press ENT.

Step8

Choose one raid set from the Select Raid Set screen. Press ENT to confirm it.

Step9

The volume set attributes screen appears:

The volume set attributes screen shows the volume set default configuration value that is currently being configured. The volume set attributes are:

Large than 2TB : (64bit LBA, 4K Block)

The Raid Level,

The Capacity (Not supported via LCD Panel.)

The Stripe Size,

The SCSI HOST / SCSI ID / SCSI LUN ;

Fibre Channel / Fibre Base LUN / Fibre LUN ;

SAS Port / SAS LUN Base / SAS LUN

The Cache Mode,

The Tagged Queuing,

The SCSI Max Rate, and

The Volume Name (number).

All value can be changing by the user. Press the UP/ DOWN to select the

attributes. Press the ENT to modify each attribute of the default value. Using the UP/DOWN to select attribute value and press the ENT to accept the default value

Step10

After user completes modifying the attribute, press the ESC to enter the Select Capacity for the volume set. Using the UP/DOWN to set the volume set capacity and press ENT to confirm it.

Step11

When you are finished defining the volume set, press ENT to confirm the Create function.

Step12

Press ENT to define fast initialization and ESC to normal initialization. The controller will begin to Initialize the volume set you have just configured. If space remains in the raid set, the next volume set can be configured. Repeat steps 7 to 12 to configure another volume set.



User can use this method to examine the existing configuration. Modify volume set configuration method provides the same functions as create volume set configuration method. In volume set function, you can use the modify volume set function to modify the volume set parameters except the capacity size.

4.6 Configuring Raid Sets and Volume Sets

The *web browser start-up* screen will display the current configuration of your RAID subsystem. It displays the Raid Set List, Volume Set List and Physical Disk List. The raid set information, volume set information and drive information can also be viewed by clicking on the RaidSet Hierarchy screen. The current configuration can also be viewed by clicking on RaidSet Hierarchy in the menu.

Delete Pass Through
Identify Drive
System Control
System Config
USB SCSI Target Config
Ethernet Config
Alert By Mail Config
SNMP Configuration
NTP Configuration
View Events/Write Resque
Generate Test Event
Clear Event Buffer
Modify Password
Upgrade Firmware
Restart Controller
Information
RaidSet Hierarchy
System Information
Hardware Monitor

Raid Set Hierarchy

| Raid Set | IDE Channels | Volume Set(Ch/Lun) | Volume State | Capacity |
|---------------|--------------|-----------------------|--------------|----------|
| Raid Set # 00 | Ch01 | Volume Set # 00 (0/0) | Normal | 60.0GB |
| | Ch02 | Volume Set # 01 (0/1) | Normal | 63.0GB |
| | Ch03 | | | |
| | Ch04 | | | |

IDE Channels

| Channel | Usage | Capacity | Model |
|---------|---------------|----------|----------------|
| Ch01 | Raid Set # 00 | 61.5GB | Maxtor 6Y060M0 |
| Ch02 | Raid Set # 00 | 61.5GB | Maxtor 6Y060M0 |
| Ch03 | Raid Set # 00 | 61.5GB | Maxtor 6Y060M0 |
| Ch04 | Raid Set # 00 | 61.5GB | Maxtor 6Y060M0 |
| Ch05 | N.A. | N.A. | N.A. |
| Ch06 | N.A. | N.A. | N.A. |
| Ch07 | N.A. | N.A. | N.A. |
| Ch08 | N.A. | N.A. | N.A. |
| Ch09 | N.A. | N.A. | N.A. |
| Ch10 | N.A. | N.A. | N.A. |
| Ch11 | N.A. | N.A. | N.A. |

To display raid set information, move the mouse cursor to the desired raid set number, then click it. The raid set Information will show in the screen.

To display volume set information, move the mouse cursor to the desired Volume Set number, then click it. The volume set Information will show in the screen.

To display drive information, move the mouse cursor to the desired physical drive number, then click it. The drive Information will show in the screen.

4.6.1 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 default configuration, which is based on 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. |
|--|-------------------------|

4.7 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, stripe size, and capacity. A hot spare option is also created depending upon the existing configuration.

Tick on the **Confirm The Operation** and click on the **Submit** button in the Quick Create screen, the raid set and volume set will start to initialize.



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.

4.8 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.

4.8.1 Create Raid Set

Select The IDE Drives For RAID Set

| Select | Channel | Capacity | Model |
|-------------------------------------|----------|----------|----------------|
| <input checked="" type="checkbox"/> | IDE Ch01 | 61.5GB | Maxtor 6Y060M0 |
| <input checked="" type="checkbox"/> | IDE Ch02 | 61.5GB | Maxtor 6Y060M0 |
| <input checked="" type="checkbox"/> | IDE Ch03 | 61.5GB | Maxtor 6Y060M0 |
| <input checked="" type="checkbox"/> | IDE Ch04 | 61.5GB | Maxtor 6Y060M0 |

Raid Set Name:

☐ Confirm The Operation

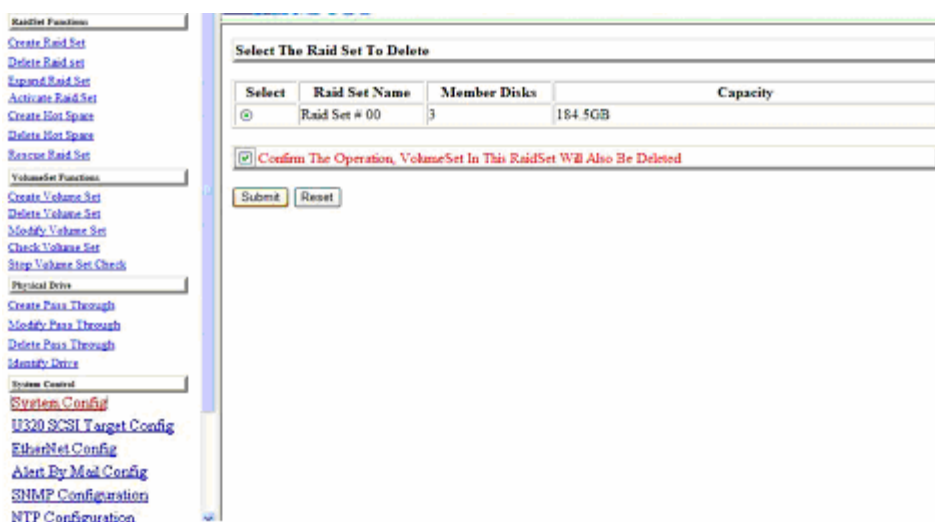
To create a raid set, click on the **Delete Raid Set** link. A **Select The SATA Drive For RAID Set** screen is displayed showing the IDE drive connected to the current controller. Click on the selected physical drives with the current raid set. Enter 1 to 15 alphanumeric characters to define a unique 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.

4.8.2 Delete Raid Set

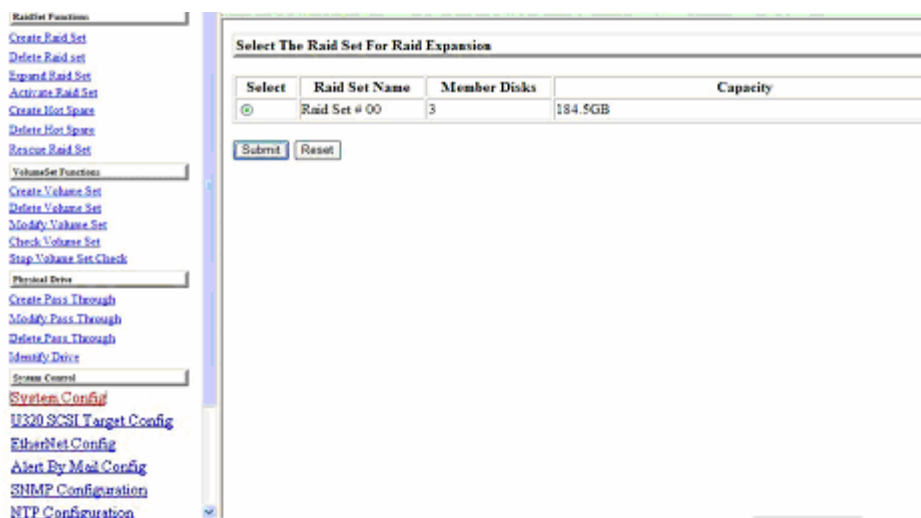
To delete a raid set, click on the Create Raid Set link. A *Select The RAID SET To Delete* screen is displayed showing all raid set existing in the current controller. Click the raid set number you which to delete in the select column to delete screen.

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



4.8.3 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.

4.8.4 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.

The screenshot displays a web-based configuration interface for RAID management. On the left is a sidebar menu with various configuration options. The main area is titled "Select The Raid Set To Activate" and contains a table with the following data:

| Select | Raid Set Name | Member Disks | Capacity |
|-----------------------|---------------|--------------|----------|
| <input type="radio"/> | Raid Set # 00 | 4 | 246.0GB |

Below the table are two buttons: "Submit" and "Reset".

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.

4.8.5 Create Hot Spare

Select The IDE Drives For Hot Spare

| Select | Channel | Capacity | Model |
|-------------------------------------|----------|----------|----------------|
| <input checked="" type="checkbox"/> | IDE Ch01 | 61.5GB | Maxtor 6Y060M0 |
| <input type="checkbox"/> | IDE Ch02 | 61.5GB | Maxtor 6Y060M0 |
| <input type="checkbox"/> | IDE Ch03 | 61.5GB | Maxtor 6Y060M0 |
| <input type="checkbox"/> | IDE Ch04 | 61.5GB | Maxtor 6Y060M0 |

☐ **Confirm The Operation**

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.

4.8.6 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.

[Create Raid Set](#)
[Delete Raid Set](#)
[Expand Raid Set](#)
[Activate Raid Set](#)
[Create Hot Spare](#)
[Delete Hot Spare](#)
[Recreate Raid Set](#)

[VolumeSet Functions](#)
[Create Volume Set](#)
[Delete Volume Set](#)
[Modify Volume Set](#)
[Check Volume Set](#)
[Stop Volume Set Check](#)

[Physical Drive](#)
[Create Pass Through](#)
[Modify Pass Through](#)
[Delete Pass Through](#)
[Identify Drive](#)

[System Control](#)
[System Config](#)
[i320 SCSI Target Config](#)
[Ethernet Config](#)
[Alert By Mail Config](#)
[SNMP Configuration](#)
[NTP Configuration](#)

Select The Hot Spare Drive To Delete

| Select | Channel | Capacity | Model |
|-------------------------------------|----------|----------|----------------|
| <input checked="" type="checkbox"/> | IDE Ch01 | 61.5GB | Maxtor 6Y060M0 |

☒ Confirm The Operation

4.8.7 Offline Raid Set

This function allows the user to move the whole created Raid Set to another Alnico RAID subsystem without turning off power. "Active Raid Set" can resume the offline-Raid Set to online status.

Select The Raid Set To Offline

| Select | Raid Set Name | Member Disks | Raid State | Capacity |
|----------------------------------|---------------|--------------|------------|----------|
| <input checked="" type="radio"/> | Raid Set # 00 | 1/1 | Normal | 160.0GB |

☐ Confirm The Operation, VolumeSet In This RaidSet Will Also Be Deleted

4.9 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.

4.9.1 Create Volume Set

The following is the volume set features for the Alnico RAID

1. Volume sets of different RAID levels may coexist on the same raid set.
2. Up to 16 volume sets can be created in a raid set.
3. The maximum addressable size of a single volume set can be exceeded than 2 TB.

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, SCSI Channel, SCSI ID, SCSI LUN, Fibre Channel, Fibre LUN Base, Fibre LUN, SAS Port, SAS LUN Base, SAS LUN, Cache mode, tag queuing and Max Sync Rate.

| Enter Volume Attribute On Raid Set #00 | |
|--|-----------------|
| Volume Name | AXS-6360-VOL#00 |
| Member Disks | 16 |
| Volume Raid Level | Reid 6 |
| Max Capacity Allowed | 2240.0 GB |
| Select Volume Capacity | 2240.0 GB |
| Greater Two TB Volume Support | No |
| Volume Initialization Mode | 64bit LBA |
| Volume Stripe Size | 4K Block |
| Volume Cache Mode | Write Back |
| Tagged Command Queuing | Enabled |
| Max SCSI Speed | 320MB/Sec |
| SCSI Channel:SCSI ID:SCSI Lun | 0 : 0 : 0 |

4.9.1.1 Volume Name:

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

4.9.1.2 Capacity:

The maximum volume size is default in the first setting. Enter the appropriate

volume size to fit your application.

4.9.1.3 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.

4.9.1.4 Strip Size:

This parameter sets the size of the stripe written to each disk in a RAID 0, 1, 0+1, 5 or 6 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



RAID level 3 can't modify strip size.

4.9.1.5 Greater Two TB Volume Support

When the RAID set capacity of per volume is over 2TB, a special selection will appear on the GUI, please make a choice according to your O.S.:

64bit LBA: for Linux, Unix Windows 2003 SP1 (or later) and etc...

4K Block: Windows 2000, XP, enlarge block size from 512Byte to 4K.No. : Disable greater than 2TB feature.

4.9.1.6 Volume initiation Mode

This parameter sets the initiation mode of selected volume set,

Foreground Initialization is the fast way to initial of the selected volume set.

Background Initialization is the normal way to initial of the selected volume set.

No Init is special selection to rescue the volume. RAID system initiate the selected volume set without writing any data and parity bit into the HDDs.

4.9.1.7 Cache Mode:

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

4.9.1.8 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 SCSI command tag queuing support for each drive channel. This function should normally remain enabled. Disable this function only when using older SCSI drives that do not support command tag queuing

4.9.1.9 Max SCSI Speed (This item is only available for AN-308SC, AN-312SC & AN-316SC) :

The RAID subsystem supports 320 MB/sec as the highest data transfer rate.

4.9.1.8 SCSI Channel/SCSI ID/SCSI Lun (AN-308SC, AN-312SC & AN-316SC) ; Fibre Channel/LUN Base/LUN (AN-308F4, AN-312F4 & AN-316F4) ; SAS Port/LUN Base/LUN (AN-308S3, AN-312S3 & AN-316S3)

4.9.1.8.1 SCSI Channel/SCSI ID/SCSI Lun (AN-308SC, AN-312SC & AN-316SC)

SCSI Channel: The RAID subsystem has dual SCSI Channel (AL-6060S has only one SCSI Channel).

SCSI ID: Each SCSI device attached to the SCSI card, as well as the SCSI HBA itself, must be assigned a unique SCSI ID number. A Wide SCSI channel can connect up to 15 devices. The RAID subsystem is as a large SCSI device. We should assign an ID from a list of SCSI IDs.

SCSI LUN: Each SCSI ID can support up to 8 LUNs. The SCSI HBA treats each LUN like a SCSI device.

4.9.1.8.2 Fibre Channel/LUN Base/LUN (AN-308F4, AN-312F4 & AN-316F4)

Fibre Channel: The RAID subsystem supports channel 0,1 and 0&1 For Cluster

Enter Volume Attribute On Raid Set #01

| | |
|----------------------------|-----------------|
| Volume Name | Volume Set # 00 |
| Volume Capacity | 103.0GB |
| Volume Raid Level | Raid 6 |
| Volume Stripe Size | 128 KBytes |
| Volume Cache Mode | Write Back |
| Tagged Command Queuing | Enabled |
| Fibre Channel/LUN Base/LUN | 0 : 0 : 0 |

☐ Confirm The Operation

Submit Reset

0
1
0&1 For Cluster

LUN base: Each fibre device attached to the Fibre card, as well as the Fibre HBA itself, must be assigned a unique fibre ID number. A Fibre channel can connect up to 128(0 to 127) devices. The RAID subsystem is as a large Fibre device. We should assign an LUN base from a list of Fibre LUN Bases.

Enter Volume Attribute On Raid Set #01

| | |
|----------------------------|-----------------|
| Volume Name | Volume Set # 00 |
| Volume Capacity | 103.0GB |
| Volume Raid Level | Raid 6 |
| Volume Stripe Size | 128 KBytes |
| Volume Cache Mode | Write Back |
| Tagged Command Queuing | Enabled |
| Fibre Channel/LUN Base/LUN | 0 : 0 : 0 |

☐ Confirm The Operation

Submit Reset

0
8
16
24
32
40
48
56
64
72
80
88
96
104
112
120

Fibre LUN: Each Fibre LUN base can support up to 8 LUNs. The Fibre HBA treats each LUN like a Fibre disk.

Enter Volume Attribute On Raid Set #01

| | |
|----------------------------|-----------------|
| Volume Name | Volume Set # 00 |
| Volume Capacity | 103.0GB |
| Volume Raid Level | Raid 6 |
| Volume Stripe Size | 128 KBytes |
| Volume Cache Mode | Write Back |
| Tagged Command Queuing | Enabled |
| Fibre Channel LUN Base LUN | 0 : 120 : 120 |

☒ Confirm The Operation

Submit Reset

SAS Port: The RAID subsystem has dual SAS port.

SAS LUN Based: Each SAS device attached to the SAS HBA card, as well as the SAS HBA itself, must be assigned a unique LUN number. A SAS port can connect up to 128(0 to 127) devices. The RAID subsystem is as a large SAS device. We should assign an LUN base from a list of SAS LUN Base.

SAS LUN: Each SAS LUN Base can support up to 8 LUNs. The SAS HBA adapter treats each LUN like a SAS device.

4.9.2 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 Raid 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 delete the volume set.

Select The Volume Set To Delete

| Select | Volume Set Name | On Raid Set | Capacity |
|-----------------------|-----------------|---------------|----------|
| <input type="radio"/> | Volume Set # 00 | Raid Set # 00 | 6.0GB |

☒ Confirm The Operation

4.9.3 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.

Enter Volume Attribute On Raid Set #01

| | |
|----------------------------|-----------------|
| Volume Name | Volume Set # 00 |
| Volume Capacity | 6.0GB |
| Volume Raid Level | Raid 5 |
| Volume Stripe Size | 64 KBytes |
| Volume Cache Mode | Write Back |
| Tagged Command Queuing | Enabled |
| Fibre Channel LUN Base LUN | 0 : 0 : 0 |

☒ Confirm The Operation

Submit Reset

4.9.3.1 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.

Enter Volume Attribute On Raid Set #01

| | |
|----------------------------|-----------------|
| Volume Name | Volume Set # 00 |
| Volume Capacity | 6.0GB |
| Volume Raid Level | Raid 0 |
| Volume Stripe Size | 64 KBytes |
| Volume Cache Mode | Write Back |
| Tagged Command Queuing | Enabled |
| Fibre Channel LUN Base LUN | 0 : 0 : 0 |

☒ Confirm The Operation

Submit Reset

4.9.4 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 of the redundant data and scrub the bad blocks 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. Scrub will remap the bad blocks in a volume set. The checking percentage can also be viewed by clicking on RaidSet Hierarchy in the main menu.

Select The Volume Set To Be Checked

| Select | Volume Set Name | On Raid Set | Capacity |
|-------------------------------------|-----------------|---------------|----------|
| <input checked="" type="checkbox"/> | AXS-8560-VOL#00 | Raid Set # 00 | 240.0GB |

☒ Scrub Bad Block If Bad Block Is Found, Assume Parity Data Is Good.
☒ Re-compute Parity If Parity Error Is Found, Assume Data Is Good.

☐ Confirm The Operation

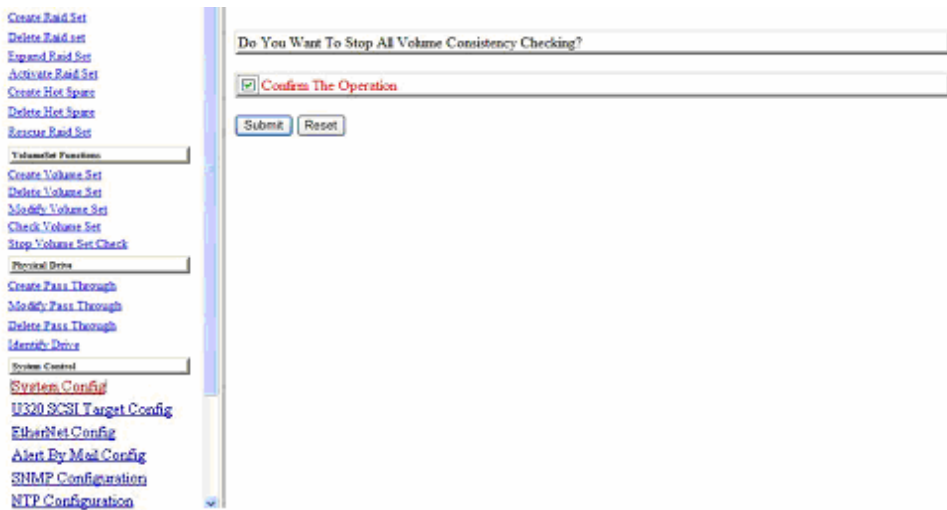
Submit Reset

4.9.5 Stop VolumeSet Check

Use this option to stop checking and scrubbing on a volume set.

4.10 Physical Drive

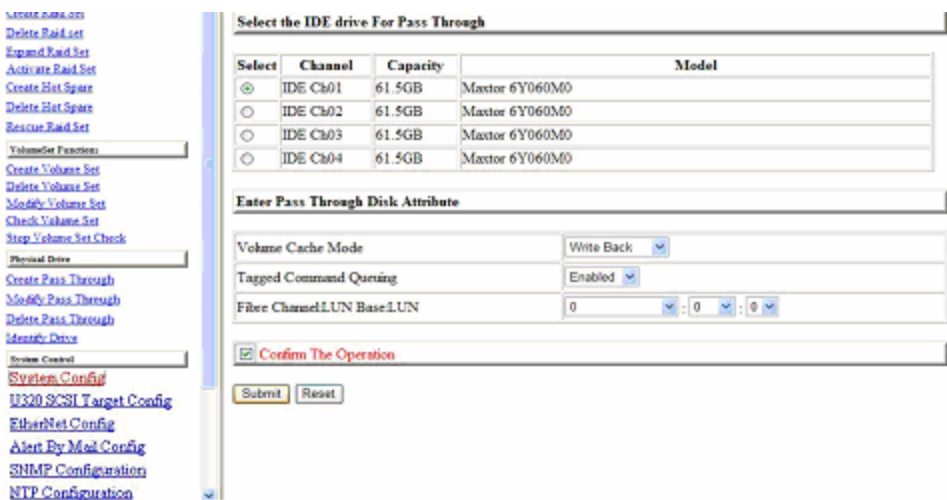
Choose this option from the Main Menu to select a physical disk and to perform the operations listed below.



4.10.1 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, Max SCSI speed and SCSI Channel, SCSI ID, SCSI LUN, Fibre Channel, Fibre LUN Base, Fibre LUN, SAS Port, SAS LUN Base, SAS LUN for this volume.



4.10.2 Modify Pass-Through Disk

Use this option to modify the Pass-Through Disk Attribute. User can modify the cache mode, Tagged Command Queuing, Max SCSI speed and SCSI Channel, SCSI ID, SCSI LUN, Fibre Channel, Fibre LUN Base, Fibre LUN, SAS Port, SAS LUN Base, SAS 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.

| Select | Channel | Capacity | Model |
|----------------------------------|----------|----------|----------------|
| <input checked="" type="radio"/> | IDE Ch01 | 61.5GB | Maxtor 6Y060M0 |

Submit Reset

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

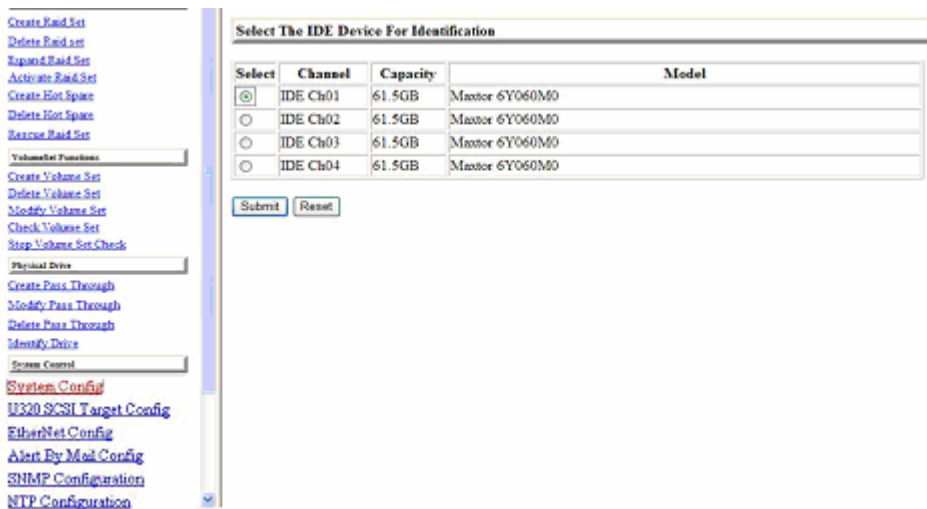
4.10.3 Delete Pass-Through Disk

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.

4.10.4 Identify Selected Drive

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

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



4.11 System Controls

4.11.1 System Configuration

To set the raid system function, move the cursor bar to the main menu and click on the **System Configuration** link. The **System Configuration** menu will show all items. Move the cursor bar to an item, then press **Enter** key to select the desired function.

4.11.1.1 System Beeper Setting:

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

4.11.1.2 Back Ground Task priority:

The Back Ground Task 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 (Low, Normal, High) to balance volume set access and rebuild tasks appropriately. For high array performance, specify a Low value.

4.11.1.3 Terminal Port Configuration:

Speed setting values are 1200, 2400, 4800, 9600, 19200, 38400, 57600, and 115200. Stop Bits values are 1 bit and 2 bits.



Parity value is fixed at None. Data Bits value is fixed at 8 bits.

4.11.1.4 JBOD /RAID Mode Configuration

To set or change the RAID Mode of RAID subsystem, press the **UP/ DOWN** to select **JBOD/RAID Mode Configuration** and then press the **ENT** to accept the selection. The RAID mode selection screen appears and uses the **UP/DOWN** to set RAID mode. After completing the modification, the confirmation screen will be displayed and then press **ENT** to accept the function.

4.11.1.5 Max SATA-Mode Support

Alnico Lite supports SATA-II (3.0Gps) and NCQ (Native command queuing), user can use this option to change the speed of SATA interface according to the HDD speed. There are 4 selections : SATA 150, SATA150+NCQ, SATA 300, SATA 300+NCQ.

To set or change the configuration, press the **UP/ DOWN** to select **SATA-Mode** and then press the **ENT** to accept the selection.

4.11.1.5.2 HDD Read Ahead Cache

Alnico Lite supports HDD Read Ahead Cache, allowing the users to disable the cache in the HDD. To some HDD models, disabling the cache in the HDD is necessary to prove the RAID subsystem functions.

To set or change the configuration, press the **UP/ DOWN** to select **HDD Read Ahead Cache** and then press the **ENT** to accept the selection.

4.11.1.5.3 Stagger Power On Control

Alnico Lite supports Stagger Power On Control, allowing the power supplier to power up in order each HDD on the RAID subsystem. In the past, all the HDDs on the RAID subsystem will be 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 5.0.

To set or change the configuration, press the **UP/ DOWN** to select **Stagger Power On Control** and then press the **ENT** to accept the selection.

4.11.1.6 Disk Write Cache Mode

Disk cache can be turned off to prevent data lost, turned on to increase the performance of the machine. The following is the reason why a user might want to turn off the cache. In case of power failure, the data stored in the disk cache waiting to be process might be lost. The disadvantage to turn off the disk cache is that performance will decrease dramatically.

Auto : Disk cache's setting will according to the installation of battery back up. When battery back up installed, Disk cache is disable. No battery back up installed, Disk cache is enable.

To set or change the configuration, press the **UP/ DOWN** to select “**Disk Write Cache Mode**” and then press the **ENT** to accept the selection.

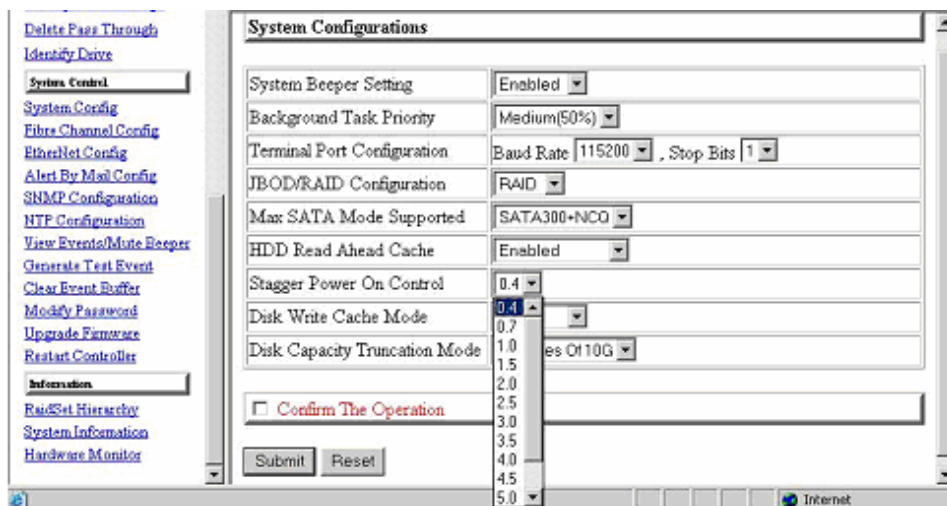
4.11.1.7 Disk Capacity Truncation Mode

This function is used for cutting down the reminder or decimal to allow the storage space to be as a whole number.

For example:

It is rarely that the actual size of the Hard Drive is a whole number. Let's take a 40GB HDD for example, the actual size read by the controller maybe 40.55GB. This function “capacity truncation” can be used to trim down the capacity to 40.00 GB. This function is useful because in the future the 40.55HDD might go bad, and the user can't locate another 40GB drive which contains 40.55GB in the actual capacity, then that particular user will have to buy another drive with bigger capacity to rebuild the raid volume.

To set or change the configuration, press the **UP/ DOWN** to select “**Disk Capacity Truncation Mode**” and then press the **ENT** to accept the selection.



4.11.1.8 MAC Over Two TB

Make use of this item to have the created volume (larger than 2TB) successfully recognized on MAC systems.

4.11.1.8 Spin Down Idle HDD

“Spin Down” is mainly designed to save the power consumption taken by the idle hard drives. When Spin Down is invoked, the SMART status of each hard drive will be marked as “N/A” to signify the hard drive has been at non-spin mode. As soon as data access is requested again, all the idle hard drives will be automatically waken up by the RAID controller.

| System Configurations | |
|--|--------------------------------|
| System Beeper Setting | Enabled |
| Background Task Priority | Low(20%) |
| Terminal Port Configuration | Baud Rate 115200 , Stop Bits 1 |
| JBOD/RAID Configuration | RAID |
| Max SATA Mode Supported | SATA300+NCQ |
| HDD Read Ahead Cache | Enabled |
| Volume Data Read Ahead | Normal |
| Stagger Power On Control | 0.7 |
| Spin Down Idle HDD (Minutes) | Disabled |
| HDD SMART Status Polling | Disabled |
| Disk Write Cache Mode | 1(For Testing) |
| Disk Capacity Truncation Mode | 3 |
| MAC Over Two TB | 5 |
| | 10 |
| | 15 |
| | 20 |
| | 30 |
| | 40 |
| | 60 |
| <input type="checkbox"/> Confirm The Operation | |
| <input type="button" value="Submit"/> <input type="button" value="Reset"/> | |

4.11.2 U320 SCSI Target Config (AN-308SC, AN-312SC & AN-316SC) / Fibre Channel Config (AN-308F4, AN-312F4 & AN-316F4)

U320 SCSI Target Config (AN-308SC, AN-312SC & AN-316SC)

Use to enable or disable QAS and Down To U160 If U320 Unstable. Also select 12/16Bytes CDB.

U320 SCSI Target Configurations

| | |
|-------------------------------|--------------|
| Channel 0 QAS | Enabled |
| Channel 1 QAS | Enabled |
| Down To U160 IF U320 Unstable | Enabled |
| Two TB CDB Selection | 16 Bytes CDB |
| | 12 Bytes CDB |
| | 16 Bytes CDB |

☐ Confirm The Operation

Submit Reset

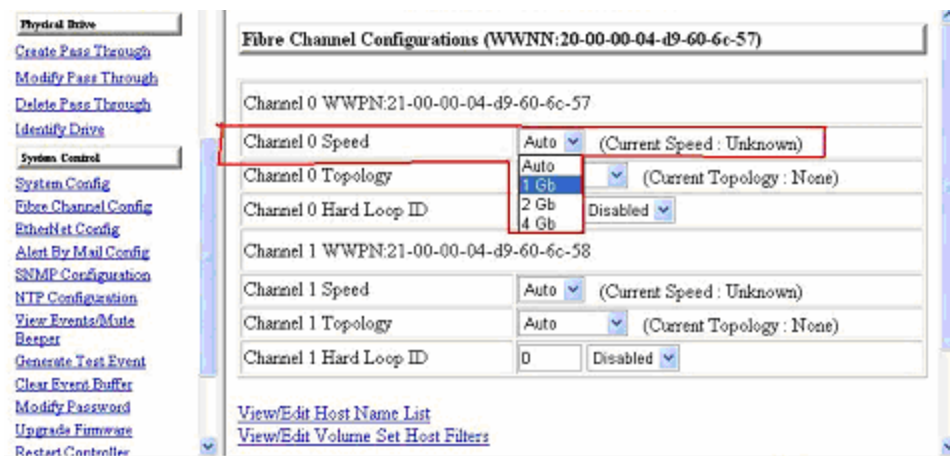
Fibre Channel Config (AN-308F4, AN-312F4 & AN-316F4)

4.12.2.1 Configure Fibre Channel parameters

To configure Fibre Channel parameters, click "System Controls" -> "Fibre Channel Config" from the menu of the RAID manager.

4.12.2.2 Channel Speed

Each FC Channel can be configured as 1 Gbps/sec, 2 Gbps/sec, 4Gbps/sec for 6160A or use "Auto" option for auto speed negotiation between 1G/2G/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 to refresh display of current speed.



4.12.2.3 Channel Topology

Each FC Channel can be configured as 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.

4.12.2.4 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.

View/Edit Host Name List

View/Edit Volume Set Host Filters

Please refer to LUN Masking in the following section for explanations.

4.12.2.5 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.

4.12.2.5.1 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. Only hosts that will be used as include/exclude filters are necessary to be added.

To add a host to the list, 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" -> "Volume Set Host Filters" from the Menu Frame. Select the volume for LUN masking and then click the submit button.

[Create Volume Set](#)
[Delete Volume Set](#)
[Modify Volume Set](#)
[Check Volume Set](#)
[Stop Volume Set Check](#)
[Volume Set Host Filter](#)
Physical Drive
[Create Pass Through](#)
[Modify Pass Through](#)
[Delete Pass Through](#)
[Identify Drive](#)
System Control
[System Config](#)
[U320 SCSI Target Config](#)
[Ethernet Config](#)
[Alert By Mail Config](#)
[SNMP Configuration](#)
[NTP Configuration](#)
[View Events/Mute Buzzer](#)
[Generate Test Event](#)
[Clear Event Buffer](#)
[Modify Password](#)
[Upgrade Firmware](#)

Fibre Channel Host Name List

| | | |
|---|----------------------|---------|
| <input checked="" type="radio"/> Select | WWN:210000e08b03d013 | K7-1600 |
| <input type="radio"/> Select | WWN:210000e08b03d010 | test |

Add or Delete Selected Host Name Entry

Host
WWN : Hex

Nick
Name :

Operation :

☐ **Confirm The Operation**

4.12.2.5.2 View/Edit Volume Set Host Filters

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.

[VolumeSet Functions](#)
[Create Volume Set](#)
[Delete Volume Set](#)
[Modify Volume Set](#)
[Check Volume Set](#)
[Stop Volume Set Check](#)
[Volume Set Host Filters](#)
[Physical Drive](#)
[Create Pass Through](#)
[Modify Pass Through](#)
[Delete Pass Through](#)
[Identify Drive](#)
[System Control](#)
[System Config](#)
[USB SCSI Target Config](#)
[FiberNet Config](#)
[Alert By Mail Config](#)
[SNMP Configuration](#)
[NTP Configuration](#)
[View Events/Logs](#)
[Beeper](#)
[Generate Test Event](#)
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[Modify Password](#)
[Upgrade Firmware](#)
[Restart Controller](#)
[Information](#)
[RaidSet Hierarchy](#)
[System Information](#)
[Hardware Monitor](#)

Fibre Channel Volume Set Host Filters (Ch0/LUN:0)

| # | Type | Mode | Range Mask | Host WWN | Nick Name |
|---|---------|------|------------|------------------|-----------|
| 1 | Exclude | R/W | ffffffff | 210000e08b03d013 | K7-1600 |

Add or Delete Selected Host Filter Entry

View/Edit Host Name List

Host:

Range: Hex

Mask: Hex

Filter Type:

Access:

Mode:

Operation:

☐ Confirm The Operation

4.12.2.5.2.1 Range Mask

Some times it is convenient to combine some correlated 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, they can be combined as a single filter entry (using either WWN as host WWN) with Range Mask setting as 0xFFFFFFFF_FFFFFFFE. Note that under most circumstances, the Range Mask is left as 0xFFFFFFFF_FFFFFFFF, which means that only a single WWN is specified for that filter entry.

4.12.2.5.2.2 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.

4.12.2.5.2.3 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.

4.11.3 EtherNet Config

Use this feature to set the controller Ethernet port configuration. Customer doesn't need to create a reserved space on the arrays before the Ethernet port and HTTP service working. The firmware-embedded Web Browser-based RAID manager can access it from any standard internet browser or from any host computer either directly connected or via a LAN or WAN with no software or patches required.

DHCP (Dynamic Host Configuration Protocol) is a protocol that lets network administrators manage centrally and automate the assignment of IP (Internet Protocol) configurations on a computer network. When using the Internet's set of protocols (TCP/IP), in order for a computer system to communicate to another computer system it needs a unique IP address. Without DHCP, the IP address must be entered manually at each computer system. DHCP lets a network administrator supervise and distribute IP addresses from a central point. The purpose of DHCP is to provide the automatic (dynamic) allocation of IP client configurations for a specific time period (called a lease period) and to eliminate the work necessary to administer a large IP network.

To configure the raid controller EtherNet port, move the cursor bar to the main menu and click on the **System Controls** link. The **System Controls** menu will show all items. Move the cursor bar to the **EtherNet Config** item, then press **Enter** key to select the desired function.

[Recreate Raid Set](#)
[Volume Set Functions](#)
[Create Volume Set](#)
[Delete Volume Set](#)
[Modify Volume Set](#)
[Check Volume Set](#)
[Strip Volume Set Check](#)
[Physical Drive](#)
[Create Pass Through](#)
[Modify Pass Through](#)
[Delete Pass Through](#)
[Identify Drive](#)
[System Control](#)
[System Config](#)
[U320 SCSI Target Config](#)
[EtherNet Config](#)
[Alert By Mail Config](#)
[SNMP Configuration](#)
[NTP Configuration](#)
[View Events/Mode](#)
[Reaper](#)
[Generate Test Event](#)
[Clear Event Buffer](#)
[Modify Password](#)
[Upgrade Firmware](#)
[Restart Controller](#)
[Information](#)
[RaidSet Hierarchy](#)
[System Information](#)
[Hardware Monitor](#)

Ether Net Configurations

| | |
|--|-------------------|
| DHCP Function | Disabled |
| Local IP Address (Used If DHCP Disabled) | 1 1 1 1 |
| Gateway IP Address (Used If DHCP Disabled) | 1 1 1 2 |
| Gateway IP Mask (Used If DHCP Disabled) | 1 1 1 3 |
| Current IP Address | 211.21.58.237 |
| Current Gateway IP Address | 211.21.58.233 |
| Current Gateway Mask | 255.255.255.248 |
| Ether Net MAC Address | 00:04:D9:60:08:12 |

☒ Confirm The Operation

4.11.4 Alert By Mail Config

To configure the raid controller email function, move the cursor bar to the main menu and click on the **System Controls** link. The **System Controls** menu will show all items. Move the cursor bar to the **Alert By Mail Config** item, then press **Enter** key to select the desired function. This function can only set by the web-based configuration.

The firmware contains SMTP manager monitors all system events and user can select either single or multiple user notifications to be sent via 'Plain English' e-mails with no software required. 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.

| | | | | | | | | | | | |
|---|---|--|------------------------------------|---|------------------------|--|-------------------------------|--|--|---|----------------|
| Rescue Mail Set Volume Set Functions Create Volume Set Delete Volume Set Modify Volume Set Check Volume Set Stop Volume Set Check Physical Drive Create Pass Through Modify Pass Through Delete Pass Through Identify Drive System Control System Config USB2 SCSI Target Co EtherNet Config Alert By Mail Config SNMP Configuration NTP Configuration View Events/Logs Generate Test Event Clear Event Buffer Modify Password Upgrade Firmware Restart Controller Information RaidSet Hierarchy System Information Hardware Monitor | SMTP Server Configuration SMTP Server IP Address: 0 0 0 0 Mail Address Configurations Sender Name: Test Mail Address: Test@petastor.com.tw Account: Test Password: ***** MailTo Name1: Test1 Mail Address: Test1@petastor.com.tw MailTo Name2: Mail Address: MailTo Name3: Mail Address: MailTo Name4: Mail Address: Event Notification Configurations <table border="1"> <tr> <td><input type="radio"/> Disable Event Notification</td> <td>No Event Notification Will Be Sent</td> </tr> <tr> <td><input type="radio"/> Urgent Error Notification</td> <td>Send Only Urgent Event</td> </tr> <tr> <td><input type="radio"/> Serious Error Notification</td> <td>Send Urgent And Serious Event</td> </tr> <tr> <td><input type="radio"/> Warning Error Notification</td> <td>Send Urgent, Serious And Warning Event</td> </tr> <tr> <td><input checked="" type="radio"/> Information Notification</td> <td>Send All Event</td> </tr> </table> | <input type="radio"/> Disable Event Notification | No Event Notification Will Be Sent | <input type="radio"/> Urgent Error Notification | Send Only Urgent Event | <input type="radio"/> Serious Error Notification | Send Urgent And Serious Event | <input type="radio"/> Warning Error Notification | Send Urgent, Serious And Warning Event | <input checked="" type="radio"/> Information Notification | Send All Event |
| <input type="radio"/> Disable Event Notification | No Event Notification Will Be Sent | | | | | | | | | | |
| <input type="radio"/> Urgent Error Notification | Send Only Urgent Event | | | | | | | | | | |
| <input type="radio"/> Serious Error Notification | Send Urgent And Serious Event | | | | | | | | | | |
| <input type="radio"/> Warning Error Notification | Send Urgent, Serious And Warning Event | | | | | | | | | | |
| <input checked="" type="radio"/> Information Notification | Send All Event | | | | | | | | | | |

4.11.5 SNMP Configuration

| | | | | | | | | | | | |
|---|---|--|---------------------------|--|-------------------------|--|------------------------------|--|---------------------------------------|--|----------------|
| Volume Set Functions Create Volume Set Delete Volume Set Modify Volume Set Check Volume Set Stop Volume Set Check Physical Drive Create Pass Through Modify Pass Through Delete Pass Through Identify Drive System Control System Config USB2 SCSI Target Co EtherNet Config Alert By Mail Config SNMP Configuration NTP Configuration View Events/Logs Generate Test Event Clear Event Buffer Modify Password Upgrade Firmware Restart Controller Information RaidSet Hierarchy System Information Hardware Monitor | SNMP Trap Configurations SNMP Trap IP Address #1: 0 0 0 0 Port#: 0 SNMP Trap IP Address #2: 0 0 0 0 Port#: 0 SNMP Trap IP Address #3: 0 0 0 0 Port#: 0 SNMP Community Configuration Community: <input type="text"/> SNMP Trap Notification Configurations <table border="1"> <tr> <td><input checked="" type="radio"/> Disable SNMP Trap</td> <td>No SNMP Trap Will Be Sent</td> </tr> <tr> <td><input type="radio"/> Serious Error Notification</td> <td>Send Only Serious Event</td> </tr> <tr> <td><input type="radio"/> Error Notification</td> <td>Send Serious And Error Event</td> </tr> <tr> <td><input type="radio"/> Warning Notification</td> <td>Send Serious, Error And Warning Event</td> </tr> <tr> <td><input type="radio"/> Information Notification</td> <td>Send All Event</td> </tr> </table> | <input checked="" type="radio"/> Disable SNMP Trap | No SNMP Trap Will Be Sent | <input type="radio"/> Serious Error Notification | Send Only Serious Event | <input type="radio"/> Error Notification | Send Serious And Error Event | <input type="radio"/> Warning Notification | Send Serious, Error And Warning Event | <input type="radio"/> Information Notification | Send All Event |
| <input checked="" type="radio"/> Disable SNMP Trap | No SNMP Trap Will Be Sent | | | | | | | | | | |
| <input type="radio"/> Serious Error Notification | Send Only Serious Event | | | | | | | | | | |
| <input type="radio"/> Error Notification | Send Serious And Error Event | | | | | | | | | | |
| <input type="radio"/> Warning Notification | Send Serious, Error And Warning Event | | | | | | | | | | |
| <input type="radio"/> Information Notification | Send All Event | | | | | | | | | | |

4.11.5.2 NTP Configuration

[Delete Pass Through](#)
[Identify Drive](#)
System Control
[System Config](#)
[U320 SCSI Target Config](#)
[Ethernet Config](#)
[Alert By Mail Config](#)
[SNMP Configuration](#)
NTP Configuration
[View Events/Mute Beeper](#)
[Generate Test Event](#)
[Clear Event Buffer](#)
[Modify Password](#)
[Upgrade Firmware](#)
[Restart Controller](#)
Information
[RAID Set Hierarchy](#)
[System Information](#)
[Hardware Monitor](#)

NTP Server Configurations

| | | | | |
|--------------------------|---|---|---|---|
| NTP Server IP Address #1 | 0 | 0 | 0 | 0 |
| NTP Server IP Address #2 | 0 | 0 | 0 | 0 |

Time Zone Configuration

Time Zone : (GMT-12:00)International Date Line West

Automatic Daylight Saving : Enabled

Current Time : 2005/6/1 0:6:7

NTP Server Not Set

☐ Confirm The Operation

Submit Reset

4.11.6 View Events/ Mute Beeper

To view the RAID subsystem controller's information, move the mouse cursor to the main menu and click on the **View Events/Mute Beeper** 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. The RAID system does not built the real time clock. The Time information is the relative time from the RAID subsystem power on.

The screenshot displays the RAID management software interface. On the left is a sidebar menu with various options. The main area shows a table titled 'System Events Information' with columns for Time, Device, Event Type, Elapse Time, and Errors. The table lists several events, including 'Complete Check', 'Start Checking', 'Complete Init', 'Start Initialize', 'Create Volume', 'Expand RaidSet', 'Create RaidSet', 'PassThrough Disk Deleted', 'PassThrough Disk Created', 'Delete RaidSet', 'Fan#4 Recovered', 'Fan#3 Recovered', 'Fan#4 Failed', 'Fan#3 Failed', 'Complete Init', and 'Start Initialize'.

| Time | Device | Event Type | Elapse Time | Errors |
|--------------------|-----------------|--------------------------|-------------|--------|
| 2004-4-1 11:14:55 | Volume Set # 00 | Complete Check | 000:00:38 | 0 |
| 2004-4-1 11:14:17 | Volume Set # 00 | Start Checking | | |
| 2004-4-1 11:12:18 | Volume Set # 00 | Complete Init | 000:00:37 | |
| 2004-4-1 11:11:41 | Volume Set # 00 | Start Initialize | | |
| 2004-4-1 11:11:41 | Volume Set # 00 | Create Volume | | |
| 2004-4-1 11:8:34 | Raid Set # 00 | Expand RaidSet | | |
| 2004-4-1 11:4:7 | Raid Set # 00 | Create RaidSet | | |
| 2004-4-1 11:3:30 | IDE Channel 1 | PassThrough Disk Deleted | | |
| 2004-4-1 11:0:14 | IDE Channel 1 | PassThrough Disk Created | | |
| 2004-4-1 10:23:45 | Raid Set # 00 | Delete RaidSet | | |
| 2004-4-1 5:47:3 | H/W Monitor | Fan#4 Recovered | | |
| 2004-4-1 5:47:3 | H/W Monitor | Fan#3 Recovered | | |
| 2004-4-1 4:47:12 | H/W Monitor | Fan#4 Failed | | |
| 2004-4-1 4:47:12 | H/W Monitor | Fan#3 Failed | | |
| 2004-3-31 21:47:13 | Volume Set # 01 | Complete Init | 000:14:05 | |
| 2004-3-31 21:33:8 | Volume Set # 01 | Start Initialize | | |

Next Page

4.11.7 Generate Test Event

Use this feature to generate a test event to confirm the setting of “**Alert By Mail Config**”.

4.11.8 Clear Events Buffer

Use this feature to clear the entire events buffer information.

4.11.9 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.

The screenshot shows a web browser-based configuration interface. On the left is a vertical menu with various links. The main content area displays the 'Modify System Password' form. The form includes three password input fields: 'Enter Original Password', 'Enter New Password', and 'Re-Enter New Password', each with a masked password '****'. Below these fields is a checkbox labeled 'Confirm The Operation' which is checked. At the bottom of the form are 'Submit' and 'Reset' buttons.

Left Menu Links:

- Volume Set Functions
 - Create Volume Set
 - Delete Volume Set
 - Modify Volume Set
 - Check Volume Set
 - Stop Volume Set Check
- Periodic Drive
 - Create Pass Through
 - Modify Pass Through
 - Delete Pass Through
- Identify Drive
- Screen Control
- System Config
 - U320 SCSI Target Co
 - EtherNet Config
 - Alert By Mail Config
 - SNMP Configuration
 - NTP Configuration
 - View Events/Status
 - Receptor
 - Generate Test Event
 - Clear Event Buffer
 - Modify Password
 - Upgrade Firmware
 - Restart Controller
- Information
 - RaidSet Hierarchy
 - System Information
 - Hardware Monitor

4.11.10 Update Firmware:

Please reference the Appendix A. Upgrading Firmware.

4.11.11 Restart Controller

Please reference the Appendix A. Upgrading Firmware.

4.12 Information Menu

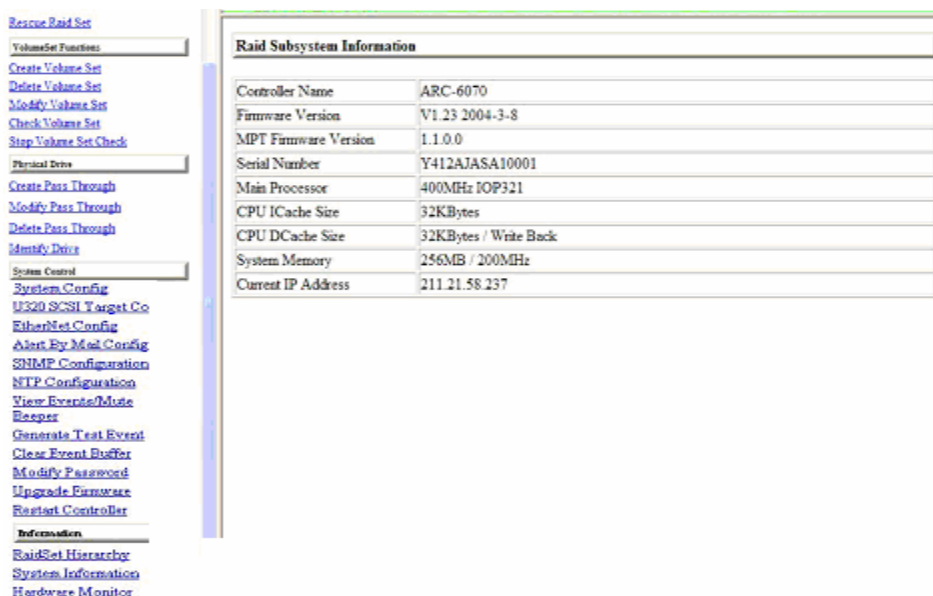
4.12.1 RaidSet Hierarchy

Use this feature to view the internal raid subsystem current raid set, current volume set and physical disk configuration. Please reference this chapter "Configuring Raid Sets and Volume Sets".

4.12.2 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.



| Raid Subsystem Information | |
|----------------------------|-----------------------|
| Controller Name | ARC-6070 |
| Firmware Version | V1.23 2004-3-8 |
| MPT Firmware Version | 1.1.0.0 |
| Serial Number | Y412AJASA10001 |
| Main Processor | 400MHz IOP321 |
| CPU ICache Size | 32KBytes |
| CPU DCache Size | 32KBytes / Write Back |
| System Memory | 256MB / 200MHz |
| Current IP Address | 211.21.58.237 |

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.

4.12.3 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.

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|------------------------------|-------|-------------------|----------|------------------|---------|--------------------|---------|--------------------------|---------|------------------------|---------|------------------------------|---------|------------------------|----|------------------------|----|--------------------|-------|--------------------|-------|--------------------|----------|--------------------|----------|-------------------|-------|-------------------|-------|-------------------|-------|-------------------|-------|-------------------|-------|-------------------|-------|-------------------|-------|
| VolumeSet Functions Create Volume Set Delete Volume Set Modify Volume Set Check Volume Set Stop Volume Set Check Physical Drive Create Pass Through Modify Pass Through Delete Pass Through Identify Drive System Control System Config U320 SCSI Target Co FiberNet Config Alert By Mail Config SNMP Configuration NTP Configuration View Events/Event Beeper Generate Test Event Clear Event Buffer Modify Password Upgrade Firmware Restart Controller Information RaidSet Hierarchy System Information Hardware Monitor | Hardware Monitor Information <table> <tr><td>Controller Board Temperature</td><td>38 °C</td></tr> <tr><td>Power Supply +12V</td><td>11.916 V</td></tr> <tr><td>Power Supply +5V</td><td>5.080 V</td></tr> <tr><td>Power Supply +3.3V</td><td>3.248 V</td></tr> <tr><td>DDR Supply Voltage +2.5V</td><td>2.528 V</td></tr> <tr><td>CPU Core Voltage +1.3V</td><td>1.312 V</td></tr> <tr><td>DDR Termination Power +1.25V</td><td>1.264 V</td></tr> <tr><td>System Power Supply #1</td><td>OK</td></tr> <tr><td>System Power Supply #2</td><td>OK</td></tr> <tr><td>System Fan#1 Speed</td><td>0 RPM</td></tr> <tr><td>System Fan#2 Speed</td><td>0 RPM</td></tr> <tr><td>System Fan#3 Speed</td><td>2909 RPM</td></tr> <tr><td>System Fan#4 Speed</td><td>2934 RPM</td></tr> <tr><td>Hdd#1 Temperature</td><td>26 °C</td></tr> <tr><td>Hdd#2 Temperature</td><td>27 °C</td></tr> <tr><td>Hdd#3 Temperature</td><td>28 °C</td></tr> <tr><td>Hdd#4 Temperature</td><td>26 °C</td></tr> <tr><td>Hdd#5 Temperature</td><td>26 °C</td></tr> <tr><td>Hdd#6 Temperature</td><td>25 °C</td></tr> <tr><td>Hdd#7 Temperature</td><td>25 °C</td></tr> </table> | Controller Board Temperature | 38 °C | Power Supply +12V | 11.916 V | Power Supply +5V | 5.080 V | Power Supply +3.3V | 3.248 V | DDR Supply Voltage +2.5V | 2.528 V | CPU Core Voltage +1.3V | 1.312 V | DDR Termination Power +1.25V | 1.264 V | System Power Supply #1 | OK | System Power Supply #2 | OK | System Fan#1 Speed | 0 RPM | System Fan#2 Speed | 0 RPM | System Fan#3 Speed | 2909 RPM | System Fan#4 Speed | 2934 RPM | Hdd#1 Temperature | 26 °C | Hdd#2 Temperature | 27 °C | Hdd#3 Temperature | 28 °C | Hdd#4 Temperature | 26 °C | Hdd#5 Temperature | 26 °C | Hdd#6 Temperature | 25 °C | Hdd#7 Temperature | 25 °C |
| Controller Board Temperature | 38 °C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Power Supply +12V | 11.916 V | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Power Supply +5V | 5.080 V | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Power Supply +3.3V | 3.248 V | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| DDR Supply Voltage +2.5V | 2.528 V | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CPU Core Voltage +1.3V | 1.312 V | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| DDR Termination Power +1.25V | 1.264 V | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| System Power Supply #1 | OK | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| System Power Supply #2 | OK | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| System Fan#1 Speed | 0 RPM | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| System Fan#2 Speed | 0 RPM | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| System Fan#3 Speed | 2909 RPM | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| System Fan#4 Speed | 2934 RPM | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hdd#1 Temperature | 26 °C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hdd#2 Temperature | 27 °C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hdd#3 Temperature | 28 °C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hdd#4 Temperature | 26 °C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hdd#5 Temperature | 26 °C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hdd#6 Temperature | 25 °C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hdd#7 Temperature | 25 °C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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 LCM, LED and alarm buzzer.

| Item | Warning Condition |
|------------------------------|-----------------------------------|
| Controller Board Temperature | > 60 Celsius |
| Controller Fan Speed | < 1500 RPM |
| Power Supply +12V | < 10.8V or > 13.2V |
| Power Supply +5V | < 4.75V or > 5.25V |
| Power Supply +3.3V | < 3.135V or > 3.465V |
| DDR Supply Voltage +2.5V | < 2.375V or > 2.625V |
| CPU Core Voltage +1.3V | < 1.235V or > 1.365V |
| SATA Chip +1.25V | < 1.188V or > 1.313V |
| HDD temperature | > 55 Celsius |

Chapter 5.

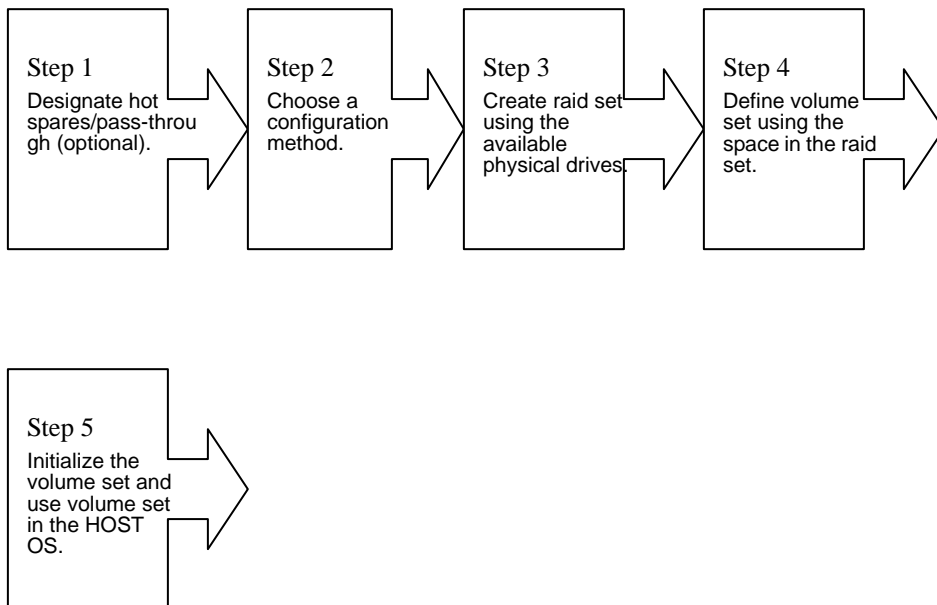
Serial Port Configuration

The RAID subsystem configuration utility is firmware-based and uses to configure raid sets and volume sets. Because the utility resides in the RAID controller firmware, its operation is independent of the operating systems on your computer. Use this utility to:

- Create raid set,
- Expand raid set,
- Define volume set,
- Add physical drive,
- Modify volume set,
- Modify RAID level/stripe size,
- Define pass-through disk drives,
- Update firmware,
- Modify system function, and
- Designate drives as hot spares

5.1 Configuring Raid Sets and Volume Sets

You can configure raid sets and volume sets with VT-100 terminal function using Quick Volume/Raid Setup automatically, or Raid Set/Volume Set Function manually 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:



5.2 Designating Drives as Hot Spares

All unused disk drive that is not part of a raid set can be created as a Hot Spare. The Quick Volume/Raid Setup configuration will automatically add the spare disk drive with the raid level for user to select. For the Raid Set Function configuration, user can use the **Create Hot Spare** option to define the hot spare disk drive.

A Hot Spare disk drive can be created 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.

Press the **Enter** key to select a disk drive, and press **Yes** in the Create Hot Spare to designate it as a hot spare.

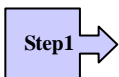
5.3 Using Quick Volume /Raid Setup Configuration

In Quick Volume /Raid Setup Configuration, it collects all drives in the tray and include them in a raid set. The raid set you create is associated with exactly one volume set, and you can modify the default RAID level, stripe size, and capacity of the volume set. Designating Drives as Hot Spares will also show in the raid level selection option. The volume set default settings will be:

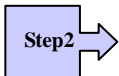
| Parameter | Setting |
|--|----------------------------------|
| Volume Name | Volume Set # 00 |
| SCSI Channel / SCSI ID / SCSI LUN | 0/0/0 |
| Fibre Channel / Fibre LUN Base / Fibre LUN | 0/0/0 |
| SAS Port / SAS LUN Base / SAS LUN | 0/0/0 |
| Cache Mode | Write Back |
| Tag Queuing | Yes |
| Max Sync Rate | Depend your host adapter setting |

The default setting values can be changed after configuration is complete.

Follow the steps below to create arrays using Quick Volume /Raid Setup Configuration:



Choose Quick Volume And Raid Setup from the main menu. The available RAID levels and associated Hot Spare for the current volume set drive are displayed.



RAID Level Try to use drives of the same capacity in a specific array. If you use drives with different capacities in an array, all the drives in the array is treated as though they have the capacity of the *smallest* drive in the array.

The number of physical drives in a specific array determines the RAID levels that can be implemented with the array.

RAID 0 requires one or more physical drives,

RAID 1 requires at least 2 physical drives,

RAID 1+ Spare requires more than 2 physical drives,

RAID 3 requires at least 3 physical drives,

RAID 5 requires at least 3 physical drives,

RAID 6 requires at least 4 physical drives,

RAID 3+ Spare requires at least 4 physical drives, and

RAID 5 + Spare requires at least 4 physical drives.

RAID 6 + Spare requires at least 5 physical drives.

Using the UP/DOWN key to select the RAID for the volume set and presses ENT to confirm it.

-
- Step3** → *Available Capacity* Set the capacity size for the volume set. After select *RAID level* and press ENT.
- The selected capacity for the current volume set is displayed. Using the UP/DOWN to create the current volume set capacity size and press ENT to confirm it. The available stripe sizes for the current volume set are displayed.
-
- Step4** → *Select Stripe size* This parameter specifies the size of the stripes written to each disk in a RAID 0, 1(0+1), 5or 6 Volume Set. You can set the stripe size to 4 KB, 8 KB, 16 KB, 32 KB, 64 KB, or 128 KB. A larger stripe size provides better-read performance, especially if your computer does mostly sequential reads. However, if you are sure that your computer does random read requests more often, choose a small stripe size. Using the UP/DOWN to select stripe size and press ENT to confirm it.
-
- Step5** → When you are finished defining the volume set, press ENT to confirm the Quick Volume And Raid Set Setup function.
-
- Step6** → *Fast Initialization* Press ENT to define fast initialization and ESC to normal initialization. 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. In Fast Initialization, the initialization proceeds must be completed before the volume set ready for system accesses.
-
- Step7** → The controller will begin to Initialize the volume set you have just configured.
-
- Step8** → If you need to add additional volume set using main menu Create Raid Volume Set function.
-

5.4 Using Raid Set/Volume Set Function Method

In Raid Set Function, you can use the **Create Raid Set** function to generate the new raid set. In Volume Set Function, you can use the **Create Volume Set** function to generate its associated volume set and parameters.

If the current controller has unused physical devices connected, you can choose the Create Hot Spare option in the Raid Set Function to define a global hot spare. Select this method to configure new raid sets and volume sets. The **Raid Set/Volume Set Function** configuration option allows you to associate volume set with partial and full raid set.



To setup the Hot Spare (option), choose Raid Set Functions from the main menu. Select the Create Hot Spare Disk to set the Hot Spare.



Choose Raid Set Function from the main menu. Select the Create A New Raid Set.



A Select Drive IDE Channel in the next displayed showing the IDE drive connected to the current controller.



Press the UP/ DOWN to select specific physical drives. Press the ENT to associate the selected physical drive with the current raid set.

Try to use drives of the same capacity in a specific raid set. If you use drives with different capacities in an array, all the drives in the array is treated as though they have the capacity of the *smallest* drive in the array.

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

RAID 0 requires one or more physical drives per raid set.

RAID 1 requires at least 2 physical drives per raid set.

RAID 1 + Spare requires at least 3 physical drives per raid set.

RAID 3 requires at least 3 physical drives per raid set.

RAID 5 requires at least 3 physical drives per raid set.

RAID 6 requires at least 4 physical drives per raid set.

RAID 3 + Spare requires at least 4 physical drives per raid set.

RAID 5 + Spare requires at least 4 physical drives per raid set.

RAID 6 + Spare requires at least 5 physical drives per raid set.



After adding physical drives to the current raid set as desired, press ESC to confirm the Select Drive IDE Channel function.



Press ENT when you are finished creating the current raid set. To continue defining another raid set, repeat step 3. To begin volume set configuration, go to step 7.



Choose Volume Set Functions from the main menu. Select the Create Raid Volume Set and press ENT.

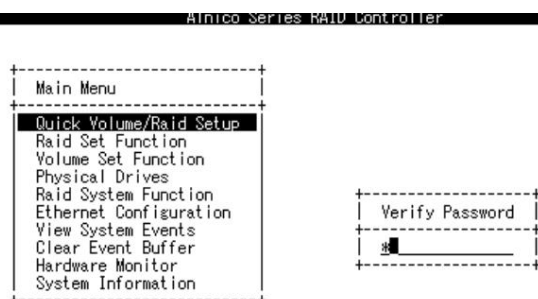
- Step8** → Choose one raid set from the Select Raid Set screen. Press ENT to confirm it.
-
- Step9** → The volume set attributes screen appears:
- The volume set attributes screen shows the volume set default configuration value that is currently being configured. The volume set attributes are:
- The Raid Level,
 - The Capacity (Not supported via LCD Panel.)
 - The Stripe Size,
 - The SCSI Channel / SCSI ID / SCSI LUN,
 - The Fibre Channel / Fibre Lun Base / Fibre Lun,
 - The SAS Port / SAS Lun Base / SAS Lun
 - The Cache Mode,
 - The Tagged Queuing,
 - The SCSI Max Rate, and
 - The Volume Name (number).
- All value can be changing by the user. Press the UP/ DOWN to select the attributes. Press the ENT to modify each attribute of the default value. Using the UP/DOWN to select attribute value and press the ENT to accept the default value
-
- Step10** → After user completes modifying the attribute, press the ESC to enter the Select Capacity for the volume set. Using the UP/DOWN to set the volume set capacity and press ENT to confirm it.
-
- Step11** → When you are finished defining the volume set, press ENT to confirm the Create function.
-
- Step12** → Press ENT to define fast initialization and ESC to normal initialization. The controller will begin to Initialize the volume set you have just configured. If space remains in the raid set, the next volume set can be configured. Repeat steps 7 to 12 to configure another volume set.
-

Note: User can use this method to examine the existing configuration. Modify volume set configuration method provides the same functions as create volume set configuration method. In volume set function, you can use the modify volume set function to modify the volume set parameters except the capacity

size.

5.5 Main Menu

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



ArrowKey Or AZ:Move Cursor, Enter:Select, ESC:Escape, L:Line Draw, X:Redraw

| Option | Description |
|-----------------------------|--|
| Quick Volume And Raid Setup | Create a default configurations which are based on 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 Function | Setting the raid system configurations |
| * U320 SCSI Target Config | To enable or disable QAS or Auto Speed Down. And select 12/16Bytes CDB (Avail with SCSI Models) |
| * Fibre Channel Config | To set the Fibre channel config function (Avila with Fibre Models) |
| Ethernet Configuration | Use to configure the Ethernet port of RAID subsystem. |
| 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 |

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 0000 by the manufacture.

5.5.1 Quick Volume / Raid Setup

Quick Volume/Raid Setup is the fastest way to prepare a raid set and volume set. It only needs a few keystrokes to complete it. Although disk drives of different capacity may be used in the raid set, it will use the smallest capacity of the disk drive as the capacity of all disk drives in the raid set. The Quick Volume/Raid Setup option creates a raid set with the following properties:

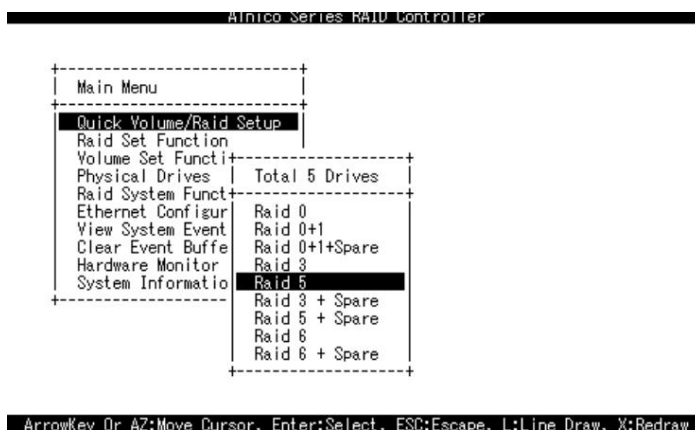
All of the physical disk drives are contained in a raid set.

The raid levels associated with hot spare, capacity, and stripe size are selected during the configuration process.

A single volume set is created and consumed all or a portion of the disk capacity available in this raid set.

If you need to add additional volume set, using main menu Create Volume Set function

The total physical drives in a specific raid set determine the RAID levels that can be implemented with the raid set. Press the **Quick Volume/Raid Setup** from the main menu; all possible RAID levels screen will be displayed.



A single volume set is created and consumed all or a portion of the disk capacity available in this raid set. Define the capacity of volume set in the Available Capacity popup. The default value for the volume set is displayed in the selected capacity. Using the Arrow key to modify volume set capacity and press

the Enter key to accept this value. If it only use part of the raid set capacity, you can use the Create Volume Set option to define another volume sets.

> 2TB Support

When the RAID set capacity of per volume is over 2TB, a special selection will appear on the LCD panel, please make a choice according to your O.S.:

Use 64bit LBA: for Linux, Unix Windows 2003 SP1 (or later) and etc...

Use 4K Block : Windows 2000, XP, enlarge block size from 512Byte to 4K.

No. :Disabled greater than 2TB feature.

Using the **UP/DOWN** to select attribute value and press the **ENT** to accept the default value.



Stripe size This parameter sets the size of the stripe written to each disk in a RAID 0, 1(0+1), 5, or 6 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.



Press the **Yes** key in the Create Vol/Raid Set dialog box, the raid set and volume set will start to initialize it.

5.5.2 Raid Set Function

User manual configuration can complete 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.



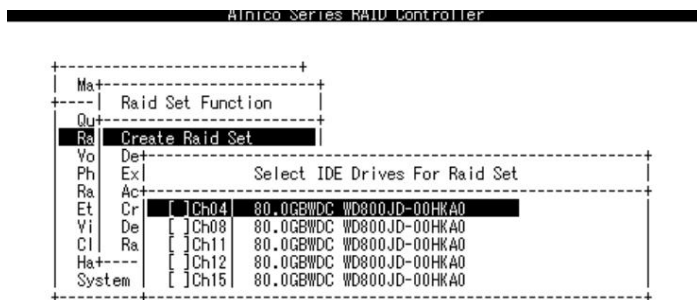
5.5.2.1 Create Raid Set

To define raid set, follow the procedure below:

1. Select **Raid Set Function** from the main menu.
2. Select **Create Raid Set** option from the **Raid Set Function** dialog box.

3. A **Select SATA Drive For Raid Set** window is displayed showing the SATA drive connected to the current controller. Press the **UP** and **DOWN** arrow keys to select specific physical drives. Press the **Enter** key to associate the selected physical drive with the current raid set. Repeat this step, as many disk drives as user want to add in a single raid set.

To finish selecting SATA drives For Raid Set, press **Esc** key. A **Create Raid Set confirmation** screen appears, Press **Yes** key to confirm it.



ArrowKey Or AZ:Move Cursor, Enter:Select, ESC:Escape, L:Line Draw, X:Redraw

1. An Edit The Raid Set Name dialog box appears. 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 #.

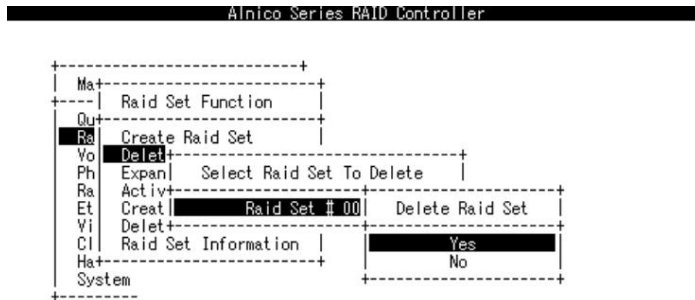


ArrowKey Or AZ:Move Cursor, Enter:Select, ESC:Escape, L:Line Draw, X:Redraw

5.5.2.2 Delete Raid Set

To change a raid set, you should first delete it and recreate the raid set. To

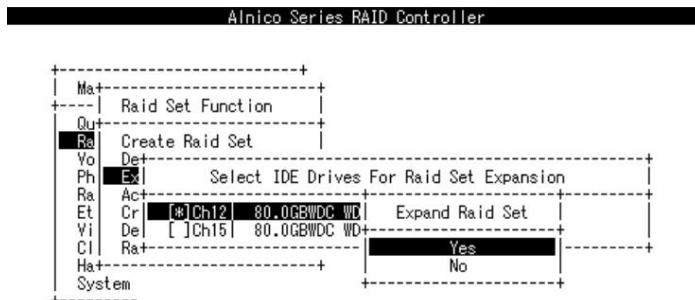
delete a raid set, select the raid set number that user want to delete in the **Select Raid Set to Delete** screen. The **Delete Raid Set** dialog box appears, then press **Yes** key to delete it. The double confirmation screen appears, then press **Yes** key to make sure of the function.



ArrowKey Or AZ:Move Cursor, Enter:Select, ESC:Escape, L:Line Draw, X:Redraw

5.5.2.3 Expand Raid Set

Instead of deleting a raid set and recreating it with additional disk drives, the Expand Raid Set function allows the users to add disk drive to the raid set that was created.



ArrowKey Or AZ:Move Cursor, Enter:Select, ESC:Escape, L:Line Draw, X:Redraw

To expand a raid set, follow the procedure below:

1. Click on **Expand Raid Set** option. If there is an available disk, then the Select SATA Drives For Raid Set Expansion screen appears.
2. Select the target Raid Set by clicking on the appropriate radial button. Select the target disk by clicking on the appropriate check box.
3. The double confirmation screen appears, Press **Yes** key to start the function.

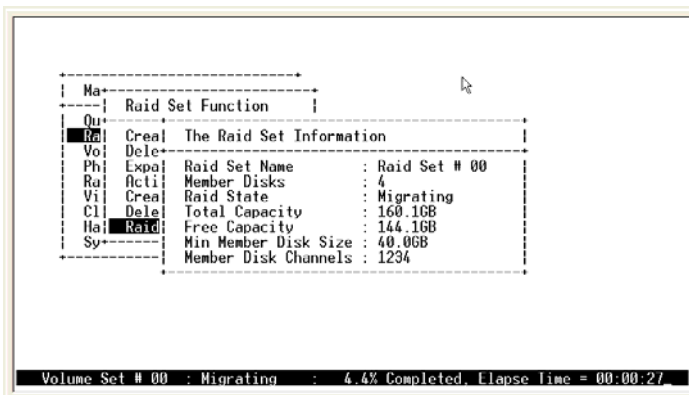
The new add capacity will be define one or more volume sets. Follow the instruction presented in the Volume Set Function to create the volume set s.



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.

5.5.2.3.1 Migrating



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.

5.5.2.4 Activate Incomplete Raid Set

The following screen is the Raid Set Information after one of its disk drive has removed in the power off state.

| | | | | | |
|----|----|------|--------------------------|---|---------------|
| Ma | + | | | | |
| | - | | Raid Set Function | | |
| | Qu | + | | | |
| | Ra | Crea | The Raid Set Information | | |
| | Vo | Dele | | | |
| | Ph | Expa | Raid Set Name | : | Raid Set # 00 |
| | Ra | Acti | Member Disks | : | 4 |
| | Vi | Crea | Raid State | : | Incomplete |
| | Cl | Dele | Total Capacity | : | 160.1GB |
| | Ha | Raid | Free Capacity | : | 160.1GB |
| | Sy | | Min Member Disk Size | : | 40.0GB |
| | | | Member Disk Channels | : | 123- |

Arrow key:Move cursor, Enter:Select, ESC:Escape, L:Line Draw, X:Redraw

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.

Ainico Series RAID Controller

| | | | | | |
|----|----|-----------|--------------------------|---|---------------|
| Ma | + | | | | |
| | - | | Raid Set Function | | |
| | Qu | + | | | |
| | Ra | Crea | The Raid Set Information | | |
| | Vo | Dele | | | |
| | Ph | Expa | Raid Set Name | : | Raid Set # 00 |
| | Ra | Acti | Member Disks | : | 4 |
| | Et | Crea | Raid State | : | Degraded |
| | Vi | Dele | Total Capacity | : | 320.1GB |
| | Cl | Raid | Free Capacity | : | 320.1GB |
| | Ha | | Min Member Disk Size | : | 80.0GB |
| | Sy | System In | Member Disk Channels | : | 48Bx |

ArrowKey Or AZ:Move Cursor, Enter:Select, ESC:Escape, L:Line Draw, X:Redraw

5.5.2.5 Create Hot Spare

Ainico Series RAID Controller

| | | |
|----|----------------------|--|
| Ma | Raid Set Function | |
| Qu | Create Raid Set | |
| Vo | Det | |
| Ph | Ex | Select Drives For HotSpare, Max 3 HotSpare Supported |
| Ra | Ac | |
| Et | Cr | (*Ch15) 80.0GBWDC WD Create HotSpare ? |
| Vi | De | |
| Cl | Raid Set Information | Yes |
| Ha | System Information | No |

ArrowKey Or AZ:Move Cursor, Enter:Select, ESC:Escape, L:Line Draw, X:Redraw

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.

Press the **Enter** key to select a disk drive and press **Yes** in the Create Hot Spare to designate it as a hot spare.

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

5.5.2.6 Delete Hot Spare

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

Press the **Enter** keys to select a disk drive, and press **Yes** in the Delete Hot Spare to delete the hot spare.

Ainico Series RAID Controller

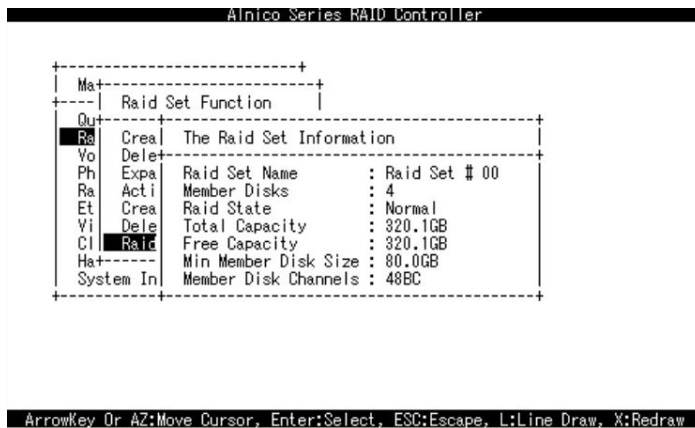
| | | |
|----|----------------------|--|
| Ma | Raid Set Function | |
| Qu | Create Raid Set | |
| Vo | Det | |
| Ph | Ex | Select The HotSpare Device To Be Deleted |
| Ra | Ac | |
| Et | Cr | (*Ch15) 80.0GBWDC WD Delete HotSpare ? |
| Vi | De | |
| Cl | Raid Set Information | Yes |
| Ha | System Information | No |

ArrowKey Or AZ:Move Cursor, Enter:Select, ESC:Escape, L:Line Draw, X:Redraw

5.5.2.7 Raid Set Information

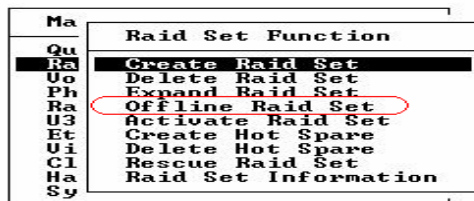
To display Raid Set information, move the cursor bar to the desired Raid Set

number, then press **Enter** key. The Raid Set Information will show as below.
You can only view the information of this Raid Set.



5.5.2.8 Offline Raid Set

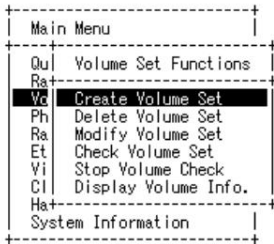
This function allows the user to move the whole created Raid Set to another Alnico RAID subsystem without turning off power. "Active Raid Set" can resume the offline-Raid Set to online status.



5.5.3 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.

Alnico Series RAID Controller



ArrowKey Or AZ:Move Cursor, Enter:Select, ESC:Escape, L:Line Draw, X:Redraw

5.5.3.1 Create Volume Set

The following is the volume set features for the Alnico RAID

1. Volume sets of different RAID levels may coexist on the same raid set.
2. Up to 16 volume sets can be created in a raid set.
3. The maximum addressable size of a single volume set can be exceeded than 2 TB.

To create a volume set, follow the following steps:

1. Select the **Volume Set Function** from the Main menu.
2. Choose the **Create Volume Set** from **Volume Set Functions** dialog box screen.
3. The **Create Volume From Raid Set** dialog box appears. This screen displays the existing arranged raid sets. Select the raid set number and press **Enter** key. The **Volume Creation** is displayed in the screen.

Alnico Series RAID Controller



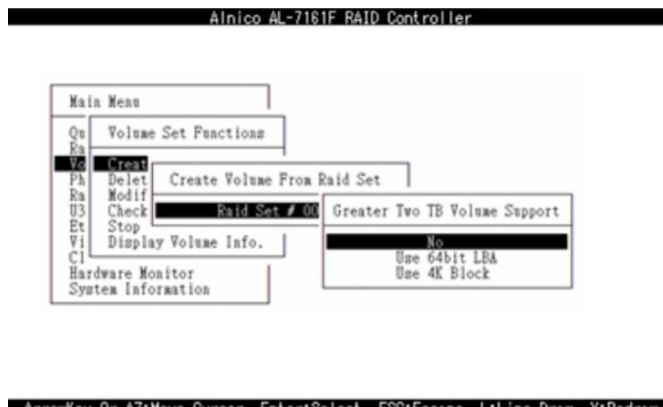
ArrowKey Or AZ:Move Cursor, Enter:Select, ESC:Escape, L:Line Draw, X:Redraw

4. The **Greater Two TB Volume Support** is a special selection for the Volume set capacity of per volume is over 2TB, please make a choice according to your O.S.:

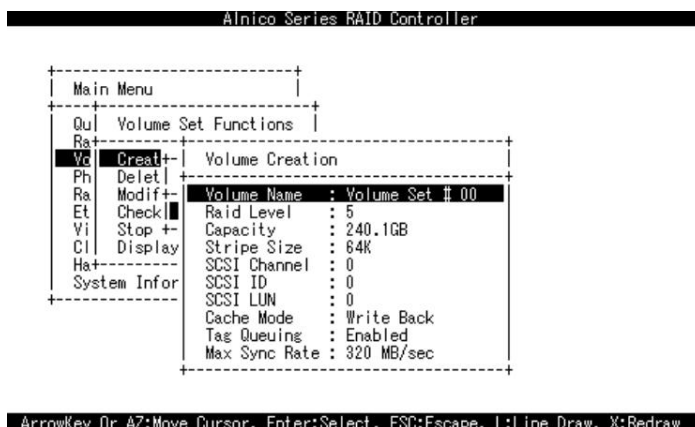
64bit LBA: for Linux, Unix Windows 2003 SP1 (or later) and etc...

4K Block : Windows 2000, XP, enlarge block size from 512Byte to 4K.

No. :Disabled greater than 2TB feature



5. A window with a summary of the current volume set's settings. The "Volume Creation" option allows user to select the Volume name, capacity, RAID level, strip size, SCSI Channel / SCSI ID / LUN, Fibre Channel / Fibre LUN Base / Fibre LUN, SAS Port / SAS LUN Base / SAS LUN, Cache mode, tag queuing and Max Sync Rate. User can modify the default values in this screen; the modification procedures are at "Modify Volume Set" section.



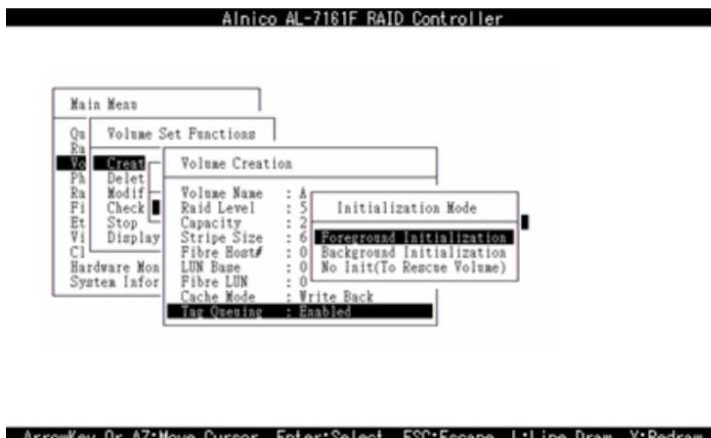
6. After completing the modification of the volume set, press Esc key to confirm

it. A Initialization screen is presented.

Foreground Initialization is the fast way to initial of the selected volume set.

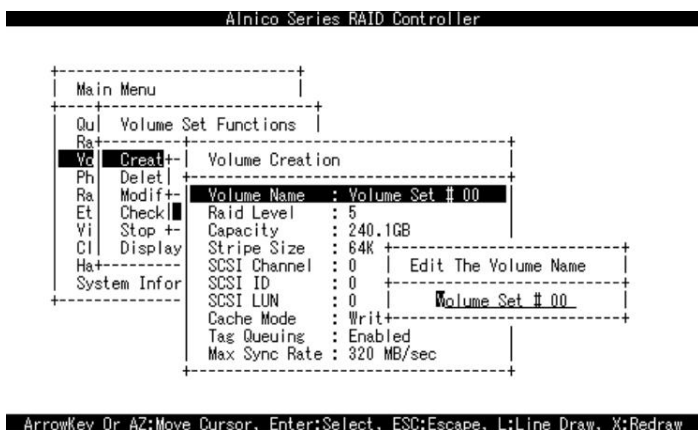
Background Initialization is the normal way to initial of the selected volume set.

No Init is special selection to rescue the volume. RAID system initiate the selected volume set without writing any data and parity bit into the HDDs.



7. Repeat steps 3 to 5 to create additional volume sets.
8. The initialization percentage of volume set will be displayed at the button line.

5.5.3.1.1 Volume Name



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

5.5.3.1.2 Capacity

```

Alnico Series RAID Controller
+-----+
| Main Menu |
+-----+
| Qu | Volume Set Functions |
| Ra |
| Va | Cre | Volume Creation |
| Ph | Delet |
| Ra | Modif |
| Et | Check |
| Vi | Stop |
| Cl | Display |
| Ha |-----|
| System Infor |
+-----+

Available Capacity : 240.1 GB
Selected Capacity : 240.1 GB

Volume Name : Volume Set # 00
Raid Level : 5
Capacity : 240.1GB
Stripe Size : 64K
SCSI Channel : 0
SCSI ID : 0
SCSI LUN : 0
Cache Mode : Write Back
Tag Queuing : Enabled
Max Sync Rate : 320 MB/sec
  
```

ArrowKey Or AZ:Move Cursor, Enter:Select, ESC:Escape, L:Line Draw, X:Redraw

The maximum volume size is default in the first setting. The capacity can increase or decrease by the **UP** and **DOWN** arrow key. Each volume set has a selected capacity which is less than or equal to the total capacity of the raid set on which it resides.

5.5.3.1.3 Raid Level

```

Alnico Series RAID Controller
+-----+
| Main Menu |
+-----+
| Qu | Volume Set Functions |
| Ra |
| Va | Cre | Volume Creation |
| Ph | Delet |
| Ra | Modif |
| Et | Check |
| Vi | Stop |
| Cl | Display |
| Ha |-----|
| System Infor |
+-----+

Volume Name : Volume Set # 00
Raid Level : 5
Capacity : 240.1
Stripe Size : 64K
SCSI Channel : 0
SCSI ID : 0
SCSI LUN : 0
Cache Mode : Writ
Tag Queuing : Enab
Max Sync Rate : 320

Select Raid Level
0
0+1
3
5
6
  
```

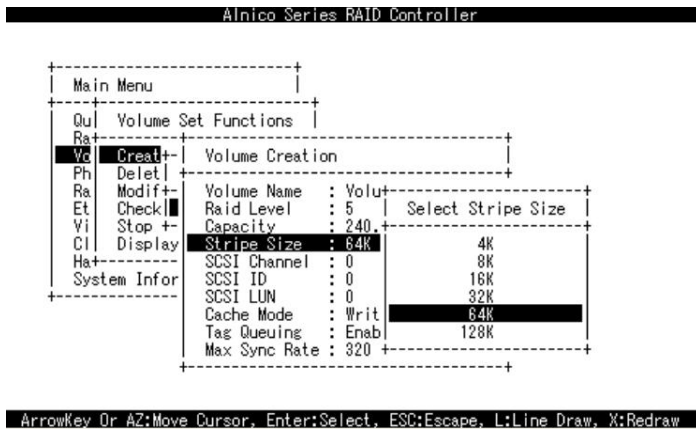
ArrowKey Or AZ:Move Cursor, Enter:Select, ESC:Escape, L:Line Draw, X:Redraw

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** key to confirm.

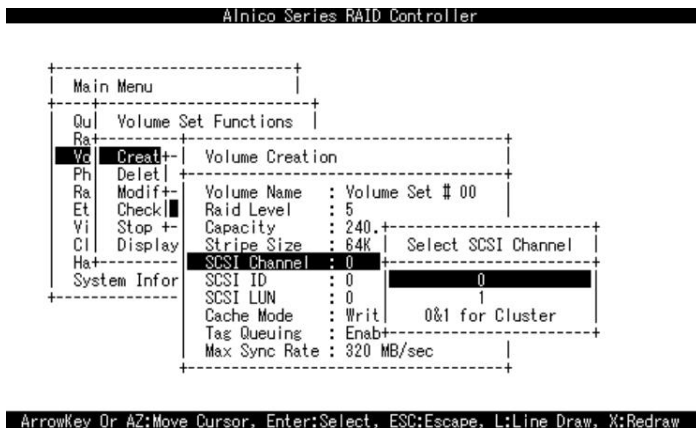
5.5.3.1.4 Strip Size

This parameter sets the size of the segment written to each disk in a RAID 0, 1(0+1), 5 or 6 logical drive. You can set the stripe size to 4 KB, 8 KB, 16 KB, 32 KB, 64 KB, or 128 KB.



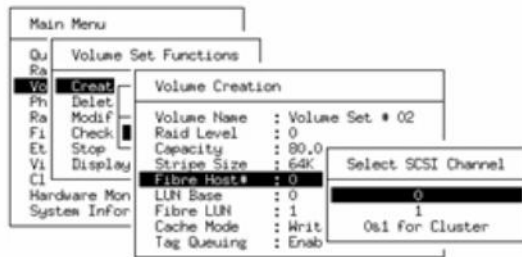
5.5.3.1.5 SCSI Channel / Fibre Host / SAS Port

SCSI Channel



Two Ultra 320 SCSI channel can be applied. Choose the SCSI Channel, A Select SCSI Channel dialog box appears, select the channel number and press Enter key to confirm it.

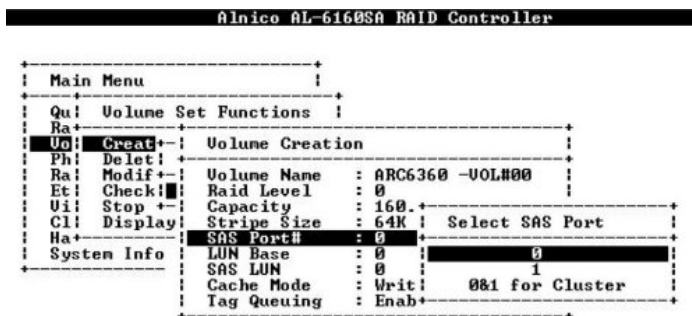
Fibre Host



ArrowKey Or AZ+Move Cursor, Enter+Select, ESC+Escape, L+Line Down, X+Redraw

Two 4Gbps Fibre channel can be applied. Choose the Fibre Host, a **Select Fibre Channel** dialog box appears, select the channel number and press **Enter** key to confirm it.

SAS port



Two SAS ports (2 X 3Gb Links per port) can be applied. Choose the SAS port#, a **Select SAS Port** dialog box appears, select the channel number and press **Enter** key to confirm it.

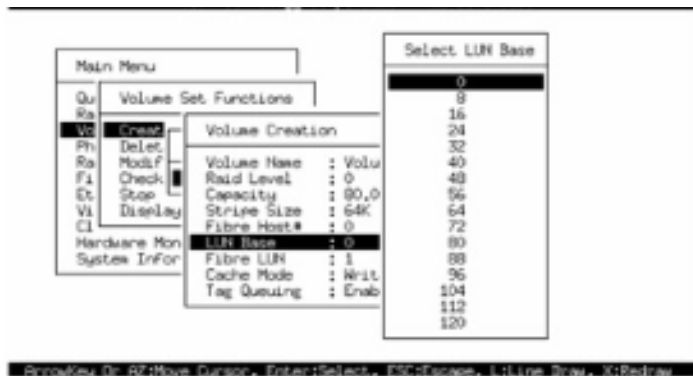
5.5.3.1.6 SCSI ID / Fibre LUN Base / SAS LUN Base

SCSI ID



Each SCSI device attached to the SCSI card, as well as the card itself, must be assigned a unique SCSI ID number. A LVD SCSI channel can connect up to 15 devices. RAID subsystem is as a large SCSI device. We should assign an ID from a list of SCSI IDs.

Fibre 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 128(0 to 127) devices. The RAID subsystem is as a large Fibre device. We should assign an LUN base from a list of Fibre LUNs.

SAS LUN Base

| Alnico AL-6160SA RAID Controller | | |
|----------------------------------|--------------------|-----------------|
| Main Menu | | Select LUN Base |
| Qu: Volume Set Functions | | 0 |
| Ra: Create | Volume Creation | 8 |
| Ph: Delet | | 16 |
| Ra: Modif | | 24 |
| Et: Check | Volume Name : ARC6 | 32 |
| Vi: Stop | Raid Level : 0 | 40 |
| Cl: Display | Capacity : 160. | 48 |
| Ha: System Info | Stripe Size : 64K | 56 |
| | SAS Port# : 0 | 64 |
| | LUN Base : 0 | 72 |
| | SAS LUN : 0 | 80 |
| | Cache Mode : Writ | 88 |
| | Tag Queuing : Enab | 96 |
| | | 104 |
| | | 112 |
| | | 120 |

Each SAS device attached to the SAS HBA, as well as the card itself, must be assigned a unique SAS ID number. Our RAID subsystem can be setup to 0 to 127. The RAID subsystem is as a large SAS device. We should assign an LUN base from a list of SAS LUNs. SAS LUN Base are accounted by 8, 16, 24, 32.....

5.5.3.1.7 SCSI LUN /Fibre LUN/ SAS LUN

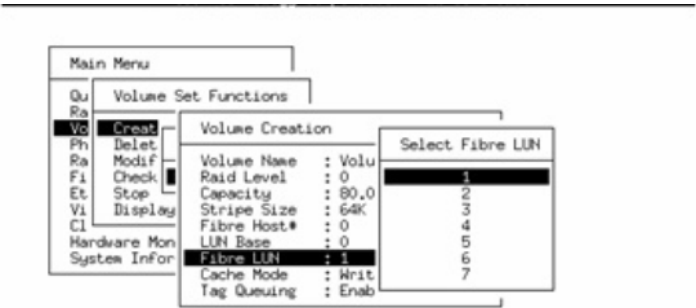
SCSI LUN

| Alnico Series RAID Controller | | |
|-------------------------------|---------------------|-----------------|
| Main Menu | | |
| Qu: Volume Set Functions | | |
| Ra: Create | Volume Creation | Select SCSI LUN |
| Ph: Delet | | 0 |
| Ra: Modif | Volume Name : Volu | 1 |
| Et: Check | Raid Level : 5 | 2 |
| Vi: Stop | Capacity : 240. | 3 |
| Cl: Display | Stripe Size : 64K | 4 |
| Ha: System Infor | SCSI Channel : 0 | 5 |
| | SCSI ID : 0 | 6 |
| | SCSI LUN : 0 | 7 |
| | Cache Mode : Writ | |
| | Tag Queuing : Enab | |
| | Max Sync Rate : 320 | |

ArrowKey Or AZ:Move Cursor, Enter:Select, ESC:Escape, L:Line Draw, X:Redraw

Each SCSI ID can support up to 8 LUNs. Most SCSI host adapter treats each LUN like a SCSI disk.

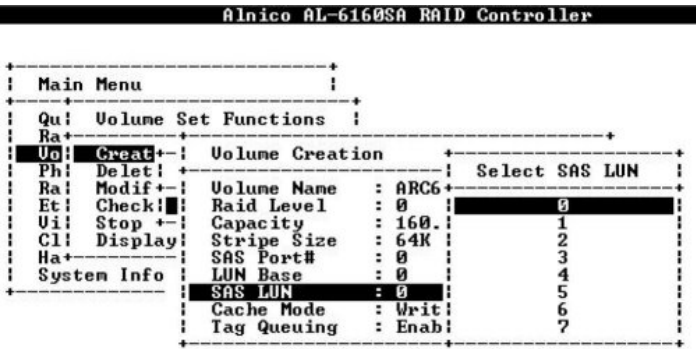
Fibre LUN



ArrowKey On AZ:Move Cursor, Enter:Select, ESC:Escape, L:Line Draw, K:Redraw

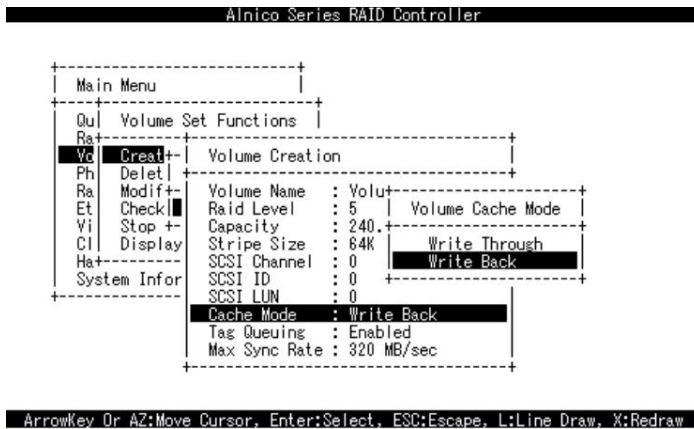
Each Fibre LUN base can support up to 8 LUNs. Most Fibre Channel host adapter treats each LUN like a Fibre disk.

SAS LUN



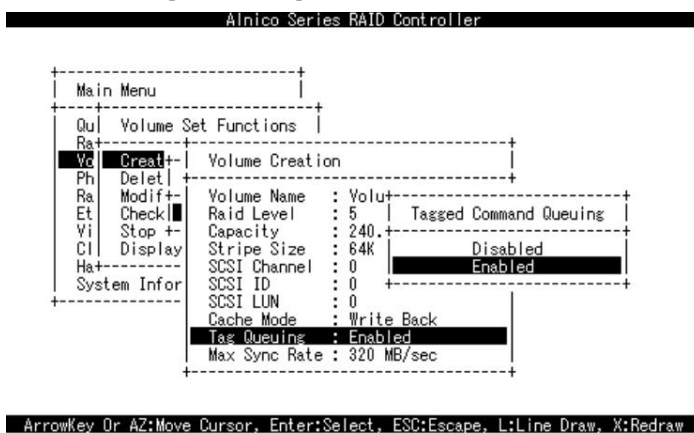
Each SAS LUN base can support up to 8 LUNs. The SAS HBA treats each LUN like a SAS device.

5.5.3.1.8 Cache Mode



User can set the cache mode to: Write-Through Cache or Write-Back Cache.

5.5.3.1.9 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 SCSI command tag queuing support for each drive channel. This function should normally remain enabled. Disable this function only when using older SCSI drives that do not support command tag queuing.

5.5.3.1.10 Max Sync Rate

The RAID subsystem supports 320 MB/sec as the highest data transfer rate.



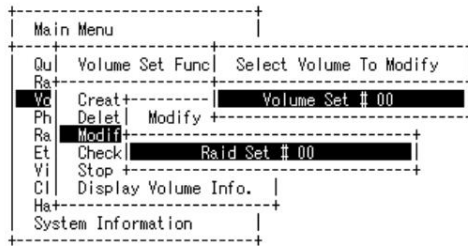
5.5.3.2 Delete Volume Set

To delete Volume set from raid set system function, move the cursor bar to the **Volume Set Functions** menu and select the **Delete Volume Set** item, then press **Enter** key. The **Volume Set Functions** menu will show all Raid Set # item. Move the cursor bar to an RAID Set number, then press **Enter** key to show all Volume Set # in the raid set. Move cursor to the deleted Volume Set number, press **Enter** key to delete it.



5.5.3.3 Modify Volume Set

Alnico Series RAID Controller



ArrowKey Or AZ:Move Cursor, Enter:Select, ESC:Escape, L:Line Draw, X:Redraw

Use this option to modify volume set configuration. To modify Volume Set values from Raid Set system function, move the cursor bar to the Volume Set Functions menu and select the **Modify Volume Set** item, then press **Enter** key. The Volume Set Functions menu will show all Raid Set number items. Move the cursor bar to an Raid Set number item, then press **Enter** key to show all Volume Set item Select the Volume Set from the list you which to change, press **Enter** key to modify it.

As shown in the following can be modified at this screen. Choose this option to display the properties of the selected Volume Set; you can modify all values except the capacity.

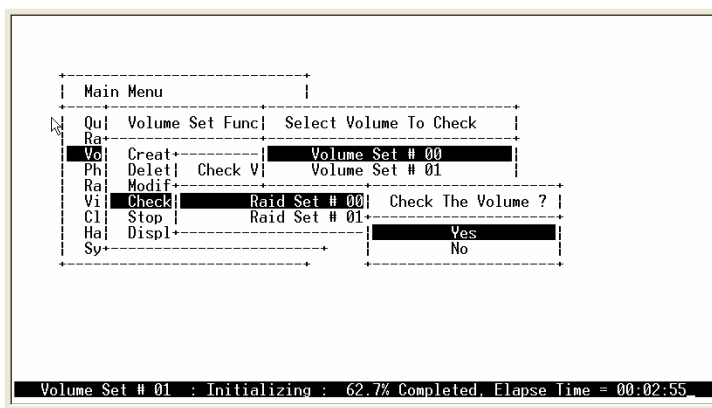
5.5.3.3.1 Volume Set Migration



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 **Volume Set Information** when one RAID level to another, a Volume set strip size changes or when a disk is added to a raid set.

5.5.3.4 Check Volume Set

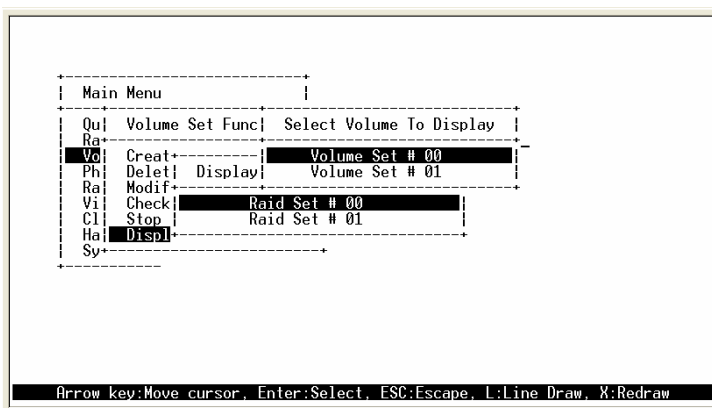
Use this option to verify the correctness of the redundant data in a volume set. For example, in a system with dedicated parity, volume set check means computing the parity of the data disk drives and comparing the results to the contents of the dedicated parity disk drive. To check Volume Set from Raid Set system function, move the cursor bar to the **Volume Set Function** menu and select the **Check Volume Set** item, then press **Enter** key. The Volume Set Functions menu will show all Raid Set number items. Move the cursor bar to a Raid Set number item, then press **Enter** key to show all Volume Set item. Select the Volume Set from the list you which to check, press **Enter** key to select it. After completing the selection, the confirmation screen appears, presses **Yes** to start check.



5.5.3.5 Stop Volume Set Check

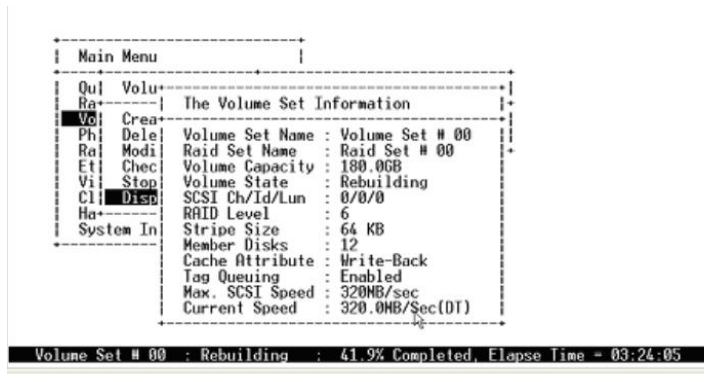
Use this option to stop checking on a volume set.

5.5.3.6 Display Volume Set Info.

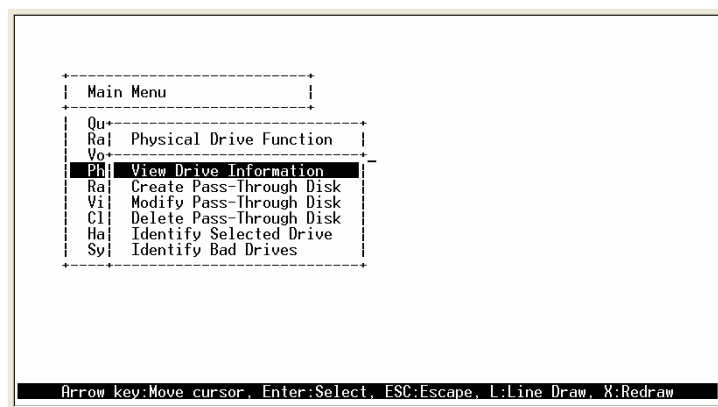


To display Volume Set information, move the cursor bar to the desired Volume Set number, then press **Enter** key. The Volume Set Information will show as following.

You can only view the information of this Volume Set.

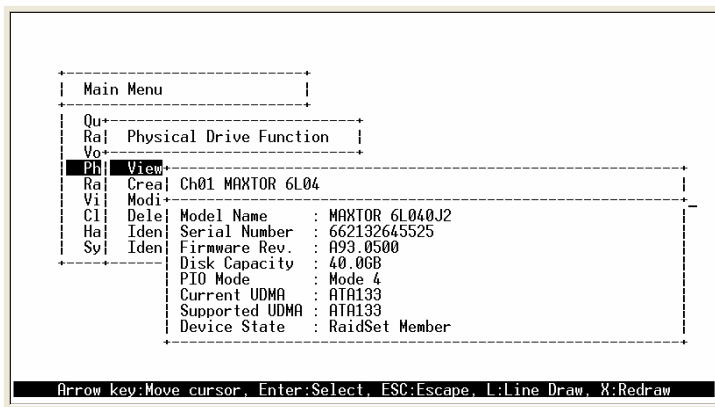


5.5.4 Physical Drive



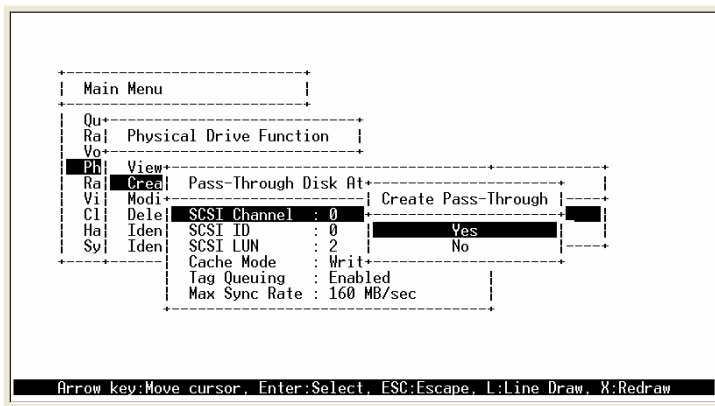
Choose this option from the Main Menu to select a physical disk and to perform the operations listed above.

5.5.4.1 View Drive Information



When you choose this option, the physical disks in the RAID subsystem are listed. Move the cursor to the desired drive and press Enter. The following appears:

5.5.4.2 Create Pass-Through Disk



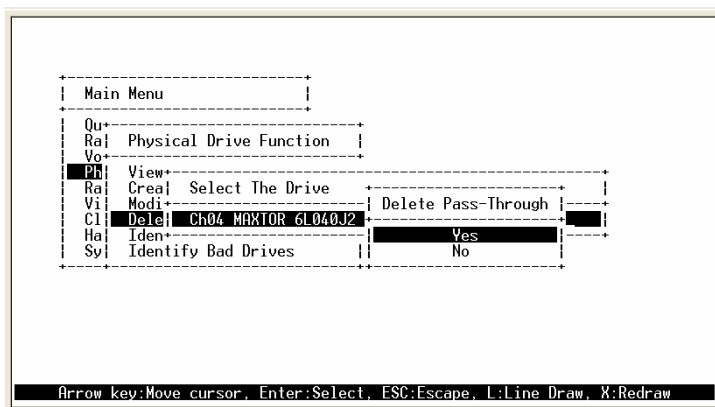
Disk is not controlled by the RAID subsystem firmware and thus cannot be a part of a Volume Set. The disk is available to the operating system as an individual disk. It is typically used on a system where the operating system is on a disk not controlled by the RAID subsystem firmware. The SCSI Channel, SCSI ID, SCSI LUN, Fibre Channel, Fibre LUN Base, Fibre LUN, SAS Port, SAS LUN Base, SAS LUN, Cache Mode, Tag Queuing, and Max Sync Rate items detail description can reference the **Create Volume Set** section.

5.5.4.3 Modify Pass-Through Disk

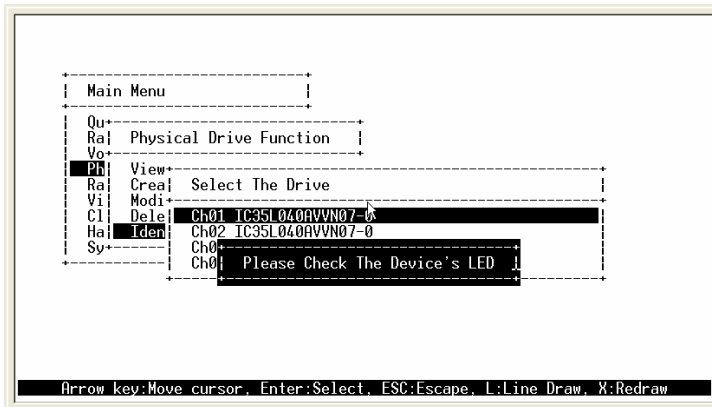
Use this option to modify the Pass-Through Disk Attribute. To modify Pass-Through Disk parameters values from Pass-Through Disk pool, move the cursor bar to the Physical Drive Function menu and select the **Modify Pass-Through Drive** option and then press **Enter** key. The Physical Drive Function menu will show all Raid Pass-Through Drive number option. Move the cursor bar to a desired item, then press **Enter** key to show all Pass-Through Disk Attribute. Select the parameter from the list you which to change, press **Enter** key to modify it.

5.5.4.4 Delete Pass-Through Disk

To delete Pass-through drive from the Pass-through drive pool, move the cursor bar to the Physical Drive Function menu and select the Delete pass-through drive item, then press **Enter** key. The Delete Pass-Through confirmation screen will appear and press **Yes** key to delete it.



5.5.4.5 Identify Selected Drive



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

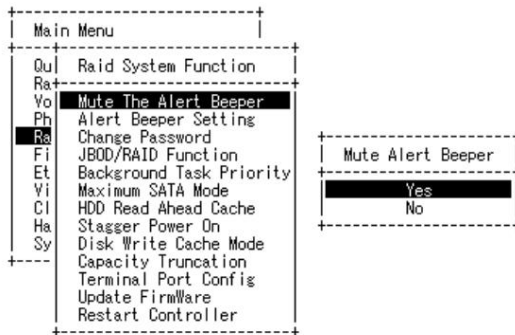
5.5.5 Raid System Function

To set the raid system function, move the cursor bar to the main menu and select the **Raid System Function** item and then press **Enter** key. The Raid System Function menu will show all items. Move the cursor bar to an item, then press **Enter** key to select the desired function.



5.5.5.1 Mute The Alert Beeper

Ainico AL-7181F RAID Controller

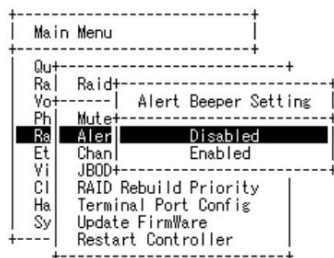


ArrowKey Or AZ:Move Cursor, Enter:Select, ESC:Escape, L:Line Draw, X:Redraw

The Mute The Alert Beeper function item is used to control the RAID subsystem Beeper. Select the **Yes** and press **Enter** key in the dialog box to turn the beeper off temporarily. The beeper will still activate on the next event.

5.5.5.2 Alert Beeper Setting

Ainico Series RAID Controller



ArrowKey Or AZ:Move Cursor, Enter:Select, ESC:Escape, L:Line Draw, X:Redraw

The Alert Beeper function item is used to Disabled or Enable the RAID subsystem controller alarm tone generator. Select the **Disabled** and press **Enter** key in the dialog box to turn the beeper off.

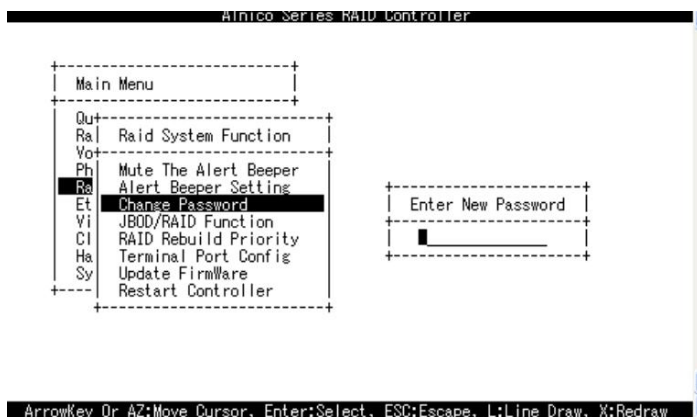
5.5.5.3 Change Password

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.

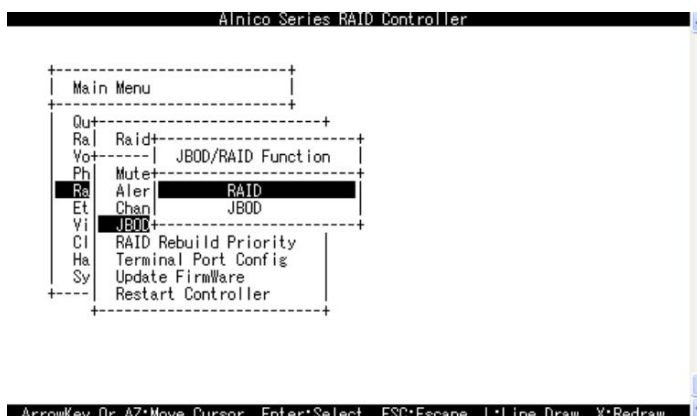
To set or change the RAID subsystem password, move the cursor to Raid System Function screen, press the Change Password item. The Enter New Password screen appears.

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



5.5.5.4 RAID/JBOD Function

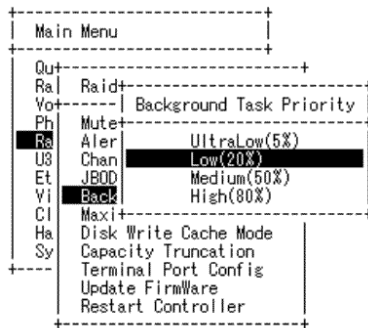
The “Raid Rebuild Priority” is a relative indication of how much time the controller devotes to a rebuild operation. The RAID subsystem allows user to choose the rebuild priority (low, normal, high) to balance volume set access and rebuild tasks appropriately.



5.5.5.5 Back Ground Task priority

The “Back Ground Task 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 (low, normal, high) to balance volume set access and rebuild tasks appropriately.

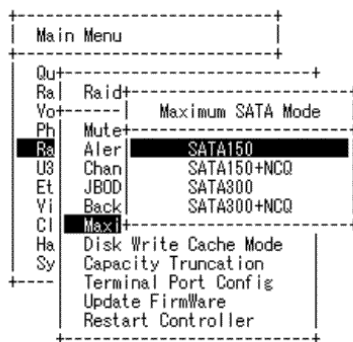


ArrowKey Or AZ:Move Cursor, Enter:Select, ESC:Escape, L:Line Draw, X:Redraw

5.5.5.6 Max SATA-Mode Support

Alnico Lite supports SATA-II (3.0Gps) and NCQ (Native command queuing), user can use this option to change the speed of SATA interface according to the HDD speed. There are 4 selections : SATA 150, SATA150+NCQ, SATA 300, SATA 300+NCQ.

To set or change the configuration, press the **UP/ DOWN** to select **SATA-Mode** and then press the **ENT** to accept the selection.



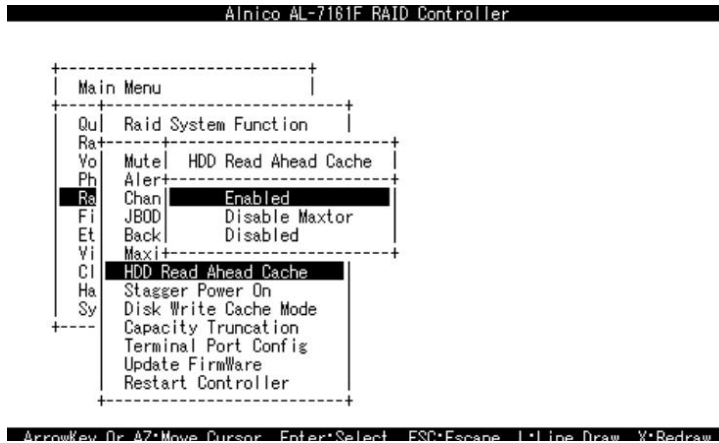
ArrowKey Or AZ:Move Cursor, Enter:Select, ESC:Escape, L:Line Draw, X:Redraw

5.5.5.7 HDD Read Ahead Cache

Alnico Lite supports HDD Read Ahead Cache, allowing the users to disable the cache in the HDD. To some HDD models, disabling the cache in the HDD is

necessary to prove the RAID subsystem functions.

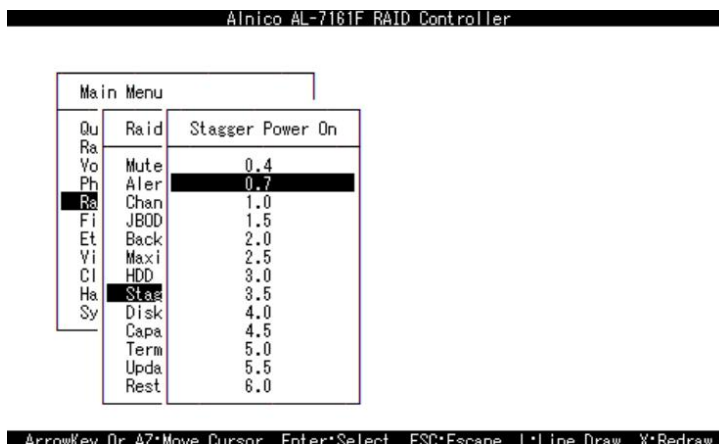
To set or change the configuration, press the **UP/ DOWN** to select **HDD Read Ahead Cache** and then press the **ENT** to accept the selection.



5.5.5.8 Stagger Power On Control

Alnico Lite supports Stagger Power On Control, allowing the power supplier to power up in order each HDD on the RAID subsystem. In the past, all the HDDs on the RAID subsystem will be 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 5.0.

To set or change the configuration, press the **UP/ DOWN** to select **Stagger Power On Control** and then press the **ENT** to accept the selection.



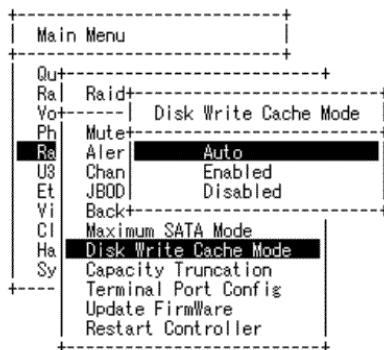
5.5.5.9 Disk Write Cache Mode

Disk cache can be turned off to prevent data lost, turned on to increase the performance of the machine. The following is the reason why a user might

wants to turn off the cache. In case of power failure, the data stored in the disk cache waiting to be process might be lost. The disadvantage to turn off the disk cache is that performance will decrease dramatically.

Auto : Disk cache's setting will according to the installation of battery back up. When battery back up installed, Disk cache is disable. No battery back up installed, Disk cache is enable.

To set or change the configuration, press the **UP/ DOWN** to select “**Disk Write Cache Mode**” and then press the **ENT** to accept the selection.



ArrowKey Or AZ:Move Cursor, Enter:Select, ESC:Escape, L:Line Draw, X:Redraw

5.5.5.10 Disk Capacity Truncation Mode

This function is used for cutting down the reminder or decimal to allow the storage space to be as a whole number.

For example:

It is rarely that the actual size of the Hard Drive is a whole number. Let's take a 40GB HDD for example, the actual size read by the controller maybe 40.55GB. This function “capacity truncation” can be used to trim down the capacity to 40.00 GB. This function is useful because in the future the 40.55HDD might go bad, and the user can't locate another 40GB drive which contains 40.55GB in the actual capacity, then that particular user will have to buy another drive with bigger capacity to rebuild the raid volume.

To set or change the configuration, press the **UP/ DOWN** to select “**Disk Capacity Truncation Mode**” and then press the **ENT** to accept the selection.

```

+-----+
| Main Menu |
+-----+
| Out |
| Ra | Raid |
| Yo |-----+
|      | Truncate Disk Capacity |
| Ph | Mute |
| Ra | Aler | To Multiples Of 10G |
| U8 | Chan | To Multiples Of 1G |
| Et | JBOD | Disabled |
| Vi | Back |
| Cl |-----+
|      | Maximum SATA Mode |
| Ha | Disk Write Cache Mode |
| Sy | Capacity Truncation |
|      | Terminal Port Config |
|      | Update Firmware |
|      | Restart Controller |
+-----+

```

ArrowKey Or AZ:Move Cursor, Enter:Select, ESC:Escape, L:Line Draw, X:Redraw

5.5.5.11 Terminal Port Config.

Alnico Series RAID Controller

| | | |
|-----------|----------------------|-------------------------------------|
| Main Menu | | |
| Qu | | |
| Ra | Raid System Function | |
| Vo | | |
| Ph | Mul | Terminal Port RS232 Speed Selection |
| Ra | All | |
| Et | Ch | Baud Rate 1200 |
| Vi | JB | Stop Bits 2400 |
| Cl | RA | 4800 |
| Ha | Terminal Port Cor | 9600 |
| Sy | Update FirmWare | 19200 |
| | Restart Controller | 38400 |
| | | 57600 |
| | | 115200 |

ArrowKey Or AZ:Move Cursor, Enter:Select, ESC:Escape, L:Line Draw, X:Redraw

Parity value is fixed at None.

Handshaking value is fixed at None.

Speed setting values are 1200, 2400, 4800, 9600, 19200, 38400, 57600, and 115200.

| Alnico Series RAID Controller | | | |
|-------------------------------|----------------------|--------------|------------------|
| Main Menu | | | |
| Out | Raid System Function | | |
| Vo | | | |
| Ph | Mul | Terminal Por | Select Stop Bits |
| Ra | Al | | |
| Et | Ch | Baud Rate | 1 bit |
| Vi | JB | Stop Bits | 2 bits |
| Cl | RA | | |
| Ha | Terminal Port Config | | |
| Sy | Update Firmware | | |
| | Restart Controller | | |

ArrowKey Or AZ:Move Cursor, Enter:Select, ESC:Escape, L:Line Draw, X:Redraw

Stop Bits values are 1 bit and 2 bits.

5.5.5.12 Update Firmware

Please reference the appendix B firmware utility for updating firmware.



1. User can update the firmware through the VT100 terminal or Web browser-based RAID management via HTTP Proxy through the controller's serial port.
2. User can update the firmware by the firmware-embedded web browser-based RAID manager through the controller's 10/100 Ethernet LAN port.

5.5.5.13 Spin Down Idle HDD

"Spin Down" is mainly designed to save the power consumption taken by the idle hard drives. When Spin Down is invoked, the SMART status of each hard drive will be marked as "N/A" to signify the hard drive has been at non-spin mode. As soon as data access is requested again, all the idle hard drives will be automatically waken up by the RAID controller.

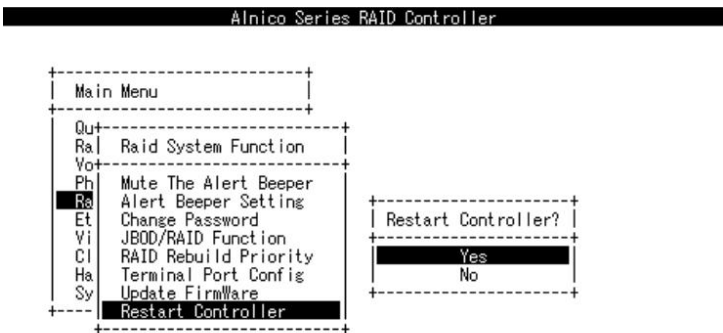
| Ma | Raid System Function |
|----|--------------------------|
| Qu | Mute The Alert Beeper |
| Ra | Alert Beeper Setting |
| Uo | Change Password |
| Ph | JBOD/RAID Function |
| Ra | Background Task Priority |
| U3 | Maximum SATA Mode |
| Et | HDD Read Ahead Cache |
| Ui | Volume Data Read Ahead |
| Cl | Stagger Power On |
| Ha | Spin Down Idle HDD |
| Sy | HDD SMART Status Polling |
| | Disk Write Cache Mode |
| | Capacity Truncation |
| | Terminal Port Config |
| | Update FirmWare |
| | Restart Controller |

5.5.5.14 Restart Controller

Use the Restart Controller Function to reset the entire configuration from the RAID subsystem controller non-volatile memory. To reset the controller, move the cursor bar to the Main menu Raid System Function item and then press the **Enter** key. The Raid System Function menu appears on the screen. Press **Enter** key to the Reset Controller item. The Reset Controller confirmation screen appears. Select **Yes** key to reset entire RAID system.



It can only work properly at Host and Drive without any activity.



ArrowKey Or AZ:Move Cursor, Enter:Select, ESC:Escape, L:Line Draw, X:Redraw

5.5.6 U320 SCSI Target Config / Fibre Channel Config

AN-308SC, AN-312SC & AN-316SC : U320 SCSI Target Config

Use to enable or disable QAS and Down To U160 If U320 Unstable or select 12/16Bytes CDB. 12 Bytes CDB allows the RAID subsystem to support Over-2TB under Windows Server 2003 (Must be coupled with SP1 and Alnico MPIO driver) and Linux (Must be coupled with Alnico Linux patch). 16Bytes CDB allows the RAID subsystem to fully support Over-2TB without any extra files or drivers pre-installed


```

+-----+
| Main Menu |
+-----+
| Qst+-----+
| Rst U320 SCSI Target Configuration |
| Yot+-----+
| Phl Channel 0 QAS : Enabled |
| Rst Channel 1 QAS : Enabled |
| U3l Auto Speed Down : Enabled |
| Et1 Two TB CDB Select : 16 Bytes CDB |
| Vil Inband SCSI Function: Disabled |
| Ctl Inband SCSI Channel : 0 |
| Hal Inband SCSI ID : 0 |
| Syt+-----+
+-----+

```

AN-308F4, AN312F4 & AN-316F4 : Fibre Channel Config.

To set the Fibre channel config function, move the cursor bar to the main menu and select the **Fibre Channel Config** item and then press **Enter** key. The Fibre Channel Configuration menu will show all items. Move the cursor bar to an item, then press **Enter** key to select the desired function.

Ainico AL-7161F RAID Controller

```

Main Menu
Quick 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

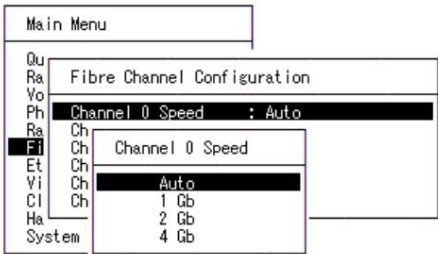
```

ArrowKey Or AZ+Move Cursor Enter+Select ESC+Escape L+Line Draw Y+Redraw

5.5.6.1 Channel Speed

Each FC Channel can be configured as **1 Gbps/sec**, **2 Gbps/sec**, **4Gbps/sec** for **6160A** or use "**Auto**" option for auto speed negotiation between 1G/2G/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.

Ainico AL-7161F RAID Controller

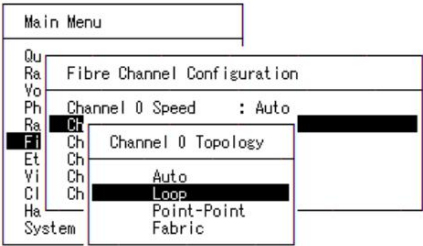


ArrowKey Or AZ:Move Cursor, Enter:Select, ESC:Escape, L:Line Draw, X:Redraw

5.5.6.2 Channel Topology

Each FC Channel can be configured as **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.

Ainico AL-7161F RAID Controller



ArrowKey Or AZ:Move Cursor, Enter:Select, ESC:Escape, L:Line Draw, X:Redraw

5.5.6.3 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.

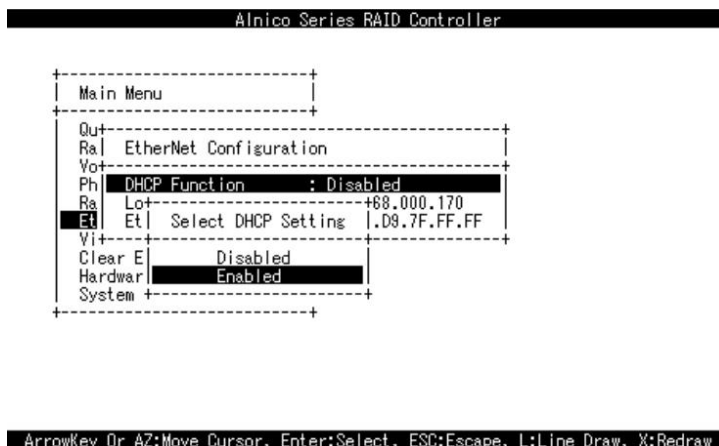
5.5.7 Ethernet Configuration

Use this feature to set the controller Ethernet port configuration. Customer doesn't need to create a reserved space on the arrays before the Ethernet port and HTTP service working.

5.5.7.1 DHCP Function

DHCP (Dynamic Host Configuration Protocol) is a protocol that lets network administrators manage centrally and automate the assignment of IP (Internet Protocol) configurations on a computer network. When using the Internet's set of protocols (TCP/IP), in order for a computer system to communicate to another computer system it needs a unique IP address. Without DHCP, the IP address must be entered manually at each computer system. DHCP lets a network administrator supervise and distribute IP addresses from a central point. The purpose of DHCP is to provide the automatic (dynamic) allocation of IP client configurations for a specific time period (called a lease period) and to eliminate the work necessary to administer a large IP network.

To manually configure the IP address of the controller, move the cursor bar to the Main menu Ethernet Configuration Function item and then press the **Enter** key. The Ethernet Configuration menu appears on the screen. Move the cursor bar to DHCP Function item, then press **Enter** key to show the DHCP setting. Select the “**Disabled**” or “**Enabled**” option to enable or disable the DHCP function.



5.5.7.2 Local IP address

If you intend to set up your client computers manually, make sure that the assigned IP address is in the same range of your default router address and that

it is unique to your private network. However we would highly recommend that if you have a network of computers and the option to assign your TCP/IP client configurations automatically, please do. An IP address allocation scheme will reduce the time it takes to set-up client computers and eliminate the possibilities of administrative errors.

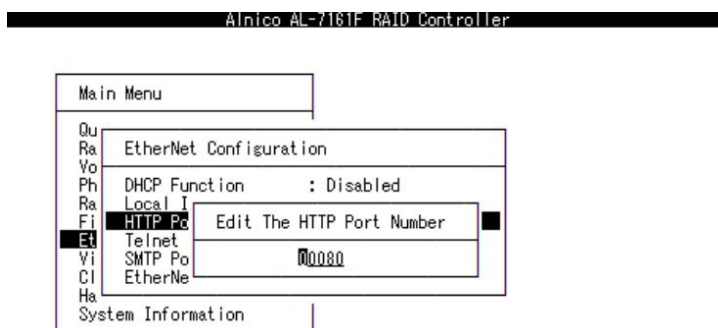
To manually configure the IP address of the controller, move the cursor bar to the Main menu Ethernet Configuration Function item and then press the **Enter** key. The Ethernet Configuration menu appears on the screen. Move the cursor bar to Local IP Address item, then press **Enter** key to show the default address setting in the RAID controller. You can reassign the IP address of the controller.



ArrowKey Or AZ:Move Cursor, Enter:Select, ESC:Escape, L:Line Draw, X:Redraw

5.5.7.3 HTTP Port Number

Use to change the HTTP port number. Default is 80.



ArrowKey Or AZ:Move Cursor, Enter:Select, ESC:Escape, L:Line Draw, X:Redraw

5.5.7.4 Telnet Port Number

Use to change the Telnet Port number. Default is 23.

Ainico AL-7161F RAID Controller

The screenshot shows the Main Menu of the Ainico AL-7161F RAID Controller. The menu options are: Qu, Ra, Vo, Ph, Ra, Fi, Et, Vi, Ci, Ha, and System Information. The 'Et' option is highlighted. A sub-menu is displayed for 'Ethernet Configuration' with options: DHCP Function (Disabled), Local I, HTTP Po, Edit The Telnet Port Number, Telnet, SMTP Po, and EtherNe. The 'Telnet' option is highlighted, and a value of '00023' is shown next to it.

ArrowKey Or A7:Move Cursor Enter:Select ESC:Escape L:Line Draw Y:Redraw

5.5.7.5 SMTP Port Number

Use to change the SMTP Port number. Defaults is 25.

Ainico AL-7161F RAID Controller

The screenshot shows the Main Menu of the Ainico AL-7161F RAID Controller. The menu options are: Qu, Ra, Vo, Ph, Ra, Fi, Et, Vi, Ci, Ha, and System Information. The 'Et' option is highlighted. A sub-menu is displayed for 'Ethernet Configuration' with options: DHCP Function (Disabled), Local I, HTTP Po, Edit The SMTP Port Number, Telnet, SMTP Po, and EtherNe. The 'SMTP Po' option is highlighted, and a value of '00025' is shown next to it.

ArrowKey Or A7:Move Cursor Enter:Select ESC:Escape L:Line Draw Y:Redraw

5.5.7.6 Ethernet Address

A MAC address stands for Media Access Control address and is your computer's unique hardware number. On an Ethernet LAN, it's the same as your Ethernet address. When you're connected to the Internet from the RAID controller Ethernet port, a correspondence table relates your IP address to the RAID controller's physical (MAC) address on the LAN.

Ainico Series RAID Controller

| | |
|-----------|--------------------------------------|
| Main Menu | |
| Qu+ | EtherNet Configuration |
| Ra | |
| Vo+ | |
| Ph | DHCP Function : Disabled |
| Ra | Local IP Address : 192.168.000.170 |
| Et | EtherNet Address : 00.04.09.7F.FF.FF |
| Vi+ | |
| Clear E | |
| Hardwar | |
| System | |

ArrowKey Or AZ:Move Cursor, Enter:Select, ESC:Escape, L:Line Draw, X:Redraw

5.5.8 View System Events

To view the RAID subsystem controller's system event information, move the cursor bar to the main menu and select the **View System Events** link, then press the **Enter** key. The RAID subsystem events screen appears.

Ainico Series RAID Controller

| | | | |
|-------------------------|-----------------|------------------|-------------------|
| Main Menu | | | |
| Quick Volume/Raid Setup | | | |
| Time | Device | Event Type | ElapseTime Errors |
| 000:30:49 | Volume Set # 00 | Create Volume | |
| 000:31:19 | Raid Set # 00 | Create RaidSet | |
| 000:31:28 | H/W Monitor | BPlane Temp OK | |
| 000:31:38 | H/W Monitor | BPlane Over Temp | |
| 000:31:44 | Raid Set # 00 | Delete RaidSet | |
| 000:31:44 | Volume Set # 00 | Complete Init | 000:08:30 |
| 000:31:50 | H/W Monitor | BPlane Temp OK | |
| 000:32:51 | H/W Monitor | BPlane Over Temp | |

ArrowKey Or AZ:Move Cursor, Enter:Select, ESC:Escape, L:Line Draw, X:Redraw

Choose this option to view the system events information: Time, Device, Event type, Elapse Time and Errors. The RAID system does not built the real time clock. The Time information is the relative time from the RAID subsystem power on.

5.5.9 Clear Events Buffer

Use this feature to clear the entire events buffer information.

5.5.10 Hardware Monitor

| Ainico Series RAID Controller | |
|-------------------------------|----------------------------------|
| Main Menu | The Hardware Monitor Information |
| | Controller Temp. : 35 (Celsius) |
| Quick Volume | Power +12V : 12.160 |
| Raid Set Fun | Power +5V : 5.107 |
| Volume Set F | Power +3.3V : 3.264 |
| Physical Dri | Power +2.5V : 2.544 |
| Raid System | Power +1.3V : 1.312 |
| Ethernet Con | Power +1.25V : 1.280 |
| View System | System Power #1 : OK |
| Clear Event | System Power #2 : OK |
| Hardware Mon | System Fan#1 RPM : 5532 |
| System Infor | System Fan#2 RPM : 5192 |
| | System Fan#3 RPM : 4687 |
| | System Fan#4 RPM : 5113 |

ArrowKey Or AZ:Move Cursor, Enter:Select, ESC:Escape, L:Line Draw, X:Redraw

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

| Ainico Series RAID Controller | |
|-------------------------------|----------------------------------|
| Main Menu | The Hardware Monitor Information |
| | HDD #1 Temp. : 25 |
| Quick Volume | HDD #2 Temp. : 26 |
| Raid Set Fun | HDD #3 Temp. : 25 |
| Volume Set F | HDD #4 Temp. : 28 |
| Physical Dri | HDD #5 Temp. : 24 |
| Raid System | HDD #6 Temp. : 24 |
| Ethernet Con | HDD #7 Temp. : 26 |
| View System | HDD #8 Temp. : 27 |
| Clear Event | HDD #9 Temp. : 25 |
| Hardware Mon | HDD #10 Temp. : 25 |
| System Infor | HDD #11 Temp. : 26 |
| | HDD #12 Temp. : 28 |
| | HDD #13 Temp. : 25 |
| | HDD #14 Temp. : 25 |
| | HDD #15 Temp. : 27 |
| | HDD #16 Temp. : 28 |

ArrowKey Or AZ:Move Cursor, Enter:Select, ESC:Escape, L:Line Draw, X:Redraw

| Item | Warning Condition |
|------------------------------|----------------------|
| Controller Board Temperature | > 60 Celsius |
| Controller Fan Speed | < 1500 RPM |
| Power Supply +12V | < 10.8V or > 13.2V |
| Power Supply +5V | < 4.75V or > 5.25V |
| Power Supply +3.3V | < 3.135V or > 3.465V |
| DDR Supply Voltage +2.5V | < 2.375V or > 2.625V |

| | |
|------------------------|----------------------|
| CPU Core Voltage +1.3V | < 1.235V or > 1.365V |
| SATA Chip +1.25V | < 1.188V or > 1.313V |
| HDD temperature | > 55 Celsius |

5.5.11 System Information

Alnico Series RAID Controller

| | |
|--------------|------------------------------------|
| Main Menu | |
| Quick Volume | The System Information |
| Raid Set Fun | |
| Volume Set F | |
| Physical Dri | Main Processor : 400MHz IOP321 |
| Raid System | CPU ICache Size : 32KB |
| Ethernet Con | CPU DCache Size : 32KB/Write Back |
| View System | System Memory : 512MB/200MHz |
| Clear Event | Firmware Version : V1.28 2004-2-4 |
| Hardware Mon | Serial Number : 1100-2118-6633 |
| System Infor | Controller Name : AL-6160S |
| | Current IP Addr. : 192.168.000.170 |

ArrowKey Or AZ:Move Cursor, Enter:Select, ESC:Escape, L:Line Draw, X:Redraw

Choose this option to display Main processor, CPU Instruction cache and data cache size, firmware version, serial number, controller model name, and the cache memory size. To check the system information, move the cursor bar to **System Information** item, then press **Enter** key. All major controller system inform

Appendix A.

Upgrading Firmware

Since the RAID 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 firmware through the RS-232 port or 10/100 Ethernet port. New releases of firmware are available in the form of a DOS file. 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 and Ethernet port

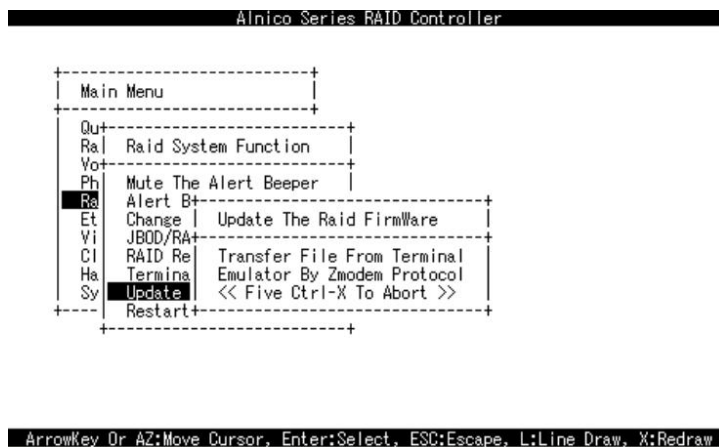
The firmware can be downloaded to the RAID controller by using an ANSI/VT-100 compatible terminal emulation program or HTTP web browser manager. You must complete the appropriate installation procedure before proceeding with this firmware upgrade. Please refer to Software Operation Manual : Chapter 4.3, "VT100 terminal (Using the controller's serial port)" for details on establishing the connection. Whichever terminal emulation program is used must support the ZMODEM file transfer protocol.

Web browser-based RAID manager can be used to update the firmware. You must complete the appropriate installation procedure before proceeding with this firmware upgrade. Please refer to Software Operation Manual : chapter 6.1, "Web browser-based RAID manager (Using the controller's Ethernet port)" for details on establishing the connection.

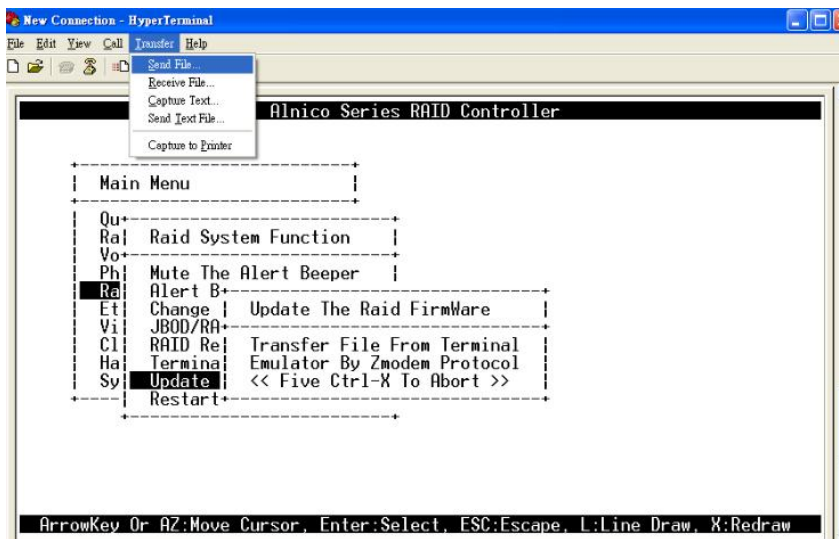
Upgrading Firmware Through ANSI/VT-100 Terminal Emulation

Get the new version firmware for your RAID 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.

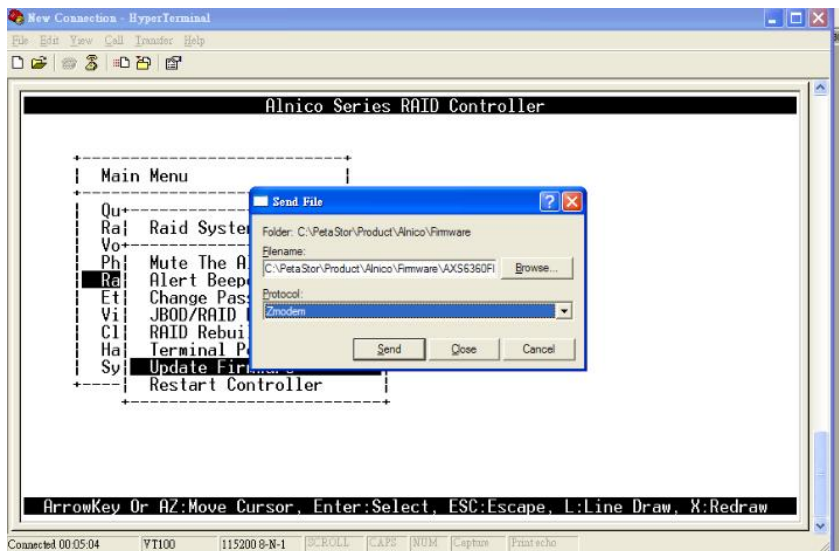


3. Go to the tool bar and select Transfer. Open "**Send File**".

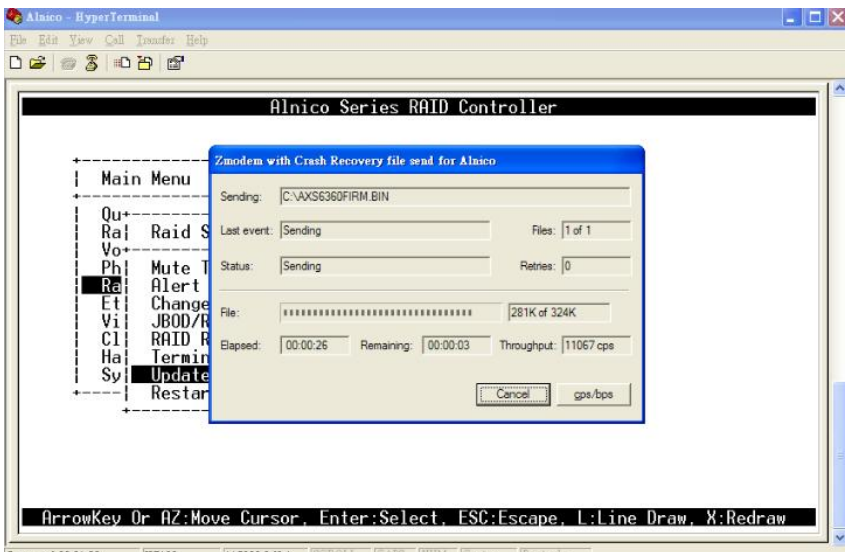


4. Select “**ZMODEM modem**” under Protocol. ZMODEM as the file transfer protocol of your terminal emulation software.

5. Click Browse. Look in the location where the Firmware upgrade software is located. Select the File name and click “**open**”.



6. Click “**Send**”. Send the Firmware Binary to the controller



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



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

Alnico Series RAID Controller

```

Main Menu
-----
Qu+ Raid System Function
Ra+
Vo+
Ph+ Mute The Alert Beeper
Ra+ Alert Beeper Setting
Et+ Change Password
Vi+ JBOD/RAID Function
Cl+ RAID Rebuild Priority
Ha+ Terminal
Sy+ Update [Start Updating Firmware, Please Wait]
Restart
  
```

ArrowKey Or AZ:Move Cursor, Enter:Select, ESC:Escape, L:Line Draw, X:Redraw

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”.

```

Main Menu
-----
Qu+ Raid System Function
Ra+
Vo+
Ph+ Mute The Alert Beeper
Ra+ Alert Beeper Setting
Et+ Change Password
Vi+ JBOD/RAID Function
Cl+ RAID Rebuild Priority
Ha+ Maximum ATA Mode
Sy+ Terminal
Update [Firmware Has Been Updated Successfully]
Reset C
  
```

Arrow key:Move cursor, Enter:Select, ESC:Escape, L:Line Draw, X:Redraw

11. After the new firmware completes download, user should find a chance to restart the controller for the new firmware to take effect.



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. For Example, download the bin file from your OEM's web site onto the c:

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

Click Browse. Look in the location where the Firmware upgrade software is located. Select the File name click **"open"**.

Click the **"Confirm The Operation"** and press the **"Submit"** button.

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

The screenshot shows the RAID controller's web management interface. On the left is a sidebar with a tree view of configuration categories: **Resource Raid Set**, **Volume Functions** (with sub-items: Create Volume Set, Delete Volume Set, Modify Volume Set, Check Volume Set, Snap Volume Set Check), **Physical Drive** (with sub-items: Create Pass Through, Modify Pass Through, Delete Pass Through, Identify Drive), **System Control** (with sub-items: System Config, U320 SCSI Target Co, Ethernet Config, Alert By Mail Config, SNMP Configuration, NTP Configuration, View Events/Mode, Beeper, Generate Test Event, Clear Event Buffer, Modify Password, Upgrade Firmware, Restart Controller), and **Information** (with sub-items: RaidSet Hierarchy, System Information, Hardware Monitor). The main content area is titled 'Upgrade The Raid System Firmware Or Boot Rom'. It contains a text input field labeled 'Enter The BootRom Or Firmware File Name' with the value 'C:\XNS6360FIRM.BIN' and a 'Browse...' button. Below this is a section with a green checkmark icon and the text 'Confirm The Operation'. At the bottom of this section are 'Submit' and 'Reset' buttons.

After the firmware upgrade is complete, a bar indicator will show “ Firmware Has Been Updated Successfully”

After the new firmware completes download, user should find a chance to restart the controller for the new firmware to take effect.



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.

Appendix B.

Fibre Operation

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 200 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-to-point 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.

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 N-ports 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.

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

Appendix C.

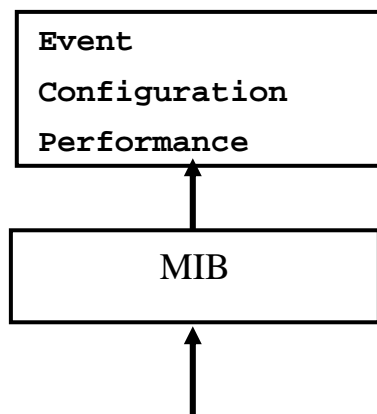
SNMP Operation & Definition

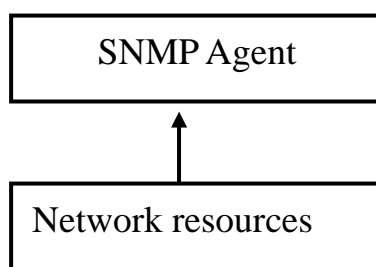
Overview

The Alnico RAID subsystem firmware-embedded Simple Network Management Protocol (SNMP) agent for the connect array. An SNMP-based management application (also known as an SNMP manager) can monitor the disk array. An example of An SNMP management application is Hewlett-Packard's Open View. The firmware-embedded SNMP agent can be used to augment the RAID controller if you are already running an SNMP management application at your site.

SNMP Definition

SNMP, an IP-based protocol, has a set of commands for getting the status of target devices. The SNMP management platform is called the SNMP manager, and the managed devices have the SNMP agent loaded. Management data is organized in a hierarchical data structure called the management Information Base (MIB). These MIBs are defined and sanctioned by various industry associations. The objective is for all vendors to create products in compliance with these MIBs so that inter-vendor interoperability can be achieved. If a vendor wishes to include additional device information that is not specified in a standard MIB, then that is usually done through MIB extensions.





SNMP Installation

- The installation of the SNMP manager is accomplished in several phases:
- Installing the Manager software on the client
- Placing a copy of the management information base (MIB) in a directory which is accessible to the management application
- Compiling the MIB description file with the management application

MIB Compilation and Definition File creation

Before the manager application accesses the RAID controller, user needs to integrate the MIB into the management application's database of events and status indicator codes. This process is known as compiling the MIB into the application. This process is highly vendor-specific and should be well-covered in the User's Guide of your SNMP application. Ensure the compilation process successfully integrates the contents of the XXXX.MIB file into the traps database.

Location for MIB

Depending upon the SNMP management application used, the MIB must be placed in a specific directory on the network management station running the management application. The MIB file must be manually copied to this directory. For example:

| SNMAP Management Application | MIB Location |
|------------------------------|-----------------------|
| HP OpenView | \OV\MIBS |
| Netware NMS | \NMS\SNMPMIBS\CURRENT |

Your management application may have a different target directory. Consult the management application's user manual for the correct location.

RAIDMIB Object Definition

All traps are defined under this object according to the following table :

| Trap | Description | Trap Number |
|---------------------|-------------------------------|--------------|
| [Reserved] | | 1-127 |
| Traps | 128-255 are RaidSet | Traps |
| rsCreate | | 128 |
| rsDelete | | 129 |
| rsExpand | | 130 |
| rsRebuild | | 131 |
| rsDegraded | | 132 |
| rsNoEvent | | 133 |
| [Reserved] | | 134-255 |
| Traps | 256-383 are VolumeSet | Traps |
| vsInitializing | | 256 |
| vsRebuilding | | 257 |
| vsMigrating | | 258 |
| vsChecking | | 259 |
| vsCompleteInit | | 260 |
| vsCompleteRebuild | | 261 |
| vsCompleteMigrating | | 262 |
| vsCompleteChecking | | 263 |
| vsCreate | | 264 |
| vsDelete | | 265 |
| vsModify | | 266 |
| vsDegraded | | 267 |
| vsFailed | | 268 |
| vsRevived | | 269 |
| vsTotals | | 270 |
| [Reserved] | | 271-383 |
| Traps | 384-511 are IDE Device | Traps |
| pdAdded | | 384 |
| pdRemoved | | 385 |
| pdReadError | | 386 |
| pdWriteError | | 387 |
| pdAtaEccError | | 388 |
| pdAtaChangeMode | | 389 |
| pdTimeOut | | 390 |

| | |
|---------------|---------|
| pdMarkFailed | 391 |
| pdPciError | 392 |
| pdSmartFailed | 393 |
| pdCreatePass | 394 |
| pdModifyPass | 395 |
| pdDeletePass | 396 |
| pdTotals | 397 |
| [Reserved] | 398-511 |

| | | |
|----------------|-----------------------------|--------------|
| Traps | 512-639 are SCSI Bus | Traps |
| scsiReset | | 512 |
| scsiParity | | 513 |
| scsiModeChange | | 514 |
| scsiTotals | | 515 |
| [Reserved] | | 516-639 |

| | | |
|--------------------|---------------------------------|--------------|
| Traps | 640—676 Hardware Monitor | Traps |
| hwSdram1BitEcc | | 640 |
| hwSdramMultiBitEcc | | 641 |
| hwTempController | | 642 |
| hwTempBackplane | | 643 |
| hwVoltage15 | | 644 |
| hwVoltage3 | | 645 |
| hwVoltage5 | | 646 |
| hwVoltage12 | | 647 |
| hwVoltage1_3 | | 648 |
| hwVoltage2_5 | | 649 |
| hwVoltage1_25 | | 650 |
| hwPower1Failed | | 651 |
| hwFan1Failed | | 652 |
| hwPower2Failed | | 653 |
| hwFan2Failed | | 654 |
| hwPower3Failed | | 655 |
| hwFan3Failed | | 656 |
| hwPower4Failed | | 657 |
| hwFan4Failed | | 658 |
| hwUpsPowerLoss | | 659 |
| hwTempController_R | | 660 |
| hwTempBackplane_R | | 661 |
| hwVoltage15_R | | 662 |
| hwVoltage3_R | | 663 |
| hwVoltage5_R | | 664 |
| hwVoltage12_R | | 665 |
| hwVoltage1_3_R | | 666 |
| hwVoltage2_5_R | | 667 |

| | |
|------------------|-----|
| hwVoltage1_25_R | 668 |
| hwPower1Failed_R | 669 |
| hwFan1Failed_R | 670 |
| hwPower2Failed_R | 671 |
| hwFan2Failed_R | 672 |
| hwPower3Failed_R | 673 |
| hwFan3Failed_R | 674 |
| hwPower4Failed_R | 675 |
| hwFan4Failed_R | 676 |

Appendix D.

Event Messages

Alnico RAID Event List

| Event | Type | Meaning | Action |
|----------------------|-------------|-----------------------------------|--|
| Device Inserted | Warning | HDD inserted | |
| Device Removed | Warning | HDD removed | |
| Reading Error | Warning | HDD reading error | Keep Watching HDD status, maybe it is caused by noise or HDD unstable. |
| Writing Error | Warning | HDD writing error | Keep Watching HDD status, maybe it is caused by noise or HDD unstable. |
| ATA Ecc Error | Warning | HDD ECC error | Keep Watching HDD status, maybe it is caused by noise or HDD unstable. |
| Change ATA Mode | Warning | HDD change ATA mode | Check HDD connection. |
| Time Out Error | Warning | HDD Time out | Keep Watching HDD status, maybe it is caused by noise or HDD unstable. |
| Device Failed | Urgent | HDD failure | Replace HDD |
| PCI Parity Error | Serious | PCI Parity error | If only happen once, it maybe caused by noise. If always happen, please check power supply or contact to us. |
| Device Failed(SMART) | Urgent | HDD SMART failure | Replace HDD |
| PassThrough Disk | Inform | Pass Through Disk Created | |
| PassThrough Disk | Inform | Pass Through Disk Modified | |
| PassThrough Disk | Inform | Pass Through Disk Deleted | |
| Start Initialize | Warning | Volume initialization has started | |
| Start Rebuilding | Warning | Volume rebuilding has | |

| | | | |
|-----------------------|---------|---------------------------------|-------------|
| | | started | |
| Start Migrating | Warning | Volume migration has started | |
| Start Checking | Warning | Volume parity checking has | |
| Complete Init | Warning | Volume initialization completed | |
| Complete Rebuild | Warning | Volume rebuilding completed | |
| Complete Migrate | Warning | Volume migration completed | |
| Complete Check | Warning | Volume parity checking | |
| Create Volume | Warning | New Volume Created | |
| Delete Volume | Warning | Volume deleted | |
| Modify Volume | Warning | Volume Modify | |
| Volume Degraded | Urgent | Volume degraded | Replace HDD |
| Volume Failed | Urgent | Volume failure | |
| Failed Volume Revived | Urgent | Failed Volume revived | |
| Abort Initialization | Warning | Initialization been abort | |
| Abort Rebuilding | Warning | Rebuilding been abort | |
| Abort Migration | Warning | Migration been abort | |
| Abort Checking | Warning | Parity Check been abort | |
| Stop Initialization | Warning | Initialization been stoped | |
| Stop Rebuilding | Warning | Rebuilding been stoped | |
| Stop Migration | Warning | Migration been stoped | |
| Stop Checking | Warning | Parity Check been stoped | |
| Create RaidSet | Warning | New Raidset created | |
| Delete RaidSet | Warning | Raidset deleted | |

| | | | |
|-----------------------------|---------|--|---|
| Expand RaidSet | Warning | Raidset expand. | |
| Rebuild RaidSet | Warning | Raidset rebuilding | |
| RaidSet Degraded | Urgent | Raidset degraded | Replace HDD |
| SCSI Bus Reset | Inform | SCSI Bus got a Reset command | Depend on system status, it could be normal status(such as host boot up) or abnormal status cause by unstable SCSI cabling / termination. |
| SCSI Bus Parity | Inform | SCSI Bus encounter Parity Error | Check SCSI cabling / termination |
| SCSI Bus SE<>LVD | Inform | SCSI Bus transfer speed changed | Depend on system status, it could be normal status(such as SE device inserted) or abnormal status cause by unstable SCSI cabling / termination. |
| IDE Bus Reset | Inform | IDE Bus got a Reset command | Depend on system status, it could be normal status(such as host boot up) or abnormal status cause by compatibility problem. |
| IDE Bus UDMA CRC | Inform | IDE Bus encounter UDMA CRC Error | |
| FC Link Up | Inform | Fibre Channel Link Up | |
| FC Link Down | Inform | Fibre Channel Link Down | |
| In U160 Mode | Serious | SCSI Bus transfer speed changed to U160 | The SCSI Bus may noisy, check the SCSI cabling and termination. |
| DRAM 1-Bit ECC | Urgent | DRAM 1-Bit ECC error | Check DRAM |
| DRAM Fatal Error | Urgent | DRAM fatal error encountered | Check the DRAM module and replace with new one if required. |
| Controller Over Temperature | Urgent | Abnormally high temperature detected on controller (over 6degree) | Check air flow and cooling fan of the enclosure, and contact us. |
| Backplane Over Temperature | Urgent | Abnormally high temperature detected on backplane (over 55 degree) | Check air flow and cooling fan of the enclosure, and contact us. |
| HDD Over Temperature | Urgent | Abnormally high temperature detected on HDD (over 55) | Check air flow and cooling fan of the enclosure. |
| #.#V Abnormal | Urgent | Abnormal voltage detected. (exceed 5% tolerance, 12V is 10%) | If only happen once, it maybe caused by noise. If always happen, please check the voltage output of the power |

| | | | |
|-------------------------------|---------|--|---|
| Power Failed | Urgent | Power # failure | Check the power supply, Replace a new one if required. |
| Fan Failed | Urgent | Cooling Fan # failure or speed below 1700RPM | Check cooling fan of the enclosure, and replace with a new one if |
| UPS AC Power Loss | Urgent | UPS AC Power failure detected | Check AC power status or cabling between UPS and RAID system. |
| Controller Temp. Recovered | Serious | Controller temperature back to normal level. | |
| Backplane Tempe. Recovered | Serious | Backplane temperature back to normal level. | |
| Hdd Temp. Recovered | | | |
| #. #V Recovered | Serious | Voltage output back to normal | |
| Power # Recovered | Serious | Power # back to on-line state. | |
| Fan # Recovered | Serious | Fan # back to on-line state. | |
| UPS AC Power Recovered | Serious | UPS AC power back to on-line state. | |
| Raid Powered On | Warning | Raid Power On | |
| Test Event | Urgent | Test Event | |
| Power On With Battery Backup | Warning | Raid Power On with battery backup | |
| Incomplete RAID Discovered | Serious | Some raidset member disks missing before power on | Check disk information to find out which channel missing. |
| HTTP Log In | Serious | a HTTP login detected | |
| Telnet Log In | Serious | a Telnet login detected | |
| VT100 Log In | Serious | a VT100 login detected | |
| API Log In | Serious | a API login detected | |
| Lost Rebuilding/Migration LBA | Urgent | Some rebuilding/migration raidset member disks missing before power on | Reinserted the missing member disk back, controller will continued the incompleted rebuilding/migration |

