ESCORT DA-3500

DISK ARRAY SOLUTION

USER'S GUIDE

Version 2.11

FCC ID : OBX983500

DATAWORLD INTERNATIONAL CORPORATION

stand-by, global spare, automatic rebuilding, hot swapping, on-line background rebuilding, and on-line RAID expansion, etc.

High Expandability and Flexibility

The subsystem can be upgraded to have more SCSI/LVD/Fibre channels with an optional daughter board without any difficulty. Each subsystem's SCSI/LVD/Fibre channel can be defined as either a drive channel or a host channel. This allows the connection of multi-host systems through independent channels. Channel 0 of the subsystem can be further assigned as synchronized cache port for active-active redundancy. The subsystem can even handle bad sectors on drives during disk read or write commands. It can recover the data from other drives of the same logical drive and do bad sector reassignments. And it does all this in a manner transparent to the host.

No Shutdown - Hot Swappable Components and Their Monitoring

Under no circumstances, should users turn off the subsystem. The subsystem's components - controllers, hard disks, fans and power supplies, can be online hot swapped. Since these components are being ceaselessly monitored, any of their fail messages, including those of hard disk overheat, are immediately transmitted by three different proprietary measures: LCD display, audible alarm and LED signal. The latter two message sources have the same or the nearest locations as those of the corresponding abnormally behaving components. The CPU temperature and controller voltage are also supervised so that warning messages will be immediately shown on LCD, once the abnormality occurs. In short, DA-3500 Series supports Fault-bus management interface. It gathers the failure signals from the drives, cooling fans, power supplies, hard disk temperatures, controller voltages and UPS device. Besides those three unprecedented and considerate measures, DA-3500 Series creates an even more user-friendly environment, i.e. it reports this fault information to users through GUI RAID Manager and RS-232 Terminal Emulation carried out on a remote computer,

Heat dissipation Design

To best dissipate heat, the subsystem deliberately chooses aluminum alloy cartridges as its hard disk accommodation. Four big highly efficient cooling fans, placed underneath the top cover's rearward, pump the internal hot air out in upward direction; moreover, a cooling fan is installed in each

Federal Communications Commission (FCC) Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

-- Reorient or relocate the receiving antenna.

-- Increase the separation between the equipment and receiver.

-- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

-- Consult the dealer or an experienced radio/TV technician for help.

Warning: A shielded-type power cord is required in order to meet FCC emission limits and also to prevent interference to the nearby radio and television reception. It is essential that only the supplied power cord be used.

Use only shielded cables to connect I/O devices to this equipment.

You are cautioned that changes or modifications not expressly approved by the party responsible for compliance could void your authority to operate the equipment.

1.2 Features

- *32 bit High-Throughput RAID Processor*
- *8 to 128 MB Cache Memory (DRAM or EDO RAM) of Intelligent Read-Ahead/Write-Back Cache Memory*
- *Five Operating Modes :*
  - *Non-RAID Disk Spanning*
  - *RAID-0 Disk Striping*
  - *RAID-1 Disk Mirroring and Striping (RAID 0+1)*
  - *RAID-3 Disk Striping with Dedicated Parity*
  - *RAID-5 Multiple Block Striping with Interspersed Parity*
- *Comprehensive failure management including:*
  - *Automatic bad sector reassignment*
  - *Hot-swapping*
  - *Spare drive operation (Supports both global Spare and Local Spare)*
  - *Background rebuilding (Rebuild priority selectable)*
  - *Verify-after-Write supported on normal writes, rebuild writes and/or RAID initialization writes*
- *Works with any operating system without additional software drivers*
- *Support 3-8 Ultra Wide SCSI Channels and Can Expand to LVD Ultra2 Wide SCSI Channels (DA-3500)*
- *Support 3-8 LVD Ultra2 Wide SCSI Channels (DA-3500V)*
- *All channels can be configured as either a host or drive interface*
- *Support up to 15 SCSI ID's per channel*
- *Up to 8 logical drives, each with independent RAID modes*
- *Up to 8 Partition Per Logical Drive*
- *Logical drive can be assigned a name for ease of Identification*
- *Metal Casting Structure for Excellent Heat-Dissipation*
- *Support for SAF-TE Enclosure Management*

For Europe

CE This drive is in conformity with the EMC directive.

For equipment FCC ID:

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation.

Federal Communications Commission (FCC) Statement

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1.4 Front and Back View

The follows show the front and back panels of the ESCORT DA-3500.

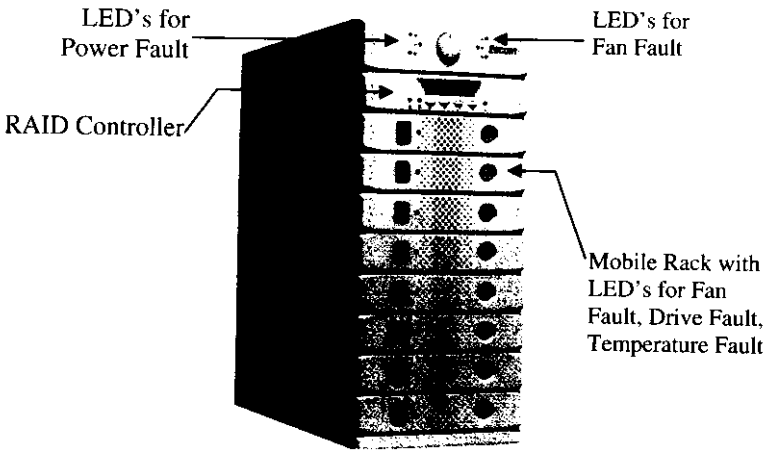


Figure 1-1 Front Configuration

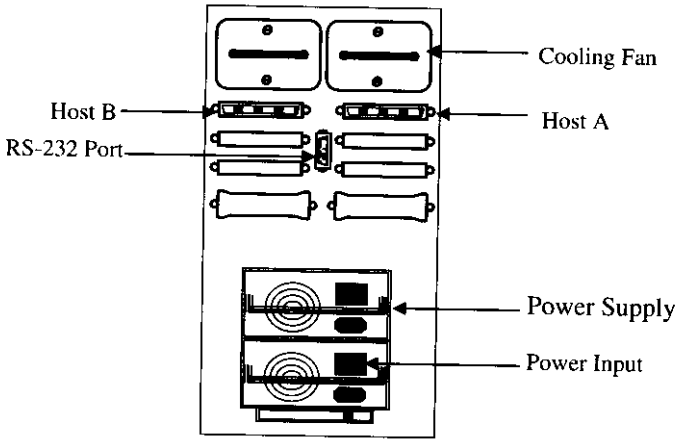


Figure 1-2 Back Configuration

1.5 Setting ESCORT DA-3500 Series Disk Array

1.5.1 Prepare Hard Disk

Please note that disabled or removed all your hard disk terminators before used on the DA-3500 Series Disk Array Because the DA-3500 Series Disk Array is designed use external terminator. Checking your hard disk manual about jumpers where Status LED and ID select before you install them. The DA-3500 Series Disk Array is designed use 3.5 inches half high or smaller of hard disk drive and they maybe not the same model, capacity, RPM and access time. The RAID size will be calculated with the lowest capacity of hard disks.

Chapter 1 ESCORT DA-3500 Series Disk Array

1.1 Introduction

ESCORT DA-3500 Series Disk Array equipped with redundant hot-swappable controllers, and the most elaborate triple measure EMCU (environment monitor control unit) design, is the-state-of-art storage subsystem acknowledged in the present markets. While being able to utilize all kinds of SCSI channels, including LVD and fibre one, DA-3500 series offers a great variety of RAID levels: 0, 1(0+1), 3 or 5, to fill the requirements for all sorts of applications. DA-3500 series employs SCA-II – the single connector back-plane technology. Only one 68-pin cable is needed to daisy chain a series of boards. This cuts down installation time, thus secures greater stability and reliability. To best dissipate heat, not only a cooling fan is installed in each cartridge's front panel, but also aluminum alloy is carefully chosen as constructing material for the cartridges themselves. For its most remarkable features, DA-3500 series undoubtedly deserves the customers' first choice.

High Performance

The subsystem can simultaneously distribute multiple requests from hosts to those connected SCSI drives to perform high-speed parallel data transfer. To achieve highest data throughput, full Ultra Wide SCSI support, including concurrent I/O and tagged command queuing are implemented. The controllers use high performance processors for intelligent I/O task optimization. The caching function is designed with intelligent read-ahead and write-back. Characterized with its OS-independence, the subsystem provides an optimal mass storage solution for a wide range of SCSI-based computers, single-user workstations, high-end PC servers, and mid-range UNIX systems. It can highly enhance the processing speed of disk I/O, especially suitable for processing work of large database, video, image and graphic application.

High Data Availability

The subsystem can provide RAID 0, 1(0+1), 3 and 5 options. With these RAID functions, it guarantees users the highest data availability and protection using capabilities like automatic drive failure detection, hot

Fig 4

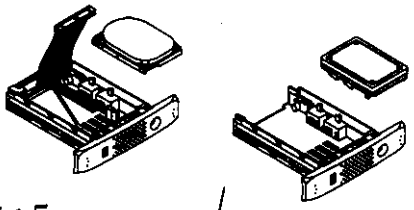
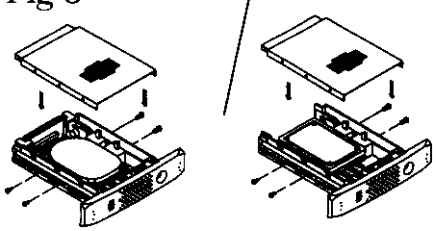


Fig 5



4. Connect the power cable, I/O connector and SCSI ID cable to the hard drive, then place the drive inside the cartridge. (Fig 4.)

Connect power supply to any drive

COLOR	RED	BLAC K	BLAC K	YELLOW
DC Power	+5V	COM	COM	+12V

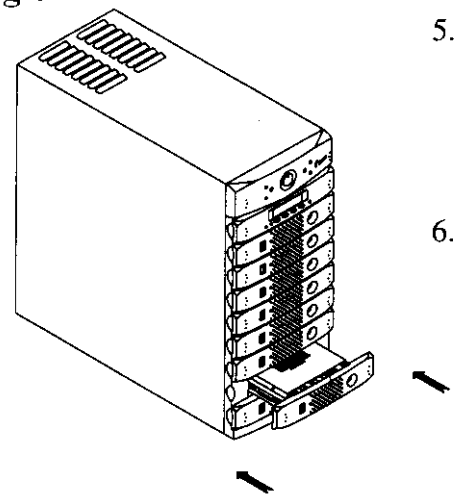
Connect LED to any drive

COLOR	AMBER	BLACK
AMBER-LED	+	-

Connect SCSI ID switch:

COLOR	BLACK	GRAY	YELLOW	BLUE	RED
ID SW	COM	8	4	2	1

Fig 6



5. Fasten the drive with four screws provided (screws should not be longer than 0.25") Replace the top cover to the cartridge. (Fig 5.)

6. Slide the Cartridge into the Receiving Frame and turning the Keylock to On position. (Fig 6.)

Warring : Before you remove the cartridge, please cut off the power by turning the Keylock to Off position, The power green LED will go off wait for 10 seconds for drive head parking.

cartridge's front panel to cool down the hard disk temperature. In total, there are eleven cooling fans, excluding the other two fans for the power supplies.

Explicit Front Panel Design

DA-3500 Series provides a clear and definite front panel design for easy management and maintenance. A safety power button is specially designed for preventing the subsystem from being mistakenly shut down, i.e. the user turns the button rightwards before pushes it. The four LEDs on the main front panel (above the controller's LCD) respectively indicate the power/failure status of the four big fans and the two power supplies. The two accompanying reset switches are separately employed to call off each corresponding audio alarm. On the left side of every cartridge's front panel, there is an ID LED indicating the hard drive's SCSI ID within. On the lower left, a LED indicates this hard drive's three working conditions – normal, overheat and failed, with three different colors – green, amber and red respectively; moreover, the color becomes amber, when the fan fails within. The other LED exhibiting amber light on the upper left shows the same drive's access. As on the main front panel, a reset switch in-between lifts the alarms for the fan and hard drive abnormalities.

User-friendly RAID System Configuration

In addition to its excellent hot swappable capabilities and most elaborate monitoring design, DA-3500 Series can be configured through the following ways to setup/display RAID proprietary properties and functions, i.e. SCSI ID, disk drive specification, logical drive, partition, rebuilding rate, RAID level, CPU & memory size, etc...

Full Active-Active Redundant Controllers and Power Supplies

Both controllers and power supplies have full active-active redundancy capability. For Controllers, the subsystem supports synchronized write-back cache to protect the information stored. When two controllers/power supplies are connected together and one controller/power supply fails, the other will take over in a way transparent to the host with no loss of data and no need to power down the whole storage device. Two controllers are active and provide RAID storage connectivity with up to twice the performance of a single controller.

1.6.7 In-Rush Current

CONDITIONS	LIMITS
132/264VAC, Full load. Turn off 1 sec; turn on at peak of input voltage cycle. 25°C Air Ambient cold start.	No damage shall occur or components over stressed, input fuse shall not blow.

1.6.8 Line Requirement

CONDITIONS	LIMITS
Full load, 90/180 -132/264 VAC input	+/- 1%

1.6.9 Input Leakage Current

Input leakage current from line to ground will be less than 3.5 mA rms. Measurement will be made at 240 VAC and 60 Hz.

1.6.10 Isolation (Hi-pot)

1500VRMS, 50 Hz, for one (1) minute between each input AC line and the grounding conductor.
3000VRMS, 50 Hz, for one (1) minute between each input AC lines and secondary low voltage outputs and shields.
All isolation transformers will have been tested prior to assembly into a power supply unit. Any such transformers without a grounded shield will be tested to 3750 VRMS.

1.6.11 Over Power Protection

This power supply shut down all DC outputs when +5 Vdc and +12 Vdc outputs are overloaded to the limit. The power supply logic shall latch into the off state requiring a power on cycle to be performed by the operator. The power supply will turn-off within 20 ms of the occurrence of the overload. The –5 Vdc and –12 Vdc outputs will be internally current limited.

- *8 Hot Swappable Mobile Rack and Automatically Rebuild*
- *Supports Industry Standard Single Connector Architecture (SCA-2)*
- *Environment Monitor Control Unit (EMCU) Supports LCD Display, Audible Alarm Function and LED's for Drive Fault, Power Fault, Fan Fault, Temperature Fault*
- *Intelligent SCSI Back-plane Design, Provides Hot Swappable Controller(DA-3500V), Disk Drives, Power Supply, Fan Modules*
- *GUI RAID Manager & RS-232 Terminal Interface for RAID Management*
- *Dynamic RAID Expansion Capability*
- *Flash EEPROM for Easy Firmware Up-grading*
- *Modem Support on Either of The Com Port*
- *Supports TELNET with PPP Protocol for Remote Administration*
- *Performance Optimization for Sequential or Random I/O*
- *Allows Multiple Drive Failure and Concurrent Multiple Drive Rebuild of A RAID (0+1) Logical Drive.*
- *Prior to First Disk Access, It Allow Adjustment of Delay Time During Controller Initialization to Enhance Compatibility with Slow-Initial Drives*
- *Full Tagged Command Queuing and Multi-Threaded I/O Implementation*
- *Optional Battery Backup module to protect data in Write-Back cache when power failure occurs*
- *Active/Active Redundant Controller Supported (Option)*
- *Dual 300W Redundant and Load Sharing Power Supply*

1.3 Packing

- *ESCORT DA-3500 Series Disk Array Subsystem.*
- *Provides Eight Mobile Rack.*
- *One external Wide SCSI Cables (HP68M to HP68M).*
- *Provides Two Power-Cord.*
- *ESCORT DA-3500 Series Disk Array User's guide.*

Chapter 2 Functional Description

The primary function of a disk array is to increase data availability, to increase total storage capacity, and to provide performance flexibility by selectively spreading data over multiple spindles. Data Protection - As the number of disks on system increases, the likelihood of one failing increases. Thus, a disk array should be immune from a single disk drive crash. Disk mirroring (keeping an exact copy of a one disk on another) is the simplest, but requires twice the disk capacity (and associated cost). Encoding schemes can be used to reduce the redundancy required to lower ratios. Storage Capacity is increased by placing many smaller form factor drives onto an intelligent controller which makes all the drives appear as one drive to the computer system. Spreading data over spindles can increase performance and performing operations in parallel, which allows multiple, drives to be working on a single transfer request.

The advantages of RAID are: Availability, Capacity and Performance. Choosing the right RAID level and drive failure management can increase Availability, subsequently increasing Performance and Capacity. The RAID subsystem provides complete RAID functionality and enhanced drive failure management.

2.1 RAID Management

RAID stands for Redundant Array of Inexpensive Drive. The advantages of using a RAID storage subsystem are:

- Provides disk spanning by weaving all connected drives into one single volume.
- Increases disk access speed by breaking data into several blocks when reading/writing to several drives in parallel. With RAID, storage speed increases as more drives are added.
- Provides fault-tolerance by mirroring or parity operation.

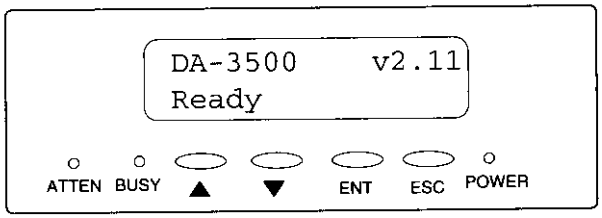
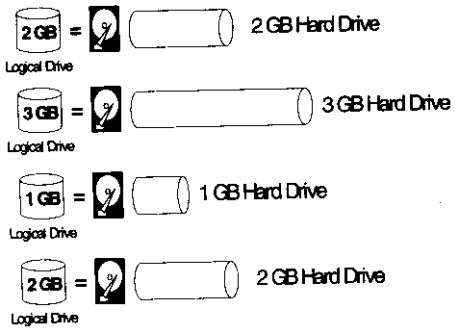


Figure 1-3 Locations of the Parts

Figure 1-3 Front View

POWER	Lighted LED indicates power is on.
BUSY	Unlit indicates no activity. Blinking indicates data is being accessed. Lighted LED indicates unprocessed cached data is still in the memory.
ATTEN	Lights when an error message appears or service is required, e.g., when a drive fails and needs to be replaced.
▼ ▲ buttons	Scroll through available options.
ENT button	Choose or executes an option.
ESC button	Returns to previous menu or cancel selection.
2 x 16 LCD	RAID controller
■■■■■	Displays throughput during normal operation, approximately 256Kbytes/sec per division. Displays message for configuration and management.

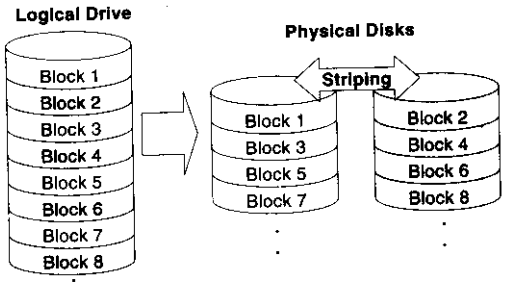
JBOD
Single Drive Control



JBOD	
Minimum Disks required	1
Capacity	1
Redundancy	No

JBOD stands for Just a Bunch of Drives. The RAID controller treats each drive as a stand-alone disk, therefore each drive is an independent logical drive. JBOD does not provide data redundancy.

RAID 0
Disk Striping

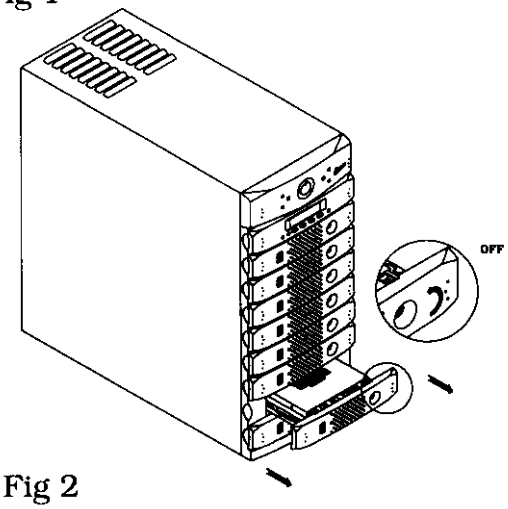


RAID 0	
Minimum Disks required	2
Capacity	N
Redundancy	No

RAID 0 provides the highest performance but no redundancy. Data in the logical drive is striped (distributed) across several physical drives.

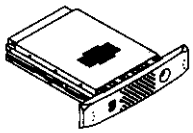
1.5.2 Assemble the Disk and Mobile Rack

Fig 1



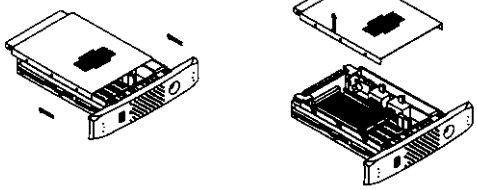
1. Before take the cartridge out, make sure that turning the keylock to Off position . (Fig 1.)

Fig 2



2. Move out the Cartridge from the receiving Frame. (Fig 2.)

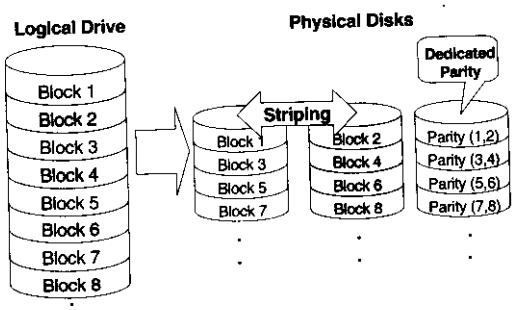
Fig 3



3. Open the Top Cover of Cartridge. (Fig 3.)

RAID 3
Disk Striping with
Dedicated Parity Disk

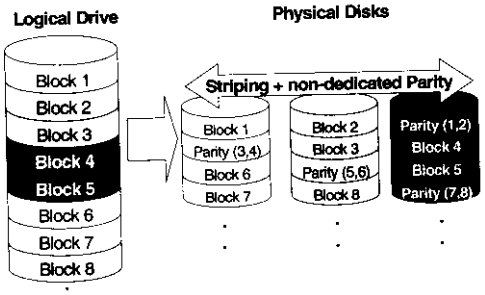
RAID 3	
Minimum Disks required	3
Capacity	N-1
Redundancy	Yes



RAID 3 performs Block Striping with Dedicated Parity. One drive member is dedicated to storing the parity data. When a drive member fails, the RAID controller can recover/regenerate the lost data of the failed drive from the dedicated parity drive.

RAID 5
Striping with Interspersed Parity

RAID 5	
Minimum Disks required	3
Capacity	N-1
Redundancy	Yes



RAID 5 is similar to RAID 3 but the parity data is not stored in one dedicated hard drive. Parity information is interspersed across the drive array. In the event of a failure, the RAID controller can recover/regenerate the lost data of the failed drive from the other surviving drives.

1.6 Redundant Power Supply

1.6.1 General

This specification describes the physical, function and electrical characteristics of a redundancy 300+300 watts, 4-output, fan-cooled switching power supply.

1.6.2 Parameter Specifications

Unless specified otherwise, all parameters must be met over the limits of Temperature, load and input voltage.

1.6.3 Input Voltage

Normal	Minimum	Maximum
115 VAC	90 VAC	132 VAC
230 VAC	180 VAC	264 VAC

Input voltage range set with a 115/230 VAC selector.

1.6.4 Input Waveform

The unit is capable of operation with a 10% distorted sinewave input as measured by a distortion analyzer. Its flattopping clipped 10% from the peak value of standard sinewave.

1.6.5 Input Frequency

47 Hz to 63 Hz

1.6.6 Input Current

Output Power	300W
Vin: 115 VAC	6.0 A
Vin: 230 VAC	3.0 A

Data is written to two duplicate sets of disks, providing total redundancy. If a drive fails, the data can be immediately accessed from the 'Mirrored' drive. Relative availability is excellent, but performance is reduced by the need to write all data to two sets of disks. Cost of storage capacity is twice that of data requirements. RAID 1 is most appropriate for applications where data protection is critical.

- Raid Level 3 - Data protection disk Parallel Array - mathematical ECC type code calculated from multiple spindles and stored on another spindle.

    1. Short Reads - Normal speed (i.e. 1x per-spindle rate)
    2. Long Reads - Normal speed
    3. Short Write - Slower due to re-calculating of ECC code (including reading from other spindles and the ECC write)
    4. Long Write - slightly slower due to ECC writes, but less reading required than in short writes (**)
    5. Redundancy - Excellent
    6. Cost - only slightly more than no redundancy options

Synchronized Access with Dedicated Parity Data is striped across drives in the array, with parity written to a dedicated parity drive. Excellent availability of data with fault tolerance at a storage cost of number of data drives + 1. Drives are rotationally synchronized, with all drives accessed simultaneously. Designed for applications processing large sequential files such as graphics and imaging. RAID 3 is best suited for single-threaded applications requiring high transfer rates for moving large blocks of data. Data is striped across the disk array with one drive reserved as the parity drive to reconstruct any lost data.
Because of its' ability to process large sequential files more efficiently than other RAID solutions, RAID Level 3 is the best RAID storage option for the prepress market. As explained in "Storage Option for Today's Prepress Workplace" (Digital Output Magazine, October, 1996) and "RAID 3 in the Prepress Workplace" (Digital Output magazine, November, 1996), the proper implementation of RAID 3 storage technology in the prepress workflow provides the highest performance levels for processing large graphics and image files.

CONDITIONS	LIMITS
90/180 VAC input	When output power is over to 120%

1.6.12 +5 VDC

CONDITIONS	LIMITS
All operating	6.25 VDC +/- 0.65 VDC

1.6.13 +12 VDC

CONDITIONS	LIMITS
All operating	13.6 VDC +/- 15.6 VDC

1.6.14 Short Circuit Protection

A short circuit placed on any output shall cause no damage to this unit.

1.6.15 No Load Operation

When primary power is applied, with no load no any output voltage, no damage or hazardous conditions shall occur. In such a case, the power supply shall power up and stabilize.

RAID 5 applications include:

- Enterprise or LAN servers
- Point of Sale (POS) Network Storage (Retail)
- Transaction Processing (Banking, Insurance, Accounting)
- Process Control (Industrial)

(* Should be the same speed as a single spindle)
(** -- Should be faster than a single spindle due to parallelism on write.)

Some General Application Principles

The vast majority of the files processed in the prepress workflow are large graphical images. In order to minimize the processing time of application requests, high data-transfer rates between the centralized storage array and multiple workstations is required. With synchronized access and dedicated parity, a RAID 3-storage array is particularly suited for applications that require rapid processing of large sequential files.

In RAID Level 3, all drives are accessed simultaneously with parity written to a dedicated parity drive. Large sequential files, such as graphic images and multi-page documents, are transferred in large block sizes, typically over 1MB, to and from all drives in the array at the same time. As a result, the combined bandwidth of all the drives in the array is utilized, and very high transfer rates are achieved.

In RAID Level 5, each drive is accessed independently with parity spread across all drives in the array. In applications such as database and transaction processing where large numbers of small files are processed, RAID 5 provides high-performance due to its ability to independently access small files from multiple disks at the same time.

The main difference between RAID 3 and RAID 5 is in the approach to storing and retrieving data from the drives in the array. Each is designed to provide maximum performance for specific application requirements. RAID 3 is designed to provide maximum data-transfer rates with large files, and RAID 5 is designed to provide maximum performance in processing many small files.

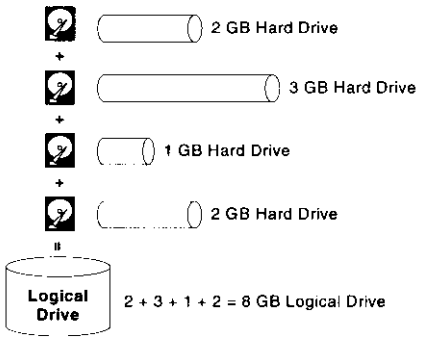
In a five drive RAID 3 array, data is written simultaneously to four drives

What are the RAID levels?

RAID Level	Description	Minimum Drives	Data Availability	Performance Sequential	Performance Random
NRAID	Non-RAID	1		Drive	Drive
RAID 0	Disk Striping	N	==NRAID	R: Highest W: Highest	R: High W: Highest
RAID 1 (0+1)	Mirroring Plus Striping (if N>1)	N+1	>>NRAID ==RAID 5	R: High W: Medium	R: Medium W: Low
RAID 3	Striping with Parity on dedicated disk	N+1	>>NRAID ==RAID 5	R: High W: Medium	R: Medium W: Low
RAID 5	Striping with interspersed parity	N+1	>>NRAID ==RAID 5	R: High W: Medium	R: High W: Low

NRAID
Disk Spanning

NRAID	
Minimum Disks required	1
Capacity	N
Redundancy	No



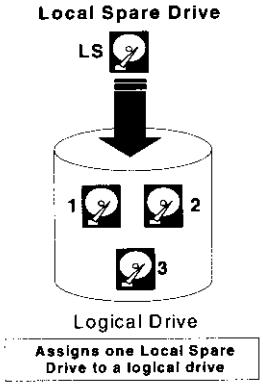
NRAID stands for Non-RAID.
The capacity of all the drives are combined to become one logical drive (no block striping). In other words, the capacity of the logical drive is the total capacity of the physical drives. NRAID does not provide data redundancy.

overall storage solution for prepress workflow operations.
Additional Considerations

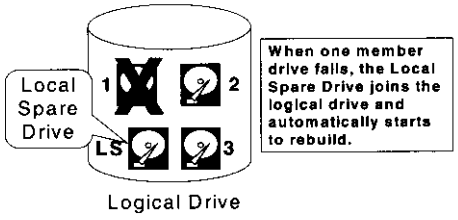
In addition to RAID 3 performance, several important factors and features should be considered as well. Hardware-based RAID arrays, in which all array management functions are performed independent of the host , are preferable to software-based arrays which use the host CPU to perform array functions. The storage system should be host and operating system independent rather than restricted to use with proprietary systems or devices. Warm Spare Drives should be supported so that, in the event of a drive failure within the array, the spare drive automatically goes on line and data from the failed drive is automatically rebuilt without the need for human intervention. Advanced systems support Global Spares, which allows a single spare drive to serve multiple arrays within the system. Remote maintenance capability allows support personnel to access the RAID system remotely to perform monitoring and maintenance activities. Graphical User Interface (GUI) facilitates ease of configuration, monitoring and management of the RAID System.

2.2 Drive Failure Management

2.2.1 Global and Local Spare Drive

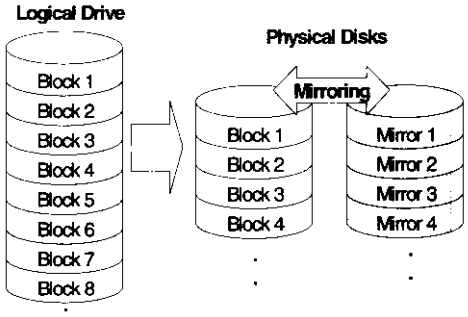


Local Spare Drive is a standby drive assigned to serve one specified logical drive. When a member drive of this specified logical drive fails, the Local Spare Drive becomes a member drive and automatically starts to rebuild.



Global Spare Drive does not only serve one specified logical drive. When a

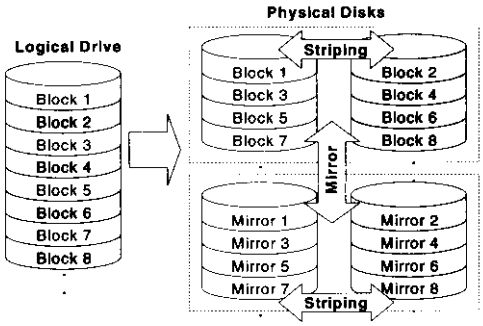
RAID 1
Disk Mirroring



RAID 1	
Disks required	2
Capacity	N/2
Redundancy	Yes

RAID 1 mirrors the data stored in one hard drive to another. RAID 1 can only be performed with two hard drives. If there are not less than four hard drives, RAID (0+1) will be performed automatically.

RAID (0+1)
Disk Striping with Mirroring



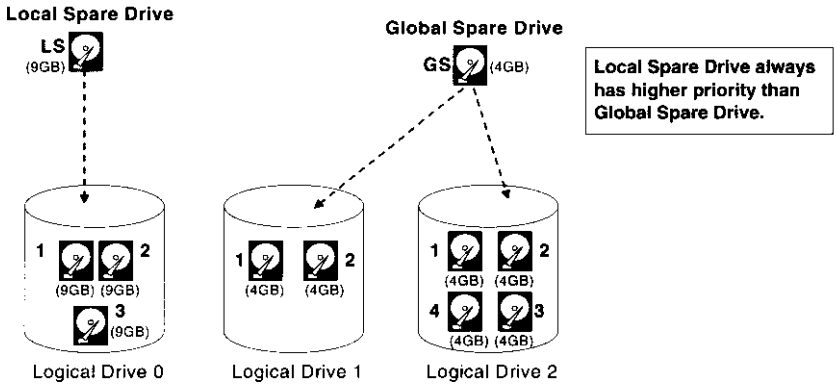
RAID (0+1)	
Minimum Disks required	4
Capacity	N/2
Redundancy	Yes

RAID (0+1) combines RAID 0 and RAID 1 - Mirroring and Striping. RAID (0+1) allows multiple drive failure because of the full redundancy of the hard drives. If there are not less than four hard drives assigned to perform RAID 1, RAID (0+1) will be performed automatically.

IMPORTANT:
"RAID (0+1)" will not appear in the list of RAID levels supported by the RAID controller. If you wish to perform RAID 1, the RAID controller will determine whether to perform RAID 1 or RAID (0+1). This will depend on the drive number that has been selected for the logical drive.

functions together will better fit various needs. Take note though that the **Local Spare Drive always has higher priority than the Global Spare Drive.**

In the example shown below, the member drives in Logical Drive 0 are 9 GB drives, and the members in Logical Drives 1 and 2 are all 4 GB drives. It is not possible for the 4 GB Global Spare Drive to join Logical Drive 0 because of its insufficient capacity. However using a 9GB drive as the Global Spare drive for a failed drive that comes from Logical Drive 1 or 2 will bring huge amount of excess capacity since these logical drives require 4 GB only. In the settings below, the 9 GB Local Spare Drive will aid Logical Drive 0 once a drive in this logical drive failed. If the failed drive is in Logical Drive 1 or 2, the 4 GB Global Spare drive will immediately give aid to the failed drive.



2.2.2 Identifying Drives

Assuming there is a failed drive in the RAID 5 logical drive, make it a point to replace the failed drive with a new drive to keep the logical drive working.

When trying to remove a failed drive and you mistakenly removed the wrong drive, you will no longer be able to read/write the logical drive because the two drives may have already failed.

Benefits of RAID:

- High data availability (i.e., if a single spindle crashes, no data is lost)
- Increased disk connectivity per system - since multiple spindles appear as one spindle to the computer system.
- Large capacity storage in a small footprint -
- Flexibility through intelligent array controllers
- Performance enhancements in some circumstances.

Who uses RAID & at which RAID Level

- Raid Level 0 – Disk Striping - Data is segmented and split onto multiple spindles.

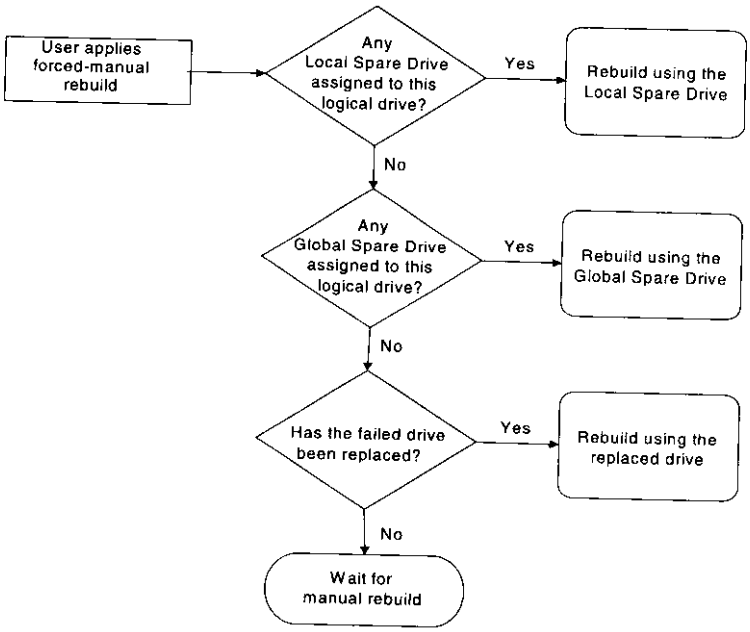
    1. Short Reads - Easily handles multiple simultaneous reads
    2. Long Reads- Single operation can be split and processed in parallel
    3. Short Writes - Easily handles multiple simultaneous reads
    4. Long Writes - Single operation can be split and processed in parallel
    5. Cost - Good (no extra hardware)

Technically not a true RAID level, as it provides no fault tolerance. Data is distributed across the individual disks of an array in pre-defined segment sizes. It is designed to provide high performance in application environments with non-critical data.

- Raid Level 1 – Disk Mirroring - Duplicate data is kept on multiple spindles
    1. *Short Reads - Faster (shorter latency) since resolution can be from any of multiple disks*
    2. *Long Reads - Faster since resolution can be from any of multiple disks (*)*
    3. Short Writes - Slower since need to write to multiple disks
    4. Long Writes - Slower since need to write to multiple disks
    5. Redundancy - Excellent
    6. Cost - Expensive - at least double the spindle cost

2.2.3 Automatic Rebuild

Automatic Rebuild



When a member drive in the logical drive failed, the DA-3500 will first check whether there is a Local Spare Drive assigned to this logical drive. If yes, it will automatically start to rebuild.

If there is no Local Spare Drive available, the DA-3500 will search for a Global Spare Drive. If there is a Global Spare Drive, it will automatically rebuild the logical drive.

If neither Local Spare Drive nor Global Spare Drive is available, the DA-3500 will detect the SCSI channel and ID of the failed drive. Once the failed drive has been replaced by a new drive/used drive, it will automatically start to rebuild using the replaced drive. If there is no available drive for rebuilding, the ESCORT Disk Array will not try to rebuild again until the user applies another forced-manual rebuild.

Target applications for RAID 3 are:

- Graphics
- Multimedia (Audio & Video)
- CAD/CAM,
- Image Processing
- Data Acquisition
- Communications
- Raid Level 4 similar to 3, with block striping instead of byte.
- Raid Level 5 - Striping plus data protection - stripe data across multiple spindles (as in RAID Level 0) and have data protection calculations (as in RAID level 3) but don't put all the calculated figures onto one spindle, but spread it out-Block Striping with Distributed Parity.

1. Short Reads - Normal
2. Long Reads - Faster due to parallelism
3. Short Write - Slower due to ECC calculation (including reading and writing)
4. Long Write - slightly slower due to ECC writes (**)
5. Redundancy - Excellent
6. Cost - only slightly more than no redundancy options

RAID 5 is the right choice for most multi-threaded applications with heavy transaction processing. Best suited for applications processing large numbers of small files, such as database management and transaction-based applications. Tagged Command Queuing (TCQ) up to 32 levels pipelines multiple commands across the interface and reduces seek time in these applications. Data is striped across all drives in the array for protection. Each drive in the array stores user data as well as encoded parity data. Provides excellent availability of data at the same cost as RAID 3. In database and transaction processing applications, many users are normally accessing large numbers of small files. Because it spreads user and parity data across the array in relatively small block sizes, RAID 5 provides the high I/O rate best suited for these applications.

Each method can be enabled or disabled individually. Hard drives will perform Verify-after-Write according to the selected method.

IMPORTANT:
The "Verification on LD Normal Drive Writes" method will affect "Write" performance during normal use.

2.4 Cache Parameters

2.4.1 Optimization for Sequential or Random I/O

When using RAID with applications such as video or image oriented applications, the application reads/writes from the drive using large-block, sequential files instead of small-block, random access files. The DA-3500 series Disk Array provides the options to optimize for large-sequential I/O or optimize for small-random I/O access.

"Optimization for Sequential I/O" provides larger stripe size (block size, also known as Chunk size) than "Optimization for Random I/O". A lot of the controller's internal parameters will also be changed to optimize for sequential or random I/O. The change will take effect after the ESCORT Disk Array reboots.

If the existing logical drives were built with "Optimization for Random I/O", these logical drives will not read/write when using "Optimization for Sequential I/O" (shows "INVALID") and vice versa because the stripe size is different. Change it back to the original setting and reset the ESCORT Disk Array to make available the logical drive data again.

IMPORTANT:
Changing the setting to "Optimization for Sequential I/O" or "Optimization for Random I/O" should be performed only when no logical drive exist. Otherwise, you will not be able to access the data in the logical drive later on.

and parity information to the fifth drive. Large image files striped across all four drives are accessed at the same time, taking advantage of the combined bandwidth of the array to deliver high data transfer rates.

In a similar RAID 5 array, data is written independently to each of the five drives as parity is distributed across all drives in the array. Individual small files can be accessed from different drives in the array at the same time, resulting in high data transaction rates. In processing large image files, however, transfer rates are limited to the bandwidth of each independently accessed drive, resulting in poor data transfer rates compared to a RAID 3 Array.

For certain applications within the prepress workflow, different RAID levels provide adequate performance. RAID 0, in which data is striped across all drives in a similar manner to RAID 3, provides high data-transfer rates, but without the parity necessary to provide fault-tolerance. This means that if one drive in the array should fail, the data on all related drives is lost. RAID 0 is useful for temporary storage where a high transfer rate is needed but fault-tolerance is not. For on-demand digital printing, such as with Indigo, Xeikon or Spontane, where large images are created, utilized and distributed quickly, RAID 0 provides the required performance.

RAID 5 implementation would be useful in the database management aspect of handling the storage of the massive number of image, text and page-layout files processed within a prepress workflow. The management of these files, either on-line or archived, is transaction intensive and would benefit from a RAID 5 implementation.

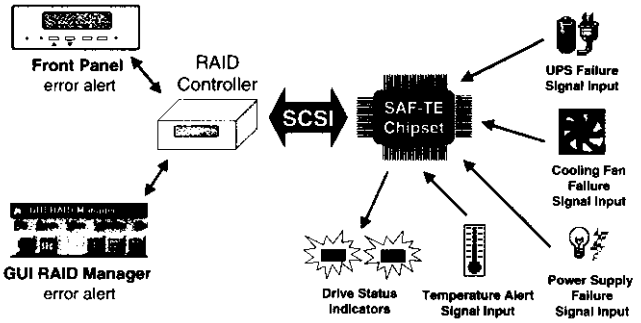
Some of today's advanced RAID systems will support multiple RAID levels concurrently. With these new capabilities, it is possible to configure a system with multiple arrays, each supporting a different RAID level. Files related to quick recovery and distribution applications are stored in the RAID 0 array, and database and transaction related files are stored in the RAID 5 array. All files necessary to primary workflow operations are stored in the RAID 3 array. In this manner, it is possible to segment storage so that performance levels for selected applications can be maximized. RAID 3, with its' superior performance capability in processing large files, is the best

2.6 SAF-TE Enclosure Management

2.6.1 What is SAF-TE?

SAF-TE stands for SCSI Accessed Fault-Tolerant Enclosures. It is an enclosure management technology. A SAF-TE-compliant enclosure monitors the fan temperature, power supply, UPS and also provides drive status LED. The SAF-TE enclosure connects to the RAID controller via a SCSI connector. The RAID controller communicates with the SAF-TE enclosure with standard SCSI commands.

SAF-TE Support

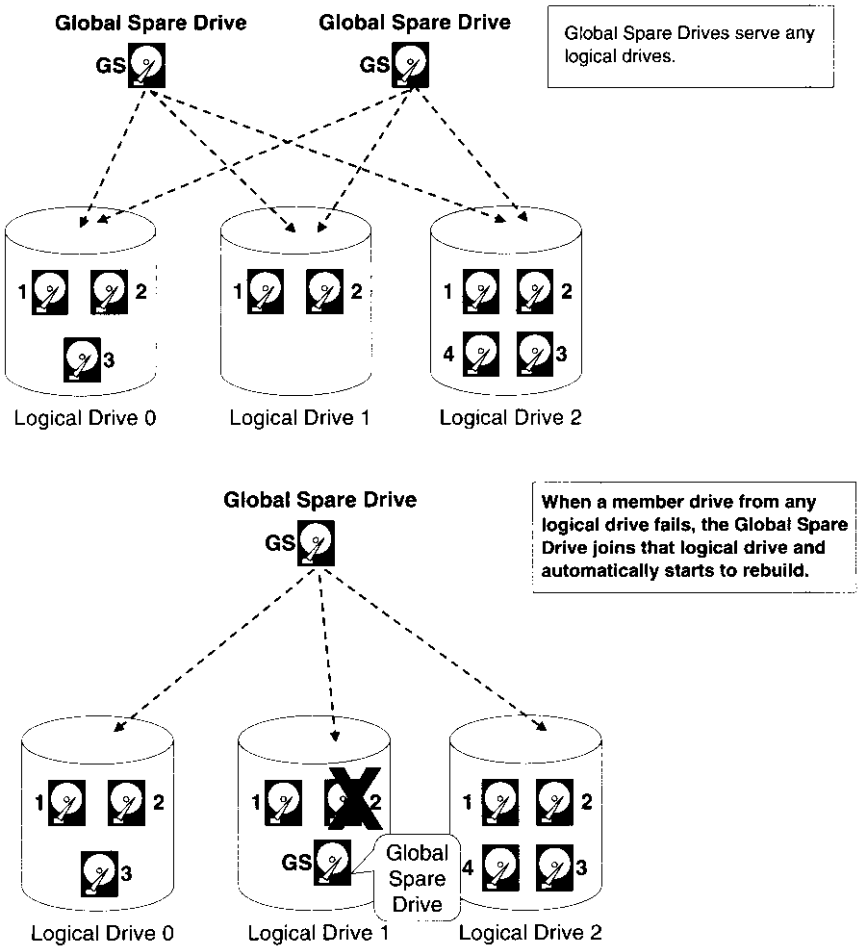


- SAF-TE chipset connects to the drive channel of the controller together with the other SCSI drives.

2.6.2 How Does SAF-TE work?

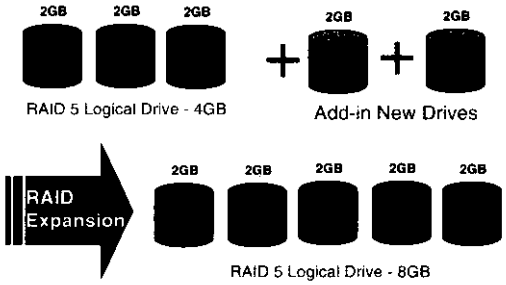
The SAF-TE device (often a back plane within a drive-bay enclosure) must occupy a connector on one of the drive channels' SCSI cables. The presence of a SAF-TE device will be detected and its presence will be displayed in both the RS-232 terminal emulation and the GUI RAID Manager programs.

member drive from any of the logical drive fails, the Global Spare Drive will join that logical drive and automatically starts to rebuild.



The ESCORT DA-3500 series Disk Array provides both Local Spare Drive and Global Spare Drive functions. On certain occasions, applying these two

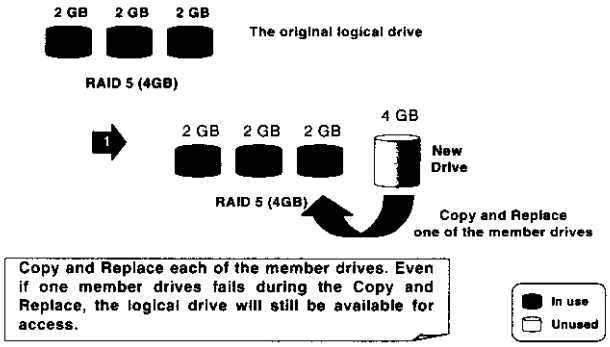
RAID Expansion - Mode 1



In the figure above, new drives are added to increase the capacity of a 4-Gigabyte RAID 5 logical drive. The two new drives increase the capacity to 8 Gigabytes.

Mode 2 Expansion, on the other hand, requires the same number of higher-capacity SCSI hard disk drives for a given logical drive.

RAID Expansion - Mode 2 (1/3)

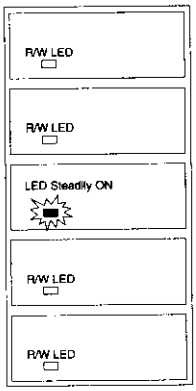


The figure above illustrates expansion of the same 4-Gigabyte RAID 5 logical drive using Mode 2 Expansion. Drives are copied and replaced, one by one, onto three higher-capacity drives.

To prevent this from happening, the RAID controller provides an easy way of identifying for the failed drive. That is, the read/write LED of the failed hard drive will light. This LED will prevent you from removing the wrong drive, and is also helpful when locating for a drive.

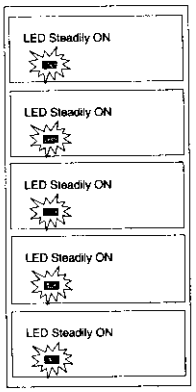
Flash Selected SCSI Drive

The Read/Write LED of the drive you selected will light steadily for about one minute.



Flash All SCSI Drives

The Read/Write LED of all connected drives will light for about one minute. If the LED of the defective drive did not light on the "Flash Selected SCSI Drive" function, use "Flash All SCSI Drives". The "Flash All SCSI Drives" function will light LEDs of all the drives except the defective one.



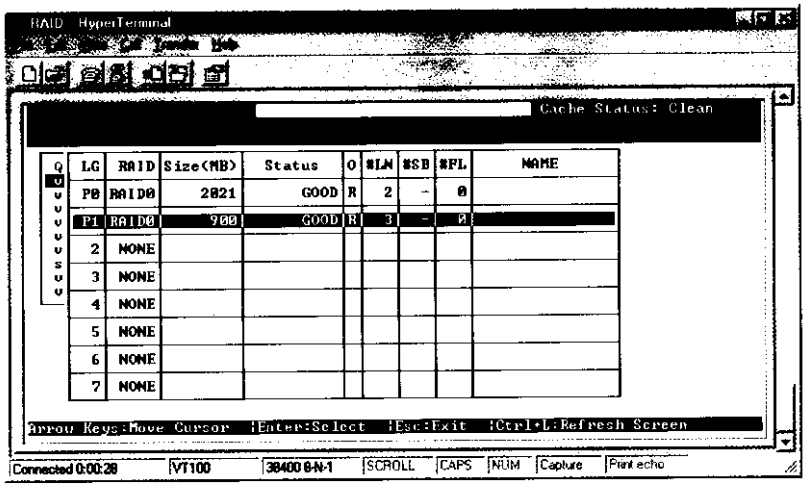
2.7.3 Example: RAID Expansion in Windows NT Server

Limitations When Using Windows NT 4.0

1. Only the Windows NT Server Disk Administrator includes the Extend Volume Set function; Windows NT Workstation does not have this feature.
2. The system drive (boot drive) of a Windows NT system cannot be extended.
3. The drive that will be extended should be using the NTFS file system.

The Example:

The following example demonstrates the expansion of a 900MB RAID 0 logical drive. The HyperTerminal emulation software that comes with Windows 95/NT is used to connect to the RAID controller via RS-232.



2.2.4 Concurrent Rebuild in RAID (0+1)

RAID (0+1) allows multiple drive failure and concurrent multiple drive rebuild. Newly replaced drives must be scanned and set as Local Spare Drives. These drives will be rebuilt at the same time (you do not need to repeat the rebuilding process for each drive).

2.3 Disk Array Parameters

2.3.1 Rebuild Priority

Rebuilding time will depend on the capacity of the logical drive. The DA-3500 series Disk Array provides background rebuilding ability. Meaning, the controller is able to serve other I/O requests while rebuilding the logical drives. The rebuilding process is totally transparent to the host computer or the operating system.

The background rebuild process has four priority options:

- Low
- Normal
- Improved
- High

The default priority is "Low" which uses the DA-3500 Disk Array's minimum resources to rebuild. Choosing "Normal" or "Improved" will speedup the rebuilding process and choosing "High" will use the ESCORT Disk Array maximum resources to complete the rebuilding process at the shortest time.

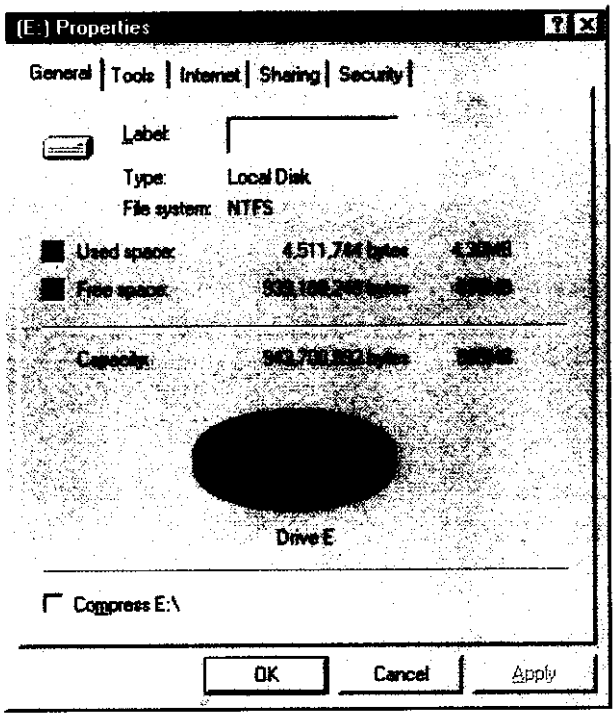
Rebuild priority can be configured through the RS-232C Terminal Interface, GUI RAID Manager or the front panel.

2.3.2 Verify-after-Write

The DA-3500 Disk Array has the ability to force the hard drives to verify after data has been written to the media of the HDD. There are three selectable methods:

- Verification on LD Initialization Writes
  Performs Verify-after-Write while initializing the logical drive.
- Verification on LD Rebuild Writes
  Performs Verify-after-Write during the rebuilding process.
- Verification on LD Normal Drive Writes
  Performs Verify-after-Write during normal I/O requests.

Place the cursor on Disk 1, right-click your mouse, and select "Properties." You will see that the total capacity for the Drive E: is just under 900MB.



2.5 Drive-Side SCSI Parameters

2.5.1 SCSI Motor Spin-up

When the power supply is unable to provide sufficient current for all the hard drives that are powered-up at the same time, spinning-up the hard drives serially is one of the best way of consuming lower power-up current.

By default, all hard drives will spin-up when powered-on. These hard drives can be configured so that all of them will not spin-up at power-on. There are 3 methods of spinning-up the hard drive's motor: Spin-up at power-on, Spin-up serially in random sequence or Spin-up by SCSI command. Please refer to the hard drive's user's manual for instructions on configuring the hard drive using the "Spin-up by SCSI command". The procedure for each brand/model of hard drive should vary.

Configure all the hard drives as above and enable "SCSI Motor Spin-Up" in Drive-Side SCSI Parameters. Power off all hard drives, and power them on again. All the hard drives will not spin-up at this time. The RAID controller will then spin-up the hard drives one by one at four seconds interval.

Important:
If the drives are configured as "Delay Motor Spin-up" or "Motor Spin-up in Random Sequence", some of these drives may not be ready yet for the RAID controller to access when the system powers up. Increase the disk access delay time so that the RAID controller will wait until the drive's ready.

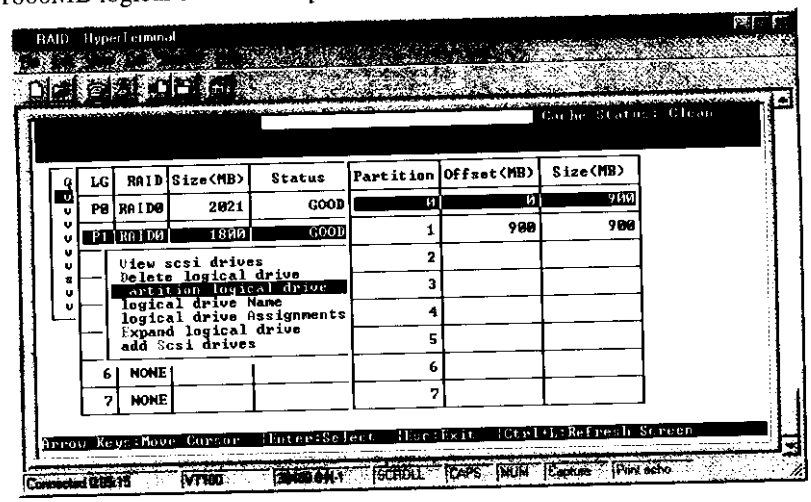
2.5.2 SCSI Reset at Power Up

By default, when the ESCORT Disk Array is powered up, it will send a SCSI bus reset command to the SCSI bus. When disabled, it will not send a SCSI bus reset command on the next power-up.

2.5.3 Disk Access Delay Time

Sets the delay time before the ESCORT Disk Array tries to access the hard drives after power-on. The default is 15 seconds.

From the menu, select Partition Logical Drive. You will see that the 1800MB logical drive is composed of two 900MB partitions.



Follow the directions in section 5.3.1 to map the new partition to a Host LUN. The new partition must be mapped to a host LUN in order for the HBA (host-bus adapter) to see it. Once you have mapped the partition, reboot Windows NT. The HBA should be able to detect an additional "disk."

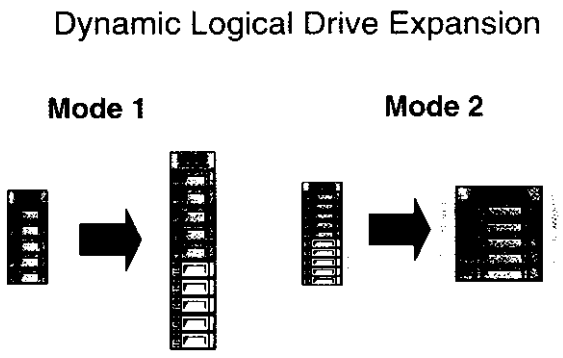
2.7 Dynamic Logical Drive Expansion

2.7.1 What Is It and How Does It Work?

Before Dynamic Logical Drive Expansion, increasing the capacity of a RAID system using traditional methods meant backing up, re-creating and then restoring. Dynamic Logical Drive Expansion (a new feature of firmware version 2.11) allows users to add new SCSI hard disk drives and expand a RAID 0, 3 or 5 Logical Drive without powering down the system.

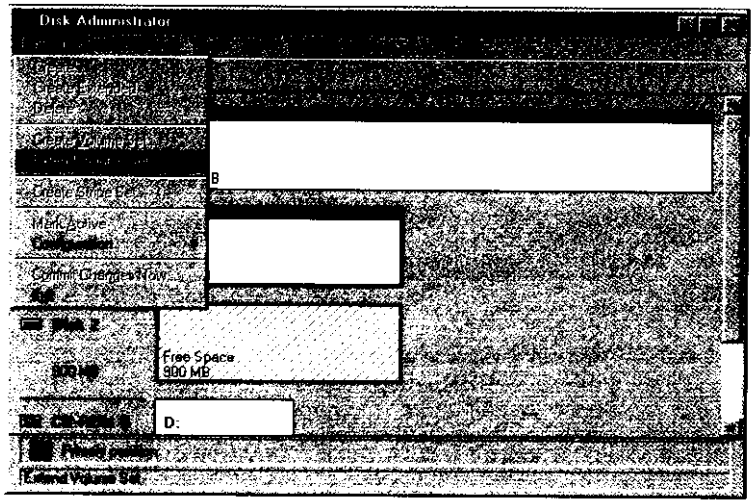
2.7.2 Two Modes of Dynamic Logical Drive Expansion

There are two modes of Dynamic Logical Drive Expansion: Mode 1 and Mode 2.

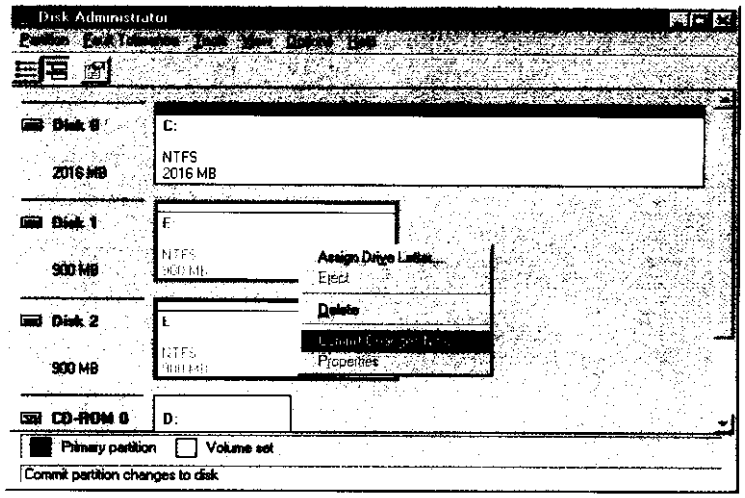


Mode 1 Expansion involves adding more SCSI hard disk drives to a logical drive, which may require that the user obtain an enclosure with more drive bays. The data will be re-striped onto the original and newly added disks.

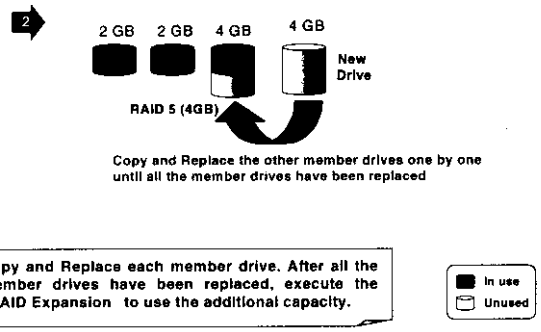
From the "Partition" menu, select "Extend Volume Set."



The screen will display that volume set of Drive E: has been extended by the 900MB in Disk2. Move the cursor to "Commit Changes Now" to confirm that you want the free space to become a part of the same logical drive.

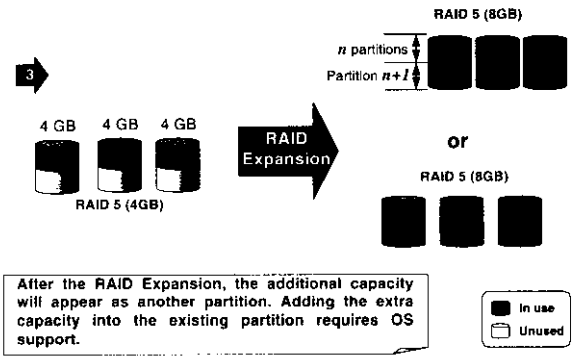


RAID Expansion - Mode 2 (2/3)



This results in a new 4-Gigabyte, RAID 5 logical drive composed of three physical drives. The 4 Gigabytes of increased capacity is in a new partition.

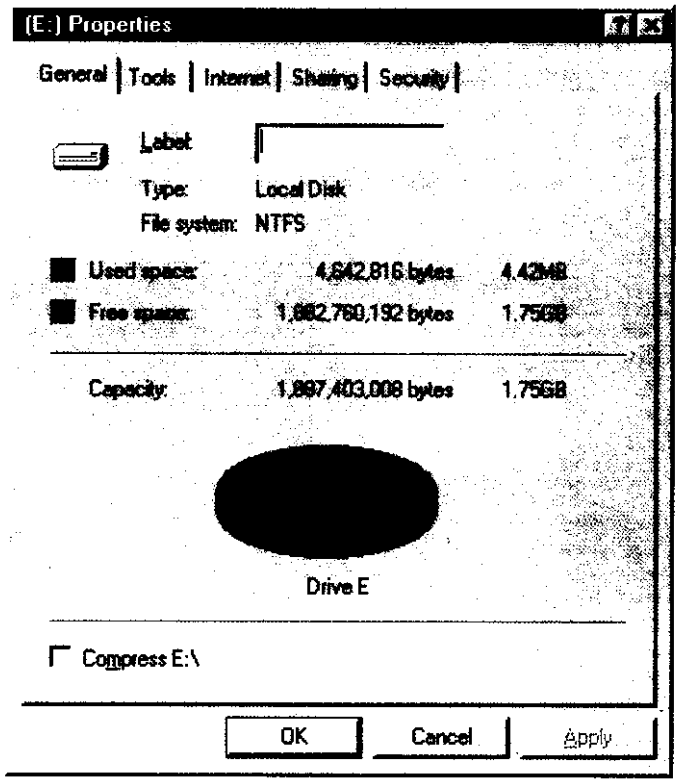
RAID Expansion - Mode 2 (3/3)



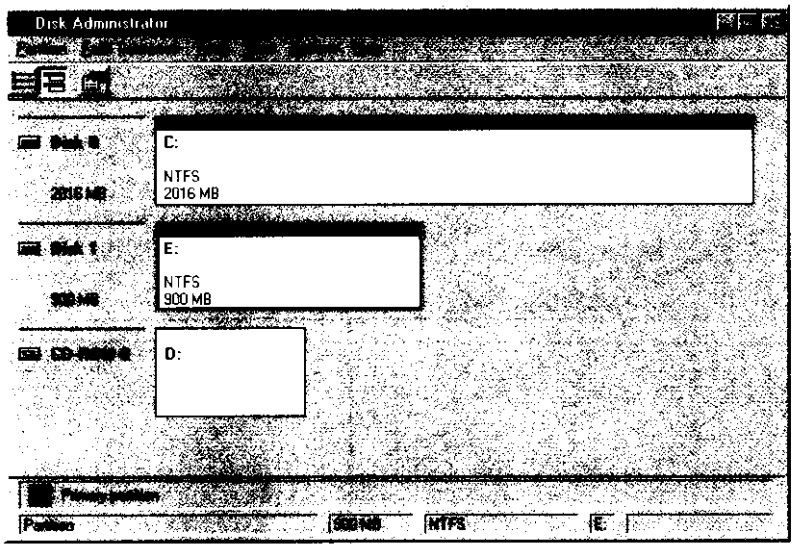
Important:

- *The increased capacity from Mode 1 Expansion of a logical drive will be a new partition.*
- *At the time of this printing, Firmware version 2.11 does not support the "Copy and Replace" function that is required for Mode 2 Expansion. Third-party hard disk utilities may be used for Mode 2 Expansion of logical drives. Later versions of the firmware will support "Copy and Replace."*

Drive E: now has a capacity just under 1800MB.



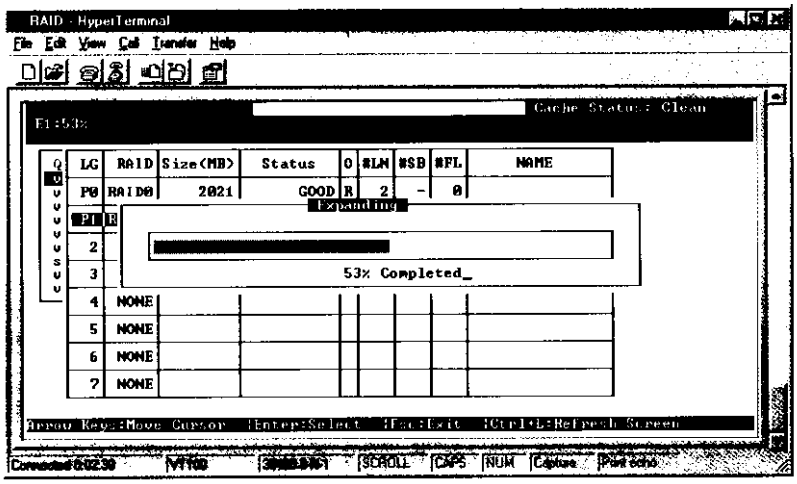
You can view information about this drive in the Windows NT Server Disk Administrator.



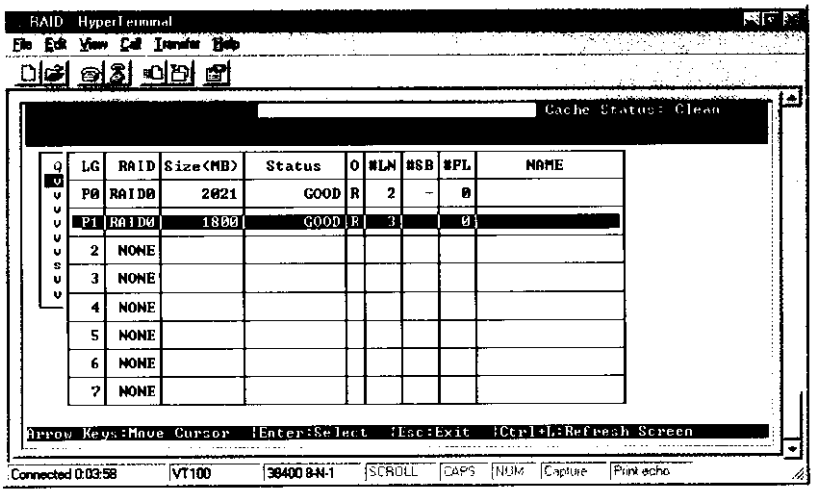
Peripheral Device Type Parameters Reference for Various Operating Systems:

Operating System	Peripheral Device Type	Peripheral Device Qualifier	Device Support for Removable Media	LUN Applicability
NT 4.0	1f	connected	disabled	All Undefined LUNs
NT 5.0	3	connected	enabled	All Undefined LUNs
NetWare 4.x	1f	connected	disabled	All Undefined LUNs
SCO Unix 5.0x	7f	connected	either is okay	All Undefined LUNs
UnixWare 2.1x	3	connected	either is okay	All Undefined LUNs
Solaris 2.5.x/2.6	7f	connected	either is okay	All Undefined LUNs

Follow the steps described in section 5.2.8 to add SCSI disk drives and perform Mode 1 Dynamic Logical Drive Expansion.



The 900MB logical drive has become a 1800MB logical drive. Place the cursor on that logical drive, and then press <Enter>.



Chapter 3 In-band SCSI

3.1 What is it and why do you need it?

These days more and more external devices require communication with the host computer for device monitoring and administration. This is usually done through RS-232C ports.

ESCORT DA-3500 series Disk Array now offers an alternative means of communication for its RAID controllers In-band SCSI. The traditional way for SCSI controllers to communicate with the host computer has been via software (such as the GUI RAID Manager) using an RS-232C connection. With In-band SCSI, integrators have more flexibility. They may use RS-232C or the existing SCSI cable instead.

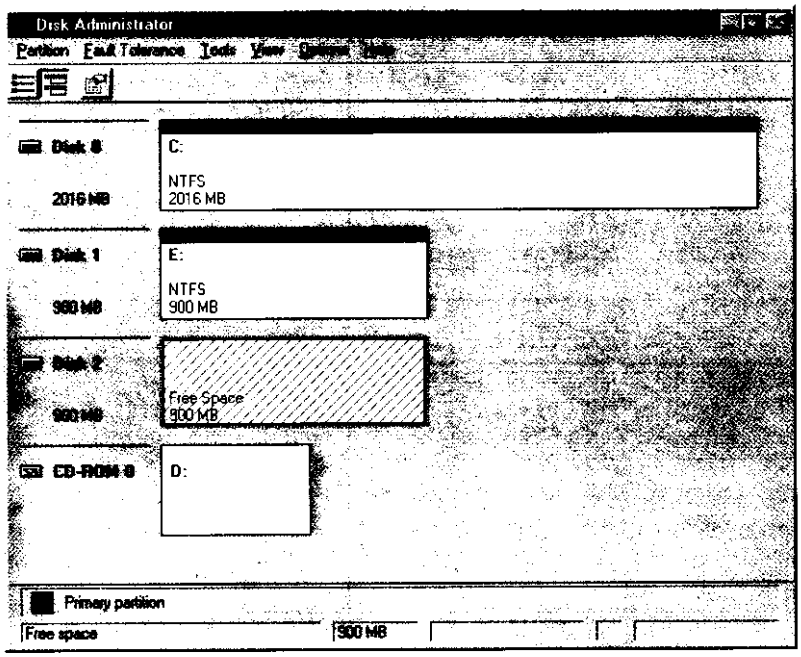
How does it use the SCSI cable? In-band SCSI technology translates the original commands into standard SCSI commands. These SCSI commands are then sent to and received from the SCSI raid controller. The GUI RAID Manager can administrate the RAID controller just as it could before via RS-232C. (Note: It is assumed that users of In-band SCSI possess the following: a third-party SCSI adapter and a channel on their RAID controller that can be designated as a host channel.) Both of these are required for In-band SCSI communication between the host and the RAID controller.)

3.2 How Do You Configure the GUI RAID Manager to Use In-band SCSI?

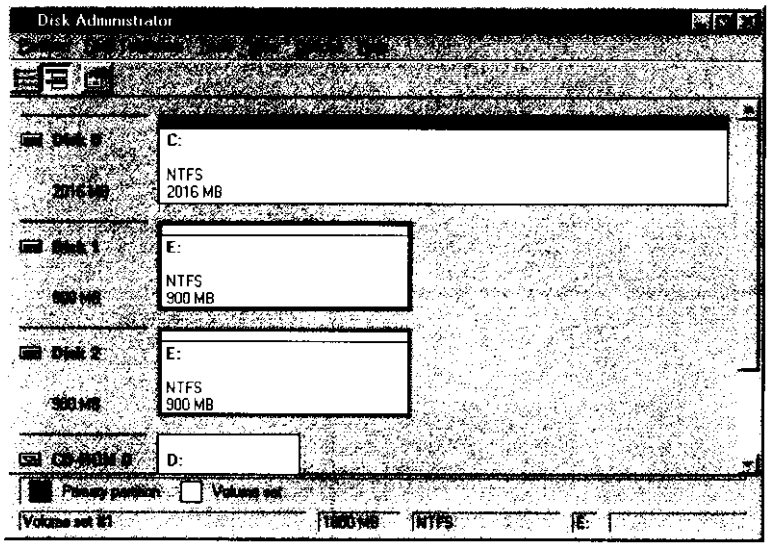
3.2.1 RAID Controller Adjustments

Don't disconnect your RS-232C cable yet! It is required for another 10 minutes or so. Some adjustments must be made to the RAID controller and to the host computer's SNMP settings before the two can communicate using SCSI commands. (Note: The SNMP settings must be changed prior to installation of the GUI RAID Manager. See *SNMP Settings* below for a detailed explanation.) The RAID controller settings can be changed using

Return to Windows NT Server Disk Administrator. There now exists a Disk 2 with 900MB of free space. Click on Disk 2 to select it.



Logical Drive E: is now composed of two 900MB partitions with a total volume of 1800MB. To see this, hold down on the <Ctrl> key and select both Disk 1 and Disk2; then right-click your mouse and select "Properties."



Press <Enter> to confirm the selection. Now that we have changed the Peripheral Device Type, let us set the Peripheral Device Qualifier. Press <Esc> to return to the sub-menu mentioned above. Use the arrow keys to scroll down to Device Qualifier., press ▼ or ▲ to select "Device Qualifier Connected. "

The default setting is "Connected." If your Front Panel reads "Disconnected," press <ENT> and you will be prompted to change to "Connected". If your Device Qualifier setting reads "Connected," press <Esc> to return to the Host-side SCSI submenu.

```
Device Qualifier
Connected
```

Use the ▼ or ▲ to select Support for Removable Media. The default setting is "Disabled." If the LCD reads "Enabled," press <Enter> and you will be prompted to accept a change. If the screen reads "Disabled," press <Esc> to return to the Host-side SCSI submenu.

```
Support Removable
Media - Disabled
```

Press ▼ or ▲ to select "LUN Application"; and then press <Enter>. The default setting is "All Undefine LUN."

```
LUN Application-
All Undefine LUN
```

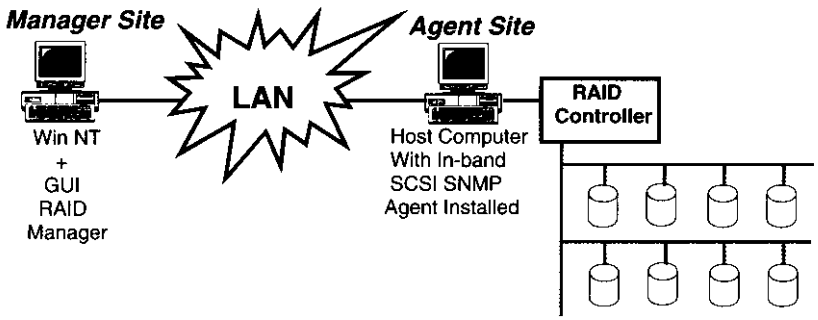
Press <Enter> and use ▼ or ▲ to select "Undefine LUN-0 ."

```
Applies to    ?
Undefine LUN-0's
```

Press <Enter> to accept. The screen should display the following message.

```
LUN Application-
Undefine LUN-0's
```

The RAID controller adjustments necessary to use In-band SCSI have been completed. For locally accessing the host computer (see section 3.3.1, *Local Connection — SNMP Not Required*), all steps have been completed. For



In the figure above, the "Agent Site" is a host computer connected to a RAID controller via a SCSI cable. The "Manager Site" is a Windows NT system with the GUI RAID Manager. The Agent Site could be running an operating system other than Windows NT. It provides the In-band SCSI SNMP agents for the following operating systems:

- ◊ Windows NT
- ◊ NetWare
- ◊ SCO Unix OpenServer
- ◊ SCO UnixWare
- ◊ Sun Solaris

The Manager Site should be a Windows NT Workstation or Server with SNMP service and the GUI RAID Manager installed.

Basic Procedures to Establish the Connection

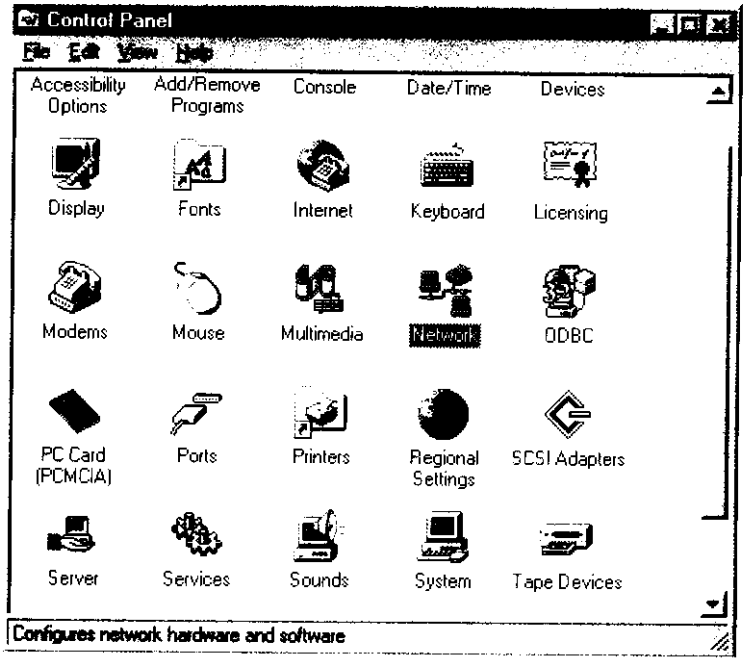
The following criteria must be met for the Agent Site and Manager Site:

Checklist for Agent Site

1. The host computer is connected to the RAID controller via the host SCSI cable (the cable which is used to transfer data between the host computer and the RAID — there no need for an extra SCSI cable.)
2. The host computer's operating system has SNMP service installed.
3. The host computer has the In-band SCSI SNMP agent installed for the corresponding operating system. (The example described herein is Windows NT.)
4. The host computer is up and running.

Example Settings for Agent Site Using Windows NT

1. Install SNMP Service in Windows NT. Look for the "Network" icon in the Control Panel. Double click on the "Network" icon to open it.

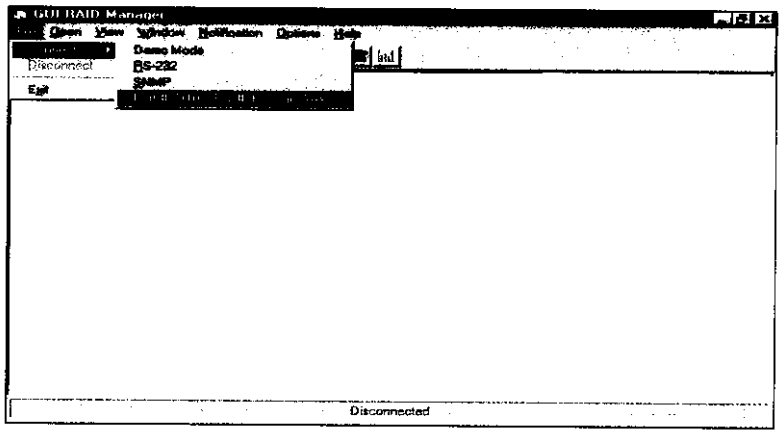


The Properties window appears. Choose the "Service" tab. If the SNMP Service is already installed, please go ahead to step called "Install the SNMP Agent and GUI RAID Manager." If the SNMP Service is not yet installed, click on "Add" and choose "SNMP Service" to install.

IMPORTANT:

This following applies to Windows NT 4.0 with Service Pack 3: if the "SNMP Service" is installed after the Service Pack 3 has been installed, Service Pack 3 must be re-installed in order for the SNMP service to work properly.

1. Run the GUI RAID Manager. Start the connection by choosing FILE>CONNECT>SNMP.



2. The "Setting of SNMP Interface" window appears. Enter the IP address and community name of the Agent Site. For "Agent-site Communication Type," choose "SCSI Bus Interface." The "Controller Index" refers to the sequence of the RAID controller which is going to be administrated. If only one RAID controller is installed in the agent site computer, choose "0". If there is more than one RAID controller installed in the agent site computer, choose "1" to administrate the second RAID controller. Choose "2" to administrate the third RAID controller, etc.

Chapter 4 Quick Setup

NOTE:
A "Logical Drive" is a set of drives grouped together to operate under a given RAID level and appears as a single contiguous drive. A logical drive can be further divided into a maximum of 8 "Partitions". During operation, the host sees an unpartitioned logical drive or a partition of a partitioned logical drive as one single physical drive.

4.1 Front Panel

The ESCORT DA-3500 series Disk Array default configurations are based on the number and location of the drives installed. If this is your first time to install, we suggest that you try the default configurations provided by the "Quick Installation" function. This will allow you to immediately verify whether the system is working. Further optimization can then be made later on.

IMPORTANT:
Quick Setup assumes there is only one host channel.

Press **ENT** for 2 seconds to enter the Main menu. Select "Quick Logical Drive Install ..", then press **ENT**.

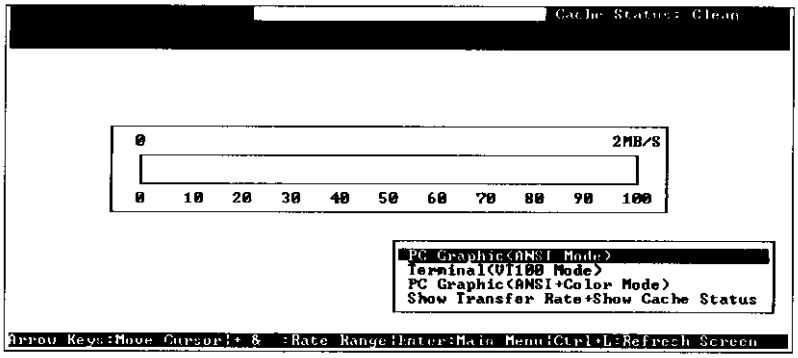
```
Quick Logical
```

The number of drives and the first possible RAID level will appear on the LCD display.

```
Set TDRV=4 with
```

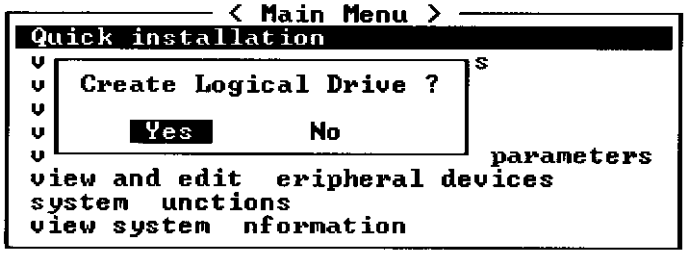
Use ▼ or ▲ to select the RAID level, then press **ENT** for two seconds to enter the selected RAID level. The RAID controller will now start initialization.

```
Init Parity  10%
```



The initial screen appears when the RAID controller is powered-on. Use ↑ ↓ arrow keys to select the desired terminal emulation mode, then press **[ENTER]** to enter the Main Menu.

Type **Q** or use the ↑ ↓ keys to select "Quick installation", then press **[Enter]**. Choose **Yes** to create a logical drive.

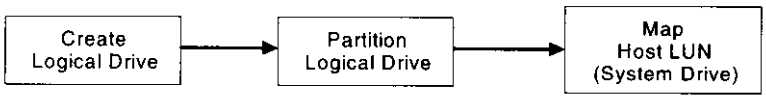


All possible RAID levels will be displayed. Use the ↑ ↓ keys to select a RAID level, then press **[Enter]**. The assigned spare drive will be a Local Spare Drive, not Global Spare Drive.

Chapter 5 Configuring RAID

5.1 Starting to Build a RAID System Drive

The following figure is a basic flowchart when configuring a RAID system. Hardware installation must be completed before any configurations take place.



When power is turned on, the ESCORT Disk Array system scans all the hard drives that are on all the drive channels. If a hard drive was connected after the RAID controller completes initialization, use the "SCAN SCSI DRIVE" function to let the RAID controller recognize the newly added hard drive and configure it as a member of a logical drive or a spare drive.

In accordance to your requirement, configure a logical drive to contain one or more hard drives based on the desired RAID level, and partition the logical drive into one or several partitions. Map each partition as one system drive (LUN). The host SCSI adapter will recognize the system drives after re-scanning the host SCSI bus.

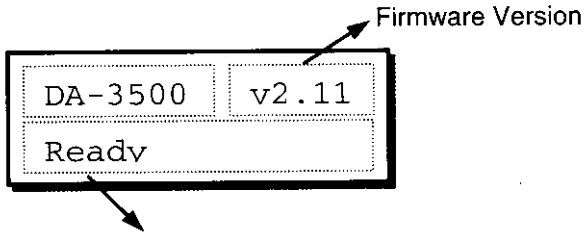
Since the RAID controller is totally operating system independent, the operating system of the host computer will not be able to find out whether the attached devices are physical hard drives or virtual system drives created by the RAID controller.

NOTE:
A "Logical Drive" is a set of drives grouped together to operate under a given RAID level and appears as a single contiguous drive. A logical drive can be further divided into a maximum of 8 "Partitions". During operation, the host sees an unpartitioned logical drive or a partition of a partitioned logical drive as one single physical drive.

Chapter 6 General Front Panel Operation

6.1 Understanding the Information on the LCD

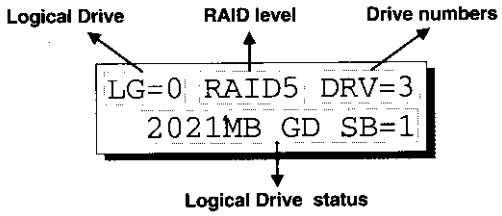
6.1.1 The Initial Screen



Status/Data Transfer Indicator:

Ready	There is a logical drive mapped to a LUN.
No Host LUN	No logical drive created or the logical drive has not yet been mapped to any Host LUN.
■■■■■■■■■■■■■■	Indicates data transfer. Each block indicates 256KBytes of data throughput.

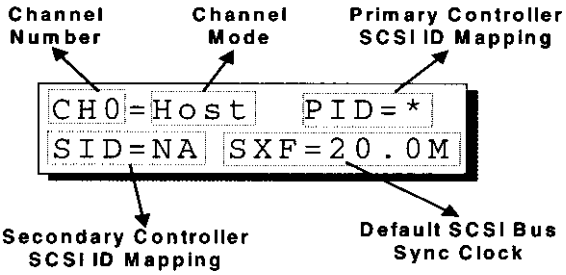
6.1.2 Logical Drive Status



Logical Drive: The Logical Drive number.
RAID level: The RAID level used in this logical drive.
Drive numbers: The number of SCSI drives contained in this logical drive.
Logical Drive status:

LG=x RB	Rebuilding
LG=x SB	Local Spare Drive
GlobalSB	Global Spare Drive
NEW DRV	New drive
BAD DRV	Failed drive
ABSENT	Drive does not exist
MISSING	Drive missing (drive was once there)
SB-MISS	Spare drive missing

6.1.4 SCSI Channel Status



Channel Mode:

Host	Host Channel mode
Drive	Drive Channel mode

Default SCSI Bus Sync Clock:

*??.?*M	The default setting of this SCSI channel is ??.? Mhz in Synchronous mode
Async	The default setting of this SCSI channel is in Asynchronous mode

Primary Controller SCSI ID Mapping:

*	Multiple SCSI IDs applied (Host Channel mode only)
(ID number)	Primary Controller is using this SCSI ID for host LUN mapping.
NA	No SCSI ID applied (Drive Channel mode only)

Secondary Controller SCSI ID Mapping:

*	Multiple SCSI IDs applied (Host Channel mode only)
(ID number)	Secondary Controller is using this SCSI ID for host LUN mapping.
NA	No SCSI ID applied (Drive Channel mode only)

Use ▼ and ▲ to change the maximum size that will be used on each drive.

```
MaxSiz=  1010MB
Set to   1010MB?
```

The Local Spare Drive can also be assigned here. Press ▼ or ▲ to choose "Spare Drive Assignments", then press **ENT**.

```
Spare Drive
Assignments   ..
```

The currently available drives will be shown on the LCD. Use ▼ or ▲ to browse through the drives, then press **ENT** to choose the drive you wish to serve as the Local Spare Drive. Press **ENT** again for two seconds.

```
C=1 I=15  1010MB
*LG=0 SL SEAGATE
```

Press ESC to return to the previous menu. Use ▼ or ▲ to choose "Create Logical Drive", then press **ENT** for two seconds to start initializing the logical drive. The desired capacity of the drives will be used in this logical drive.

```
Create Logical
Drive         ?
```

The RAID controller will start to initialize the parity of the logical drive. Please note that if NRAID or RAID 0 is selected, initialization time is shorter and completes immediately.

```
Init Parity  90%
Please Wait!
```

The LCD will display the logical drive's information after completing initialization.

```
LG=0 RAID5 DRV=3
  2012MB GD SB=0
```

IMPORTANT:

The basic read/write unit of a hard drive is Block. If the drive members in one logical drive have different block numbers (capacity), the minimum block number among all the member drives will be chosen as the maximum block number of the RAID configuration.

Press ▼ or ▲ to select a logical drive, then press **ENT**.

```
LG0 RAID5 DRV=3
  2012MB GD SB=1
```

Press ▼ or ▲ to select "Partition Logical Drive", then press **ENT**.

```
Partition
Logical Drive ..
```

The current partition's information will be displayed on the LCD. Press ▼ or ▲ to browse through the existing partition in the logical drive. Select a partition by pressing **ENT** for two seconds.

```
LG=0 Partition=0
  2012MB      ?
```

Use ▼ or ▲ to change the number of the flashing digit, then press **ENT** to move to the next digit. After changing all the digits, press **ENT** for two seconds to confirm the partition and capacity.

```
LG=0 Partition=0
  1000MB      ?
```

The rest of the drive space will automatically be created as another partition.

```
LG=0 Partition=1
  1021MB      ?
```

6.2.5 Deleting a Partition of a Logical Drive

Press **ENT** for two seconds to enter the Main Menu. Press ▼ or ▲ to select "View and Edit Logical Drives..", then press **ENT**.

```
View and Edit
Logical Drives ↕
```

Press ▼ or ▲ to select a logical drive, then press **ENT**.

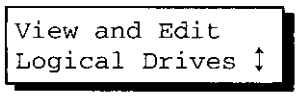
```
LG0 RAID5 DRV=3
  2012MB GD SB=1
```

Press ▼ or ▲ to choose "Partition Logical Drive", then press **ENT**.

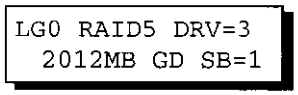
```
Partition
Logical Drive ..
```

6.2.6 Assigning a Logical Drive Name

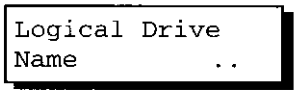
Press **ENT** for two seconds to enter the Main Menu. Press ▼ or ▲ to select "View and Edit Logical Drives..", then press **ENT**.



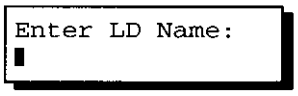
Press ▼ or ▲ to select a logical drive, then press **ENT**.



Press ▼ or ▲ to select "Logical Drive Name", then press **ENT**.

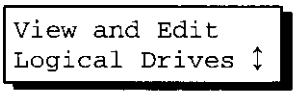


Press ▼ or ▲ to change the character of the flashing cursor. Press **ENT** to move the cursor to the next space. The maximum character for a logical drive name is 25.

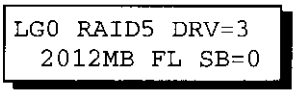


6.2.7 Rebuilding a Logical Drive

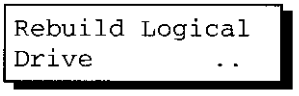
Press **ENT** for two seconds to enter the Main Menu. Press ▼ or ▲ to select "View and Edit Logical Drives..", then press **ENT**.



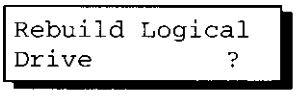
Press ▼ or ▲ to select the logical drive that has a failed member drive, then press **ENT**.



Press ▼ or ▲ to select "Rebuild Logical Drive", then press **ENT**.



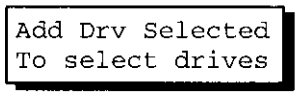
Press **ENT** for two seconds to start rebuilding the logical drive.



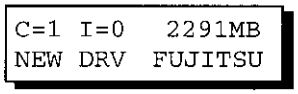
IMPORTANT:

- *Mode 1 Expansion can only be performed on RAID 0, 3 and 5 logical drives. Mode 1 Expansion cannot be performed on an NRAID or RAID 1 logical drive.*
- *Mode 1 Expansion (Expanding logical drives by adding more SCSI hard disk drives) cannot be canceled once started. If a power failure occurs, the Mode 1 Expansion will be paused and the controller will NOT automatically continue the expansion when the power comes back on. Resumption of the RAID expansion must be performed manually.*
- *If a member drive of the logical drive fails during RAID expansion, the Mode 1 expansion will be paused. The expansion will resume automatically after logical drive rebuild has been completed.*

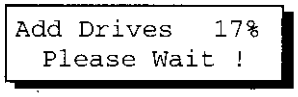
Use ▼ or ▲ to "Add drive Selected to Selected Drives" (i.e., add it to the logical drive); and then press <ENT>.



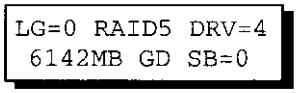
The front panel will again display the information for the drive (or drives) that you wish to add. Press <ENT> to confirm.



The front panel will display its progress in adding the drive.

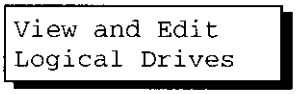


Upon completion, the controller will display the new volume for the logical drive.

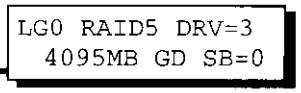


6.2.9 Logical Drive Parity Check

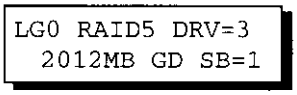
From the Main Menu, press ▼ or ▲ to select "View and Edit Logical Drives."



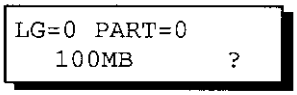
Your logical drive will be displayed. If



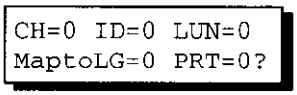
Press ▼ or ▲ to browse through all the available logical drives. Press **ENT** for two seconds to select a logical drive.



Press ▼ or ▲ to browse through all the available partitions in the logical drive. Press **ENT** for two seconds to continue.

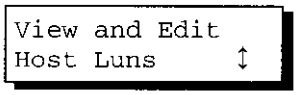


The mapping information will be shown on the LCD. Press **ENT** for two seconds to confirm the LUN mapping.

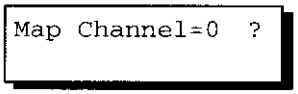


6.3.2 Viewing and Deleting LUN Mappings

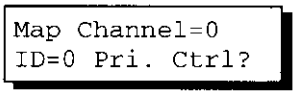
Press **ENT** for two seconds to enter the Main Menu. Press ▼ or ▲ to select "View and Edit Host Luns", then press **ENT**.



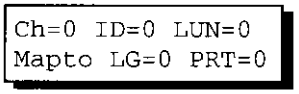
Press ▼ or ▲ to select a host channel, then press **ENT** for two seconds.



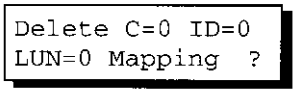
Press ▼ or ▲ to select a SCSI ID, then press **ENT** for two seconds.



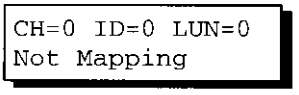
Press ▼ or ▲ to browse through the LUN number and its LUN mapping information.



Press **ENT** on the LUN you wish to delete.



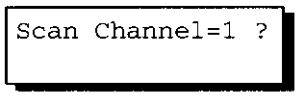
Press **ENT** for two seconds to confirm deletion. The deleted LUN has now been unmapped.



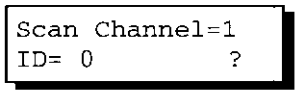
and Edit SCSI Drives", then press **ENT**.

SCSI drive information will be displayed on the LCD. Press **ENT**. Use ▼ or ▲ to select "Scan New SCSI Drive", then press **ENT** again.

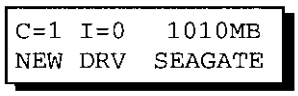
Press ▼ or ▲ to select a SCSI channel, then press **ENT** for two seconds.



Press ▼ or ▲ to select a SCSI ID, then press **ENT** for two seconds.

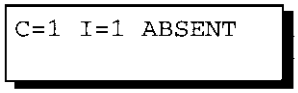


The information of the scanned SCSI drive will be displayed on the LCD.

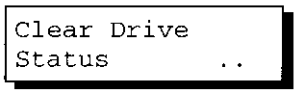


If the drive was not detected on the selected SCSI channel and ID, the LCD will display "Scan Fail!"

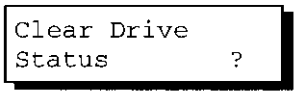
An empty drive entry will be added to this channel/SCSI ID for enclosure management. The drive status is "ABSENT".



To clear the empty drive entry, press ▼ or ▲ on the empty drive entry, then press **ENT**. Press ▼ or ▲ to choose "Clear Drive Status", then press **ENT**.



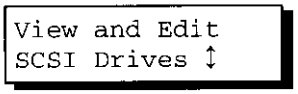
Press **ENT** for two seconds to confirm the drive entry's deletion. The other existing SCSI drive information will be displayed on the LCD.



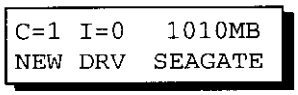
it vice versa.

6.4.3 Adding a Local Spare Drive

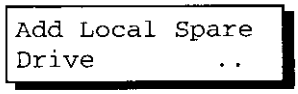
Press **ENT** for two seconds to enter the Main Menu. Press ▼ or ▲ to select "View and Edit SCSI Drives", then press **ENT**.



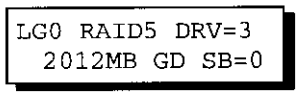
SCSI drive information will be displayed on the LCD. Press ▼ or ▲ to select a SCSI drive that has not been assigned to any logical drive, spare drive or failed drive yet, then press **ENT**.



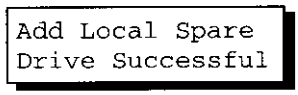
Press ▼ or ▲ to select "Add Local Spare Drive", then press **ENT**.



Press ▼ or ▲ to select the logical drive where the Local Spare Drive will be assigned to, then press **ENT** for two seconds.

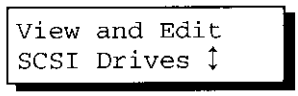


The message "Add Local Spare Drive Successful" will be displayed on the LCD.

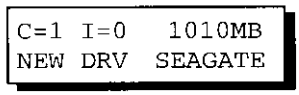


6.4.4 Adding Global Spare Drive

Press **ENT** for two seconds to enter the Main Menu. Press ▼ or ▲ to select "View and Edit SCSI Drives", then press **ENT**.

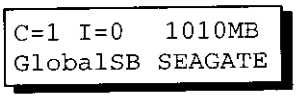


SCSI drive information will be displayed on the LCD. Press ▼ or ▲ to select a SCSI drive that has not been assigned to any logical drive yet, then press **ENT**.

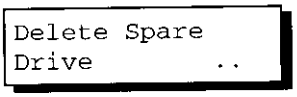


and Edit SCSI Drives", then press **ENT**.

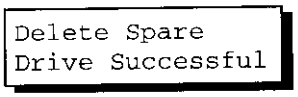
SCSI drive information will be displayed on the LCD. Press ▼ or ▲ to select the spare drive you wish to delete, then press **ENT.**



Press ▼ or ▲ to select "Delete Spare Drive", then press **ENT** to continue.

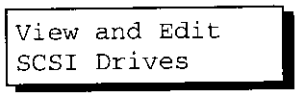


Press **ENT** for two seconds to delete the spare drive.

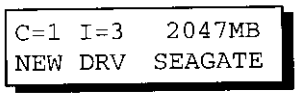


6.4.7 SCSI Drives Utilities

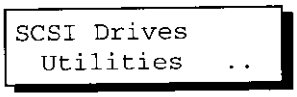
From the Main Menu, press ▼ or ▲ to select "View and Edit Logical Drives."



Your logical drive will be displayed. If you have more than one logical drive, use the ▼ or ▲ to select whichever drive you would like to run the utilities for; and then press <ENT>.

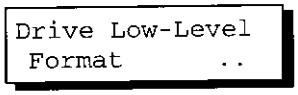


Press ▼ or ▲ to select "SCSI Drives Utilities"; and then press <ENT>.

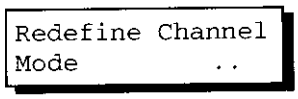


6.4.7.1 SCSI Drive Low-level Format

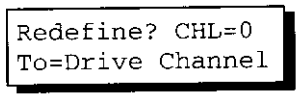
If you would like to perform a low-level format to a drive, press ▼ or ▲ to select "Drive Low-level Format"; and then press <ENT>.



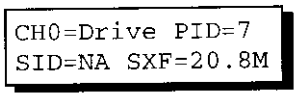
Press ▼ or ▲ to select "Redefine Channel Mode", then press **ENT**.



Press **ENT** for two seconds to change the channel mode.



The new channel's setting will be displayed on the LCD .



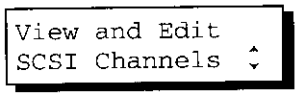
IMPORTANT:

- *Every time you change a channel's mode, you must reset the RAID controller for the changes to take effect.*

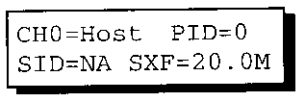
6.5.2 Setting a SCSI Channel's ID / Host Channel

Viewing a SCSI Channel's ID

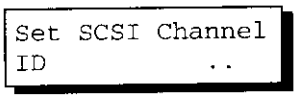
Press **ENT** for two seconds to enter the Main Menu. Press ▼ or ▲ to select "View and Edit SCSI Channels", then press **ENT**.



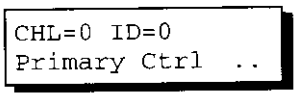
SCSI channel information will be displayed on the LCD. Press **ENT** on the host channel you wish the SCSI ID changed.



Press ▼ or ▲ to select "Set SCSI Channel ID", then press **ENT**.



Press ▼ or ▲ to browse through all the current SCSI ID settings. Press **ENT** to continue.



IMPORTANT:

- *Every time you change a channel's SCSI ID, you must reset the RAID controller for the changes to take effect.*
- *The default SCSI ID of the Host channel is 0, the Drive channel is 7.*
- *If only one controller exist, you must set the Secondary Controller's SCSI ID to "A". If a secondary controller exist, you need to set a SCSI ID. (The ESCORT Disk Array support dual controller)*
- *Multiple SCSI ID can be applied to the Host channel while the Drive channel, one SCSI ID or no SCSI ID.*
- *Multiple SCSI ID is supported in firmware version 2.11 or later. Firmware versions earlier than 2.11 only supports one SCSI ID.*
- *At least a controller's SCSI ID has to be present on the SCSI bus.*

6.5.3 Setting a SCSI Channel's Primary ID / Drive Channel

Press **ENT** for two seconds to enter the Main Menu. Press ▼ or ▲ to select "View and Edit SCSI Channels", then press **ENT**.

```
View and Edit
SCSI Channels  ⇕
```

SCSI channel information will be displayed on the LCD. Press **ENT** on the drive channel you wish the SCSI ID changed.

```
CH1=Drive  PID=7
SID=NA SXF=20.0M
```

Press ▼ or ▲ to select "Set SCSI Channel Primary ID", then press **ENT**.

```
Set SCSI Channel
Primary ID    ..
```

The current Primary SCSI ID will be displayed on the LCD. Press ▼ or ▲ to change the current SCSI ID, then press **ENT** for two seconds.

```
Set Pri. Ctlr
ID= 7 to ID: 8 ?
```

IMPORTANT:

- *Every time you change a channel's SCSI ID, you must reset the RAID controller for the changes to take effect.*
- *The default SCSI ID of the Host channel is 0, the Drive channel is 7.*
- *If only one controller exist, you must set the Secondary Controller's SCSI ID to "A". If a secondary controller exist, you need to set a SCSI ID. (The ESCORT Disk Array support dual controller)*
- *Multiple SCSI ID can be applied to the Host channel while the Drive channel, one SCSI ID or no SCSI ID.*
- *Multiple SCSI ID is supported in firmware version 2.11 or later. Firmware versions earlier than 2.11 only supports one SCSI ID.*
- *At least a controller's SCSI ID has to be present on the SCSI bus.*

6.5.5 Setting a SCSI Channel's Terminator

Press **ENT** for two seconds to enter the Main Menu. Press ▼ or ▲ to select "View and Edit SCSI Channels", then press **ENT**.

```
View and Edit
SCSI Channels  ↕
```

SCSI channel information will be displayed on the LCD. Press ▼ or ▲ to browse through the information of every SCSI channel. Press **ENT** on a channel you wish the terminator mode changed.

```
CH0=Host  PID=0
SID=NA SXF=20.0M
```

Press ▼ or ▲ to select "Set SCSI Channel Terminator", then press **ENT**.

```
Set SCSI Channel
Terminator    ..
```

The current status of the SCSI terminator will be displayed on the LCD. Press **ENT** to continue.

```
SCSI Terminator
Enabled       ..
```

IMPORTANT:

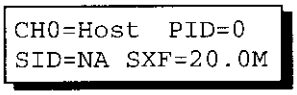
- *Every time you change the Transfer Speed, you must reset the RAID controller for the changes to take effect.*

6.5.7 Setting the Transfer Width

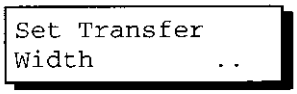
The RAID controller supports 8-bit SCSI and 16-bit SCSI. Enable "Wide Transfer" to use the 16-bit SCSI function. Disabling "Wide Transfer" will limit the RAID controller to 8-bit SCSI.

Press **ENT** for two seconds to enter the Main Menu. Press ▼ or ▲ to select "View and Edit SCSI Channels", then press **ENT**.

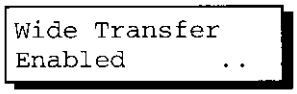
SCSI channel information will be displayed on the LCD. Press ▼ or ▲ to browse through the information of every SCSI channel. Press **ENT** on the channel you wish the transfer width changed.



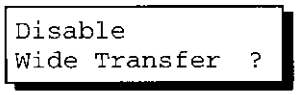
Press ▼ or ▲ to select "Set Transfer Width", then press **ENT**.



The current mode will be displayed on the LCD. Press **ENT** to continue.



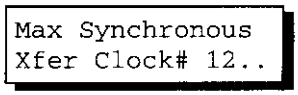
Press **ENT** again for two seconds.



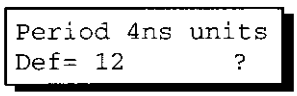
IMPORTANT:

- *Every time you change the SCSI Transfer Width, you must reset the RAID controller for the changes to take effect.*

To set the maximum synchronous clock of this SCSI target, choose "Max. Synchronous Xfer Clock", then press **ENT**. The current clock setting will be displayed on the LCD.

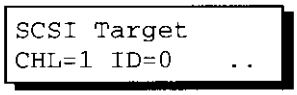


Press ▼ or ▲ to change the clock, then press **ENT** for two seconds. Refer to Appendix G, Sync. Clock Period and Sync. Clock Frequency, for more information.

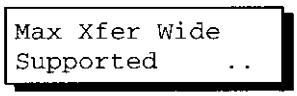


Maximum Transfer Width

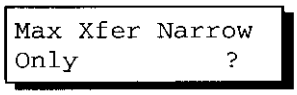
Press ▼ or ▲ to select a SCSI target, then press **ENT**.



To set the maximum transfer width of this SCSI target, choose "Max. Xfer Narrow Only" or "Max. Xfer Wide Supported", then press **ENT**. The current clock setting will be displayed on the LCD.

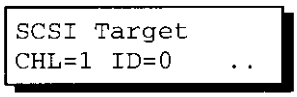


Press **ENT** for two seconds to change the setting.

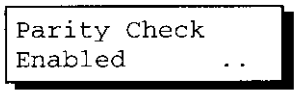


Parity Check

Press ▼ or ▲ to select a SCSI target, then press **ENT**.

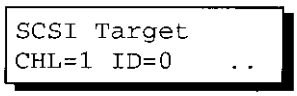


Choose "Parity Check", then press **ENT**. The current clock setting will be displayed on the LCD.

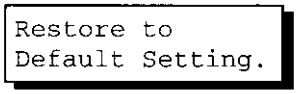


Restoring the Default Setting

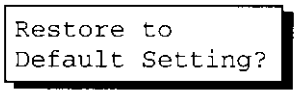
Press ▼ or ▲ to select a SCSI target, then press **ENT**.



Choose "Restore to Default Setting", then press **ENT**.

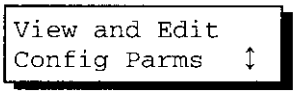


Press **ENT** again for two seconds to restore the SCSI target's default settings.



6.6 Viewing and Editing Configuration Parameters

Press **ENT** for two seconds to enter the Main Menu. Press ▼ or ▲ to select "View and Edit Config Parms", then press **ENT**. Press ▼ or ▲ to select the desired option.



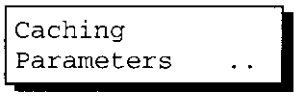
6.6.1 Communication Parameters

Refer to Chapter 9, Remote Administration, for information on communication parameters.

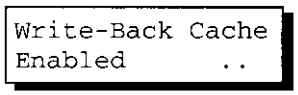
6.6.2 Caching Parameters

6.6.2.1 Write-Back Cache Enable/Disable

Press ▼ or ▲ to select "Caching Parameters", then press **ENT**.



Press ▼ or ▲ to select "Write-Back Cache", then press **ENT**. The current status (Enabled or Disabled) will be displayed on the LCD.



Press ▼ or ▲ to select an I/O count from 1 to 1024 or Auto, then press **ENT** for two seconds.

```
Maximum Queued
I/O Count-Auto ?
```

IMPORTANT:

- Every time you change this setting, you must reset the RAID controller for the changes to take effect.

6.6.3.2 LUNs per Host SCSI ID

Press ▼ or ▲ to select "LUNs per Host SCSI ID", then press **ENT**. The current setting will be displayed on the LCD.

```
LUNs per Host
SCSI ID - 8   ..
```

Press ▼ or ▲ to select a number from 1, 2, 4 and 8, then press **ENT** for two seconds.

```
LUNs per Host
SCSI ID - 4   ?
```

IMPORTANT:

- *Every time you change this setting, you must reset the RAID controller for the changes to take effect.*

6.6.4 Drive-side SCSI Parameters

Press ▼ or ▲ to select "Drive-side SCSI Parameters", then press **ENT**.

```
Drive-side SCSI
Parameters    ..
```

6.6.4.1 SCSI Motor Spin-Up

Press ▼ or ▲ to select "Motor Spin-Up", then press **ENT**. The current setting will be displayed on the LCD.

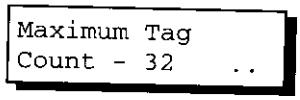
```
Motor Spin-Up
Disabled      ..
```

Press **ENT** for two seconds to confirm the setting.

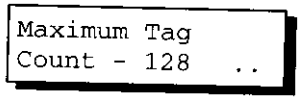
```
Enable Motor
Spin-Up       ?
```

6.6.4.4 Maximum Tag Count

Press ▼ or ▲ to select "Maximum Tag Count", then press **ENT**. The current setting will be displayed on the LCD.



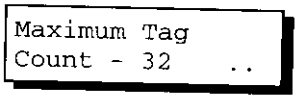
Press ▼ or ▲ to select between 1 and 128 seconds or "Disable", then press **ENT** for two seconds.



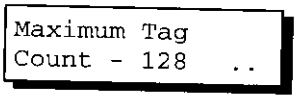
- *Every time you change this setting, you must reset the RAID controller for the changes to take effect.*
- *Disabling Tag Count will disable the Write-Back cache built in the hard drive.*

6.6.4.5 Tag Command Queuing

Firmware 2.11 now supports tag command queuing with an adjustable maximum tag count from 1 to 128. The default setting is Tag Command Queuing Enabled with a maximum tag count of 32. This setting can be changed or tag command queuing can be disabled. From the Main Menu, select "View and Edit Configuration Parameters." Then select "Drive-side SCSI Parameters." Press ▼ or ▲ to select "Maximum Tag Count," then press <ENT>. The current setting will be displayed on the LCD.



Press ▼ or ▲ to select between 1 and 128 seconds or "Disable", then press <ENT>. for two seconds.



IMPORTANT:

- *Every time you change this setting, you must reset the controller for the changes to take effect.*
- *Disabling Tag Command Queuing will disable the Write-Back cache built in the hard drive.*

select "View and Edit Configuration Parameters."

Press ▼ or ▲ to choose "Drive-side SCSI Parameters," and then press <ENT>.

```
Drive-side SCSI
Parameters  ..
```

Use ▼ or ▲ to select "Periodic Drive Check Time - Disable," and then press <ENT>.

```
Periodic Drive
ChkTime -Disable
```

Use ▼ or ▲ to choose the desired interval for idle drive failure detection.

```
Set Drive Check
Time 1/16sec ?
```

IMPORTANT:

- *By choosing a time value to enable the "Periodic Drive Check Time", the controller will poll all of the connected drives in the controller drive channels at the assigned interval. Drive removal will be detected even if a host does not attempt to access data on the drive.*
- *If the "Periodic Drive Check Time" is set to "Disabled" (the default setting is "Disabled"), the controller will not be able to detect any drive removal that occurs after the controller has been powered on. The controller will only be able to detect drive removal when a host attempts to access the data on the drive.*

6.6.5 Disk Array Parameters

Press ▼ or ▲ to select "Disk Array Parameters", then press **ENT**.

```
Disk Array
Parameters    ..
```

Press **ENT** for two seconds to confirm the setting.

```
Enable VerifyOn
LD rebu Writes ?
```

IMPORTANT:

- *When "Verification on Logical Drive Rebuild Writes" is enabled, rebuilding of the logical drive will be slower than when it is disabled.*

Verification on Normal Drive Writes

Press ▼ or ▲ to select "On Normal Drive Writes", then press **ENT**. The current setting will be displayed on the LCD.

```
On Normal Drive
Writes Disabled.
```

Press **ENT** for two seconds to confirm the setting.

```
Enable VerifyOn
Drive Writes ?
```

IMPORTANT:

- *When "Verification on Normal Drive Writes" is enabled, all read/write will be slower than when it is disabled.*

6.6.6 Controller Parameters

6.6.6.1 Controller Name

Press ▼ or ▲ to select "Controller Parameters", then press **ENT**.

```
Controller
Parameters    ..
```

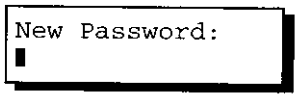
The current Controller Name will be displayed on the LCD. Press **ENT** to enter a new controller name.

```
Controller Name:
Not Set
```

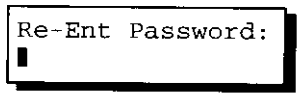
To enter the controller name, press ▼ or ▲ to select a character, then press **ENT** to move to the next character. After entering all the character, press **ENT** for two seconds.

```
Enter Ctlr Name:
▮
```

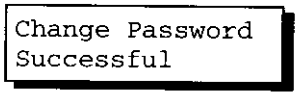
To enter the current password, press ▼ or ▲ to select a character, then press **ENT** to move to the next space. After entering all the character, press **ENT** for two seconds.



To enter the new password, press ▼ or ▲ to select a character, then press **ENT** to move to the next space. After entering all the characters, press **ENT** for two seconds. Re-enter the new password, then press **ENT** for two seconds.

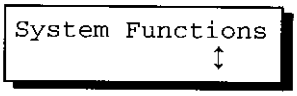


The LCD will display the message "Change Password Successful".

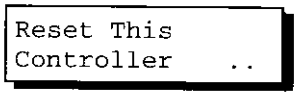


6.8.3 Resetting the Controller

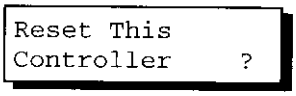
Press **ENT** for two seconds to enter the Main Menu. Press ▼ or ▲ to select "System Functions", then press **ENT**.



Press ▼ or ▲ to select "Reset This Controller", then press **ENT**.

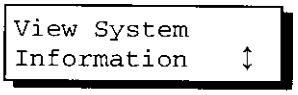


Press **ENT** again for two seconds.
The RAID controller will now start to reset.



6.9 Viewing System Information

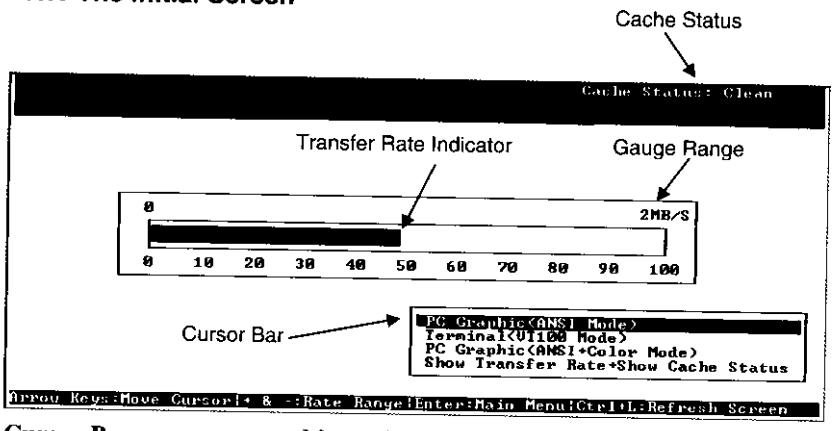
Press **ENT** for two seconds to enter the Main Menu. Press ▼ or ▲ to select "View System Information", then press **ENT**.



Chapter 7 RS-232C Terminal Interface

7.1 Understanding the Information on the Screen

7.1.1 The Initial Screen



Cursor Bar: Move the cursor bar to a desired item, then press **ENTER** to select.

Controller Name: Identifies the type of RAID controller.

Transfer Rate Indicator: Indicates the current data transfer rate.

Gauge Range: Use + or - keys to change the gauge range in order to view the transfer rate indicator.

Cache Status: Indicates the current cache status.

PC Graphic (ANSI Mode): Enters the Main Menu and operates in ANSI mode.

Terminal (VT-100 Mode): Enters the Main Menu and operates in VT-100 mode.

PC Graphic (ANSI+Color Mode): Enters the Main Menu and operates in ANSI color mode.

Show Transfer Rate+Show Cache Status: Press ENTER on this item to show the cache status and transfer rate.

Status Logical Drive Status.

INITING	The logical drive is now initializing.
INVALID	The logical drive was created with "Optimization for Sequential I/O", but the current setting is "Optimization for Random I/O". Or The logical drive was created with "Optimization for Random I/O", but the current setting is "Optimization for Sequential I/O".
GOOD	The logical drive is in good condition.
DRV FAILED	A drive member failed in the logical drive.
REBUILDING	Rebuilding the logical drive.
DRV ABSENT	One of the drives cannot be detected.
INCOMPLETE	Two or more drives failed in the logical drive.

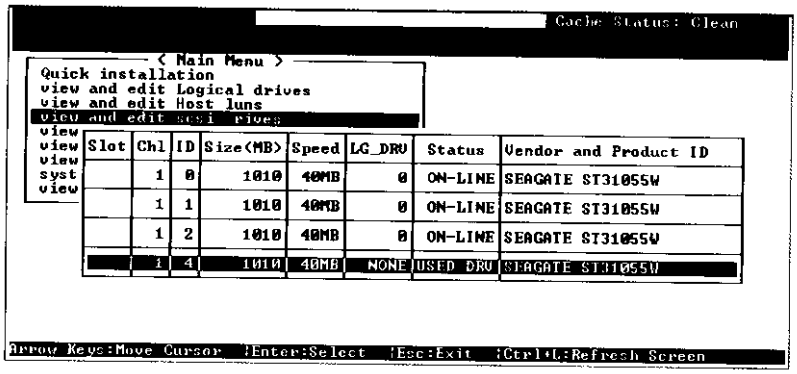
#OnLine Total drive members in the logical drive.

#STB Standby drives available for the logical drive. This includes all the spare drives available for the logical drive.

#Fail Failed drive member in the logical drive.

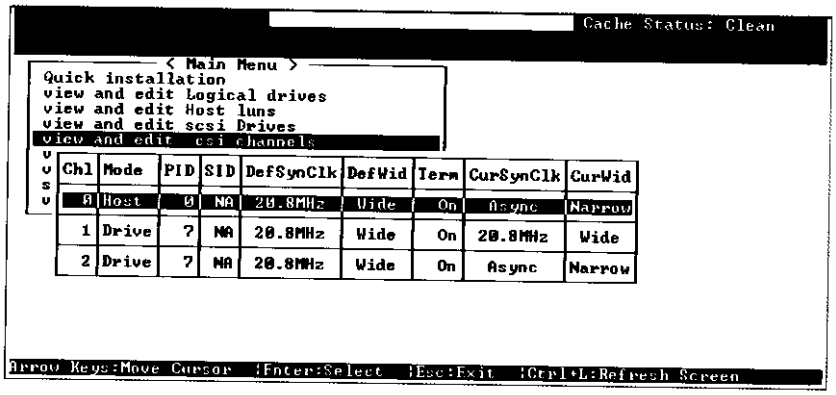
Name Logical drive name.

7.1.4 SCSI Drive's Status



Slot Slot number of the SCSI drive.

7.1.5 SCSI Channel's Status



Chl The SCSI channel's ID.

Mode Channel mode.

- Host — Host Channel mode
- Drive — Drive Channel mode

PID Primary controller's SCSI ID mapping:

- * — Multiple SCSI IDs were applied (Host Channel mode only).
- *(ID number)* — The Primary Controller is using the SCSI ID for host LUN mapping.
- NA — No SCSI ID applied (Drive Channel mode only).

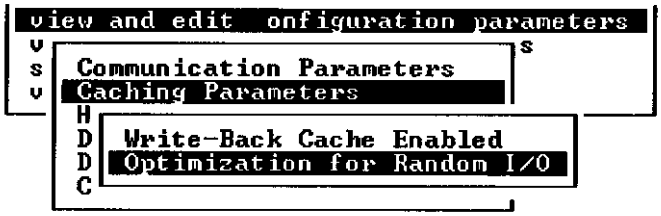
SID Secondary controller's SCSI ID mapping:

- * — Multiple SCSI IDs were applied (Host Channel mode only).
- *(ID number)* — The Primary Controller is using the SCSI ID for host LUN mapping.
- NA — No SCSI ID applied (Drive Channel mode only).

DefSynClk Default SCSI bus sync clock:

- *??.?*M — The default setting of the SCSI channel is ??.? Mhz in Synchronous mode.
- Async — The default setting of the SCSI channel is Asynchronous mode.

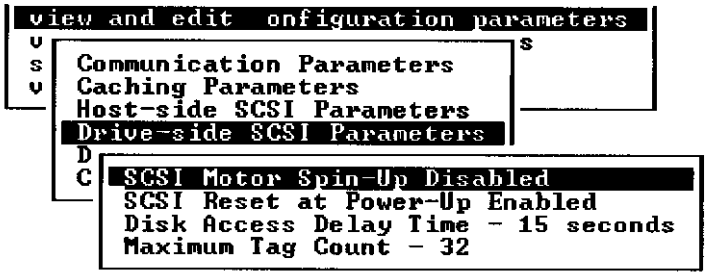
7.1.6 Viewing the Current Setting of Each Function



Most of the current setting of each function can be viewed in the menu.

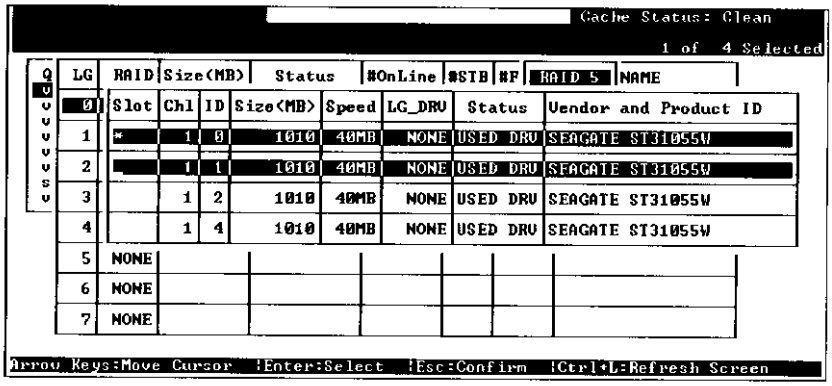
In the example shown above:

- The current setting of "Write-Back Cache" is "Enabled".
- The current setting of Optimization is "Optimization for Random I/O".

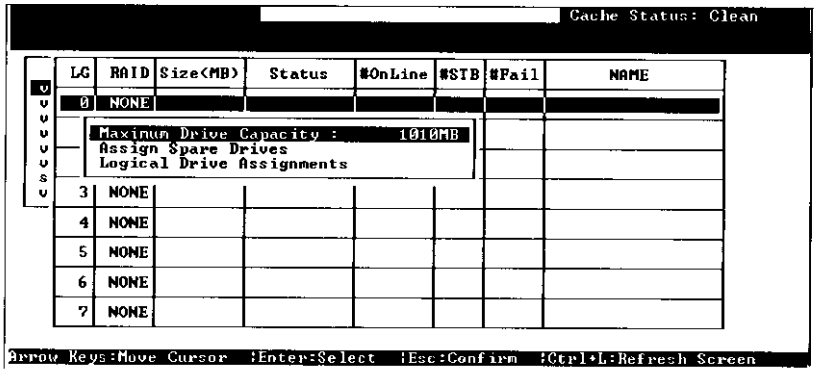


In the example shown above:

- The current setting of "SCSI Motor Spin-Up" is "Disabled".
- The current setting of "SCSI Reset at Power-Up" is "Enabled".
- The current setting of "Disk Access Delay Time" is "15 seconds".
- The current setting of "Maximum Tag Count" is "32".



A list of physical drives will appear. To include a drive, move the cursor to it, and then press [Enter]. An asterisk (*) will appear on the drive that has been selected. Press [ESC] when done.

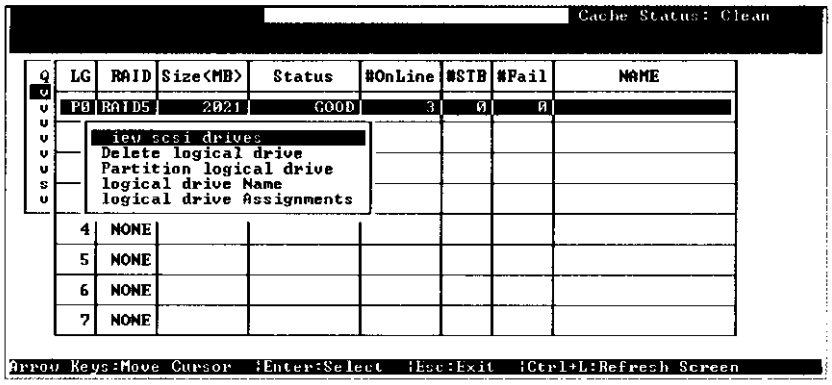


To limit the capacity of each drive included in the logical drive, select "Maximum Drive Capacity", then enter the maximum capacity that will be used by each drive.

You can assign a Local Spare Drive by choosing "Assign Spare Drives" in the above screen. A list of available drives will be displayed on the screen. Mark an asterisk (*) on the drive(s) that will be assigned by moving the cursor bar to that device, then pressing **[Enter]**. Press **[ESC]** when done.

To exit this menu, press **[ESC]**.

To view the SCSI drive members of the logical drive, choose the logical drive by pressing [**Enter**].



Choose "View SCSI Drives". The member drive information will be displayed on the screen. Refer to "7.1.4. SCSI Drive's Status" for the detailed descriptions of each item.

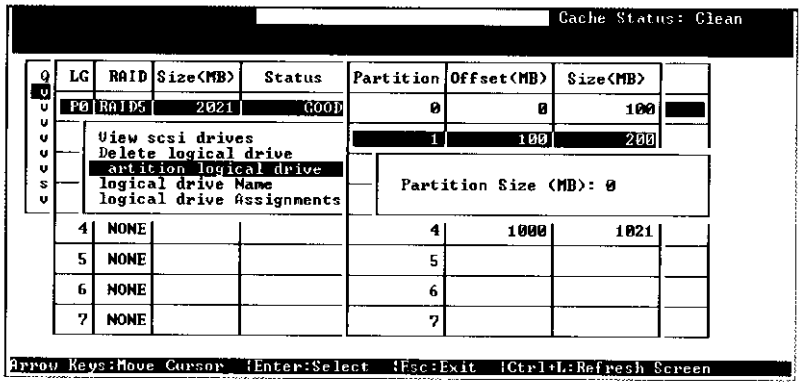
7.2.3 Deleting a Logical Drive

Choose the logical drive you wish to delete, then press [**Enter**]. Choose "Delete logical drive". Choose **Yes** when prompted to confirm.

7.2.4 Partitioning a Logical Drive

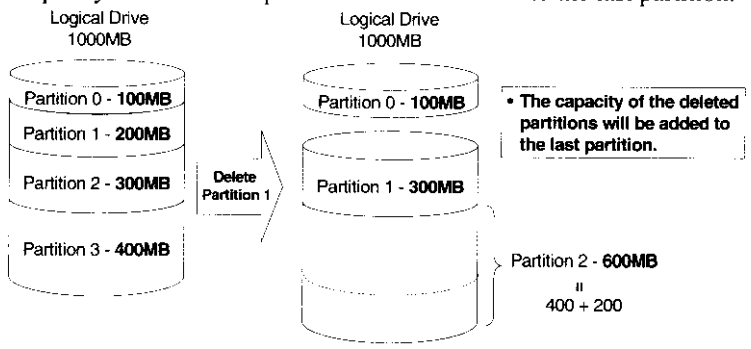
Choose the logical drive you wish to partition, then press [**Enter**]. Choose "Partition logical drive", then press [**Enter**]. Choose **Yes** to confirm.

7.2.5 Deleting a Partition of a Logical Drive



Choose the logical drive of the partition you wish to delete, then press [**Enter**]. Choose "Partition logical drive". The current partition table of the logical drive will be displayed in tabulated form. Move the cursor bar to the partition you wish to delete, then press [**Enter**]. Enter "0" on the partition size to delete this partition.

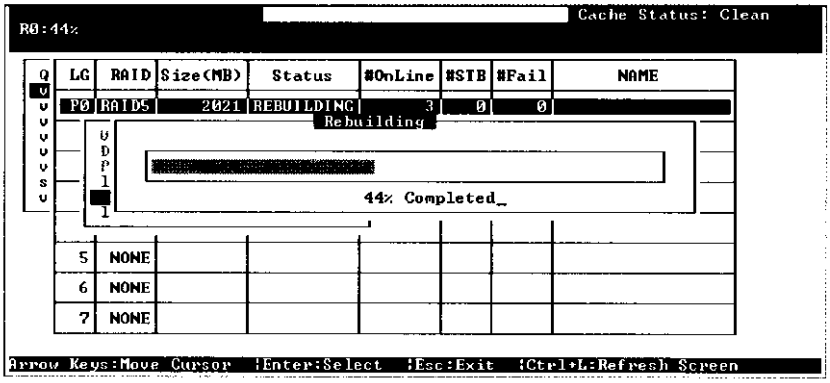
The capacity of the deleted partition will be added into the last partition.



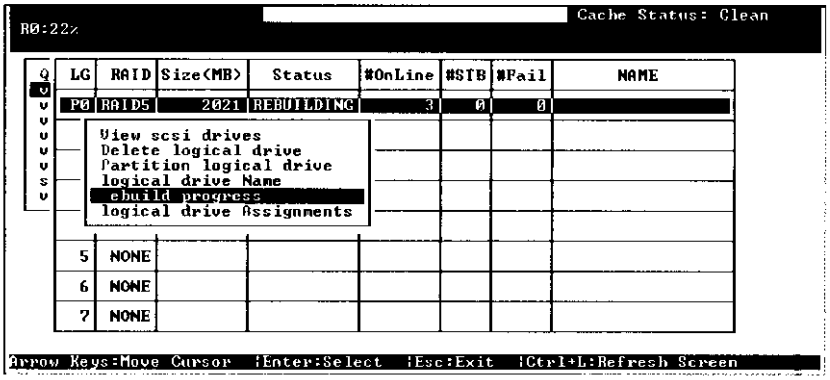
IMPORTANT:

- *The capacity of the deleted partition will be added into the last partition.*
- *As long as a partition has been changed, it is necessary to re-*

Choose the logical drive that has a failed member drive, then press [**Enter**]. Choose "Rebuild logical drive", then press [**Enter**]. When prompted with "Rebuild Logical Drive?", select **Yes**.



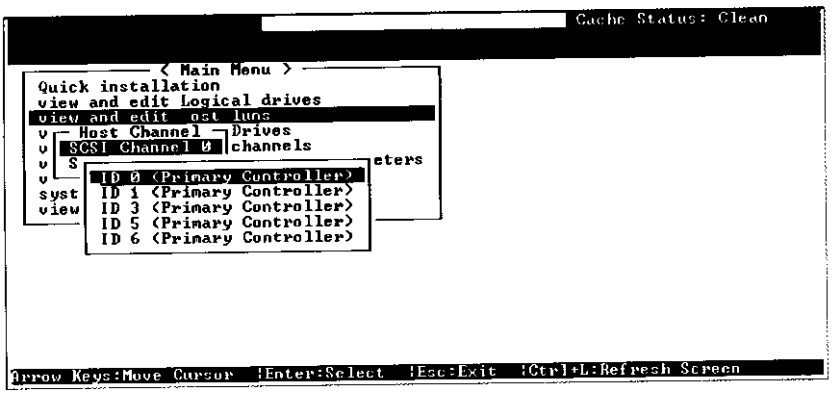
The rebuilding progress will be displayed on the screen.



When rebuilding has already started or the logical drive has been automatically rebuilt by a Local Spare Drive or Global Spare Drive, choose "Rebuild progress" to view the rebuilding progress.

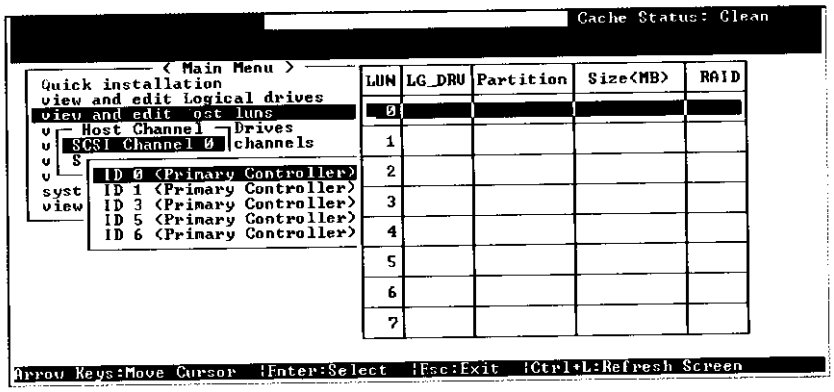
IMPORTANT:

- *The Rebuild function will appear only when a logical drive (with RAID level 1, 3 or 5) has a failed drive member.*

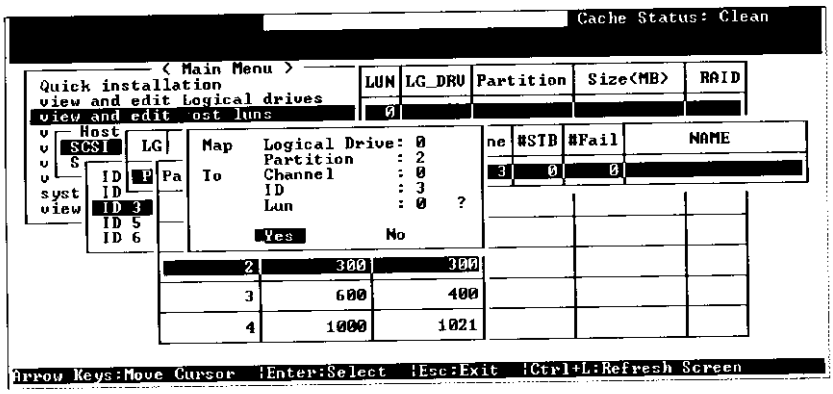


If the host channel has been assigned multiple SCSI IDs, a list of the host channel's SCSI IDs will be displayed on the screen. Choose the SCSI ID you wish to map, then press [**Enter**].

Note:
Multiple SCSI ID is supported in firmware version 2.11 or later. Firmware versions earlier than 2.11 only supports one SCSI ID.



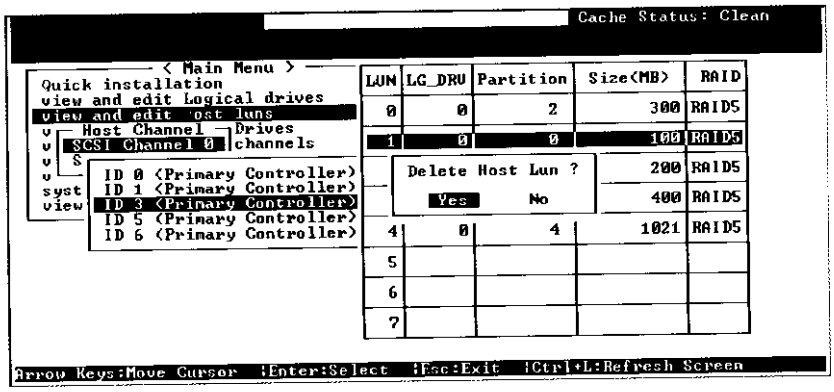
A list of LUNs and their respective mappings will be displayed on the screen. To map a host LUN to a logical drive's partition, select an available LUN (one not mapped yet) by moving the cursor bar to the LUN, then pressing [**Enter**].



The prompt shown above will display the mapping you wish to create. Choose **Yes** to create the LUN mapping you selected. In the example above, partition 2 of logical drive 0 will map to LUN 0 of SCSI ID 3 on host channel 0.

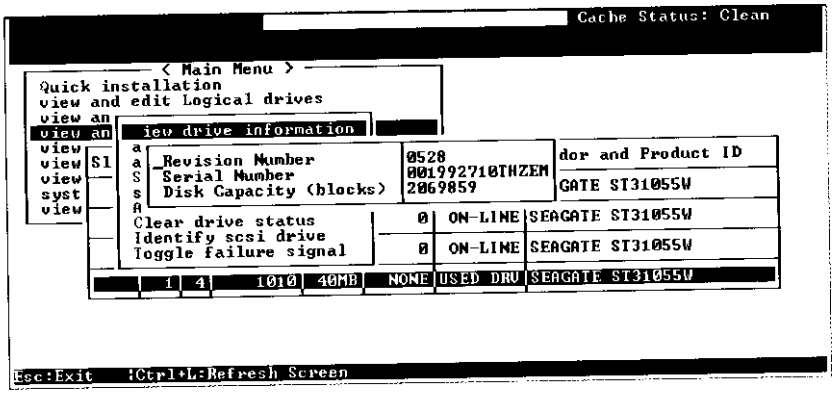
7.3.2 Viewing and Deleting the LUN Mappings

Choose the host channel and SCSI ID of the LUN mapping you wish to view or delete.



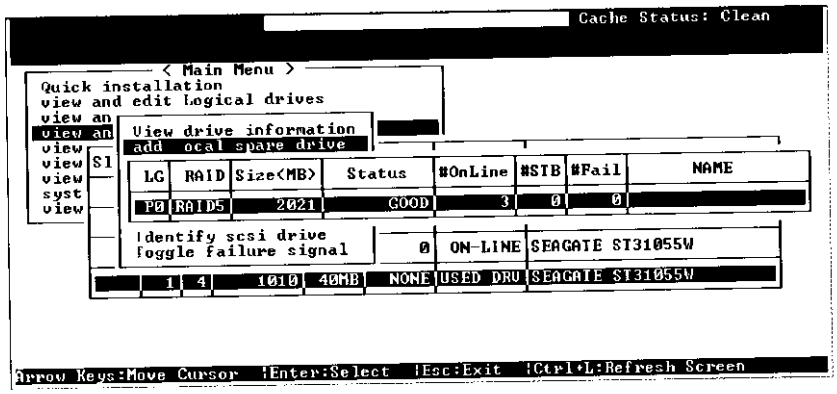
A list of the current LUN mapping will be displayed on the screen. Move the cursor bar to the LUN mapping you wish to delete, then press **[Enter]**. Select **Yes** to delete the LUN mapping, or **No** to cancel.

7.4.2 Viewing Drive Information



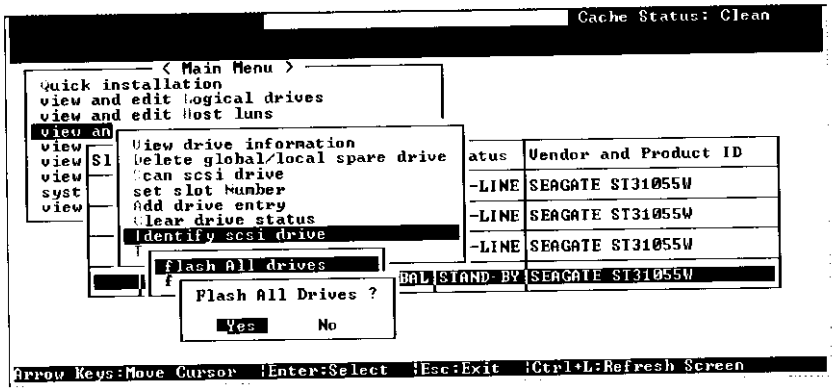
Choose the SCSI drive you wish to view, then press [**Enter**]. Select "View drive information". The revision number, serial number and disk capacity (counts in block; one block refers to 512K) of the drive will be displayed on the screen.

7.4.3 Adding a Local Spare Drive

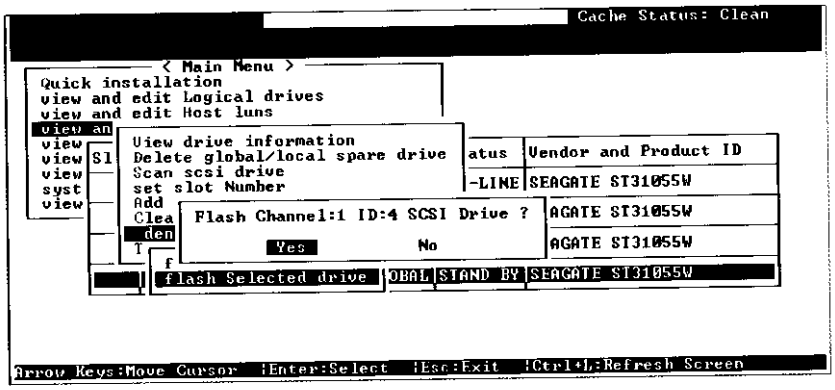


Move the cursor bar to the SCSI drive that has not yet been assigned to a logical drive or as a spare drive, then press [**Enter**]. Choose "Add Local Spare Drive". A list of available logical drives will be displayed on the

7.4.5 Identifying a Drive

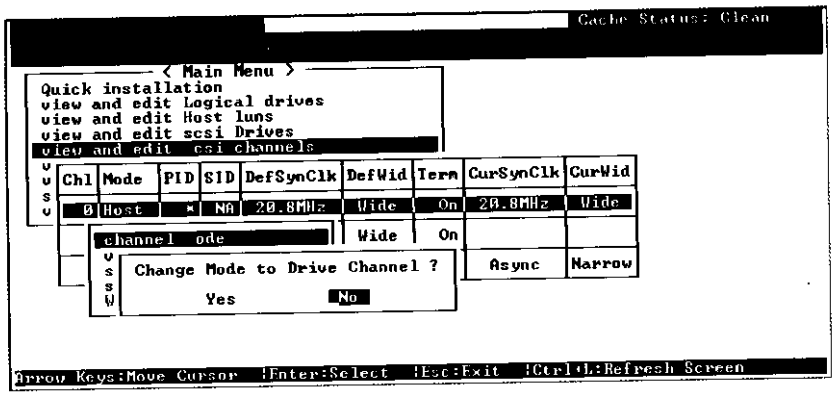


Move the cursor bar to the drive you wish to identify, then press **[Enter]**. Choose "Identify SCSI drive", then choose "flash all drives" to flash the read/write LEDs of all the drives in the drive channel. Choose **Yes**.



Or choose "flash selected drive" to flash the read/write LED of the selected drive only. Choose **Yes**.

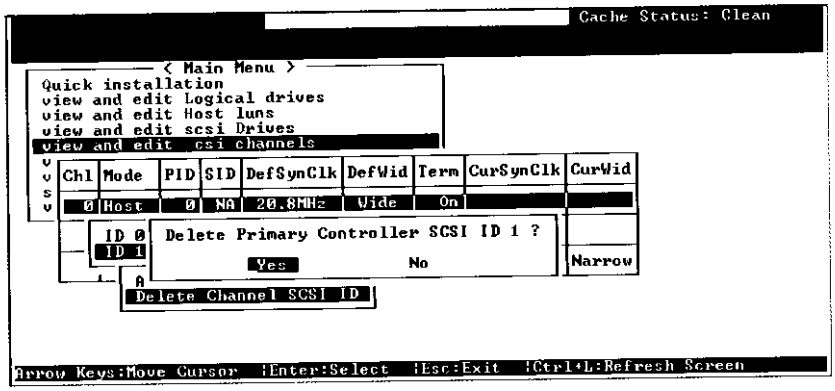
7.5.1 Redefining a Channel Mode



Choose the channel you wish to change, then press **[Enter]**. Choose "Channel Mode", then press **[Enter]**. A dialog box will appear asking you to confirm the change. Select **Yes** to change the mode of the selected SCSI channel.

IMPORTANT:
Every time you change the channel mode, you must reset the RAID controller for the changes to take effect.

Deleting a SCSI ID

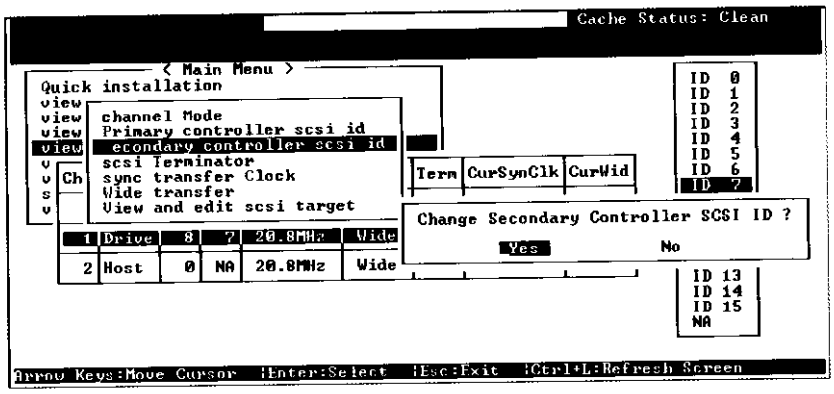


Choose the SCSI ID you wish to delete. Choose "Delete Channel SCSI ID". The dialog box "Delete Primary Controller SCSI ID?" will appear. Select **Yes**, then press **[Enter]** to delete.

IMPORTANT:

- *Every time you change a channel's SCSI ID, you must reset the RAID controller for the changes to take effect.*
- *The default SCSI ID of the Host channel is 0, the Drive channel is 7. If only one controller exist, you must set the Secondary Controller's SCSI ID to "A". If a secondary controller exist, you need to set a SCSI ID.(The RAID Disk Array support dual controller)*
- *Multiple SCSI ID can be applied to the Host channel while the Drive channel, one SCSI ID or no SCSI ID.*
- *Multiple SCSI ID is supported in firmware version 2.11 or later. Firmware versions earlier than 2.11 only supports one SCSI ID.*
- *At least a controller's SCSI ID has to be present on the SCSI bus.*

7.5.4 Setting a Secondary Controller's SCSI ID / Drive Channel

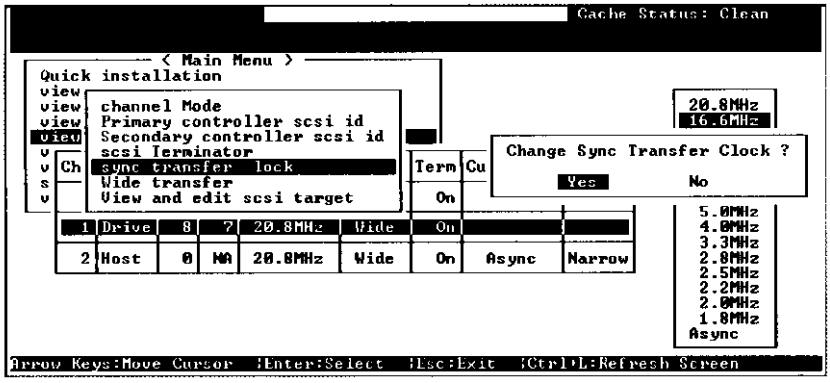


Choose a Drive channel, then press **[Enter]**. Choose "Secondary Controller SCSI ID". A list of SCSI IDs will be displayed on the screen. Only one SCSI ID can be assigned to the drive channel of a controller. Now choose a SCSI ID for the drive channel of the Secondary Controller. The dialog box "Change Secondary Controller SCSI ID?" will appear. Select **Yes**, then press **[Enter]**.

IMPORTANT:

- *Every time you change a channel's SCSI ID, you must reset the RAID controller for the changes to take effect.*
- *The default SCSI ID of the Host channel is 0, the Drive channel is 7.*
- *If only one controller exist, you must set the Secondary Controller's SCSI ID to "NA". If a secondary controller exist, you need to set a SCSI ID.(The ESCORT Disk Array support dual controller)*
- *Multiple SCSI ID can be applied to the Host channel while the Drive channel, one SCSI ID or no SCSI ID.*
- *Multiple SCSI ID is supported in firmware version 2.11 or later. Firmware versions earlier than 2.11 only supports one SCSI ID.*
- *At least a controller's SCSI ID has to be present on the SCSI bus.*

7.5.6 Setting a Transfer Speed

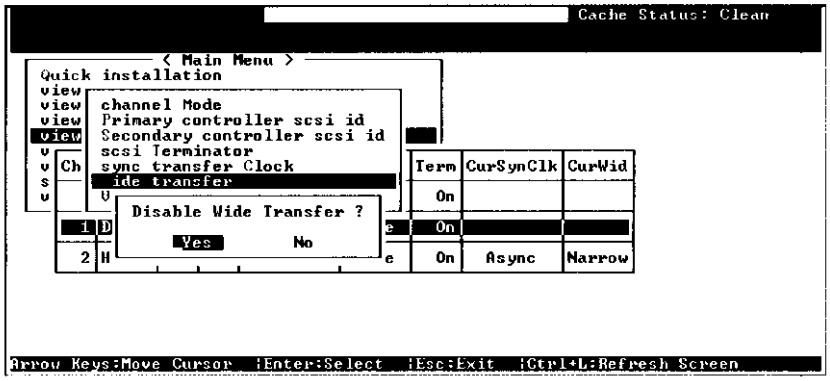


Move the cursor bar to a channel, then press [**Enter**]. Choose "Sync Transfer Clock", then press [**Enter**]. A list of the clock speed will appear. Move the cursor bar to the desired speed and press [**Enter**]. A dialog box "Change Sync Transfer Clock?" will appear. Choose **Yes**.

IMPORTANT:

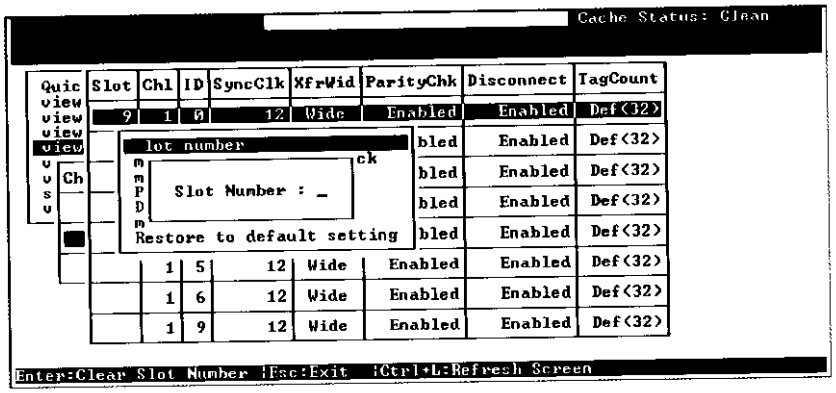
- *Every time you change the SCSI Transfer Speed, you must reset the RAID controller for the changes to take effect.*

7.5.7 Setting a Transfer Width



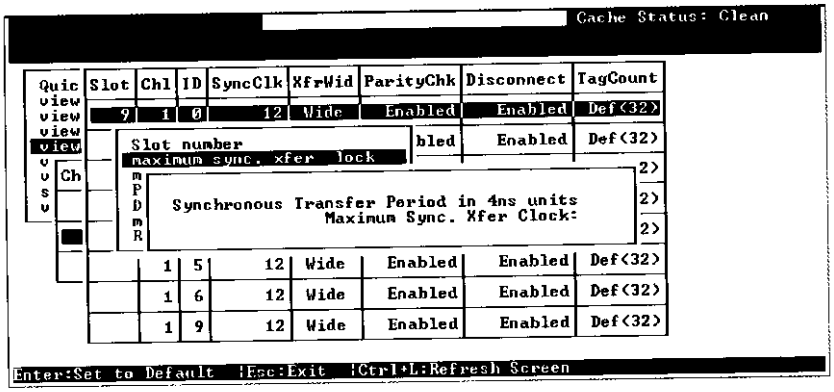
A list of all the SCSI targets and their current settings will appear. Press [**Enter**] on a SCSI target and a menu list will appear on the screen.

Slot Number



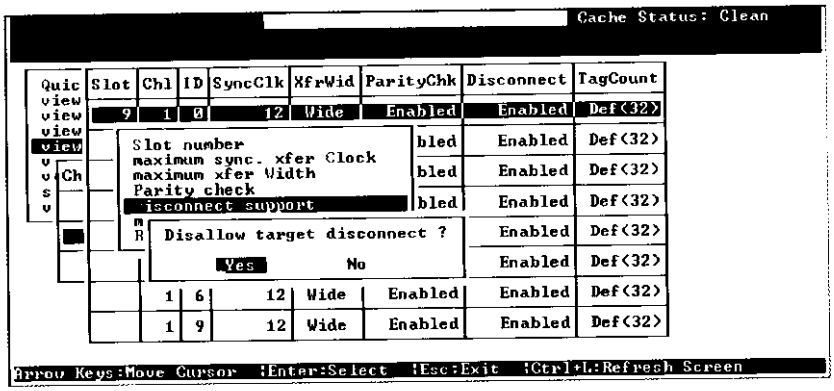
Choose "Slot Number", then press [**Enter**]. Enter a slot number, then press [**Enter**] again.

Maximum Synchronize Transfer Clock



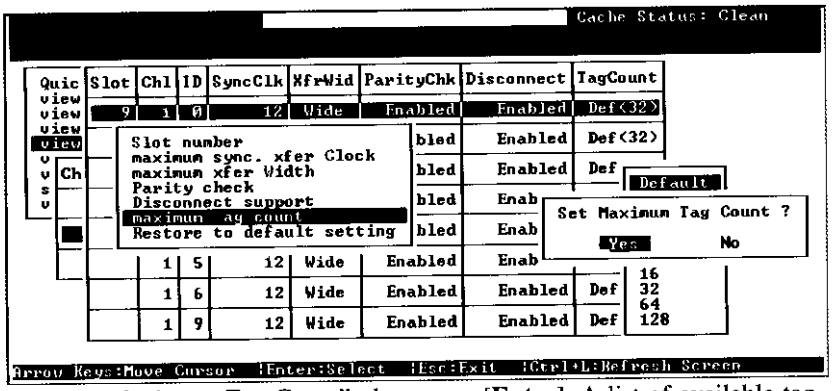
Choose "Maximum Sync. Xfer Clock", then press [**Enter**]. A dialog box will appear on the screen. Enter the clock, then press [**Enter**].

Disconnecting Support



Choose "Disconnect Support". Choose **Yes** in the dialog box that followed to confirm the setting.

Maximum Tag Count



Choose "Maximum Tag Count", then press [**Enter**]. A list of available tag count numbers will appear. Move the cursor bar to a number, then press [**Enter**]. Choose **Yes** in the dialog box that followed to confirm the setting.

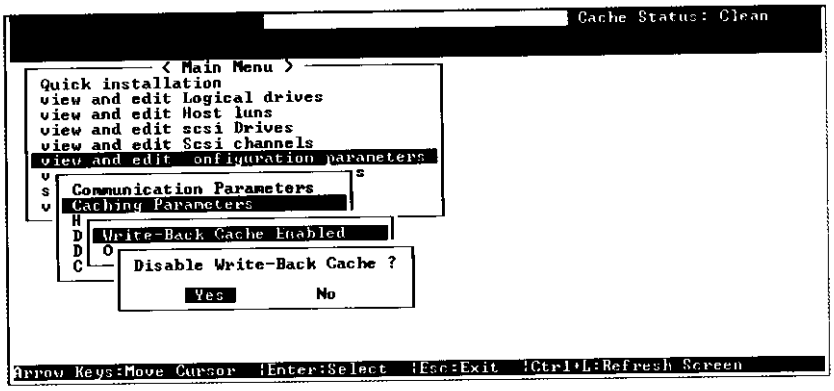
Move the cursor bar to the desired item, then press [**Enter**].

7.6.1 Communication Parameters

Refer to Chapter 10, Remote Administration for more information.

7.6.2 Caching Parameters

Write-Back Cache Enable/Disable



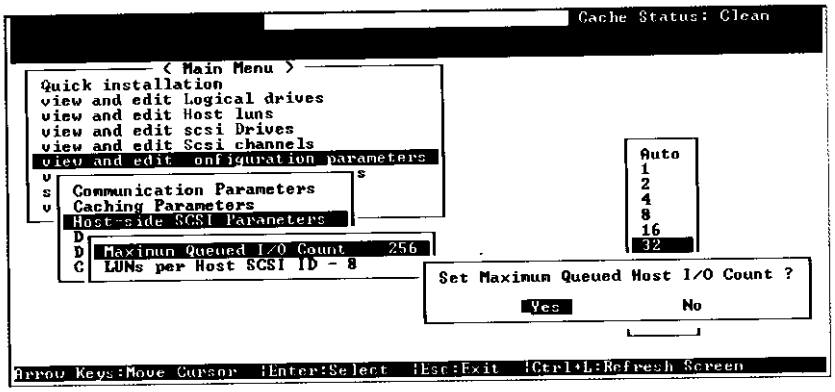
Choose "Caching Parameters", then press [**Enter**]. Select "Write-Back Cache", then press [**Enter**]. "Enabled" or "Disabled" will display the current setting of the Write-Back Cache. Choose **Yes** in the dialog box that followed to confirm the setting.

IMPORTANT:

- *Every time you change the Cache Parameters, you must reset the controller for the changes to take effect.*

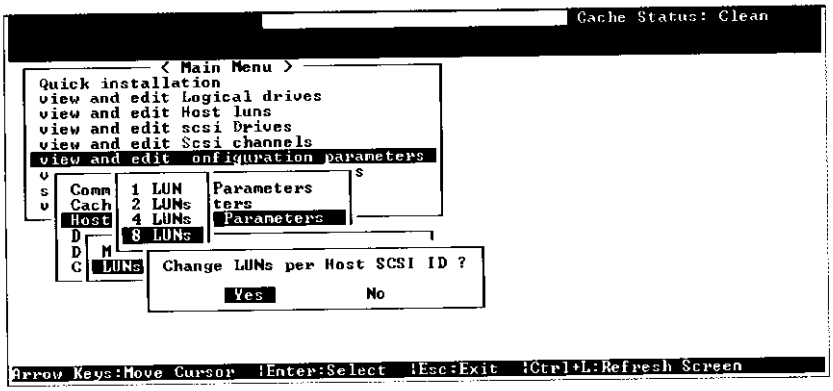
7.6.3 Host-side SCSI Parameters

Maximum Queued I/O Count



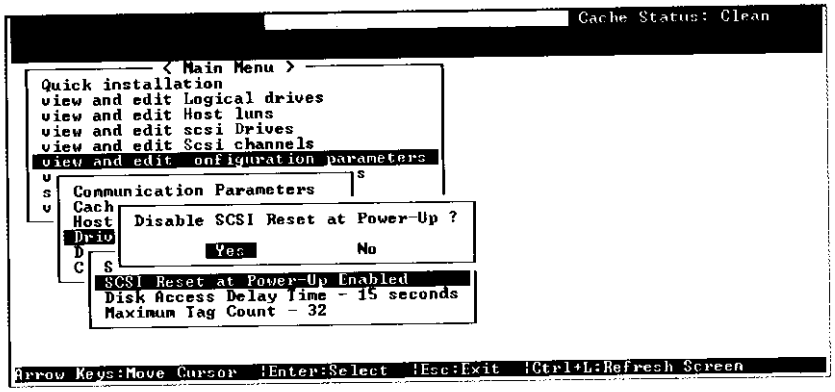
Choose "Host-side SCSI Parameters", then press [**Enter**]. Choose "Maximum Queued I/O Count", then press [**Enter**]. A list of available selections will appear. Move the cursor bar to an item, then press [**Enter**]. Choose **Yes** in the dialog box that followed to confirm the setting.

LUNs per Host SCSI ID



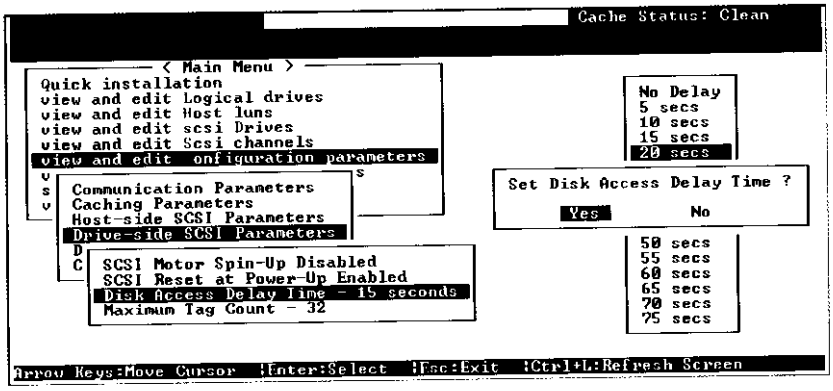
Choose "LUNs per Host SCSI ID", then press [**Enter**]. A list of selections

SCSI Reset at Power-Up



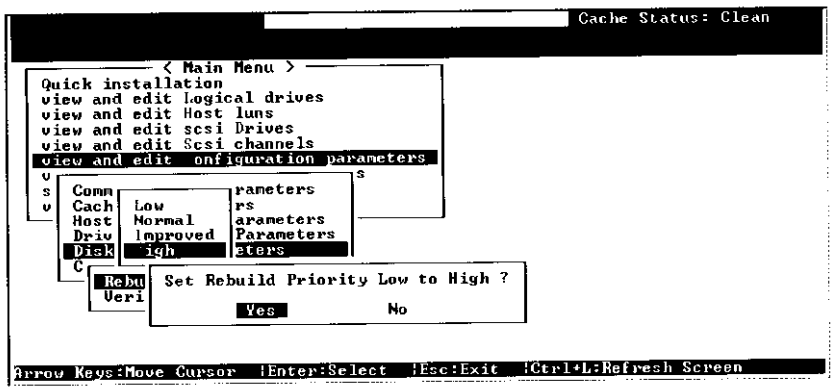
Choose "SCSI Reset at Power-Up", then press [**Enter**]. Choose **Yes** in the dialog box that followed to confirm the setting.

Disk Access Delay Time



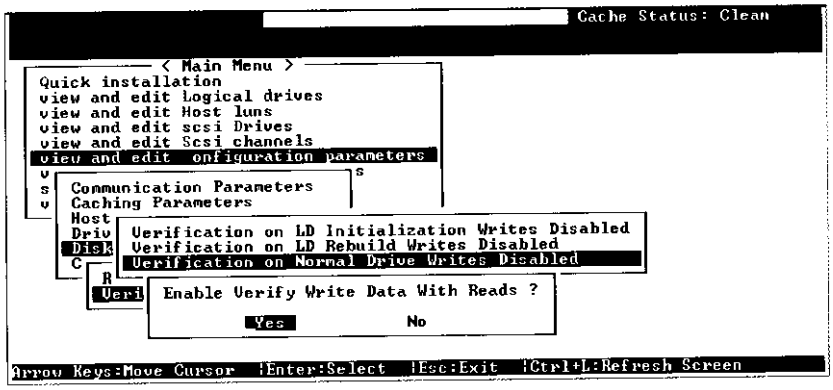
Choose "Disk Access Delay Time", then press [**Enter**]. A list of selections will appear. Move the cursor bar on a selection, then press [**Enter**]. Choose **Yes** in the dialog box that followed to confirm the setting.

Rebuild Priority



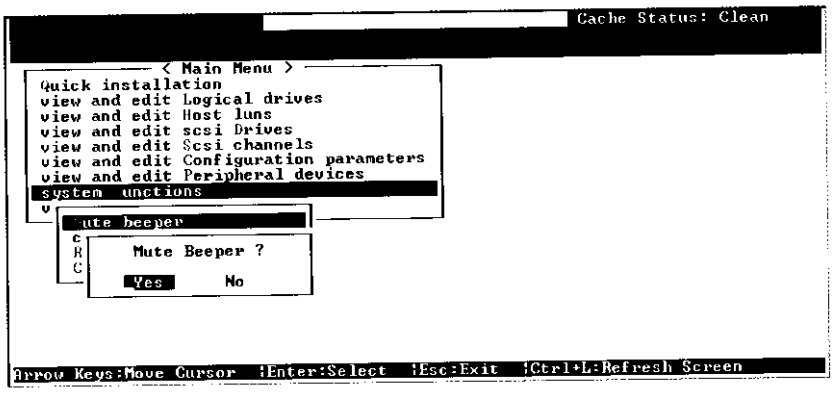
Choose "Rebuild Priority", then press [**Enter**]. A list of the priority selections will appear. Select the desired priority; then press [**Enter**].

Verification On Writes



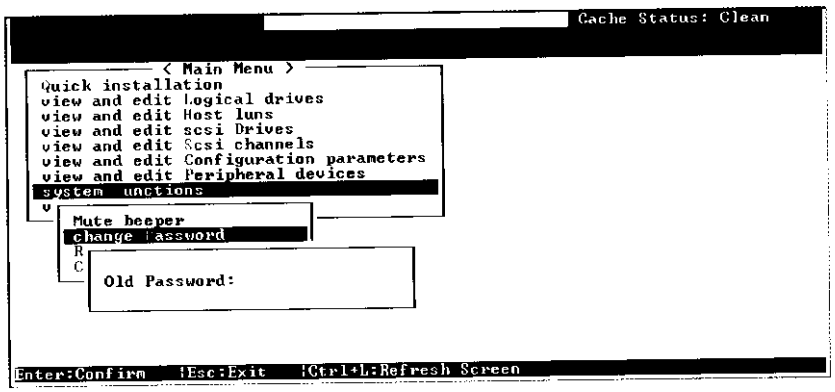
Choose "Verification on Writes", then press [**Enter**]. Move the cursor bar to an item, then press [**Enter**]. Choose **Yes** in the dialog box that followed to confirm the setting.

7.7.1 Mute Beeper



When the controller's beeper has been activated, choose "Mute beeper", then press [**Enter**]. Choose "**Yes**" and press [**Enter**] in the next dialog box to turn the beeper off temporarily. The beeper will still activate on the next event.

7.7.2 Change Password



Use the controller's password to protect the controller from unauthorized entry. Once the controller's password has been set, regardless of whether the front panel, the RS-232C terminal interface or the GUI RAID Manager is used, the user can only configure and monitor the RAID controller by providing the correct password.

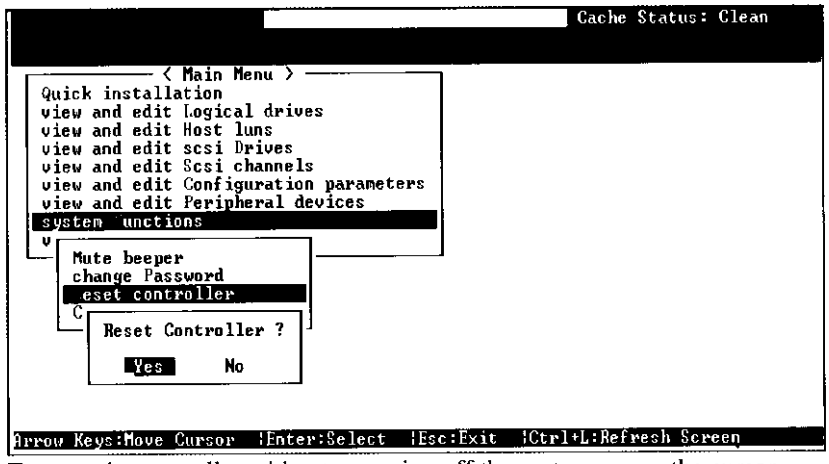
Enter the desired password in the column, then press [**Enter**]. The next dialog box will display "Re-Enter Password". Enter the password again and press [**Enter**].

The new password will now become the controller's password. Providing the correct password is necessary when entering the Main Menu from the Initial screen.

Disabling the Password

To disable or delete the password, press [**Enter**] only in the password column that is used for entering a new password. The existing password will be deleted. No password checking will occur when entering the Main Menu from the Initial screen.

7.7.3 Reset Controller



To reset the controller without powering off the system, move the cursor bar to "Reset Controller", then press [**Enter**]. Choose **Yes** in the dialog box that followed, then press [**Enter**]. The controller will now reset as well as power-off or re-power-on.

Chapter 8 Redundant Controller

8.1 Before You Begin...

What Does Redundant Controller Mean? Why Do We Need Redundant Controller?

Redundant controller is using two or more RAID controllers in the same RAID system. If you have two controllers, both must be working normally and capable of monitoring each other at the same time. Each controller serves its own I/O requests. When a controller fails to function, another controller will temporarily take over for the failed controller. One of the goals of a RAID system is to provide a stable storage architecture. The functionality of a redundant controller increases the availability of the RAID system.

All electronic components have its lifetime. A simple memory parity error may sometimes cause the controller to completely hang up. This is the reason why we need a redundant controller - to minimize the down-time chance of a RAID system.

What can the cache memory do for a redundant controller?

There are always a lot of data stored in the cache memory. Normally, when a controller fails, data stored in the cache memory are lost; but this is not the case with the DA-3500V controller series. The controller has a dedicated hardware that performs cache synchronization. Using SCSI channel 0 as a synchronized cache port for synchronizing the cache memory, data stored in the cache memory will not be lost if one of the controllers fails.

Write-Back Cache: Enabled or Disabled?

When using the DA-3500V in a redundant controller configuration, Write-Back mode can be enabled when SCSI cable is used for redundant controller communication, which allows the cache data of the controllers to be synchronized. (Synchronizing the cache memories also achieves the goal of avoiding data loss if a controller fails to function.)

Limitations

- Both controllers must use the same firmware version.
- The time of the takeover process is about 5 seconds. Some operating systems will not retry accessing the HDDs.

Quick Start

To set up the redundant function of the controllers, you must perform a few basic steps. These steps will be described later in this chapter.

- Controller settings
  - Communication Parameters
  - Redundant Configuration

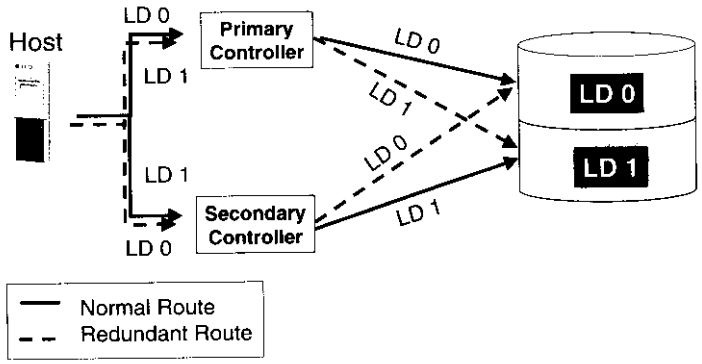
**The redundant function of the controllers can be enabled via the front panel or a terminal emulation program. Section 8.2 describes the procedures for using the front panel. The same menus and messages are displayed when using the terminal interface. The same result can be achieved regardless of the method used.*

Connecting a RS-232C cable when using the terminal interface is highly recommended but is not essential for the redundant controller's functionality.

8.2 Setting Up The Redundant Controllers

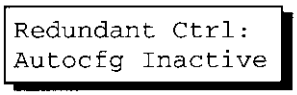
Example of Redundant Controllers

Here is a sample illustration of the redundant controller's operation:



for two seconds to select "Autocfg."

The message "Redundant Ctrl Autocfg Inactive" will appear.



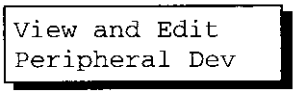
Power-off Controller 1, and then power-on Controller 2. Set Controller 2 to "**Autocfg**" as described in the above steps. Power-off Controller 2.

When the redundant controller function is set to the "Automatic" setting, the controllers will decide among themselves which will be the Primary or Secondary controller. If you need to specify a particular controller as Primary or Secondary, do not set it as "autocfg"; choose "primary" or "secondary" instead. Refer to the following section.

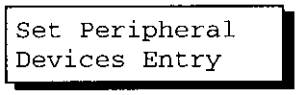
Redundant Configuration Using Manual Setting

Power-on Controller 1. Make sure Controller 2 is powered-off.

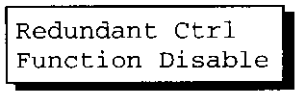
Press **ENT** for two seconds on the front panel of Controller 1 to enter the Main Menu. Use ▼ or ▲ to navigate through the menus. Choose "View and Edit Peripheral Dev..", then press **ENT**.



Choose "Set Peripheral Device Entry", then press **ENT**.



Choose "Redundant Ctrl Function ___", and then press **ENT**. (Note: The current setting will be displayed on the LCD. If this controller has never been set as a redundant controller before, the default setting of the redundant controller function is Disabled.



The Primary and Secondary controllers synchronize each other configurations. For the DA-3500V, write-back cache is still enabled if SCSI channel 0 is used as the synchronized cache channel.

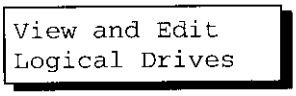
The Write-Back mode of the cache memory will automatically be disabled and the cache memory will work in Write-through mode. The settings on the LCD or terminal interface will show that the default Write-back setting has been disabled, and cannot be changed (DA-3500 only).

Assigning Logical Drives to the Secondary Controller

A logical drive can be assigned to the Primary or Secondary controller. When creating a logical drive, the logical drive will by default be assigned to the Primary controller. It can be assigned to the Secondary controller if the host computer is connected to the Secondary controller. The logical drive will not be able to be accessed by the Secondary controller if this logical drive has not been assigned to the Secondary controller.

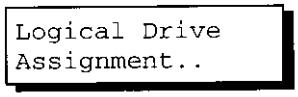
Press **ENT** for two seconds on the front panel of the Primary controller to enter the Main Menu.

Use ▼ or ▲ to navigate through the menus. Choose "View and Edit Logical Drives..", then press **ENT**.

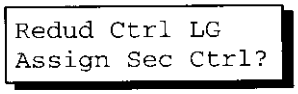


Create a logical drive or choose an existing logical drive, then press **ENT** to see the logical drive menu.

Choose "Logical Drive Assignment.. ", then press **ENT**.



The message "Redud Ctrl LG Assign Sec Ctrl?" will appear. Press **ENT** for two seconds to confirm. The logical drive has



Controller' or in the "Autocfg" mode. (Configure the new controller without the redundant cable and SCSI cables connected.)

When the new controller is connected, it will appear as if it does not exist. Execute the following steps for the new controller to function. Press **ENT** for 2 seconds on the Primary Controller to enter the Main Menu.

Use ▼ or ▲ to choose "View and Edit Peripheral Dev..", then press **ENT**.

```
View and Edit
Peripheral Dev
```

Choose "Set Peripheral Device Entry..", then press **ENT**.

```
Set Peripheral
Devices Entry ..
```

Choose "Redundant Ctrl Function__", then press **ENT**.

```
Redundant Ctrl
Function__
```

The message "Redundant Ctrl Autocfg Degraded" will appear on the LCD.

```
Redundant Ctrl
Autocfg Degraded
```

Press **ENT** and the message "Deassert Reset on Failed Ctrl?" will appear.

```
Deassert Reset on
Failed Ctrl?
```

Press **ENT** for 2 seconds and the controller will start to scan for the new controller.

```
Redundant Ctrl
Scanning
```

The new controller will then start to initialize.

```
Initializing...
  Please Wait...
```

Once initialized, it will begin acting as the Secondary Controller.

```
DA-3500  v2.11
■■■■■■
```

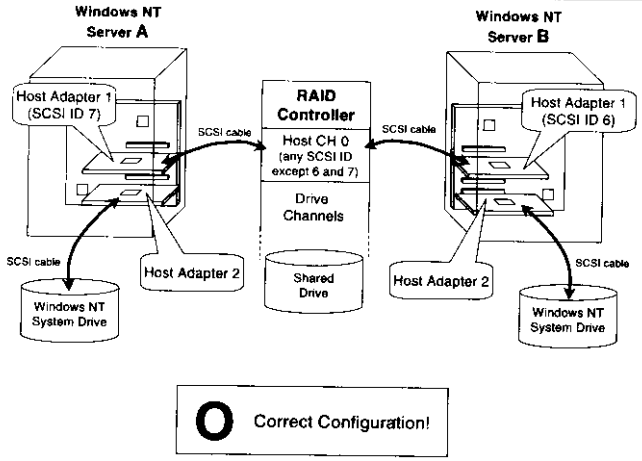
9.2 Using Microsoft Cluster Server (MSCS)

The Microsoft Windows NT Server 4.0 Enterprise edition includes the built-in Microsoft Cluster Server (MSCS). MSCS provides server cluster ability as an option.

The DA-3500V RAID controller series is compliant with Microsoft Cluster Server and can be used with it perfectly well.

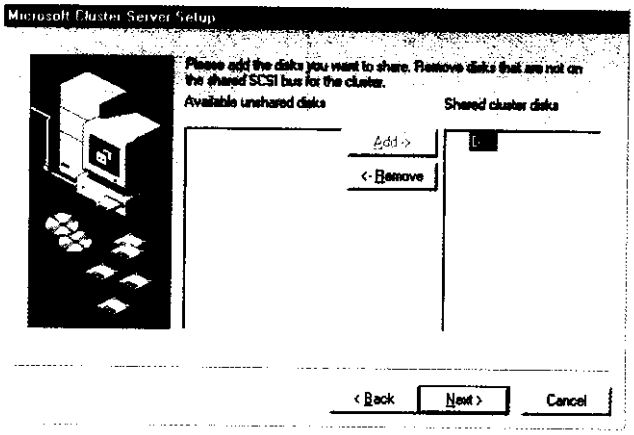
According to released documentation about Microsoft Cluster Server, the following guidelines should be followed:

- Windows NT system drive (including system files and paging files) must never exist on a shared SCSI bus. You must install the Windows NT system drive on a local (not shared) SCSI bus or IDE channel, and install the shared drive to a shared SCSI bus.
- The IDs of the SCSI adapters in your computers must be set to either SCSI ID 6 or 7. To make these changes, on the first Windows NT computer, set the SCSI adapter to ID 7. Then on the other Windows NT computer in the cluster, set the corresponding SCSI adapter to ID 6. Repeat this process for each set of SCSI adapters within the cluster.
- Map the logical drive(s) to the host channel using any other SCSI IDs except 6 and 7.
- The adapter must use SCSI ID 6 and 7 to ensure proper bus arbitration. These values must be used even if your computer supports 16-bit SCSI adapters (Wide SCSI, Ultra Wide SCSI or LVD SCSI). Failure to use these specified values will result in timeout errors on the SCSI bus and subsequent errors in the MSCS service.
- It is a must to restart the computers (all the computers in a cluster) after reconfiguring or adding disks (this includes changing the partition layout in the Disk Administrator).



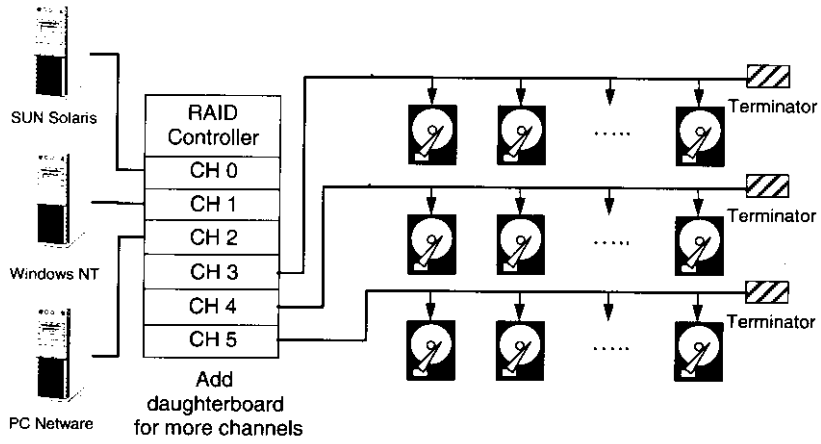
If the system drive is placed on the same SCSI bus as the shared drive, or the shared drive does not exist, the above screen will appear and you will not be able to continue installing MSCS.

The Windows NT system drive does not exist on the same SCSI bus as the shared drive. Connect the Windows NT system drive to another SCSI host adapter.



With the correct configuration, the installation program will add the shared drive to the "Shared cluster disks" automatically. You can add or remove them manually if you have more shared disks.

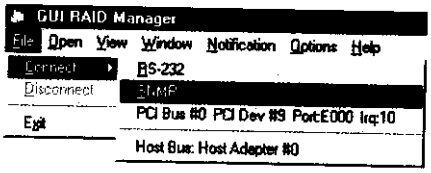
9.3 Multiple Host



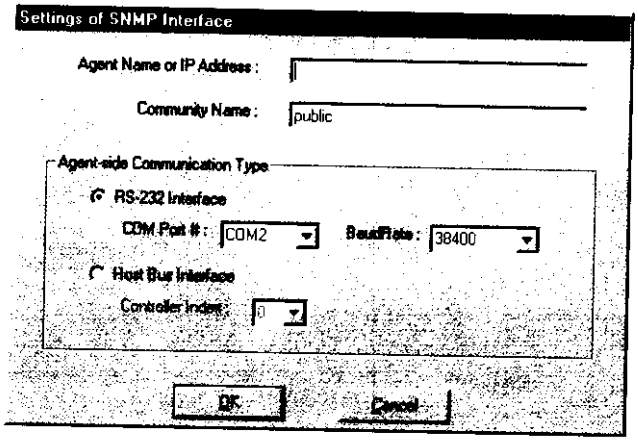
The ESCORT DA-3500 series Disk Array can be connected to simultaneously serve more than one host computer. The figure above is an example of connecting to multiple hosts.

All host computers share the RAID facilities of a controller but access different logical drives. Accessing the same logical drive will cause data conflict. To prevent data conflict that arises from sharing the same logical drive, a 3rd party "HA" management hardware or software is required.

How to Establish Connection through SNMP?



Choose the "File" menu. Click "Connect" and choose "SNMP" from the pop up menu.



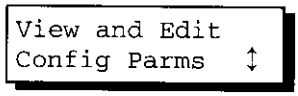
Enter the Agent name or the IP address and the Community name of the host computer in the first column.

Click on the select button in front of "RS-232 Interface" to select. Choose the COM port of the host computer connected to the DA-3500, and choose the baud rate speed of the RAID controller. Press "OK" to establish the connection. After the connection has been established, all operations will act exactly the same as executing the GUI RAID Manager from the host computer. The Fault-bus error signals and drive failure signals will also pass through the SNMP.

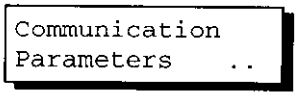
Baud Rate Settings

The baud rate can be changed via the front panel. To change the baud rate of the controller according to the host RS-232C interface:

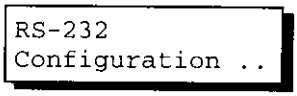
Press **ENT** for two seconds to enter the Main Menu. Press ▼ or ▲ to select "View and Edit Config Parm", then press **ENT**.



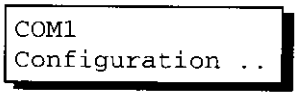
Select "Communication Parameters ..", then press **ENT**.



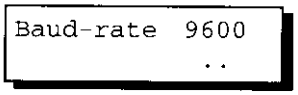
Select "RS-232 Configuration ..", then press **ENT**.



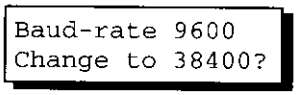
Select "COM1 Configuration ..", then press **ENT**. (Select COM2 if you are using COM2)



Select "Baud-rate ", then press **ENT**.



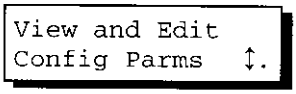
Press ▼ or ▲ to select the baud rate, then press **ENT** for 2 seconds to set.



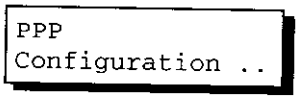
* Available baud rates are: 2400, 4800, 9600, 19200 and 38400.

Enable Terminal Emulation

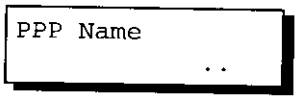
Press **ENT** for two seconds to enter the Main Menu. Press ▼ or ▲ to select "View and Edit Config Parm", then press **ENT**.



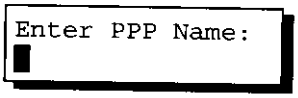
Select "PPP Configuration ..", then press **ENT**.



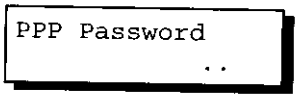
Select "PPP Name ..", then press **ENT**.



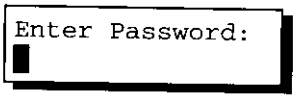
Enter the PPP Name one by one. Press ▼ or ▲ to choose a character for that space, then press **ENT** to move to the next space. After the PPP Name has been entered, press **ENT** for 2 seconds to set.



Select "PPP Password ..", then press **ENT**.



Enter the PPP Password one by one. Press ▼ or ▲ to choose a character for that space, then press **ENT** to move to the next space. After the PPP Password has been entered, press **ENT** for 2 seconds to set.



Data Routing Through PPP, Data Routing Direct to Port

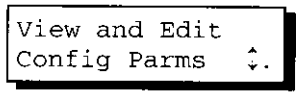
There are two options in this column, "Comm Route PPP" (Data Routing Through PPP) and "Comm Route Dir" (Data Routing Direct to Port). Set it to "Comm Route PPP" (Data Route Through PPP) in order to let the terminal emulation data pass through PPP, then to the client computer.

IMPORTANT:

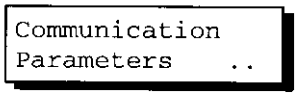
- *If the COM port is not used for PPP connection, set it as "Comm Route Dir" (Data Routing Direct to Port) to keep the terminal emulation working properly.*

Check IP Address Assigned to the Controller

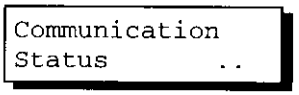
Press **ENT** for two seconds to enter the Main Menu. Press ▼ or ▲ to select "View and Edit Config Parm", then press **ENT**.



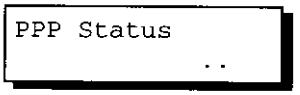
Select "Communication Parameters ..", then press **ENT**.



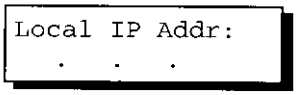
Select "Communication Status ..", then press **ENT**.

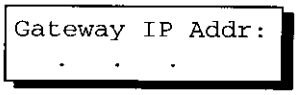


Select "PPP Status ..", then press **ENT**.



Press **ENT** to view the IP address of DA-3500V, then press ▼ or ▲ to view the Gateway IP address.





Connect Telnet to the Controller's IP from the Client Computer

Use any "Telnet" client program from the remote computer, then connect to the IP address of DA-3500. The terminal emulation screen will display the client Telnet program, as well as when using terminal emulation locally.

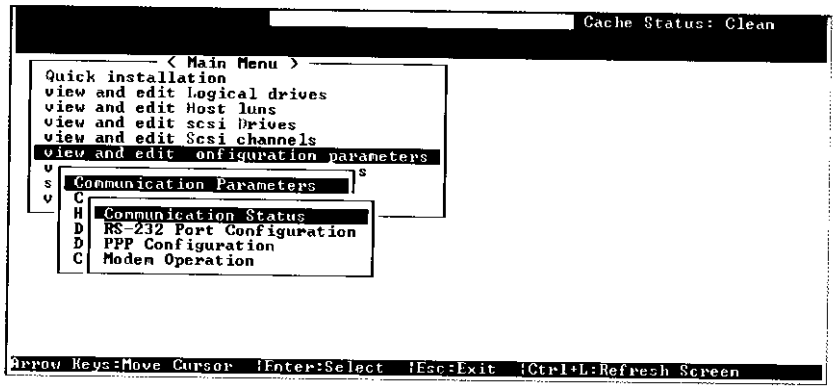
-
- *The terminal emulation screen for both COM 1 and COM 2 connections are synchronized. Users connected to COM 1 and COM 2 can see each other's operating screen.*

Hardware Connection for DA-3500

Pick up a standard external modem which uses standard AT command set. Connect the modem to COM 1 or COM 2 of the DA-3500 series Disk Array. Complete the other connections of the modem (power cables and phone wires) and switch on the power of the Modem.

Setting DA-3500 using the RS-232C Terminal Interface

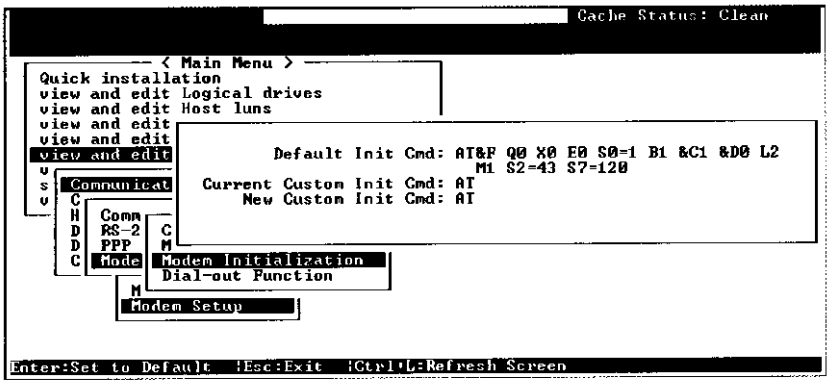
The following example shows connecting COM 1 to the local terminal emulation, and COM 2 to the modem:



Choose "**Yes**" to configure the modem on the COM2 port.

To delete the configured modem port, press [**Enter**] on the configured modem port item and choose "Deconfigure Modem Port".

Modem Initialization Command



In the Modem Setup menu, choose "Modem Initialization". A dialog box will appear showing the default initialization command and the current custom initialization command. Enter the AT command in the "New Custom Init Cmd" field, if required.

Modem Operating Modes

To send the initialization command to the modem, there are three selectable options:

- Sending Default Init command only – "None <Default Used>"
- Sending Custom Init command only – "Replace Default"
- Sending Default Init command and Custom Init command – "Append to Default"

In the Communication Parameter menu, select "RS-232 Port Configuration". Choose "COM 2 Configuration" to configure the COM 2 port of the DA-3500 series Disk Array.

Set the baud rate of the modem and the client terminal emulation program. In this example, COM 1 and COM 2 are used for terminal emulation at the same time. The baud rate for both COM 1 and COM 2 must be the same.

Set the "Data Routing...." to "Data Routing Direct to Port", and enable the Terminal Emulation. The Modem is now ready to answer the dial-in connections.

IMPORTANT:

- *If COM 1 and COM 2 are both used as terminal emulation, the baud rate must be the same.*
- *The baud rate setting in the client (remote site) terminal emulation program must be the same as the baud rate setting of the controller's COM port.*

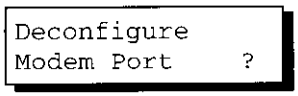
Establish the Connection from the Remote Terminal

Use a terminal emulation program that supports ANSI or VT-100 terminal emulation modes. From the remote terminal program, dial the phone number of the modem connected to the DA-3500 series Disk Array. The modem should answer the call and start "handshaking" with the modem on the remote site. After the connection is established, the screen on the remote terminal program will look the same as the screen on the local site.

How do you know the modem is connected?

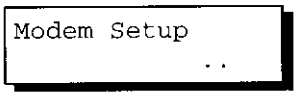
Choose "Communication Status" from the Communication Parameters menu and press **[Enter]**. The configured COM port and it's current status will be shown on the screen. The message "Modem Present and Connected" means the modem is connected now.

Select "Deconfigure Modem Port", then press **ENT** for two seconds to delete.

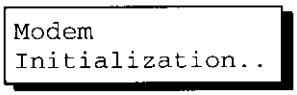


Modem Initialization Command

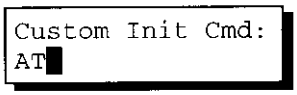
In the "Modem Setup" menu, press **ENT**.



Select "Modem Initialization ..", then press **ENT**.



Enter the AT command, if required, then press **ENT** for two seconds when finished.

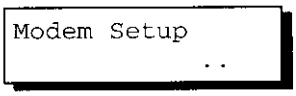


Modem Operating Modes

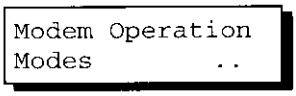
To send the initialization command to the Modem, there are three selectable options:

- Sending Default Init command only – "None"
- Sending Custom Init command only – "Replace"
- Sending Default Init command plus Custom Init command – "Append"

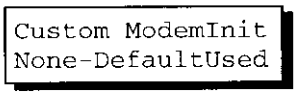
In the "Modem Setup" menu, press **ENT**.



Select "Modem Operation Modes ..", then press **ENT**.



The current setting of this item will be displayed on LCD. Press **ENT**.



How do you know the modem is connected?

In the "Communication Parameters .." menu, press **ENT**.

```
Communication
Parameters    ..
```

Select "Communication Status ..", then press **ENT**.

```
Communication
Status        ..
```

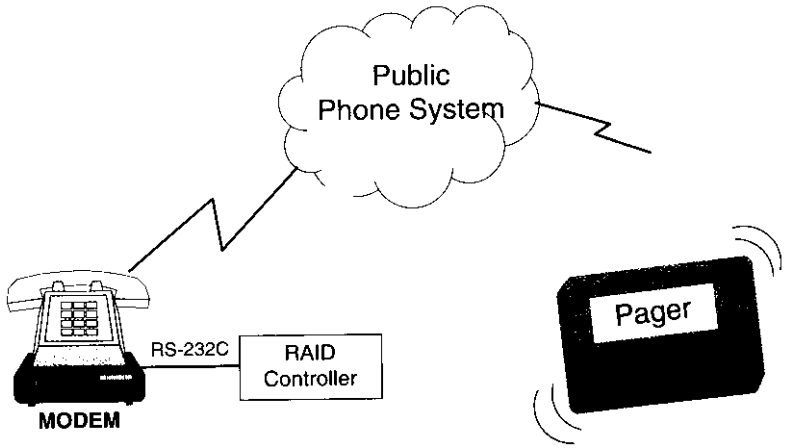
Select "Modem Status..", then press **ENT**.

```
Modem Status
              ..
```

The current connection status will be shown on the LCD.

```
Modem on COM1
Connected
```

10.4 Dial-out for Event Notifications



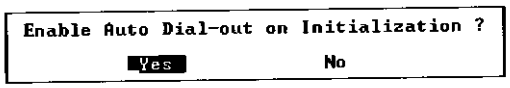
Function menu will appear on the screen.

Dial-out Command

Choose "Dial-out Command" in the Dial-out Function menu. A dialog box will appear showing the current dial-out commands. Enter the new dial-out command in the New Dial-out command column, then press [**Enter**].

The Dial-out command is the only command that will be sent to the modem when dialing-out. If it dialing to a pager, the pager number and message (if applicable) have to be composed in this column. If it's dialing to a remote terminal, the phone number of the remote modem has to be entered in this column. Refer to the manual of your modem for the AT command set.

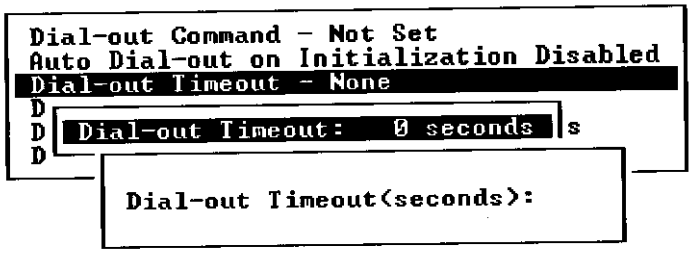
Auto Dial-out on Initialization

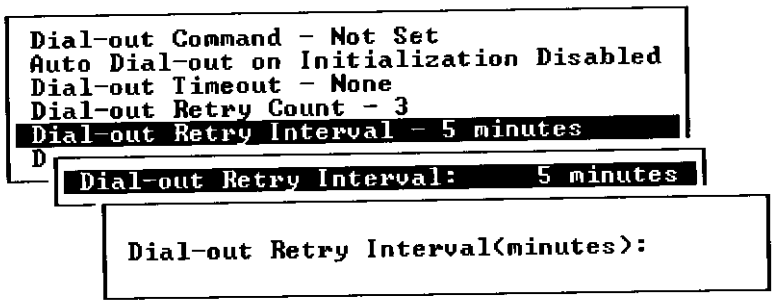


Choose "Auto Dial-out on Initialization" from the Dial-out Function menu. A dialog box will appear. Choose **Yes** to confirm the change.

If the "Auto Dial-out on Initialization" has been enabled after the modem initializes, it will send the Dial-out Command to the modem automatically.

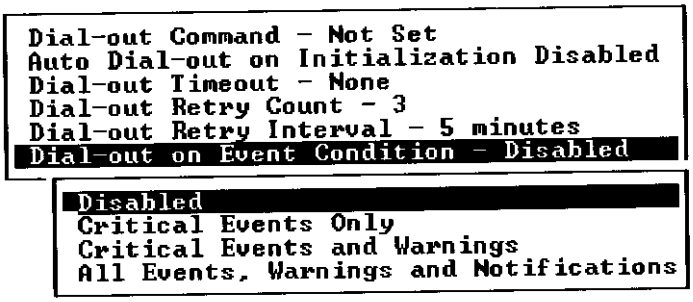
Dial-out Time out





Choose "Dial-out Retry Interval" in the Dial-out Function menu. The current setting in this column will appear. Press **[Enter]**. A dialog box will appear for entering the Dial-out Retry Interval. Enter the desired dial-out retry interval in this column (in minutes).

Dial-out on Event Condition

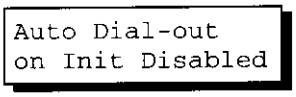


Choose "Dial-out on Event Condition" in the Dial-out Function menu. A list of selections will appear. Move the cursor bar on the desired selection, then press **[Enter]** to choose.

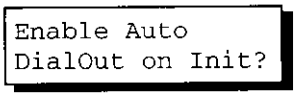
Choosing one of the options will enable the "Dial-out on Event Condition" (except "Disable"). The controller will send the "Dial-out command" to the modem when an event has occured.

Auto Dial-out on Initialization

Select "Auto Dial-out on Init .." in the Dial-out Functions menu, then press **ENT**.

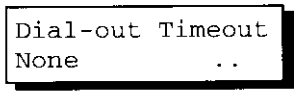


Press **ENT** for two seconds to set.

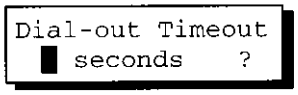


Dial-out Timeout

Select "Dial-out Timeout .." in the Dial-out Functions menu, then press **ENT**.



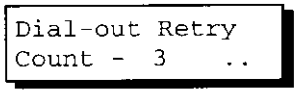
Enter the Dial-out Timeout period in this column. Press ▼ or ▲ to change the current character, press **ENT** to move the cursor to the next space. Press **ENT** for two seconds when finished.



When the modem is dialing out, the controller will start to count the dial-out timeout period. If the connection cannot be established within the dial-out timeout period, the controller will send a 'hang-up' command to the modem to hang up the phone.

Dial-out Retry Count

Select "Dial-out Retry Count .." in the Dial-out Functions menu, then press **ENT**.



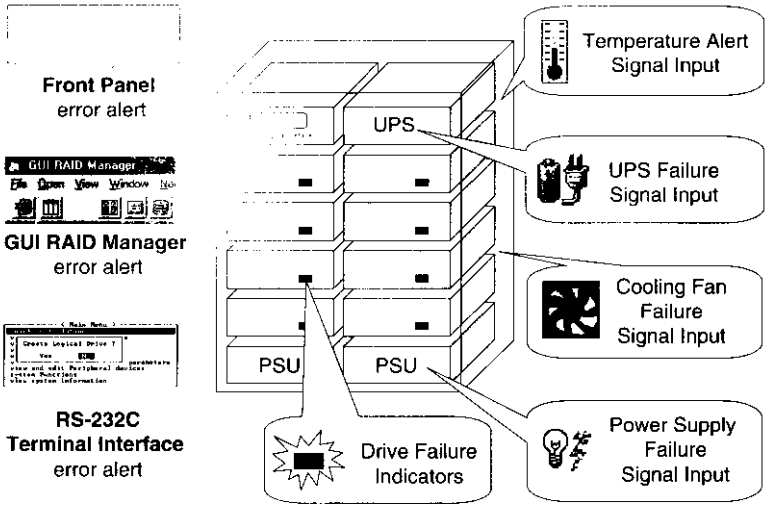
Enter the Dial-out retry count in this column. Press ▼ or ▲ to change the current character, then press **ENT** to move the cursor to the next space. Press **ENT** for two seconds when finished.

If the modem cannot establish a connection during dial-out, the controller will retry. (This is true unless the Dial-out Retry Count is not set as "0". The default retry count is "3" - which means the controller will retry the dial-out

Chapter 11 Fault-Bus

11.1 What is Fault-Bus? Why Do I Need Fault-Bus?

Fault-bus is a proprietary enclosure management interface. It gathers the failure signals from the cooling fans, redundant power supply, enclosure temperature sensor and UPS device. It reports this failure information to the user through the front panel, RS-232C terminal interface and GUI RAID Manager. The LED of the failed drive will light, showing the location of the drive that needs to be replaced. It will warn the user if a dangerous situation happens within the RAID system.



Fault-bus is actually a signal bus which contains a group of input and output signals. The Fault-bus design is fully open for easy integration. Simply install, configure and integrate the RAID controller with the enclosure, the RAID controller will be able to provide corresponding alert to the user for an immediate dispose to protect the data stored in the RAID system.

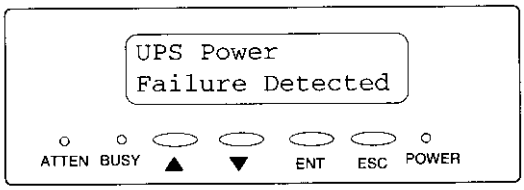
- Detect the temperature in the enclosure, then activate or deactivate the "temperature" signal of the Fault-bus according to the detected information. When the temperature goes too high, activate the signal. When the temperature goes back to normal, keep the signal inactive. If more than one temperature sensor is supported in this enclosure, collect the temperature information from each sensor and combine them into one signal.
- Receive the UPS status from the UPS, then activate or deactivate the "UPS" signal of the Fault-bus according to the received information. When UPS reports a power failure, activate the signal. When UPS reports that power failure has recovered, keep the signal inactive.

Drive Failure Signals Output

Each SCSI drive can be assigned a slot number. There are 10 slot signal outputs in the left Fault-bus connector. If the RAID controller detects that a SCSI drive has failed, the corresponding slot number signal will be activated for that failed drive.

The controller will report the Fault-bus error signals to the user by way of the front panel, RS-232C terminal interface and the GUI RAID Manager.

11.2.1 Fault-Bus Error Alert



When the Fault-bus function is enabled and a failure signal is detected, an alert message will be shown on the LCD. The ATTEN LED will also light at the same time.

IMPORTANT:

The Fault-Bus signals are collected from the enclosure. The controller itself does not detect the temperature, fan rotation or the power supply voltage.

Assign a Slot Number to an Existing SCSI Drive

The SCSI drive information will be displayed on the LCD. Press ▼ or ▲ to select the desired SCSI drive, then press **ENT**.

```
C=1 I=0   1010MB
LG=0  LN SEAGATE
```

Press ▼ or ▲ to choose "Slot Number Assignments", then press **ENT**.

```
Slot Number
Assignments   ..
```

If there is a slot number already assigned to this SCSI drive, the current slot number will be displayed. Press ▼ or ▲ to select the desired slot number, then press **ENT**.

```
Slot Def  # 1
Change to # ▉  ?
```

The slot number has two characters. The right character will be chosen first, then the left character. Press **ENT** once to switch between the left and right character. Press **ENT** for two seconds.

```
Slot Assignment
Set to    # 0  ?
```

Assign a Slot Number to an Empty Canister

When there is an empty drive canister which currently does not contain any drive, its SCSI channel/ID will not appear in the drive information list. Assign a slot number to this empty canister and add a drive entry in order to use it later when a drive is installed.

Add Drive Entry

Choose "View and Edit SCSI Drives" to enter the Main Menu. The SCSI drive information will be displayed on the LCD. Press ▼ or ▲ to select a SCSI drive, then press **ENT**.

```
C=1 I=0   1010MB
LG=0  LN SEAGATE
```

Press ▼ or ▲ to select the empty drive entry you desire to remove, then press **ENT**.

Press ▼ or ▲ to select "Clear Drive Status", then press **ENT**.

```
Clear Drive
Status       ..
```

Press **ENT** for two seconds to confirm.

```
Clear Drive
Status       ?
```

Set Each Fault-bus Error Signal Input as Active-high or Active-low

Choose "View and Edit Periph Parms" to enter the Main Menu, then press **ENT**.

```
View and Edit
Periph Parms  ↕
```

Press ▼ or ▲ to select "Define Periph. Active Signal", then press **ENT**.

```
Define Periph.
Active Signal ..
```

Press ▼ or ▲ to select the desired item: Power Supply, Cooling Fan, Temperature Alert, or UPS Power Fail to Drive Failure, then press **ENT** to choose.

```
PowerSupply Fail
Sig. Active Low
```

Press ▼ or ▲ to select an alternative selection. Press **ENT** for two seconds to confirm.

```
Set Power Fail Sig
Active High?
```

Enable Each Fault-bus Error Signal Input

Choose "View and Edit Periph Parms" to enter the Main Menu, then press **ENT**.

```
View and Edit
Periph Parms  ↕
```

Press ▼ or ▲ to select "View Peripheral Devices Status", then press **ENT**.

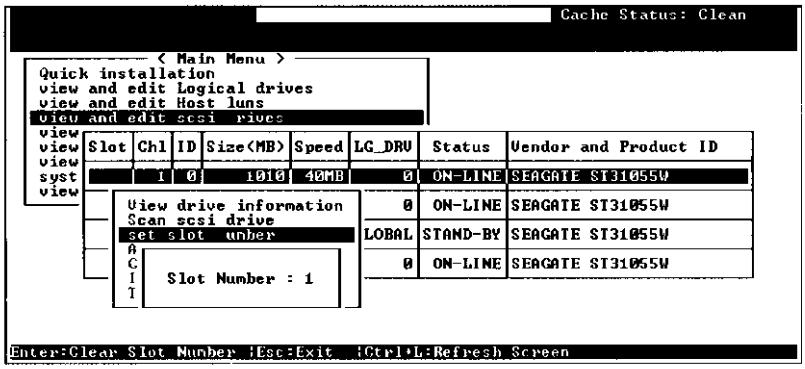
```
View Peripheral
Devices Status..
```

Press ▼ or ▲ to view the desired item: Power Supply, Cooling Fan, Temperature Alert or UPS Power Fail.

```
Power Supply
Status Normal
```

11.3.3 Configuring the Controller with the RS-232C Terminal Interface

Assign Each SCSI Drive or Canister a Slot Number



Choose "View and Edit SCSI Drives" in the Main Menu, then press **[Enter]**. A list of the connected SCSI drives will appear. The "Slot" column indicates the current slot number of each SCSI drive.

Assign a Slot Number to an Existing SCSI Drive

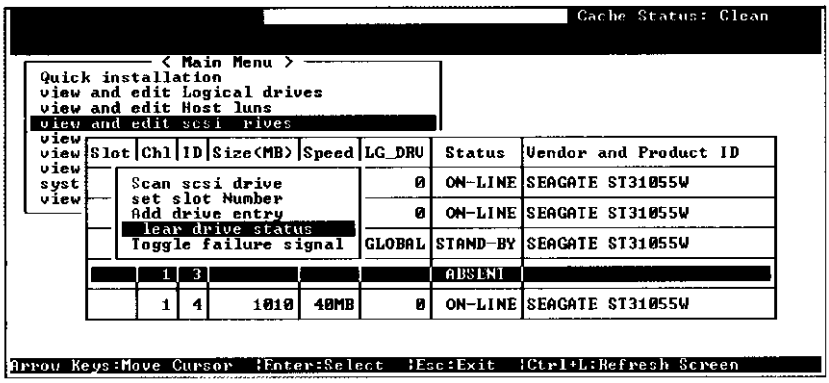
Choose the desired drive to edit the slot number, then press **[Enter]**. Choose "Set Slot Number" in the menu, then press **[Enter]**. Enter the corresponding slot number of this SCSI drive, then press **[Enter]**. The slot number will appear in the slot column of the drive information list.

Move the cursor bar on the empty drive entry and press [**Enter**]. Choose "Set Slot Number" in the menu, then press [**Enter**]. Enter the slot number of this empty canister so as you can use it later when a drive is installed.

Delete the Slot Number of a SCSI Drive or Empty Drive Entry

Choose the desired SCSI drive or empty drive entry to delete its slot number and press [**Enter**]. Choose "Set Slot Number" in the menu, then press [**Enter**] on the selected slot number. The slot number can also be cleared by entering "0" at the slot number.

Remove Empty Drive Entry



Before you remove an empty drive entry, the slot number has to be deleted first. Please refer to the above paragraph on how to delete the slot number.

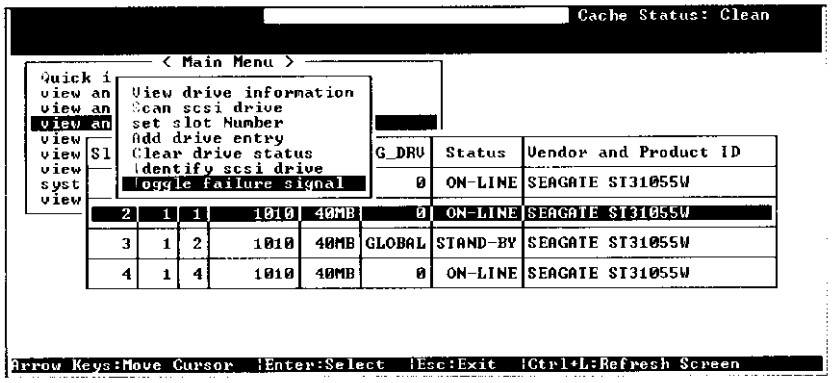
Move the cursor on the empty drive entry, then press [Enter]. Choose "Clear Drive Status", then press [Enter]. The empty drive entry will now disappear from the drive information list.

IMPORTANT:

You will not be able to remove an empty drive entry if it has been assigned a slot number. Delete the slot number before removing the empty drive entry.

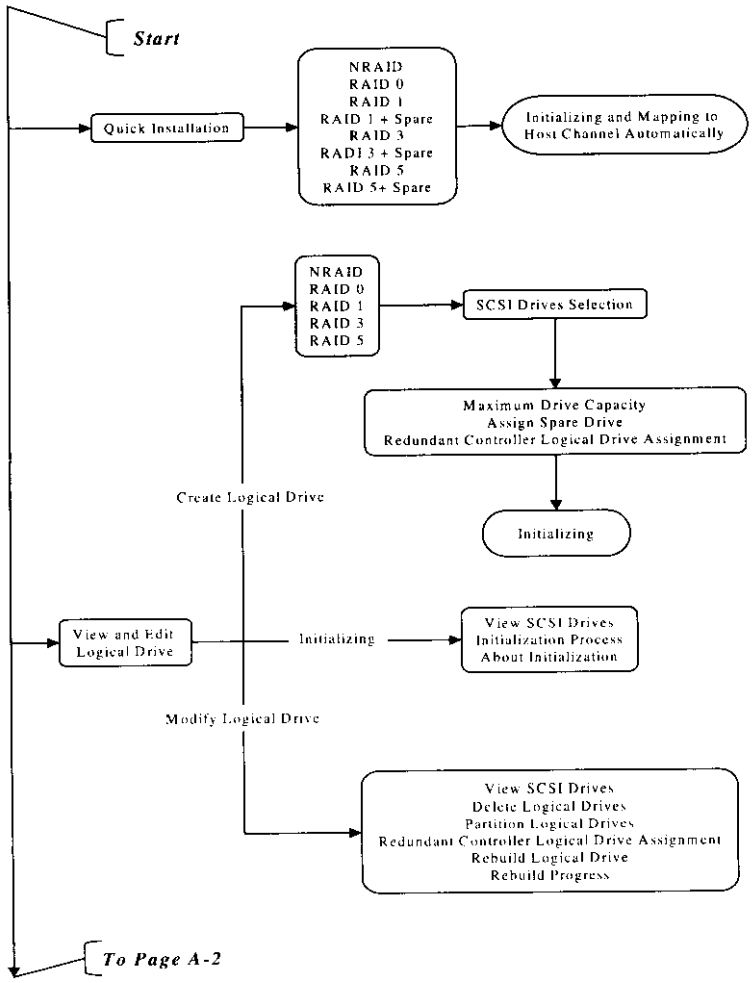
Each item of the error signal input can be individually enabled or disabled. Choose "View and Edit Peripheral Devices" in the Main Menu, then press [Enter]. Select et Peripheral Device Entry", then press [**Enter**]. Move the cursor to the desired item to enable or disable, and press [**Enter**]. Choose "**Yes**" in the following dialog box, then press [**Enter**] to set.

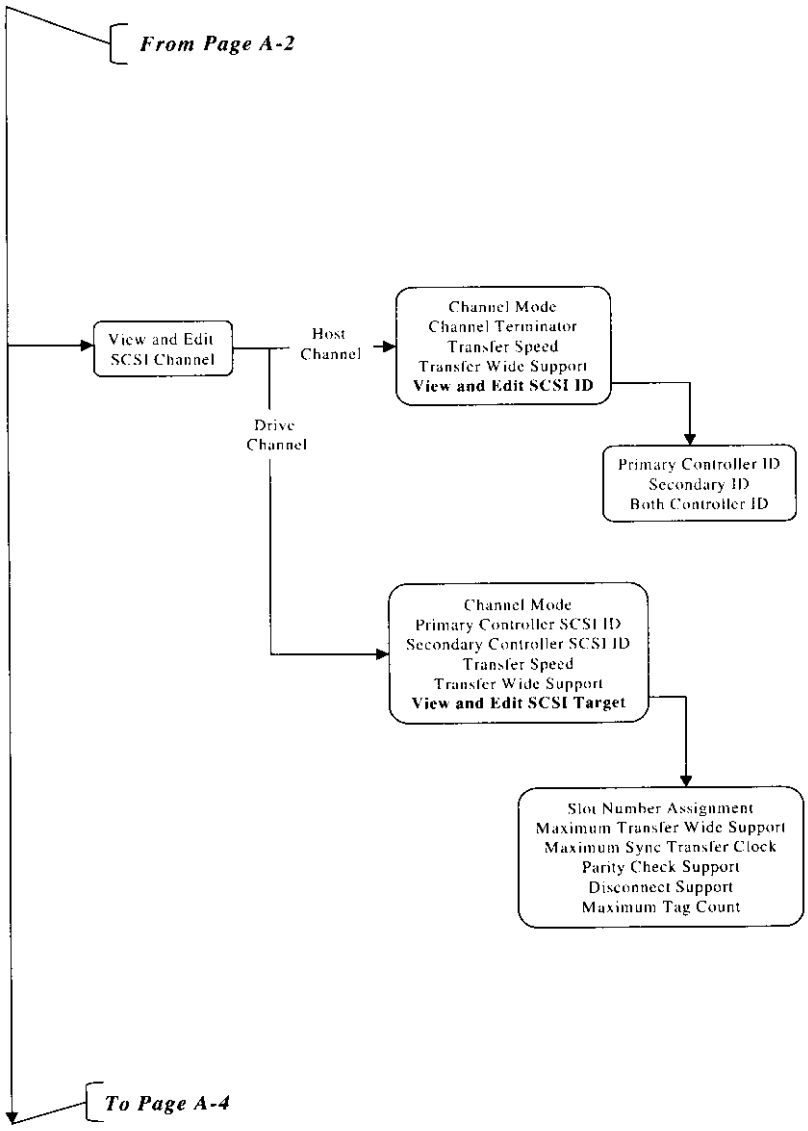
Test Drive Failure LED for Each Drive Canister

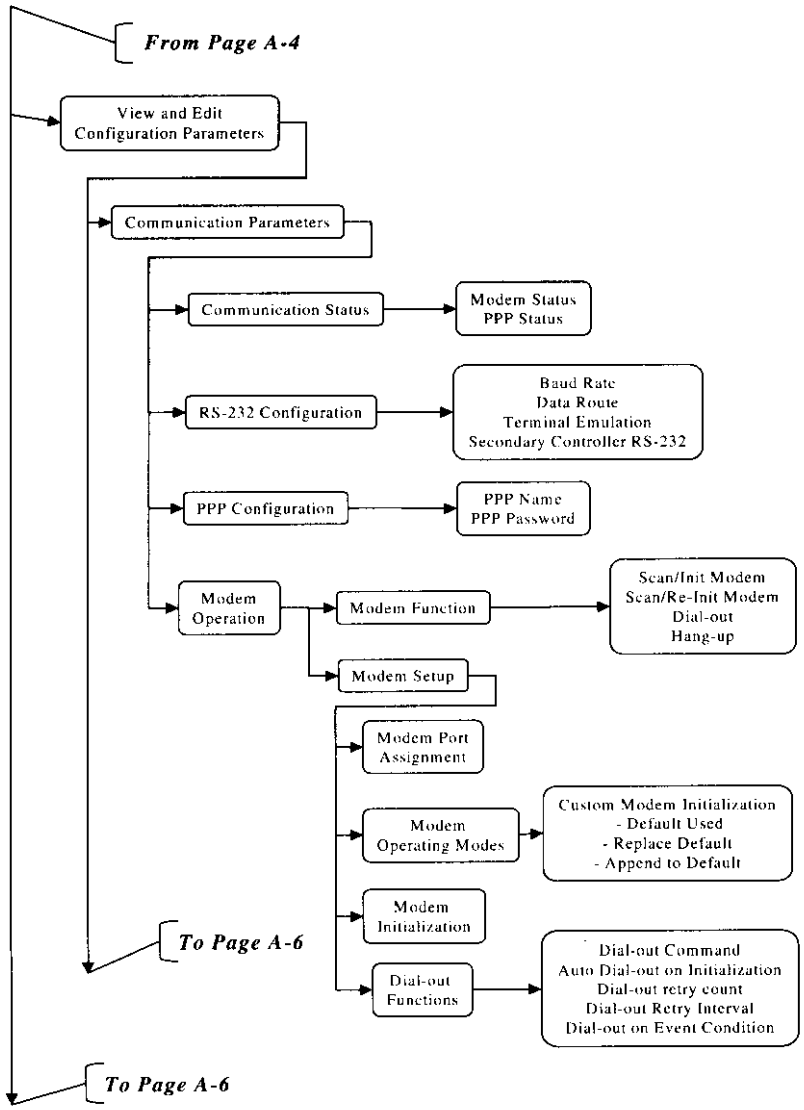


Choose the desired SCSI drive or empty drive entry from the drive information list, and press [**Enter**]. Choose "Toggle Failure Signal" in the menu, then press [**Enter**] to toggle the drive failure signal. The drive failure LED should light on or off followed with the toggle.

Appendix A Front Panel Navigation Map




From Page A-2
View and Edit SCSI Channel
Host Channel
Drive Channel
Channel Mode
Channel Terminator
Transfer Speed
Transfer Wide Support
View and Edit SCSI ID
Primary Controller ID
Secondary ID
Both Controller ID
Channel Mode
Primary Controller SCSI ID
Secondary Controller SCSI ID
Transfer Speed
Transfer Wide Support
View and Edit SCSI Target
Slot Number Assignment
Maximum Transfer Wide Support
Maximum Sync Transfer Clock
Parity Check Support
Disconnect Support
Maximum Tag Count
To Page A-4


From Page A-4
View and Edit Configuration Parameters
Communication Parameters
Communication Status
Modem Status
PPP Status
RS-232 Configuration
Baud Rate
Data Route
Terminal Emulation
Secondary Controller RS-232
PPP Configuration
PPP Name
PPP Password
Modem Operation
Modem Function
Scan/Init Modem
Scan/Re-Init Modem
Dial-out
Hang-up
Modem Setup
Modem Port Assignment
Modem Operating Modes
Custom Modem Initialization
- Default Used
- Replace Default
- Append to Default
Modem Initialization
Dial-out Functions
Dial-out Command
Auto Dial-out on Initialization
Dial-out retry count
Dial-out Retry Interval
Dial-out on Event Condition
To Page A-6
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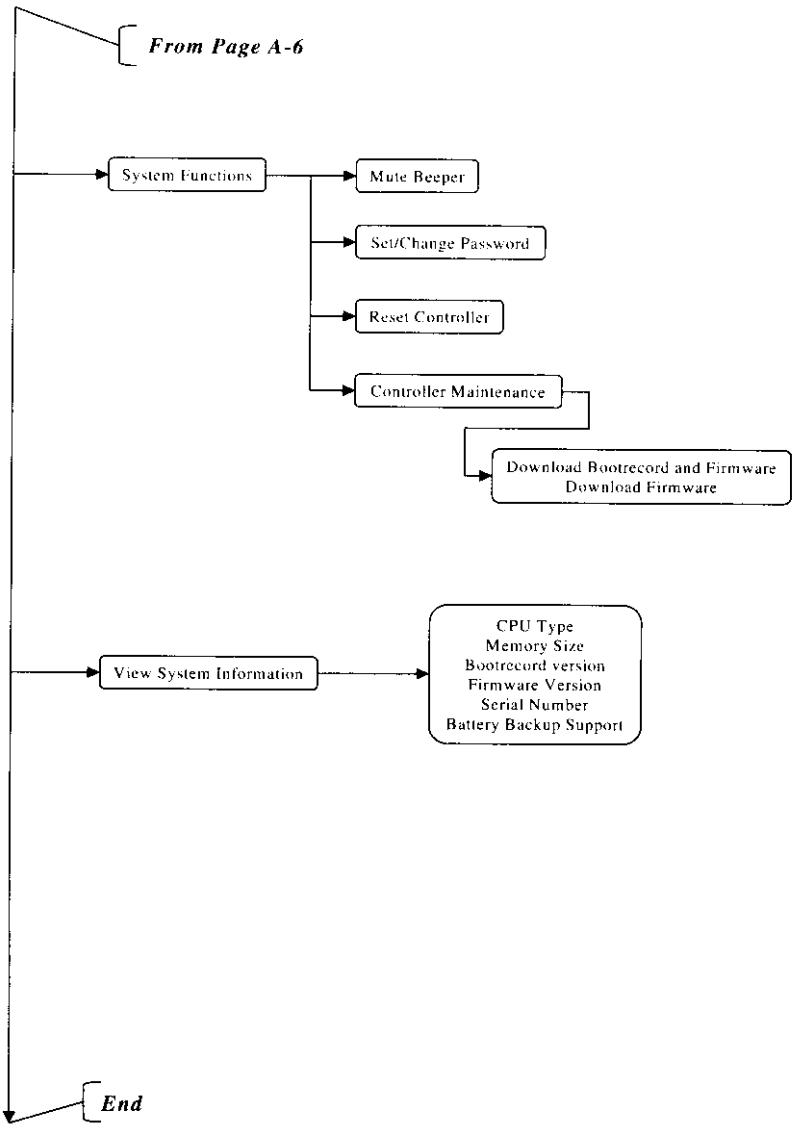

From Page A-6
System Functions
Mute Beeper
Set/Change Password
Reset Controller
Controller Maintenance
Download Bootrecord and Firmware
Download Firmware
View System Information
CPU Type
Memory Size
Bootrecord version
Firmware Version
Serial Number
Battery Backup Support
End

Specifications	**DA-3500**	**DA-3500V**
RAID Processor	486DX4/100	AMD 5x86/133
Interface	Ultra Wide SCSI	LVD Ultra2 Wide
SCSI Channels	3 - 8	3 - 8
Data Transfer Rate	Up to 40 MB/s	Up to 80 MB/s
Supports SCA-2	Optional	V
Intelligent Back-Plane	Optional	V
Hot-Swappable Controller Function	X	Optional
Redundant Controller (Active/Active)	Optional	Optional
Daughter Board (optional)	- 2 Ultra Wide for Differential. - 3 LVD Ultra2 Wide SCSI	- 2 Ultra Wide for Differential. - Ultra2 Wide SCSI - 2 fibre channels

Appendix D Upgrading Firmware

The ESCORT DA-3500 series Disk Array's firmware resides in the Flash Memory that can be updated through the COM ports or In-band SCSI. New releases of the firmware are available in the form of a DOS file in the "pub" directory of Dataworld FTP site or on a 5.25" or 3.5" diskette. The file available at the FTP site is usually a self-extracting file that contains the following:

FW30Bxyz	Firmware Binary (where "xyz" refers to the firmware version)
B30Buvw	Boot Record Binary (where "uvw" refers to the boot record version)
README.TXT	Read this file first before upgrading the firmware/boot record. It contains the most up-to-date information which is very important to the firmware upgrade and usage.

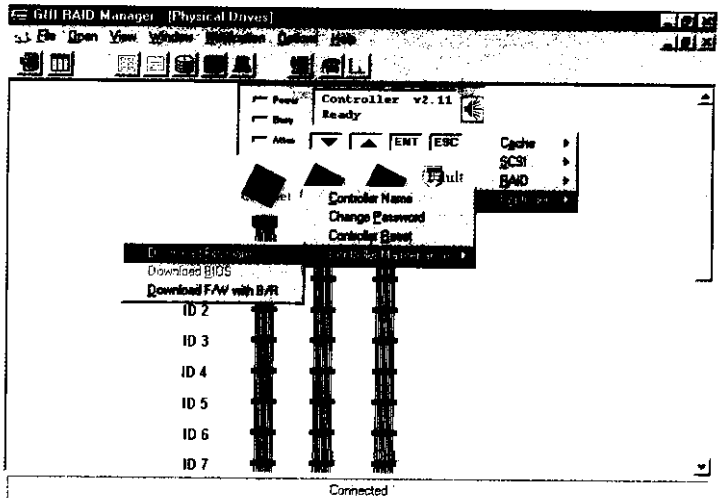
These files must be extracted from the compressed file and copied to directory in drive C.

IMPORTANT:

- *Allow the downloading process to finish. Do not reset or turn off the computer or the controller while it is downloading the file. Doing so may result in an unrecoverable error that requires the service of the manufacturer.*
- *While the firmware is new, the boot record that comes with it may be the same version as the one in the controller. If this is the case, there is no need to upgrade the Boot Record Binary.*

Upgrading the firmware using In-band SCSI + GUI RAID Manager

The In-band SCSI connection and the ability to upgrade the firmware via In-band SCSI are supported in Dataworld GUI RAID Manager, version 1.61A and later versions. This version of the GUI RAID Manager is for use with the firmware 2.11. If the firmware currently in the controller is earlier than 2.11, In-band SCSI is not supported.



Upgrade the Firmware Binary Only

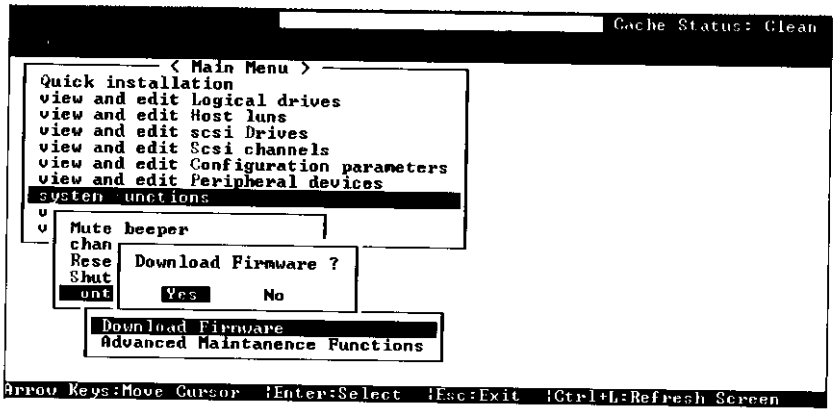
1. Double click on the controller panel to get the menu appears. Choose "Controller Maintenance". If both boot record and firmware are desired to upgrade, choose "Download Firmware".
2. Provide the firmware filename to the GUI RAID Manager. It will start to download the firmware to the controller.
3. Shutdown the system which is accessing the RAID, then reset the controller in order to use the new downloaded firmware.

Upgrading the firmware using RS-232 Terminal Emulation

The firmware can be downloaded to the RAID controller by using an ANSI/VT-100 compatible terminal emulation program. Whichever terminal emulation program is used must support the ZMODEM file transfer protocol. The following example uses the HyperTerminal in Windows NT. Other terminal emulation programs (e.g., Telix and PROCOMM Plus) can perform the firmware upgrade as well.

Upgrading Both Boot Record and Firmware Binaries

Upgrading the Firmware Binary Only



1. From the Main Menu, scroll down to "System Functions."
2. Go to "Controller Maintenance."
3. Choose "Download Firmware."
4. Set ZMODEM as the file transfer protocol of your terminal emulation software.
5. Send the Firmware Binary to the controller. In HyperTerminal, select "Send file." If you are not using HyperTerminal, choose "Upload" or "Send" (depending on the software).
6. When the Firmware completes downloading, the controller will automatically reset itself.

Appendix F Sync. Clock Period & Sync. Clock Frequency

Sample equation:

$$\frac{1}{20.8Mhz \times 4ns} = \frac{1}{20.8 \times 10^{6} \times 4 \times 10^{-9}} = 12$$

$$\frac{1}{12 \times 4ns} = \frac{1}{12 \times 4 \times 10^{-9}} = 20.8Mhz$$

Where "20.8Mhz" is called the Synchronous Clock Frequency, and "12" is called the Synchronous Clock Period.

Synchronous Clock Period	Synchronous Clock Frequency	Synchronous Clock Period	Synchronous Clock Frequency
12	20.8	62	4.0
15	16.6	75	3.3
18	13.8	88	2.8
25	10.0	100	2.5
31	8.0	110	2.2
37	6.7	120	2.0
43	5.8	135	1.8
50	5.0	0	Asynchronous

Cannot detect SCSI drive	1. Check drive power connections. 2. Check drive SCSI cable connections. 3. Check ID numbers (must be unique for each device on the same SCSI channel).
Host cannot detect DA-3500V	1. Check host SCSI cable connections. 2. Check SCSI port to LUN assignment. 3. Check logical drive mapping to LUN.
Parity error detected	1. DRAM SIMM should be replaced.
Logical drive failure detected during boot-up	1. Check proper installation or connection of the drives (use the "View SCSI drives" function to help locate the problem).
System is not stable after running for a period of time.	1. SCSI cable must be shorter than 3 meters. 2. Make sure terminators are proper installed. 3. Power supply voltage must be within specification. 4. Check the enclosure's inner temperature.
When using "Scan New SCSI Drive" and the desired ID is empty, an empty drive entry appears.	1. Refer to Chapter 6.4.1 or 7.4.1, Scan New SCSI Drive, on how to remove the empty drive entry.

Upon replacing the failed controller with a new one during Redundant controller connection, nothing appears on the LCD of the new controller.	1. Set the new controller as "redundant controller enabled" before connecting to the active controller. 2. Connect the new controller to the active controller and choose "Deassert failed controller" on the active controller. 3. Refer to "Chapter 8 Redundant Controller" for more details.
The host adapter recognizes the controller in every SCSI ID.	1. There is a SCSI ID conflict. 2. The host channel's SCSI ID should not be identical to the host adapter's SCSI ID.
When connecting two host computers with the same host channel, the SCSI bus hangs.	1. The host channel's SCSI ID and host adapter's SCSI ID in the two host computers should be different.
"Power supply unstable or NVRAM failed!" appears on the LCD.	1. The voltage input of the RAID controller is lower than 4.75V. 2. Check the +5V voltage. 3. If the voltage drops to lower than 4.75V when attaching/detaching a drive, check the power supply.
Cannot find 'Rebuild logical drive' in the menu.	1. The 'Rebuild' option only appears when the logical drive has a failed drive.

View and Edit Host LUNs

LUN Mappings

Host Channel	Pri. / Sec. Controller	SCSI ID	LUN	Logical Drive	Partition	Size

View and Edit SCSI Drives

Slot	Chl	ID	Size (MB)	Ultra ? (Y/N)	Wide ? (Y/N)	LG DRV? Global Spare? Local Spare?		Vendor & Product ID
						LG		
						LG		
						LG		
						LG		
						LG		
						LG		
						LG		
						LG		
						LG		
						LG		
						LG		
						LG		
						LG		
						LG		

Initialization	
Dial-out Timeout	_____ Seconds
Dial-out Retry Count	Retry _____ times
Dial-out Retry Interval	_____ Minutes
Dial-out on Event Condition	☐ Disabled ☐ Critical Events Only ☐ Critical Events and Warnings ☐ All Events, Warnings and Notifications

Caching Parameters

Write-back Cache	☐ Enabled ☐ Disabled
Optimization for	☐ Random I/O ☐ Sequential I/O

Host Side SCSI Parameters

Maximum Queued I/O Count	☐Auto ☐_____
LUNs per Host SCSI ID	☐1 LUN ☐2 LUNs ☐4 LUNs ☐8 LUNs

Drive Side SCSI Parameters

SCSI Motor Spin-up	☐ Enabled ☐ Disabled
SCSI Reset at Power Up	☐ Enabled ☐ Disabled
Disk Access Delay Time	☐ No Delay ☐_____ Seconds
Maximum Tag Count	☐ Disabled ☐_____

Disk Array Parameters

Rebuild Priority	☐ Low ☐ Normal ☐ Improved ☐ High
Verifications on Writes	
Verifications on LD Initialization Writes	☐ Enabled ☐ Disabled
Verifications on LD Rebuild Writes	☐ Enabled ☐ Disabled
Verifications on Normal Drive Writes	☐ Enabled ☐ Disabled

Controller Parameters

Controller Name	☐ Not Set ☐ _____

View and Edit Peripheral Devices

Set Peripheral Device Entry

Redundant Controller	☐ Enabled ☐ Disabled
Power Supply Status	☐ Enabled ☐ Disabled
Fan Status	☐ Enabled ☐ Disabled
Temperature Status	☐ Enabled ☐ Disabled
UPS Status	☐ Enabled ☐ Disabled

Define Peripheral Device Active Signal

Power Supply Fail Signal	☐ Active High ☐ Active Low
Fan Fail Signal	☐ Active High ☐ Active Low
Temperature Alert Signal	☐ Active High ☐ Active Low
UPS Power Fail Signal	☐ Active High ☐ Active Low
Drive Failure Outputs	☐ Active High ☐ Active Low

View System Information

Total Cache Size	☐ EDO DRAM ☐ Normal DRAM _____ MB
Firmware Version	
Bootrecord Version	
Serial Number	
Battery Backup	☐On ☐ Off

View and Edit SCSI Channels

Chl	Mode (Host / Drive)	Primary Controller SCSI ID(s)	Secondary Controller SCSI ID(s)	Default Sync Clock	Default Wide	Terminator Diff/Enable/ Disable/	Current Sync Clock	Current Wide

View and Edit Configuration Parameters

Communication Parameters
RS-232 Port Configuration

COM 1 (RS-232 Port)

Baud Rate	☐ 2400 ☐ 4800 ☐9600 ☐19200 ☐38400
Data Routing	☐ Direct to Port ☐ Through PPP
Terminal Emulation	☐ Enabled ☐ Disabled

COM 2 (Redundant Controller Port)

Baud Rate	☐ 2400 ☐ 4800 ☐9600 ☐19200 ☐38400
Data Routing	☐ Direct to Port ☐ Through PPP
Terminal Emulation	☐ Enabled ☐ Disabled

PPP Configuration

PPP Access Name	
PPP Access Password	

Modem Operation → Modem Setup

Configure Modem Port	☐Modem Port Not Configured ☐COM1 ☐COM2
Modem Operation Mode	☐None (Default Used) ☐Replace Default ☐Append to Default
Modem Initialization - Custom Init. Command	AT
Dial-out Command	AT
Auto Dial-out on	☐ Enabled ☐ Disabled

Appendix H Record the Settings

View and Edit Logical Drives

Logical Drive Information

LG	RAID Level	#On-Line (DRV=)	#STB (SB=)	Logical Drive Name

Partition Information

LG	Partition	Size (MB)	LG	Partitio n	Size (MB)

The RS-232C Terminal Interface is not working.	1. Check RS-232C cable connections. 2. Check Baud Rate. 3. Enable Terminal Emulation. 4. Data Routing Direct to Port.
When choosing "Configure Modem Port", the screen is full of "Comm Buffer Overflow".	1."Terminal Emulation" should be enabled after all modem configuration are completed.
The logical drive states "NVALID".	1. "Optimization for . I/O", when creating the logical drive in Cache Parameter, is different from the current setting. 2. Change "Optimization for ...I/O" to the opposite setting and reset the RAID controller.
In "View and Edit SCSI Channels", the speed is only "20.8Mhz", not "40Mhz"	1. "20.8Mhz" is SCSI sync frequency, not the transfer rate. 2. Refer to Appendix C, SCSI cable Specification, for details.
All settings are too complex to remember.	1. After completing system installation, write down all the settings and related information in "Appendix H Record the Settings" for future reference.

Appendix G Troubleshooting Guide

NOTE:
The following is a checklist of the common problems encountered during installation. For failures that occur during operation, refer to the failure recovery procedure in the "Disk Failure Management" section.

PROBLEM	CHECK
LCD is off	1. Check power connections of the board and LCD panel. 2. Requires minimum of 8 MB DRAM SIMM installed.
7-segment LED flashes "F".	1. SIMM module not installed yet. 2. Null board (pin plug) for the battery backup connector is not installed, or its pin 1 is not installed to pin 1 of JP14.
SCSI channel failure detected upon start-up (SCSI cables connected). LCD = SCSI CHLs fail CHL = x,x,x	1. Check ID numbers (must be unique for each device on the same SCSI channel). 2. Make sure terminators are properly installed. 3. Check the voltage output of the power supply.
Initialization failure	1. Check ID numbers (must be unique for each device on the same SCSI channel). 2. Make sure terminators are properly installed.

Appendix E Pin Assignment

The ESCORT Disk Array can be configured via a PC, running a VT-100 terminal emulation program, or a VT-100 compatible terminal. The 9-pin D-sub male connector is provided RS-232 signal. The port is set as a DTE device. The default setting at 9600 baud, 8 bit, 1 stop bit and no parity.

pin 1 - Data Carrier Detect (CD)

2 - Transmit Data (TD)

3 - Receive Data (RD)

4 - Data Set Ready (DSR)

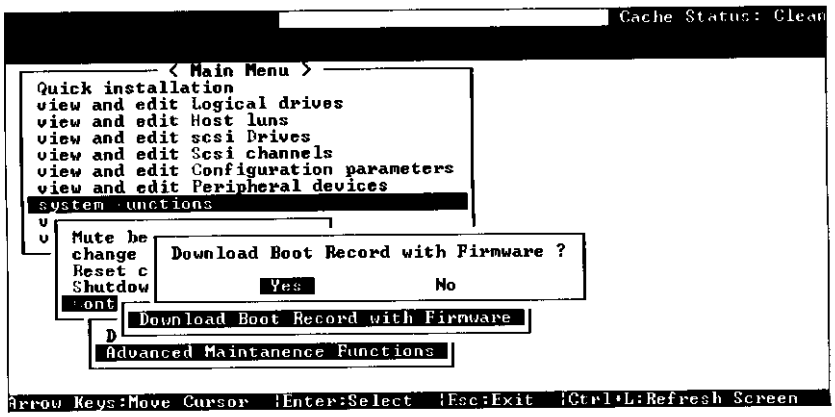
5 - Signal Ground (SG)

6 - Data Terminal Ready (DTR)

7 - Clear To Send (CTS)

8 - Ready To Send (RTS)

9 - Ring Indicator (RI)]

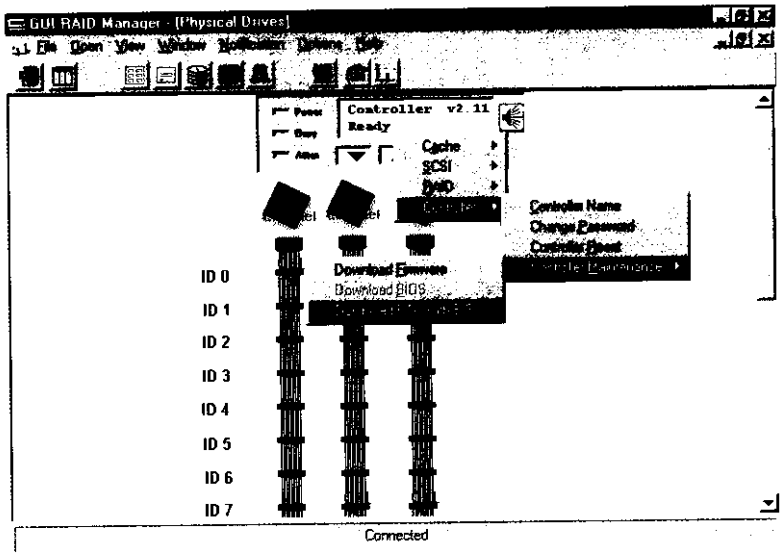


1. From the Main Menu, scroll down to "System Functions."
2. Go to "Controller Maintenance."
3. Choose "Advanced Maintenance."
4. Select "Download Boot Record and Firmware."
5. Set ZMODEM as the file transfer protocol of your terminal emulation software.
6. Send the Boot Record Binary to the controller. In HyperTerminal, go to the "Transfer" menu and choose "Send file." If you are not using Hyper Terminal, choose "Upload" or "Send" (depending on the software).
7. After the Boot Record has been downloaded, send the Firmware Binary to the controller. In HyperTerminal, go the the "Transfer" menu and choose "Send file." If you are not using Hyper Terminal, choose "Upload" or "Send" (depending on the software).
8. When the Firmware completes downloading, the controller will automatically reset itself.

Establish the In-band SCSI connection in GUI RAID Manager

Please refer to section 4.3 for details on establishing the In-band SCSI connection in GUI RAID Manager.

Upgrade Both Boot Record and Firmware Binaries



1. Double click on the controller panel to get the menu appears. Choose "Controller Maintenance" > "Advanced Maintenance" -> "Download Boot Record and Firmware".
2. Provide the boot record binary filename, the GUI RAID Manager will start to download the boot record binary to the controller.
3. After the boot record download completed, provide the firmware filename to the GUI RAID Manager. It will start to download the firmware to the controller.
4. Shutdown the system which is accessing the RAID, then reset the controller in order to use the new downloaded firmware.

Appendix C SCSI Cable Specifications

The recommended SCSI cable for an ultra wide SCSI-2 operating at a transfer rate of 40 Mbytes/sec. is described below:

- Maximum length 1.5 meters
- Impedance Between 90 Ω to 132 Ω
- Signal Attenuation 0.095 dB/meter @ 5 MHz (max.)
- Pair-Pair Propagation Delay Delta 0.2 ns/meter (max.)
- DC Resistance 0.23 Ω/meter @ 20 °C (max.)

SCSI Standards, Cable Length and Corresponding Maximum Possible Drive Connections

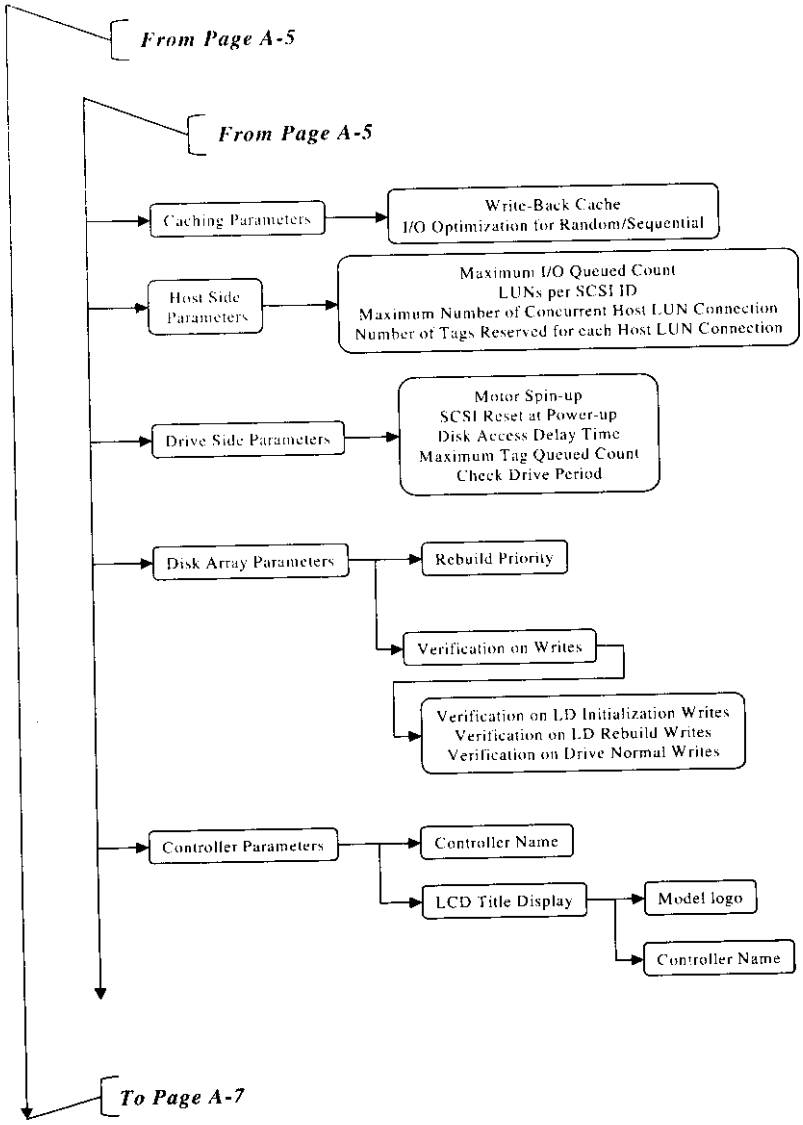
	Single-Ended	Differential	LVD	Maximum Devices
SCSI-1	6 m	25 m	-	8
Wide SCSI-2	3 m	25 m	-	16
Ultra SCSI-2	3 m	25 m	-	8
Ultra Wide SCSI-2	1.5 m	25 m	-	16
Ultra2 Wide SCSI (LVD)	-	-	12 m	16

SCSI Bus Width and Maximum Throughput

	Bus Width	SCSI Bus Sync. Frequency	Max. Bus Throughput
SCSI-1	8-bit	Asynchronous	5 MB/Sec
(Fast) SCSI-2	8-bit	10 Mhz	10 MB/Sec
(Fast) Wide SCSI-2	16-bit	10 Mhz	20 MB/Sec
Ultra SCSI-2	8-bit	20 Mhz	20 MB/Sec
Ultra Wide SCSI-2	16-bit	20 Mhz	40 MB/Sec
Ultra2 Wide SCSI	16-bit	40 Mhz	80MB/Sec

Appendix B Technical Specifications

- It is HOST and O.S. Independent Disk Array Subsystem.
- 32 Bit High-Throughput RAID Processor.
- 8-128 MB Write-Back Cache (DRAM or EDO RAM).
- Provides Ultra Wide SCSI Channels and Can Expand to LVD Ultra2 Wide SCSI (80MB/s).
- Supports RAID Levels 0,1,0+1,3,5 & Non-RAID.
- Dynamic RAID Expansion Capability.
- Local Spare Drive and Global Spare Drive Both Supported.
- Provides 8 Hot Swappable Disk Drive Bays (Aluminum Alloy Casting).
- Environment Monitor Control Unit (EMCU) Supports LCD Display, Audible Alarm and LED's for Drive Fault, Power Fault, Fan Fault, Temperature Fault, Voltage Fault(DA-3500V).
- Flash EEPROM for Easy Firmware Up-grading.
- Supports Bad Sector Reassignment.
- LCD Setup/Display Panel
- Intelligent Read-Ahead/Write –Back Cache Option.
- Powerful and User Friendly GUI RAID Management for Windows 95/NT.
- RS-232C Monitor Port to Set Controller Features, Disk Configuration and Modem Connect for RAID Remote Management.
- Supports Battery Back-up Function for Cache Memory (optional)
- Dual 300W Redundant and Load Sharing Power Supply (400W optional).
- MTBF : 500,000 hours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Caching Parameters
Write-Back Cache
I/O Optimization for Random/Sequential
Host Side Parameters
Maximum I/O Queued Count
LUNs per SCSI ID
Maximum Number of Concurrent Host LUN Connection
Number of Tags Reserved for each Host LUN Connection
Drive Side Parameters
Motor Spin-up
SCSI Reset at Power-up
Disk Access Delay Time
Maximum Tag Queued Count
Check Drive Period
Disk Array Parameters
Rebuild Priority
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Verification on LD Initialization Writes
Verification on LD Rebuild Writes
Verification on Drive Normal Writes
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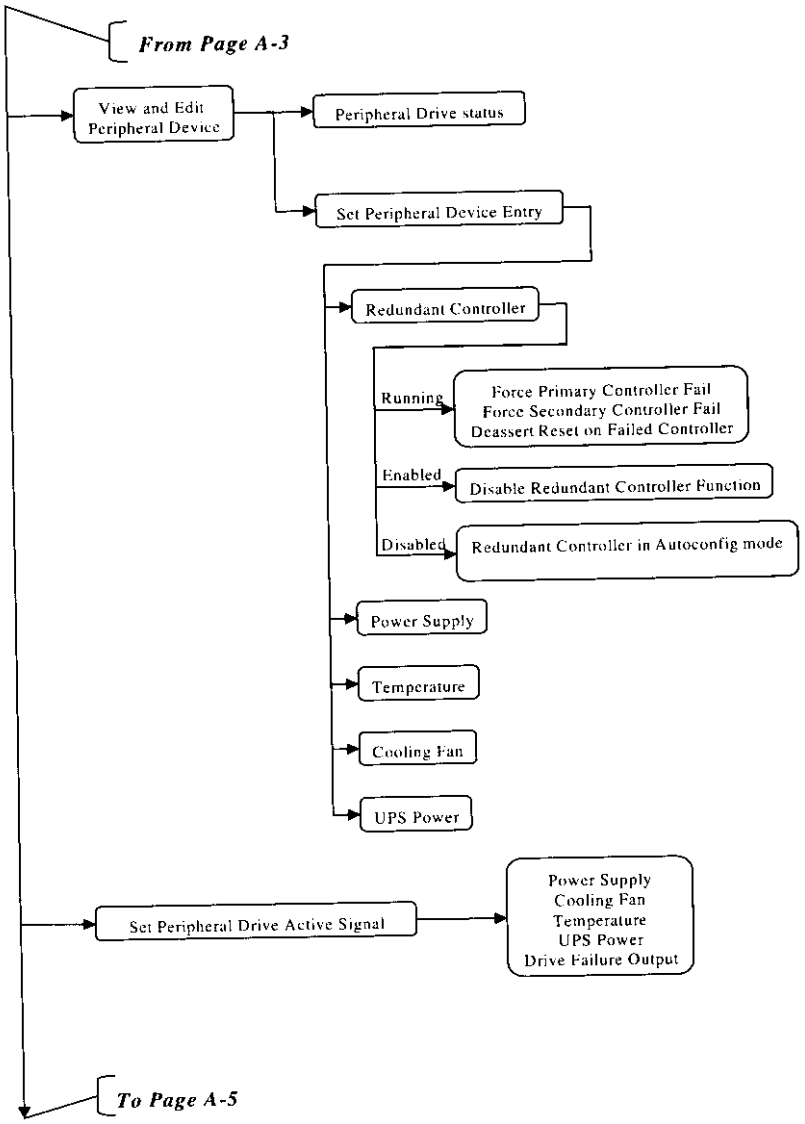
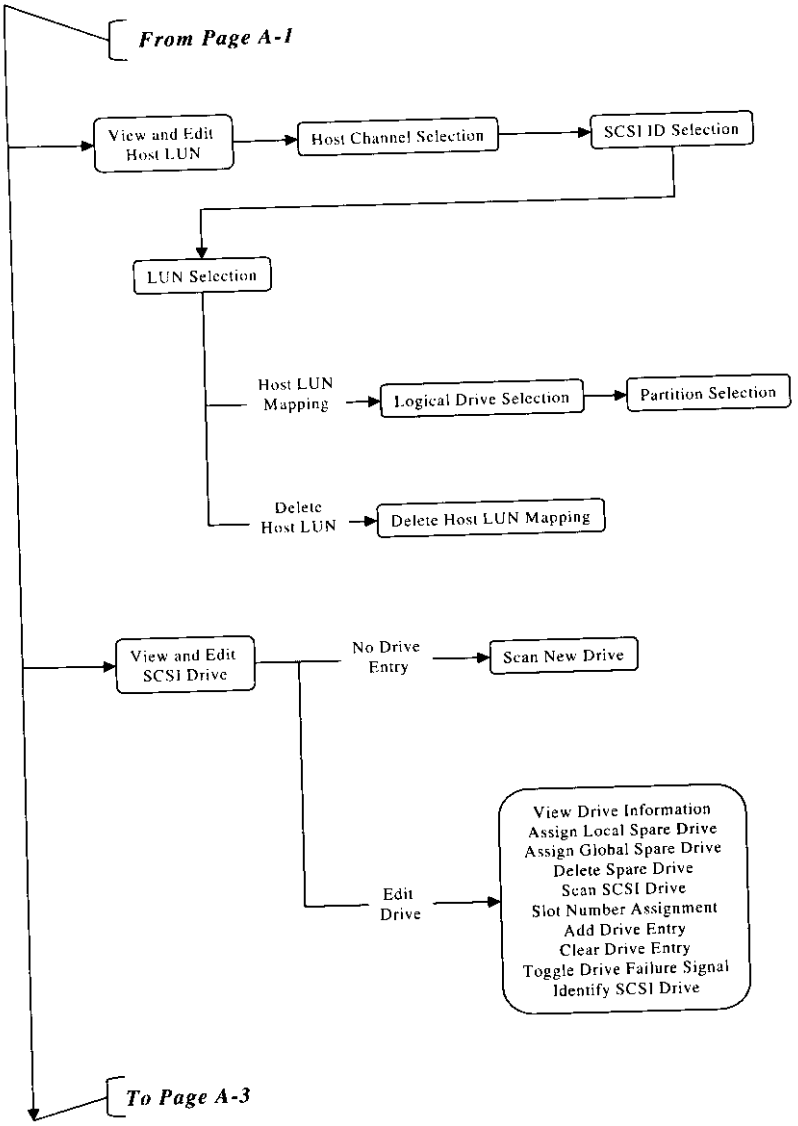
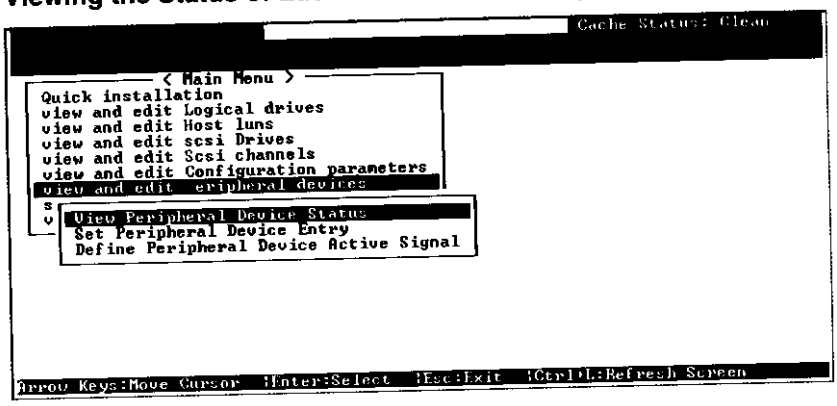
Model logo
Controller Name
To Page A-7


From Page A-3
View and Edit Peripheral Device
Peripheral Drive status
Set Peripheral Device Entry
Redundant Controller
Running
Force Primary Controller Fail
Force Secondary Controller Fail
Deassert Reset on Failed Controller
Enabled
Disable Redundant Controller Function
Disabled
Redundant Controller in Autoconfig mode
Power Supply
Temperature
Cooling Fan
UPS Power
Set Peripheral Drive Active Signal
Power Supply
Cooling Fan
Temperature
UPS Power
Drive Failure Output
To Page A-5


From Page A-1
View and Edit Host LUN
Host Channel Selection
SCSI ID Selection
LUN Selection
Host LUN Mapping
Logical Drive Selection
Partition Selection
Delete Host LUN
Delete Host LUN Mapping
View and Edit SCSI Drive
No Drive Entry
Scan New Drive
Edit Drive
View Drive Information
Assign Local Spare Drive
Assign Global Spare Drive
Delete Spare Drive
Scan SCSI Drive
Slot Number Assignment
Add Drive Entry
Clear Drive Entry
Toggle Drive Failure Signal
Identify SCSI Drive
To Page A-3

Viewing the Status of Each Fault-bus Error Signal Input

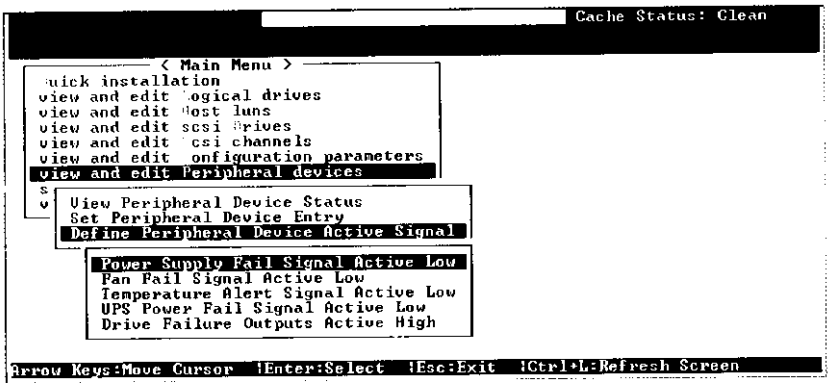


Choose "View and Edit Peripheral Devices" in the Main Menu and press [**Enter**]. Select "View Peripheral Device Status" in the menu and press [**Enter**].

ITEM	STATUS	LOCATION
Redundant Controller	Disabled	
Power Supply Status	Normal	FaultBus
Fan Status	Failed	FaultBus
Temperature Status	Alert	FaultBus
UPS Status	Normal	FaultBus

The current status of each enabled Fault-bus error signal input is listed. Try to emulate the errors and view the status of each item as described above.

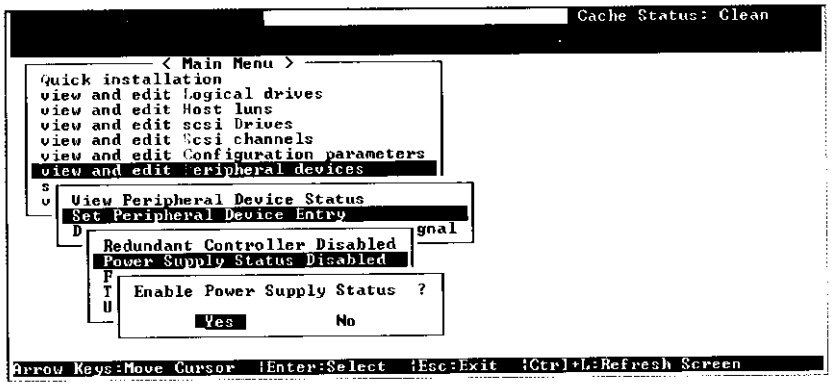
Set Each Fault-bus Error Signal Input as Active-high or Active-low



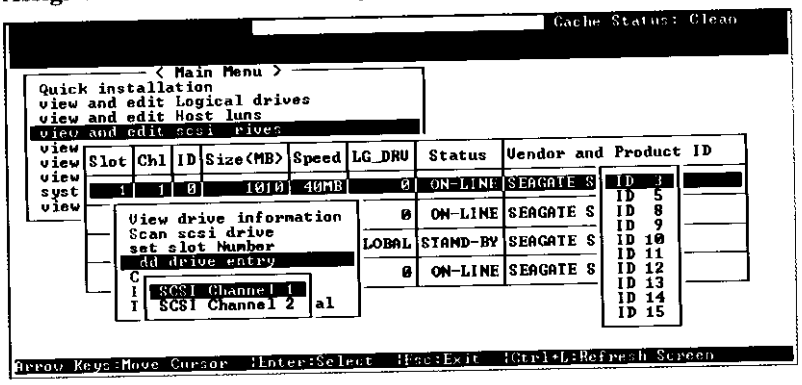
Choose "View and Edit Peripheral Devices" in the Main Menu, then press [**Enter**]. Select "Define Peripheral Device Active Signal", then press [**Enter**].

Move the cursor to the item you wish to change, then press [**Enter**]. Choose "**Yes**" when prompted to confirm, then press [**Enter**] to set. Each error signal input can be individually set as active high or active low. The drive failure signal output can also be set as active high or active low.

Enable Each Fault-bus Error Signal Input



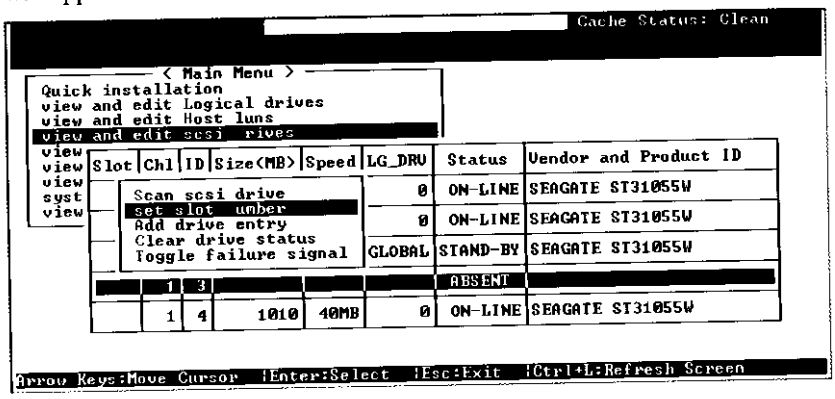
Assign a Slot Number to an Empty Canister



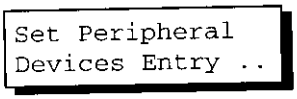
When there is an empty drive canister which currently does not contain any drive, the corresponding SCSI channel/ID will not appear in the drive information list. Assign a slot number to this empty canister and add a drive entry in order to use it later when a drive is installed.

Add Drive Entry

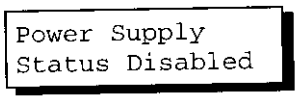
Choose a SCSI drive, then press [**Enter**]. Choose "Add Drive Entry" in the menu, then press [**Enter**]. Choose the corresponding SCSI channel/ID for this empty canister, then press [**Enter**]. An empty drive entry "ABSENT" will appear in the drive information list.



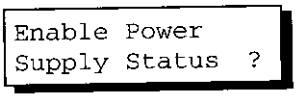
Press ▼ or ▲ to select "Set Peripheral Devices Entry", then press **ENT**.



Press ▼ or ▲ to select the desired item: Power Supply, Cooling Fan, Temperature Alert or UPS Power Fail, then press ENT to choose.

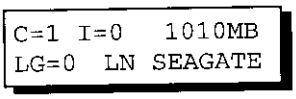


Press ▼ or ▲ to select an alternative selection. Press **ENT** for two seconds to confirm.

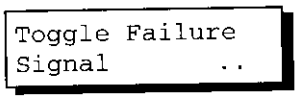


Test Drive Failure LED for Each Drive Canister

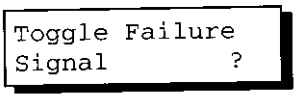
Choose "View and Edit SCSI Drives" to enter the Main Menu. The SCSI drive information will be displayed on the LCD. Press ▼ or ▲ to select the desired SCSI drive or empty drive entry, then press **ENT**.



Press ▼ or ▲ to select "Toggle Failure Signal", then press **ENT**.



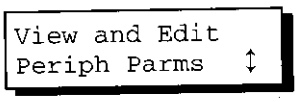
Press **ENT** for two seconds to toggle the drive failure signal.



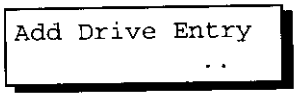
The drive failure LED should light on or off, following the toggle.

Viewing the Status of Each Fault-bus Error Signal Input

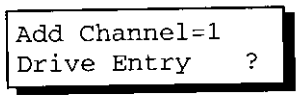
Choose "View and Edit Periph Parms" in the Main Menu, then press **ENT**.



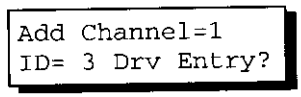
Press ▼ or ▲ to select "Add Drive Entry", then press **ENT**.



Press ▼ or ▲ to select the desired SCSI channel, then press **ENT** for two seconds.

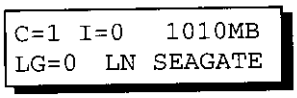


Press ▼ or ▲ to select the desired SCSI ID, then press **ENT** for two seconds.

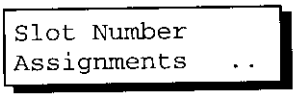


Delete the Slot Number

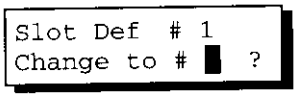
Choose "View and Edit SCSI Drives" to enter the Main Menu. The SCSI drive information will be displayed on the LCD. Press ▼ or ▲ to select the desired SCSI drive or empty drive entry, then press **ENT**.



Press ▼ or ▲ to select "Slot Number Assignment", then press **ENT**.



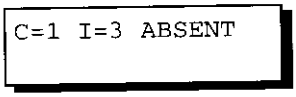
Press ▼ or ▲ to select "0" for the slot number, then press **ENT**. Press **ENT** for two seconds to set.



Remove Empty Drive Entry

Before you remove an empty drive entry, the slot number has to be deleted first. Please refer to the paragraph above on how to delete the slot number.

Choose "View and Edit SCSI Drives" to enter the Main Menu. The SCSI drive information will be displayed on the LCD.



UPS Power Failure Detected	The input signal from the UPS has been activated.
Power Supply Failure Detected	The input signal from the power supply has been activated.
Cooling Fan Failure Detected	The input signal from the cooling fan has been activated.
Elevated Temperature Alert	The input signal from the temperature sensor in the enclosure has changed.

11.3 How Do I Setup the Fault-bus?

11.3.1 Hardware

1. Connect all error signal inputs to the 3rd party circuit, then connect the error signals to the Fault-bus. Make sure each signal is active high or active low according to the 3rd party circuit.
2. Connect the ailed drive" LED (found at the front of the drive canister) to the Fault-bus. Record each canister slot number.
3. Make sure that the "Failed drive" LED signal is in accordance with your drive enclosure "Failed drive" LED circuit (the signal must be set at either **active high** or **active low**.)

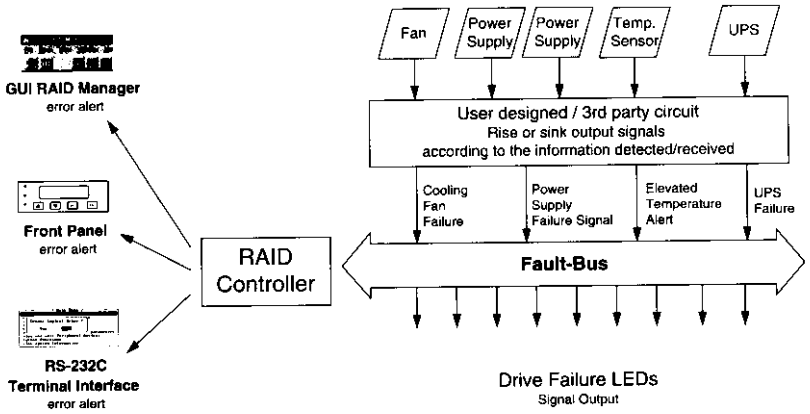
11.3.2 Configuring the Controller by the Front Panel

Assign Each SCSI Drive or Canister a Slot Number

Press **ENT** for two seconds to enter the Main Menu. Press ▼ or ▲ to select "View and Edit SCSI Drives", then press **ENT**.

View and Edit SCSI Drives ↕

11.2 How Does the Fault-Bus Work?



Error Signals Input

Fault-bus only collects the failure signals, it does not detect the temperature, fan rotation, power supply failure or the UPS power failure. A user designed or a 3rd party circuit is necessary for Fault bus.

The user designed / 3rd party circuit must do the following:

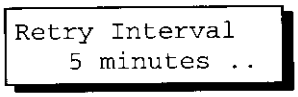
- Detect the fan rotation, and activate or deactivate the "fan" signal of the Fault-bus according to the detected information. When the fan fails to rotate, activate the signal. When the fan rotates properly, keep the signal inactive. If more than one fan is supported in this enclosure, detect the fan rotation of each fan and simply combine them into one signal.
- Detect the power supply status, then activate or deactivate the "power" signal of the Fault-bus according to the detected information. When a power supply failed, activate the signal. When the power supply is working properly, keep the signal inactive. If the enclosure supports the redundant power supply feature (with more than one power supply), detect the status of each power supply and combine them into one signal.
-

process three times if the dial-out process fails.)

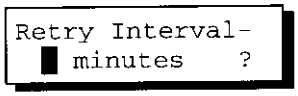
Dial-out Retry Interval

The Dial-out Retry Interval is the interval period between the dial-out retries.

Select "Retry Interval .." in the Dial-out Functions menu, then press **ENT**.

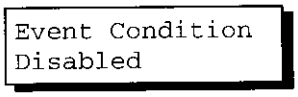


Enter the Dial-out Retry Interval in this column. Press ▼ or ▲ to change the current character, then press **ENT** to move the cursor to the next space. Press **ENT** for two seconds when finished.

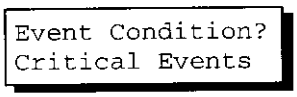


Dial-out on Event Condition

Select "Event Condition .." in the Dial-out Functions menu, then press **ENT**.



Press ▼ or ▲ to change the setting, then press **ENT** for two seconds.



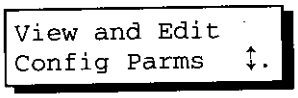
There are four options in this column:

Disabled	Disable
Critical Events	Critical Events Only
Critical &Warning	Critical Events and Warnings
All Events	All Events, Warnings and Notifications

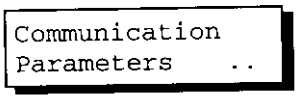
Choosing one of the options will enable the "Dial-out on Event Condition" (except "Disable"). The controller will send the "Dial-out command" to the modem when an event occurs.

Setting Dial-out Function by the Front Panel

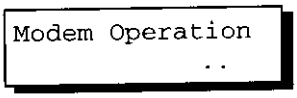
Press **ENT** for two seconds to enter the Main Menu. Press ▼ or ▲ to select "View and Edit Config Parm", then press **ENT**.



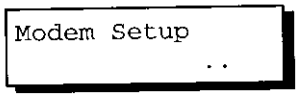
Select "Communication Parameters ..", then press **ENT**.



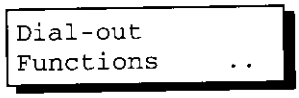
Select "Modem Operation ..", then press **ENT**.



Select "Modem Setup ..", then press **ENT**.

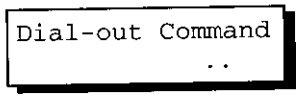


Select "Dial-out Functions ..", then press **ENT**. Press ▼ or ▲ to see the Dial-out Functions menu.

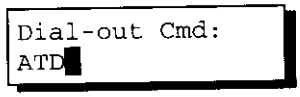


Dial-out Command

Select "Dial-out Command .." in the Dial-out Functions menu, then press **ENT**.



Enter the Dial-out command in this column. Press ▼ or ▲ to change the current character, then press **ENT** to move the cursor to the next space. Press **ENT** for two seconds when finished.

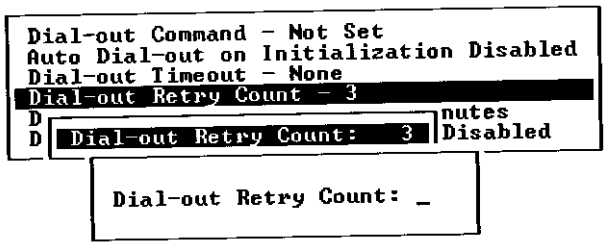


The Dial-out command is the only command that will be sent to the modem when dialing-out. If it's dialing to a pager, the pager number and message (if applicable) have to be entered in this column. If it's dialing to a remote terminal, the phone number of the remote modem has to be entered in this column. Refer to your modem's manual for the AT command set.

Choose "Dial-out Timeout" in the Dial-out Function menu. The current setting in this column will appear. Press [**Enter**]. A dialog box will appear to input the Dial-out Timeout. Enter the desired dial-out timeout time (in seconds) in this column.

When the modem is dialing out, the controller will start to count the dial-out timeout period. If the connection cannot be established within the dial-out timeout period, the controller will send a 'hang-up' command to the modem to hang up the phone.

Dial-out Retry Count



Choose "Dial-out Retry Count" in the Dial-out Function menu. The current setting in this column will appear. Press [**Enter**]. A dialog box will appear for entering the Dial-out Retry Count. Enter the desired Dial-out Retry count in this column.

When the modem cannot establish the connection when dialing-out, the controller will retry another dial-out, that is, if the Dial-out Retry Count is not set as "0". The default retry count is "3" - which means the controller will retry the dial-out process three times after the first dial-out process failed.

Dial-out Retry Interval

The Dial-out Retry Interval is the interval period between the dial-out retries.

The controller can be set to dial-out a pager for event notification, or dial-out to a remote computer with terminal emulation program as well as dial-in via a remote computer.

Dial-out to a Terminal or a Pager?

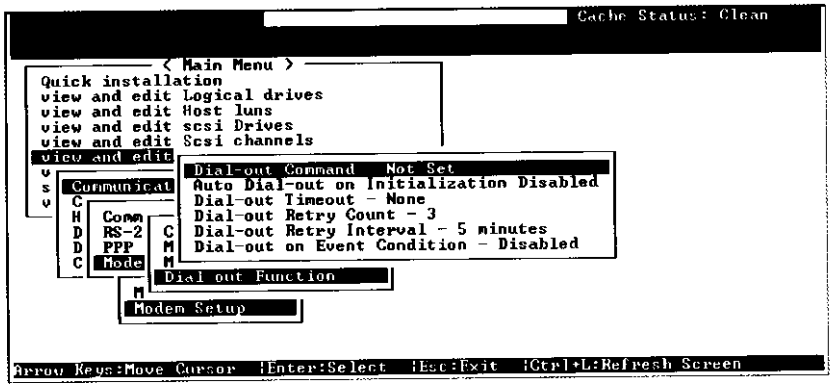
If the Dial-out function is used as a event notification to a pager, the terminal emulation of the COM port has to be disabled. If the Dial-out function is used with a remote terminal, enable the terminal emulation.

Configure the controller in order to use the remote terminal with the modem. Please refer to Chapter 10.3, Remote Terminal Emulation Using Modem, for details.

IMPORTANT:

- *If the controller is dialing-out to a pager, the Terminal Emulation of the corresponding COM port must be disabled.*
- *If the controller is dialing-out to a remote administration terminal, the Terminal Emulation of the corresponding COM port must be enabled.*

Setting Dial-out Function Through the Terminal Emulation



Choose "View and Edit Configuration Parameters" in the Main Menu, then select "Communication Parameters". Choose "Modem Operation", then select "Modem Setup" and "Dial-out Function" in the menu. A Dial-out

Choose None, Replace or Append, then press **ENT** for two seconds.

```
Custom Modem
Init - None   ?
```

IMPORTANT:

- *It is a must to enable "Auto answer mode" of the connected Modem in order to answer the dial-in calls and establish the connections automatically.*

Initializing Modem

In the "Modem Operation" menu, press **ENT**.

```
Modem Operation
              ..
```

Select "Modem Functions ..", then press **ENT**.

```
Modem Functions
              ..
```

Select "Re-Init Modem?", then press **ENT** for two seconds to scan and send initialization command to the Modem.

```
Re-Init Modem  ?
```

Baud Rate, Data Routing and Enable Terminal Emulation

Set the desired baud rate, Data Routing direct to port and enable the Terminal Emulation. Please refer to Chapter 10.2 on how to set the Baud rate, Data Routing and Terminal Emulation. The modem is now ready to answer the dial-in connection.

Establish the Connection from the Remote Terminal

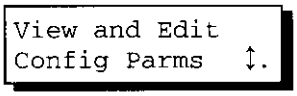
Use a terminal emulation program that supports ANSI or VT-100 terminal emulation modes. In the remote terminal program, dial the phone number of the modem connected to the DA-3500 series Disk Array. The modem should answer the call and start "handshaking" with the modem on the remote site. After the connection is established, the screen on the remote terminal program will look the same as the screen on the local site.

Setting DA-3500 Using the Front Panel

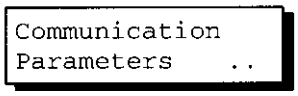
Here is an example of connecting COM 1 to the modem:

Configure Modem Port

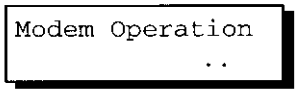
Press **ENT** for two seconds to enter the Main Menu. Press ▼ or ▲ to select "View and Edit Config Parm", then press **ENT**.



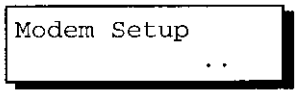
Select "Communication Parameters ..", then press **ENT**.



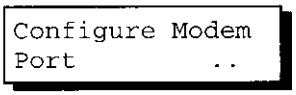
Select "Modem Operation ..", then press **ENT**.



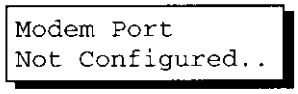
Select "Modem Setup ..", then press **ENT**.



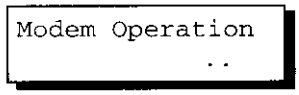
Select "Configure Modem Port ..", then press **ENT**.



The LCD displays "Modem Port Not Configured", then press **ENT**.



Select "Configure Modem on COM1?", then press **ENT** for two seconds to set.



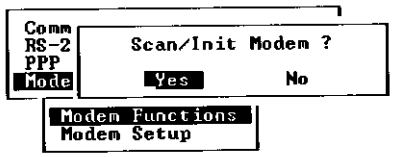
To delete the configured Modem port, choose the configured Modem port, then press **ENT**.

Choose "Modem Operating Modes" in the Mode Setup menu. The current setting will be displayed on the screen. Press **[Enter]** to see a list of choices. Choose the desired setting.

IMPORTANT:

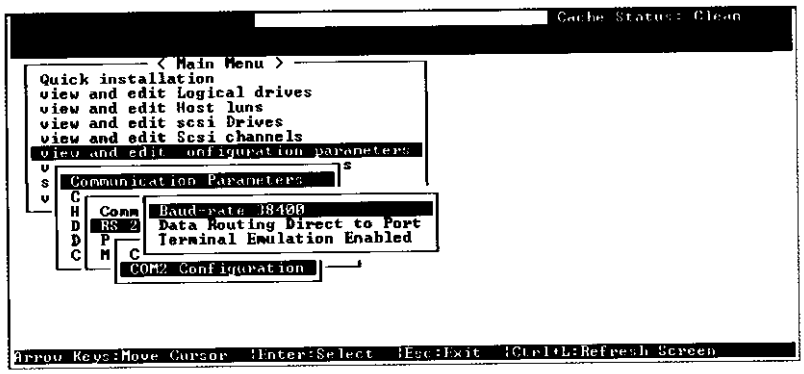
- *It is a must to enable "Auto answer mode" of the connected modem in order to answer the dial-in calls and establish the connections automatically.*

Initializing Modem

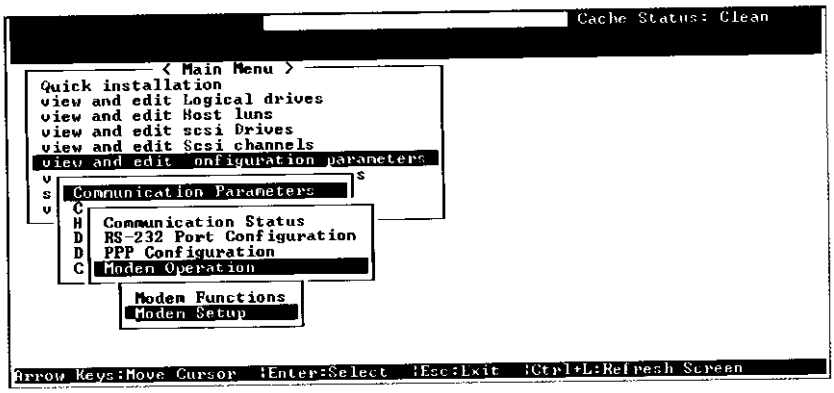


Choose "Modem Operations" in the Communication Parameters menu, then select "Modem Functions". A dialog box will appear. Choose **Yes** to scan and send initialization command to the Modem.

Baud Rate, Data Routing and Enable Terminal Emulation

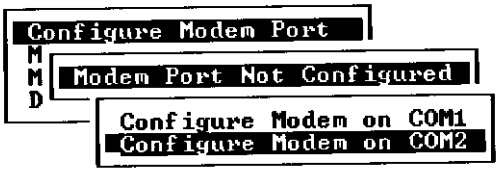


Configuring the Modem Port



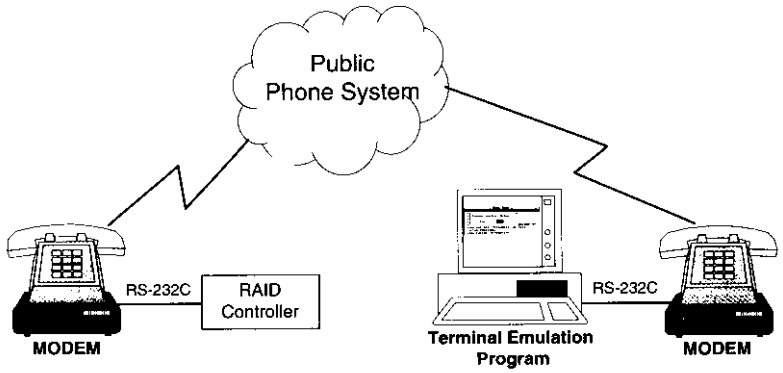
Choose "Modem Operation" from the communication parameters menu, then select "Modem Setup" in the next menu.

In the Modem Setup menu, choose Configure Modem Port.



The current setting of the modem port will be displayed on the screen. If there is no modem port configured yet, it will display "Modem Port Not Configured". Press [**Enter**] on the selection, and choose "Configure Modem on COM 2" by pressing [**Enter**].

10.3 Remote Terminal Emulation Using Modem



The controller can be configured and monitored remotely through a modem. If there are several RAID systems in several different places, the administrator can remotely administer all the controllers on his desk by using a terminal emulation program.

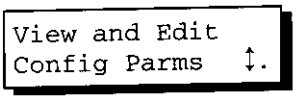
There is no need to install a RAS (Remote Access Server) to DA-3500. Simply connect a modem to DA-3500. DA-3500 can manage by itself the dial-in remote administration and dial-out event notifications through the proper settings.

If the controller is not connected as a redundant controller, COM 1 can be used as the local RS-232C terminal interface, GUI RAID Manager connection or PPP connection to the host computer. COM 2 can be used to provide a remote administration service by connecting a Modem. The terminal emulation screen will show that COM 1 and COM 2 are exactly the same and synchronized. It is a must to retain the Initial screen when not using it. The password will be asked for verification only when entering the Main Menu from the Initial screen.

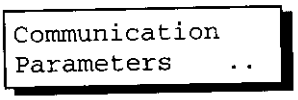
IMPORTANT:

- *Always keep the terminal emulation screen on the Initial screen for security checking. The controller's password will be asked for verification only when entering the Main Menu from the Initial screen.*

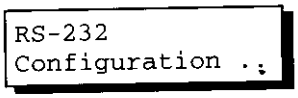
Press **ENT** for two seconds to enter the Main Menu. Press ▼ or ▲ to select "View and Edit Config Parm", then press **ENT**.



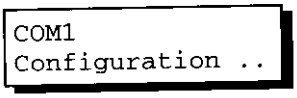
Select "Communication Parameters ..", then press **ENT**.



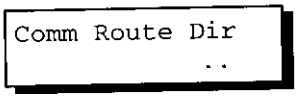
Select "RS-232 Configuration ..", then press **ENT**.



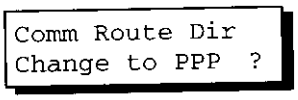
Select "COM1 Configuration ..", then press **ENT**. (Select COM2 if you are using COM2)



Select "Comm Route Dir", then press **ENT**.



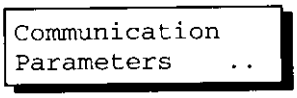
Press ▼ or ▲ to select "Change to PPP", then press **ENT** for 2 seconds to set.



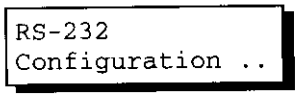
Establish Connection Between the Host Computer and DA-3500 series

After setting the data routing through PPP, DA-3500 will now wait for PPP to connect to the host computer. If the establishment succeeded, an IP will be given to DA-3500.

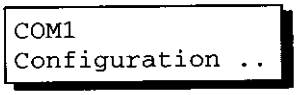
Select "Communication Parameters ..", then press **ENT**.



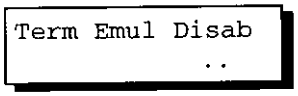
Select "RS-232 Configuration ..", then press **ENT**.



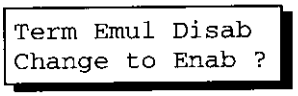
Select "COM1 Configuration ..", then press **ENT**. (Select COM2 if you are using COM2)



Select "Term Emul Disab", then press **ENT**. If it is already enabled, "Term Emul Enab" will appear. There is no need to change the setting if it's already enabled.



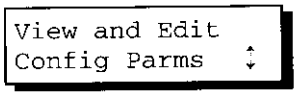
Press ▼ or ▲ to select "Change to Enab", then press **ENT** for 2 seconds to set.



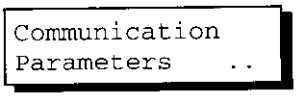
Setting PPP ID, PPP Password

To establish connection between DA-3500 and the host computer through PPP, it is necessary to enter a PPP Name and PPP Password for logon identification. Set the PPP Name and PPP Password. They will be stored in the controller and will be used for PPP connection later on.

Press **ENT** for two seconds to enter the Main Menu. Press ▼ or ▲ to select "View and Edit Config Parm", then press **ENT**.

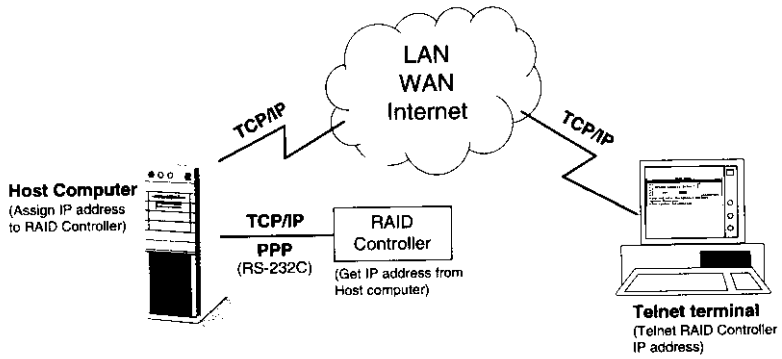


Select "Communication Parameters ..", then press **ENT**.



IMPORTANT:
The baud rate of both the RAID controller and GUI RAID Manager must be the same in order to establish the connection.

10.2 Remote Terminal Emulation Using PPP+Telnet



Connect DA-3500 to the host computer. Assign DA-3500 with an IP address (please refer to the host operating system's manual), and use TELNET from a remote client to control or monitor DA-3500 series. DA-3500 supports PPP protocol for connection to the host computer. The client computer will be able to locally as well as remotely see the terminal emulation interface.

Hardware Connection

Connect the host computer's serial port (RS-232C) to DA-3500's COM 1. If the controller is not configured as redundant controller, you may also use COM 2. Terminal emulation data through COM 1 and COM 2 are synchronized.

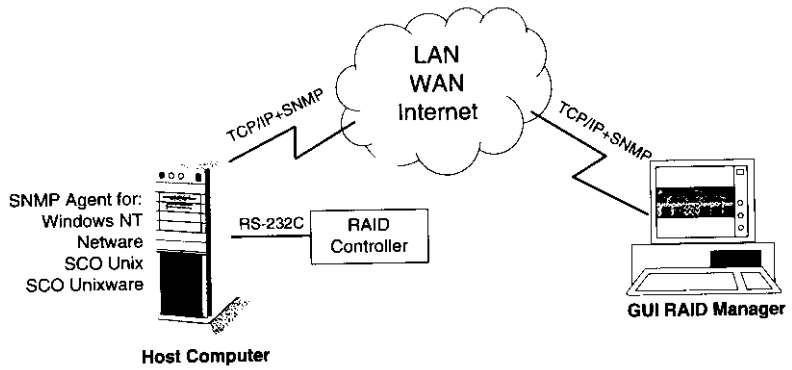
Chapter 10 Remote Administration

The ESCORT DA-3500 series Disk Array can be administered remotely. When an event, warning or controller notification occurs, controller will dial out to a pager to inform the administrator to take the appropriate measures.

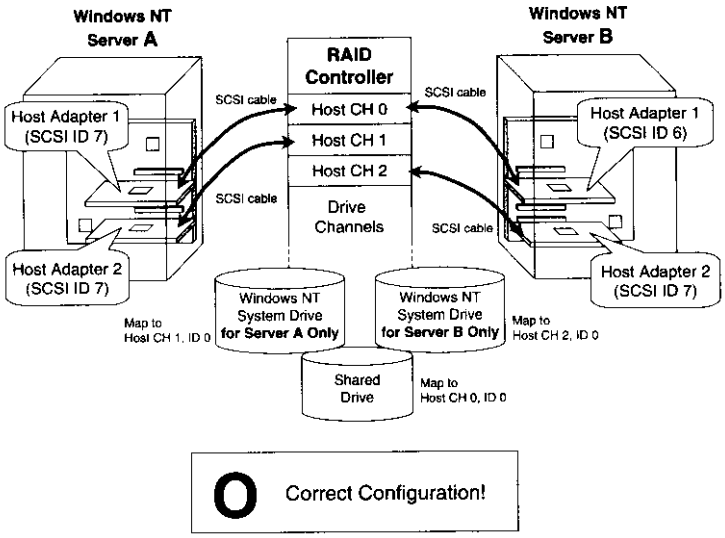
There are several options for remote administration.

- GUI RAID Manager using SNMP service
- Remote Terminal Emulation using PPP+Telnet
- Remote Terminal Emulation using Modem
- Dial-out pager for event notifications

10.1 GUI RAID Manager Using SNMP Service

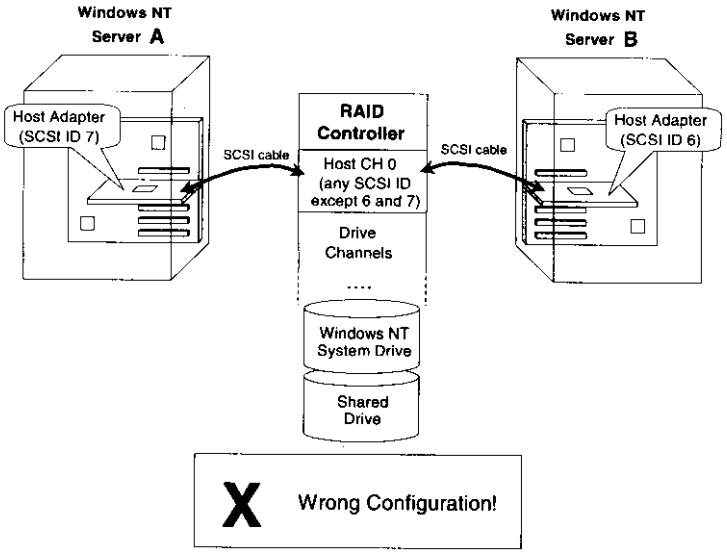


Connect the DA-3500 to the host computer via the RS-232C interface. Install the SNMP agent that corresponds to the operating system on the Host computer and enable the SNMP service. The client computer running with GUI RAID Manager will be able to remotely administer the DA-3500 series Disk Array .

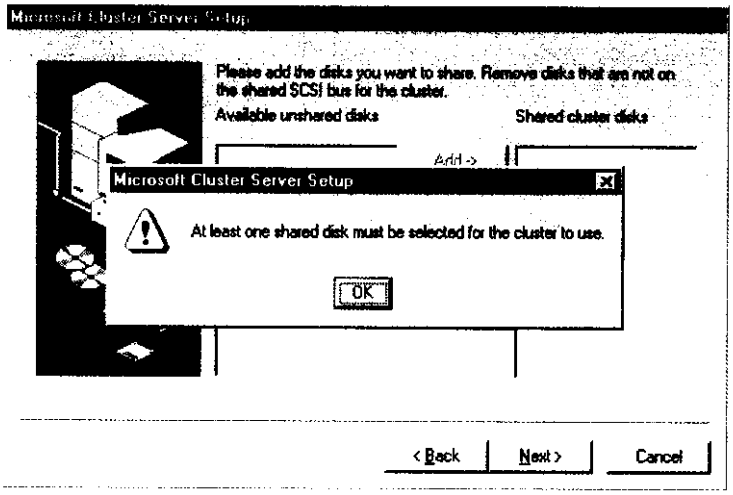


If you wish to place the Windows NT system drive in the RAID system, refer to the above figure for the configuration.

- Add a daughterboard for more channels.
- Create at least three logical drives. One Windows NT system drive for Server A, one Windows NT system drive for Server B and one for the shared drive.
- Map the shared drive to Host channel 0, ID 0.
- Map the Windows NT system drive for Server A to Host channel 1, ID 0.
- Map the Windows NT system drive for Server B to Host channel 2, ID 0.
- Use external terminators to prevent it from being affected when one of the devices fails.

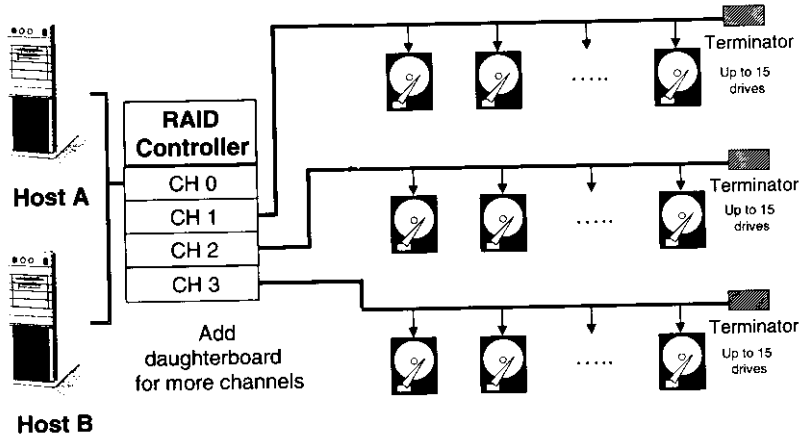


The Windows NT system drive (including system files and paging files) must never exist on a shared SCSI bus.



Chapter 9 Redundant Host, Multiple Host

9.1 Redundant Host



The ESCORT DA-3500 series Disk Array can be connected to serve redundant host computers. The figure above is an example of redundant hosts.

The Logical drives can be accessed by two host computers at the same time. Host redundant management's hardware or software helps prevent data conflict when more than one host computers are accessing the same logical drive.

now been assigned to the Secondary controller.

Map the LUN to the Secondary controller. The Secondary controller must have a host SCSI ID created. (Create the Secondary controller SCSI ID or add a SCSI ID channel in "View and Edit SCSI Channels" of the Main Menu.)

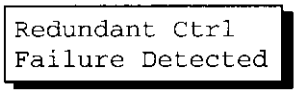
Reset the two controllers and host computers for the settings to take effect.

IMPORTANT:
Only firmware versions 2.11 and above can assign logical drives to the primary or secondary controllers.

8.3 When One of the Controller Fails...

What will happen when the one of the controllers fails?
When one of the controller fails, the other controller will take over in a few seconds (about 8 seconds).

The red ATTEN LED will light up, and the message "Redundant Ctrl Failure Detected" will appear on the LCD. The beeper in the controller will start to beep.



The message "Controller ALERT: Redundant Controller Failure Detected" will also appear on the screen of the terminal interface.

After a controller takes over, it will simultaneously act as both controllers. If it is the Primary controller that failed, the Secondary Controller becomes the Primary Controller. If the failed controller is replaced by a new one later on, the new controller will act as the Secondary Controller.

Some operating systems will not retry accessing the hard disk drives.

When and How is the Failed Controller Replaced?
Remove the failed controller **after** the take-over of the "working" controller has been completed.

The new controller has to be pre-configured as the 'Secondary

The message "Redundant Ctrl Function Disable" will be displayed on the LCD. Press **ENT** to go to the next step.)

The message "Enable Redundant Ctrl: Autocfg?" will appear. Use ▼ or ▲ to scroll through the available options ("Primary," "Secondary" or "Autocfg"). Press **ENT** for two seconds on "Primary."

```
Enable Redundant
Ctlr: Autocfg  ?
```

The message "Redundant Ctrl Primary Inactive" will appear.

```
Redundant Ctrl
Primary Inactive
```

Power-off Controller 1, then power-on Controller 2. Set Controller 2 to "Secondary" as described in the above steps.

```
Redundant Ctrl
Secndry Inactive
```

Power-off Controller 2.

Starting-up the Redundant Controllers

Power-on all hard drives and the two controllers. The message "RC connecting... <ENT> to cancel" will appear on the LCD display of the two controllers. After a few seconds, the Primary controller will startup with the model number and firmware version displayed on the LCD, while the Secondary controller will display the message "RC Standing By.. <ENT> to Cancel" on its LCD. A few seconds later, the LCD display on the Secondary controller will be similar to the LCD display on the Primary controller.

```
RC connecting...
<ENT> to cancel
```

```
RC Standing By..
<ENT> to Cancel
```

During normal operation, the controllers continuously monitor each other. Each controller is always ready to take over for the other controller, in the unlikely event of a controller failure.

The host computer is connected to both the primary and secondary controllers. Each controller has one of its SCSI channels assigned as the host channel, with the other SCSI channels assigned as the drive channels.

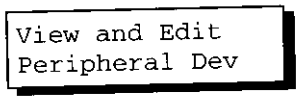
The example below was done using firmware version 2.11. Later versions of the firmware will also work perfectly well, but the message displayed on the LCD may vary.

Setting the Controllers using the Front Panel

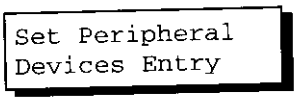
Redundant Configuration using Automatic Setting

Power-on Controller 1. Make sure Controller 2 is powered-off.

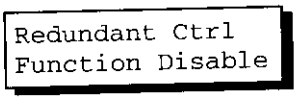
Press **ENT** for two seconds on the front panel of Controller 1 to enter the Main Menu. Use ▼ or ▲ to navigate through the menus. Choose "View and Edit Peripheral Dev.." (View and Edit Peripheral Devices), then press **ENT**.



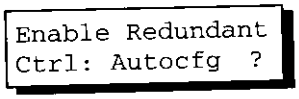
Choose "Set Peripheral Devices Entry", then press **ENT**.

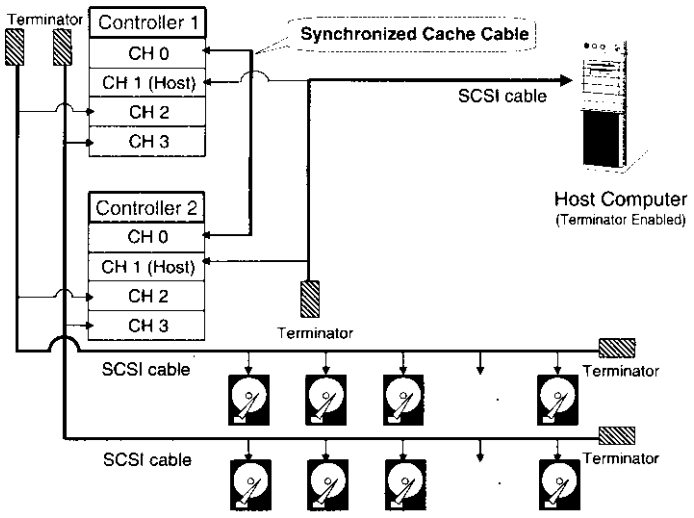


Choose "Redundant Ctrl Function___", and then press **ENT**. (Note: The current setting will be displayed on the LCD. If this controller has never been set as a redundant controller before, the default setting of the redundant controller function is Disabled. The message "Redundant Ctrl Function Disable" will be displayed on the LCD. Press **ENT** to go to the next step.)



The message "Enable Redundant Ctrl: Autocfg?" will appear. Use ▼ or ▲ to scroll through the available options ("Primary," "Secondary" or "Autocfg"), then press **ENT**





What is Primary controller and Secondary controller?

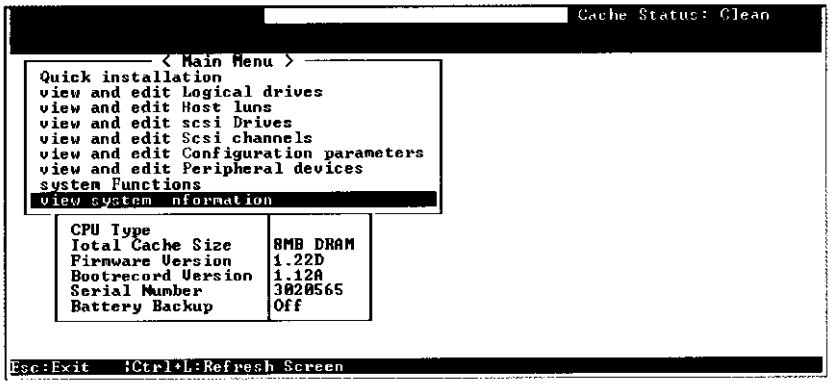
The Primary and Secondary controllers are used to serve the host computer's I/O requests. Take note that the configurations and settings can only be done on the Primary controller. The Secondary controller then synchronizes the configuration information of the Primary controller, making the configurations of the Primary and Secondary controllers exactly the same.

The controllers continuously monitor each other. When a controller detects that the other controller is not responding, the working controller will immediately take over for and disable the failed controller until it has been replaced and enabled by user command.

When should I choose Primary, Secondary or Autocfg mode?

Generally Autocfg is the simplest way to configure the controllers. By setting each controller to Autocfg mode, the controllers will decide among themselves which will be the Primary or Secondary controller. If you need to specify a particular controller as Primary or Secondary, you must set this manually.

7.8 Viewing System Information



To view the system's information, move the cursor bar to "View System Information", then press [Enter].

A list of information will appear.

CPU Type The type of CPU installed in the RAID controller.

Total Cache Size The total DRAM size installed in the controller.

Firmware Version The version of the firmware.

Bootrecord Version The version of the boot record.

Serial Number The serial number of the controller.

Battery Backup

On When the battery pack and the battery daughter board are installed and functioning normally, "On" appears in this column.

Off When the battery pack and the battery daughter board are not installed, or are not functioning normally, "Off" appears in this column.

IMPORTANT:

- *The controller will verify the password only when entering the Main Menu from the Initial screen. Always go back to the Initial screen when the controller is going to be unattended.*
- *The controller password and controller name are sharing a 16-character space. The maximum characters for the controller password is 15. When the controller name occupied 15 characters, there is only one character left for the controller password and vice versa.*

Changing the Password

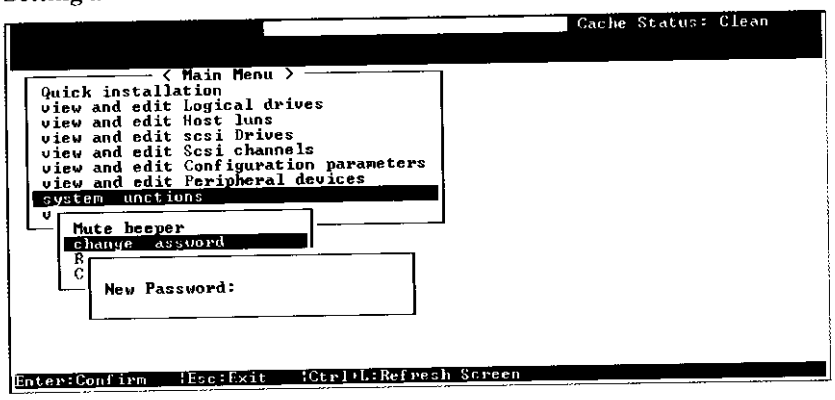
To set or change the controller password, move the cursor bar to "Change Password", then press [**Enter**].

If a password has previously been set, the controller will ask for the old password first. If the password has not yet been set, the controller will directly ask for the new password. The password can not be replaced unless a correct old password is provided.

Key-in the old password, then press [**Enter**]. If the password is incorrect, it will not allow you to change the password. Instead, it will display the message "Password incorrect!", then go back to the previous menu.

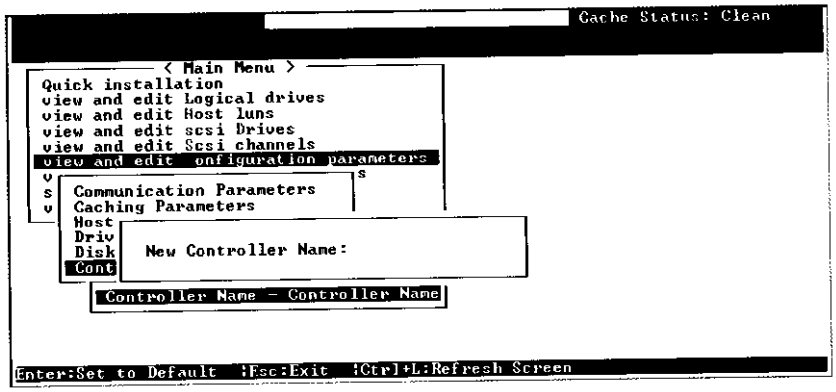
If the password is correct, or there is no preset password, it will ask for the new password.

Setting a New Password



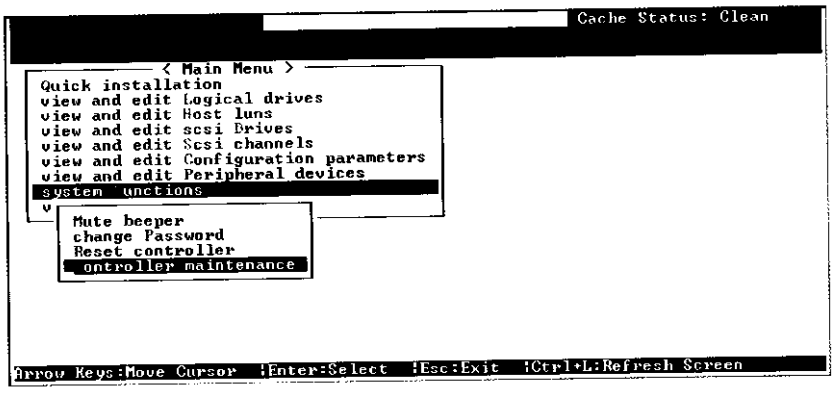
7.6.5 Controller Parameters

Controller Name



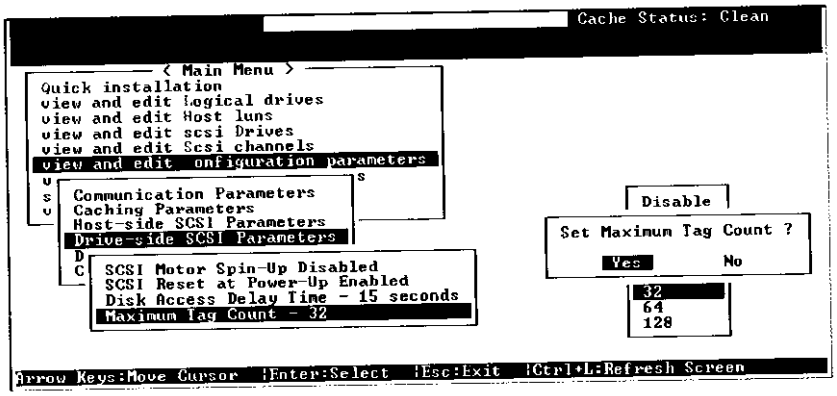
Choose "Controller Parameters", then press [**Enter**]. The current controller name will be displayed. Press [**Enter**]. Enter the new controller name in the dialog box that followed, then press [**Enter**].

7.7 System Functions



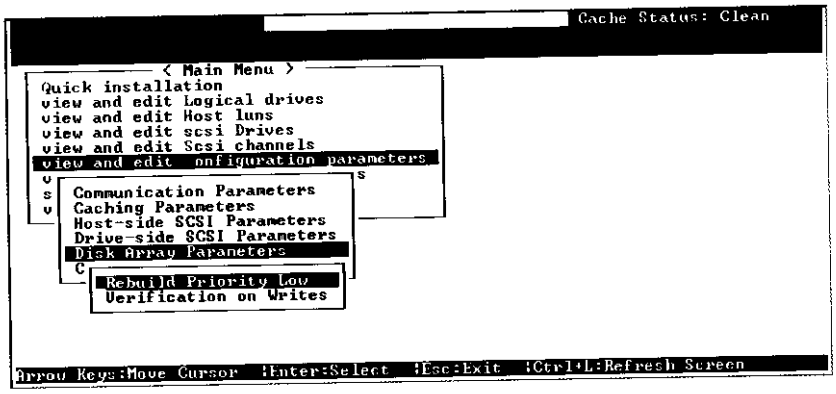
Choose "System Functions" in the Main Menu, then press [**Enter**]. The System Functions menu will appear. Move the cursor bar to an item, then press [**Enter**].

Maximum Tag Count



Choose "Maximum Tag Count", then press [**Enter**]. A list of selections will appear. Move the cursor bar to a selection, then press [**Enter**]. Select **Yes** in the dialog box that followed, then press [**Enter**] to confirm the setting.

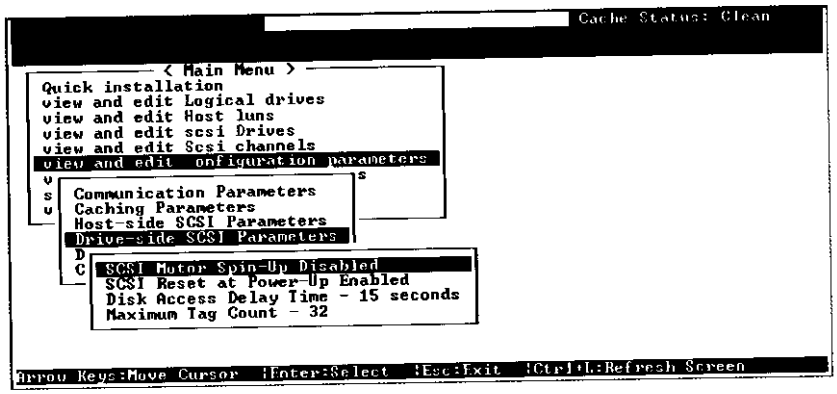
7.6.5 Disk Array Parameters



Choose "Disk Array Parameters", then press [**Enter**]. The Disk Array Parameters menu will appear.

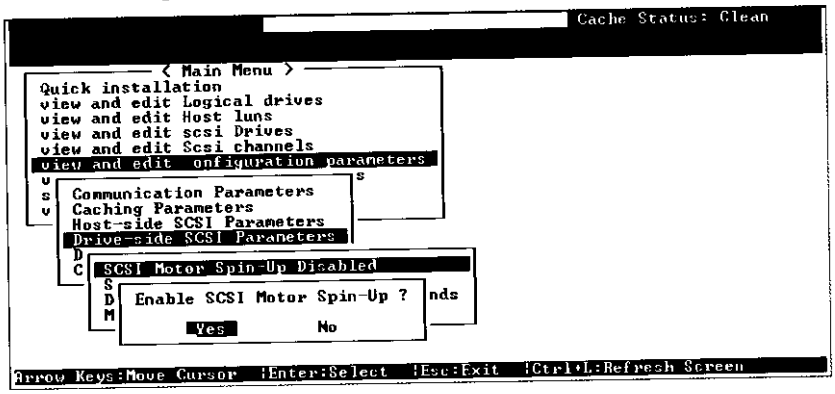
will appear. Move the cursor bar to an item, then press [**Enter**]. Choose **Yes** in the dialog box that followed to confirm the setting.

7.6.4 Drive-side SCSI Parameters



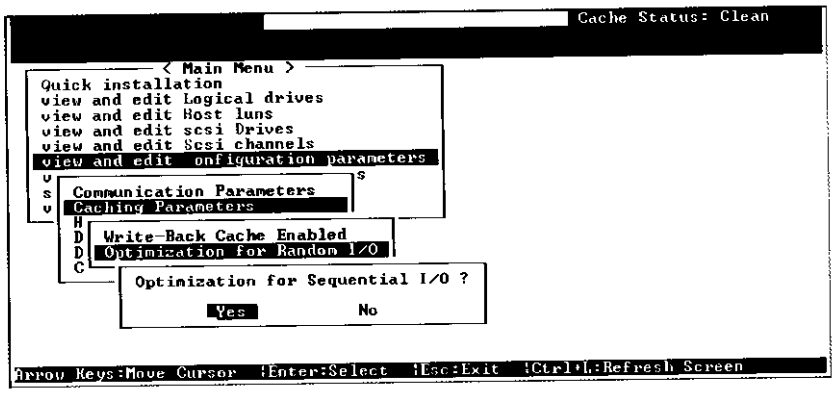
Choose "Drive-side SCSI Parameters", then press [**Enter**]. The Drive-side SCSI parameters menu will appear.

SCSI Motor Spin-Up



Choose "SCSI Motor Spin-Up", then press [**Enter**]. Choose **Yes** in the dialog box that followed to confirm the setting.

Optimization for Random or Sequential I/O



Choose "Optimization for Random I/O" or "Optimization for Sequential I/O", then press [**Enter**]. The "Random" or "Sequential" dialog box will appear, depending on the option you have selected. Choose **Yes** in the dialog box that followed to confirm the setting.

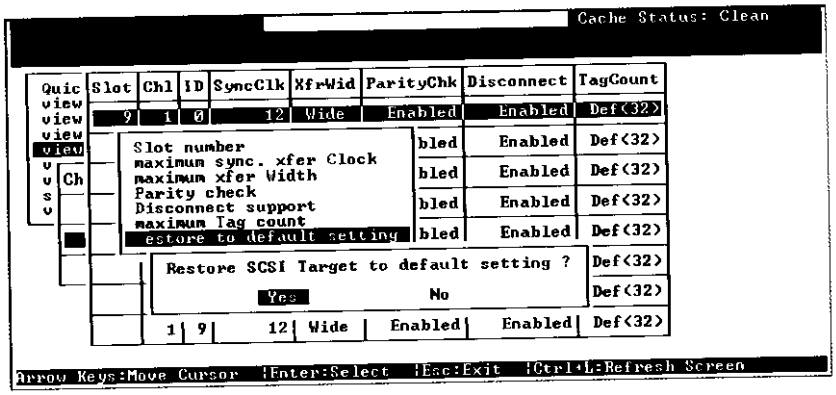
IMPORTANT:

- *Every time you change this setting, you must reset the controller for the changes to take effect.*
- *Refer to "2.4.1 Optimal for Sequential or Random I/O" for more information.*

IMPORTANT:

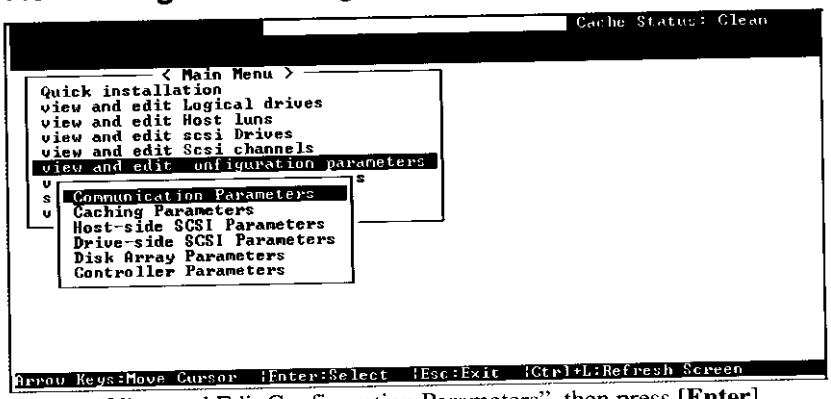
- *Disabling the Maximum Tag Count will disable the internal cache of the SCSI drive.*

Restoring the Default Setting



Choose "Restore to default setting", then press [**Enter**]. Choose **Yes** in the dialog box that followed to restore all the settings of the SCSI target to the factory default setting.

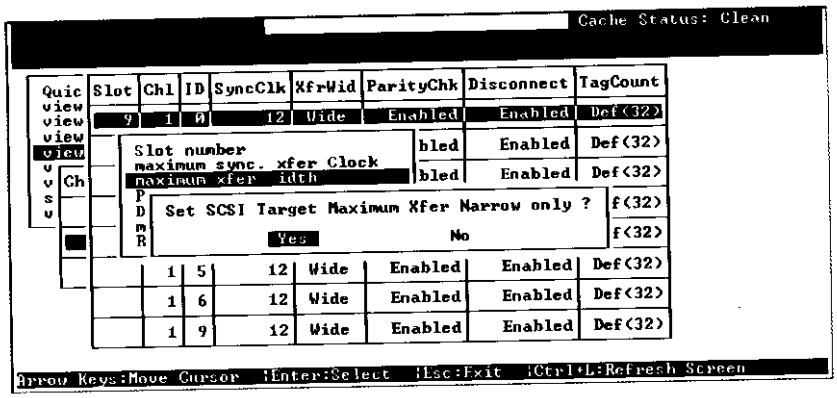
7.6 Viewing and Editing Configuration Parameters



Choose "View and Edit Configuration Parameters", then press [**Enter**].

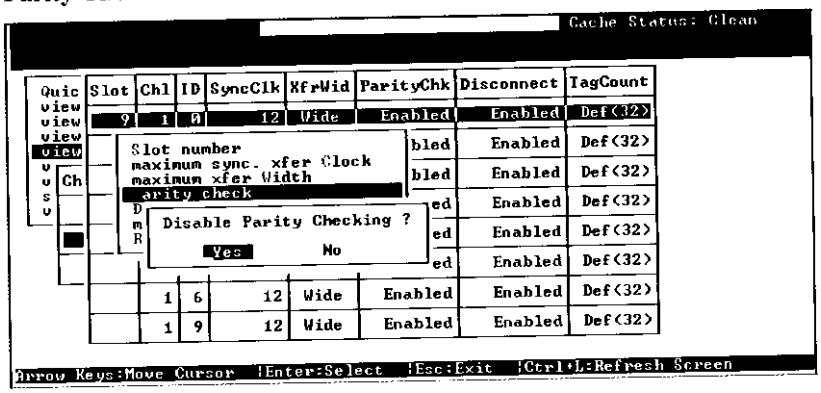
Please refer to Appendix F, Sync. Clock Period and Sync. Clock Frequency, for more information.

Maximum Transfer Width



Choose "Maximum Xfer Width", then press [**Enter**]. Choose **Yes** in the dialog box to confirm the setting.

Parity Check



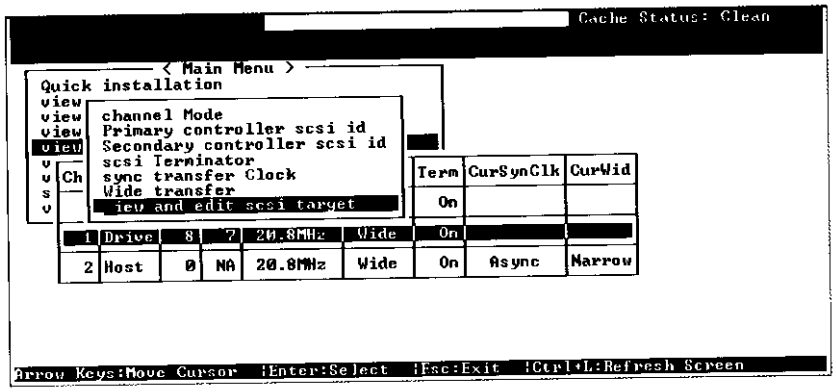
Choose "Parity Check". Choose **Yes** in the dialog box that followed to confirm the setting.

Move the cursor bar to a channel, then press **[Enter]**. Select "Wide Transfer", then press **[Enter]**. A dialog box "Disable Wide Transfer?" or "Enable Wide Transfer?" will appear. Choose **Yes**.

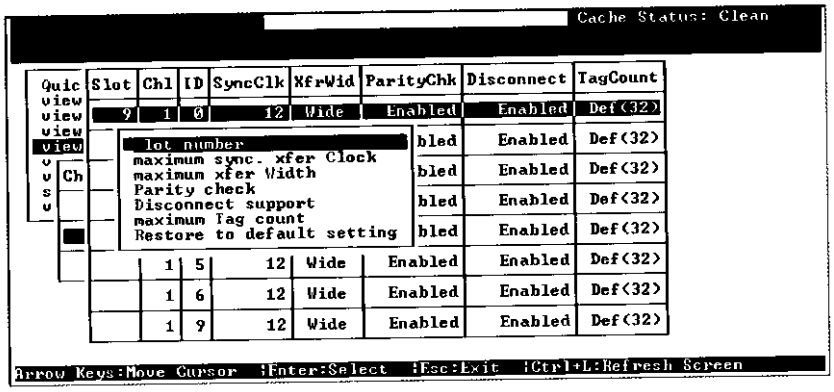
IMPORTANT:

- *Every time you change the SCSI Transfer Width, you must reset the RAID controller for the changes to take effect.*

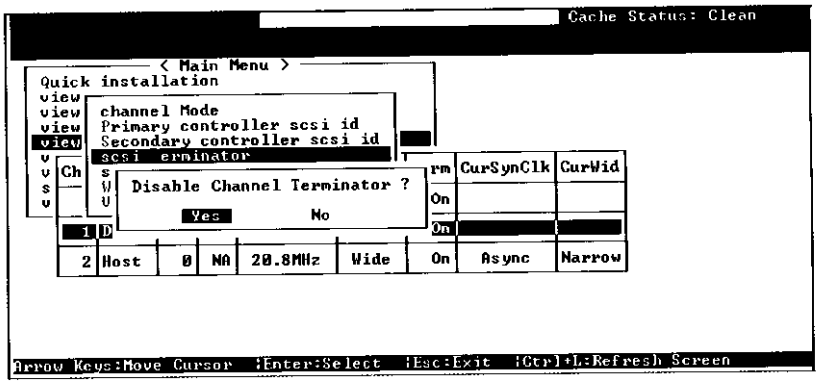
7.5.8 Viewing and Editing SCSI Target / Drive Channel



Move the cursor bar to a Drive channel, then press **[Enter]**. Select "View and Edit SCSI Target", then press **[Enter]**.



7.5.5 Setting a SCSI Channel's Terminator

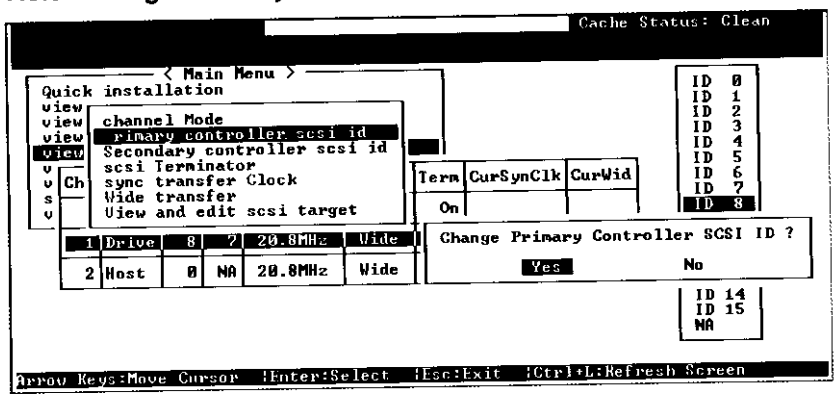


Choose the channel you wish the terminator enabled or disabled, then press [**Enter**]. Choose "SCSI Terminator", then press [**Enter**]. A dialog box will appear. Choose **Yes**, then press [**Enter**].

IMPORTANT:

- *Only a terminator with Single-Ended channel can be enabled/disabled through the setting shown above.*
- *A terminator with Differential channel must be removed/installed physically. The LCD will present this as "Diff".*

7.5.3 Setting a Primary Controller's SCSI ID / Drive Channel

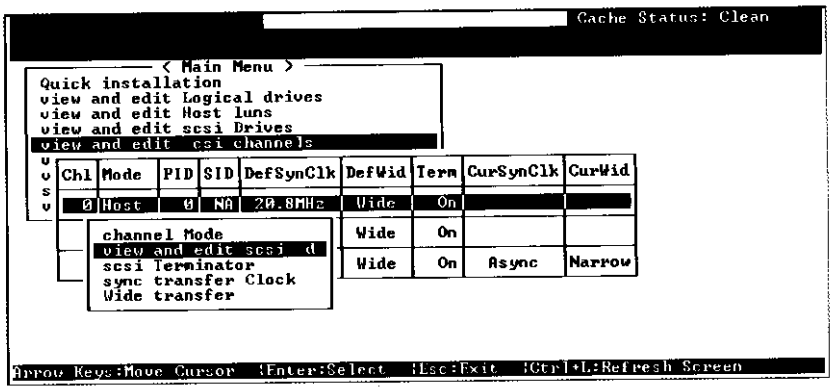


Choose a Drive channel, then press **[Enter]**. Choose "Primary Controller SCSI ID". A list of SCSI IDs will be displayed on the screen. Only one SCSI ID can be assigned to the drive channel of a controller. Now choose a SCSI ID for the drive channel of the Primary Controller. The dialog box "Change Primary Controller SCSI ID?" will appear. Select **Yes**, then press **[Enter]**.

IMPORTANT:

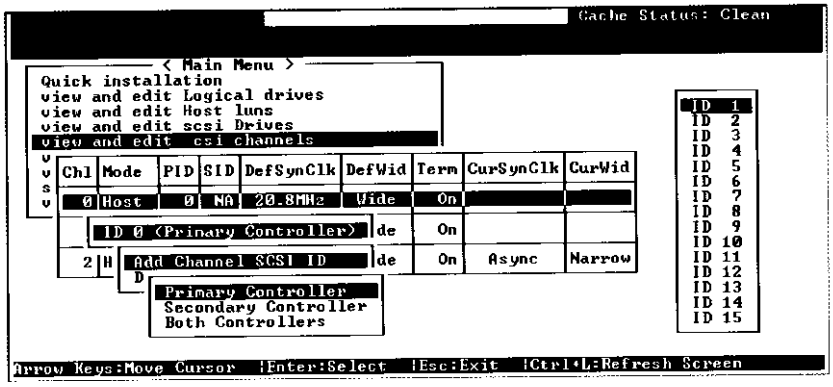
- *Every time you change a channel's SCSI ID, you must reset the RAID controller for the changes to take effect.*
- *The default SCSI ID of the Host channel is 0, the Drive channel is 7.*
- *If only one controller exist, you must set the Secondary Controller's SCSI ID to "NA". If a secondary controller exist, you need to set a SCSI ID.(The ESCORT Disk Array support dual controller)*
- *Multiple SCSI ID can be applied to the Host channel while the Drive channel, one SCSI ID or no SCSI ID.*
- *Multiple SCSI ID is supported in firmware version 2.11 or later. Firmware versions earlier than 2.11 only supports one SCSI ID.*
- *At least a controller's SCSI ID has to be present on the SCSI bus.*

7.5.2 Viewing and Editing a SCSI ID / Host Channel



Choose a Host channel, then press [**Enter**]. Choose "View and Edit SCSI ID". A list of the existing ID(s) will be displayed on the screen.

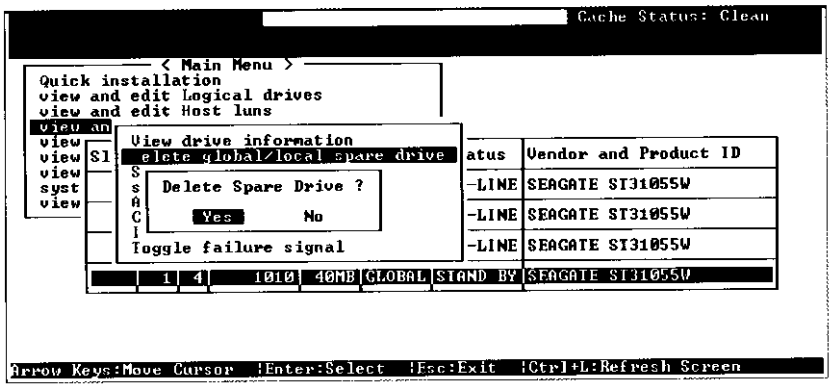
Adding a SCSI ID



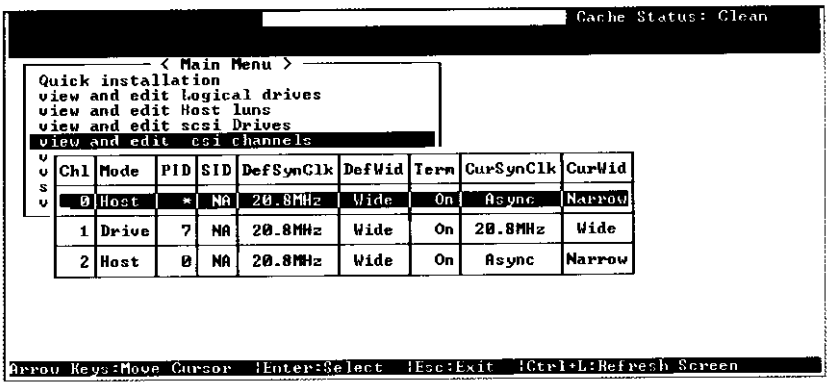
Press [**Enter**] on one of the existing SCSI ID. Choose "Add Channel SCSI ID", then choose "Primary Controller". A list of SCSI IDs will appear. Choose a SCSI ID. DO NOT choose a SCSI ID used by a device that belongs to the same SCSI channel.

7.4.6 Deleting a Spare Drive (Global / Local Spare Drive)

Move the cursor to a Local Spare Drive or Global Spare Drive, then press [**Enter**]. Choose "Delete Global/Local Spare Drive", then press [**Enter**] again. Choose **Yes**.



7.5 Viewing and Editing SCSI Channels

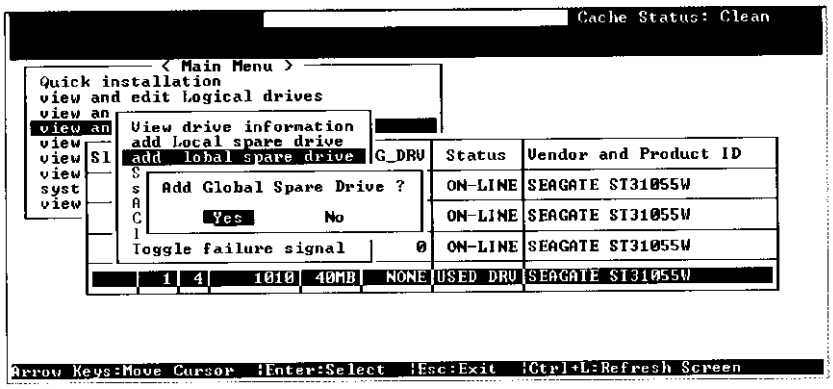


Choose "View and Edit SCSI Channels" in the Main Menu. A list of all the channels will be displayed on the screen. Refer to "7.1.5 SCSI Channel's Status" for detailed information.

screen. Move the cursor bar to a logical drive, then press **[Enter]**. The unassigned SCSI drive will be assigned to this logical drive as the Local Spare Drive.

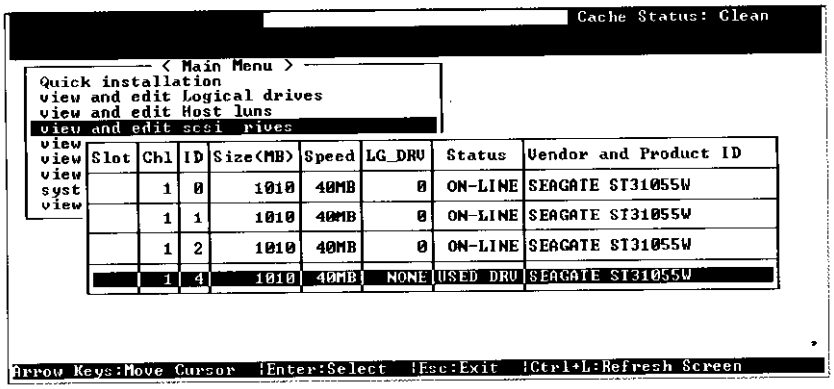
When prompted with "Add Local Spare Drive?", choose **Yes**.

7.4.4 Adding a Global Spare Drive



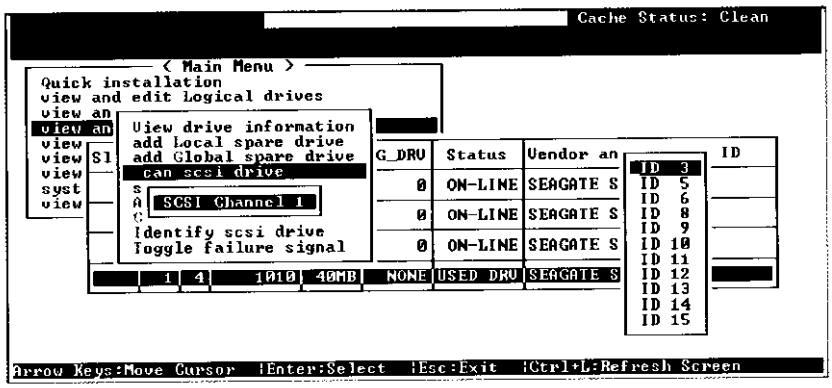
Move the cursor bar to the SCSI drive that has not yet been assigned to a logical drive or as a spare drive, then press **[Enter]**. Choose "Add Global Spare Drive". When prompted with "Add Global Spare Drive?", choose **Yes**.

7.4 Viewing and Editing SCSI Drives

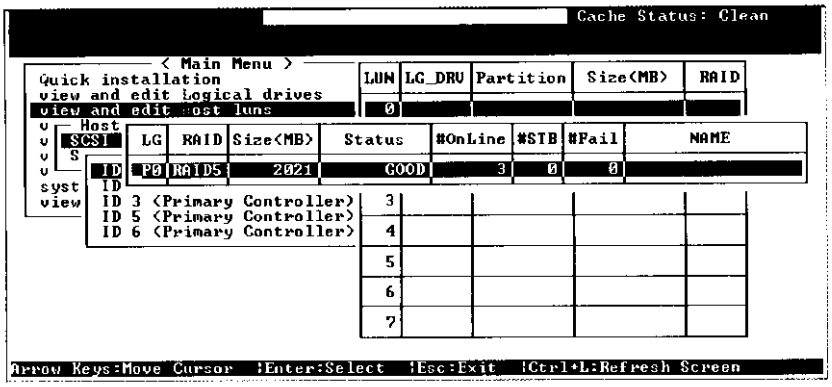


Choose "View and Edit SCSI Drives" in the Main Menu. All drives attached to the drive channels will be displayed on the screen. Refer to "7.1.4 SCSI Drive's Status" for detailed descriptions of each column.

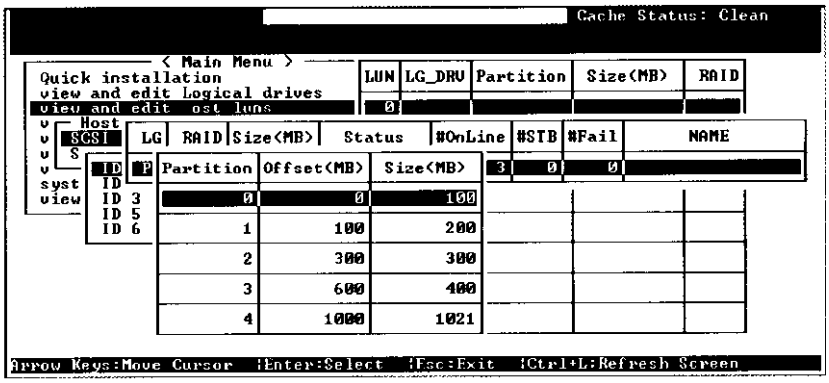
7.4.1 Scanning a New SCSI Drive



Choose a drive and press **[Enter]**. Choose "Scan SCSI drive", then press **[Enter]**. The menu may vary according to the drive status. Choose the drive channel and SCSI ID of the drive you wish to scan, then press **[Enter]**.



A list of available logical drives will be displayed on the screen. Move the cursor bar to the desired logical drive, then press [**Enter**].

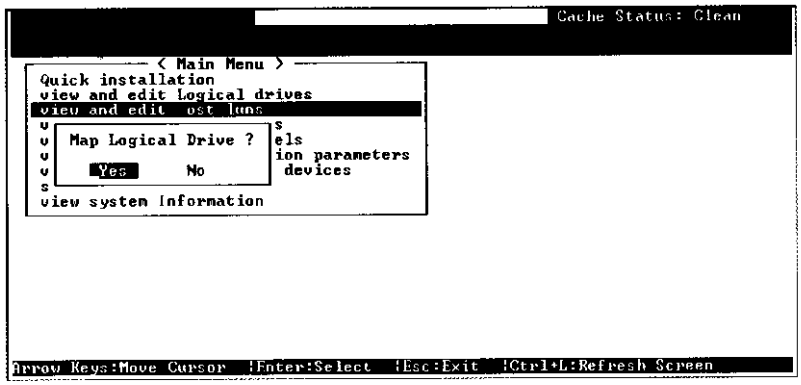


A partition table of the logical drive will be displayed on the screen. Move the cursor to the desired partition, then press [**Enter**].

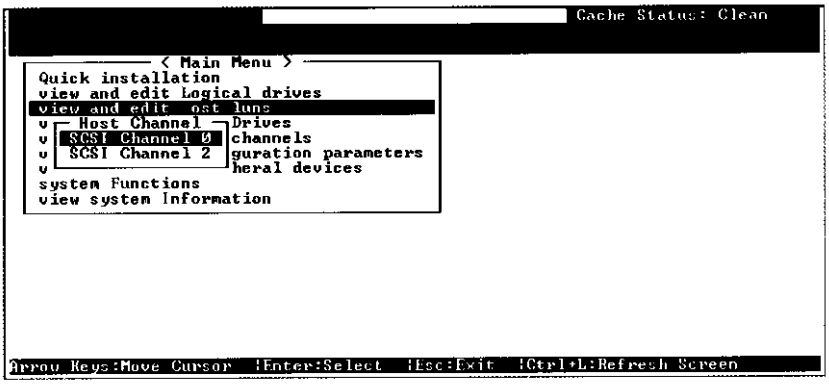
- *Refer to "2.2.3 Automatic Rebuild " for more information.*

7.3 Viewing and Editing Host LUNs

7.3.1 Mapping a Logical Drive to a Host LUN



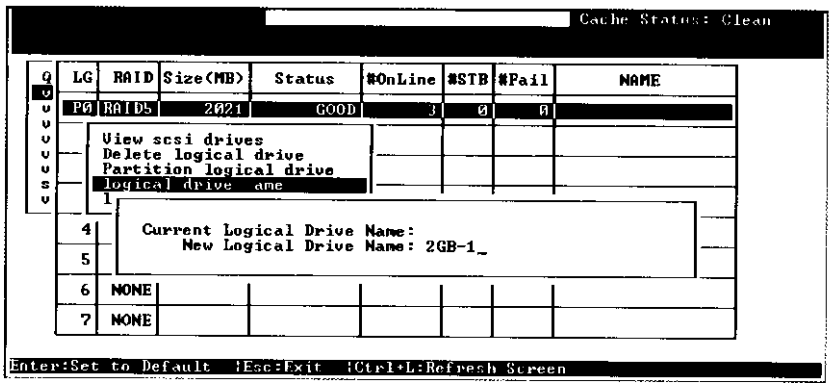
Choose "View and edit Host luns" in the Main Menu, then press [**Enter**]. When prompt with "Map Logical Drive?", select **Yes**.



A list of host channels will be displayed on the screen. Choose the host channel you wish to map.

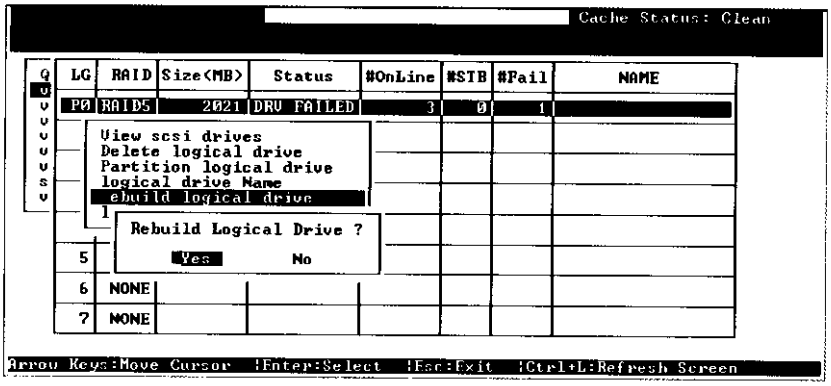
configure all host LUN mappings. All the host LUN mappings will be removed with any partition change.

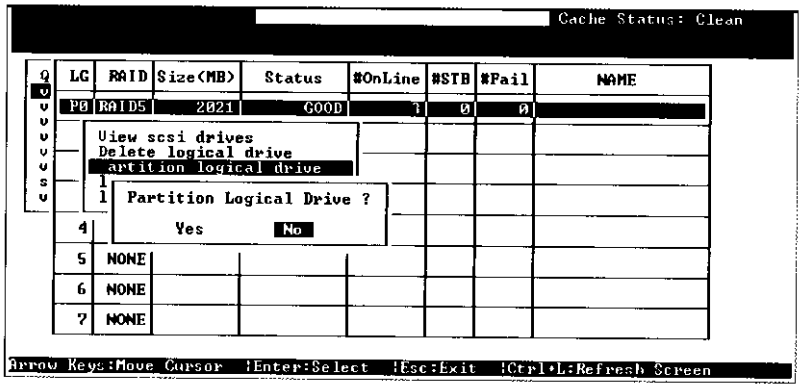
7.2.6 Assigning a Logical Drive Name



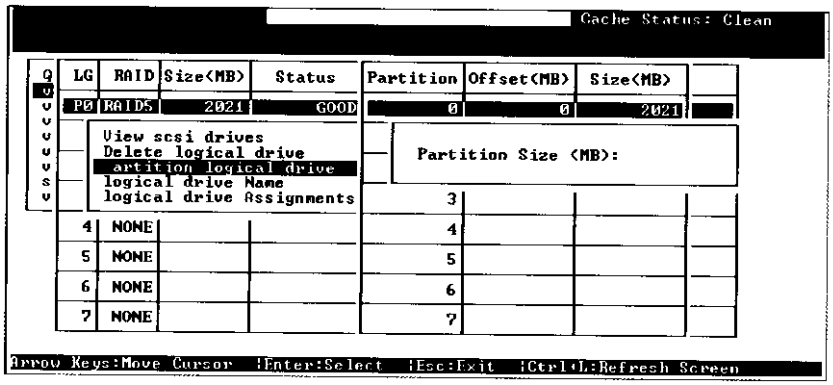
Choose the logical drive you wish to assign a logical drive name, then press **[Enter]**. Choose "logical drive name", then press **[Enter]** again. The current logical drive name will be displayed on the screen. You may now enter the new logical drive name in this field. Enter the logical drive name, then press **[Enter]** to save the new name.

7.2.7 Rebuilding Logical Drive

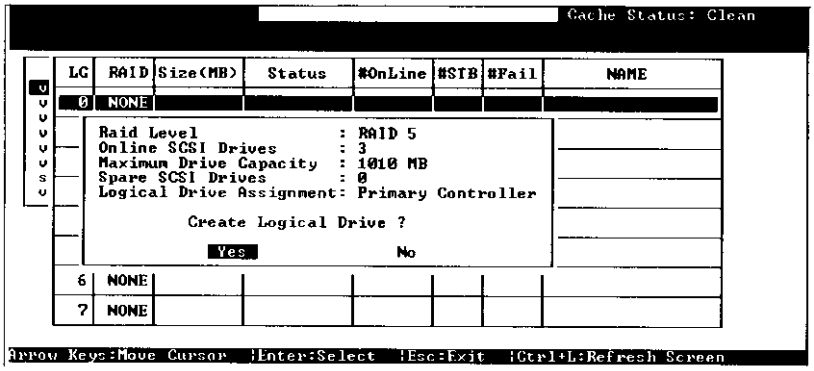




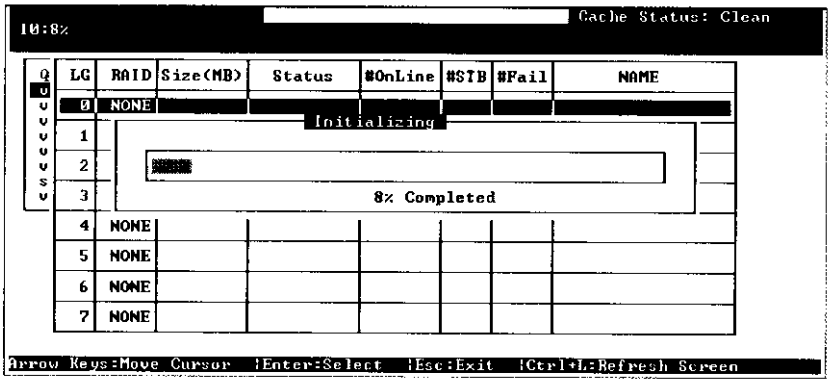
The screen will display a partition table of up to 8 partitions with the last partition selected. Press [**Enter**] and type the desired size for the selected partition, then press [**Enter**]. The remaining size will be allotted to the next partition.



A prompt to confirm the changes will appear. Select **Yes** to create the logical drive, or **No** to cancel.



When a fault-tolerant RAID level (1, 3 or 5) has been selected, the RAID controller will start initializing parity. A progress indicator will be displayed on the screen. After initialization is done, the created logical drive is also complete.

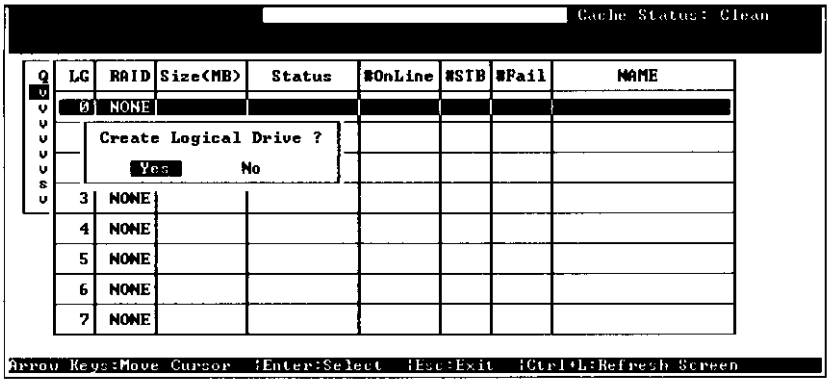


7.2.2 Viewing Logical Drives and Drive Members

Choose "View and Edit Logical Drives" in the Main Menu. The current logical drive configuration and status will be displayed on the screen. Refer to "7.1.3 Logical Drive's Status" for detailed descriptions.

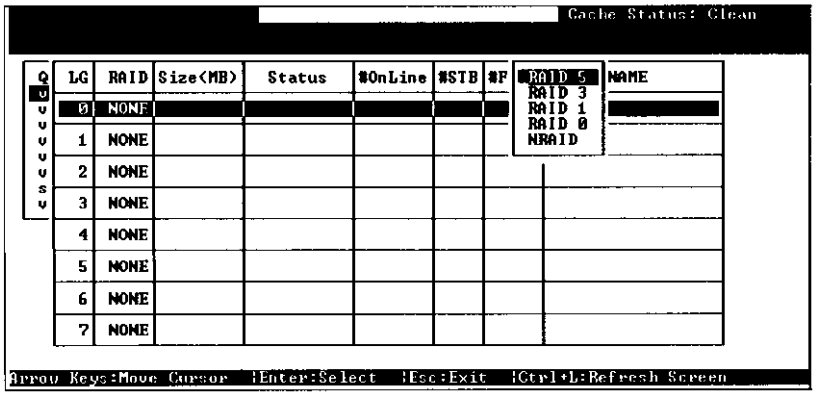
7.2 Viewing and Editing Logical Drives

7.2.1 Creating a Logical Drive



Choose "View and Edit Logical Drives" in the Main Menu. The current logical drive configuration and status will be displayed on the screen. Choose a logical drive number that has not yet been defined, then press [**Enter**]. A prompt "Create Logical Drive?" will appear. Select "**Yes**" and

SCSI ID is sup



A list of supported RAID levels will appear. Choose a RAID level for this logical drive.

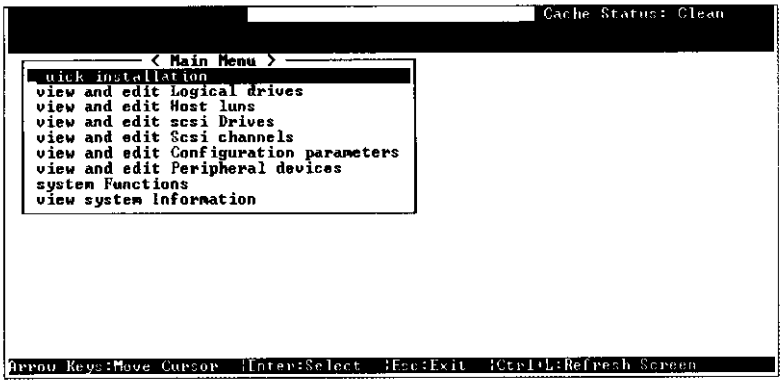
DefWid	Default SCSI Bus Width:	
	Wide	16-bit SCSI
	Narrow	8-bit SCSI
Term	Terminator Status:	
	On	Terminator is enabled.
	Off	Terminator is disabled.
	Diff	The channel is a Differential channel. The terminator can only be installed/removed physically.
CurSynClk	Current SCSI bus sync clock:	
	*??.?*M	The default setting of the SCSI channel is ??.? Mhz in Synchronous mode.
	Async	The default setting of the SCSI channel is Asynchronous mode.
	(empty)	The default SCSI bus sync clock has changed. Reset the controller for the changes to take effect.
CurWid	Current SCSI Bus Width:	
	Wide	16-bit SCSI
	Narrow	8-bit SCSI
	(empty)	The default SCSI bus width has changed. Reset the controller for the changes to take effect.

IMPORTANT:

- *Only a terminator with Single-Ended channel can be enabled/ disabled through the above setting.*
- *A terminator with Differential channel must be removed/installed physically.*

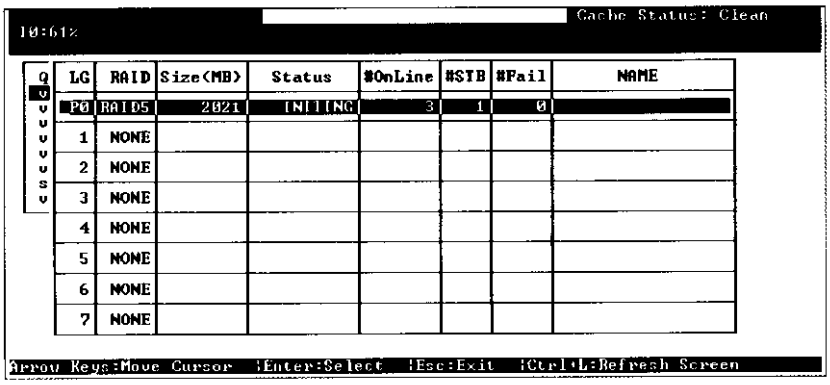
Chl	The SCSI Channel of the connected drive.	
ID	The SCSI ID of the drive.	
Size (MB)	Drive Capacity.	
Speed	**xxMB**	The maximum sync. transfer rate of this drive.
	Async	The drive is using asynchronous mode.
LG_DRV	***x***	The SCSI drive is a drive member of logical drive *x*. If the Status column showed "STAND-BY", the SCSI drive is a Local Spare Drive of logical drive *x*.
	Global	The SCSI drive is a Global Spare Drive.
Status	**INITING**	Processing initialization.
	ON-LINE	The drive is in good condition.
	REBUILD	Processing Rebuild.
	STAND-BY	Local Spare Drive or Global Spare Drive. The Local Spare Drive's LG_DRV column will show the logical drive number. The Global Spare Drive's LG_DRV column will show "Global".
	NEW DRV	The new drive has not been configured to any logical drive or as a spare drive.
	USED DRV	The used drive has not been configured to any logical drive or as a spare drive.
	BAD	Failed drive.
	ABSENT	Drive does not exist.
	MISSING	Drive once exist, but is missing now.
	SB-MISS	Spare drive missing.
Verdor and Product ID	The vendor and product model information of the drive.	

7.1.2 Main Menu



Use the arrow keys to move the cursor bar through the menu item, then press **ENTER** to choose a menu, or **ESC** to return to the previous menu/screen.

7.1.3 Logical Drive's Status



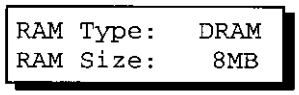
LG Logical Drive number.
P0: Logical Drive 0 of the Primary Controller

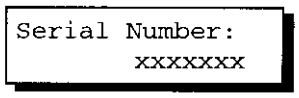
RAID RAID Level.

Size(MB) Capacity of the Logical Drive.

Press ▼ or ▲ to browse through the following:

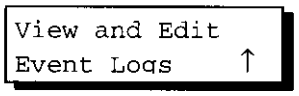
1. CPU type
2. RAM type (DRAM or EDO) and size
3. Firmware version
4. Bootrecord version
5. Serial number
6. Battery backup status
7. Controller name



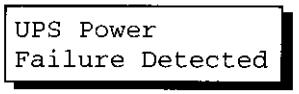


6.10 Viewing and Editing Event Logs

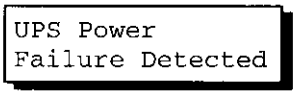
Press **ENT** for two seconds to enter the Main Menu. Press ▼ or ▲ to select "View System Information", then press **ENT**.



Press ▼ or ▲ to browse through the existing event log items.



To delete a specified item and all event prior to this event, press **ENT** for 2 seconds.



IMPORTANT:

- *The event log will be cleared after the RAID controller resets.*

6.7 Viewing and Editing Peripheral Devices

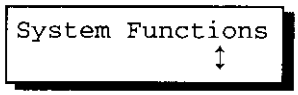
Refer to Chapter 8 for information on the Redundant Controller and Chapter 10 for information on the Fault-bus operation.

6.8 System Functions

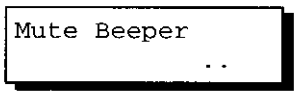
6.8.1 Mute Beeper

This function does not permanently turn off the beeper. It mutes the beeper once and will bring back the beep alarm on the next event.

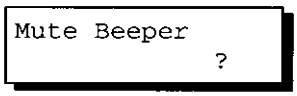
Press **ENT** for two seconds to enter the Main Menu. Press ▼ or ▲ to select "System Functions", then press **ENT**.



Press ▼ or ▲ to select "Mute Beeper", then press **ENT**.

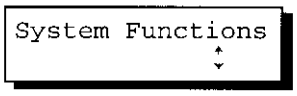


Press **ENT** for two seconds to mute the beeper.

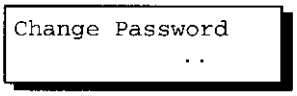


6.8.2 Changing the Password

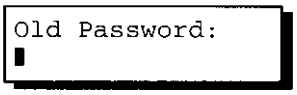
Press **ENT** for two seconds to enter the Main Menu. Press ▼ or ▲ to select "System Functions", then press **ENT**.



Press ▼ or ▲ to select "Change Password", then press **ENT**.

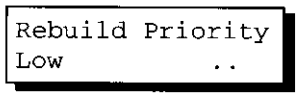


If there is an existing password, you must enter the current password first before you can enter a new password.

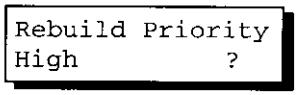


6.6.5.1 Rebuilding Priority

Press ▼ or ▲ to select "Rebuild Priority", then press **ENT**. The current setting will be displayed on the LCD.

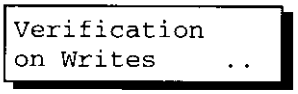


Press ▼ or ▲ to select "Low", "Normal", "Improved" or "High", then press **ENT** for two seconds.



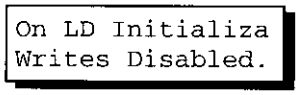
6.6.5.2 Verification on Writes

Press ▼ or ▲ to select "Verification on Writes", then press **ENT**.

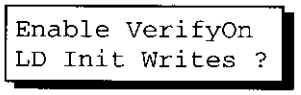


Verification on Logical Drive's Initialization Writes

Press ▼ or ▲ to select "On LD Initialize Writes", then press **ENT**. The current setting will be displayed on the LCD.



Press **ENT** for two seconds to confirm the setting.

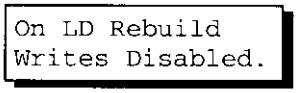


IMPORTANT:

- *When "Verification on Logical Drive Initialization Writes" is enabled, initialization of the logical drive will be slower than when it is disabled.*

Verification on Logical Drive Rebuild Writes

Press ▼ or ▲ to select "On LD Rebuild Writes", then press **ENT**. The current setting will be displayed on the LCD.



6.6.4.6 SAF-TE Enclosure Monitoring

Press ▼ or ▲ to choose "Periodic SAF-TE ChkTime -Disable," then press <ENT>.

```
Periodic SAF-TE
ChkTime -Disable
```

Press ▼ or ▲ to choose the desired SAF-TE Status Check interval.

```
Set SAF-TE Check
Time - 50 ms ?
```

6.6.4.7 Detection of Drive Hot Swap Followed by Auto Rebuild

From the Main Menu, use ▼ and ▲ to select "View and Edit Configuration Parameters."

```
View and Edit
Config Parms
```

Press ▼ or ▲ to choose "Drive-side SCSI Parameters," and then press <ENT>.

```
Drive-side SCSI
Parameters  ..
```

Use ▼ or ▲ to select "Period Drive Swap Auto Check - Disable," and then press <ENT>.

```
Period Drv Swap
AutoChk -Disable
```

Use ▼ or ▲ to choose the desired interval for "Auto Checking Drive Hot Swap," and then press <ENT> to confirm. If a member drive of a logical drive fails, the controller will start to check the failed drive to check if it has been replaced (i.e., the controller checks the same drive channel and ID at the assigned interval.) Once the drive has been replaced with another drive, the controller will automatically start to rebuild to that replacement drive.

```
Set Drv Swap Chk
Time - 5 sec
```

6.6.4.8 Idle Drive Failure Detection

From the Main Menu, use ▼ and ▲ to

```
View and Edit
Config Parms
```

IMPORTANT:

- *The corresponding settings/jumpers have to be configured on the hard drives.*
- *Every time you change this setting, you must reset the RAID controller for the changes to take effect.*
- *Refer to "1.6.1 SCSI Motor Spin-Up" for more information.*

6.6.4.2 SCSI Reset at Power-Up

Press ▼ or ▲ to select "Reset at Power-Up", then press **ENT**. The current setting will be displayed on the LCD.

```
Reset at Power
-Up Enabled   ..
```

Press **ENT** for two seconds to confirm the setting.

```
Disable Reset
at Power-Up   ?
```

IMPORTANT:

- *Every time you change this setting, you must reset the RAID controller for the changes to take effect.*
- *Refer to "1.6.2 SCSI Reset at Power-Up" for more information.*

6.6.4.3 Disk Access Delay Time

Press ▼ or ▲ to select "Init Disk Access Delay", then press **ENT**. The current setting will be displayed on the LCD.

```
Init Disk Access
Delay - 15secs..
```

Press ▼ or ▲ to select between 5 and 75 seconds or "No delay", then press **ENT** for two seconds.

```
Init Disk Access
delay -  5secs..
```

IMPORTANT:

- *Every time you change this setting, you must reset the RAID controller for the changes to take effect.*
- *Refer to "1.6.3 Disk Access Delay Time" for more information.*

Press **ENT** for two seconds to change the current setting.

```
Disable Write
-Back Cache   ?
```

IMPORTANT:

- *Every time you change the Cache Parameters, you must reset the RAID Controller for the changes to take effect.*

6.6.2.2 Optimization for Sequential / Optimization for Random

Press ▼ or ▲ to select "Caching Parameters", then press **ENT**.

```
Caching
Parameters    ..
```

Press ▼ or ▲ to select "Optimization I/O", then press **ENT**. The current setting (Random or Sequential) will be displayed on the LCD.

```
Optimization I/O
Random        ..
```

Press **ENT** for two seconds to change the current setting.

```
Optimization for
Sequential I/O ?
```

IMPORTANT:

- *Every time you change this setting, you must reset the RAID controller for the changes to take effect.*

6.6.3 Host-side SCSI Parameters

Press ▼ or ▲ to select "Host-side SCSI Parameters", then press **ENT**.

```
Host-side SCSI
Parameters    ..
```

6.6.3.1 Maximum Queued I/O Count

Press ▼ or ▲ to select "Maximum Queued I/O Count", then press **ENT**. The current setting will be displayed on the LCD.

```
Maximum Queued
I/O Count- 256..
```

Press **ENT** for two seconds to change the setting.

```
Disable
Parity Checking?
```

Disconnecting Support

Press ▼ or ▲ to select a SCSI target, then press **ENT**.

```
SCSI Target
CHL=1 ID=0    ..
```

Choose "Disconnect Support", then press **ENT**. The current clock setting will be displayed on the LCD.

```
Disconnect
Support Enabled
```

Press **ENT** for two seconds to change the setting.

```
Disable Support
Disconnect    ?
```

Maximum Tag Count

Press ▼ or ▲ to select a SCSI target, then press **ENT**.

```
SCSI Target
CHL=1 ID=0    ..
```

Choose "Max Tag Count", then press **ENT**. The current clock setting will be displayed on the LCD.

```
Max Tag Count:
Default( 32)  ..
```

Press ▼ or ▲ to change the setting, then press **ENT** for two seconds to change the setting.

```
Tag Cur=32
Set to:Default ?
```

IMPORTANT:

- *Disabling the Maximum Tag Count will disable the internal cache of this SCSI drive.*

6.5.8 Viewing and Editing a SCSI Target / Drive Channel

Press **ENT** for two seconds to enter the Main Menu. Press ▼ or ▲ to select "View and Edit SCSI Channels", then press **ENT**.

```
View and Edit
SCSI Channels  ↕
```

SCSI channel information will be displayed on the LCD. Press **ENT** on the drive channel you wish the SCSI ID changed.

```
CH1=Drive  PID=7
SID=NA SXF=20.0M
```

Press ▼ or ▲ to select "View and Edit SCSI Target", then press **ENT**.

```
View and Edit
SCSI Target   ..
```

Press ▼ or ▲ to select a SCSI target, then press **ENT**.

```
SCSI Target
CHL=1 ID=0    ..
```

Slot Number

To set the Slot number of the SCSI target, choose "Slot Assignment", then press **ENT**. The current slot number will be displayed on the LCD.

```
Slot Assignment
Default No Set..
```

Press ▼ or ▲ to change the slot number, then press **ENT** for two seconds.

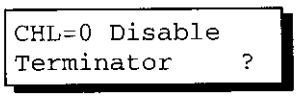
```
Slot Assignment
Set to    # 9  ?
```

Maximum Synchronous Transfer Clock

Press ▼ or ▲ to select a SCSI target, then press **ENT**.

```
SCSI Target
CHL=1 ID=0    ..
```

Press **ENT** again for two seconds to change the terminator mode to the alternative option.



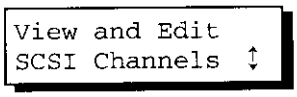
IMPORTANT:

- *Only a terminator with Single-Ended channel can be enabled/disabled through the setting shown above.*
- *A terminator with Differential channel must be removed/ installed physically from the board. The LCD will show this as "Diff".*

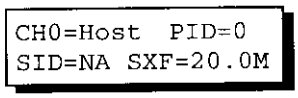
6.5.6 Setting the Transfer Speed

Transfer speed refers to the SCSI bus speed in Synchronous mode. Asynchronous mode is also available in this option setting. In Ultra/Ultra Wide SCSI, the maximum Synchronous speed is 20.8Mhz.

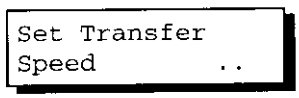
Press **ENT** for two seconds to enter the Main Menu. Press ▼ or ▲ to select "View and Edit SCSI Channels", then press **ENT**.



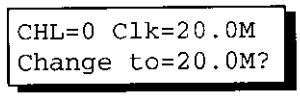
SCSI channel information will be displayed on the LCD. Press ▼ or ▲ to browse through the information of every SCSI channel. Press **ENT** on the channel you wish the transfer speed changed.



Press ▼ or ▲ to select "Set Transfer Speed", then press **ENT**.



The current speed of this SCSI channel will be displayed on the LCD. Press ▼ or ▲ to select the desired speed, then press **ENT** for two seconds.



IMPORTANT:

- *Every time you change a channel's SCSI ID, you must reset the RAID controller for the changes to take effect.*
- *The default SCSI ID of the Host channel is 0, the Drive channel is 7.*
- *If only one controller exist, you must set the Secondary Controller's SCSI ID to "NA". If a secondary controller exist, you need to set a SCSI ID. (The ESCORT Disk Array support dual controller)*
- *Multiple SCSI ID can be applied to the Host channel while the Drive channel, one SCSI ID or no SCSI ID.*
- *Multiple SCSI ID is supported in firmware version 2.11 or later. Firmware versions earlier than 2.11 only supports one SCSI ID.*
- *At least a controller's SCSI ID has to be present on the SCSI bus.*

6.5.4 Setting a SCSI Channel's Secondary ID / Drive Channel

Press **ENT** for two seconds to enter the Main Menu. Press ▼ or ▲ to select "View and Edit SCSI Channels", then press **ENT**.

```
View and Edit
SCSI Channels  ↕
```

SCSI channel information will be displayed on the LCD. Press **ENT** on the drive channel you wish the SCSI ID changed.

```
CH1=Drive  PID=7
SID=NA SXF=20.0M
```

Press ▼ or ▲ to select "Set SCSI Channel Secondary ID", then press **ENT**.

```
Set SCSI Channel
Secondary
```

The current Secondary SCSI ID will be displayed on the LCD. Press ▼ or ▲ to change the current SCSI ID, then press **ENT** for two seconds.

```
Set Sec. Ctlr
ID= 7 to ID: 8 ?
```

Adding a SCSI Channel's ID

Press ▼ or ▲ to choose "Add Channel SCSI ID", then press **ENT**.

```
Add Channel
SCSI ID      ..
```

Press ▼ or ▲ to choose "Primary Controller", then press **ENT** for two seconds.

```
Primary
Controller    ?
```

Press ▼ or ▲ to choose the SCSI ID you wish to add, then press **ENT** for two seconds.

```
Add CHL=0 ID=2
Primary Ctlr  ?
```

IMPORTANT:

- *Only one SCSI ID is allowed for the host channel. Multiple SCSI ID is not supported in firmware version 2.11. It will be supported in later versions.*
- *To change the SCSI ID of the host, delete the current ID before replacing a new one.*

Deleting a SCSI Channel's ID

Press ▼ or ▲ to choose "Add Channel SCSI ID", then press **ENT**.

```
Add Channel
SCSI ID      ..
```

Press ▼ or ▲ to choose "Primary Controller", then press **ENT** for two seconds.

```
Primary
Controller    ?
```

Press ▼ or ▲ to choose the SCSI ID you wish to add, then press **ENT** for two seconds.

```
Add CHL=0 ID=2
Primary Ctlr  ?
```

WARNING:

- *Do not switch the controller's and/or SCSI disk drive's power off during the SCSI Drive Low-level Format. If any power failure occurs during a drive low-level format, the formatting must be performed again when power resumes.*
- *All of the data stored in the SCSI disk drive will be destroyed during a low-level format.*
- *The SCSI disk drive on which a low-level disk format will be performed cannot be a spare drive (local or global) nor a member drive of a logical drive. The "SCSI Drive Low-level Format" option will not appear if the drive is not a "New Drive" or a "Used Drive".*

6.4.7.2 SCSI Drive Read/Write Test

If you would like to perform a drive/read write test to the drive, press ▼ or ▲ to select "Drive Read/Write Test"; and then press <ENT>.

```
Drive Read/Write
 Test          ..
```

IMPORTANT:

- *The option to run these utilities disappears after you have created a logical drive. This is because running these utilities will destroy data on a hard disk drive.*

6.5 Viewing and Editing SCSI Channels

6.5.1 Viewing and Redefining a Channel Mode

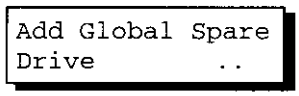
Press **ENT** for two seconds to enter the Main Menu. Press ▼ or ▲ to select "View and Edit SCSI Channels", then press **ENT**.

```
View and Edit
SCSI Channels  ↕
```

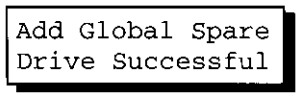
SCSI Channel information will be displayed on the LCD. Press ▼ or ▲ to browse through the information of every SCSI channels. Press **ENT** on the channel you wish the channel mode changed.

```
CH0=Host  PID=0
SID=NA SXF=20.0M
```

Press ▼ or ▲ to select "Add Global Spare Drive", then press **ENT**.

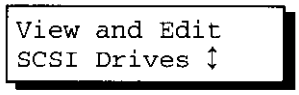


Press **ENT** again for two seconds to add the spare drive. The message "Add Global Spare Drive Successful" will be displayed on the LCD.

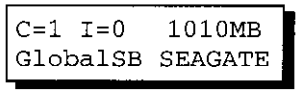


6.4.5 Identifying a Drive

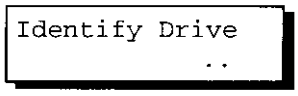
Press **ENT** for two seconds to enter the Main Menu. Press ▼ or ▲ to select "View and Edit SCSI Drives", then press **ENT**.



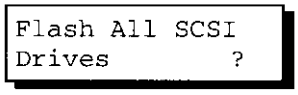
SCSI drive information will be displayed on the LCD. Press ▼ or ▲ to select a SCSI drive, then press **ENT.**



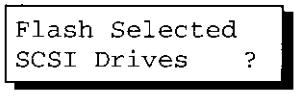
Press ▼ or ▲ to select "Identify Drive", then press **ENT** to continue.



Press ▼ or ▲ to select "Flash All SCSI Drives". Now press **ENT** for two seconds to flash the read/write LEDs of all the connected drives.



Or, press ▼ or ▲ to select "Flash Selected SCSI Drives", then press **ENT** for two seconds to flash the read/write LED of the selected drive. The read/write LED will light for one minute.



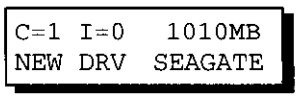
6.4.6 Deleting Spare Drive (Global / Local Spare Drive)

Press **ENT** for two seconds to enter the Main Menu. Press ▼ or ▲ to select "View

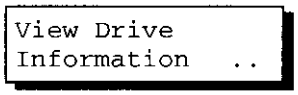
6.4.2 Viewing Drive Information

Press **ENT** for two seconds to enter the Main Menu. Press ▼ or ▲ to select "View and Edit SCSI Drives", then press **ENT**.

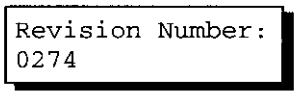
SCSI drive information will be displayed on the LCD. Press ▼ or ▲ to select a SCSI drive, then press **ENT**.



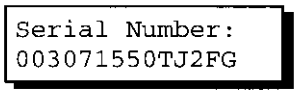
Press ▼ or ▲ to select "View Drive Information", then press **ENT**.



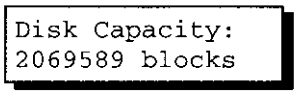
The Revision Number of the selected SCSI drive will be shown on the LCD. Press ▼ to view the next item.



The Serial Number of the drive will be shown on the LCD. Press ▼ to view the next item.



Disk Capacity will be shown (in blocks) on the LCD. Each block refers to 512K Bytes.



IMPORTANT:

- *Drives of the same brand/model/capacity might not have the same block number.*
- *The basic read/write unit of a hard drive is Block. If the drive members in one logical drive have different block numbers (capacity), the minimum block number among all the member drives will be chosen as the maximum block number for the RAID configuration.*
- *You may assign a Local/Global Spare Drive to a logical drive whose member drive's block number is smaller or equal to the Local/Global Spare Drive's block number but you may not do*

6.3.3 Pass-through SCSI Commands

Pass-through SCSI commands facilitate functions like downloading firmware for drives or devices (not firmware), setting SCSI drive mode parameters, or monitoring a SAF-TE device directly from the host. To perform such a function, the SCSI device must be mapped to a host SCSI ID.

From the Main Menu, press ▼ or ▲ to select "View and Edit Host LUNs."

```
View and Edit
Host Luns
```

If you have primary and secondary controllers, use the ▼ or ▲ to select the controller for the device that you would like to map.

```
Map Channel=0
ID=0 Pri Ctlr ?
```

Press ▼ or ▲ to choose to map a SCSI ID to "Physical Drive" or other device and then press <ENT>.

```
Map to
Physical Drive ?
```

WARNING:

- *Pass-through SCSI Commands are only intended to perform maintenance functions for a drive or device on the drive side. Do not perform any destructive commands to a disk drive (i.e., any commands that write data to a drive media). If a disk drive is a spare drive or a member of a logical drive, such a destructive command may cause a data inconsistency.*
- *When a drive/device is mapped to a host SCSI ID so that Pass-through SCSI Commands can be used, the data on that drive/device will not be protected by the controller. Users who employ Pass-through SCSI Commands to perform any write commands to drive media do so at their own risk.*

6.4 Viewing and Editing SCSI Drives

6.4.1 Scanning New SCSI Drive

Press **ENT** for two seconds to enter the Main Menu. Press ▼ or ▲ to select "View

```
View and Edit
SCSI Drives ↕
```

you have more than one logical drive, use the ▼ or ▲ to select the logical drive you would like to check the parity for; and then press <ENT>.

Press ▼ or ▲ to select "Check Parity" and then press <ENT>.

```
Check Parity
            ..
```

IMPORTANT:

If a Logical Drive Parity Check is stopped by a drive failure, the parity check cannot restart until logical drive rebuild has been completed.

6.3 Viewing and Editing Host LUNs

6.3.1 Mapping a Logical Drive to a Host LUN

Press **ENT** for two seconds to enter the Main Menu. Press ▼ or ▲ to select "View and Edit Host Luns", then press **ENT**.

```
View and Edit
Host Luns      ↕
```

Press ▼ or ▲ to select a host channel, then press **ENT** for two seconds.

```
Map Channel=0  ?
```

Press ▼ or ▲ to select a SCSI ID, then press **ENT** for two seconds.

```
Map Channel=0
ID=0 Pri. Ctrl?
```

Press ▼ or ▲ to select a LUN number, then press **ENT**.

```
Ch=0 ID=0 LUN=0
Not Mapping
```

Press **ENT** for two seconds to confirm the selected LUN mapping.

```
Map Host LUN   ?
```

The rebuilding progress will be displayed (in percentage) on the LCD.

```
Rebuilding   25%
Please Wait!
```

When rebuilding has already started or the logical drive is being rebuilt automatically by a Local Spare Drive or Global Spare Drive, choose "Rebuild Progress" to view the rebuilding progress on the LCD.

```
LG0 RAID5 DRV=3
  2012MB RB SB=0
```

```
Rebuild Progress
                ..
```

IMPORTANT:

- *The Rebuild function will appear only if a logical drive (with RAID level 1, 3 or 5) has a failed member drive.*
- *Refer to section "2.2.3 Automatic Rebuild and Manual Rebuild" of this manual for more information on the rebuilding process.*

6.2.8 Dynamic Logical Drive Expansion

From the Main Menu, press ▼ or ▲ to select "View and Edit Logical Drives."

```
View and Edit
Logical Drives
```

The logical drive will be displayed. If there is more than one logical drive, use the ▼ or ▲ to select the drive which is to be expanded; and then press <ENT>.

```
LG0 RAID5 DRV=3
  4095MB GD SB=0
```

Before the logical drive can be expanded, a SCSI hard disk drive must be added and scanned in (see section 6.4.1 for details on scanning in a drive.)

```
C=1 I=0   2291MB
NEW DRV  FUJITSU
```

Use ▼ or ▲ to "Add SCSI Drives," and then press <ENT>.

```
Add SCSI Drives
                ..
```

The current partition's information will be displayed on the LCD. Press ▼ or ▲ to browse through the existing partition in the logical drive. Select a partition by pressing **ENT** for two seconds.

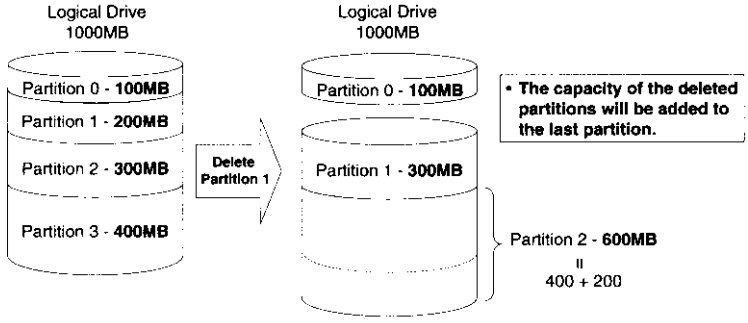
```
LG=0 Partition=1
  200MB      ?
```

Use ▼ or ▲ to change the number of the flashing digit to "0", then press **ENT** to move to the next digit. After changing all the digits, press **ENT** for two seconds.

```
LG=0 Partition=1
  300MB      ?
```

The rest of the drive space will automatically be added to another partition.

```
LG=0 Partition=2
  600MB      ?
```

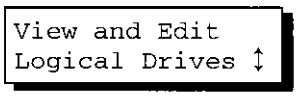


IMPORTANT:

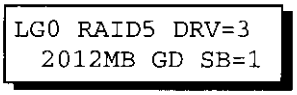
- *The capacity of the deleted partition will be added to the last partition.*
- *As long as there is a partition change, all host LUN mappings will be removed. Therefore every time a partition has been changed, it is necessary to re-configure all host LUN mappings.*

6.2.2 Viewing Logical Drives and Drive Members

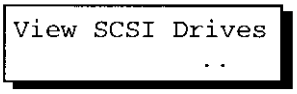
Press **ENT** for two seconds to enter the Main Menu. Press ▼ or ▲ to select "View and Edit Logical Drives..", then press **ENT**.



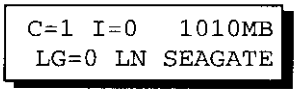
Press ▼ or ▲ to select the logical drive, then press **ENT**.



Press ▼ or ▲ to select "View SCSI Drives.. ", then press **ENT** .

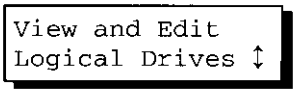


Press ▼ or ▲ to scroll through the drives.



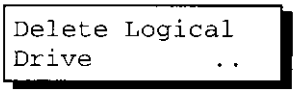
6.2.3 Deleting a Logical Drive

Press **ENT** for two seconds to enter the Main Menu. Press ▼ or ▲ to select "View and Edit Logical Drives", then press **ENT**.

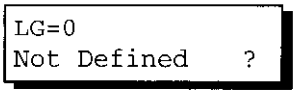


Press ▼ or ▲ to select a logical drive, then press **ENT**.

Press ▼ or ▲ to select "Delete Logical Drive", then press **ENT** .

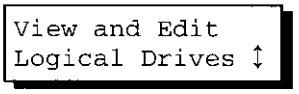


Press **ENT** for two seconds to delete. The selected logical drive has now been deleted .



6.2.4 Partitioning a Logical Drive

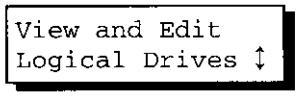
Press **ENT** for two seconds to enter the Main Menu. Press ▼ or ▲ to select "View and Edit Logical Drives..", then press **ENT**.



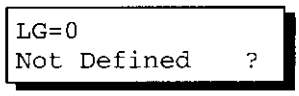
6.2 Viewing and Editing Logical Drives

6.2.1 Creating a Logical Drive

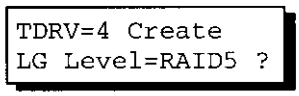
Press **ENT** for two seconds to enter the Main Menu. Press ▼ or ▲ to select "View and Edit Logical Drives", then press **ENT**.



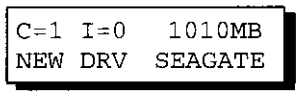
Press ▼ or ▲ to select a logical drive, then press **ENT** for two seconds. "LG" refers to Logical Drive.



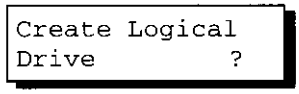
Press ▼ or ▲ to choose the desired RAID level, then press **ENT** for two seconds. "TDRV" on the LCD refers to the drives that has not yet been configured.



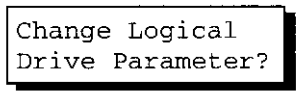
Press **ENT**, then use ▼ or ▲ to browse through the drives. Press **ENT** again to select/deselect the drives. "C=1 I=0" refers to "Channel 1, SCSI ID 0".

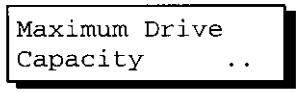


After all the desired drives have been selected, press **ENT** for two seconds to continue. Press ▼ or ▲ to choose "Create Logical Drive", then press **ENT** for two seconds to start initializing the logical drive. The maximum capacity of the drives will be used in this logical drive.



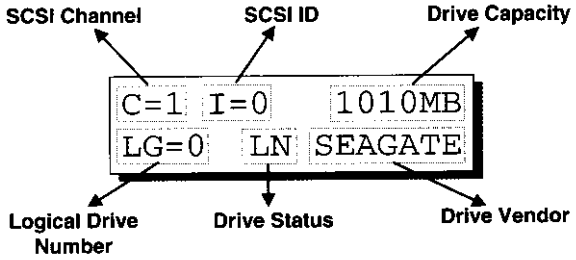
You may also choose "Change Logical Drive Parameter", then press **ENT** to set other parameters before initializing the logical drive.
Choose "Maximum Drive Capacity", then press **ENT**.





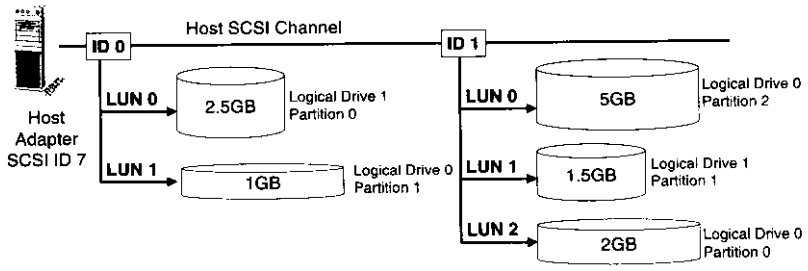
xxxxMB	The capacity of this logical drive.
SB=x	Standby drives available for this logical drive. All the spare drives available for this logical drive will be counted in this field, both Global Spare Drive and Local Spare Drive.
xxxxMB INITING	The logical drive is now initializing.
xxxxMB INVALID	The logical drive was created with "Optimization for Sequential I/O", but the current setting is "Optimization for Random I/O". or The logical drive was created with "Optimization for Random I/O", but the current setting is "Optimization for Sequential I/O".
xxxxMB GD SB=x	The logical drive is in good condition.
xxxxMB FL SB=x	One drive failed in this logical drive.
xxxxMB RB SB=x	Logical Drive is rebuilding.
xxxxMB DRVMISS	One of the drives cannot be detected.
INCOMPLETE ARRAY	Two or more drives failed in this logical drive.

6.1.3 SCSI Drive Status



Drive Status:

LG=x IN	Initializing
LG=x LN	On-line

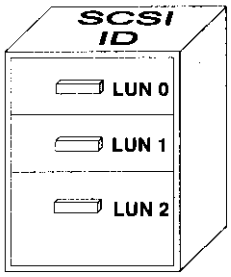


Map each partition to a host LUN. The LUN will then virtually appear to the host SCSI adapter as an individual hard drive.

5.2 How the RAID controller Works?

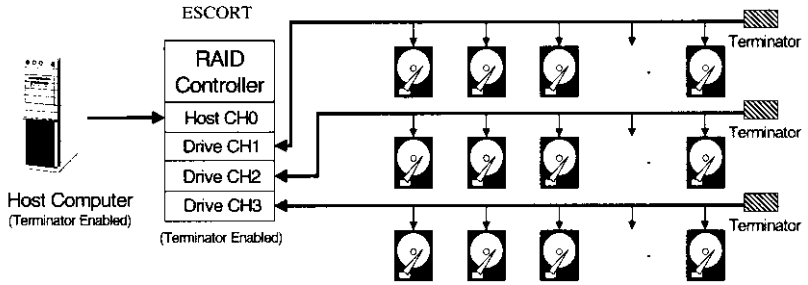
5.2.1 SCSI Channel, SCSI ID and LUN

A SCSI channel (SCSI bus) can connect up to 15 devices (the RAID controller itself excluded) when the Wide function is enabled (16-bit SCSI). It can connect up to 7 devices (the RAID controller itself excluded) when the Wide function is disabled (8-bit SCSI). Each device has one unique SCSI ID. Two devices owning the same SCSI ID is not allowed.



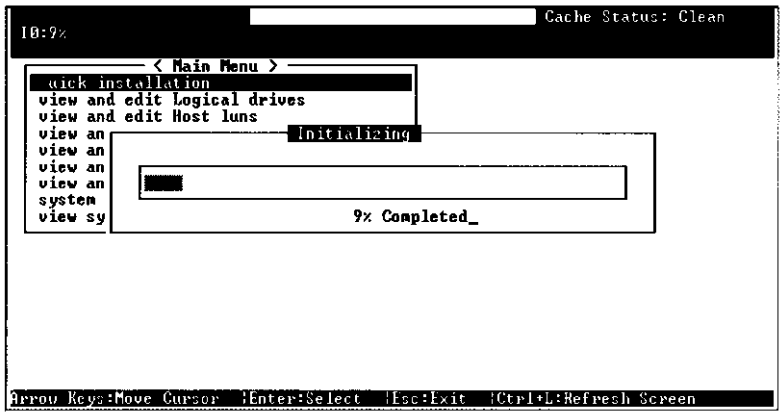
The figure on the left is a very good example. If you are to file document into a cabinet, you must put the document into one of the drawer. From a SCSI's point of view, a SCSI ID is like a cabinet, and the drawers are the LUNs. Each SCSI ID can have up to 8 LUNs (Logical Unit). Data can be stored into one of the LUNs of the SCSI ID. Most SCSI host adapters treat a LUN like another SCSI device.

5.2.2 Understanding Step by Step



Physical connection should look similar to the figure shown on the previous page. The channel connected to the host adapter is the host channel, and the channels connected to the drives are the drive channels.

The RAID controller will start initialization and automatically map the logical drive to LUN 0 of the first host channel.



The RAID levels available are as follows:

1 Drive	=	NRAID (Disk Spanning)
2 Drives	=	RAID0 or RAID1
3 Drives	=	RAID0
		RAID1 + Spare
		RAID3
		RAID5
>3 Drives	=	RAID0
(Odd)		RAID1 (0+1)+ Spare
		RAID3
		RAID3 + Spare
		RAID5
		RAID5 + Spare
>3 Drives	=	RAID0
(Even)		RAID1 (0 + 1)
		RAID3
		RAID3 + Spare
		RAID5
		RAID5 + Spare

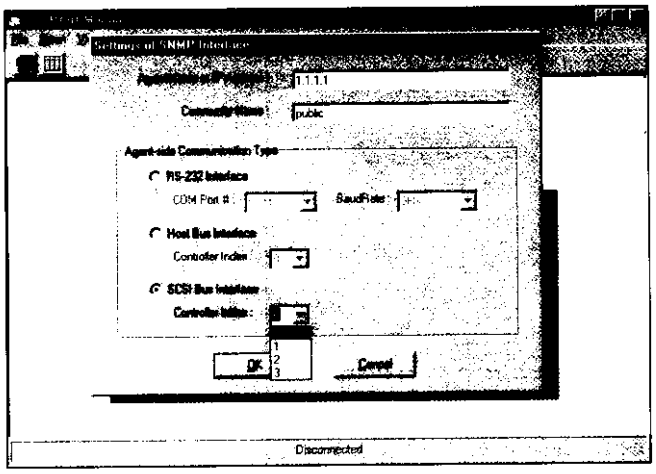
The LCD will display the logical drive's information after completing initialization.

```
LG=0 RAID5 DRV=3
 4123MB GD SB=1
```

4.2 RS-232 Terminal Interface

The keys used when operating via the terminal are as follows:

← → ↑ ↓	To select options.
[Enter]	To go to a submenu or to execute a selected option.
[Esc]	To escape and go back to the previous menu.
[Ctrl] [L]	The RAID controller will refresh the screen information.

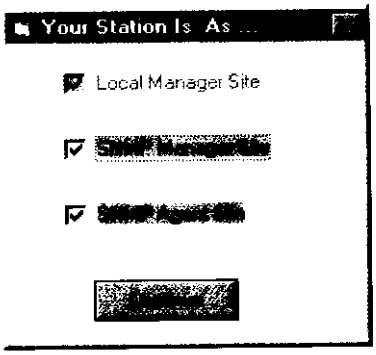


3. After the connection is established, all of the operations in the GUI RAID Manager are the same as before (please refer to the *GUI RAID Manager User Guide* for complete details on its operation.)

2. Install the SNMP Agents and GUI RAID Manager. The GUI RAID Manager can install the In-band SCSI SNMP Agent during installation. During GUI RAID Manager installation, be sure to select both the "SNMP Manager Site" and "SNMP Agent Site" options. Complete the installation by following the on-screen instructions.

Example Settings for Manager Site

1. Install the SNMP manager and GUI RAID Manager. During the installation of GUI RAID Manager, click to select the option "SNMP Manager Site." Complete the installation by following the on-screen instructions.



IMPORTANT:
This following applies to Windows NT 4.0 with Service Pack 3: if the "SNMP Service" is installed after the Service Pack 3 has been installed, Service Pack 3 must be re-installed in order for the SNMP service to work properly.

Checklist for Manager Site

1. The system is running Windows NT (Workstation or Server) and has SNMP Service installed.
2. The GUI RAID Manager was installed with the "SNMP Manager Site" option selected.
3. The GUI RAID Manager is running.

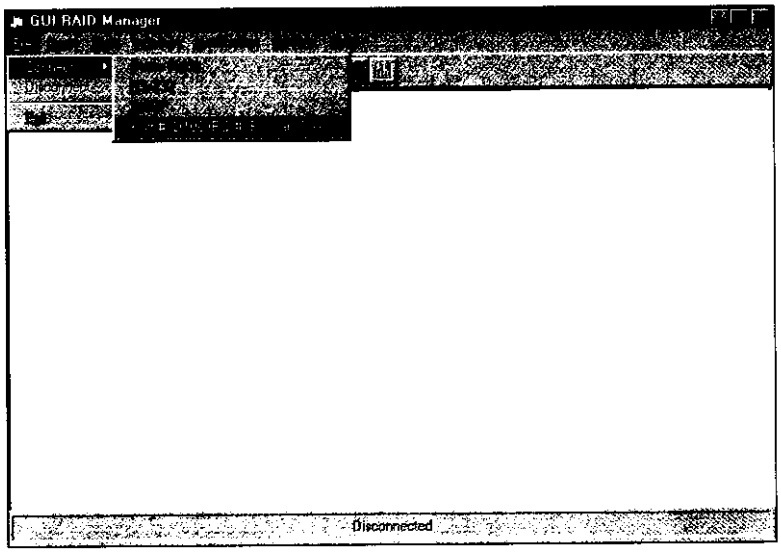
IMPORTANT:
This following applies to Windows NT 4.0 with Service Pack 3: if the "SNMP Service" is installed after the Service Pack 3 has been installed, Service Pack 3 must be re-installed in order for the SNMP service to work properly.

remotely accessing the host computer, further adjustments must be made (see section 3.3.2, *Remote Connection — SNMP Required*).

3.3 Using In-band SCSI in GUI RAID Manager

3.3.1 Local Connection — SNMP Not Required

If you are using the GUI RAID Manager on the host computer that is using In-band SCSI -- ie., 'local access' -- SNMP service is not required. You may now connect by going to FILE>CONNECT and selecting the port address.



3.3.2 Remote Connection — SNMP Required

SNMP Service is required to administrate a RAID controller installed in a remote computer. This passage describes how to establish a connection from the GUI RAID Manager to a RAID controller that is connected to a remote host via In-band SCSI. For information regarding other operations and of the GUI RAID Manager, please refer to the *GUI RAID Manager User Guide.*