AcerAltos 3102RS

Ultra-SCSI to Ultra-SCSI RAID Controller

User's Guide

Copyright

Disclaimer

This company makes no representations or warranties, either expressed or implied, with respect to the contents hereof and specifically disclaims any warranties, merchantability or fitness for any particular purpose. Any software described in this manual is sold or licensed "as is". Should the programs prove defective following their purchase, the buyer (and not this company, its distributor, or its dealer) assumes the entire cost of all necessary servicing, repair, and any incidental or consequential damages resulting from any defect in the software. Further, this company reserves the right to revise this publication and to make changes from time to time in the contents hereof without obligation to notify any person of such revision or changes.

FCC Class B Radio Frequency Interference Statement

Note:

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of 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:

1. Reorient or relocate the receiving antenna.

2. Increase the separation between the equipment and receiver.

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

4. Consult the dealer or an experienced radio/television technician for help.

Notice 1:

The changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Notice 2:

Shielded interface cables, if any, must be used in order to comply with the emission limits.

Table of Contents

Chapter 1 Introduction

The AA-3102RS is an Ultra-SCSI to Ultra-SCSI RAID controller specifically designed to provide RAID 0, 1, 3 or 5 capability to any host system equipped with a SCSI interface. It is totally independent of the host system's operating system. All RAID functions are performed by a 486 CPU coupled with high-speed DRAMs and firmware in the Flash Memory. In effect, it endows the host system with a high speed and fault-tolerant disk storage operation using the RAID technology. It is an ideal solution for weaving several hard disks into one contiguous volume.

The controller has comprehensive drive failure management that allows automatic reassignment of reserved blocks when a bad sector is encountered during a write. Hot-swapping is supported through automatic disconnection of a failed drive and detection of a reserved drive followed with background rebuilding of data. The controller also supports spare drive operation. What's remarkable is all these failure recovery procedures are transparent to the host system.

The controller has been designed with ease of integration and maintenance in mind. All major features are described in the next chapter. The AA-3102RS already includes all the major operational requirements of a RAID subsystem. The overall features of a fully-built RAID subsystem will, however, depend on the actual components used and the creativity of the integrator.

Chapter 2 Features

The AA-3102RS has the following features:

- 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 systems without additional software drivers
- 5.25" drive profile allows easy integration into external subsystem enclosures or directly into the host system's drive bay
- Up to five drive channels (optional 3-channel upgrade) for a total of 75 connected drives
- Supports up to 15 SCSI IDs per channel
- Three optional upgrade daughter boards:
  - AA-9073UWS: Ultra Wide, single-ended, 3 SCSI channels

  - AA-9072UWD: Ultra Wide, differential, 2 SCSI channels
  - AA-9073U2: Ultra2 Wide, 3 SCSI channels
- Up to 8 logical drives, each with independent RAID modes
- Up to 8 partitions per logical drive
- Logical drive can be assigned a name for ease of identification
- Number of drives for each logical drive has no limitation
- Dynamic mapping of LUNs to logical drives. Two or more LUNs can be mapped to the same logical drive for redundant host operation
- Concurrent/Background logical drive initialization
- Performance optimization for Sequential or Random I/O
- Allows multiple drive failure and concurrent multiple drive rebuild of a RAID (0+1) logical drive
- Configuration of individual SCSI target parameters
- Controller can be assigned a name for ease of identification
- Prior to first disk access, it allows adjustment of delay time during controller initialization to enhance compatibility with slow-initial drives
- All channels are Ultra-Wide SCSI-2 (downward compatible to SCSI-1) and can be configured as either a host or drive interface
- Two or more SCSI channels can be simultaneously set as host interface for redundant host system operation
- Compatible and will automatically match any SCSI hard disks with SCSI-1, SCSI-2 or (Ultra)-Wide-SCSI (1 or 2) specification
- Full Ultra-Wide-SCSI-2 implementation including Tagged Command Queuing and Multi-Threaded I/O
- Uses 486 CPU with all executable firmware downloaded into high-speed DRAM
- EDO DRAM supported for enhanced performance

- Up to 128 Mbytes of intelligent Read-Ahead/Write-Back cache with optional battery backup
- Optional battery backup module to protect data in Write-Back cache when a power failure occurs:
  - AA-9010: battery backup module
  - AA-9070: battery backup daughter board that connects to AA-9010
- Firmware resides in easy-to-update Flash Memory
- Front panel LCD and push buttons for configuration and message display
- Modem supported on either of the COM port
- Supports TELNET with PPP protocol for remote administration
- Acer RAID Manager and RS-232 terminal interface for RAID management
- SAF-TE support
- Supports Fault-bus for enclosure management

AA-3102RS, mentioned throughout this manual refers to both the AA-3102RSA and AA-3102RSB controllers. The only difference between them is: AA-3102RSA is a half-height form factor with 2-line LCD display while AA-3102RSB is a full-height form factor with 4-line LCD display.

Chapter 3 Functional Description

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 AA-3102RS RAID controller provides complete RAID functionality and enhanced drive failure management.

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.

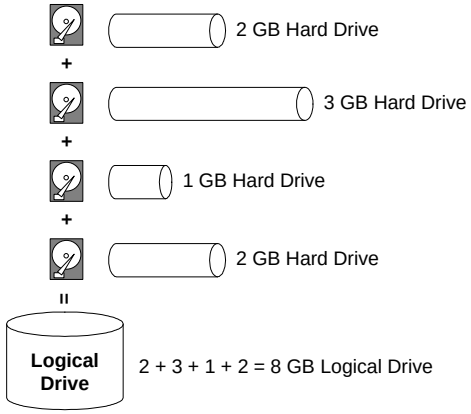
What are the RAID levels?

RAID Level	Description	Minimum Drives	Data Availability	Performance Sequential	Performance Random
NRAID	Non-RAID	1		Drive	Drive
RAID 0	Disk Striping	N	==RAID	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 Level	Description	Minimum Drives	Data Availability	Performance Sequential	Performance Random
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

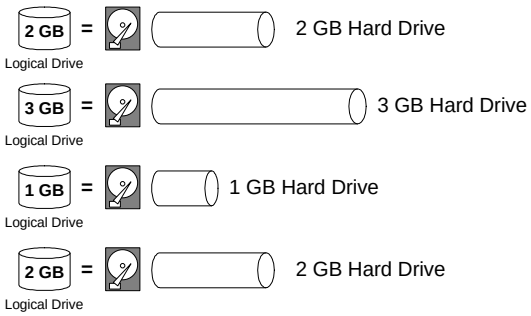
NRAID	
Minimum Disks required	1
Capacity	N
Redundancy	No



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.

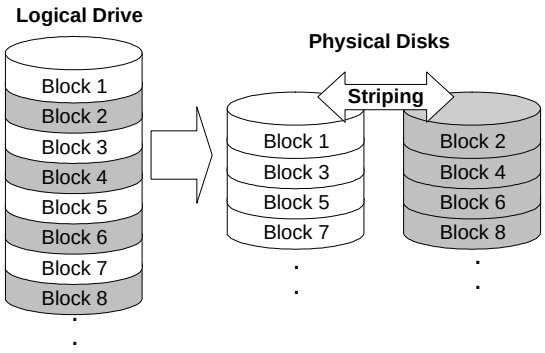
JBOD Single Drive Control

JBOD	
Minimum Disks required	1
Capacity	1
Redundancy	No



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

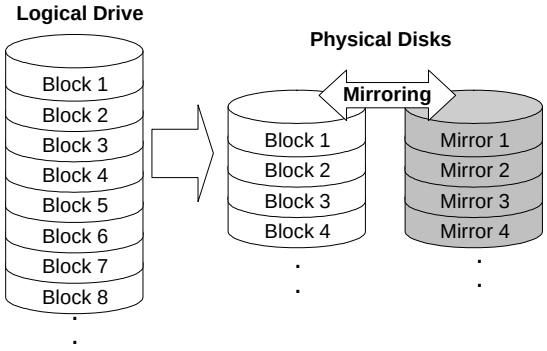
RAID 0 Disk Stripping



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.

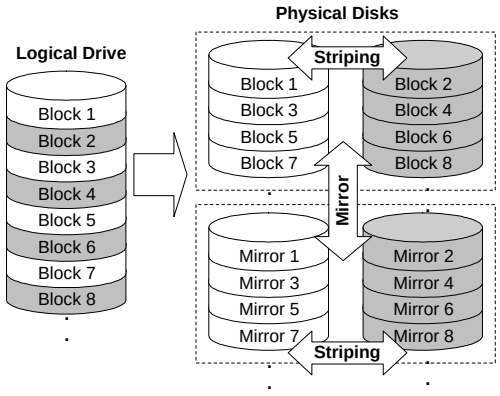
RAID 1 Disk Mirroring



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 more than two hard drives, RAID (0+1) will be performed automatically.

RAID (0+1) Disk Striping with Mirroring

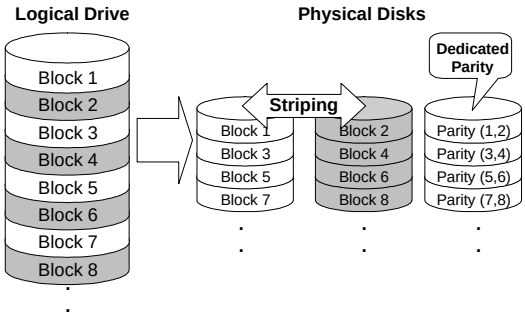


RAID (0+1)	
Minimum Disks required	4
Capacity	N/2
Redundancy	Yes

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 more than two hard drives assigned to perform RAID 1, RAID (0+1) will be performed automatically.

"RAID (0+1)" will not appear in the list of RAID levels supported by the controller. If you wish to perform RAID 1, the 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.

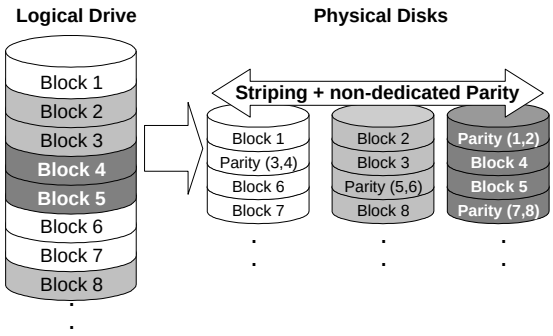
RAID 3 Disk Striping with Dedicated Parity Disk



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 controller can recover/regenerate the lost data of the failed drive from the dedicated parity drive.

RAID 5 Striping with Interspersed Parity

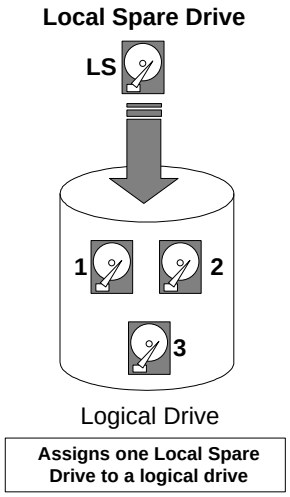


RAID 5	
Minimum Disks required	3
Capacity	N-1
Redundancy	Yes

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 controller can recover/regenerate the lost data of the failed drive from the other surviving drives.

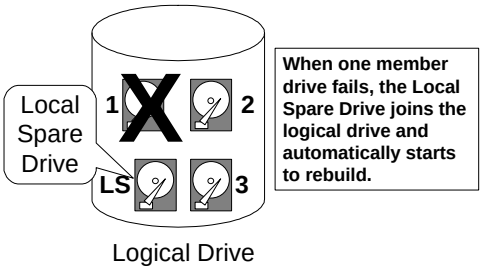
Drive Failure Management

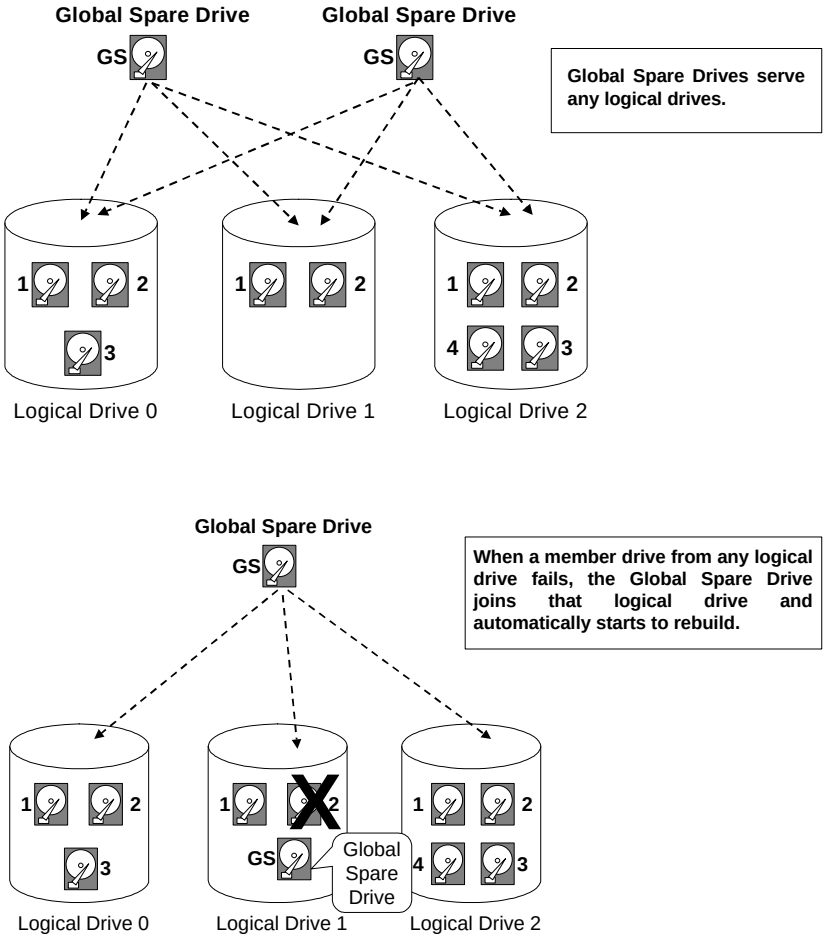
Global and Local Spare Drive



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.

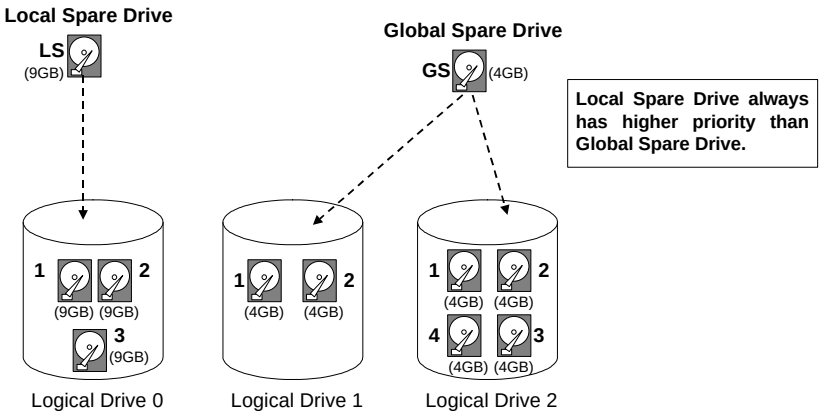
Global Spare Drive does not only serve one specified logical drive. When a member drive from any of the logical drive fails, the Global Spare Drive will join that logical drive and automatically starts to rebuild.





The AA-3102RS RAID controller provides both Local Spare Drive and Global Spare Drive functions. On certain occasions, applying these two 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.



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.

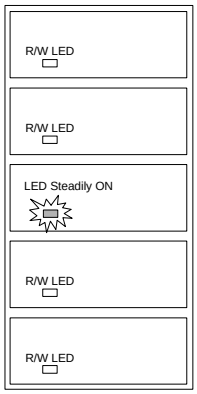
When trying to remove a failed drive and you mistakenly removed the wrong drive, you will no longer be able to read/write the logical drive because the two drives may have already failed.

To prevent this from happening, the 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.

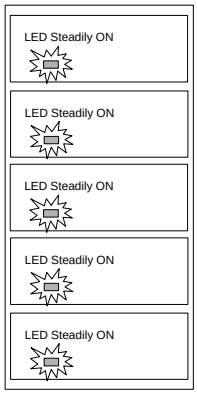
This applies to firmware versions 2.11 and above.



Flash All SCSI Drives

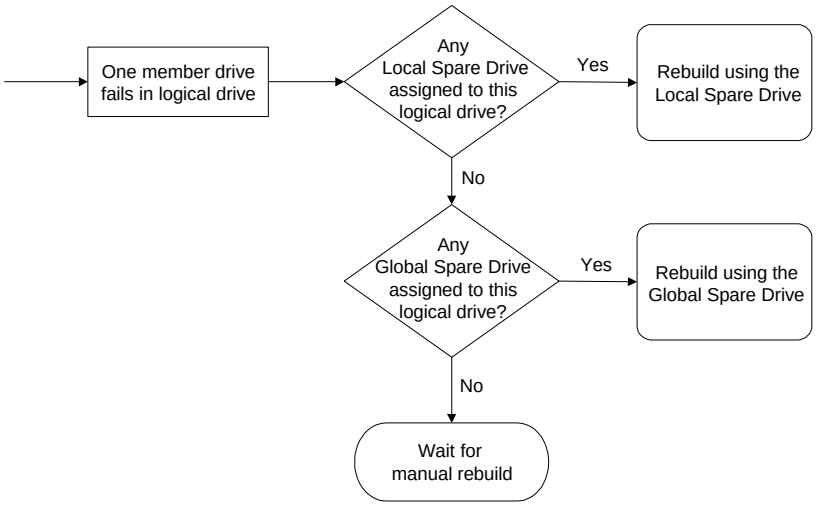
The Read/Write LED of all connected drives will light for about one minute. If the LED of the defective drive did not light on the "Flash Selected SCSI Drive" function, use "Flash All SCSI Drives". The "Flash All SCSI Drives" function will light LEDs of all the drives except the defective one.

This applies to firmware versions 2.11 and above.



Automatic Rebuild and Manual Rebuild

Automatic Rebuild



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

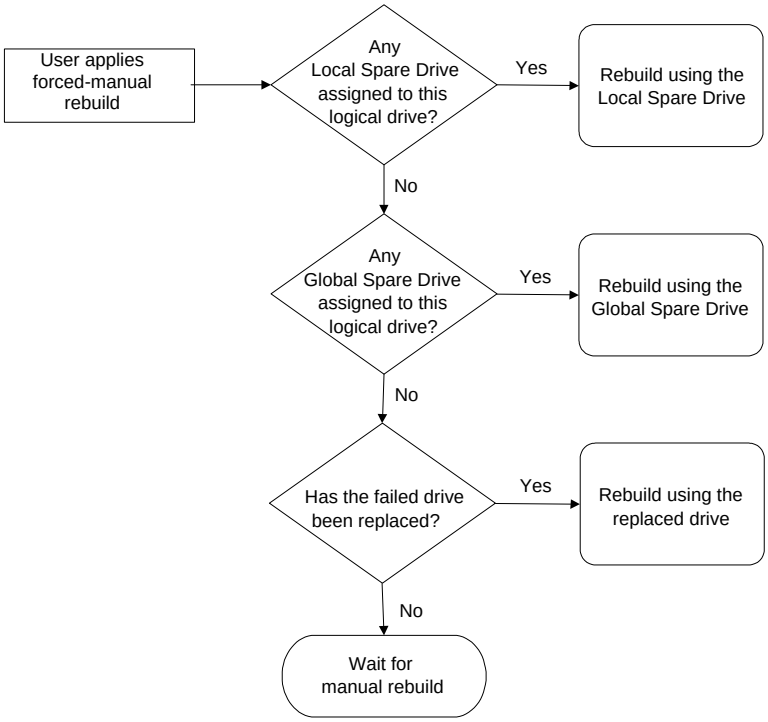
If there is no Local Spare Drive available, the controller will search for a Global Spare Drive. If there is a Global Spare Drive, it will automatically rebuild the logical drive.

If neither Local Spare Drive nor Global Spare Drive is available, the controller will not try to rebuild unless the user applies a forced-manual rebuild.

Manual Rebuild

When a user applies forced-manual rebuild, the controller will first check whether there is any 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 controller 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 controller 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 starts to rebuild using the replaced drive. If there is no available drive for rebuilding, the controller will not try to rebuild again until the user applies another forced-manual rebuild.

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).

Disk Array Parameters

Rebuild Priority

Rebuilding time will depend on the capacity of the logical drive. The AA-3102RS RAID controller 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 controller's minimum resources to rebuild. Choosing "Normal" or "Improved" will speedup the rebuilding process and choosing "High" will use the controller's maximum resources to complete the rebuilding process at the shortest time.

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

Verify-after-Write

The controller 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.

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

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

Cache Parameters

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 AA-3102RS RAID controller 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 controller 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 controller to make available the logical drive data again.

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.

Drive-Side SCSI Parameters

SCSI Motor Spin-up

When the power supply is unable to provide sufficient current for all the hard drives and controllers 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 controller, and power them on again. All the hard drives will not spin-up at this time. The controller will then spin-up the hard drives one by one at four seconds interval.

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 controller to access when the system powers up. Increase the disk access delay time so that the controller will wait a longer time for the drive to be ready.

SCSI Reset at Power Up

By default, when the controller 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.

When connecting dual host computers to the same SCSI bus, the SCSI bus reset will interrupt all the read/write requests that are being performed. This may cause some operating systems or host computers to act abnormally. Disable the "SCSI Reset at Power-up" to avoid this situation.

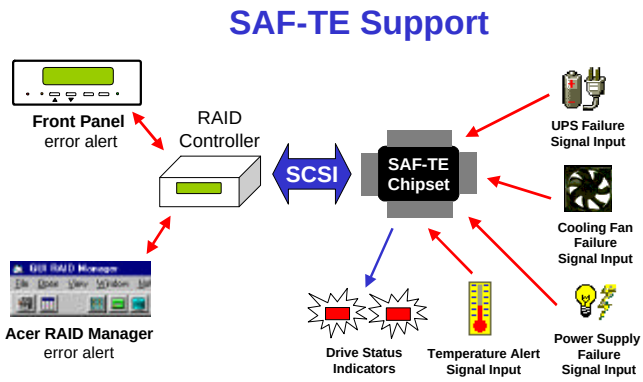
Disk Access Delay Time

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

SAF-TE Enclosure Management

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's. 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 chipset connects to the drive channel of the controller together with the other SCSI drives.

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 Acer RAID Manager programs.

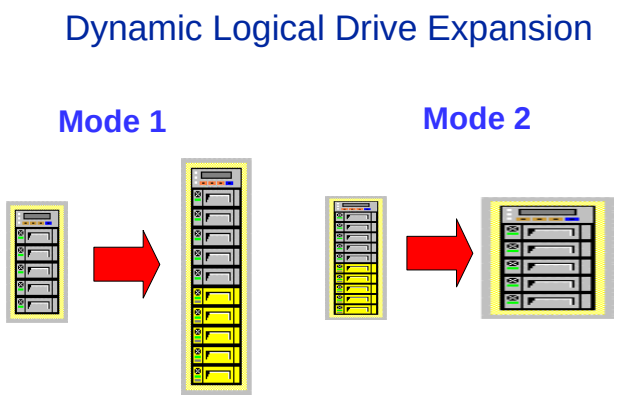
Dynamic Logical Drive Expansion

What Is It and How Does It Work?

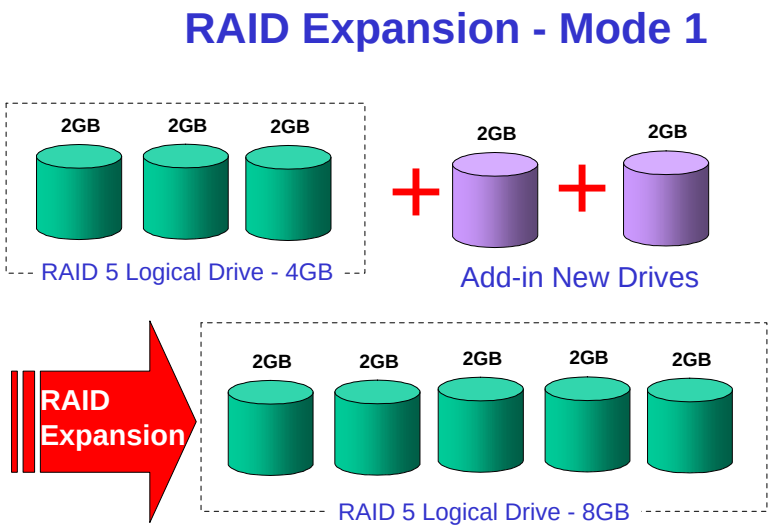
Before Dynamic Logical Drive Expansion, increasing the capacity of a RAID system using traditional methods meant backing up, re-creating and then restoring. Dynamic Logical Drive Expansion (a new feature of firmware version 2.11) allows users to add new SCSI hard disk drives and expand a RAID 0, 3 or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

Two Modes of Dynamic Logical Drive Expansion

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



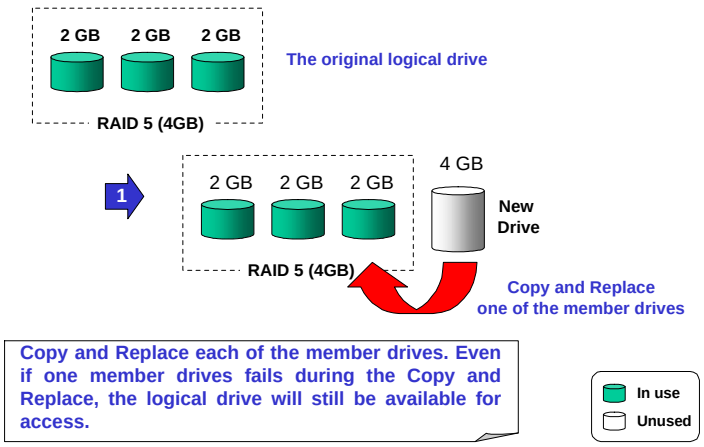
Mode 1 Expansion involves adding more SCSI hard disk drives to a logical drive, which may require that the user obtain an enclosure with more drive bays. The data will be re-striped onto the original and newly added disks.



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.

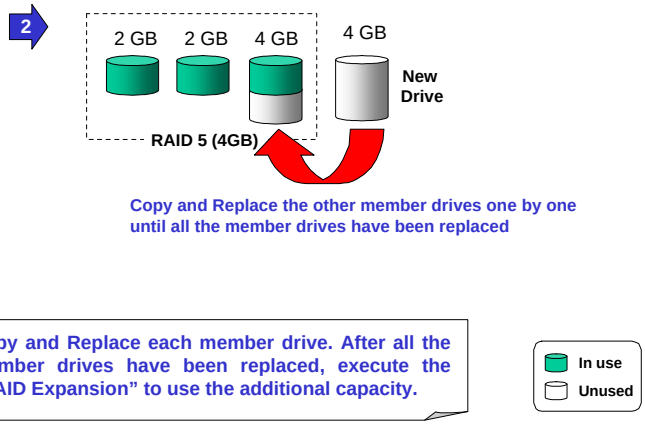
Mode 2 Expansion, on the other hand, requires the same number of higher-capacity SCSI hard disk drives for a given logical drive.

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.

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.

- *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."*

Example: RAID Expansion in Windows NT Server

Limitations When Using Windows NT 4.0

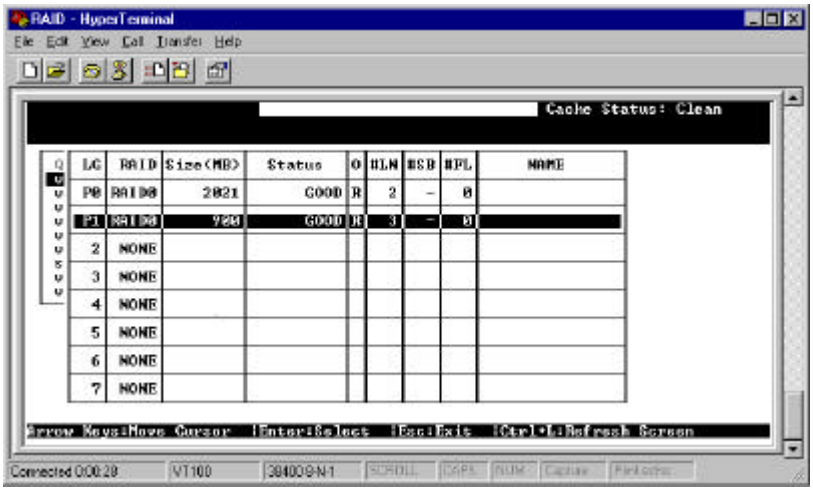
1. Only the Windows NT Server Disk Administrator includes the Extend Volume Set function; Windows NT Workstation does not have this feature.

2. The system drive (boot drive) of a Windows NT system cannot be extended.

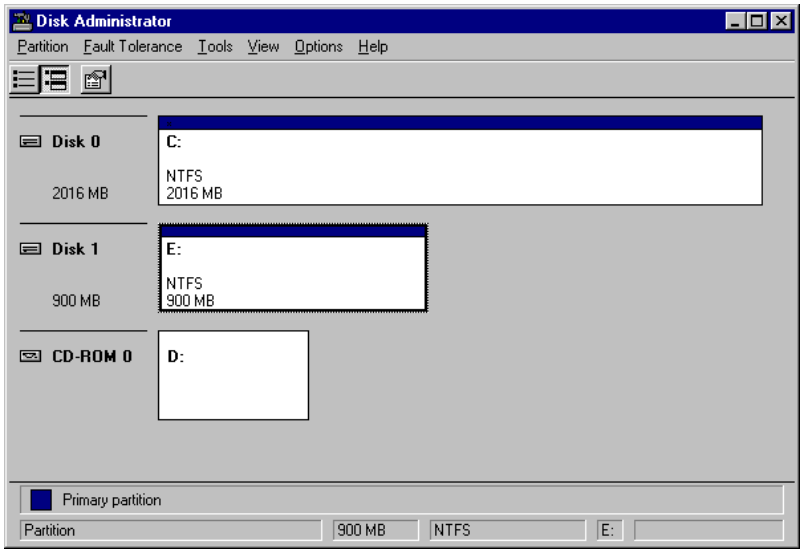
3. The drive that will be extended should be using the NTFS file system.

The Example:

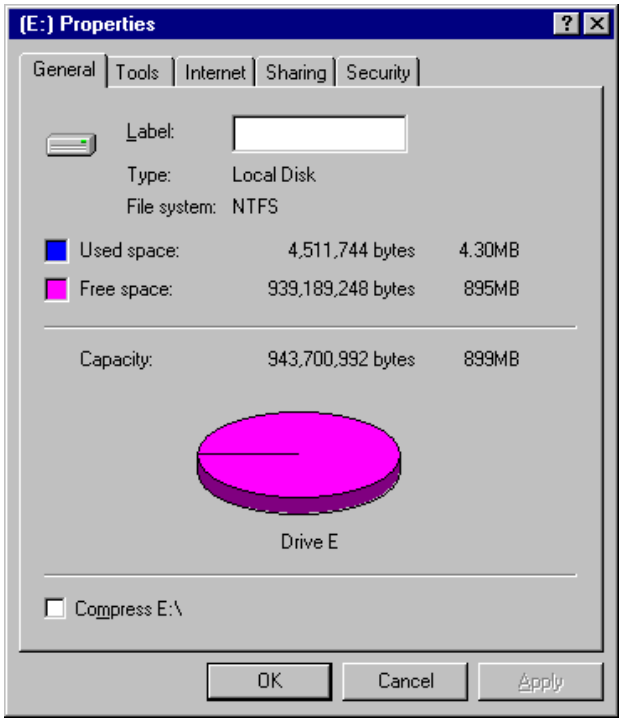
The following example demonstrates the expansion of a 900MB RAID 0 logical drive. The Hyper Terminal emulation software that comes with Windows 95/NT is used to connect to the RAID controller via RS-232.



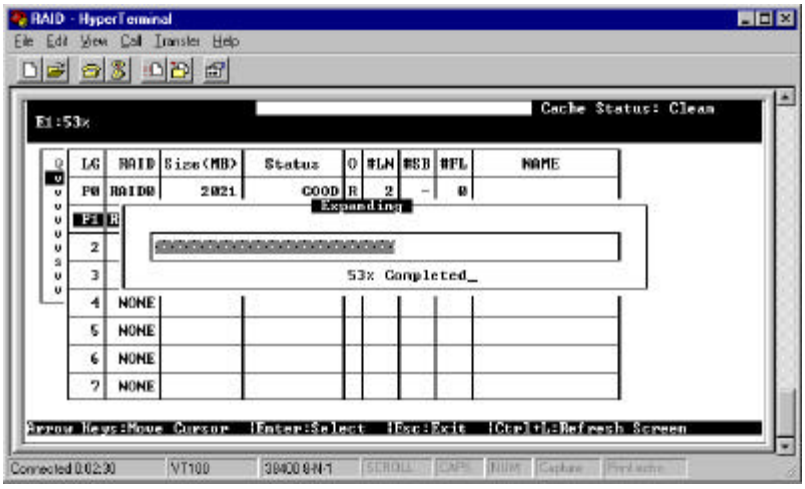
You can view information about this drive in the Windows NT Server's Disk Administrator.



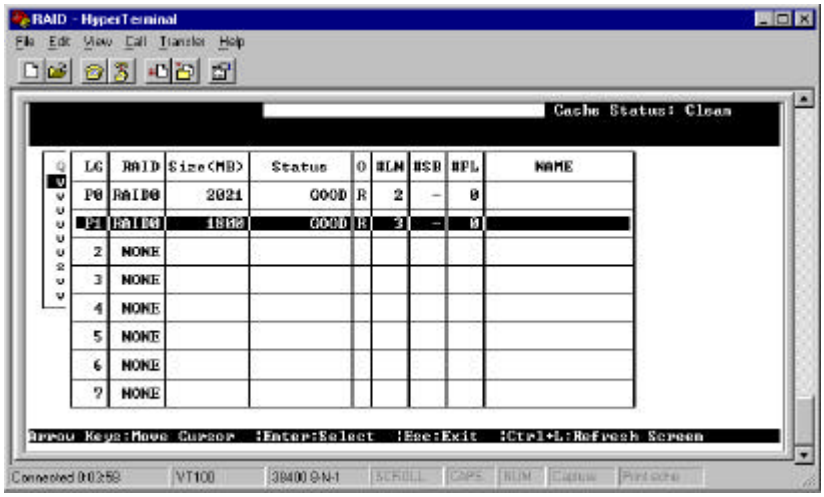
Place the cursor on Disk 1, right-click your mouse, and select "Properties." You will see that the total capacity for the Drive E: is just under 900MB.



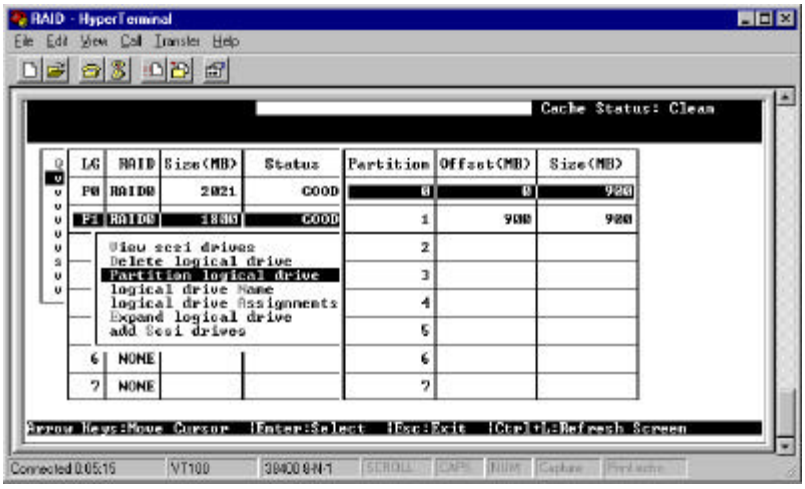
Follow the steps described in section 7.2.8 to add SCSI disk drives and perform Mode 1 Dynamic Logical Drive Expansion.



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

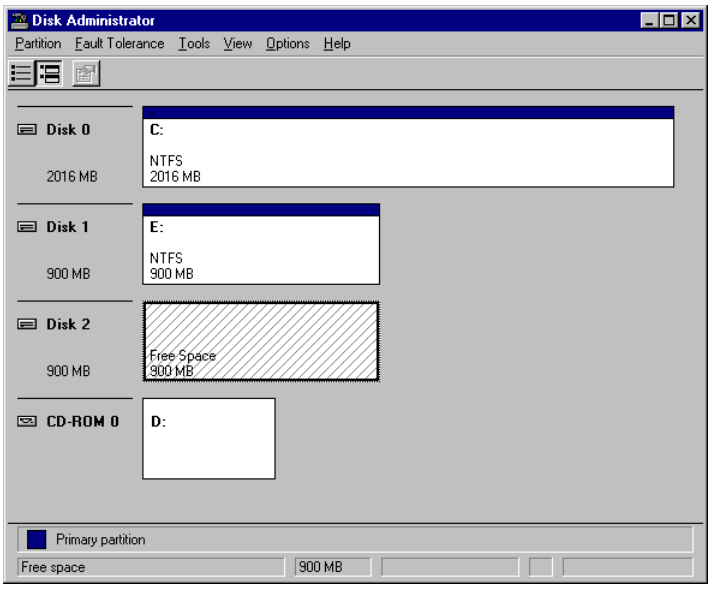


From the menu, select Partition Logical Drive. You will see that the 1800MB logical drive is composed of two 900MB partitions.

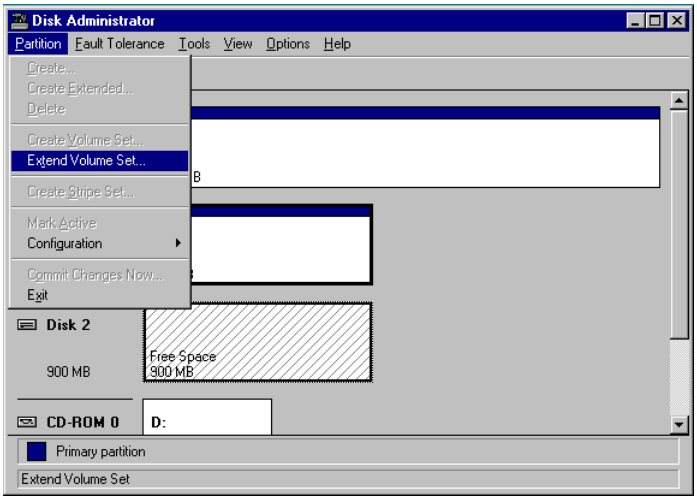


Follow the directions in Chapter 7 section “Mapping a Logical Drive to a Host LUN” to map the new partition to a Host LUN. The new partition must be mapped to a host LUN in order for the HBA (host-bus adapter) to see it. Once you have mapped the partition, reboot Windows NT. The HBA should be able to detect an additional "disk."

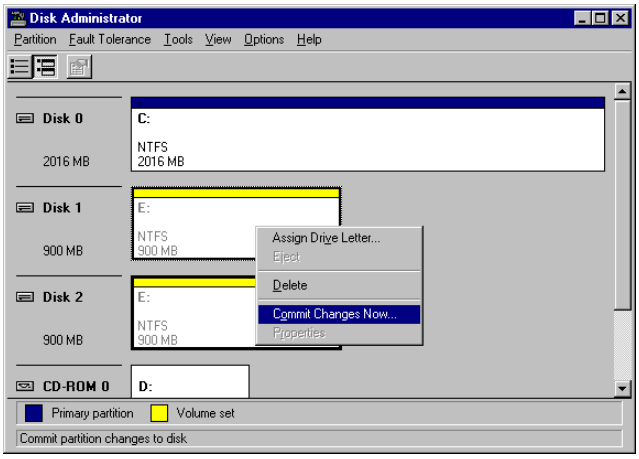
Return to Windows NT Server's Disk Administrator. There now exists a Disk 2 with 900MB of free space. Click on Disk 2 to select it.



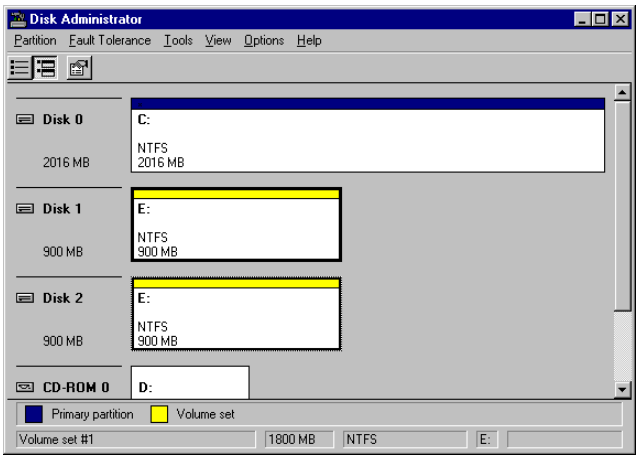
From the "Partition" menu, select "Extend Volume Set."



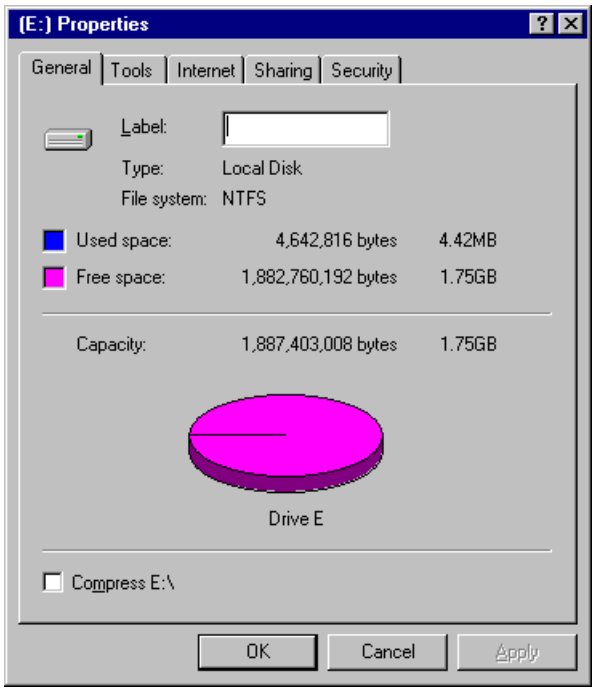
The screen will display that volume set of Drive E: has been extended by the 900MB in Disk2. Move the cursor to "Commit Changes Now" to confirm that you want the free space to become a part of the same logical drive.



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."

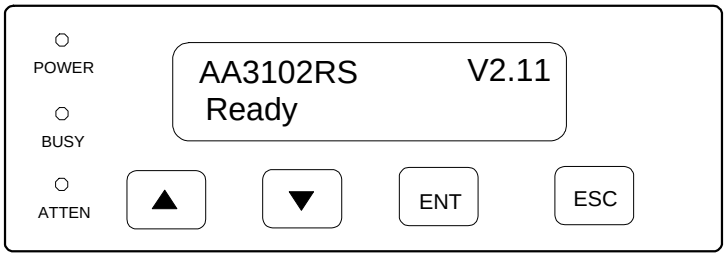


Drive E: now has a capacity just under 1800MB.



Chapter 4 Hardware Installation

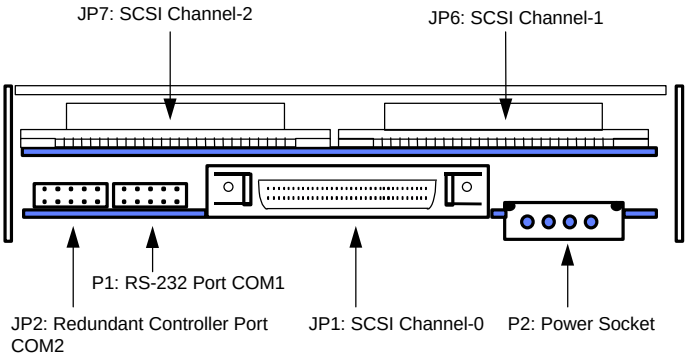
Locations of the Parts



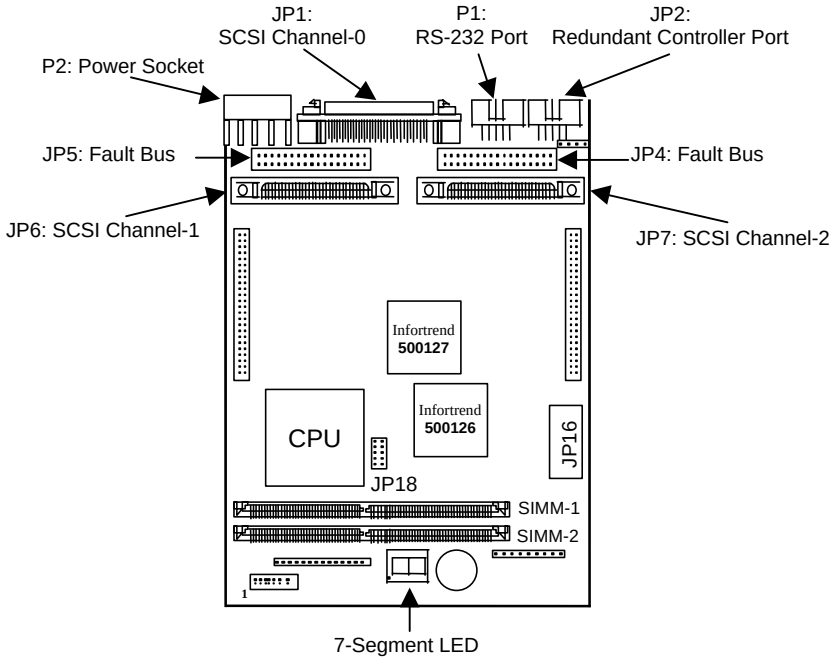
Front View

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	AA-3102RS controller

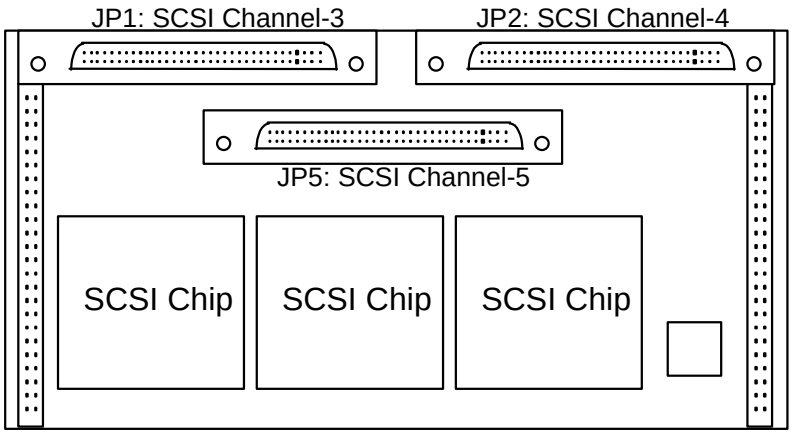
Rear View of the Main Board



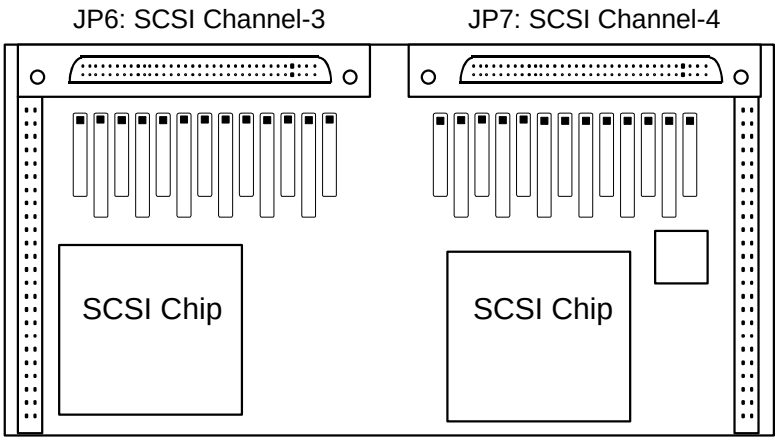
Top View of the Main Board



Top View of the Daughter Board (AA-9073UWS)

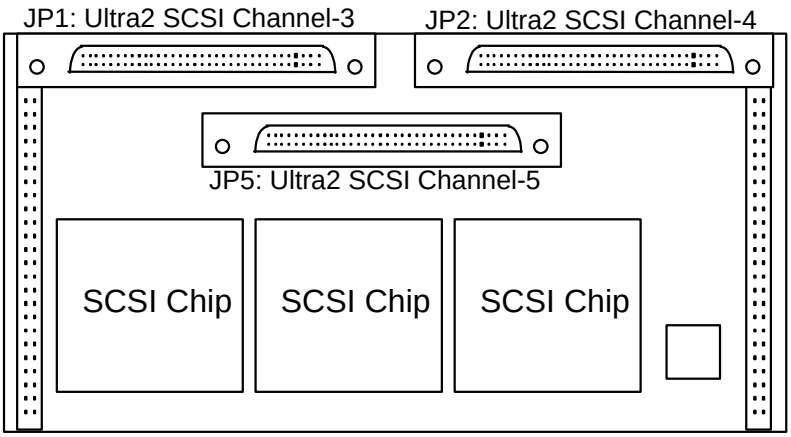


Top View of the Daughter Board (AA-9072UWD)



- Pin 1 of the terminator resistors

Top View of the Daughter Board (AA-9073U2)



Installing DRAM SIMM

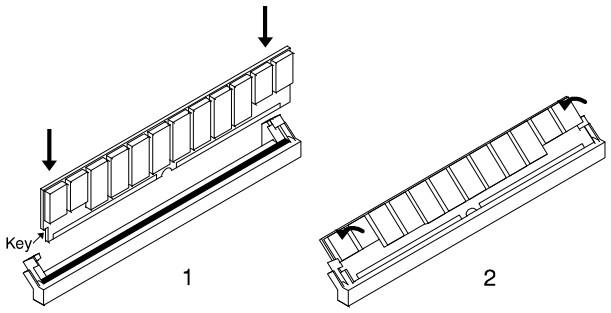
The AA-3102RS controller requires a minimum of 4 Mbytes DRAM SIMM (with or without parity function) installed in a SIMM socket in order for it to operate. The controller is normally delivered without any DRAM installed.

The following are guidelines on using DRAMs:

- Use 72-pin 60 ns DRAM or 60 ns EDO RAM SIMM module. EDO RAM is recommended for better performance.
- A SIMM, with or without parity, can be auto-detected by the controller. A SIMM with parity is recommended for security.
- The minimum DRAM required is 4 Mbytes in-stalled in a SIMM socket, however 8 Mbytes is recommended.
- The controller supports 4 MB, 8 MB, 16 MB, 32 MB, 64 MB DRAM SIMM module. Maximum DRAM size is 128 Mbytes.

To install the DRAM SIMM:

1. Power off the system and disconnect the power connector.
2. Insert the DRAM SIMM vertically into the socket making sure the key is on the left side (1). Now push the module backward until the hooks on both sides of the socket snap into place (2).



Installing the SCSI Channel Upgrade Daughter Board

The AA-3102RS's base module has 3 Ultra-Wide SCSI channels. Installing a SCSI channel upgrade daughter board (AA-9073UWS, AA-9072UWD, or AA-9073U2) onto the base module allows you to expand up to a total of 6 SCSI channels. (Only one daughter board can be mounted at a time).

- AA-9073UWS: 3 Single-Ended Ultra Wide SCSI Channels
- AA-9072UWD: 2 Differential Ultra Wide SCSI Channels
- AA-9073U2: 3 Ultra2 Wide SCSI Channels

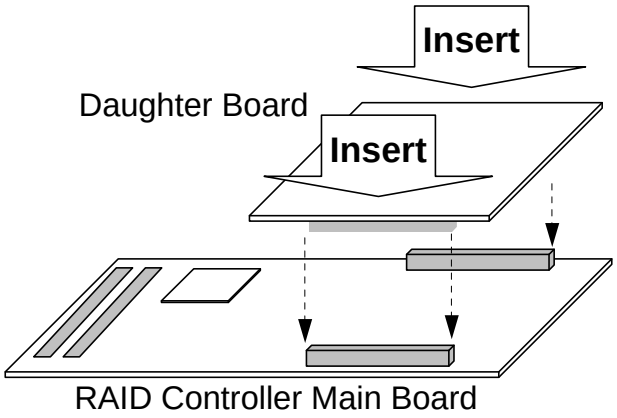
To install the SCSI channel upgrade daughter board:

1. Make sure the power of the host system and drives are off.

2. Position the daughter board so that the SCSI connectors are facing the rear of the controller.

3. While at it, make sure the connector pins on the daughter board are aligned with the two header connectors on the controller's main board.

4. Press both sides of the daughter board downward so that the connector pins on the daughter board insert into the header connectors on the main board. Make sure the daughter board is seated properly.


Insert
Daughter Board
Insert
RAID Controller Main Board

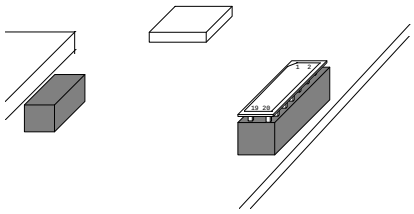
Battery Backup

The AA-3102RS controller operates using cache memory. However, when power failure occurs, the cache memory may contain buffered data that has not yet been written to the hard disks. These buffered data are not retrievable when power returns.

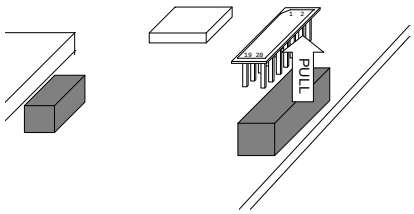
To avoid this from happening, a battery backup solution (AA-9070 and AA-9010) is available to provide up to 100 hours of back-up time. The AA-9070 is a battery backup daughter board that plugs into the controller. The AA-9010 is a battery pack that connects to the AA-9070 battery backup daughter board. Several AA-9010's can be daisy chained to provide long hours of unattended operation over a period of days.

To install the battery backup daughter board and battery pack:

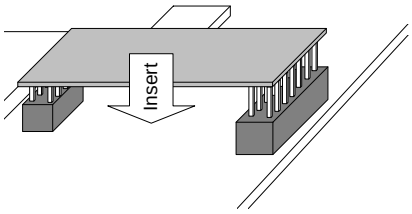
1. Make sure the power of the controller and drives are off.

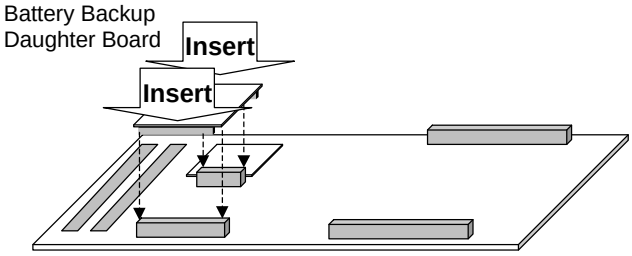


2. Locate for the female pin socket (JP16) on the AA-3102RS mainboard. Remove the socket plug that is on JP16.



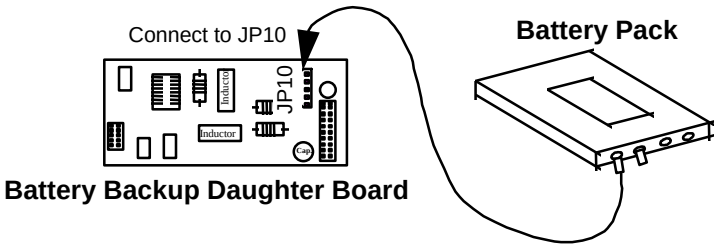
3. Now install the AA-9070 battery backup daughterboard onto the mainboard.





RAID Controller Main Board

4. Connect the AA-9010 battery pack to JP10 located on the AA-9070 daughter board.

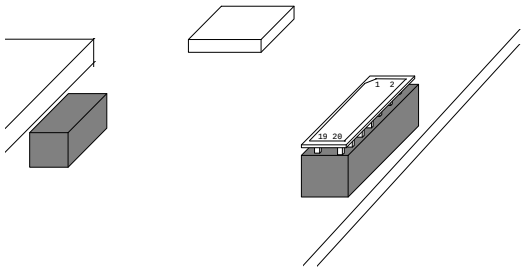


Battery Backup Daughter Board

It is a must to install the socket plug back to JP16 once you have removed the AA-9070 battery backup daughterboard. The controller will not work if you fail to do so.

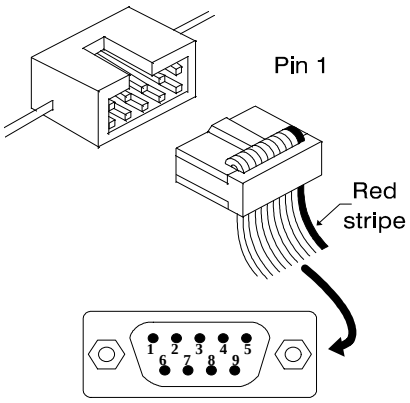
Power Connection

The power input and connection of the AA-3102RS controller is exactly the same as those for hard disk drives. The power connection is shown below.



Serial Port Connection and Set-Up

The AA-3102RS controller can be configured via a PC running a VT-100 terminal emulation program, or a VT-100 compatible terminal. The provided interface cable converts the RS-232 signal of the 10-pin header connector on the controller into a 9-pin D-Sub male connector. The pin layout of the 9-pin D-Sub male connector is similar to that of a PC's serial port and is set as a DTE device. The proper connection of the cable and pin layout is shown below.



The following are guidelines on using the serial port:

- The serial port's default is set at 9,600 baud, 8 bit, 1 stop bit and no parity. Use the COM1 serial port of the controller.
- In most cases, connecting RD, TD and SG are enough to establish communication with a terminal.
- If you are using a PC as a terminal, any of the VT-100 terminal emulation software will suffice. Microsoft Windows includes a terminal emulation program as presented with the "Terminal" icon in the Accessories window.

The baud rate can be changed using the front panel. To change the baud rate:

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

```
 View and Edit
Configuration ..
```

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

```
Communication
Parameters ..
```

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

```
RS-232
Configuration ..
```

4. Select "COM1 Configuration ..", then press ENT.

```
COM1
Configuration ..
```

5. Select "Baud-rate 9600 ..", then press ENT.

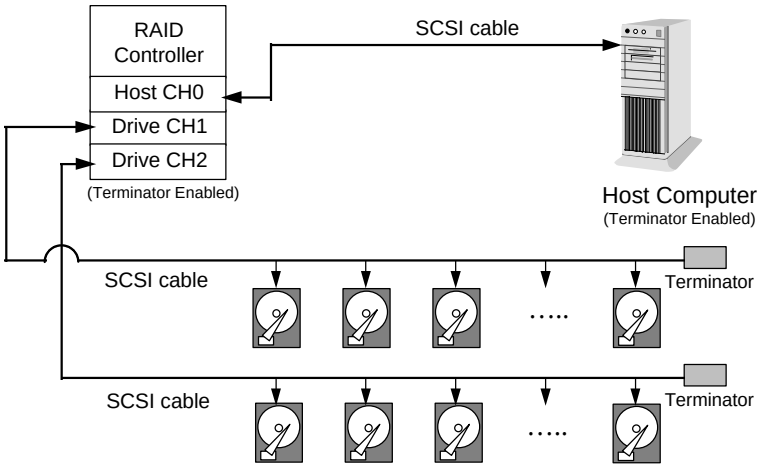
```
Baud-rate  9600
              ..
```

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

The available baud rates are: 2400, 4800, 9600, 19200 and 38400.

Basic Operational setup

An example of the operational setup is shown below:



- The SCSI cable must be shorter than 3 meters.
- Channel 0 is connected to the Host system.
- Drives are connected to drive channels 1 and/or 2.
- SCSI nodes on the same channel have their own unique ID number.
- Both the Host and drive SCSI cables are properly terminated.
- The terminator of all the hard drives must be disabled.
- The power supply is attached.
- All operation parameters are properly set.

To connect the components:

1. Make sure power is off or the power connector is disconnected.

2. Connect channel 0 of the controller to the Host system's SCS-I port using a suitable SCSI cable.

Channel 0 is the default Host interface using ID number '0'. Any of the channels can also be set as the Host interface. More than one channel can be set as the Host interface when operating with redundant Host or multiple Host systems.

3. Make sure the host side of the SCSI cable is properly terminated.

4. Assign a unique SCSI ID for every hard disks that are to be connected on the same SCSI cable; between ID numbers '0' and '6' and '8' and '15'. The default ID of the controller's channel 0 is '7'.

5. Connect the other end of the drive SCSI cable to one of the remaining channel on the controller.

6. Connect the connectors located at the middle of the drive SCSI cable to the hard disk(s).

7. Terminate the SCSI cable by installing an external terminator on the last connector. Terminators on all the hard drives must be removed so that removing a hard drive will not affect cable termination.

In-band SCSI

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.

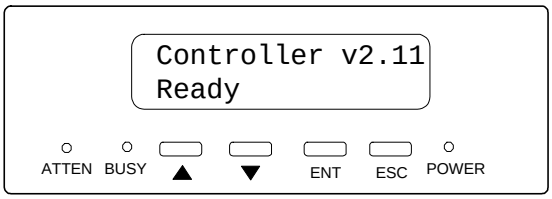
Acer now offers an alternative means of communication for its RAID controllers—In-band SCSI. The traditional way for SCSI controllers to communicate with the host computer has been via software (such as the Acer RAID Manager) using an RS-232C connection. With In-band SCSI, integrators have more flexibility. 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 Acer 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 Acer 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.)

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

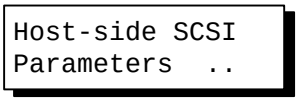
RAID Controller Adjustments

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 Acer RAID Manager . See SNMP Settings below for a detailed explanation.) The RAID controller settings can be changed using the Front Panel. (Your front panel may be different in appearance from the one shown in this example.)



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

Press <Enter>; and then use the ▼ or ▲ to select "Host-side SCSI Parameters." Then press <Enter>.



You will need to make adjustments in the following four submenus: Peripheral Device Type, Peripheral Device Qualifier, Device Support for Removable Media, and LUN Application. Different host operating systems require different adjustments. Look at the table below to find the proper settings for your host operating system.

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	3	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

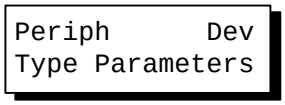
Peripheral Device Type Settings

Device Type	Setting
No Device Present	7f
Direct-access Device	0
Sequential-access Device	1
CD-ROM Device	5
Scanner Device	6
MO Device	7
Unknown Device	1f
Processor Type	3

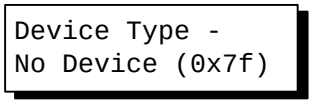
Example: Settings for Windows NT 4.0

The settings for Windows NT 4.0 are provided here as an example. For the settings for other operating systems, please refer to the table above, *Peripheral Device Type Parameters Reference for Various Operating Systems*.

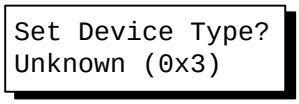
On the front panel, use ▼ or ▲ to select "Peripheral Device Type Parameters"; and then press <Enter>.



(For this example, we assume that there are currently no peripheral devices.)

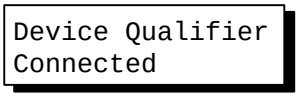


Press t or s to choose "Unknown Device - 3".



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's 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.



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's.

```
SupportRemovable
Media - Disabled
```

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

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

Press <Enter> and use t or s to select "Undefined LUN-0's."

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

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

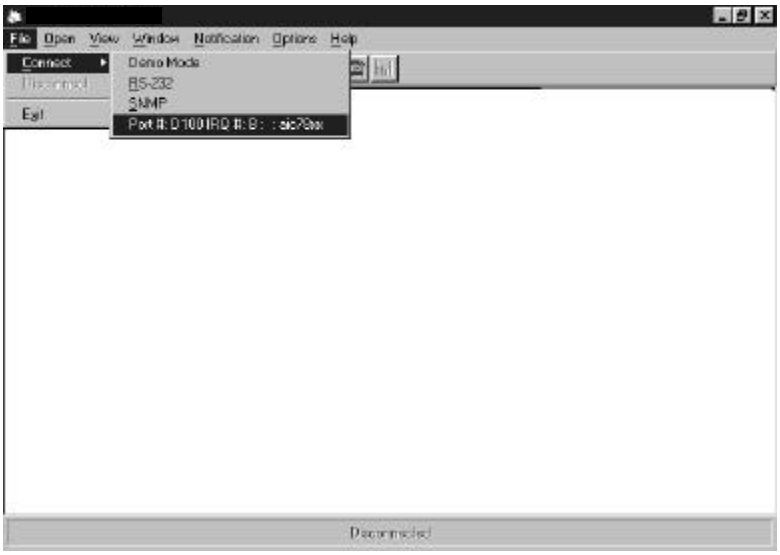
```
LUN Application-
Undefine LUN-0's
```

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

Using In-band SCSI in Acer RAID Manager

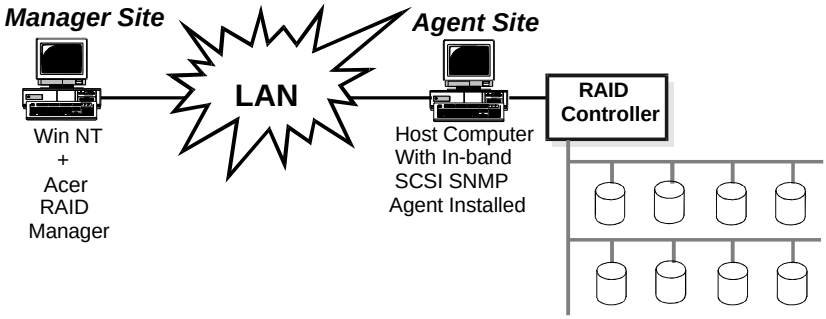
Local Connection — SNMP Not Required

If you are using the Acer RAID Manager on the host computer that is using In-band SCSI -- i.e., 'local access' -- SNMP service is not required. You may now connect by going to FILE>CONNECT and selecting the port address.



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 Acer 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 Acer RAID Manager , please refer to the Acer RAID Manager User Guide.



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 Acer RAID Manager . The Agent Site could be running an operating system other than Windows NT. Acer provides the In-band SCSI SNMP agents for the following operating systems:

- Windows NT
- NetWare

The Manager Site should be a Windows NT Workstation or Server with SNMP service and the Acer 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's 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.

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 Infortrend Acer RAID Manager was installed with the "SNMP Manager Site" option selected.

3. The Acer RAID Manager is running.

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.

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.

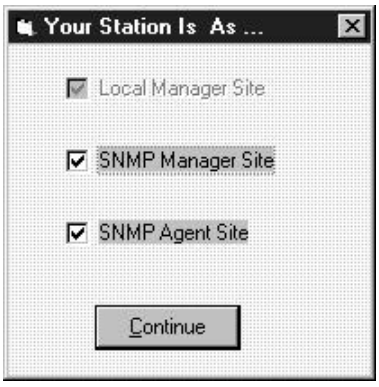
The Properties window appears. Choose the "Service" tab. If the SNMP Service is already installed, please go ahead to step called "Install the SNMP Agent and Acer RAID Manager ." If the SNMP Service is not yet installed, click on "Add" and choose "SNMP Service" to install.

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.

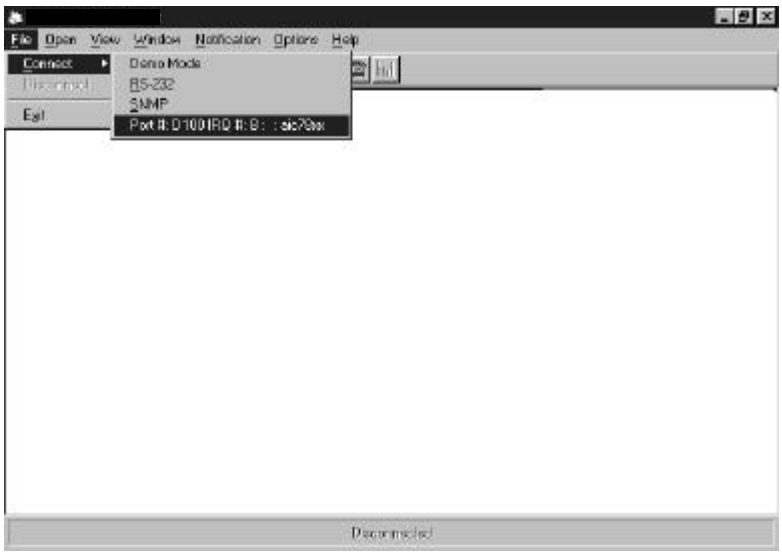
2. Install the SNMP Agents and Acer RAID Manager . The Acer RAID Manager can install the In-band SCSI SNMP Agent during installation. During Acer RAID Manager installation, be sure to select both the "SNMP Manager Site" and "SNMP Agent Site" options. Complete the installation by following the on-screen instructions.

Example Settings for Manager Site

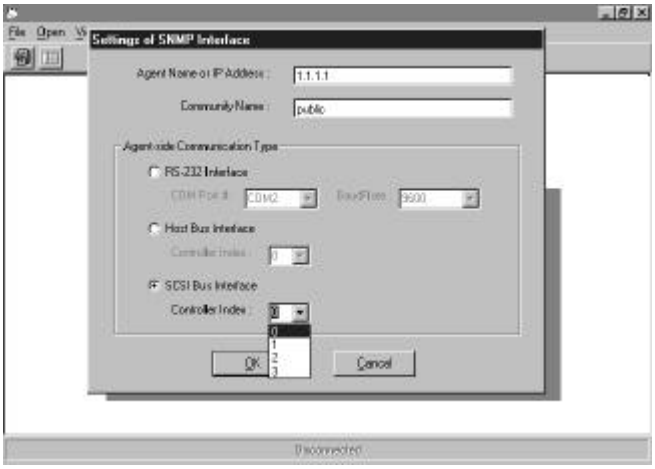
1. Install the SNMP manager and Acer RAID Manager . During the installation of Acer RAID Manager , click to select the option "SNMP Manager Site." Complete the installation by following the on-screen instructions.



2. Run the Acer RAID Manager . Start the connection by choosing FILE>CONNECT>SNMP.



3. 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.



4. After the connection is established, all of the operations in the Acer RAID Manager are the same as before (please refer to the Acer RAID Manager User Guide for complete details on its operation.)

Chapter 5 Quick Setup

A "Logical Drive" is a set of drives grouped together to operate under a given RAID level and appears as a single contiguous drive. The AA-3102RS controller is capable of grouping connected drives to as many as 8 logical drives, each configured on the same or different RAID levels. 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.

Front Panel

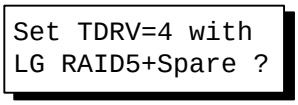
The AA-3102RS controller's default configurations are based on the number and location of the drives installed. If this is your first time to install, we suggest that you try the default configurations provided by the "Quick Installation" function. This will allow you to immediately verify whether the system is working. Further optimization can then be made later on.

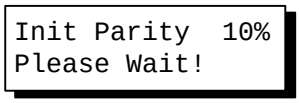
Quick Setup assumes there is only one host channel.

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

```
Quick Logical
Drive Install ..
```

The number of drives and the first possible RAID level will appear on the LCD display. Use t or s to select the RAID level, then press ENT for two seconds to enter the selected RAID level. The controller will now start initialization.





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 (Odd)	=	RAID0 RAID1 (0+1)+ Spare RAID3 RAID3 + Spare RAID5 RAID5 + Spare
>3 Drives (Even)	=	RAID0 RAID1 (0 + 1) RAID3 RAID3 + Spare RAID5 RAID5 + Spare

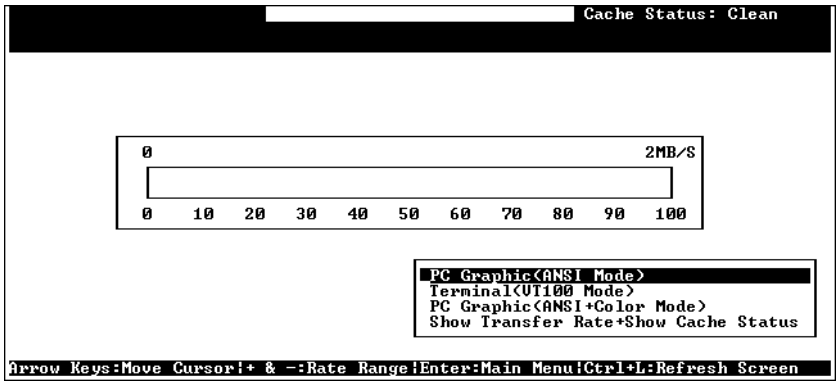
The LCD will display the logic-al drive's information after completing initialization.

RS-232 Terminal Interface

The keys used when operating via the terminal are as follows:

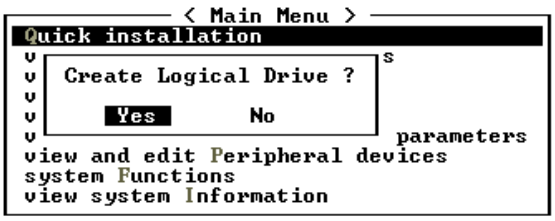
← → ↑ ↓	To select options.
[Enter]	To go to a submenu or to execute a selected option.
[Esc]	To escape and go back to the previous menu.
[Ctrl] [L]	The controller will refresh the screen information.

If the RS-232 cable is connected while the controller is powered on, press [Ctrl] [L] to refresh the screen information.

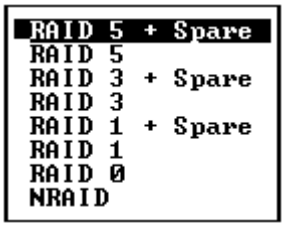


The initial screen appears when the controller is powered-on. Use ↑ ↓ arrow keys to select the desired terminal emulation mode, then press [ENTER] to enter the Main Menu.

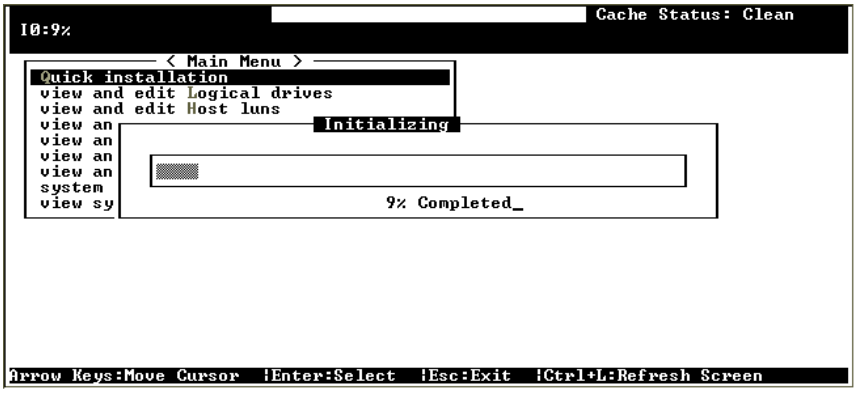
Type Q or use the ↑ ↓ keys to select "Quick installation", then press [Enter]. Choose Yes to create a logical drive.



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 a Global Spare Drive.

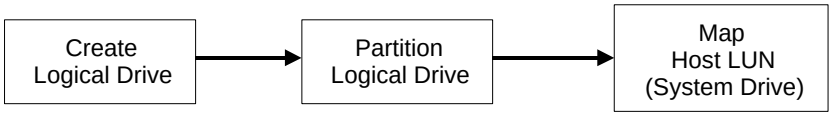


The controller will start initialization and automatically map the logical drive to LUN 0 of the first host channel.



Chapter 6 Configuring RAID

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 AA-3102RS RAID controller scans all the hard drives that are on all the drive channels. If a hard drive was connected after the controller completes initialization, use the "SCAN SCSI DRIVE" function to let the 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 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.

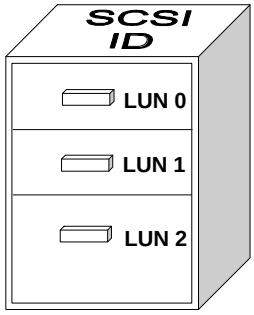
A "Logical Drive" is a set of drives grouped together to operate under a given RAID level and appears as a single contiguous drive. The AA-3102RS controller is capable of grouping connected drives to as many as 8 logical drives, each configured on the same or different RAID levels. A logical drive can 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.

How the RAID Controller Works?

SCSI Channel, SCSI ID and LUN

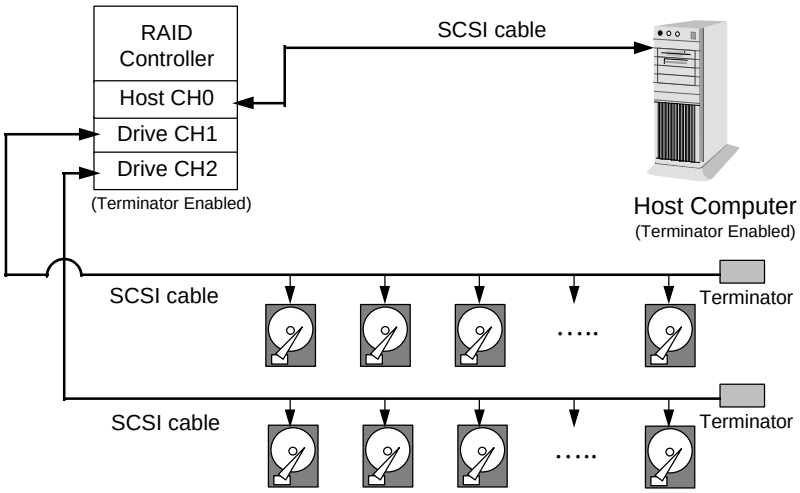
A SCSI channel (SCSI bus) can connect up to 15 devices (the SCSI controller itself excluded) when the Wide function is enabled (16-bit SCSI). It can connect up to 7 devices (the SCSI controller itself excluded) when the Wide function is disabled (8-bit SCSI). Each device has one unique SCSI ID. Two devices 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.



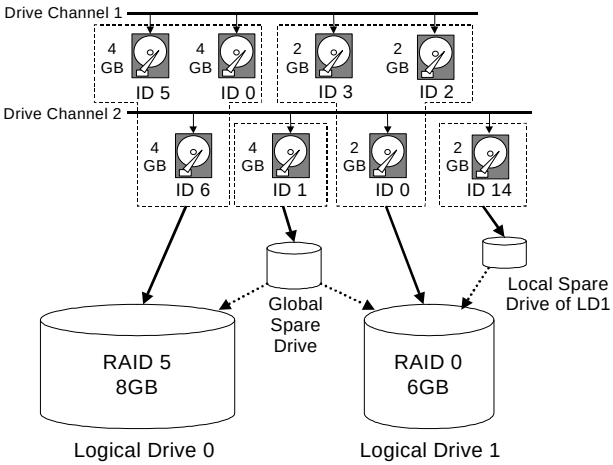
In firmware versions 2.11 or later, each SCSI ID can support up to 32 LUNs.

Understanding Step by Step

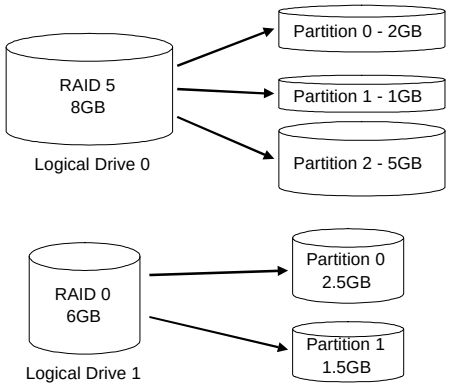


Physical connection should look similar to the figure shown on the previous page. The channel connected to the host adapter is the host channel, and the channels connected to the drives are the drive channels.

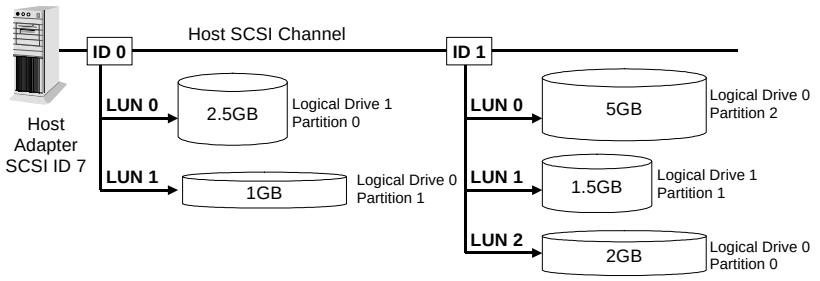
A Logical Drive consists of a group of SCSI drives. Drives in one logical drive do not have to come from the same SCSI channel. Also, each logical drive can be configured a different RAID level.



A drive can be assigned as the Local Spare Drive of one specified logical drive, or as Global Spare Drive.



You may divide a logical drive into several partitions, or use the entire logical drive as one single partition.

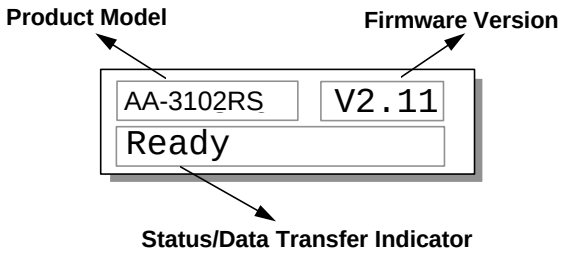


Map each partition to a host LUN. The LUN will then virtually appear to the host SCSI adapter as an individual hard drive.

Chapter 7 General Front Panel Operation

Understanding the Information on the LCD

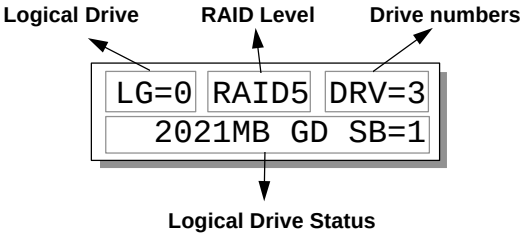
The Initial Screen



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.

Logical Drive Status



Logical Drive: The Logical Drive number.

RAID level: The RAID level used in this logical drive.

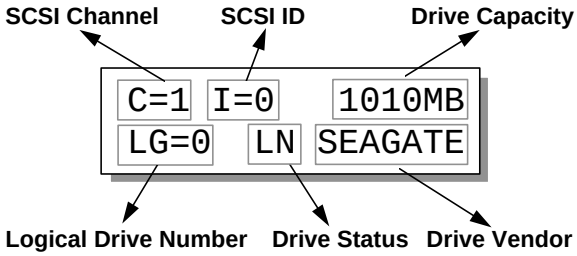
Drive numbers: The number of SCSI drives contained in this logical drive.

Logical Drive status:

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.

SCSI Drive Status

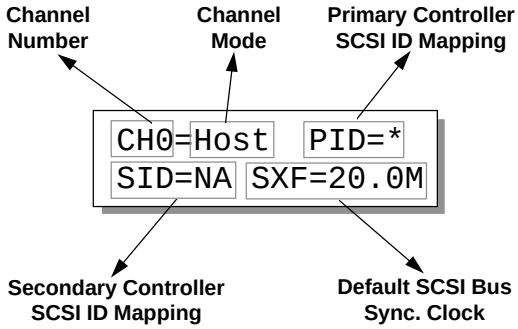


Drive Status:

LG=x IN	Initializing
LG=x LN	On-line
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

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)

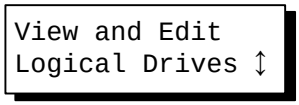
Secondary Controller SCSI ID Mapping:

*	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)

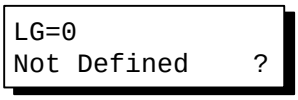
Viewing and Editing Logical Drives

Creating a Logical Drive

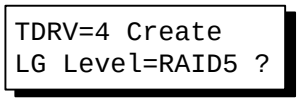
Press **ENT** for two seconds to enter the Main Menu. Press ▼ or ▲ to select "View and Edit Logical Drives", then press **ENT**.



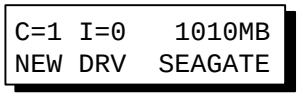
Press ▼ or ▲ to select a logical drive, then press **ENT** for two seconds. "LG" refers to Logical Drive.



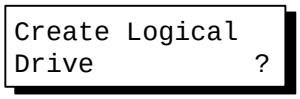
Press ▼ or ▲ to choose the desired RAID level, then press **ENT** for two seconds. "TDRV" on the LCD refers to the drives that has not yet been configured.



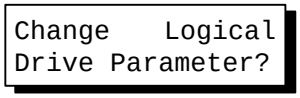
Press **ENT**, then use ▼ or ▲ to browse through the drives. Press **ENT** again to select/deselect the drives. "C=1 I=0" refers to "Channel 1, SCSI ID 0".



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.

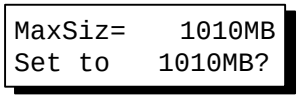


You may also choose “Change Logical Drive Parameter”, then press **ENT** to set other parameters before initializing the logical drive.



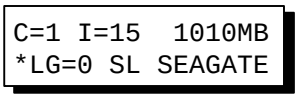
Choose “Maximum Drive Capacity”, then press **ENT**.

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

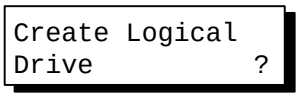


The Local Spare Drive can also be assigned here. Press ▼ or ▲ to choose “Spare Drive Assignments”, then press **ENT**.

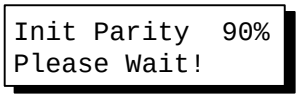
The currently available drives will be shown on the LCD. Use ▼ or ▲ to browse through the drives, then press **ENT** to choose the drive you wish to serve as the Local Spare Drive. Press **ENT** again for two seconds.



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.



The 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.



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

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.

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**.

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

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

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

Press ▼ or ▲ to select “View SCSI Drives..”, then press **ENT** .

```
View SCSI Drives
                ..
```

Press ▼ or ▲ to scroll through the drives.

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

Deleting a Logical Drive

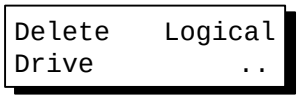
Press **ENT** for two seconds to enter the Main Menu. Press ▼ or ▲ to select "View and Edit Logical Drives", then press **ENT**.

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

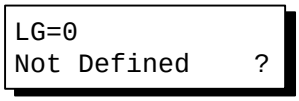
Press ▼ or ▲ to select a logical drive, then press **ENT**.

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

Press ▼ or ▲ to select “Delete Logical Drive”, then press **ENT** .

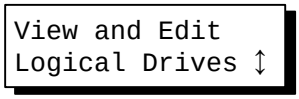


Press **ENT** for two seconds to delete. The selected logical drive has now been deleted .

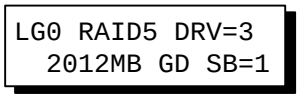


Partitioning a Logical Drive

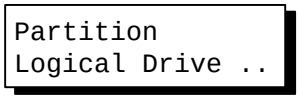
Press **ENT** for two seconds to enter the Main Menu. Press ▼ or ▲ to select "View and Edit Logical Drives..", then press **ENT**.



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



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



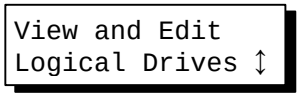
The current partition’s information will be displayed on the LCD. Press ▼ or ▲ to browse through the existing partition in the logical drive. Select a partition by pressing **ENT** for two seconds.

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.

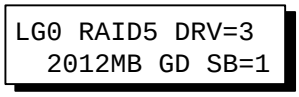
The rest of the drive space will automatically be created as another partition.

Deleting a Partition of a Logical Drive

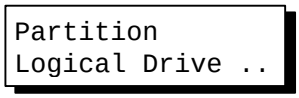
Press **ENT** for two seconds to enter the Main Menu. Press ▼ or ▲ to select "View and Edit Logical Drives..", then press **ENT**.



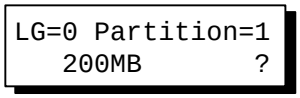
Press ▼ or ▲ to select a logical drive, then press **ENT**.



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

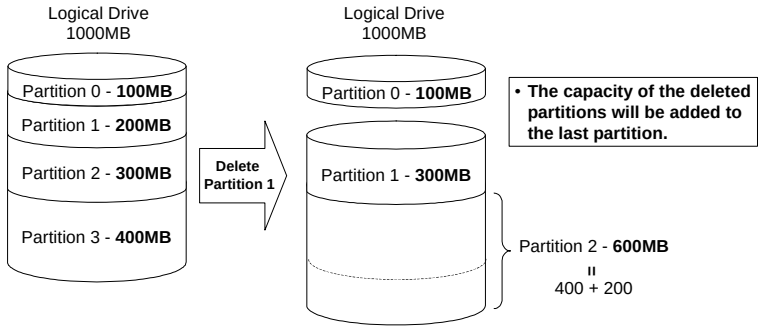


The current partition’s information will be displayed on the LCD. Press ▼ or ▲ to browse through the existing partition in the logical drive. Select a partition by pressing **ENT** for two seconds.



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.

The rest of the drive space will automatically be added to another partition.



- *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.*

Assigning a Logical Drive Name

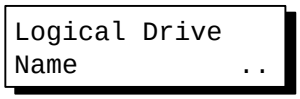
Press **ENT** for two seconds to enter the Main Menu. Press ▼ or ▲ to select "View and Edit Logical Drives..", then press **ENT**.

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

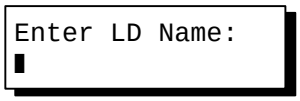
Press ▼ or ▲ to select a logical drive, then press **ENT**.

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

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

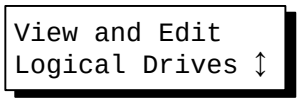


Press ▼ or ▲ to change the character of the flashing cursor. Press **ENT** to move the cursor to the next space. The maximum character for a logical drive name is 25.

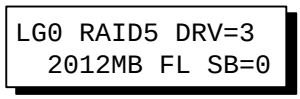


Rebuilding a Logical Drive

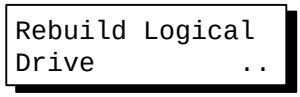
Press **ENT** for two seconds to enter the Main Menu. Press ▼ or ▲ to select "View and Edit Logical Drives..", then press **ENT**.



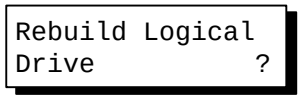
Press ▼ or ▲ to select the logical drive that has a failed member drive, then press **ENT**.



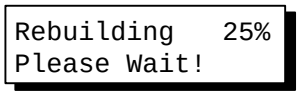
Press ▼ or ▲ to select “Rebuild Logical Drive”, then press **ENT**.



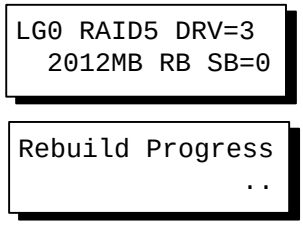
Press **ENT** for two seconds to start rebuilding the logical drive.



The rebuilding progress will be displayed (in percentage) on the LCD.



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.



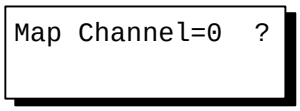
- *The Rebuild function will appear only if a logical drive (with RAID level 1, 3 or 5) has a failed member drive.*
- *Refer to Chapter 3 section “Automatic Rebuild and Manual Rebuild” of this manual for more information on the rebuilding process.*

Viewing and Editing Host LUNs

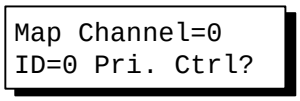
Mapping a Logical Drive to a Host LUN

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

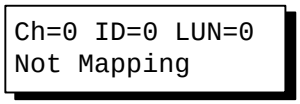
Press ▼ or ▲ to select a host channel, then press **ENT** for two seconds.



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

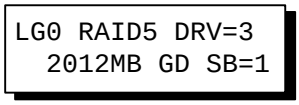


Press ▼ or ▲ to select a LUN number, then press **ENT**.

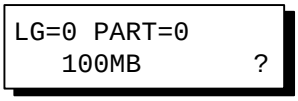


Press **ENT** for two seconds to confirm the selected LUN mapping.

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.

```
CH=0 ID=0 LUN=0
MaptoLG=0 PRT=0?
```

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**.

```
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 browse through the LUN number and its LUN mapping information.

```
Ch=0 ID=0 LUN=0
Mapto LG=0 PRT=0
```

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

```
Delete C=0 ID=0
LUN=0 Mapping  ?
```

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

```
CH=0 ID=0 LUN=0
Not Mapping
```

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 ?
```

- *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.*

Viewing and Editing SCSI Drives

Scanning New SCSI Drive

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 ↕
```

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

```
Scan new SCSI
Drive          ..
```

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

```
Scan Channel=1 ?
```

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

```
Scan Channel=1
ID= 0          ?
```

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

```
C=1 I=0   1010MB
NEW DRV  SEAGATE
```

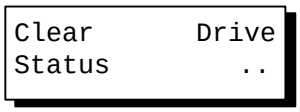
If the drive was not detected on the selected SCSI channel and ID, the LCD will display “Scan Fail!”

```
Scan Channel=1
ID=1 Scan Fail!
```

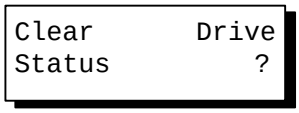
An empty drive entry will be added to this channel/SCSI ID for enclosure management. The drive status is “ABSENT”.

```
C=1 I=1 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**.

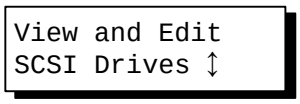


Press **ENT** for two seconds to confirm the drive entry’s deletion. The other existing SCSI drive information will be displayed on the LCD.

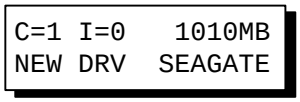


Viewing Drive Information

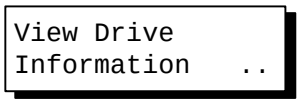
Press **ENT** for two seconds to enter the Main Menu. Press ▼ or ▲ to select "View and Edit SCSI Drives", then press **ENT**.



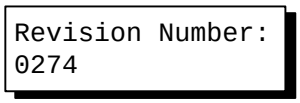
SCSI drive information will be displayed on the LCD. Press ▼ or ▲ to select a SCSI drive, then press **ENT**.



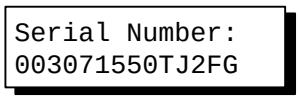
Press ▼ or ▲ to select “View Drive Information”, then press **ENT**.



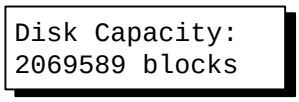
The Revision Number of the selected SCSI drive will be shown on the LCD. Press ▼ to view the next item.



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.



- *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 it vice *versa.*

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**.

```
View and Edit
SCSI Drives ↕
```

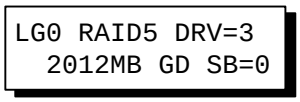
SCSI drive information will be displayed on the LCD. Press ▼ or ▲ to select a SCSI drive that has not been assigned to any logical drive, spare drive or failed drive yet, then press **ENT**.

```
C=1 I=0   1010MB
NEW DRV  SEAGATE
```

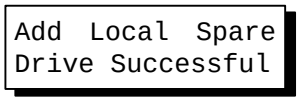
Press ▼ or ▲ to select "Add Local Spare Drive", then press **ENT**.

```
Add Local Spare
Drive         ..
```

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

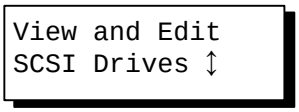


The message “Add Local Spare Drive Successful” will be displayed on the LCD.

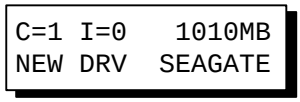


Adding Global Spare Drive

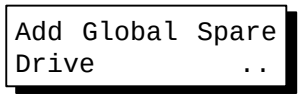
Press **ENT** for two seconds to enter the Main Menu. Press ▼ or ▲ to select "View and Edit SCSI Drives", then press **ENT**.



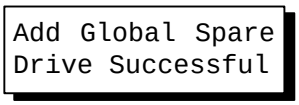
ISCSI drive information will be displayed on the LCD. Press ▼ or ▲ to select a SCSI drive that has not been assigned to any logical drive yet, then press **ENT**.



Press ▼ or ▲ to select “Add Global Spare Drive”, then press **ENT**.

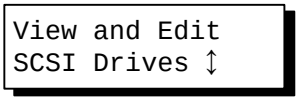


Press **ENT** again for two seconds to add the spare drive. The message “Add Global Spare Drive Successful” will be displayed on the LCD.

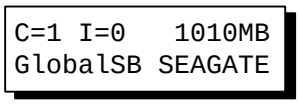


Identifying a Drive

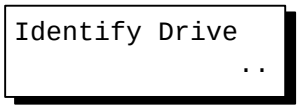
Press **ENT** for two seconds to enter the Main Menu. Press ▼ or ▲ to select "View and Edit SCSI Drives", then press **ENT**.



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.



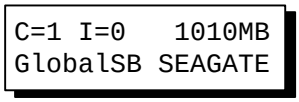
Press ▼ or ▲ to select “Flash All SCSI Drives”. Now press **ENT** for two seconds to flash the read/write LEDs of all the connected drives.

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.

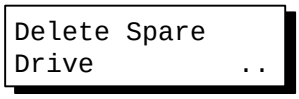
Deleting Spare Drive (Global / Local Spare Drive)

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 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.

```
Delete Spare
Drive Successful
```

SCSI Drives Utilities

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

```
View and Edit
SCSI 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>.

```
C=1 I=3   2047MB
NEW DRV  SEAGATE
```

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

```
SCSI Drives
  Utilities   ..
```

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>.

```
Drive Low-Level
 Format       ..
```

- *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".*

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          ..
```

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.

Viewing and Editing SCSI Channels

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 “Redefine Channel Mode”, then press **ENT**.

```
Redefine Channel
Mode          ..
```

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

```
Redefine? CHL=0
To=Drive Channel
```

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

```
CH0=Drive PID=7
SID=NA SXF=20.8M
```

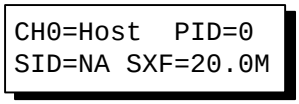
Every time you change a channel’s mode, you must reset the controller for the changes to take effect.

Setting a SCSI Channel's ID / Host Channel

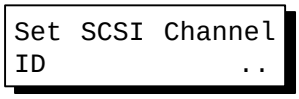
Viewing a SCSI Channel's ID

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

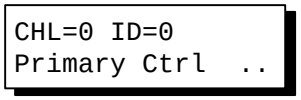
SCSI channel information will be displayed on the LCD. Press **ENT** on the host channel you wish the SCSI ID changed.



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.

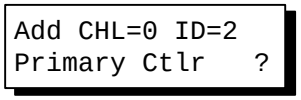


ADDING A SCSI CHANNEL'S ID

Press ▼ or ▲ to choose "Add Channel SCSI ID ", then press **ENT**.

Press ▼ or ▲ to choose "Primary Controller", then press **ENT** for two seconds.

Press ▼ or ▲ to choose the SCSI ID you wish to add, then press **ENT** for two seconds.



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   ?
```

- *Every time you change a channel's SCSI ID, you must reset the 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.*
- *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.*

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 ?
```

- *Every time you change a channel's SCSI ID, you must reset the 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.*
- *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.*

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 ID  ..
```

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 ?
```

- *Every time you change a channel's SCSI ID, you must reset the 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.*
- *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.*

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       ..
```

Press **ENT** again for two seconds to change the terminator mode to the alternative option.

```
CHL=0    Disable
Terminator    ?
```

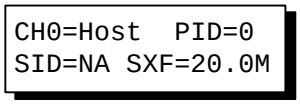
- *Only a terminator with Single-Ended channel can be enabled/ disabled through the setting shown above.*
- *A terminator with Differential channel must be removed/ installed physically from the board. The LCD will show this as "Diff".*

Setting the Transfer Speed

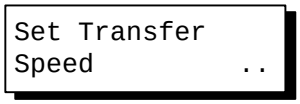
Transfer speed refers to the SCSI bus speed in Synchronous mode. Asynchronous mode is also available in this option setting. In Ultra/Ultra Wide SCSI, the maximum Synchronous speed is 20.8Mhz.

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

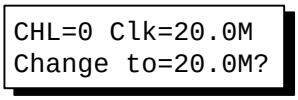
SCSI channel information will be displayed on the LCD. Press ▼ or ▲ to browse through the information of every SCSI channel. Press **ENT** on the channel you wish the transfer speed changed.



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.



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

Setting the Transfer Width

The 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 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**.

```
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 the channel you wish the transfer width changed.

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

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

```
Set Transfer
Width          ..
```

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

```
Wide Transfer
Enabled        ..
```

Press **ENT** again for two seconds.

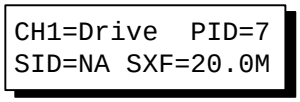
```
Disable
Wide Transfer  ?
```

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

Viewing and Editing a SCSI Target / Drive Channel

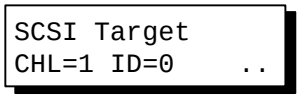
Press **ENT** for two seconds to enter the Main Menu. Press ▼ or ▲ to select "View and Edit SCSI Channels", then press **ENT**.

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



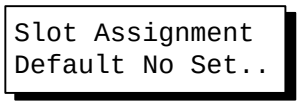
Press ▼ or ▲ to select “View and Edit SCSI Target”, then press **ENT**.

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

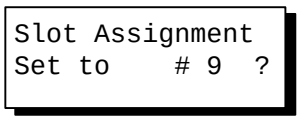


Slot Number

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.

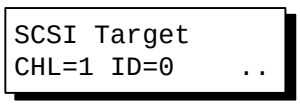


Press ▼ or ▲ to change the slot number, then press **ENT** for two seconds. Refer to Chapter 12, Fault-Bus, for more information about the slot number.

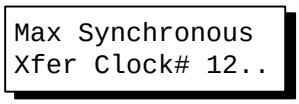


Maximum Synchronous Transfer Clock

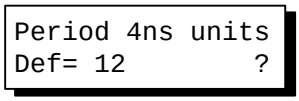
Press ▼ or ▲ to select a SCSI target, then press **ENT**.



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.

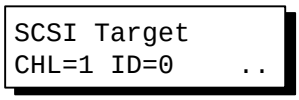


Press ▼ or ▲ to change the clock, then press **ENT** for two seconds. Refer to Appendix D, Sync. Clock Period and Sync. Clock Frequency, for more information.

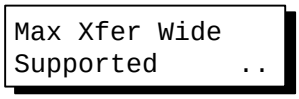


Maximum Transfer Width

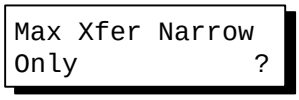
Press ▼ or ▲ to select a SCSI target, then press **ENT**.



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.

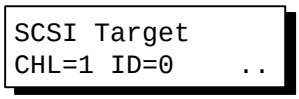


Press **ENT** for two seconds to change the setting.

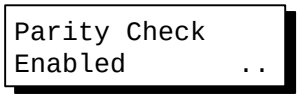


Parity Check

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.



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)  ..
```

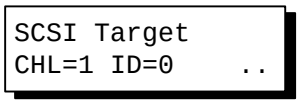
Press ▼ or ▲ to change the setting, then press **ENT** for two seconds to change the setting.

```
Tag Cur=32
Set to:Default ?
```

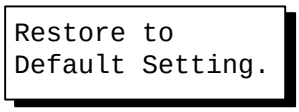
Disabling the Maximum Tag Count will disable the internal cache of this SCSI drive.

Restoring the Default Setting

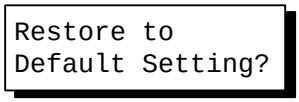
Press ▼ or ▲ to select a SCSI target, then press **ENT**.



Choose “Restore to Default Setting”, then press **ENT**.



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



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.

Communication Parameters

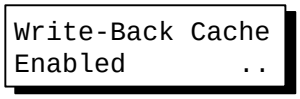
Refer to Chapter 11, Remote Administration, for information on communication parameters.

Caching Parameters

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

- *Every time you change the Cache Parameters, you must reset the controller for the changes to take effect.*
- *When using the Redundant Controller function, the cache will automatically switch to Write-through mode eventhough it shows write back.*

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 ?
```

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

Host-side SCSI Parameters

Press ▼ or ▲ to select “Host-side SCSI Parameters”, then press **ENT**.

```
Host-side SCSI
Parameters    ..
```

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 ▼ 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 ?
```

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

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    ?
```

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

Drive-side SCSI Parameters

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

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

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       ?
```

- *The corresponding settings/jumpers have to be configured on the hard drives.*
- *Every time you change this setting, you must reset the controller for the changes to take effect.*
- *Refer to Chapter 3 section “SCSI Motor Spin-Up” for more information.*

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   ?
```

- *Every time you change this setting, you must reset the controller for the changes to take effect.*
- *Refer to “3.5.2 SCSI Reset at Power-Up” for more information.*

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..
```

- *Every time you change this setting, you must reset the controller for the changes to take effect.*
- *Refer to Chapter 3 section “Disk Access Delay Time” for more information.*

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.

```
Maximum Tag
Count - 32    ..
```

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

```
Maximum Tag
Count - 128   ..
```

- *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.*

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 ?
```

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
```

Idle Drive Failure Detection

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 "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 ?
```

- *By choosing a time value to enable the "Periodic Drive Check Time", the controller will poll all of the connected drives in the controller's drive channels at the assigned interval. Drive removal will be detected even if a host does not attempt to access data on the drive.*

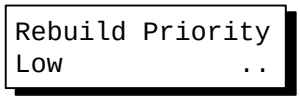
- *If the "Periodic Drive Check Time" is set to "Disabled" (the default setting is "Disabled"), the controller will not be able to detect any drive removal that occurs after the controller has been powered on. The controller will only be able to detect drive removal when a host attempts to access the data on the drive.*

Disk Array Parameters

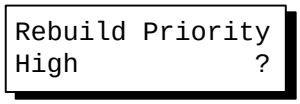
Press ▼ or ▲ to select “Disk Array Parameters”, then press **ENT**.

Rebuilding Priority

Press ▼ or ▲ to select “Rebuild Priority”, then press **ENT**. The current setting will be displayed on the LCD.

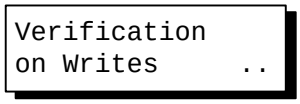


Press ▼ or ▲ to select “Low”, “Normal”, “Improved” or “High”, then press **ENT** for two seconds.



Verification on Writes

Press ▼ or ▲ to select “Verification on Writes”, then press **ENT**.



(Refer to Chapter 3 section “Verify-after-Write” for more information.)

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.

```
On LD Initializa
Writes Disabled.
```

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

```
Enable VerifyOn
LD Init Writes ?
```

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.

```
On LD Rebuild
Writes Disabled.
```

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

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

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 ?
```

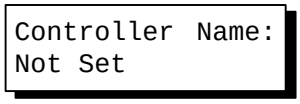
When "Verification on Normal Drive Writes" is enabled, all read/write will be slower than when it is disabled.

Controller Parameters

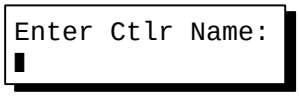
Controller Name

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

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



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.



Viewing and Editing Peripheral Devices

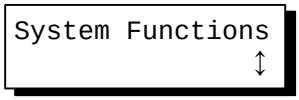
Refer to Chapter 9 for information on the Redundant Controller and Chapter 12 for information on the Fault-bus operation.

System Functions

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**.

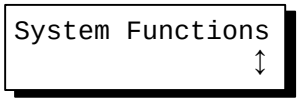


Press ▼ or ▲ to select “Mute Beeper”, then press **ENT**.

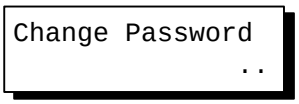
Press **ENT** for two seconds to mute the beeper.

Changing the Password

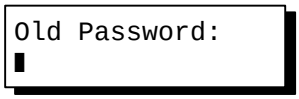
Press **ENT** for two seconds to enter the Main Menu. Press ▼ or ▲ to select "System Functions", then press **ENT**.



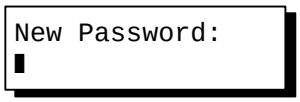
Press ▼ or ▲ to select “Change Password”, then press **ENT**.



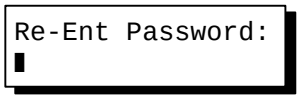
If there is an existing password, you must enter the current password first before you can enter a new password. To enter the current password, press ▼ or ▲ to select a character, then press **ENT** to move to the next space. After entering all the character, press **ENT** for two seconds.



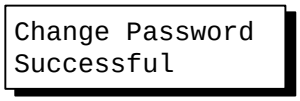
To enter the new password, press ▼ or ▲ to select a character, then press **ENT** to move to the next space. After entering all the characters, press **ENT** for two seconds.



Re-enter the new password, then press **ENT** for two seconds.

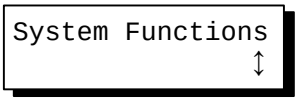


The LCD will display the message “Change Password Successful”.



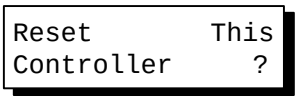
Resetting the Controller

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



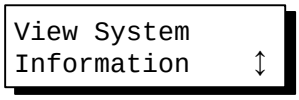
Press ▼ or ▲ to select “Reset This Controller”, then press **ENT**.

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

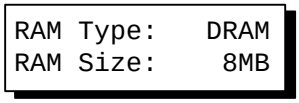


Viewing System Information

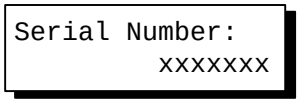
Press **ENT** for two seconds to enter the Main Menu. Press ▼ or ▲ to select "View System Information", then press **ENT**.



Press ▼ or ▲ to browse through the 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



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**.

```
View and Edit
Event Logs      ↑
```

Press ▼ or ▲ to browse through the existing event log items.

```
UPS Power
Failure Detected
```

To delete a specified item and all event prior to this event, press **ENT** for 2 seconds.

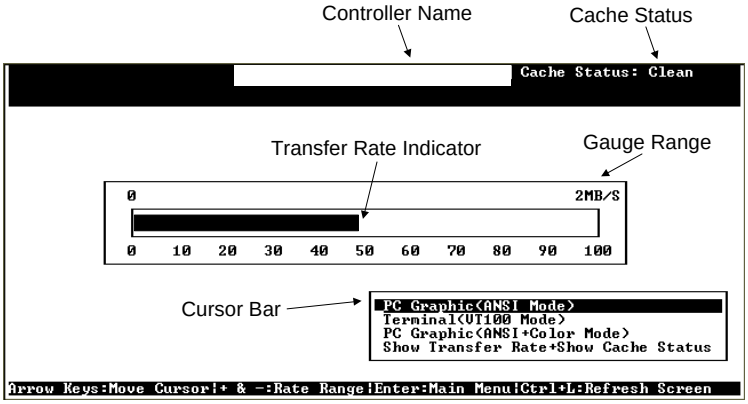
```
UPS Power
Failure Detected
```

The event log will be cleared after the controller resets

Chapter 8 RS-232C Terminal Interface

Understanding the Information on the Screen

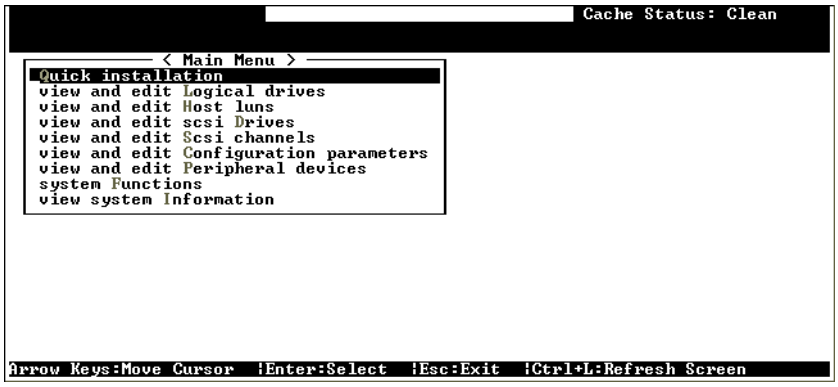
The Initial Screen



Item	Description
Cursor Bar	Move the cursor bar to a desired item, then press **ENTER** to select.
Controller Name	Identifies the type of 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.

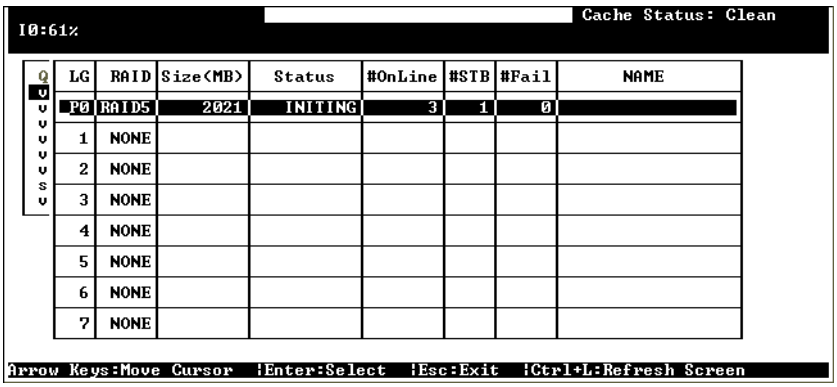
Item	Description
PC Graphic (ANSI Mode)	Enters the Main Menu and operates in ANSI mode.
Terminal (VT-100 Mode)	Enters the Main Menu and operates in VT-100 mode.
PC Graphic (ANSI+Color Mode)	Enters the Main Menu and operates in ANSI color mode.
Show Transfer Rate+Show Cache Status	Press **ENTER** on this item to show the cache status and transfer rate.

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.

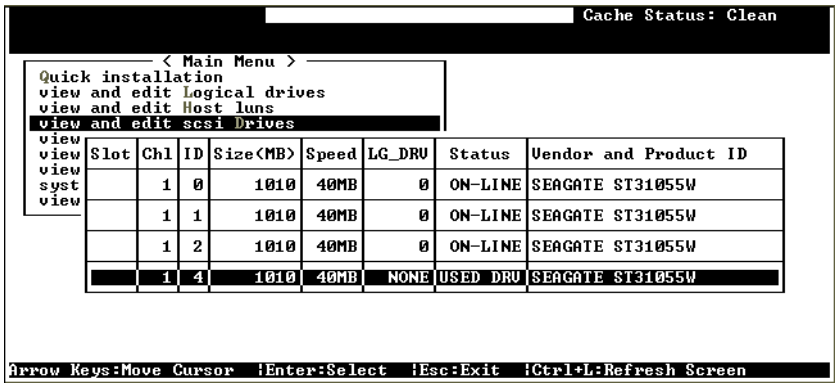
Logical Drive's Status



Item	Description	
LG	Logical Drive number. P0: Logical Drive 0 of the Primary Controller	
RAID	RAID Level.	
Size(MB)	Capacity of the Logical Drive.	
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.

Item	Description	
	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.	

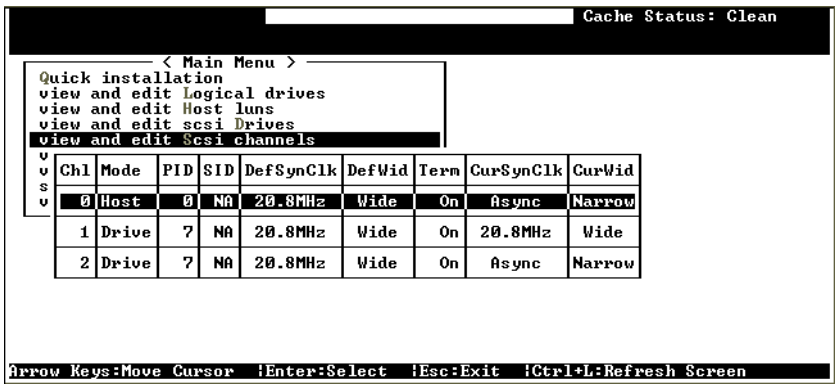
SCSI Drive's Status



Item	Description	
Slot	Slot number of the SCSI drive. Refer to Chapter 12, Fault-Bus, for details.	
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

Item	Description	
		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.
Vendor and Product ID	The vendor and product model information of the drive.	

SCSI Channel's Status

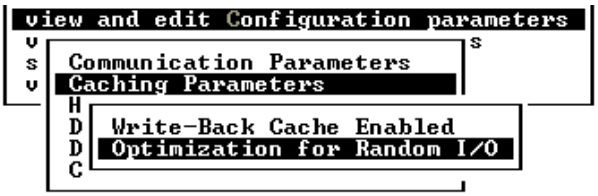


Item	Description	
Chl	The SCSI channel's ID.	
Mode	Channel mode.	
	Host	Host Channel mode
	Drive	Drive Channel mode
PID	Primary controller's SCSI ID mapping:	
	*	Multiple SCSI IDs were applied (Host Channel mode only).
	(ID number)	The Primary Controller is using the SCSI ID for host LUN mapping.
	NA	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).

Item	Description	
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.
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.

- *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.*

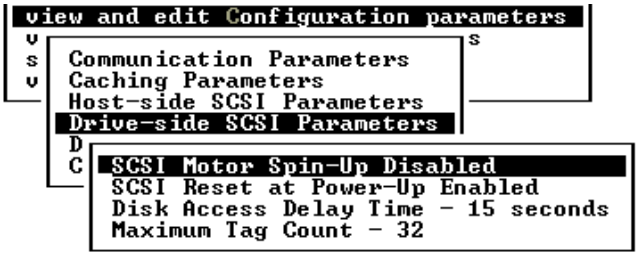
Viewing the Current Setting of Each Function



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".

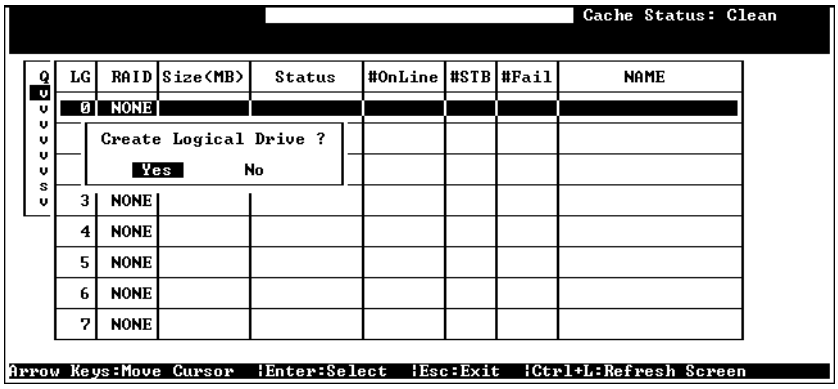


In the example shown above:

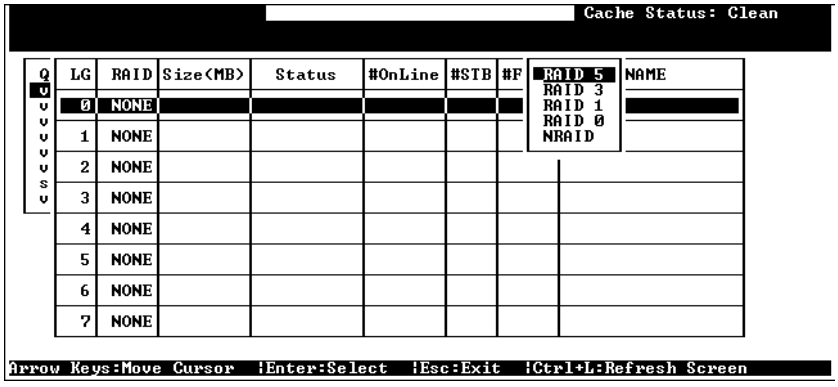
- The current setting of "SCSI Motor Spin-Up" is "Disabled".
- The current setting of "SCSI Reset at Power-Up" is "Enabled".
- The current setting of "Disk Access Delay Time" is "15 seconds".
- The current setting of "Maximum Tag Count" is "32".

Viewing and Editing Logical Drives

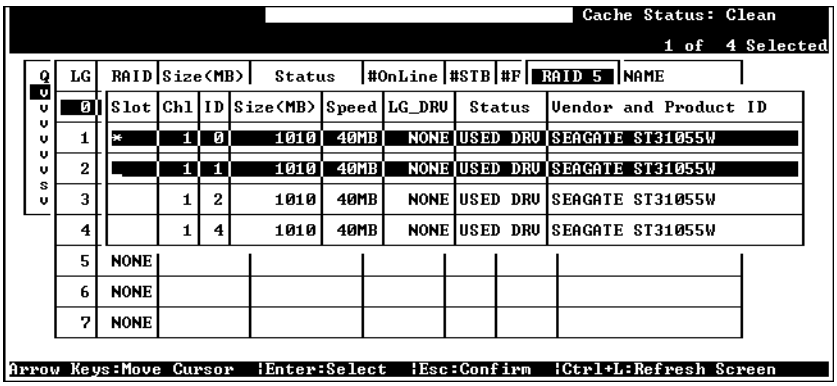
Creating a Logical Drive



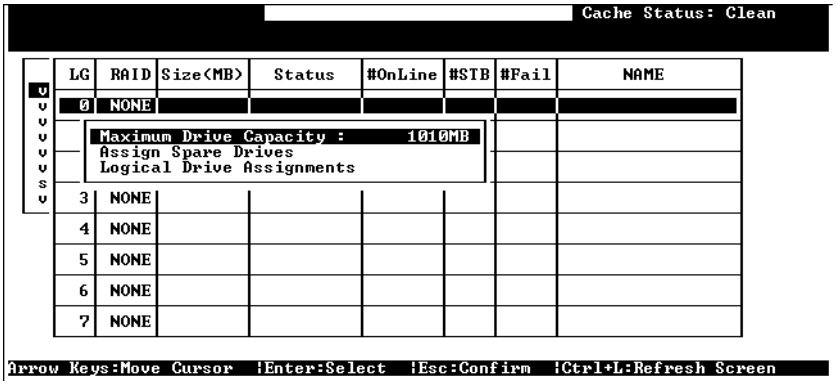
Choose "View and Edit Logical Drives" in the Main Menu. The current logical drive configuration and status will be displayed on the screen. Choose a logical drive number that has not yet been defined, then press [Enter]. A prompt "Create Logical Drive?" will appear. Select "Yes" and press [Enter].



A list of supported RAID levels will appear. Choose a RAID level for this logical drive.



The drives can be tagged for inclusion by positioning the cursor on the drive and then pressing [Enter] to select. An asterisk (*) will appear on the drive that has been selected. Press [ESC] when done.

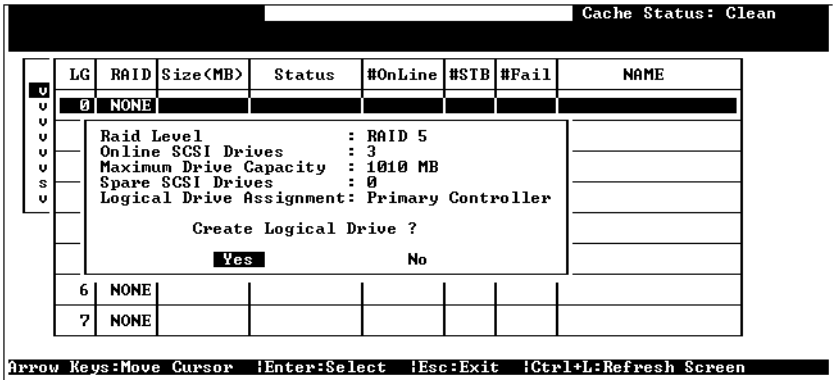


To limit the capacity of each drive included in the logical drive, select "Maximum Drive Capacity", then enter the maximum capacity that will be used by each drive.

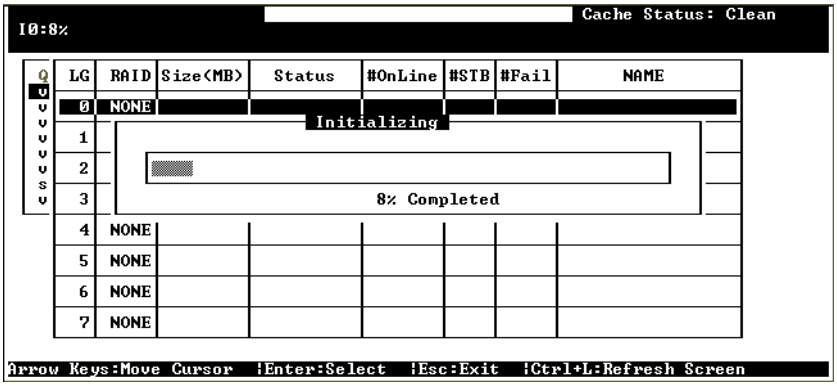
You can assign a Local Spare Drive by choosing "Assign Spare Drives" in the above screen. A list of available drives will be displayed on the screen. Mark an asterisk (*) on the drive(s) that will be assigned by moving the cursor bar to that device, then pressing [Enter]. Press [ESC] when done.

To exit this menu, press [ESC].

A prompt to confirm the changes will appear. Select Yes to create the logical drive, or No to cancel.



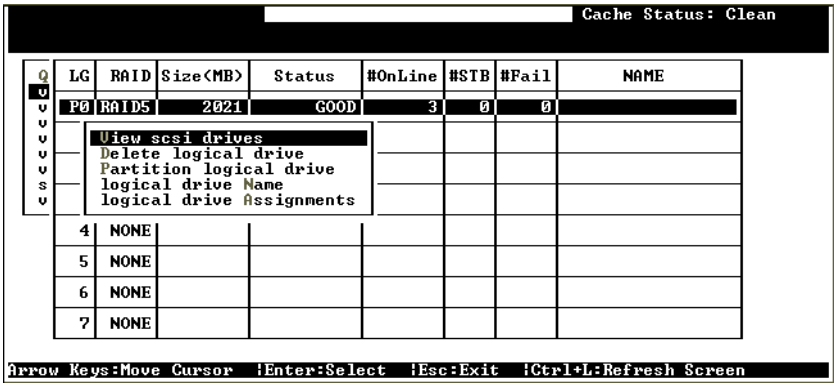
When a fault-tolerant RAID level (1, 3 or 5) has been selected, the controller will start initializing parity. A progress indicator will be displayed on the screen. After initialization is done, the created logical drive is also complete.



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 "8.1.3 Logical Drive's Status" for detailed descriptions.

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



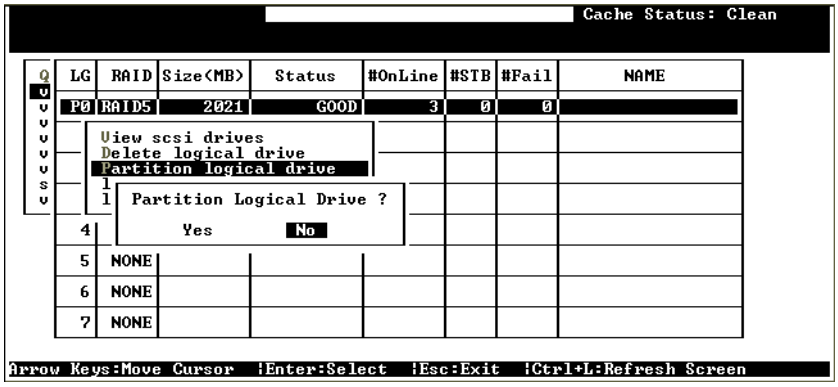
Choose "View SCSI Drives". The member drive information will be displayed on the screen. Refer to Chapter 8 section “SCSI Drive’s Status" for the detailed descriptions of each item.

Deleting a Logical Drive

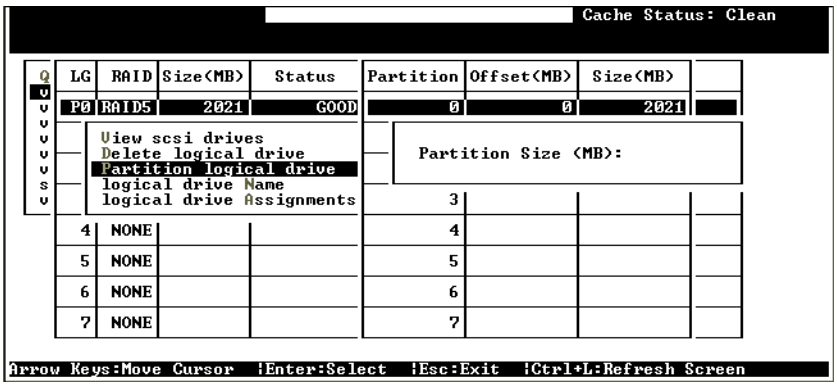
Choose the logical drive you wish to delete, then press [Enter]. Choose "Delete logical drive". Choose Yes when prompted to confirm.

Partitioning a Logical Drive

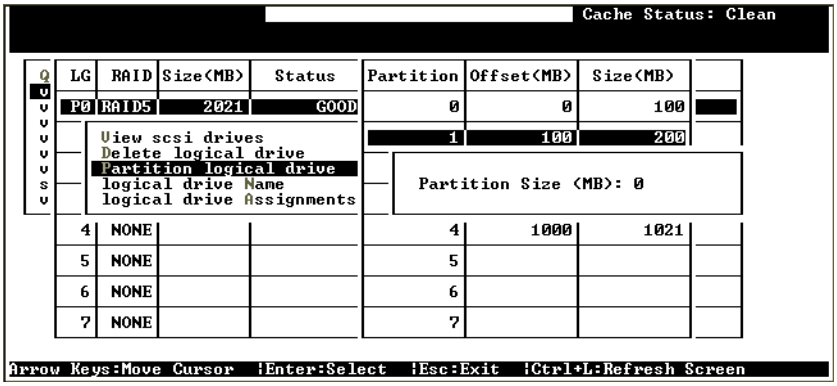
Choose the logical drive you wish to partition, then press [Enter]. Choose "Partition logical drive", then press [Enter]. Choose Yes to confirm.



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.

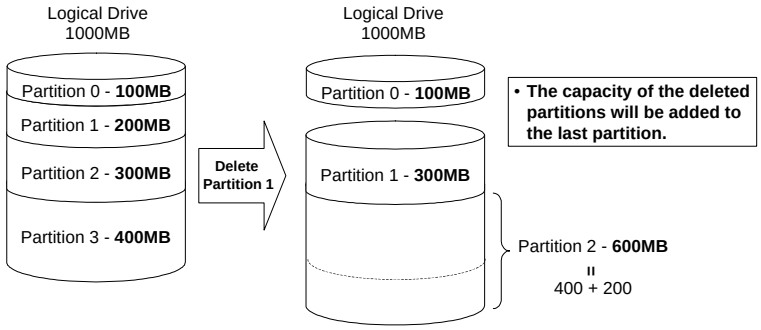


Deleting a Partition of a Logical Drive



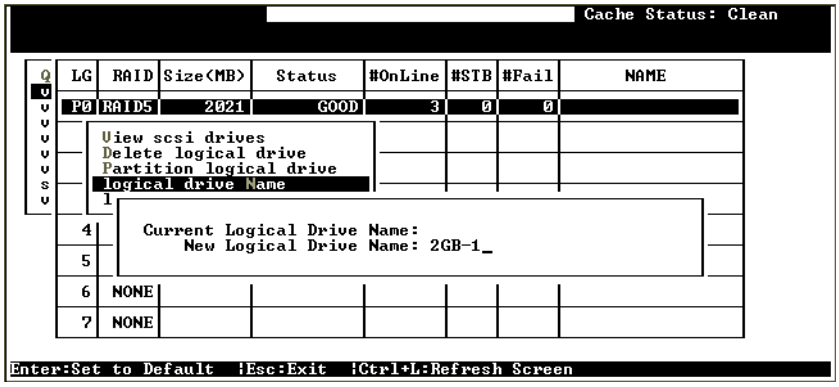
Choose the logical drive of the partition you wish to delete, then press [Enter]. Choose "Partition logical drive". The current partition table of the logical drive will be displayed in tabulated form. Move the cursor bar to the partition you wish to delete, then press [Enter]. Enter "0" on the partition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

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



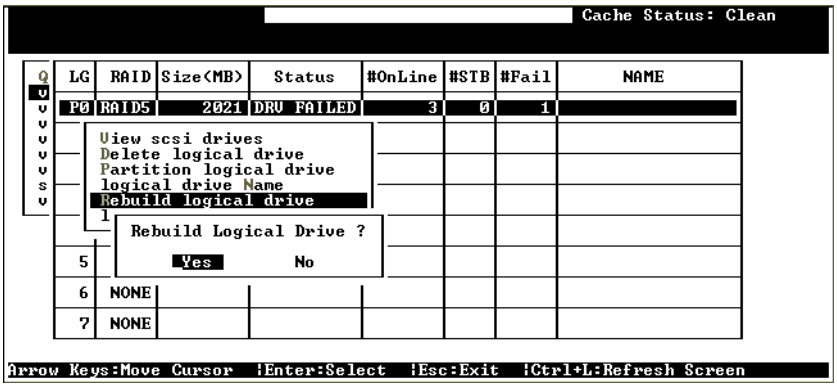
- *The capacity of the deleted partition will be added into the last partition.*
- *As long as a partition has been changed, it is necessary to re-configure all host LUN mappings. All the host LUN mappings will be removed with any partition change.*

Assigning a Logical Drive Name

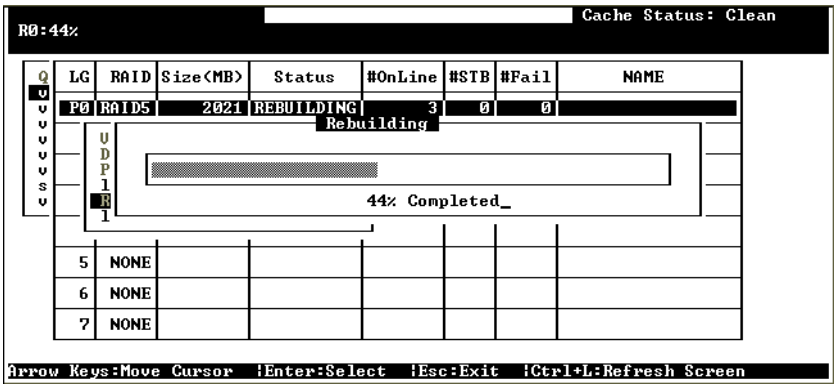


Choose the logical drive you wish to assign a logical drive name, then press [Enter]. Choose "logical drive name", then press [Enter] again. The current logical drive name will be displayed on the screen. You may now enter the new logical drive name in this field. Enter the logical drive name, then press [Enter] to save the new name.

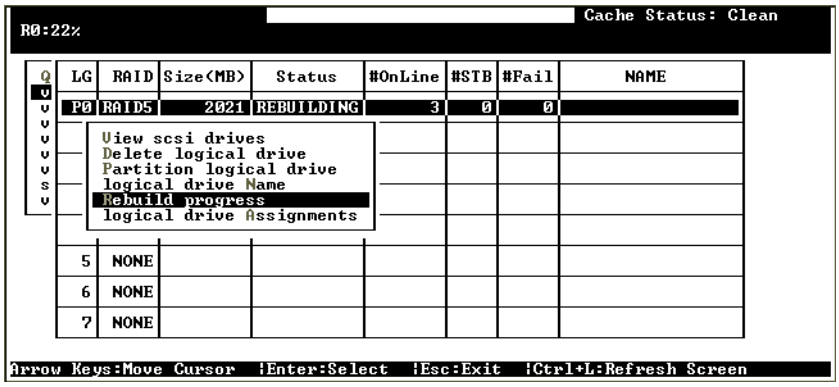
Rebuilding Logical Drive



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.

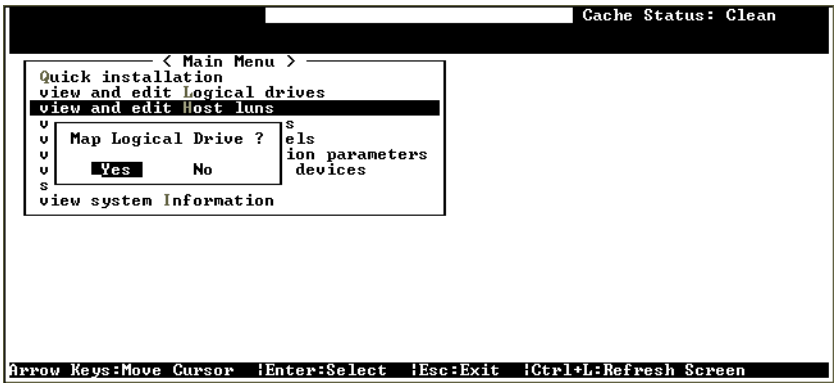


When rebuilding has already started or the logical drive has been automatically rebuilt by a Local Spare Drive or Global Spare Drive, choose "Rebuild progress" to view the rebuilding progress.

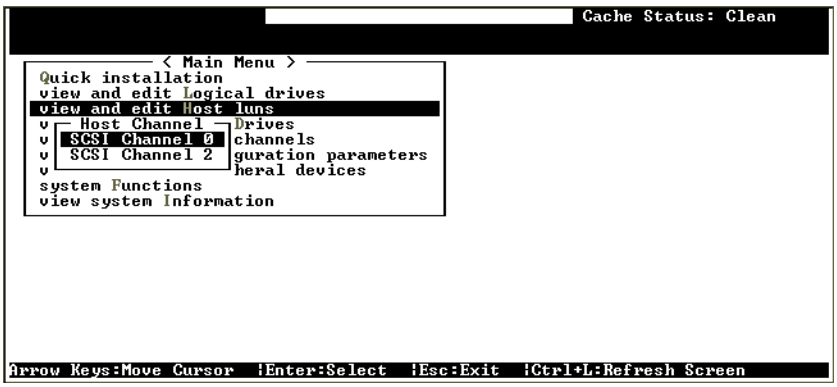
- *The Rebuild function will appear only when a logical drive (with RAID level 1, 3 or 5) has a failed drive member.*
- *Refer to Chapter 3 section "Automatic Rebuild and Manual Rebuild" for more information.*

Viewing and Editing Host LUNs

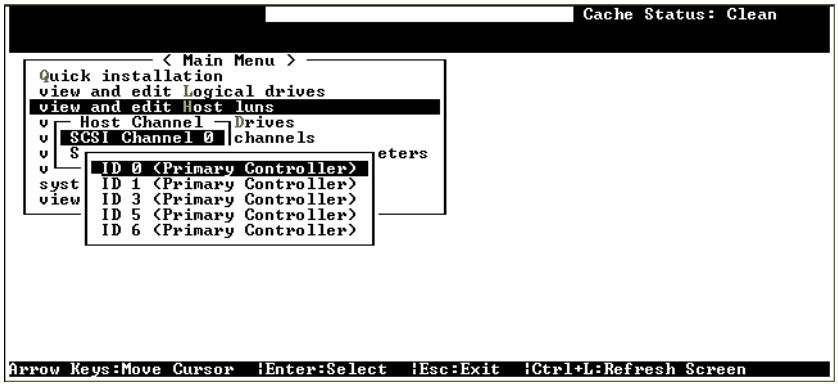
Mapping a Logical Drive to a Host LUN



Choose "view and edit Host luns" in the Main Menu, then press [Enter]. When prompt with "Map Logical Drive?", select Yes.

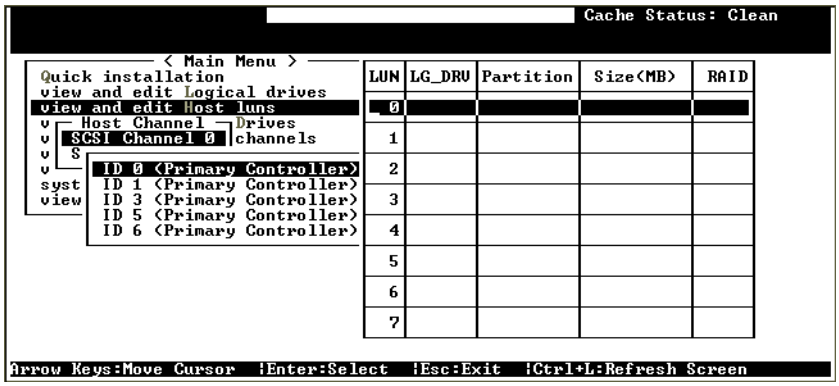


A list of host channels will be displayed on the screen. Choose the host channel you wish to map.

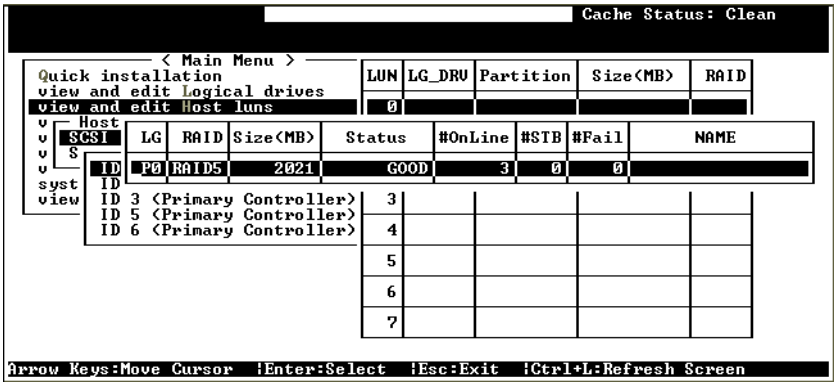


If the host channel has been assigned multiple SCSI IDs, a list of the host channel's SCSI IDs will be displayed on the screen. Choose the SCSI ID you wish to map, then press [Enter].

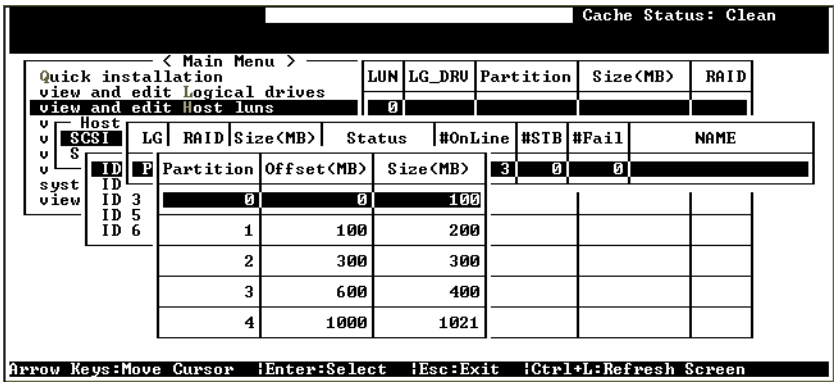
Multiple SCSI ID is supported in firmware version 2.11 or later. Firmware versions earlier than 2.11 only supports one SCSI ID.



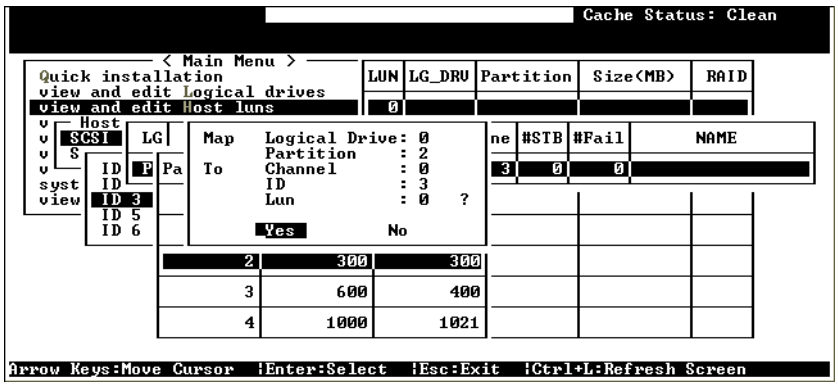
A list of LUNs and their respective mappings will be displayed on the screen. To map a host LUN to a logical drive's partition, select an available LUN (one not mapped yet) by moving the cursor bar to the LUN, then pressing [Enter].



A list of available logical drives will be displayed on the screen. Move the cursor bar to the desired logical drive, then press [Enter].



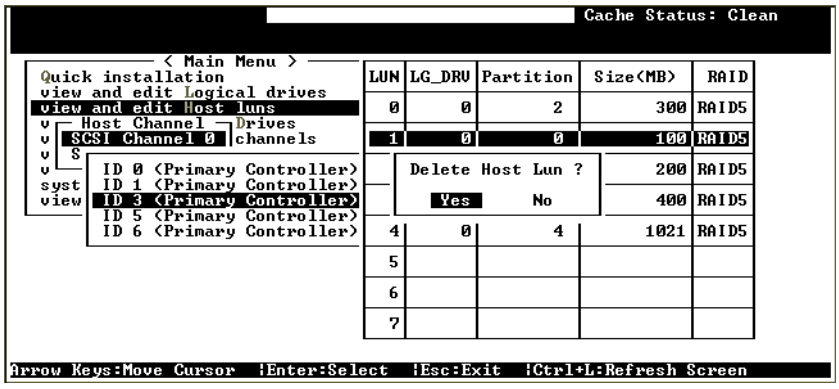
A partition table of the logical drive will be displayed on the screen. Move the cursor to the desired partition, then press [Enter].



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.

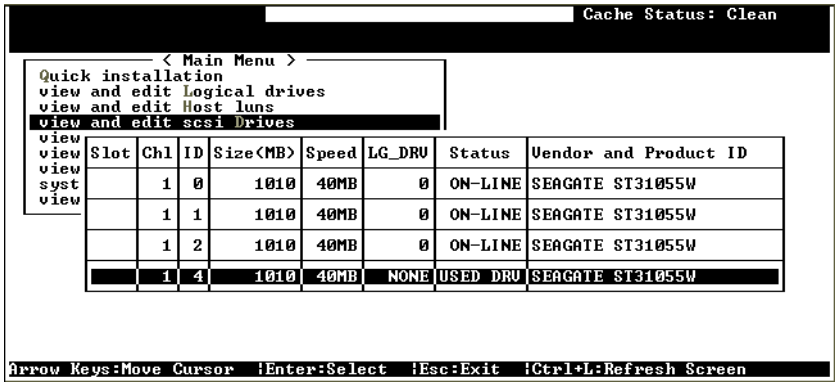
Viewing and Deleting the LUN Mappings

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



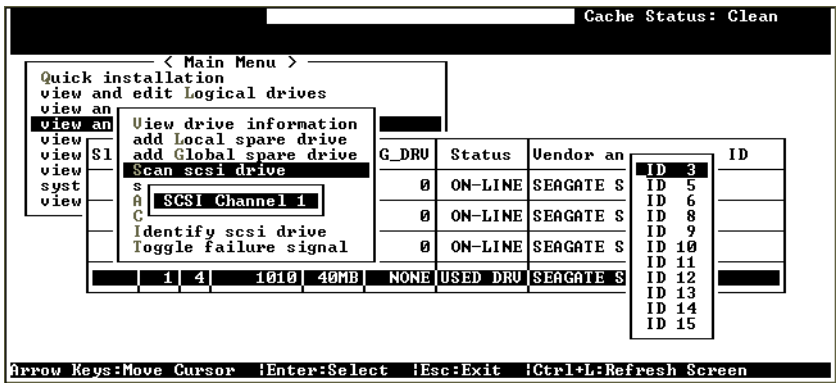
A list of the current LUN mapping will be displayed on the screen. Move the cursor bar to the LUN mapping you wish to delete, then press [Enter]. Select Yes to delete the LUN mapping, or No to cancel.

Viewing and Editing SCSI Drives



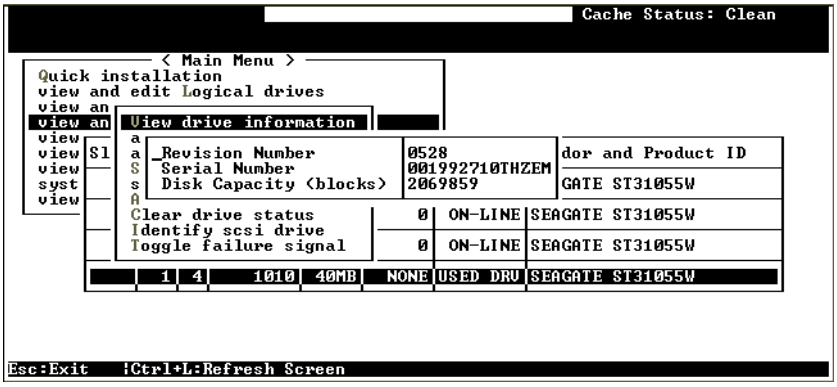
Choose "View and Edit SCSI Drives" in the Main Menu. All drives attached to the drive channels will be displayed on the screen. Refer to chapter 8 section “SCSI Drive’s Status" for detailed descriptions of each column.

Scanning a New SCSI Drive



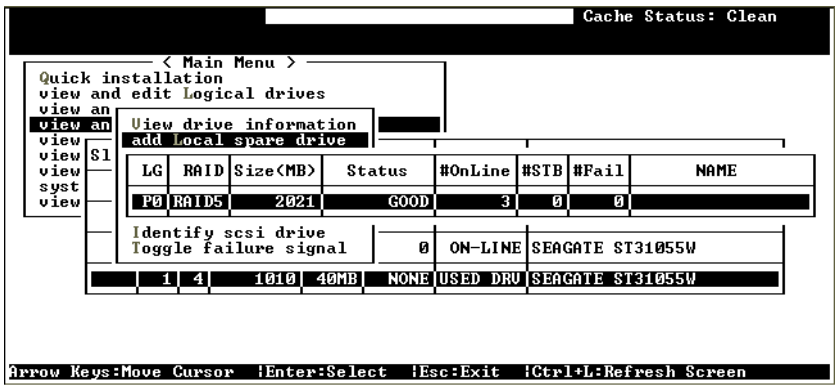
Choose a drive and press [Enter]. Choose "Scan SCSI drive", then press [Enter]. The menu may vary according to the drive status. Choose the drive channel and SCSI ID of the drive you wish to scan, then press [Enter].

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.

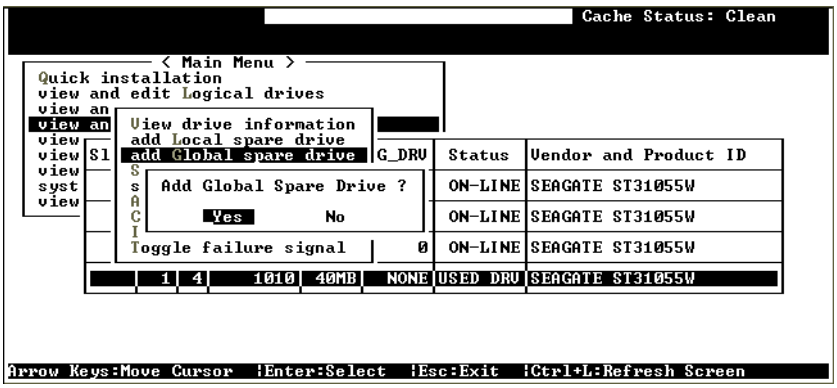
Adding a Local Spare Drive



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 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.

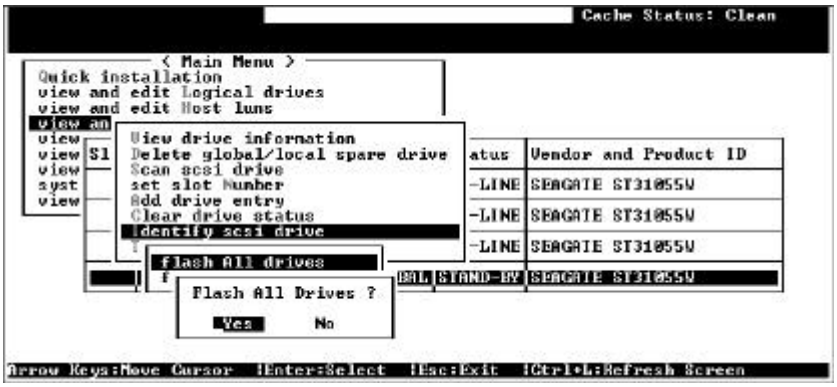
When prompted with "Add Local Spare Drive?", choose Yes.

Adding a Global Spare Drive

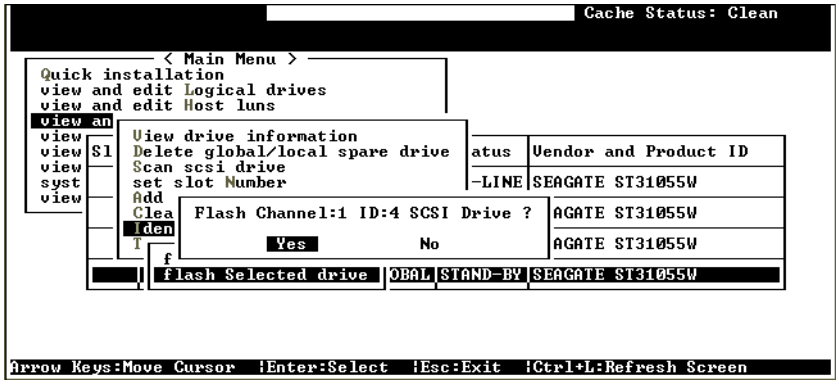


Move the cursor bar to the SCSI drive that has not yet been assigned to a logical drive or as a spare drive, then press [Enter]. Choose "Add Global Spare Drive". When prompted with "Add Global Spare Drive?", choose Yes.

Identifying a Drive



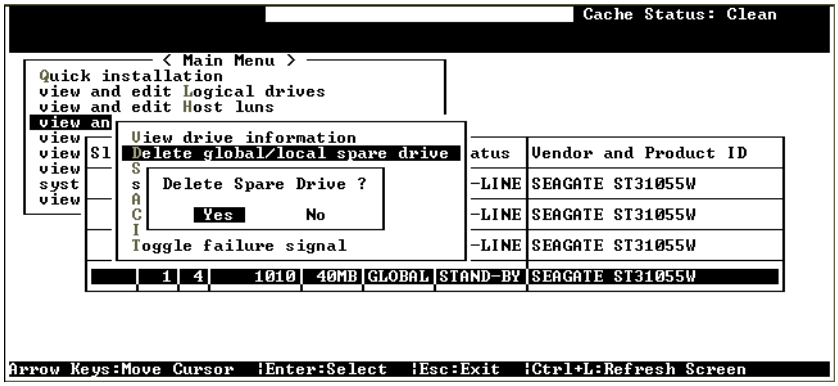
Move the cursor bar to the drive you wish to identify, then press [Enter]. Choose "Identify SCSI drive", then choose "flash all drives" to flash the read/write LEDs of all the drives in the drive channel. Choose Yes.



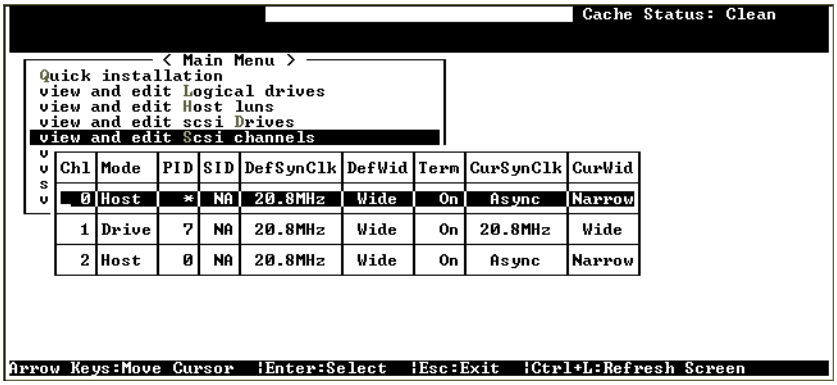
Or choose "flash selected drive" to flash the read/write LED of the selected drive only. Choose Yes.

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.

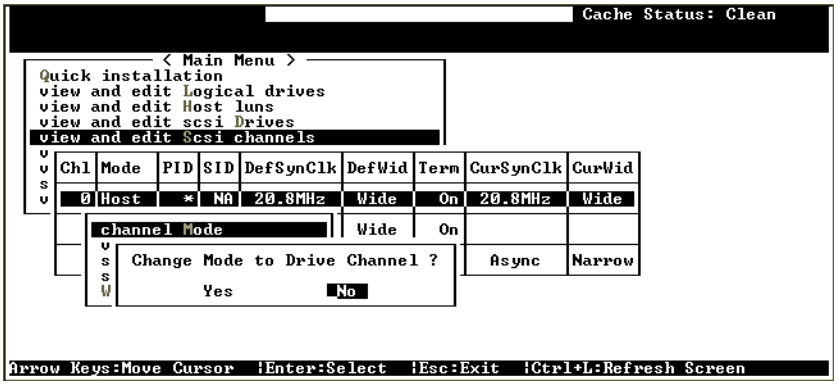


Viewing and Editing SCSI Channels



Choose "View and Edit SCSI Channels" in the Main Menu. A list of all the channels will be displayed on the screen. Refer to "SCSI Channel Status" for detailed information.

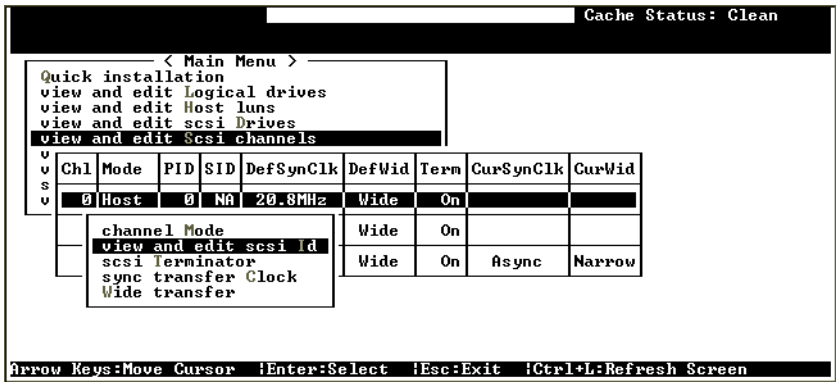
Redefining a Channel Mode



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.

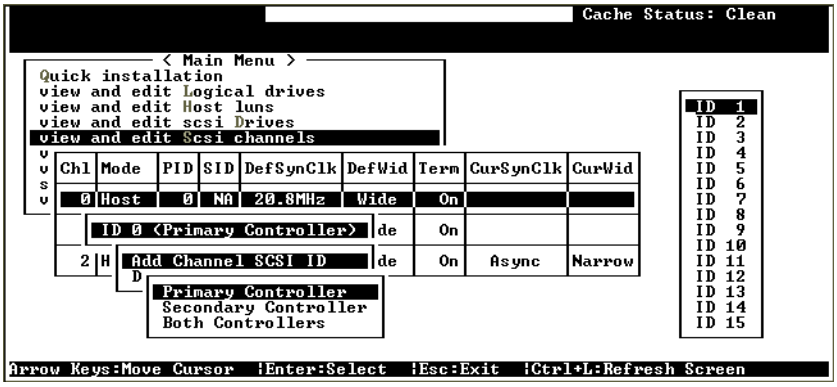
Every time you change the channel mode, you must reset the controller for the changes to take effect.

Viewing and Editing a SCSI ID / Host Channel



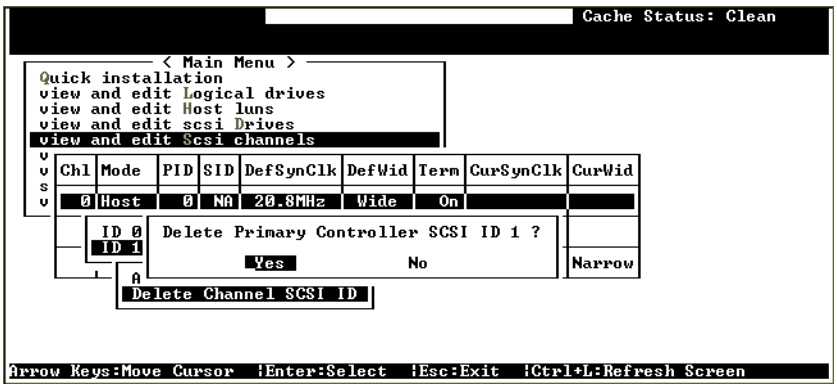
Choose a Host channel, then press [Enter]. Choose "View and Edit SCSI ID". A list of the existing ID(s) will be displayed on the screen.

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.

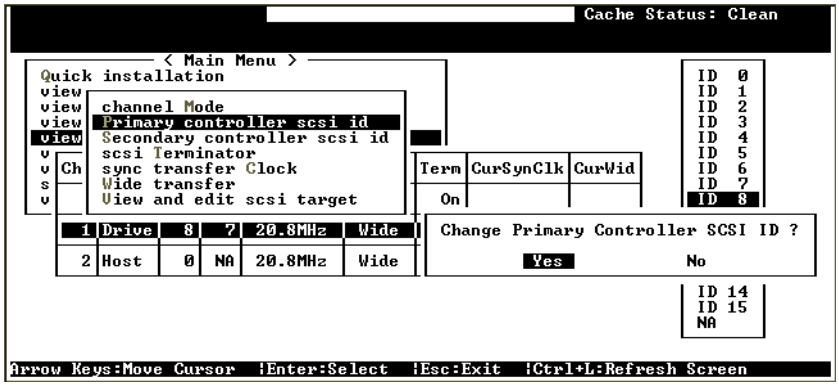
Deleting a SCSI ID



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.

- *Every time you change a channel's SCSI ID, you must reset the 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.*
- *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.*

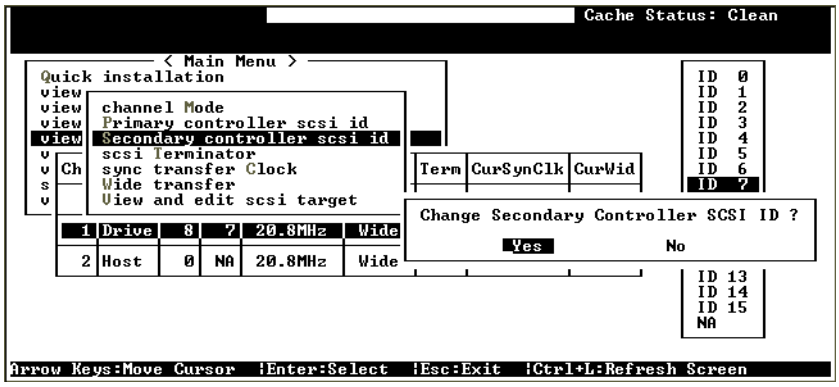
Setting a Primary Controller's SCSI ID / Drive Channel



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].

- *Every time you change a channel's SCSI ID, you must reset the 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.*
- *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.*

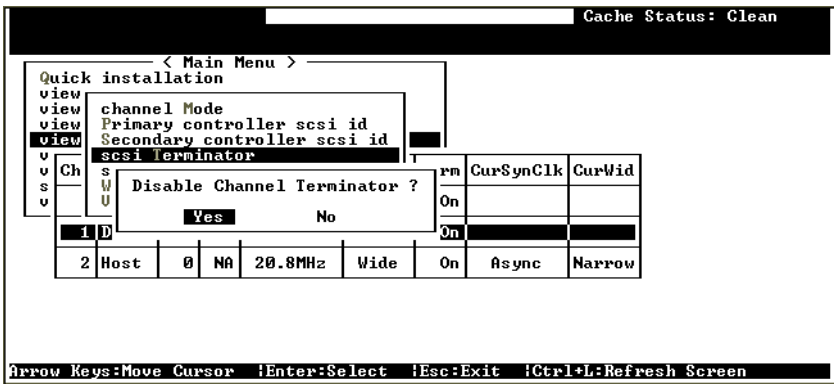
Setting a Secondary Controller's SCSI ID / Drive Channel



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].

- *Every time you change a channel's SCSI ID, you must reset the 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.*
- *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.*

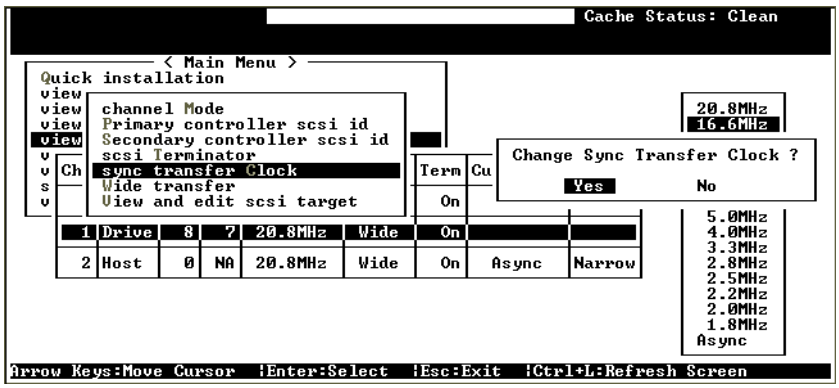
Setting a SCSI Channel's Terminator



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].

- *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".*

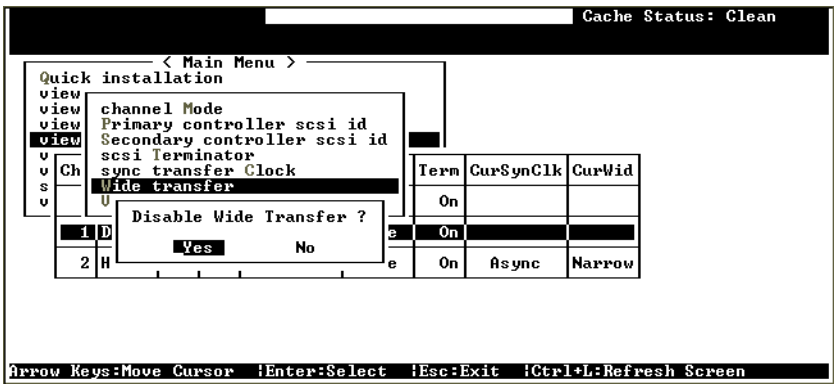
Setting a Transfer Speed



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.

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

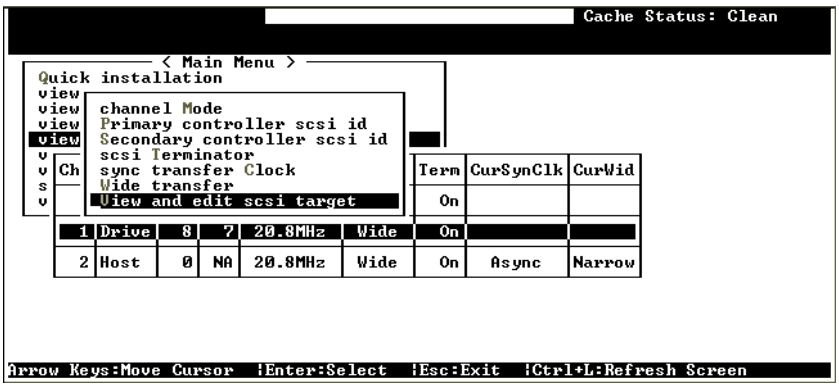
Setting a Transfer Width



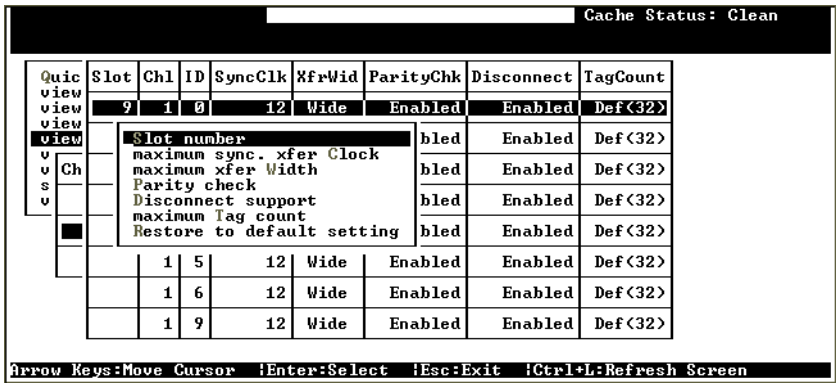
Move the cursor bar to a channel, then press [Enter]. Select "Wide Transfer", then press [Enter]. A dialog box "Disable Wide Transfer?" or "Enable Wide Transfer?" will appear. Choose Yes.

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

Viewing and Editing SCSI Target / Drive Channel

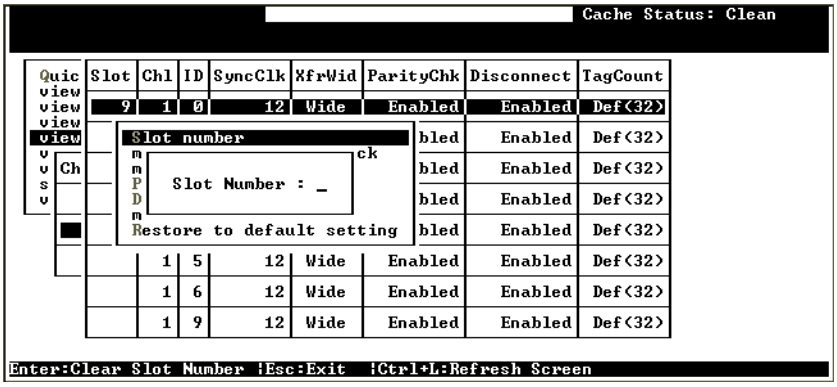


Move the cursor bar to a Drive channel, then press [Enter]. Select "View and Edit SCSI Target", then press [Enter].



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.

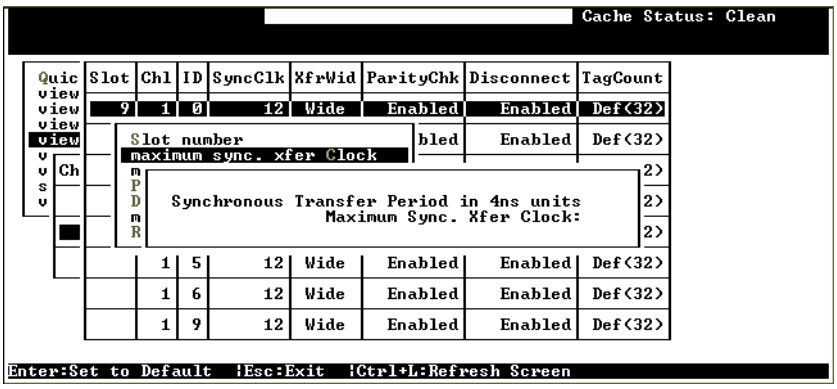
Slot Number



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

Please refer to Chapter 12, Fault-Bus, for more information.

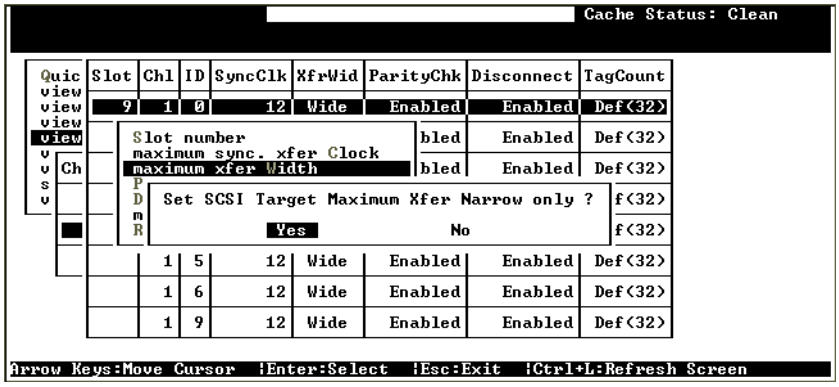
Maximum Synchronize Transfer Clock



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

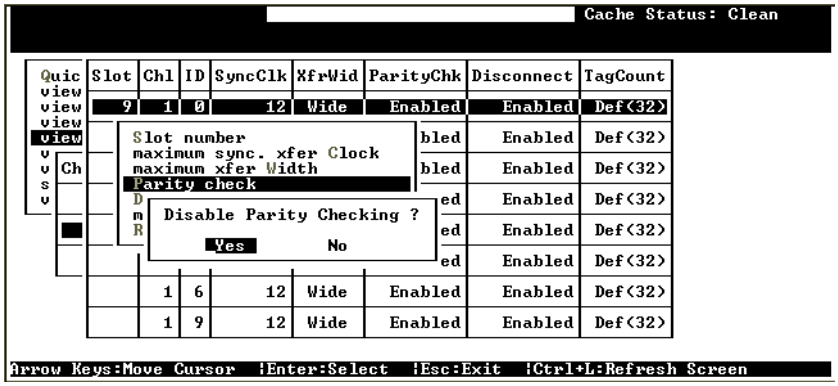
Please refer to Appendix D, Sync. Clock Period and Sync. Clock Frequency, for more information.

Maximum Transfer Width



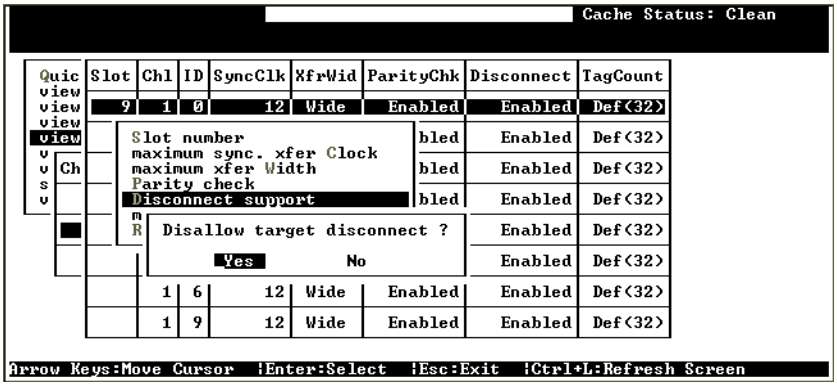
Choose "Maximum Xfer Width", then press [Enter]. Choose Yes in the dialog box to confirm the setting.

Parity Check



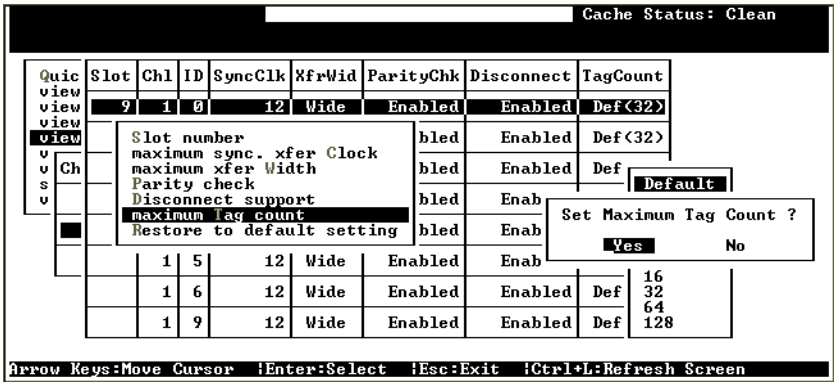
Choose "Parity Check". Choose Yes in the dialog box that followed to confirm the setting.

Disconnecting Support



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

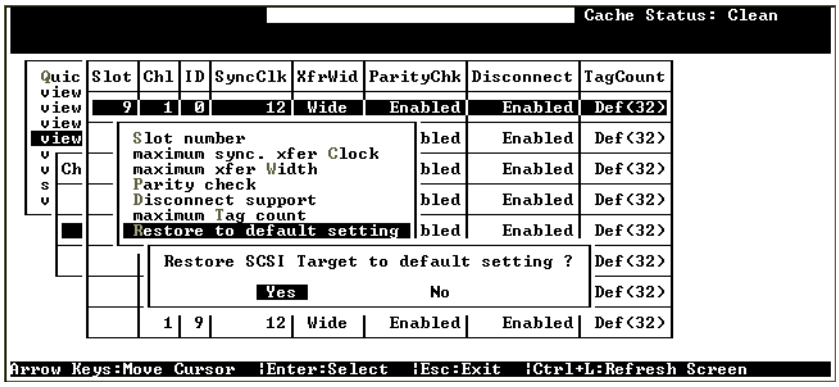
Maximum Tag Count



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.

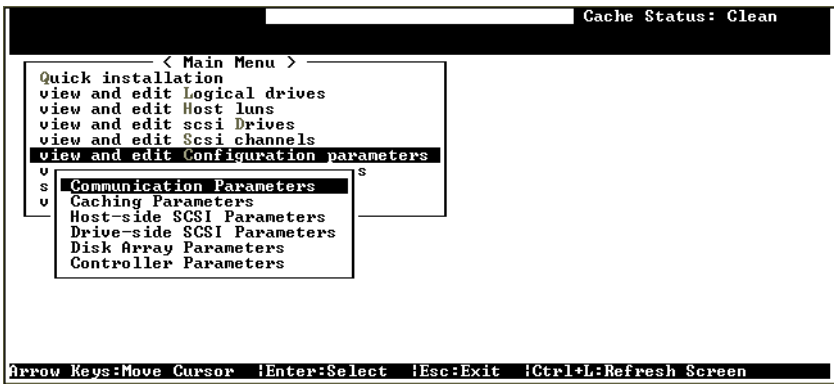
Disabling the Maximum Tag Count will disable the internal cache of the SCSI drive.

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.

Viewing and Editing Configuration Parameters



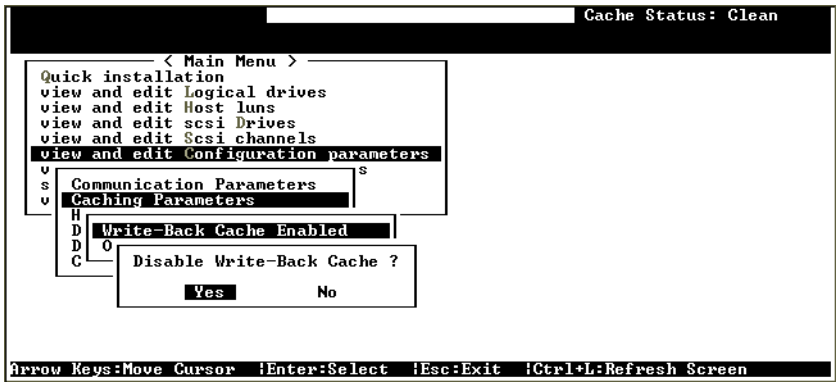
Choose "View and Edit Configuration Parameters", then press [Enter]. Move the cursor bar to the desired item, then press [Enter].

Communication Parameters

Refer to Chapter 11, Remote Administration for more information.

Caching Parameters

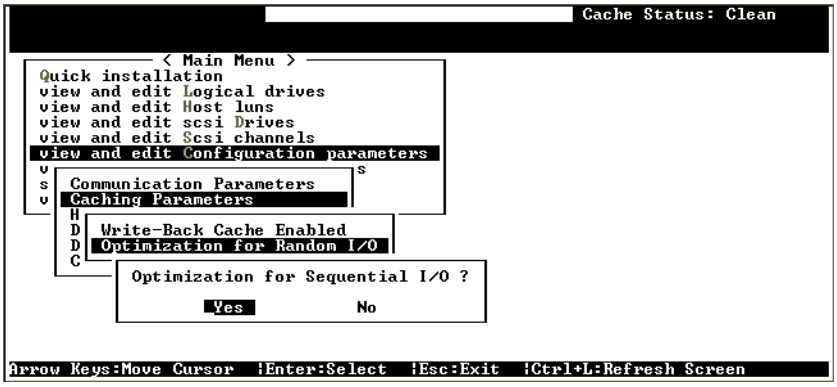
Write-Back Cache Enable/Disable



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.

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

Optimization for Random or Sequential I/O

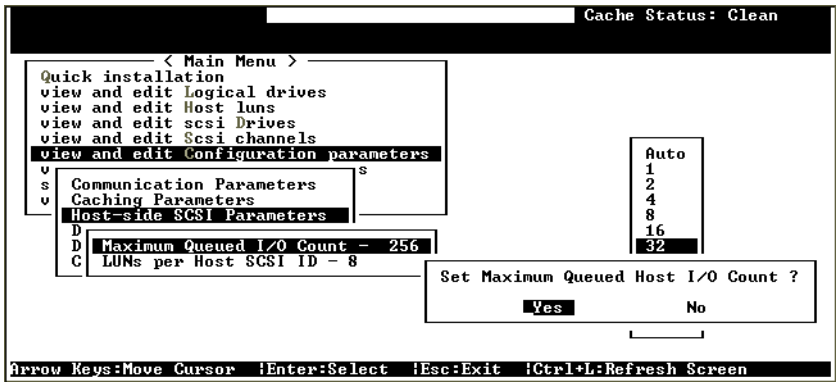


Choose "Optimization for Random I/O" or "Optimization for Sequential I/O", then press [Enter]. The "Random" or "Sequential" dialog box will appear, depending on the option you have selected. Choose Yes in the dialog box that followed to confirm the setting.

- *Every time you change this setting, you must reset the controller for the changes to take effect.*
- *Refer to section "Optimal for Sequential or Random I/O" in chapter 3 for more information.*

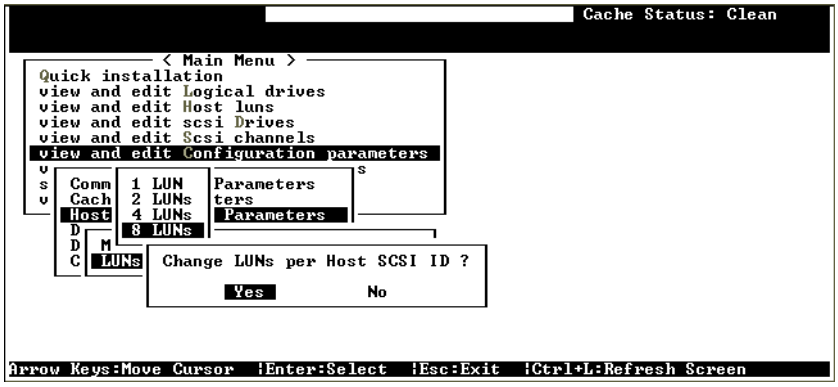
Host-side SCSI Parameters

Maximum Queued I/O Count



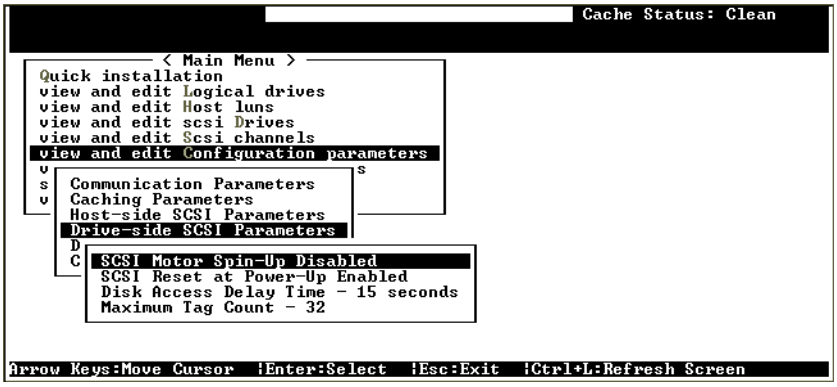
Choose "Host-side SCSI Parameters", then press [Enter]. Choose "Maximum Queued I/O Count", then press [Enter]. A list of available selections will appear. Move the cursor bar to an item, then press [Enter]. Choose Yes in the dialog box that followed to confirm the setting.

LUNs per Host SCSI ID



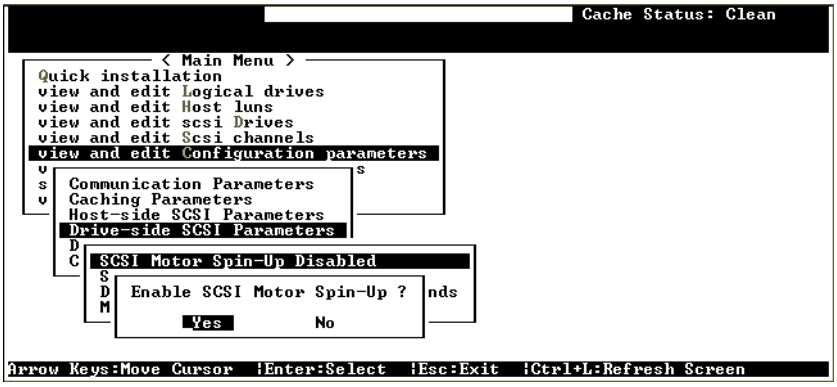
Choose "LUNs per Host SCSI ID", then press [Enter]. A list of selections will appear. Move the cursor bar to an item, then press [Enter]. Choose Yes in the dialog box that followed to confirm the setting.

Drive-side SCSI Parameters



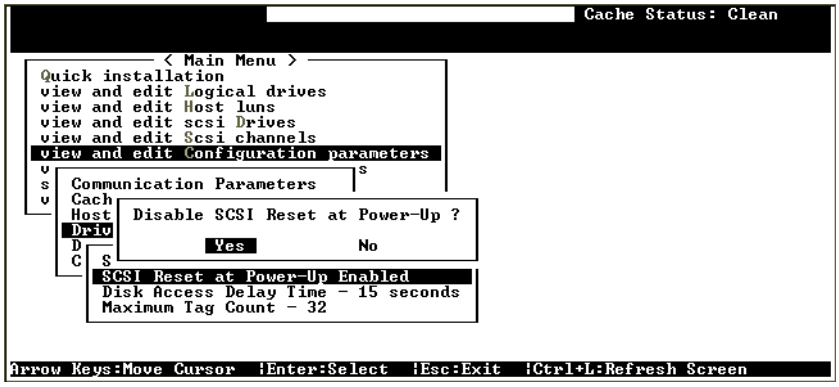
Choose "Drive-side SCSI Parameters", then press [Enter]. The Drive-side SCSI parameters menu will appear.

SCSI Motor Spin-Up



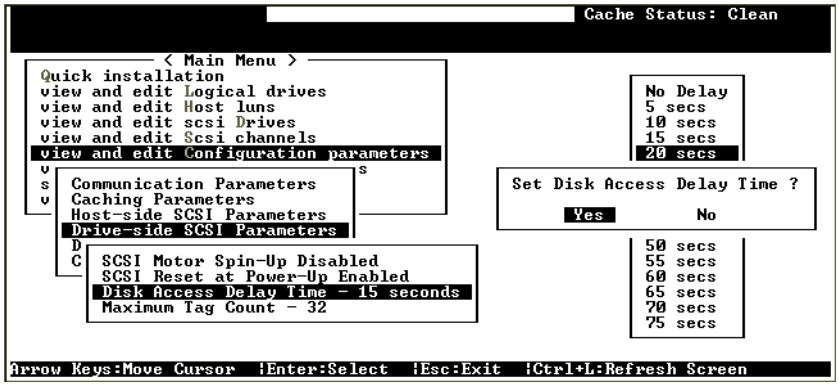
Choose "SCSI Motor Spin-Up", then press [Enter]. Choose Yes in the dialog box that followed to confirm the setting.

SCSI Reset at Power-Up



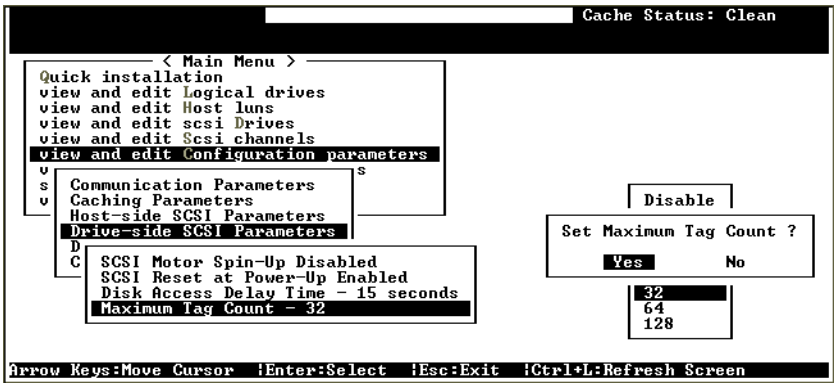
Choose "SCSI Reset at Power-Up", then press [Enter]. Choose Yes in the dialog box that followed to confirm the setting.

Disk Access Delay Time



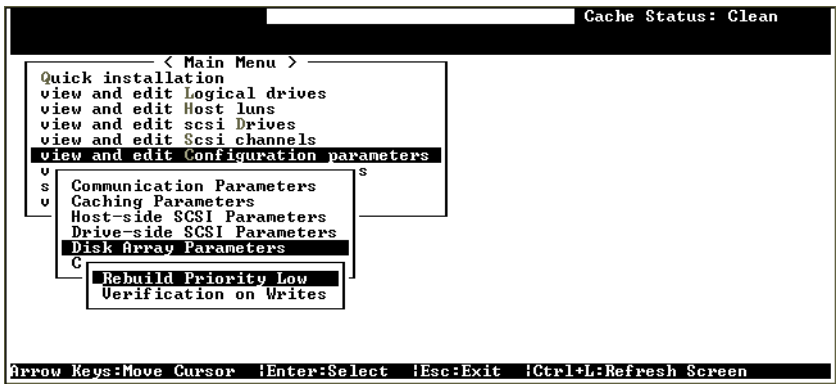
Choose "Disk Access Delay Time", then press [Enter]. A list of selections will appear. Move the cursor bar on a selection, then press [Enter]. Choose Yes in the dialog box that followed to confirm the setting.

Maximum Tag Count



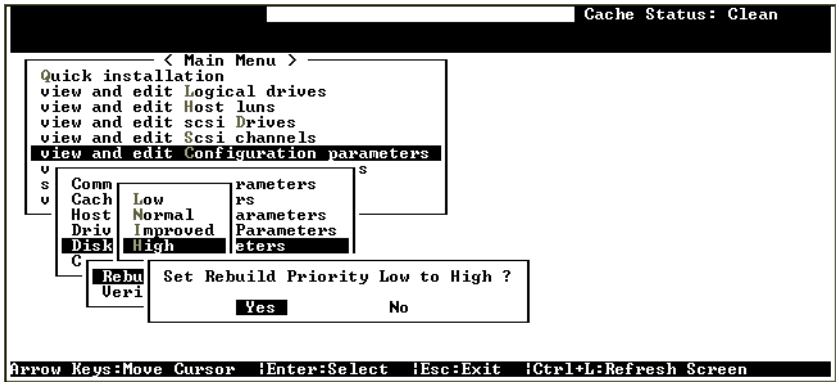
Choose "Maximum Tag Count", then press [Enter]. A list of selections will appear. Move the cursor bar to a selection, then press [Enter]. Select Yes in the dialog box that followed, then press [Enter] to confirm the setting.

Disk Array Parameters



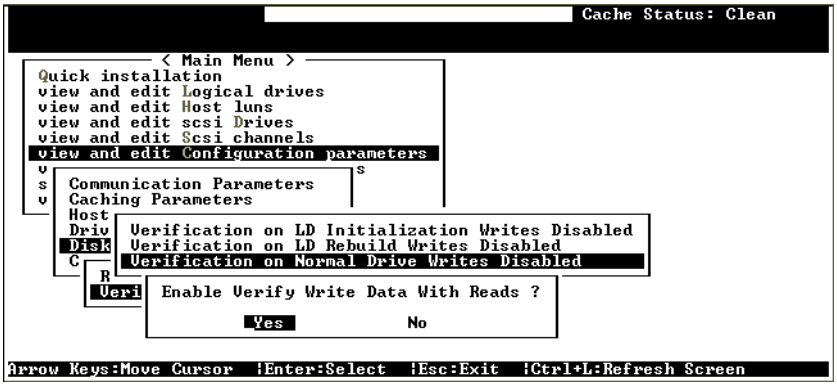
Choose "Disk Array Parameters", then press [Enter]. The Disk Array Parameters menu will appear.

Rebuild Priority



Choose "Rebuild Priority", then press [Enter]. A list of the priority selections will appear. Move the cursor bar to a selection, then press [Enter].

Verification On Writes

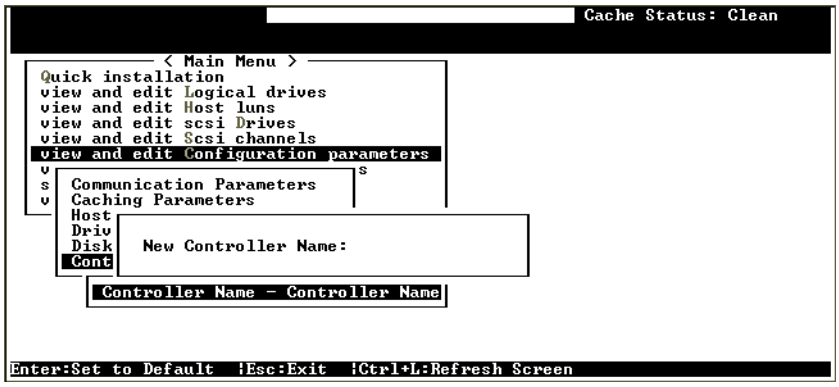


Choose "Verification on Writes", then press [Enter]. Move the cursor bar to an item, then press [Enter]. Choose Yes in the dialog box that followed to confirm the setting. (Refer to Chapter 3 section “Verify-after-Write” for more information.)

- *Every time you change this setting, you must reset the controller for the changes to take effect.*
- *Refer to Chapter 3 section “SCSI Reset at Power-Up” for more information.*

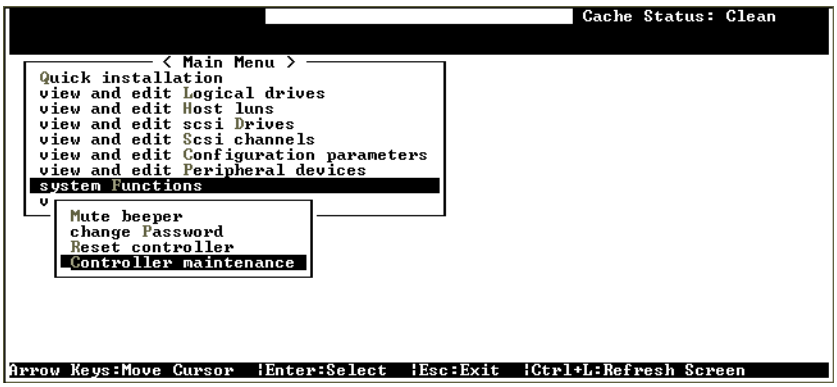
Controller Parameters

Controller Name



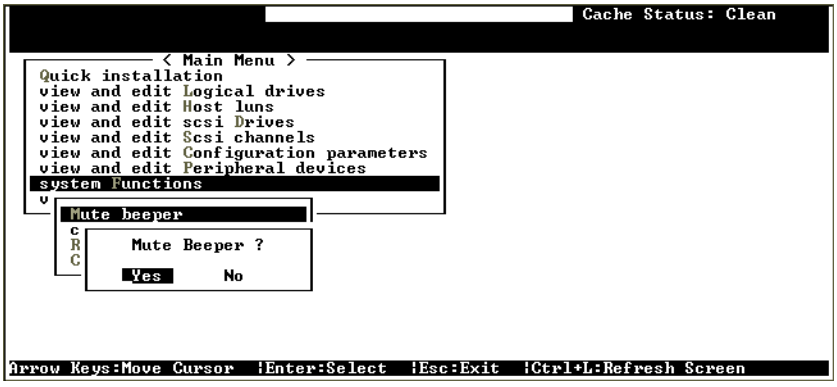
Choose "Controller Parameters", then press [Enter]. The current controller name will be displayed. Press [Enter]. Enter the new controller name in the dialog box that followed, then press [Enter].

System Functions



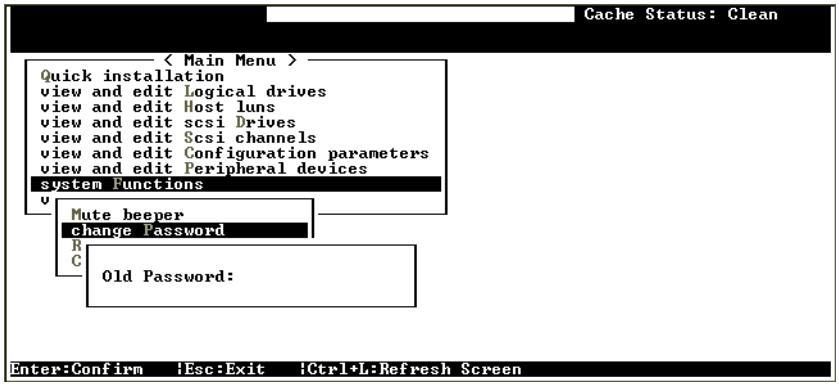
Choose "System Functions" in the Main Menu, then press [Enter]. The System Functions menu will appear. Move the cursor bar to an item, then press [Enter].

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.

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 Acer RAID Manager is used, the user can only configure and monitor the RAID controller by providing the correct password.

- *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

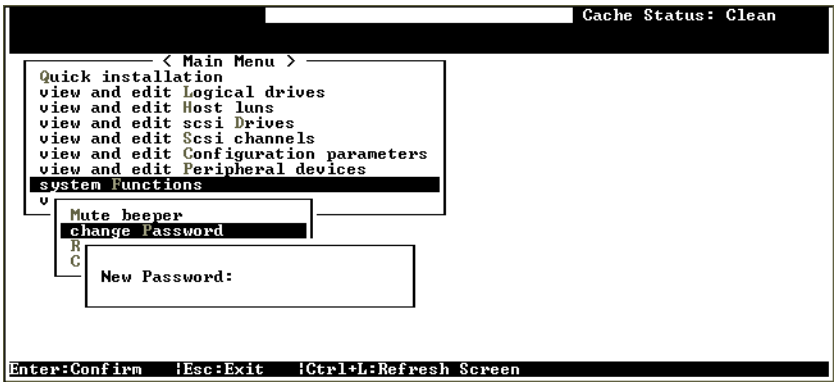
To set or change the controller password, move the cursor bar to "Change Password", then press [Enter].

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



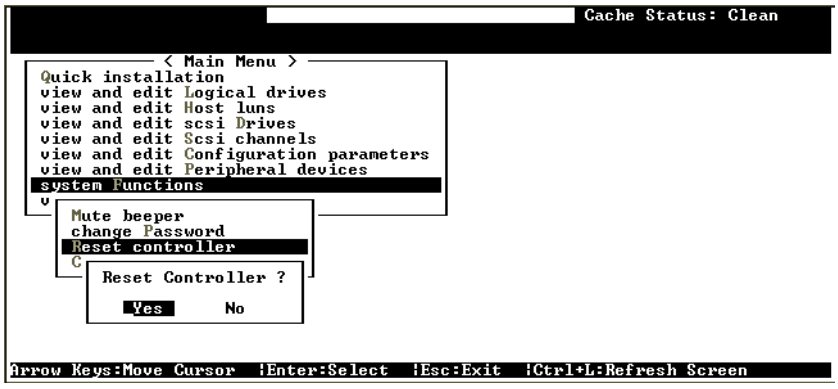
Enter the desired password in the column, then press [Enter]. The next dialog box will display "Re-Enter Password". Enter the password again and press [Enter].

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

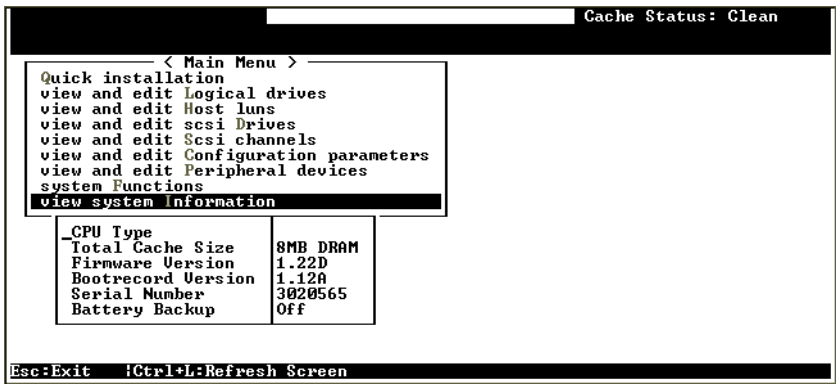
To disable or delete the password, press [Enter] only in the password column that is used for entering a new password. The existing password will be deleted. No password checking will occur when entering the Main Menu from the Initial screen.

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.

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.

Item	Description	
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 (AA-9010) and the battery daughter board (AA-9070) are installed and functioning normally, "On" appears in this column.
	Off	When the battery pack (AA-9010) and the battery daughter board (AA-9070) are not installed, or are not functioning normally, "Off" appears in this column.

Chapter 9 Redundant Controller

Before You Begin...

What Is Redundant Controller? Why The Need For 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. 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.

Write-Back Cache: Enabled or Disabled?

There is always a lot of data stored in the cache memory. When using the AA-3102RS in a redundant controller configuration, the cache memory's Write-Back mode will be disabled automatically the redundant controller feature is enabled. Instead, the cache memory will use Write-Through mode. This is to avoid data loss if a controller fails to function.

What are 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 detected that the other controller is not responding, the working controller will immediately take over 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.

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.
- The cache memory will switch to Write-Through mode.
- In firmware versions earlier than 2.11, only the primary controller serves the host's I/O request while the secondary controller just monitors the primary controller continuously. In firmware version 2.11 or later, both controllers can serve the host's I/O request.

Quick Start

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

1. *Cable connections*
    - Redundant Controller Cable
    - RS-232C Cable (for Terminal Interface Operation*)
    - SCSI Cables
2. *Controller settings*
    - Communication Parameters
    - Redundant Configuration

---

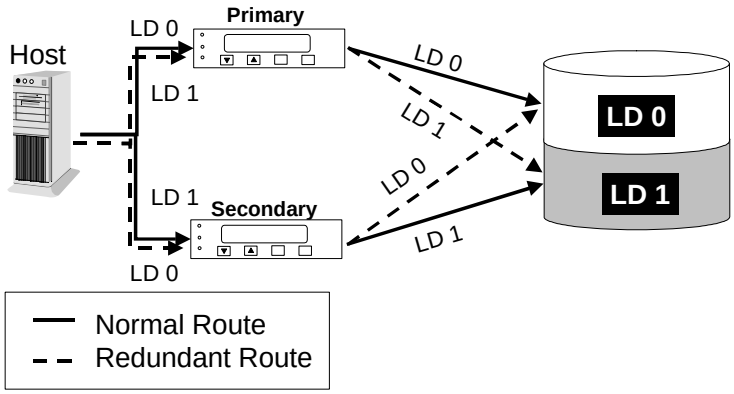
* The redundant function of the controllers can be enabled on the front panel or a terminal interface. The following describe the procedures when using the front panel. Similar menus and messages are displayed when using the terminal interface. The same result can be achieved regardless of the method used.

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

Setting Up Redundant Controllers

Example of Redundant Controllers

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



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, and the other SCSI channels assigned as the drive channel.

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.

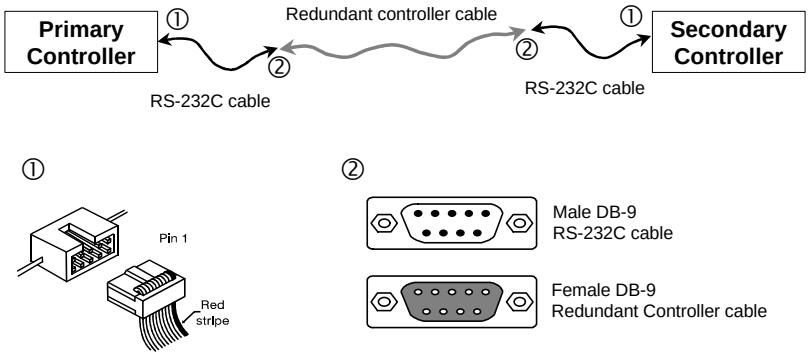
In firmware versions earlier than 2.11, only the primary controller serves the host's I/O request while the secondary controller just monitors the primary controller continuously. In firmware version 2.11 or later, both controllers can serve the host's I/O request.

Cables and Connections

The following items will be used in this example:

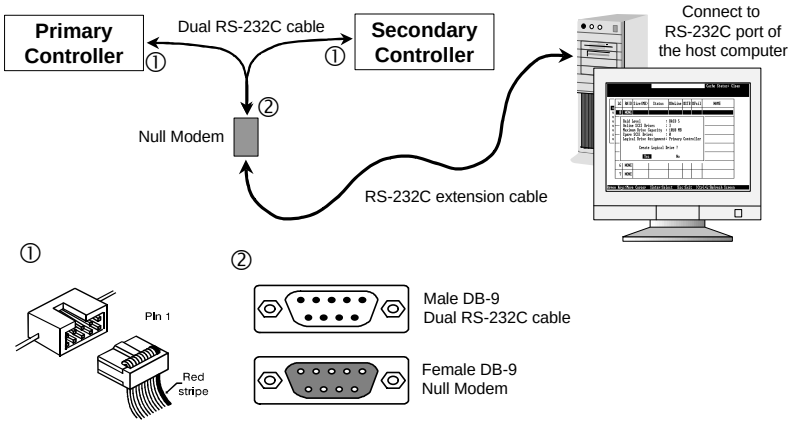
- Two AA-3102RS series controllers (Both use the same firmware version)
- AA-9011 Null Modem
- AA-9012 RS-232C extension cable
- AA-9013 Redundant controller cable
- AA-9015 Dual RS-232C cable
- AA-9016 RS-232C cable (two pcs.)

Connecting the Redundant Controller Cable



- Connect one end of the AA-9016 cable (RS-232C cable) to the AA-9013 cable. Now connect the other end of AA-9016 (the 2x5-box header end) to each of the controller's Redundant Controller ports located on the main board.
- Connect AA-9013 (redundant controller cable) to the redundant controller ports of the primary and secondary controllers.

Connecting the Controllers to the Terminal Interface



- Connect the D-sub end of AA-9015 (Dual RS-232C cable) to AA-9011 (Null Modem), then connect the other two 2x5 headers to hte COM1 serial port of each controller.
- Connect one end of the AA-9012 (RS-232C extension cable) to the AA-9011 (Null Modem) and the other end to the RS-232C port of your host computer.

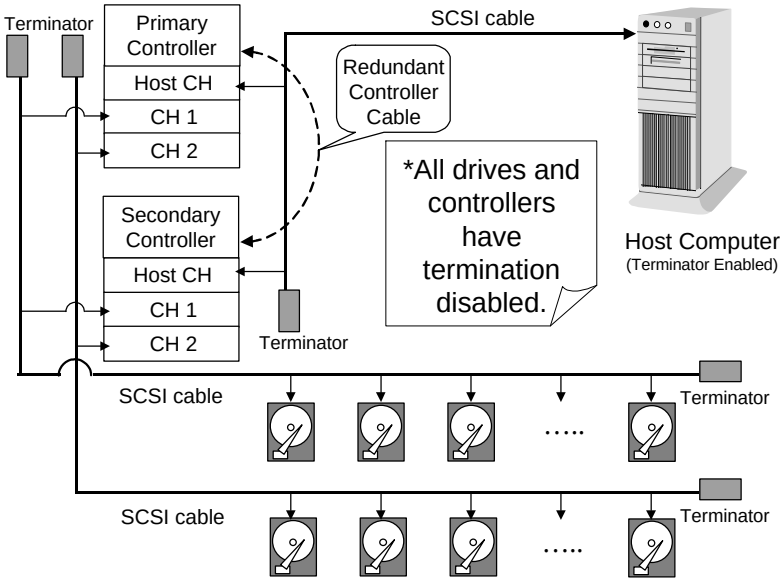
Connecting the SCSI Cable to the Host Computer

- Connect an end of the SCSI cable to the SCSI port of the host computer, then enable the SCSI terminator of the SCSI port. Connect the other end of the SCSI cable with an external SCSI terminator.
- Connect one of the SCSI connectors, located at the middle of the SCSI cable, to a controller and another connector to the other controller.
- Disable the controller's host channel SCSI termination.

- The channel selected as the Host Channel of the controllers must be similar. For example: If you connected the Host Channel of controller 1 to channel 0, you must also connect the Host Channel of controller 2 to channel 0.

Connecting the SCSI Cables to the Hard Drives

- Disable the SCSI terminator on all hard drives.
- Disable the controller's drive channel SCSI termination.
- Connect both ends of the SCSI cable with an external SCSI terminator.
- Connect the other connectors of the SCSI cable to hard drives and controllers.
- The channel selected as the Drive Channel of the controllers must be similar. For example: If you connected the SCSI cable of controller 1 to channel 1, you must also connect the SCSI cable of controller 2 to channel 1.
- Repeat the above steps for the other drive channels.
- Connect a power connector to each controller.

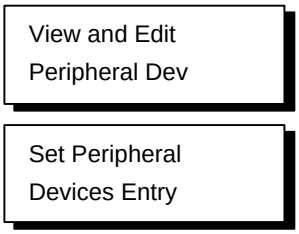


Setting the Controllers using the Front Panel

Redundant Configuration using Automatic Setting

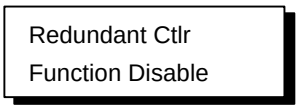
Power-on Controller 1. Make sure Controller 2 is powered-off.

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**.

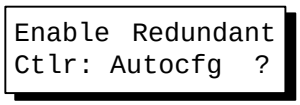


Choose "Set Peripheral Devices Entry", then press **ENT**.

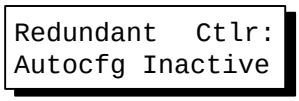
Choose "Redundant Ctlr Function___", and then press **ENT**. (Note: The current setting will be displayed on the LCD. If this controller has never been set as a redundant controller before, the default setting of the redundant controller function is Disabled. The message "Redundant Ctlr Function Disable"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



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



The message "Redundant Ctlr Autocfg Inactive" will appear.



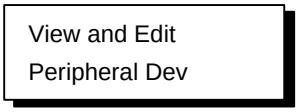
Power-off Controller 1, and then power-on Controller 2. Set Controller 2 to "**Autocfg**" as described in the above steps. Power-off Controller 2.

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.

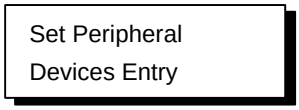
Redundant Configuration Using Manual Setting

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

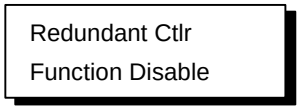
Press **ENT** for two seconds on the front panel of Controller 1 to enter the Main Menu. Use ▼ or ▲ to navigate through the menus. Choose "View and Edit Peripheral Dev..", then press **ENT**.



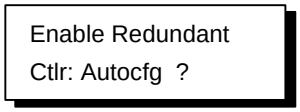
Choose "Set Peripheral Device Entry", then press **ENT**.



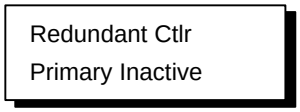
Choose "Redundant Ctlr Function___", and then press **ENT**. (Note: The current setting will be displayed on the LCD. If this controller has never been set as a redundant controller before, the default setting of the redundant controller function is Disabled. The message "Redundant Ctlr Function Disable"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



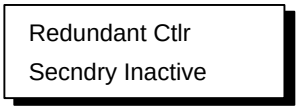
The message "Enable Redundant Ctlr: Autocfg?" will appear. Use ▼ or ▲ to scroll through the available options ("Primary," "Secondary" or "Autocfg"). Press **ENT** for two seconds on "Primary."



The message "Redundant Ctlr Primary Inactive" will appear.



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



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

Prior to firmware version 2.11, the secondary controller was a stand-by controller; i.e., it did not serve its own I/O requests. The secondary controller's LCD constantly displayed the message at right, "RC Standing By.. <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 Primary and Secondary controllers synchronize each other's configurations and settings at frequent intervals through the AA-9013 Redundant Controller Cable.

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.

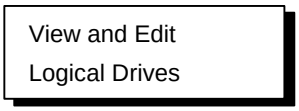
Please refer to Chapter 9 section “Connecting the Controllers to the Terminal Interface” or details on using the AA-9015 (Dual RS-232C cable) to connect both controllers. Please note that only the Primary controller will serve the terminal interface. The secondary controller only accepts and responds to the Primary controller. However, if the Primary controller happens to fail, the Secondary controller will take over and become the Primary controller, so it is preferred to connect both controllers using the AA-9015 (Dual RS-232C cable).

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.

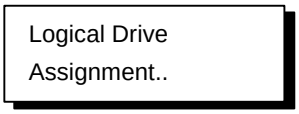
Press **ENT** for two seconds on the front panel of the Primary controller to enter the Main Menu.

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

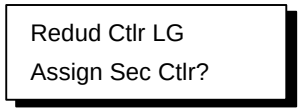


Create a logical drive or choose an existing logical drive, then press **ENT** to see the logical drive menu.

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



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

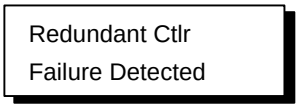
Only firmware versions 2.11 and above can assign logical drives to the primary or secondary controllers. Firmware versions earlier than 2.11 will automatically assign a logical drive to the primary controller and are unable to assign a logical drive to the secondary controller.

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 Ctlr 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.

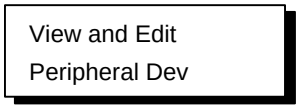
When and How is the Failed Controller Replaced?

Remove the failed controller **after** the take-over of the "working" controller has been completed.

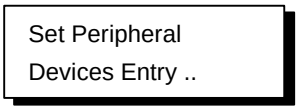
The new controller has to be pre-configured as the 'Secondary Controller' or in the "Autocfg" mode. (Configure the new controller without the redundant cable and SCSI cables connected.)

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.

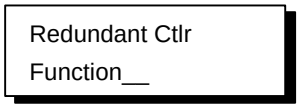
Use ▼ or ▲ to choose "View and Edit Peripheral Dev..", then press **ENT**.



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

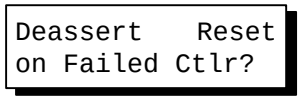


Choose "Redundant Ctlr Function__", then press **ENT**.

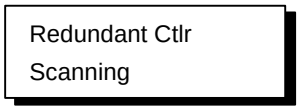


The message "Redundant Ctlr Autocfg Degraded" will appear on the LCD.

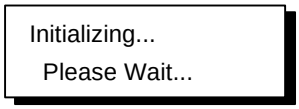
Press **ENT** and the message "Deassert Reset on Failed Ctlr?" will appear.



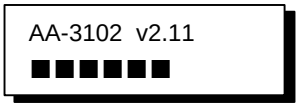
Press **ENT** for 2 seconds and the controller will start to scan for the new controller.



The new controller will then start to initialize.

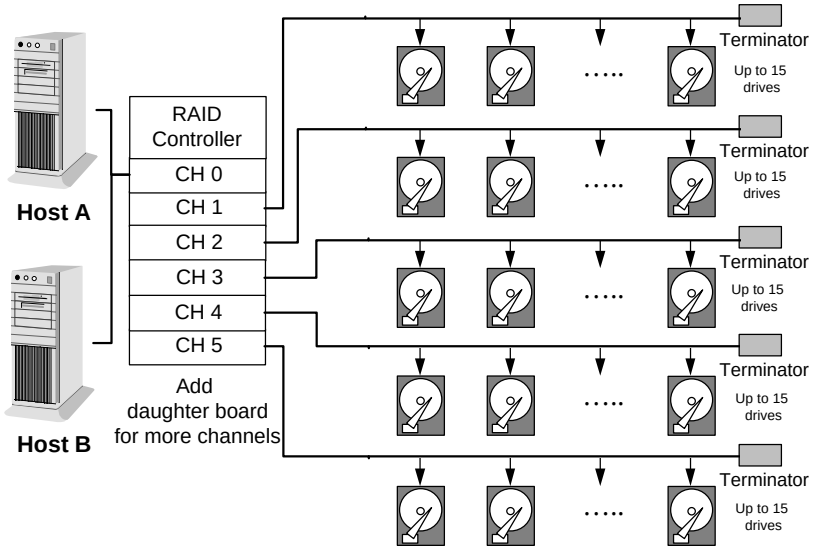


Once initialized, it will begin acting as the Secondary Controller.



Chapter 10 Redundant Host, Multiple Host

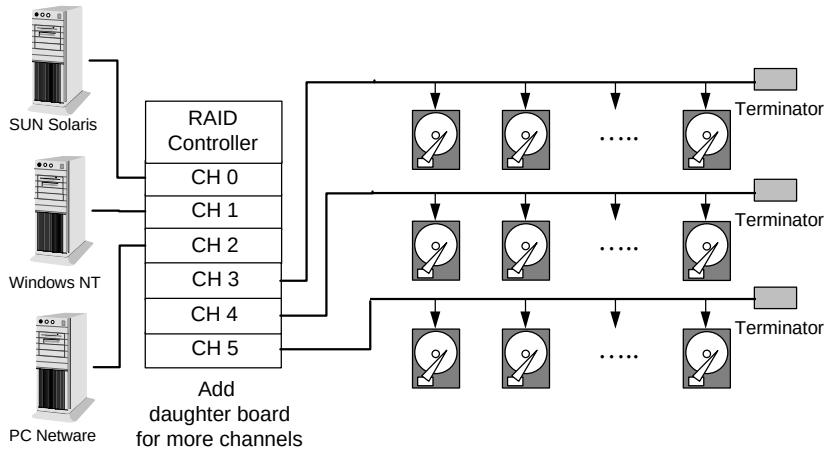
Redundant Host



The AA-3102RS RAID controller can connect and serve redundant host computers. The figure above is an example of connecting to redundant host computers.

The Logical drives can be accessed by two host computers at the same time. The host redundant management hardware/software should avoid data conflict when more than one host computers are accessing the same logical drive.

Multiple Host



The AA-3102RS RAID controller can connect and serve simultaneously more than one host computers. The figure above is an example of connecting to multiple host computers.

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 out of sharing the same logical drive, a 3rd party “HA” management hardware or software is required.

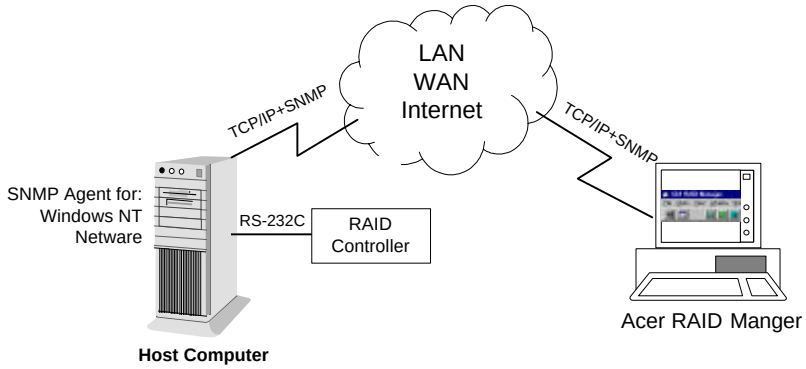
Chapter 11 Remote Administration

The AA-3102RS RAID Controller can be administered remotely. When an event, warning or controller notification occurs, AA-3102RS will dial out to a pager to inform the administrator to take the appropriate measures.

There are several ways of administrating the controller remotely:

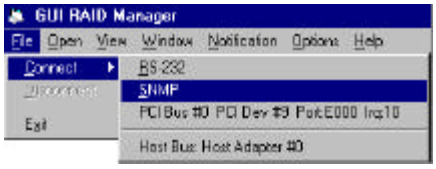
- Acer RAID Manager using SNMP service
- Remote Terminal Emulation using PPP+Telnet
- Remote Terminal Emulation using Modem
- Dial-out pager for event notifications

Acer RAID Manager Using SNMP Service

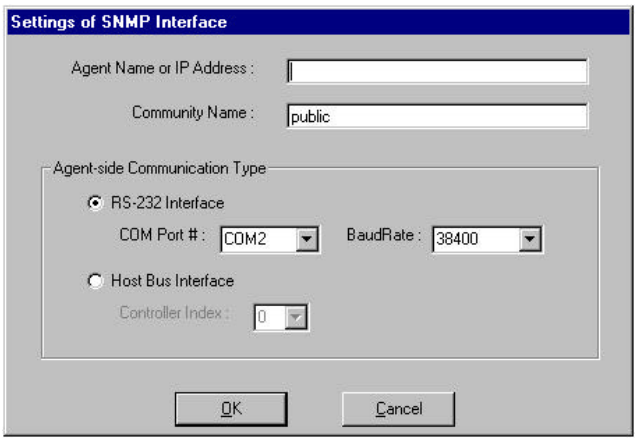


Connect the AA-3102RS RAID controller to the host computer via the RS-232C interface. Install the SNMP agent that corresponds to the operating system on the Host computer and enable the SNMP service. The client computer running with Acer RAID Manager will be able to remotely administer the AA-3102RS RAID controller.

How to Establish Connection through SNMP?



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

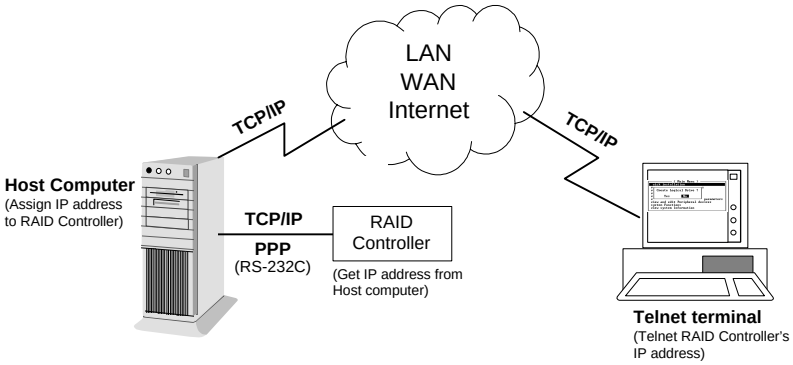


Enter the Agent name or the IP address and the Community name of the host computer in the first column.

Click on the select button in front of “RS-232 Interface” to select. Choose the COM port of the host computer connected to the AA-3102RS RAID controller, 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 Acer RAID Manager from the host computer. The Fault-bus error signals and drive failure signals will also pass through the SNMP.

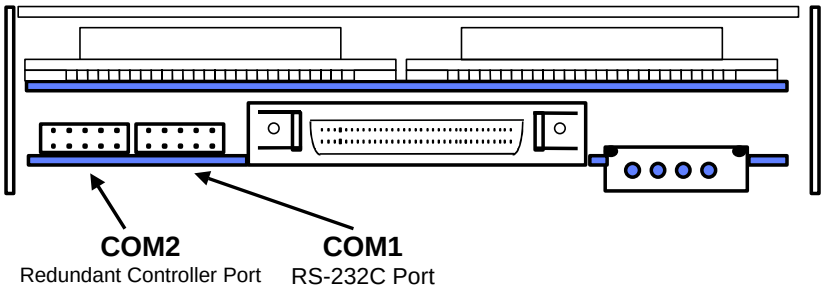
The baud rate of both the RAID controller and Acer RAID Manager must be the same in order to establish the connection.

Remote Terminal Emulation Using PPP+Telnet



Connect AA-3102RS to the host computer. Assign AA-3102RS with an IP address (please refer to the host operating system's manual), and use TELNET from a remote client to control or monitor AA-3102RS. AA-3102RS 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



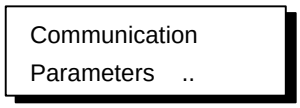
Connect the host computer's serial port (RS-232C) to AA-3102RS's COM 1. If the controller is not configured as redundant controller, you may also use COM 2. Terminal emulation data through COM 1 and COM 2 are synchronized.

Baud Rate Settings

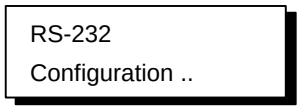
The baud rate can be changed via the front panel. To change the baud rate of the controller according to the host's RS-232C interface:

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

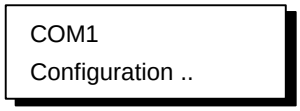
Select "Communication Parameters ..", then press **ENT**.



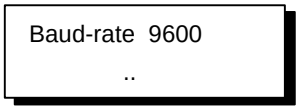
Select "RS-232 Configuration ..", then press **ENT**.



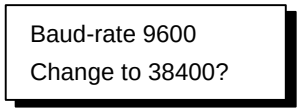
Select "COM1 Configuration ..", then press **ENT**. (Select COM2 if you are using COM2)



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



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

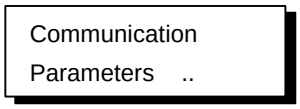


* Available baud rates are: 2400, 4800, 600, 19200 and 38400.

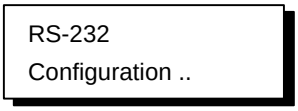
Enable Terminal Emulation

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

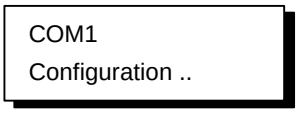
Select "Communication Parameters ..", then press **ENT**.



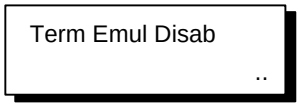
Select "RS-232 Configuration ..", then press **ENT**.



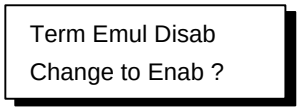
Select "COM1 Configuration ..", then press **ENT**. (Select COM2 if you are using COM2)



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.



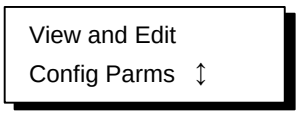
Press ▼ or ▲ to select “Change to Enab”, then press **ENT** for 2 seconds to set.



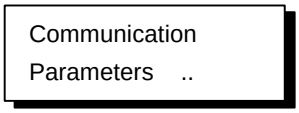
Setting PPP ID, PPP Password

To establish connection between AA-3102RS 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.

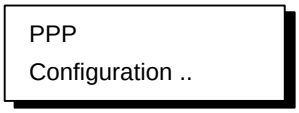
Press **ENT** for two seconds to enter the Main Menu. Press ▼ or ▲ to select "View and Edit Config Parm", then press **ENT**.



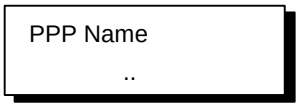
Select "Communication Parameters ..", then press **ENT**.



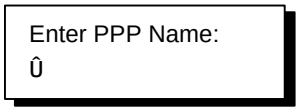
Select "PPP Configuration ..", then press **ENT**.



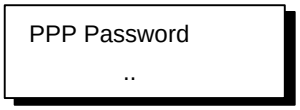
Select "PPP Name ..", then press **ENT**.



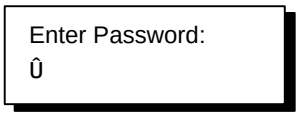
Enter the PPP Name one by one. Press ▼ or ▲ to choose a character for that space, then press **ENT** to move to the next space. After the PPP Name has been entered, press **ENT** for 2 seconds to set.



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.



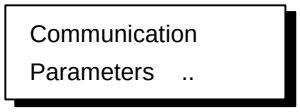
Data Routing Through PPP, Data Routing Direct to Port

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.

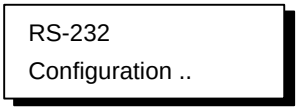
If the COM port is not used for PPP connection, set it as “Comm Route Dir” (Data Routing Direct to Port) to keep the terminal emulation working properly.

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

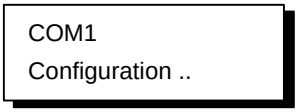
Select "Communication Parameters ..", then press **ENT**.



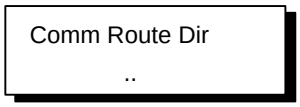
Select "RS-232 Configuration ..", then press **ENT**.



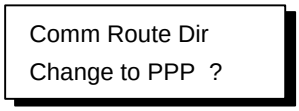
Select "COM1 Configuration ..", then press **ENT**. (Select COM2 if you are using COM2)



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



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

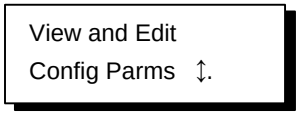


Establish Connection Between the Host Computer and AA-3102RS

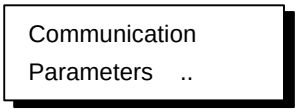
After setting the data routing through PPP, AA-3102RS will now wait for PPP to connect to the host computer. If the establishment succeeded, an IP will be given to AA-3102RS.

CHECK IP ADDRESS ASSIGNED TO THE CONTROLLER

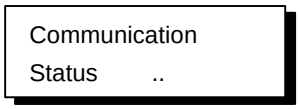
Press **ENT** for two seconds to enter the Main Menu. Press ▼ or ▲ to select "View and Edit Config Parm", then press **ENT**.



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

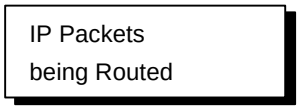


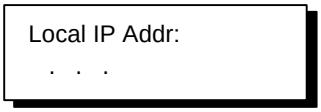
Select "Communication Status ..", then press **ENT**.

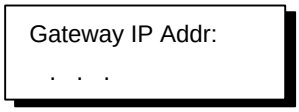


Select "PPP Status ..", then press **ENT**.

Press **ENT** to view the IP address of AA-3102RS, then press ▼ or ▲ to view the Gateway IP address.



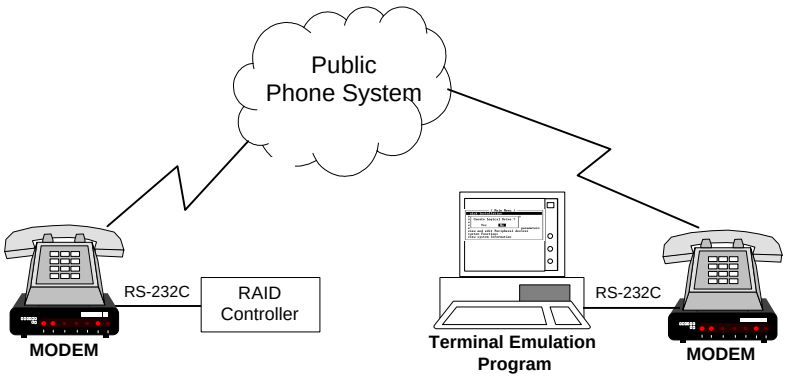




Connect Telnet to the Controller's IP from the Client Computer

Use any "Telnet" client program from the remote computer, then connect to the IP address of AA-3102RS. The terminal emulation screen will display the client Telnet program, as well as when using terminal emulation locally.

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 AA-3102RS. Simply connect a modem to AA-3102RS. AA-3102RS 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, Acer 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.

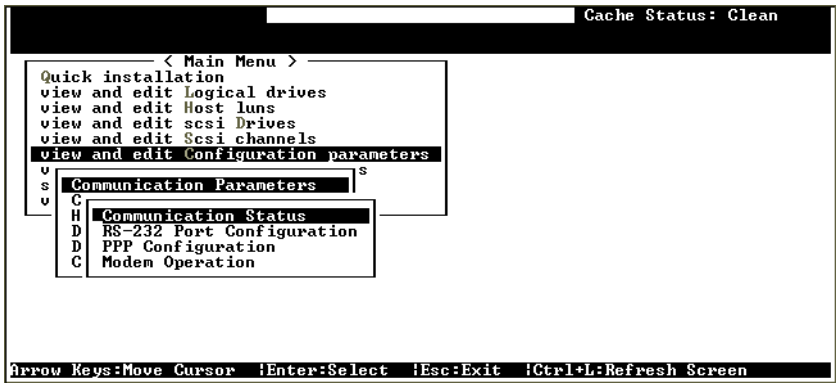
- *Always keep the terminal emulation screen on the Initial screen for security checking. The controller's password will be asked for verification only when entering the Main Menu from the Initial screen.*
- *The terminal emulation screen for both COM 1 and COM 2 connections are synchronized. Users connected to COM 1 and COM 2 can see each other's operating screen.*

Hardware Connection for AA-3102RS

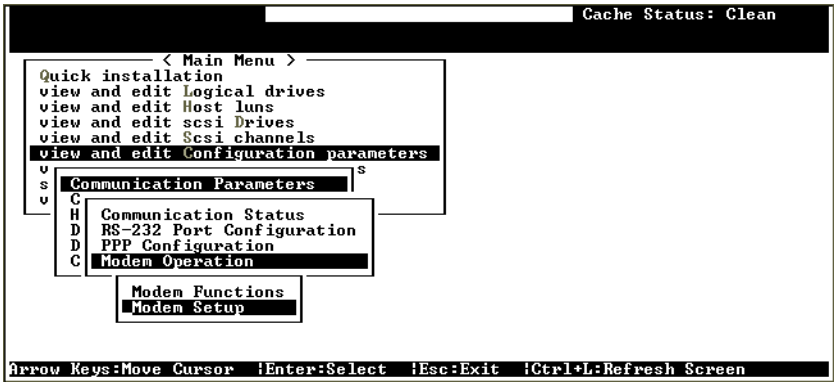
Pick up a standard external modem which uses standard AT command set. Connect the modem to COM 1 or COM 2 of the AA-3102RS RAID controller. Complete the other connections of the modem (power cables and phone wires) and switch on the power of the Modem.

Setting AA-3102RS using the RS-232C Terminal Interface

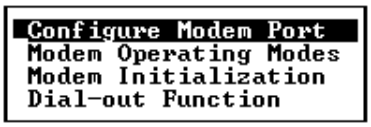
The following example shows connecting COM 1 to the local terminal emulation, and COM 2 to the modem:



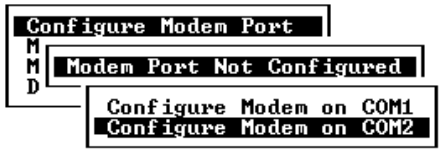
Configuring the Modem Port



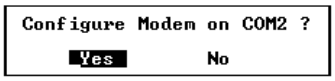
Choose “Modem Operation” from the communication parameters menu, then select “Modem Setup” in the next menu.



In the Modem Setup menu, choose Configure Modem Port.



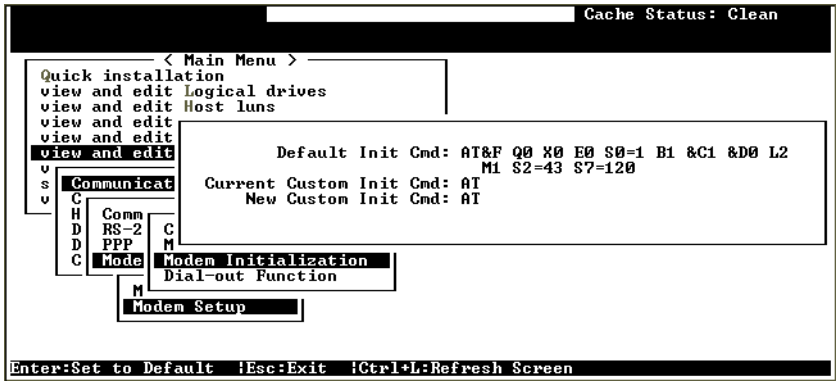
The current setting of the modem port will be displayed on the screen. If there is no modem port configured yet, it will display “Modem Port Not Configured”. Press [Enter] on the selection, and choose “Configure Modem on COM 2” by pressing [Enter].



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:

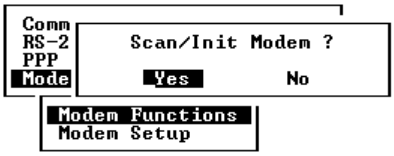
- Sending Default Init command only - “None <Default Used>“
- Sending Custom Init command only - “Replace Default”

Sending Default Init command and Custom Init command - "Append to Default"

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.

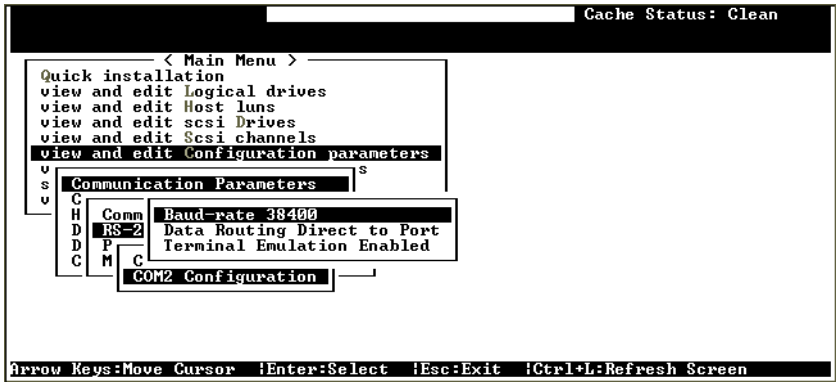
It is a must to enable "Auto answer mode" of the connected modem in order to answer the dial-in calls and establish the connections automatically.

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



In the Communication Parameter menu, select “RS-232 Port Configuration”. Choose “COM 2 Configuration” to configure the COM 2 port of the AA-3102RS RAID Controller.

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.

- *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 AA-3102RS RAID controller. 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?

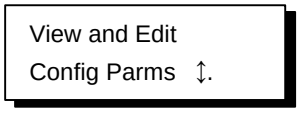
Choose “Communication Status” from the Communication Parameters menu and press [Enter]. The configured COM port and it’s current status will be shown on the screen. The message “Modem Present and Connected” means the modem is connected now.

Setting AA-3102RS Using the Front Panel

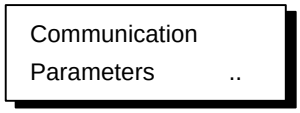
Here is an example of connecting COM 1 to the modem:

Configure Modem Port

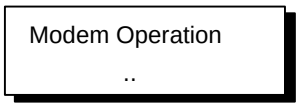
Press **ENT** for two seconds to enter the Main Menu. Press ▼ or ▲ to select "View and Edit Config Parm", then press **ENT**.



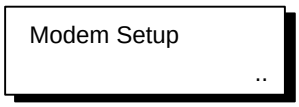
Select "Communication Parameters ..", then press **ENT**.



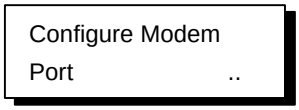
Select "Modem Operation ..", then press **ENT**.



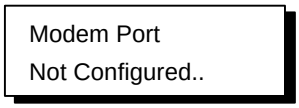
Select "Modem Setup ..", then press **ENT**.



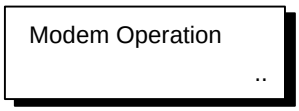
Select "Configure Modem Port ..", then press **ENT**.



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

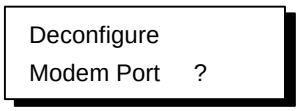


Select "Configure Modem on COM1?", then press **ENT** for two seconds to set.



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

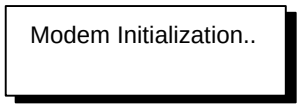
Select "Deconfigure Modem Port", then press **ENT** for two seconds to delete.



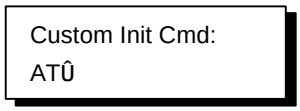
Modem Initialization Command

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.

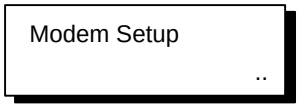


Modem Operating Modes

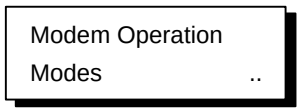
To send the initialization command to the Modem, there are three selectable options:

- Sending Default Init command only - “None“
- Sending Custom Init command only - “Replace”
- Sending Default Init command plus Custom Init command - “Append”

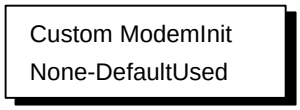
In the “Modem Setup” menu, press **ENT**.



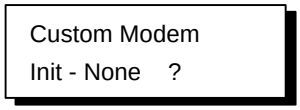
Select "Modem Operation Modes ..", then press **ENT**.



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



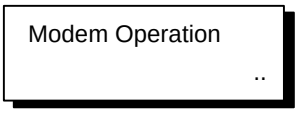
Choose None, Replace or Append, then press **ENT** for two seconds.



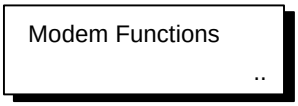
It is a must to enable "Auto answer mode" of the connected Modem in order to answer the dial-in calls and establish the connections automatically.

Initializing Modem

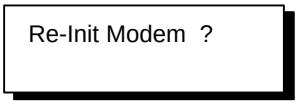
In the "Modem Operation" menu, press **ENT**.



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



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



Baud Rate, Data Routing and Enable Terminal Emulation

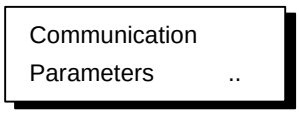
Set the desired baud rate, Data Routing direct to port and enable the Terminal Emulation. Please refer to Chapter 11 on how to set the Baud rate, Data Routing and Terminal Emulation. The modem is now ready to answer the dial-in connection.

Establish the Connection from the Remote Terminal

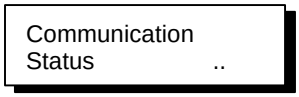
Use a terminal emulation program that supports ANSI or VT-100 terminal emulation modes. In the remote terminal program, dial the phone number of the modem connected to the AA-3102RS RAID controller. The modem should answer the call and start "handshaking" with the modem on the remote site. After the 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?

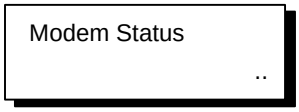
In the "Communication Parameters .." menu, press **ENT**.



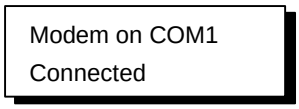
Select "Communication Status ..", then press **ENT**.



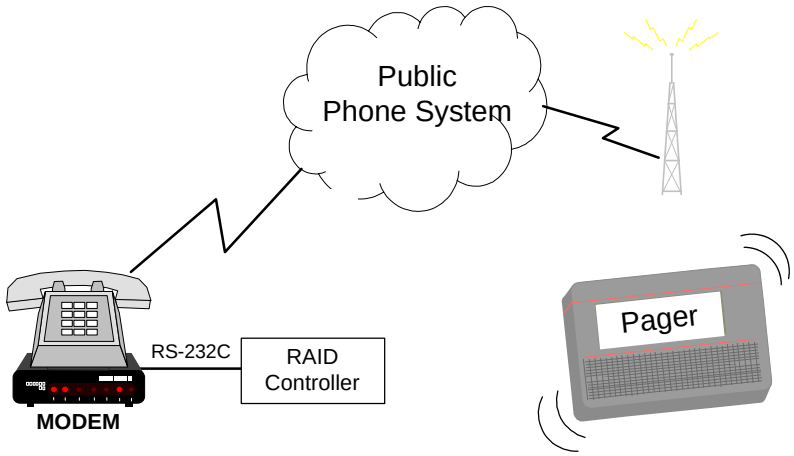
Select "Modem Status..", then press **ENT**.



The current connection status will be shown on the LCD.



Dial-out for Event Notifications



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?

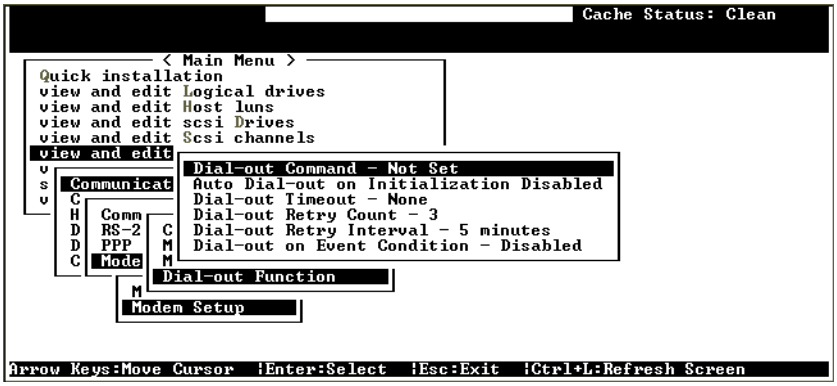
If the Dial-out function is used as a event notification to a pager, the terminal emulation of the COM port has to be disabled. If the Dial-out function is used with a remote terminal, enable the terminal emulation.

Configure the controller in order to use the remote terminal with the modem. Please refer to Chapter 12, Remote Terminal Emulation Using Modem, for details.

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

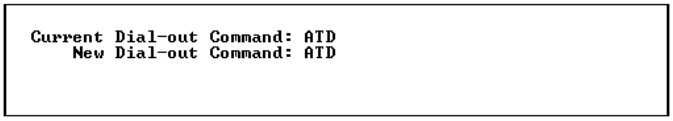
- *If the controller is dialing-out to a remote administration terminal, the Terminal Emulation of the corresponding COM port must be enabled.*

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 Function menu will appear on the screen.

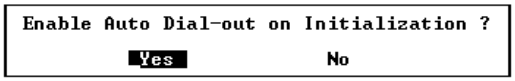
Dial-out Command



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’s 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.

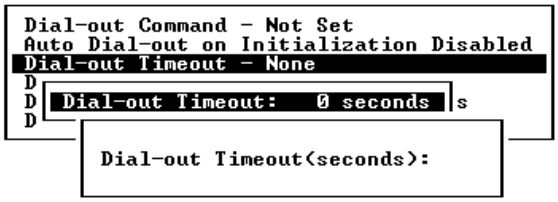
Auto Dial-out on Initialization



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.

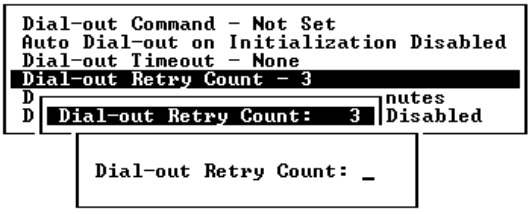
Dial-out Time out



Choose “Dial-out 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

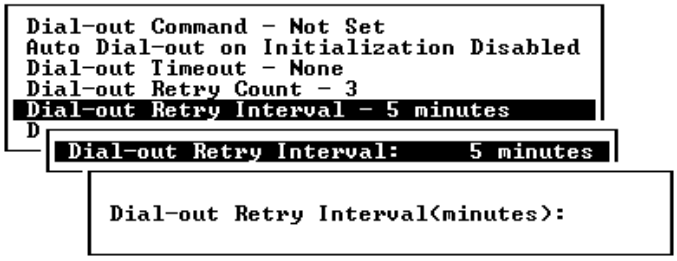


Choose “Dial-out Retry Count” in the Dial-out Function menu. The current setting in this column will appear. Press [**Enter**]. A dialog box will appear for entering the Dial-out Retry Count. Enter the desired Dial-out Retry count in this column.

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.

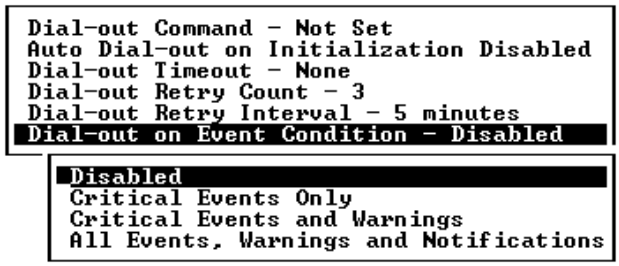
Dial-out Retry Interval

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



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

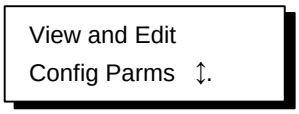


Choose “Dial-out on Event Condition” in the Dial-out Function menu. A list of selections will appear. Move the cursor bar on the desired selection, then press [**Enter**] to choose.

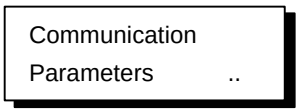
Choosing one of the options will enable the “Dial-out on Event Condition” (except “Disable”). The controller will send the “Dial-out command” to the modem when an event has occurred.

Setting Dial-out Function Through the Front Panel

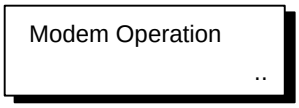
Press **ENT** for two seconds to enter the Main Menu. Press ▼ or ▲ to select "View and Edit Config Parm", then press **ENT**.



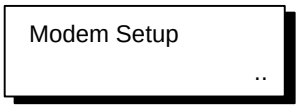
Select "Communication Parameters ..", then press **ENT**.



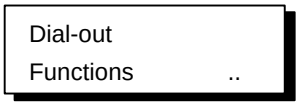
Select "Modem Operation ..", then press **ENT**.



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

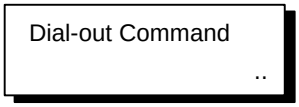


Select "Dial-out Functions ..", then press **ENT**. Press ▼ or ▲ to see the Dial-out Functions menu.

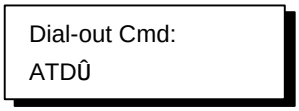


Dial-out Command

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



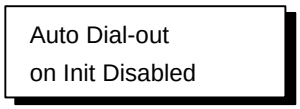
Enter the Dial-out command in this column. Press ▼ or ▲ to change the current character, then press **ENT** to move the cursor to the next space. Press **ENT** for two seconds when finished.



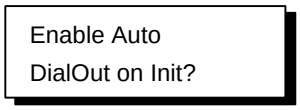
The Dial-out command is the only command that will be sent to the modem when dialing-out. If it's dialing to a pager, the pager number and message (if applicable) have to be composed in this column. If it's dialing to a remote terminal, the phone number of the remote modem has to be entered in this column.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

Auto Dial-out on Initialization

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

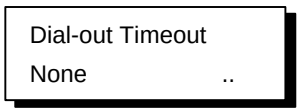


Press **ENT** for two seconds to set.

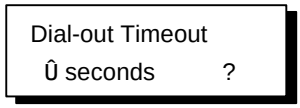


Dial-out Timeout

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



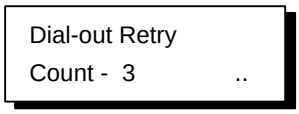
Enter the Dial-out Timeout period in this column. Press ▼ or ▲ to change the current character, press **ENT** to move the cursor to the next space. Press **ENT** for two seconds when finished.



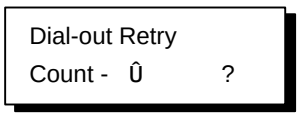
When the modem is dialing out, the controller will start to count the dial-out timeout period. If the connection cannot be established within the dial-out timeout period, the controller will send a 'hang-up' command to the modem to hang up the phone.

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.

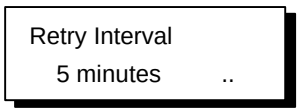


When the modem cannot establish the connection when dialing-out, the controller will retry another dial-out, that is, if the Dial-out Retry Count is not set as “0”. The default retry count is “3” - which means the controller will retry the dial-out process three times after the first dial-out process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

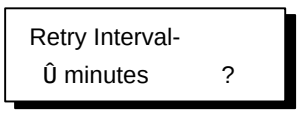
Dial-out Retry Interval

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

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

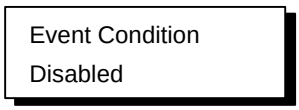


Enter the Dial-out Retry Interval in this column. Press ▼ or ▲ to change the current character, then press **ENT** to move the cursor to the next space. Press **ENT** for two seconds when finished.



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.

```
Event Condition?
Critical Events
```

There are four options in this column:

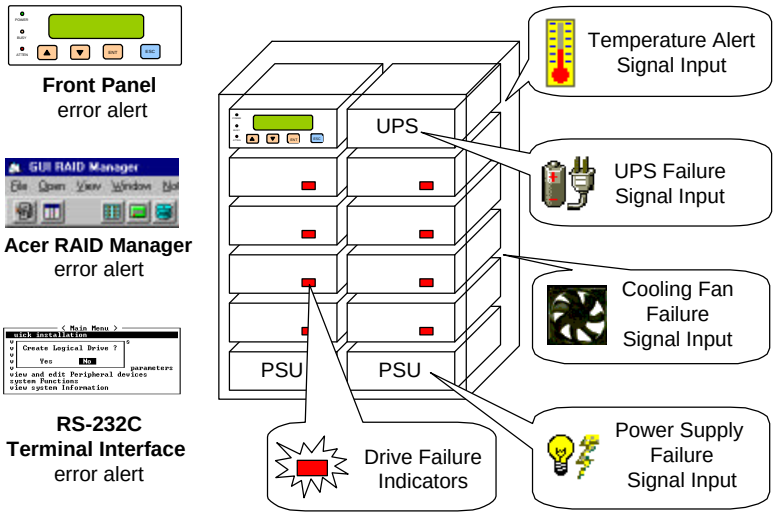
Disabled	Disable
Critical Events	Critical Events Only
Critical&Warning	Critical Events and Warnings
All Events	All Events, Warnings and Notifications

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.

Chapter 12 Fault-Bus

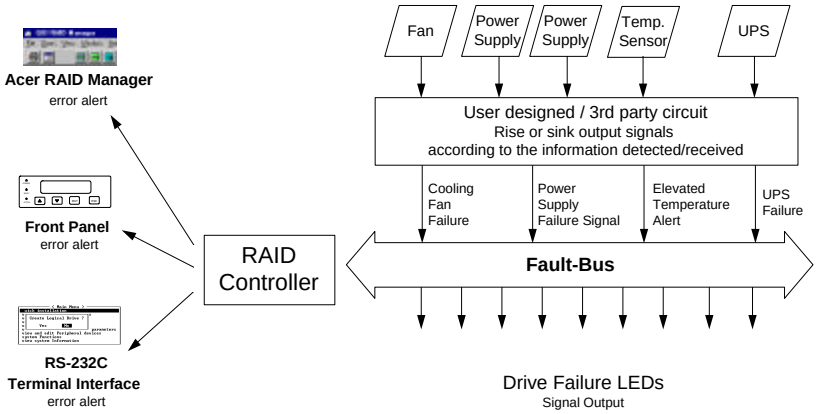
What is Fault-Bus? Why the Need for Fault-Bus?

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 these failure information to the user through the front panel, RS-232C terminal interface and Acer RAID Manager . The LED of the drive that failed will light showing the location of the drive that needs to be replaced. It warns the user of a dangerous situation happening to the RAID subsystem.



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.

How Does the Fault-Bus Work?



Error Signals Input

Fault-bus only collects the 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 rise up or sink down the “fan” signal of the Fault-bus (pin 34 in the left Fault-bus connector) according to the detected infomation. 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, and rise up or sink down the “power” signal of the Fault-bus (pin 31 in the left Fault-bus connector) 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.
- Detect the temperature in the enclosure, and rise up or sink down the “temperature” signal of the Fault-bus (pin 32 in the left Fault-bus connector) 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, and rise up or sink down the “UPS” signal of the Fault-bus (pin 33 in the left Fault-bus connector) 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.

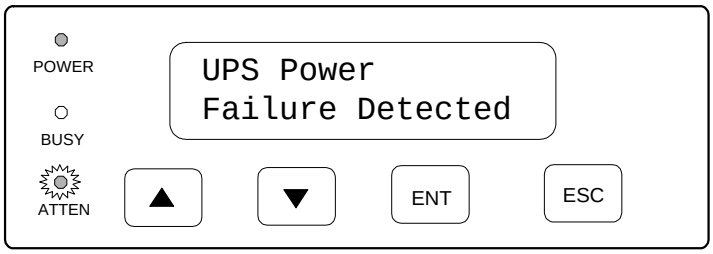
Drive Failure Signals Output

Each SCSI drive can assign a slot number. There are 20 slot signal outputs in the left Fault-bus connector, and additional 21 slot signal outputs in the right Fault-bus connector. When the RAID controller detected that one SCSI drive has failed, the corresponding slot number signal will be activated for the failed drive indicated.

Pin 27 of the left Fault-bus connector is named “any slot”. The “any slot” signal will be activated when the drive failure LED (slot) is lighted.

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

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.

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

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

How to Setup the Fault-bus?

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 LED of the failed drive, located in front of the drive canister, to the Fault-bus. Record the slot number connected to each canister.

3. If there is a “Drive failed” LED in front of the enclosure which presumably indicate a drive member failed, connect the “Drive failed” LED in front of the enclosure to pin 27 of the left Fault-bus connector.

4. Make sure the drive failure LED signal required is according to the drive failure LED circuit, active high or active low.

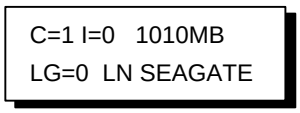
Configuring the Controller through the Front Panel

Assign Each SCSI Drive or Canister a Slot Number

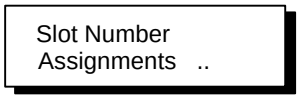
Press **ENT** for two seconds to enter the Main Menu. Press ▼ or ▲ to select "View and Edit SCSI Drives", then press **ENT**.

Assign a Slot Number to an Existing SCSI Drive

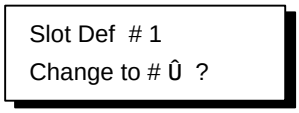
The SCSI drive information will be displayed on the LCD. Press ▼ or ▲ to select the desired SCSI drive, then press **ENT**.



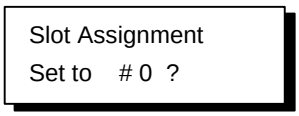
Press ▼ or ▲ to choose “Slot Number Assignments”, then press **ENT**.



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



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.

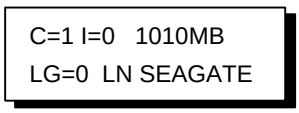


Assign a Slot Number to an Empty Canister

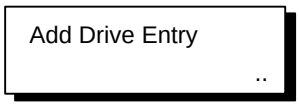
When there is an empty drive canister which currently does not contain any drive, its SCSI channel/ID will not appear in the drive information list. Assign a slot number to this empty canister and add a drive entry in order to use it later when a drive is installed.

Add Drive Entry

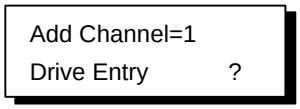
Choose “View and Edit SCSI Drives” to enter the Main Menu. The SCSI drive information will be displayed on the LCD. Press ▼ or ▲ to select a SCSI drive, then press **ENT**.



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



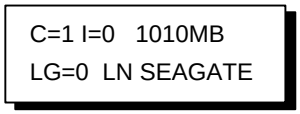
Press ▼ or ▲ to select the desired SCSI channel, then press **ENT** for two seconds.



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

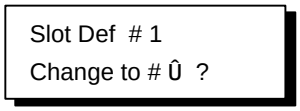
Delete the Slot Number

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**.

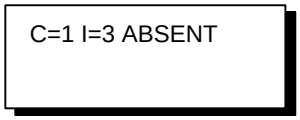
Press ▼ or ▲ to select “0” for the slot number, then press **ENT**. Press **ENT** for two seconds to set.



Remove Empty Drive Entry

Before an empty drive entry can be removed, 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. Press ▼ or ▲ to select the empty drive entry you desire to remove, then press **ENT**.



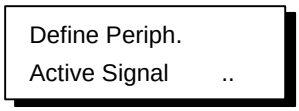
Press ▼ or ▲ to select “Clear Drive Status”, then press **ENT**.

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

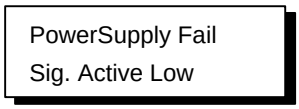
Set Each Fault-bus Error Signal Input as Active-high or Active-low

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

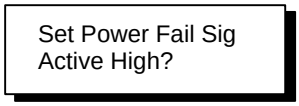
Press ▼ or ▲ to select “Define Periph. Active Signal”, then press **ENT**.



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.



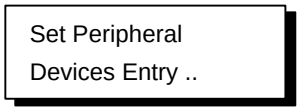
Press ▼ or ▲ to select an alternative selection. Press **ENT** for two seconds to confirm.



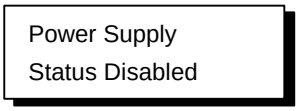
Enable Each Fault-bus Error Signal Input

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

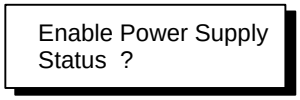
Press ▼ or ▲ to select “Set Peripheral Devices Entry”, then press **ENT**.



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

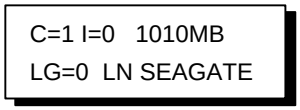


Press ▼ or ▲ to select an alternative selection. Press **ENT** for two seconds to confirm.

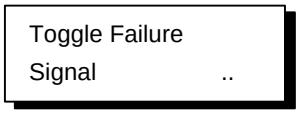


Test Drive Failure LED for Each Drive Canister

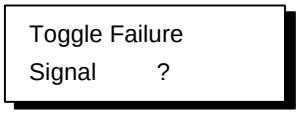
Choose “View and Edit SCSI Drives” to enter the Main Menu. The SCSI drive information will be displayed on the LCD. Press ▼ or ▲ to select the desired SCSI drive or empty drive entry, then press **ENT**.



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



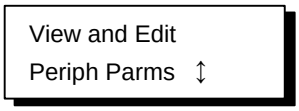
Press **ENT** for two seconds to toggle the drive failure signal.



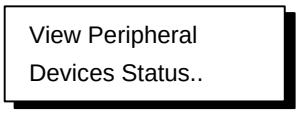
The drive failure LED should light on or off, following the toggle.

Viewing the Status of Each Fault-bus Error Signal Input

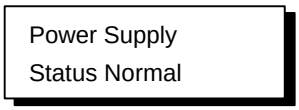
Choose “View and Edit Periph Parms” in the Main Menu, then press **ENT**.



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

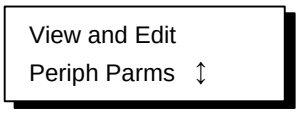


Press ▼ or ▲ to view the desired item: Power Supply, Cooling Fan, Temperature Alert or UPS Power Fail.

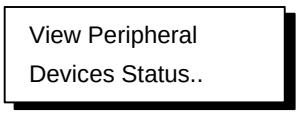


Viewing the Status of Each Fault-bus Error Signal Input

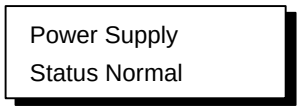
Choose “View and Edit Periph Parms” in the Main Menu, then press **ENT**.



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

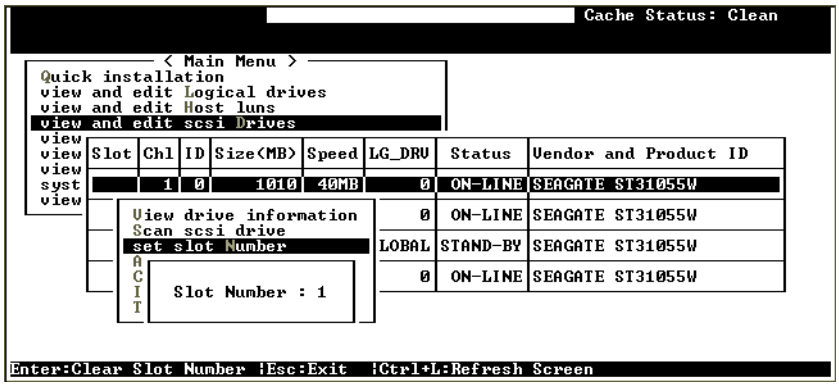


Press ▼ or ▲ to view the desired item: Power Supply, Cooling Fan, Temperature Alert or UPS Power Fail.



Configuring on the Controller through the RS-232C Terminal Interface

Assign Each SCSI Drive or Canister a Slot Number

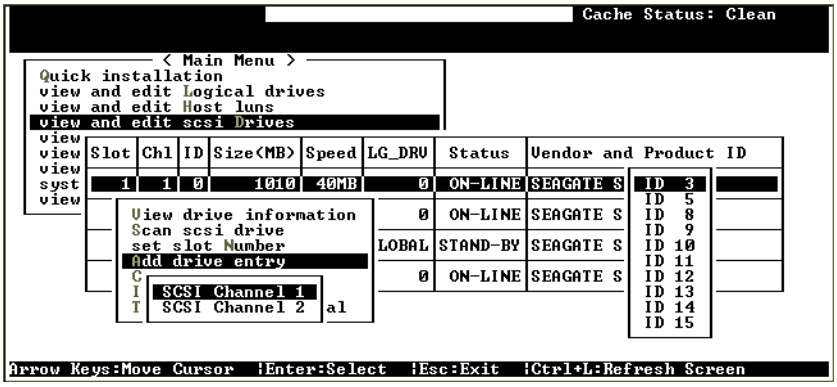


Choose “View and Edit SCSI Drives” in the Main Menu, then press [**Enter**]. A list of the connected SCSI drives will appear. The “Slot” column indicates the current slot number of each SCSI drive.

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.

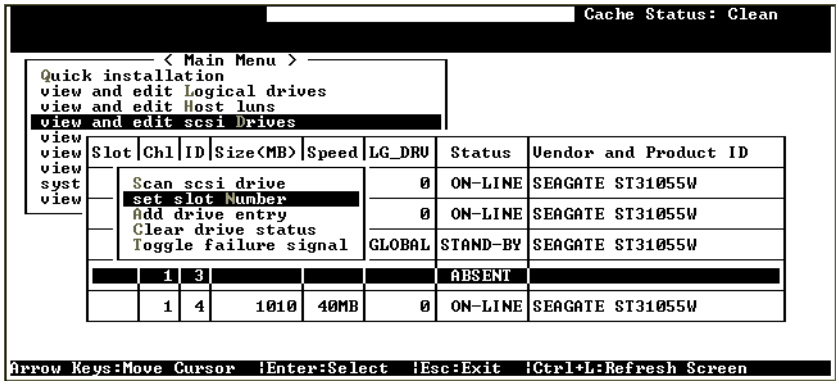
Assign a Slot Number to an Empty Canister



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.

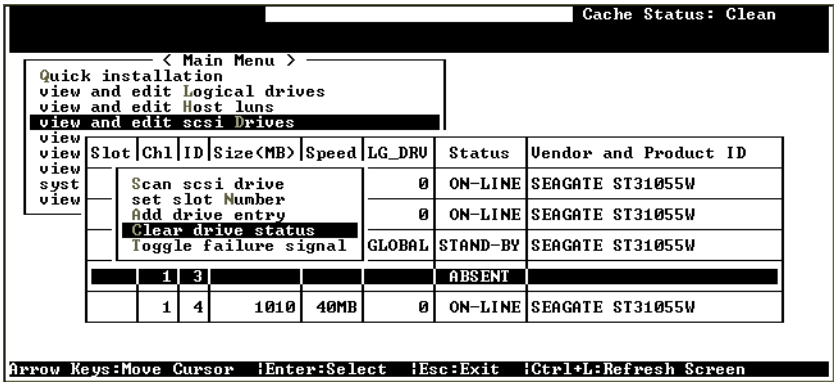


Move the cursor bar on the empty drive entry and press [**Enter**]. Choose “Set Slot Number” in the menu, then press [**Enter**]. Enter the slot number of this empty canister so as to use it later when a drive is installed.

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

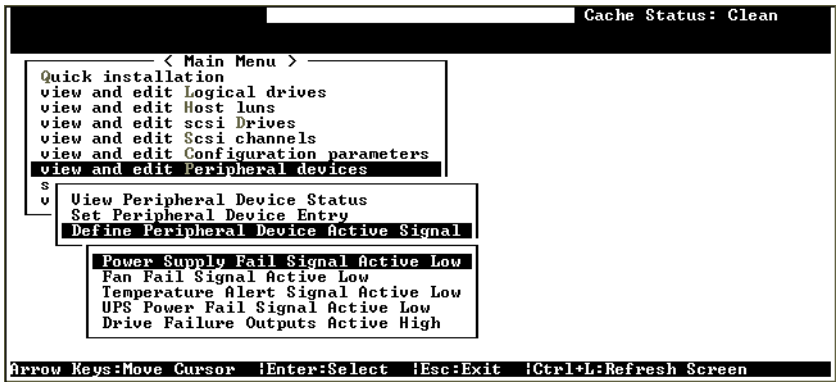


Before an empty drive entry can be removed, the slot number has to be deleted first. Please refer to the above paragraph on how to delete the slot number.

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.

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.

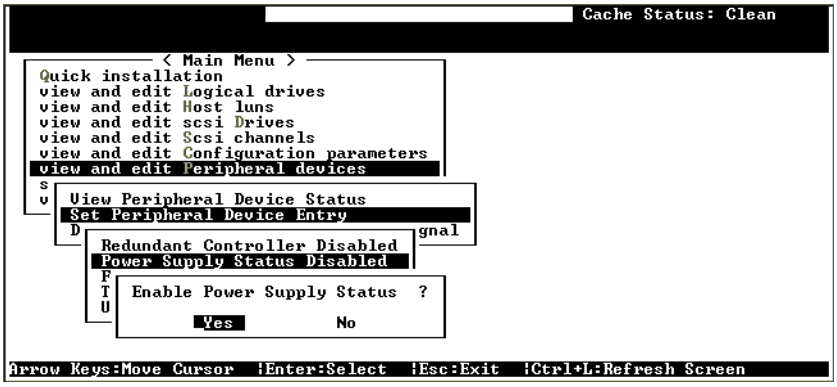
Set Each Fault-bus Error Signal Input as Active-high or Active-low



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

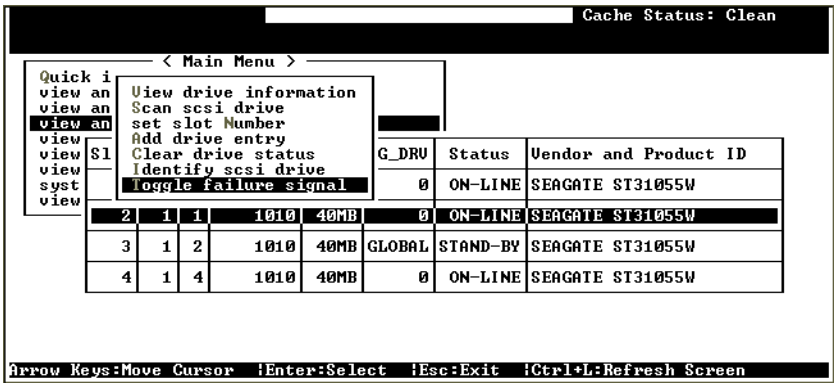
Move the cursor to the item you wish to change, then press [**Enter**]. Choose “**Yes**” when prompted to confirm, then press [**Enter**] to set. Each error signal input can be individually set as active high or active low. The drive failure signal output can also be set as active high or active low.

Enable Each Fault-bus Error Signal Input



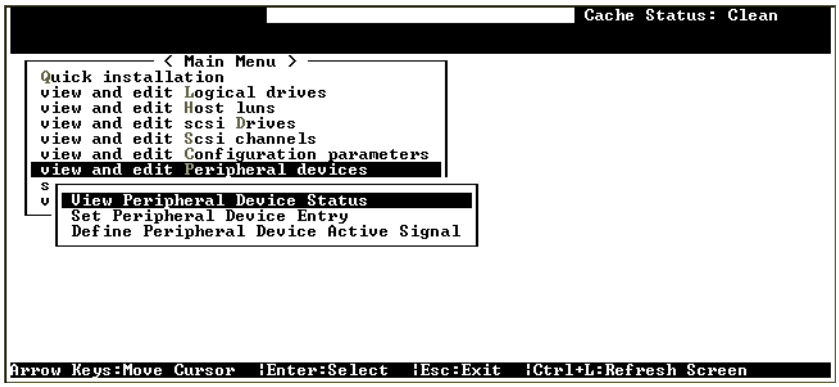
Each item of the error signal input can be individually enabled or disabled. Choose “View and Edit Peripheral Devices” in the Main Menu, then press [Enter]. Select “Set Peripheral Device Entry”, then press [**Enter**]. Move the cursor to the desired item to enable or disable, and press [**Enter**]. Choose “**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.

Viewing the Status of Each Fault-bus Error Signal Input

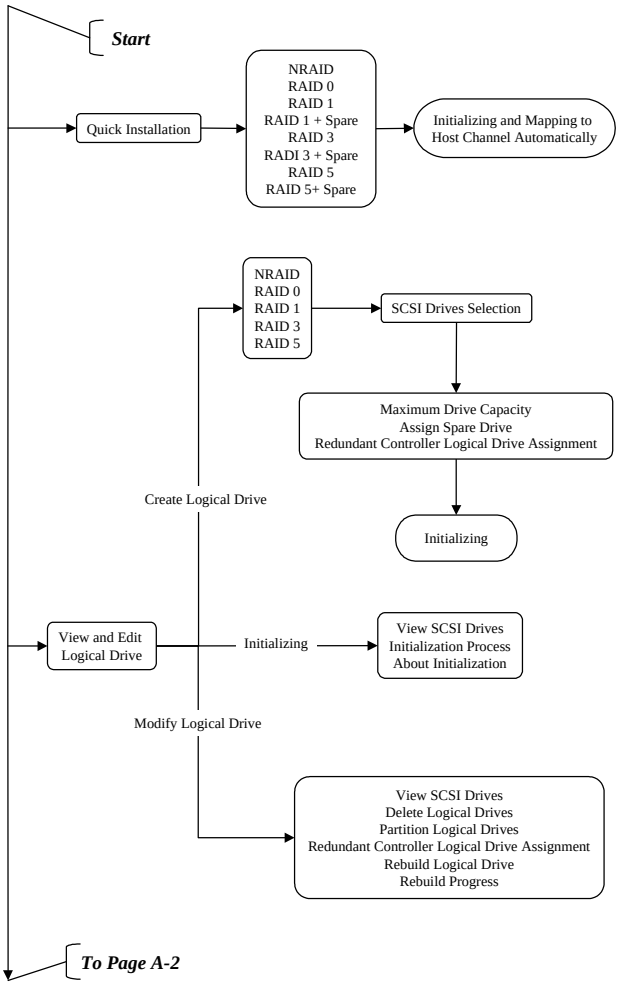


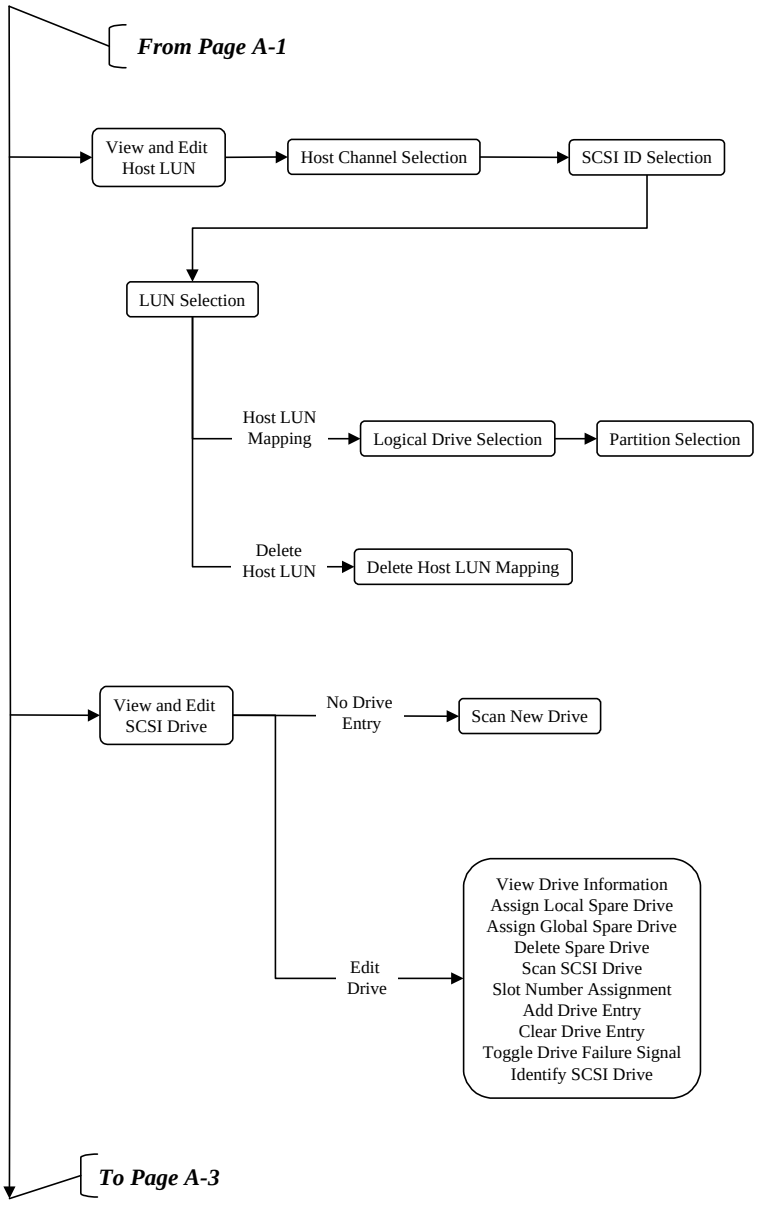
Choose “View and Edit Peripheral Devices” in the Main Menu and press [**Enter**]. Select “View Peripheral Device Status” in the menu and press [**Enter**].

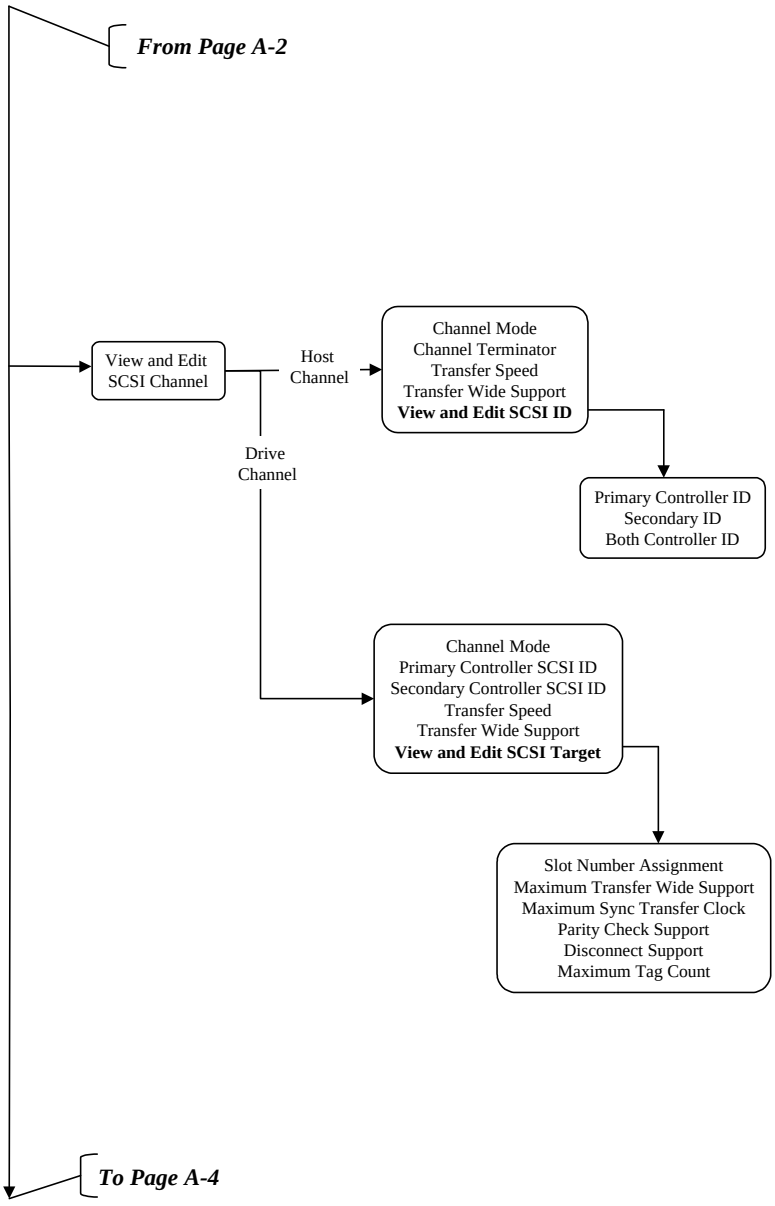
ITEM	STATUS	LOCATION
Redundant Controller	Disabled	
Power Supply Status	Normal	FaultBus
Fan Status	Failed	FaultBus
Temperature Status	Alert	FaultBus
UPS Status	Normal	FaultBus

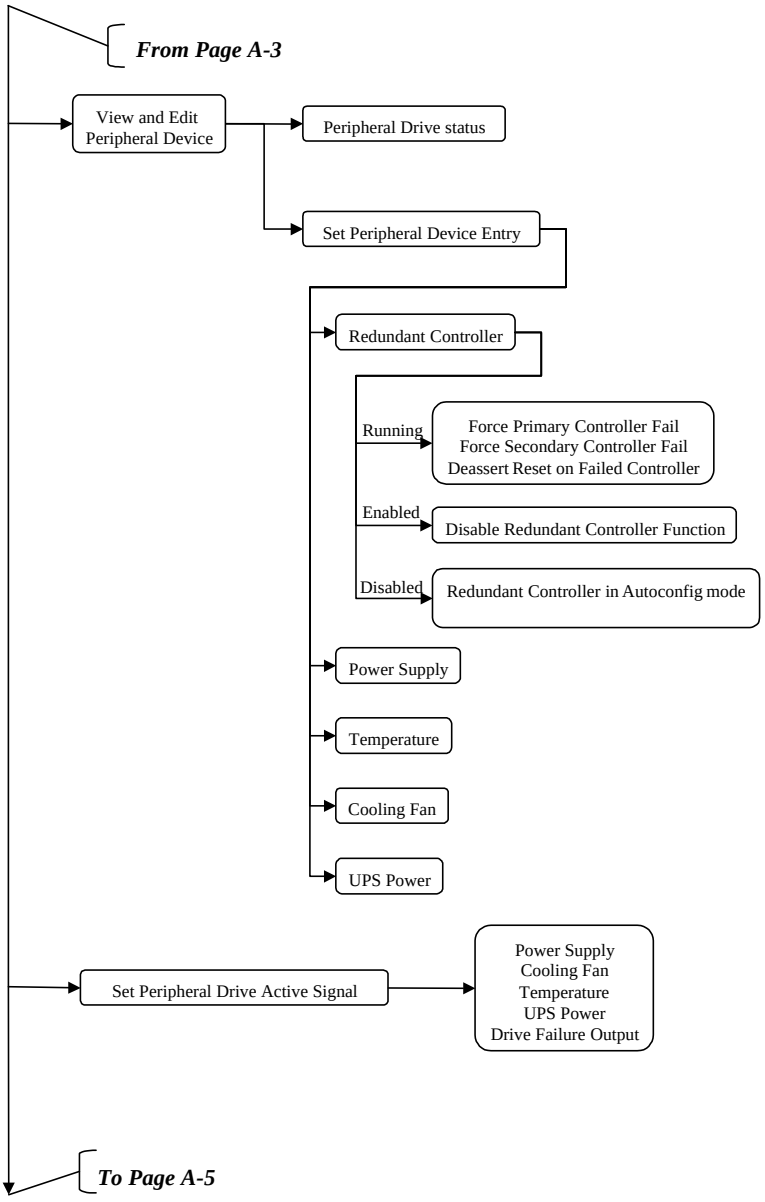
The current status of each enabled Fault-bus error signal input is listed. Try to emulate the errors and view the status of each item as described above.

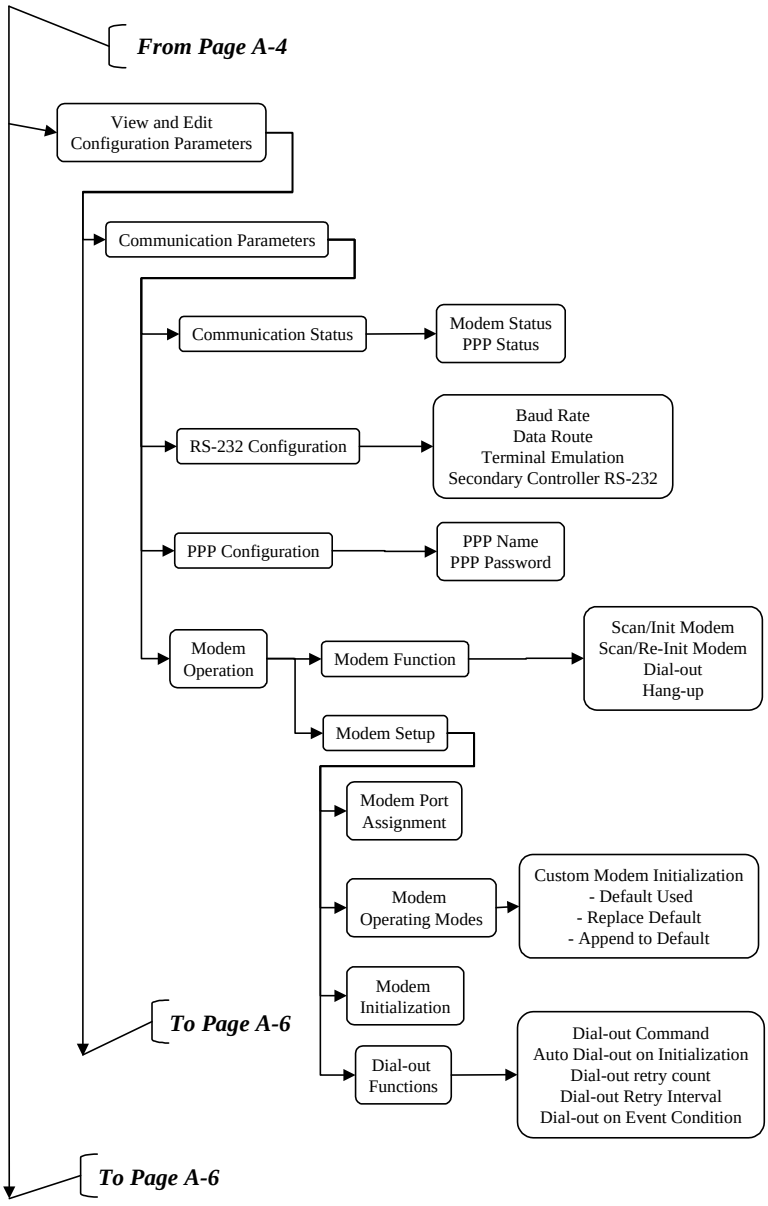
Appendix A Front Panel Navigation Map

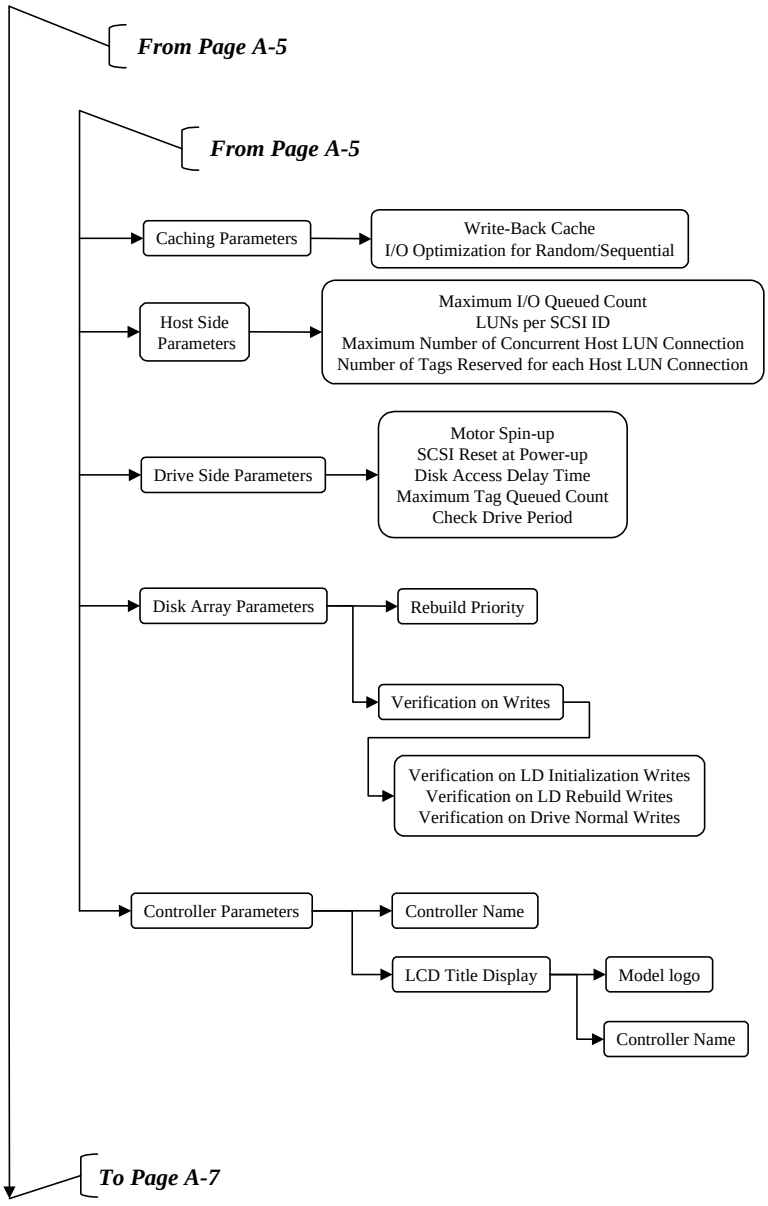


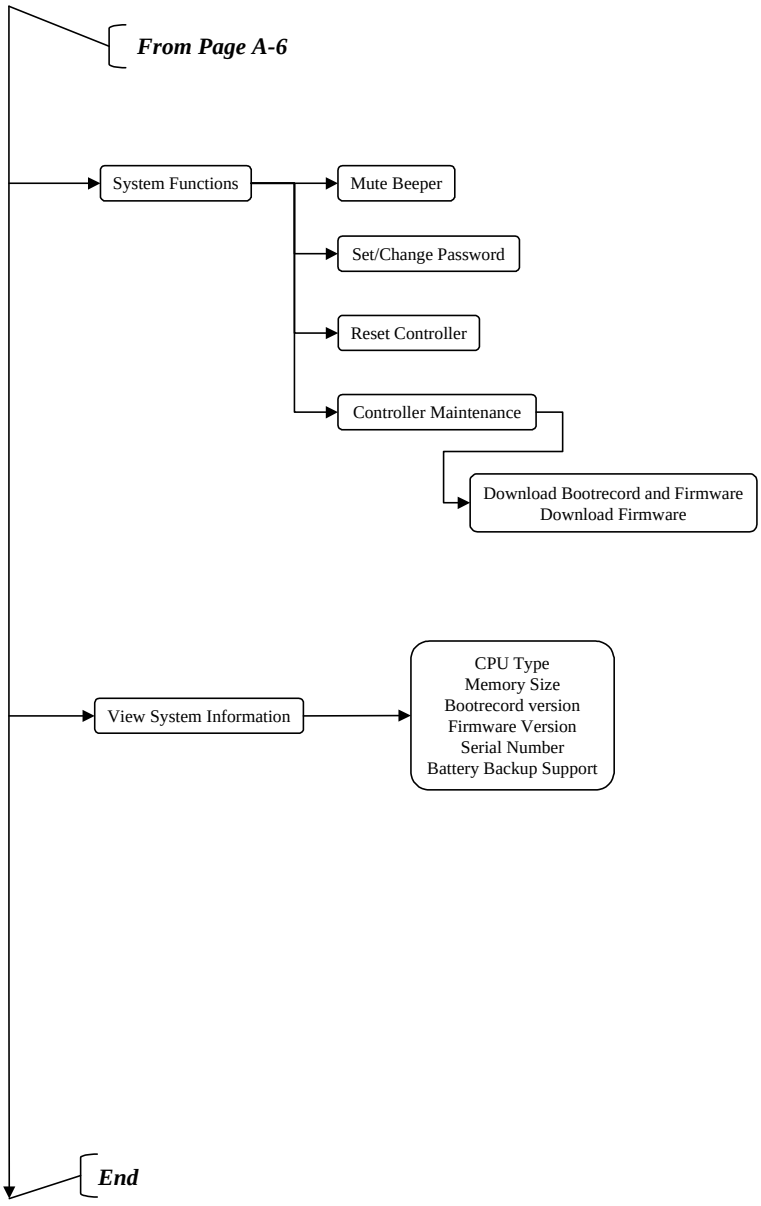

From Page A-1
View and Edit Host LUN
Host Channel Selection
SCSI ID Selection
LUN Selection
Host LUN Mapping
Logical Drive Selection
Partition Selection
Delete Host LUN
Delete Host LUN Mapping
View and Edit SCSI Drive
No Drive Entry
Scan New Drive
Edit Drive
View Drive Information
Assign Local Spare 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


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-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-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
To Page A-6


From Page A-5
From Page A-5
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
Verification on Writes
Verification on LD Initialization Writes
Verification on LD Rebuild Writes
Verification on Drive Normal Writes
Controller Parameters
Controller Name
LCD Title Display
Model logo
Controller Name
To Page A-7


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

Appendix B 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
SCSI-2	3 m	25 m	-	8
Wide SCSI-2	3 m	25 m	-	16
Ultra SCSI-2	1.5 m	25 m	-	8
Ultra SCSI-2	3m	-	-	4
Ultra Wide SCSI-2	-	25 m	-	16
Ultra Wide SCSI-2	1.5 m	-	-	8
Ultra Wide SCSI-2	3 m	-	-	4
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 (LVD)	16-bit	40 Mhz	80MB/Sec

Appendix C Upgrading the Firmware

The AA-3102RS controller'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:

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.

- *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.*

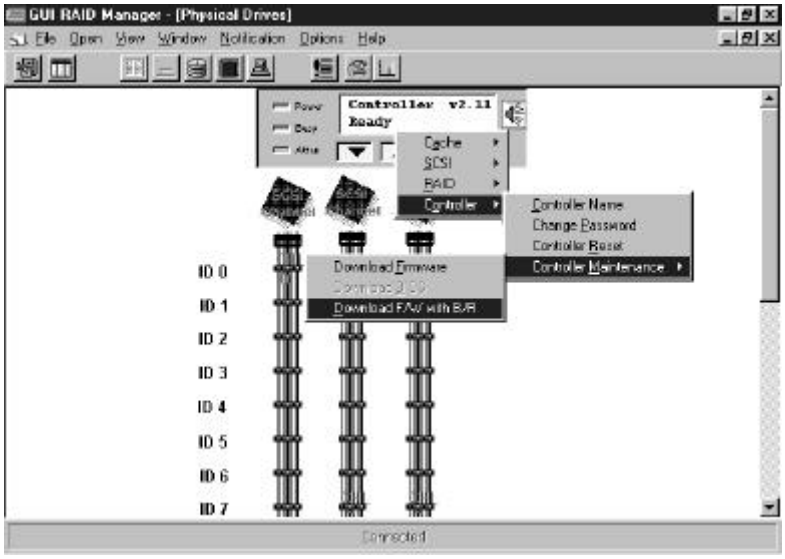
Upgrading firmware using In-band SCSI + Acer RAID Manager

The In-band SCSI connection and the ability to upgrade the firmware via In-band SCSI are supported in Acer RAID Manager , version 1.61A and later versions. This version of the Acer 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.

Establish the In-band SCSI connection in Acer RAID Manager

Please refer to Chapter 4 section “Using In-band SCSI in Acer RAID Manager” for details on establishing the In-band SCSI connection in Acer RAID Manager.

Upgrade Both Boot Record and Firmware Binaries

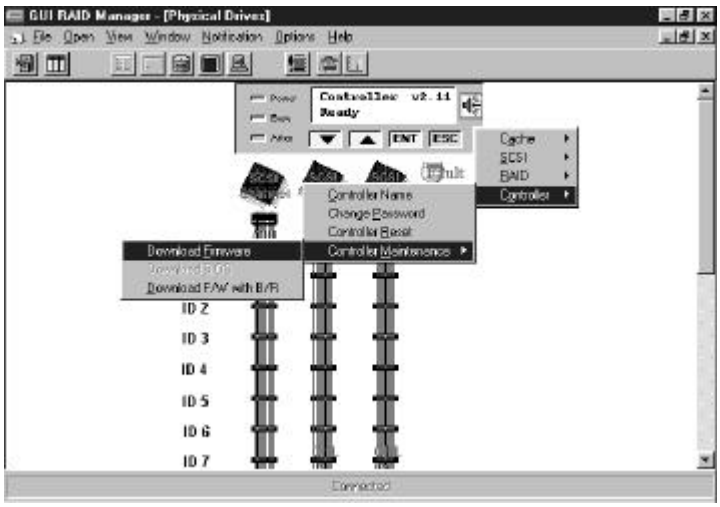


1. Double click on the controller panel to get the menu appears. Choose "Controller Maintenance" > "Advanced Maintenance" -> "Download Boot Record and Firmware".

2. Provide the boot record binary filename, the Acer 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 Acer 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.



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 Acer 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.

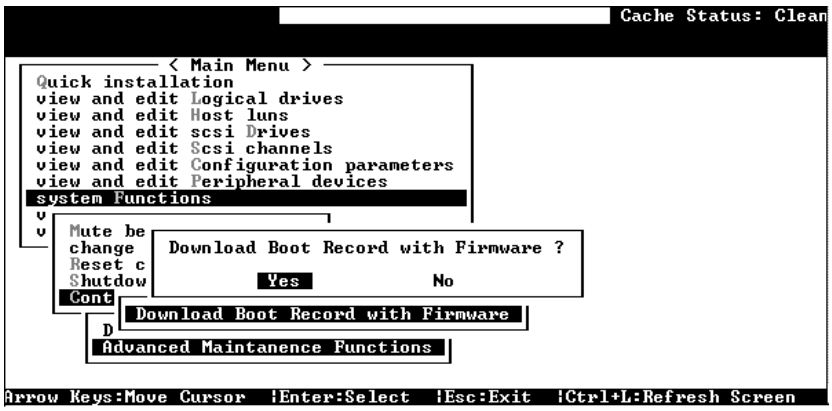
Upgrading firmware using RS-232 Terminal Emulation

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.

Establishing the connection for the RS-232 Terminal Emulation

Please refer to chapter 4 section "Serial Port Connection and Set-up" for details on establishing the connection.

Upgrading Both Boot Record and Firmware Binaries



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."

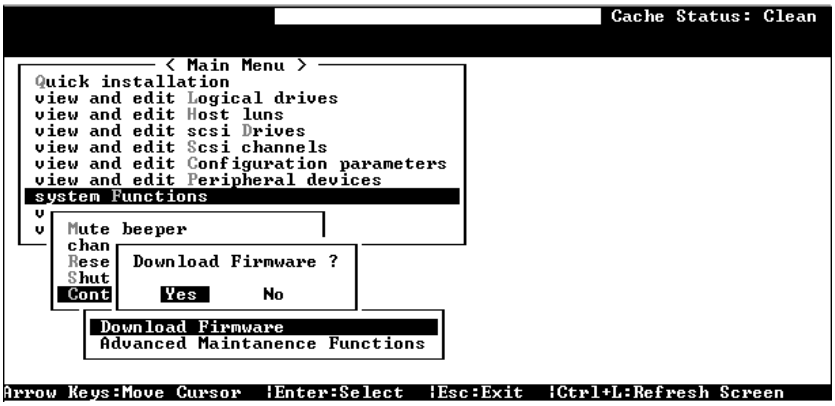
5. Set ZMODEM as the file transfer protocol of your terminal emulation software.

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 to 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.

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 D Sync. Clock Period & Sync. Clock Frequency

Changes to the SCSI Synchronous Clock Period of each SCSI target is a low-level control of the SCSI controller chip. There is no other selectable option. Only the Synchronous Clock Period is available in this field.

To calculate the Synchronous Clock Period, refer to the "Sample equation" to get the correct Synchronous Clock Period.

Sample equation:

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

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

In this example, 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

Synchronous Clock Period	Synchronous Clock Frequency	Synchronous Clock Period	Synchronous Clock Frequency
31	8.0	110	2.2
37	6.7	120	2.0
43	5.8	135	1.8
50	5.0	0	Asynchronous

Appendix E Troubleshooting Guide

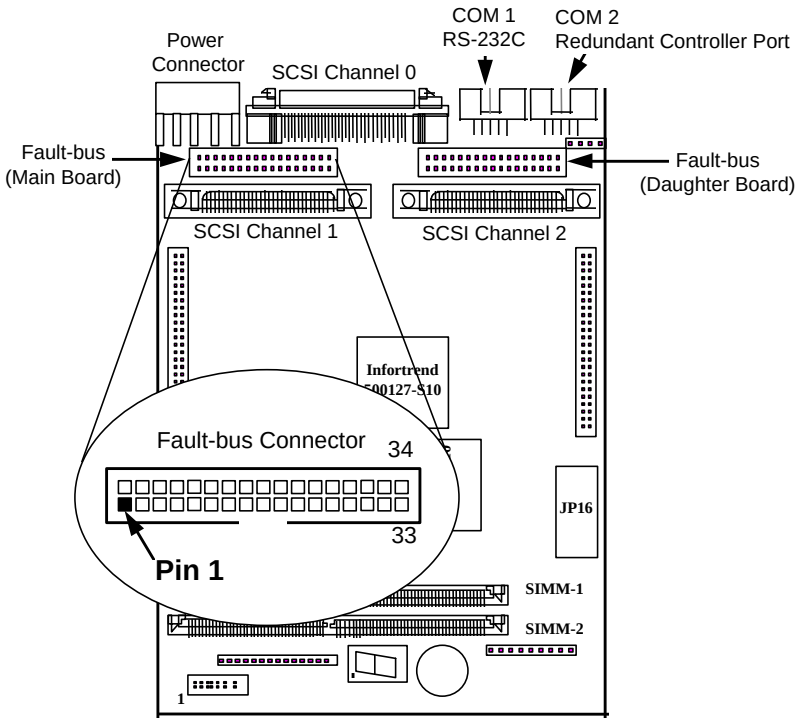
The following is a checklist of the common problems encountered during installation. For failures that occur during operation, refer to the failure recovery procedure in the "Disk Failure Management" section

PROBLEM	CHECK
LCD is off	1. Check power connections of the board and LCD panel. 2. Requires minimum of 4 MB DRAM SIMM installed.
7-segment LED flashes "F"	1. SIMM module not installed yet. 2. Null board (pin plug) for battery backup connector, JP16, is not installed.
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.

PROBLEM	CHECK
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 AA-3102RS	1. Check host SCSI cable connections. 2. Check SCSI port to LUN assign-ment. 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 7 or Chapter 8 section "Scanning New SCSI Drive" on how to remove the empty drive entry.
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.

PROBLEM	CHECK
The logical drive states “INVALID”.	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 controller.
In “View and Edit SCSI Drives” or “View and Edit SCSI Channels”, the speed is only “20.8Mhz”, not “40Mhz”	1. “20.8Mhz” is SCSI sync frequency, not transfer rate. 2. Refer to Appendix B, SCSI cable Specification, for details.
All settings are too complex to remember.	1. After the system installation completes, write down all the settings and related information in “Appendix H Take Record of the Settings” for future reference.
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 9, Redundant Controller, for more details.

Appendix F Pin Assignments



RS-232C Port

Pin	Descriptions	Pin	Descriptions
1	DCD1	6	DSR1
2	RXD1	7	RST1
3	TXD1	8	CTS1
4	DTR1	9	RT1
5	GND	10	N/C

Redundant Controller Port

Pin	Descriptions	Pin	Descriptions
1	DCD2	6	DSR2
2	RXD2	7	RTS2
3	TXD2	8	CTS2
4	DTR2	9	RS232 RESET
5	GND	10	N/C

Fault-bus Port (Main Board)

Pin	Descriptions	Pin	Descriptions
1	Slot 1	2	Slot 5
3	Slot 2	4	Slot 6
5	Slot 3	6	Slot 7
7	Slot 4	8	N/C
9	GND	10	GND
11	Slot 8	12	Slot 12
13	Slot 9	14	Slot 13
15	Slot 10	16	Slot 14
17	Slot 11	18	N/C
19	GND	20	GND
21	Slot 15	22	Slot 18
23	Slot 16	24	Slot 19
25	Slot 17	26	Slot 20
27	Any Slot	28	N/C
29	GND	30	GND
31	Power#	32	Temperature#
33	UPS#	34	FAN#

Fault-bus Port (Daughter Board)

Pin	Descriptions	Pin	Descriptions
1	Slot 21	2	Slot 25
3	Slot 22	4	Slot 26
5	Slot 23	6	Slot 27
7	Slot 24	8	N/C
9	GND	10	GND
11	Slot 28	12	Slot 32
13	Slot 29	14	Slot 33
15	Slot 30	16	Slot 34
17	Slot 31	18	N/C
19	GND	20	GND
21	Slot 35	22	Slot 39
23	Slot 36	24	Slot 40
25	Slot 37	26	Slot 41
27	Slot 38	28	N/C
29	GND	30	GND
31	N/C	32	N/C
33	N/C	34	N/C

AA- 9011 Null Modem

Swap pin-2 and pin-3
Swap pin-4 and pin-6
Swap pin-7 and pin-8

AA-9012 RS-232C Extension Cable

Extend the cable length only, no wire swap.

AA-9013 Redundant Controller Cable

Swap pin-2 and pin-3
Swap pin-4 and pin-6
Swap pin-7 and pin-8

Appendix G Specifications

RAID level	0, 1, 3, 5 (or non-RAID disk spanning)
Failure management	Bad sector reassignment, hot-swapping, spare drive operation (Global and Local Spare), background rebuilding
Failure indicator	Via front panel, RS-232 terminal
Host OS compatibility	OS independent
Cache size	Up to 128 MBytes
Host interface	Ultra-Wide-SCSI
Host channels	Up to 5 (add AA-9073UWS)
Hard disk interface	Ultra-Wide SCSI or Ultra2 Wide SCSI
Hard disk channels	Up to 5 (with AA-9073UWS or AA-9073U2)
Channel Terminator	Active, software programmable
SCSI protocol	SCSI-1, SCSI-2, (Ultra)-Wide-SCSI-1 or -2 (auto-match)
Ultra-Wide-SCSI transfer rate	40 MBytes/sec synchronous 10 MBytes/sec asynchronous
Max. SCSI drives	75
No. of logical drives	8 with different RAID operation
Partitions	8 per logical drive, total of 64
No. of LUNs	8 per channel, total of 64 (dynamic mapping to logical drives or partitions)
Control	Front panel or via RS-232 terminal
Ultra-Wide-SCSI connectors	68-pin header (host and drive side)
Ultra-Wide-SCSI cabling	Single-ended
Voltage	+5 Volts
Current	2 Amp
Operating Temperature	5 to 44 °C
Relative Humidity	10-96%, non-condensing
Operating Altitude	Sea level to 10,000 ft.
Dimensions	
AA-3102RS:	21.6(L) x 14.9(W) x 4.1(H)cm (5.25" half-height drive profile)

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	Partition	Size (MB)

LG	Partition	Size (MB)	LG	Partition	Size (MB)

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		

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		

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

COM 2 (Redundant Controller Port)

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

PPP Configuration

PPP Access Name	
PPP Access Password	

Modem Operation → Modem Setup

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

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

Caching Parameters

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

Host Side SCSI Parameters

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

Drive Side SCSI Parameters

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

Disk Array Parameters

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

Controller Parameters

Controller Name	ÿ Not Set ÿ _____

View and Edit Peripheral Devices

Set Peripheral Device Entry

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

Define Peripheral Device Active Signal

Power Supply Fail Signal	ÿ Active High ÿ Active Low
Fan Fail Signal	ÿ Active High ÿ Active Low
Temperature Alert Signal	ÿ Active High ÿ Active Low
UPS Power Fail	ÿ Active High ÿ Active Low

Signal	
Drive Failure Outputs	ÿ Active High ÿ Active Low

View System Information

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