

FCC ID:LC83102UG

IFT-3102UG

Ultra-SCSI to Ultra-SCSI RAID Controller
Instruction Manual
Revision 2.5

Infotrend Corp.
149 Stony Circle,
Ste. 210 Santa Rosa,
CA 95401, USA
www.infotrend.com

Infotrend Technology, Inc.
6F-6, No. 351
Chung-Shan Rd., Sec. 2
Chung-Ho City,
Taipei Hsien
Taiwan, R.O.C.
www.infotrend.com.tw

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First Published 1998

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Printed in Taiwan

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This instruction manual is exclusively written for firmware version 2.11 and above. It is also applicable for other firmware versions but may differ in some features or wordings shown on the screen.

Chapter 1 Introduction

The IFT-3102UG is an Ultra-Wide-SCSI-to-Ultra-Wide-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 486DX5 processor 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 of drives 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. Remarkably, all of these failure recovery procedures are transparent to the host system.

The IFT-3102UG is equipped with a 202-pin gold finger connector. All signals are integrated in this connector, thus allowing fast and easy swapping of the controller without powering-off or removing any cables.

A variety of daughterboards are available to further expand the IFT-3102UG controller with more single-ended channels, differential channels, LVD, or Fibre channels, fitting the requirements of today's applications. Corresponding backplane boards to match the daughterboards are also available.

The controller has been designed with ease of integration and maintenance in mind. All major features are described in the next chapter. The IFT-3102UG 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.

The IFT-3102UG has the ability to synchronize the cache memory. If you are using redundant controller with two IFT-3102UG controllers, and one of the controllers happens to fail, you will not lose the data stored in the cache memory.

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Chapter 2 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 system without additional software drivers. profile
- ✓ 5.25" half-height drive allows easy integration into external subsystem enclosures or directly into the host system's drive bay.
- ✓ Hot-swappable 202-pin gold-finger edge connector on the mainboard for connecting to a backplane board. Backplane board allows easy cable connection.
 - Backplane boards for use with the mainboard:
 - IFT-9078B4USA: Four single-ended Ultra Wide SCSI ports
 - IFT-9078B0: No SCSI ports on the board
 - Backplane boards for use with the daughterboard:
 - IFT-9078B4USB: Four single-ended Ultra Wide SCSI ports
 - IFT-9078B4UD: Two single-ended and two differential Ultra Wide SCSI ports
 - IFT-9078B4UL: Two single-ended and two Ultra2 Wide (LVD) SCSI ports
 - IFT-9078B4UF: Two single-ended and two single-loop (or one dual-loop) Fibre channels
- ✓ Up to seven drive channels (uses optional daughterboard for SCSI channel upgrade) for a total of 105 connected drives.
- ✓ Optional upgrade daughterboards:
 - IFT-9064US: Four single-ended Ultra Wide SCSI channels

- IFT-9064UD: Two differential and two single-ended Ultra Wide SCSI channels
 - IFT-9064UL: Two single-ended and two Ultra2 Wide (LVD) SCSI channels
 - IFT-9064UF: Two single-ended and two single-loop (or one dual-loop) Fibre channels
- ✓ Supports up to 15 SCSI ID's per channel.
 - ✓ 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 can be configured as either a host or drive interface.
 - ✓ Two or more 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 Tagged Command Queuing and Multi-Threaded I/O implementation.
 - ✓ Redundant Controller Capability: The controller has *Active-Active* redundancy capability with synchronized write-back cache feature.
 - ✓ Channel 0 on the mainboard can be configured as either a standard SCSI port or a synchronized cache port for controller redundancy.

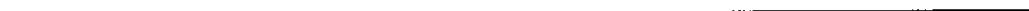
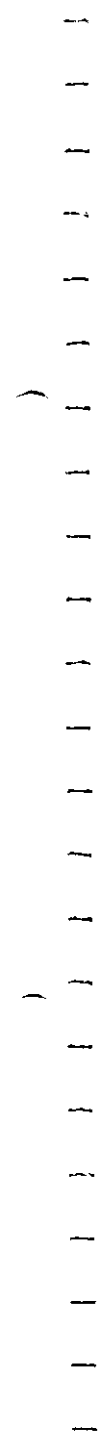
- ✓ Uses an AMD 486DX5 processor with all executable firmware downloaded into high-speed DRAM.
- ✓ EDO DRAM supported for enhanced performance.
- ✓ Up to 128 Mbytes of intelligent Read-Ahead/Write-Back cache with an optional battery backup unit.
- ✓ Optional battery backup module to protect data in Write-Back cache when a power failure occurs:
 - IFT-9010: battery backup module
 - IFT-9070: battery backup daughterboard that connects to the mainboard
- ✓ 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.
- ✓ GUI RAID Manager & RS-232 terminal interface for RAID management.
- ✓ Supports Fault-bus for enclosure management.



IMPORTANT:

IFT-3102UG, mentioned throughout this manual refers to both the IFT-3102UG and IFT-3102UGN controllers. The only difference between them is this: The IFT-3102UG supports 4 single-ended Ultra Wide SCSI channels onboard while IFT-3102UGN does not support any SCSI channels on-board. Instead of having on-board channels, the IFT-3102UGN controller uses channels from a channel upgrade daughterboard.

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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 IFT-3102UG RAID controller provides complete RAID functionality and enhanced drive failure management.

3.1 RAID Management

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

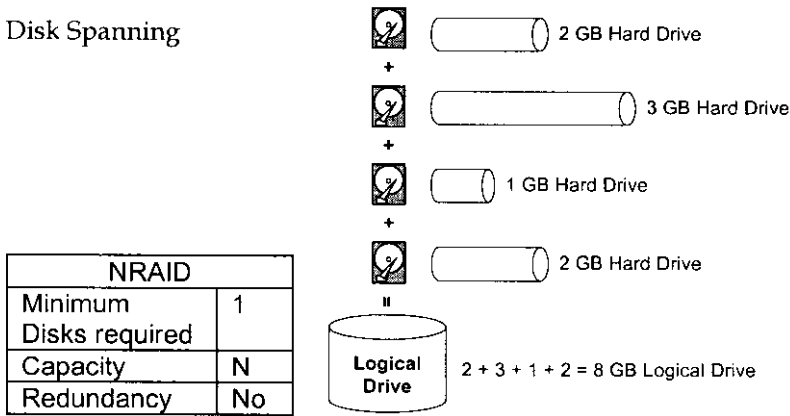
- Provides disk spanning by weaving all connected drives into one single volume.
- Increases disk access speed by breaking data into several blocks when reading/writing to several drives in parallel. With RAID, storage speed increases as more drives are added.
- Provides fault-tolerance by mirroring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

What are the RAID levels?

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

NRAID

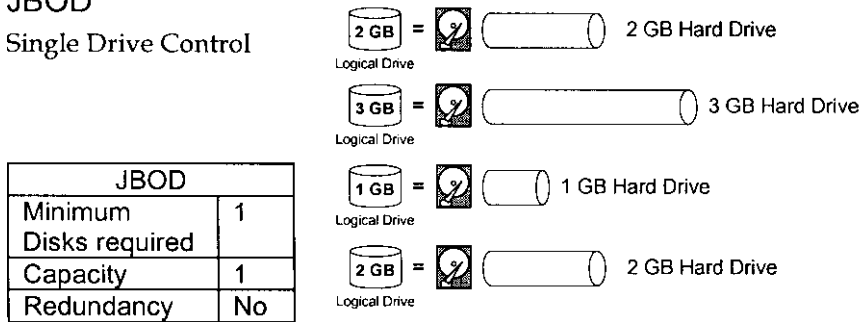
Disk Spanning



NRAID 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

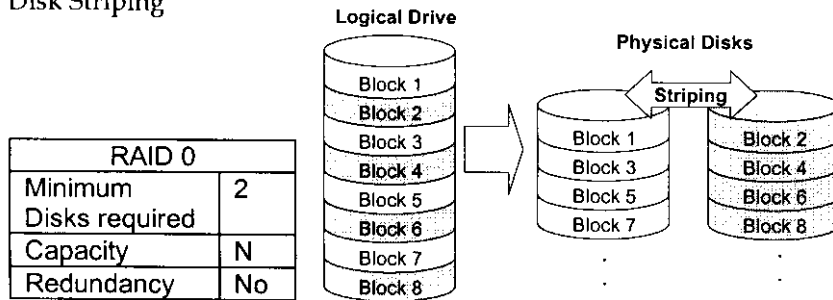
Single Drive Control



JBOD 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

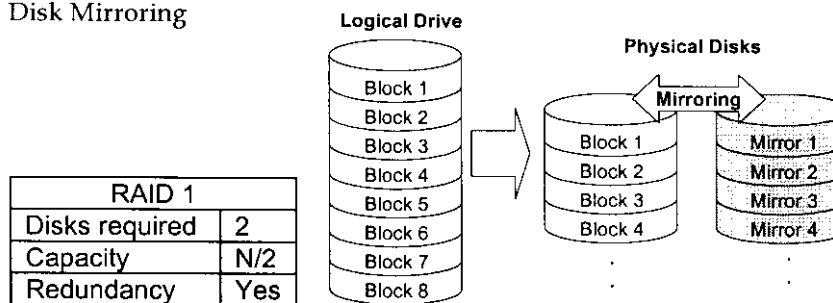
Disk Striping



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

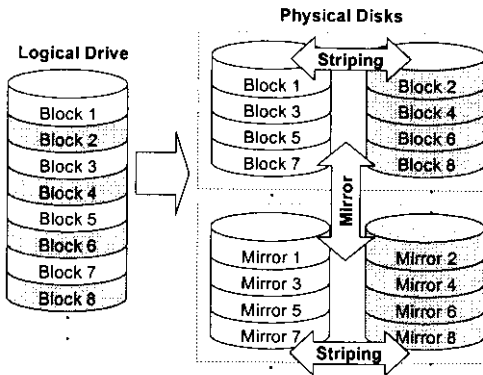


RAID 1 mirrors the data stored in one hard drive to another. RAID 1 can only be performed with two hard drives. If there are more than two hard drives, RAID (0+1) will be performed automatically.

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.



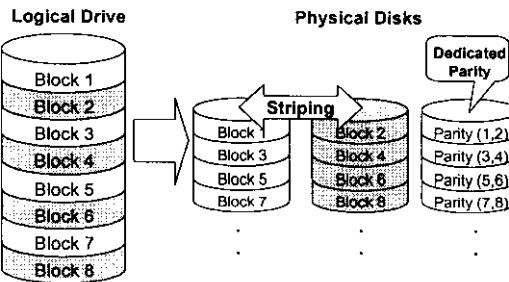
IMPORTANT:

"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

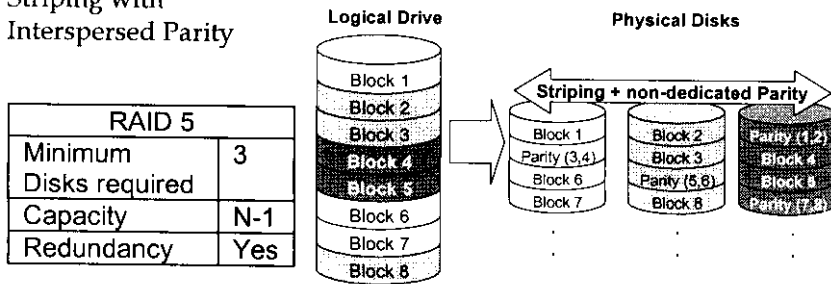
RAID 3	
Minimum Disks required	3
Capacity	N-1
Redundancy	Yes



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

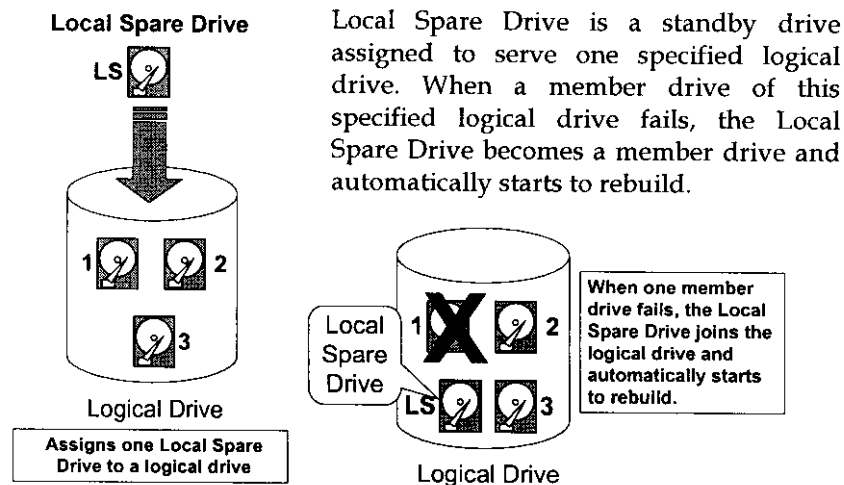
Striping with Interspersed Parity



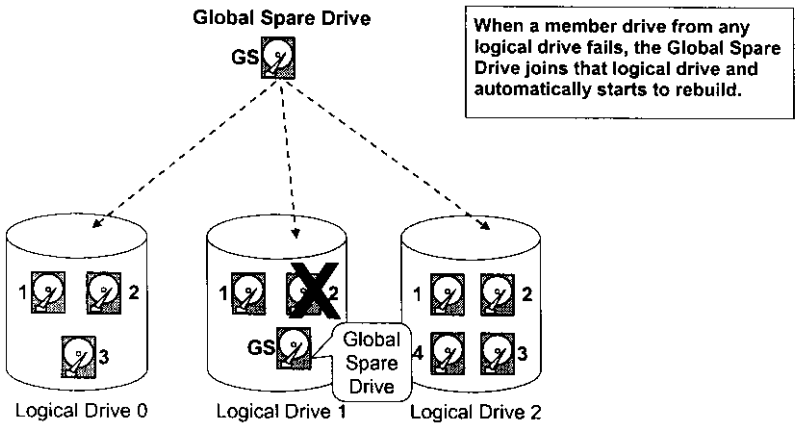
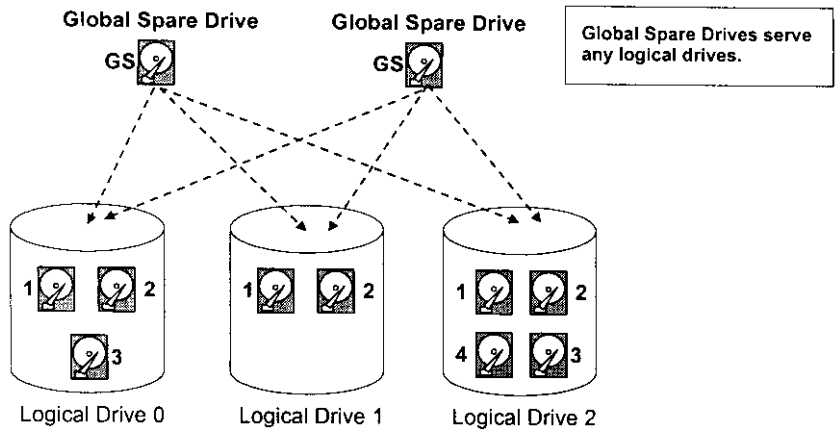
RAID 5 is similar to RAID 3 but the parity data is not stored in one dedicated hard drive. Parity information is interspersed across the drive array. In the event of a failure, the controller can recover/regenerate the lost data of the failed drive from the other surviving drives.

3.2 Drive Failure Management

3.2.1 Global and Local Spare Drive

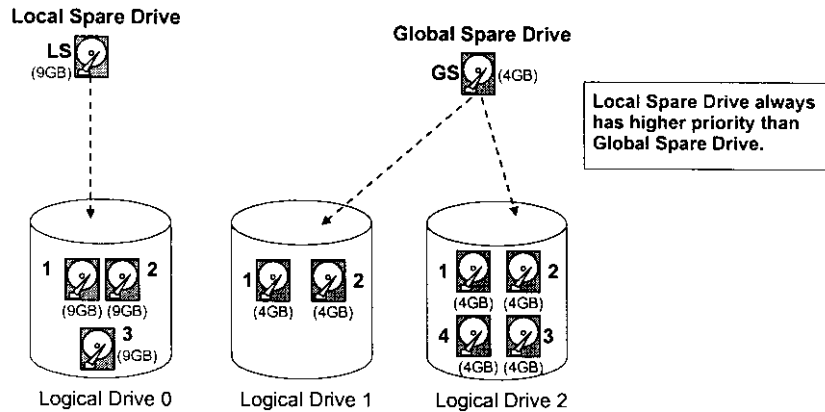


Global Spare Drive does not only serve one specified logical drive. When a member drive from any one of the logical drives fails, the Global Spare Drive will join that logical drive and automatically starts to rebuild.



The IFT-3102UG RAID controller provides both Local Spare Drive and Global Spare Drive functions. On certain occasions, the combined use of both functions will better suit users' 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.



3.2.2 Identifying Drives

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

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

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.

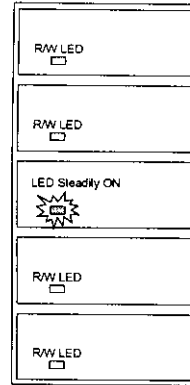
Flash Selected SCSI Drive

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



IMPORTANT:

- *This function is supported in firmware versions 2.11 and above.*



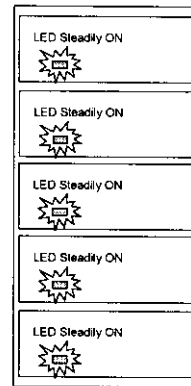
Flash All SCSI Drives

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.



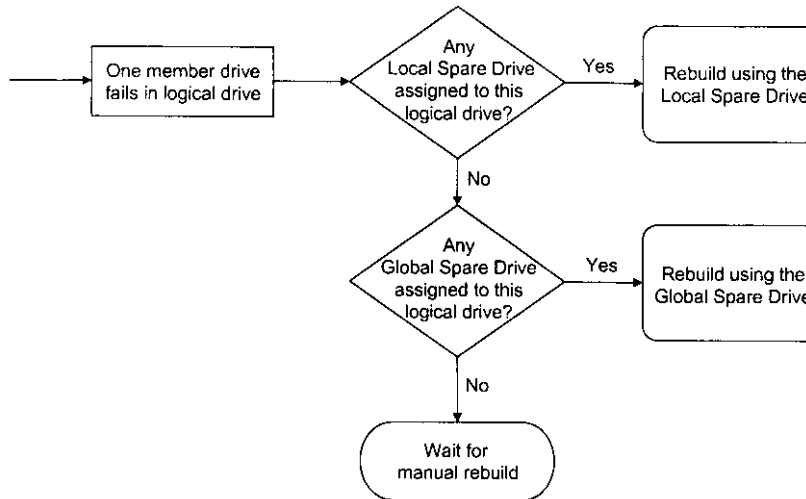
IMPORTANT:

- *This function is supported in firmware versions 2.11 and above.*



3.2.3 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.

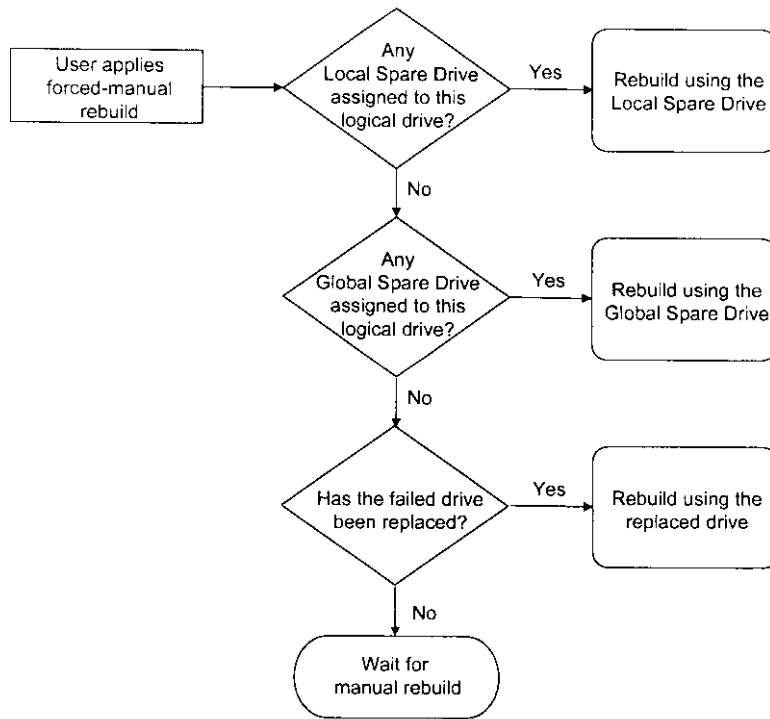
If there is no Local Spare Drive available, the controller will search for a Global Spare Drive. If there is a Global Spare Drive, it will automatically rebuild the logical drive.

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 executes a forced-manual rebuild.

3.2.4 Concurrent Rebuild in RAID (0+1)

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

3.3 Disk Array Parameters

3.3.1 Rebuild Priority

Rebuilding time will depend on the capacity of the logical drive. The IFT-3102UG 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 in the shortest time.

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

3.3.2 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.



IMPORTANT:

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

3.4 Cache Parameters

3.4.1 Optimization for Sequential or Random I/O

When using RAID for 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 IFT-3102UG 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.



IMPORTANT:

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

3.5 Drive-Side SCSI Parameters

3.5.1 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 procedures for different brands and models of hard drive will 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.



Important:

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

3.5.2 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 two host computers are connected on the same SCSI bus, performing SCSI bus reset will interrupt all read/write requests, causing some operating systems or host computers to act abnormally. Disable the "SCSI Reset at Power Up" function to prevent this from happening.

3.5.3 Disk Access Delay Time

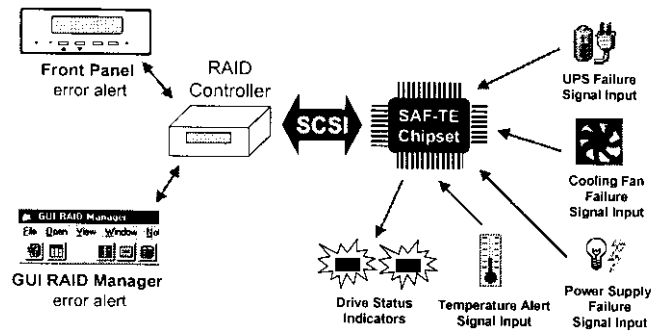
Sets the delay time before the controller tries to access the hard drives after power-on. The default is 15 seconds.

3.6 SAF-TE Enclosure Management

3.6.1 What is SAF-TE?

SAF-TE stands for SCSI Accessed Fault-Tolerant Enclosures. It is an enclosure management technology. A SAF-TE-compliant enclosure monitors the fan temperature, power supply, UPS and also provides drive status LED'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 Support



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

3.6.2 How Does SAF-TE work?

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

3.7 Dynamic Logical Drive Expansion

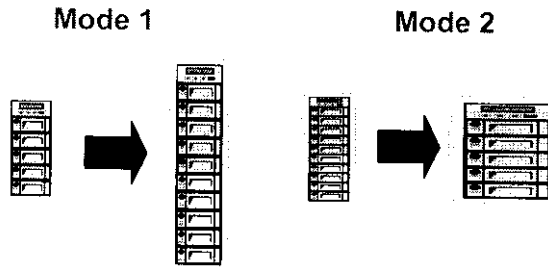
3.7.1 What Is It and How Does It Work?

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

3.7.2 Two Modes of Dynamic Logical Drive Expansion

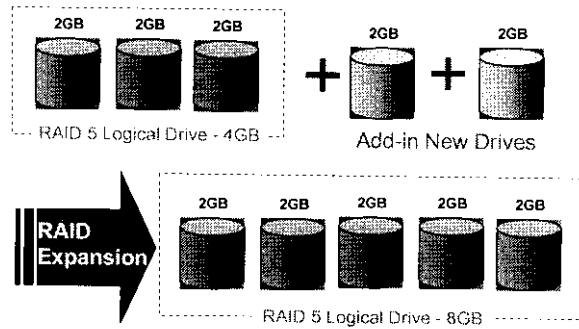
There are two modes of Dynamic Logical Drive Expansion: Mode 1 and Mode 2.

Dynamic Logical Drive Expansion



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.

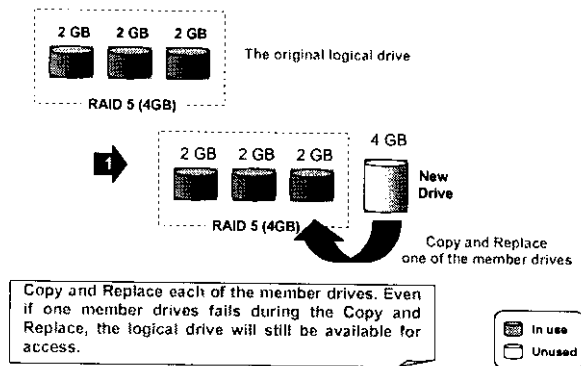
RAID Expansion - Mode 1



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

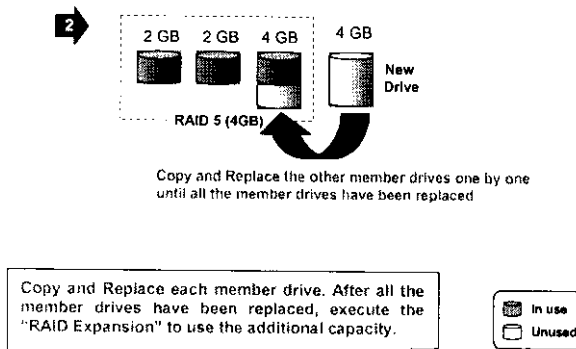
Mode 2 Expansion, on the other hand, requires the same number of higher-capacity SCSI hard disk drives for a given logical drive.

RAID Expansion - Mode 2 (1/3)



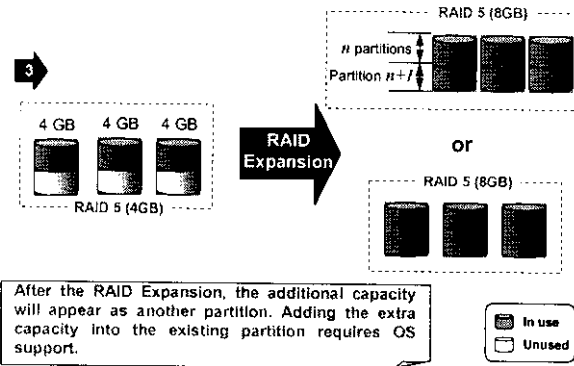
The figure above illustrates expansion of the same 4-Gigabyte RAID 5 logical drive using Mode 2 Expansion. Drives are copied and replaced, one by one, onto three higher-capacity drives.

RAID Expansion - Mode 2 (2/3)



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

RAID Expansion - Mode 2 (3/3)



IMPORTANT:

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

3.7.3 Example: RAID Expansion in Windows NT Server

Limitations When Using Windows NT 4.0

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

The Example:

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

Cache Status: Clean

LR	LG	RAID	Size<MB>	Status	O	#LN	#SB	#PL	NAME
U	P0	RAID0	2021	GOOD	R	2	-	0	
U	P1	RAID0	900	GOOD	R	3	-	0	
U	2	NONE							
U	3	NONE							
U	4	NONE							
U	5	NONE							
U	6	NONE							
U	7	NONE							

Arrow Keys: Move Cursor | Enter: Select | Esc: Exit | Ctrl+L: Refresh Screen

Connected 0:00:28 VT100 38400 B-N-1 [PC] [G] [CAPS] [NTFS] [Exp] [Print]

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

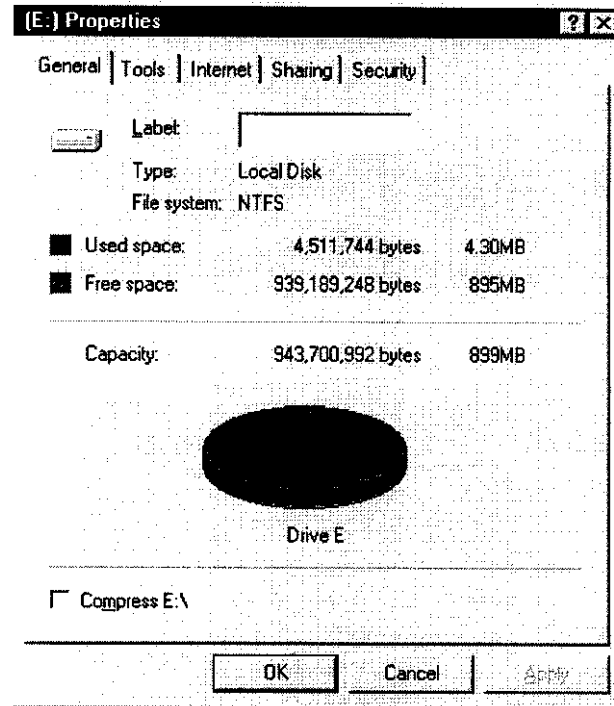
Disk Administrator

Partition	Fault Tolerance	Tools	View	Options	Help
Disk 0					
2016 MB					
C:					
NTFS					
2016 MB					
Disk 1					
900 MB					
E:					
NTFS					
900 MB					
CD-ROM 0					
D:					

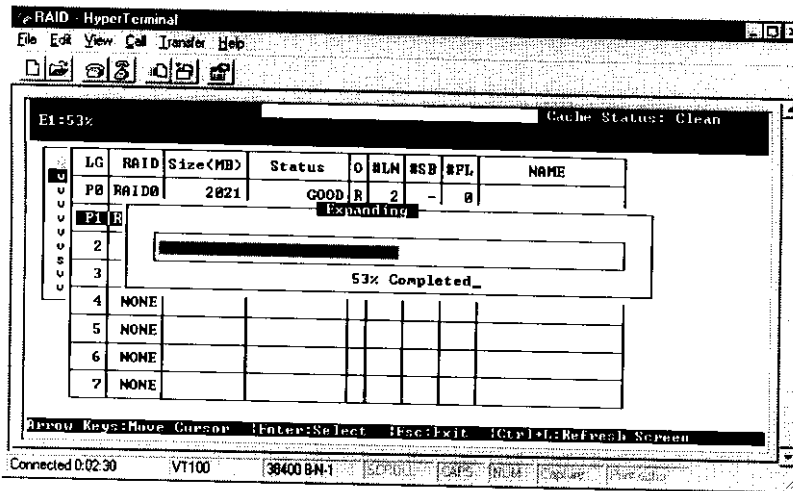
Primary partition

Partition	Size	File System	Drive Letter
	900 MB	NTFS	E:

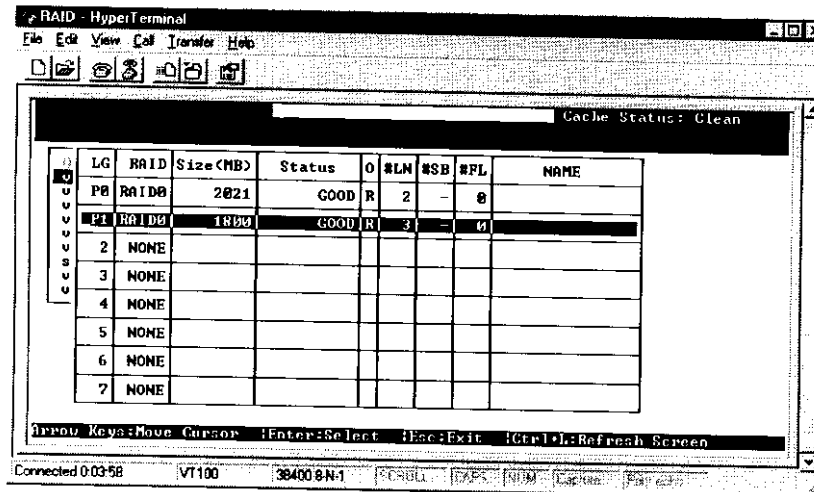
Place the cursor on Disk 1, right-click your mouse, and select "Properties." You will see that the total capacity for the Drive E: is just under 900MB.



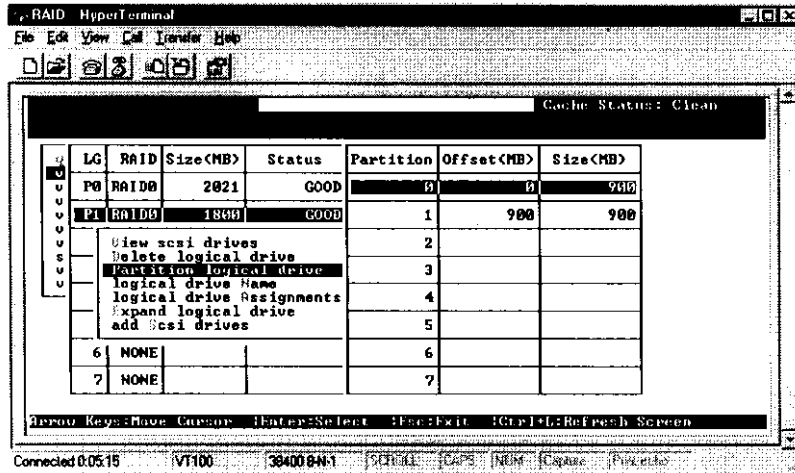
Follow the steps described in section 7.2.8 to add SCSI disk drives and perform Mode 1 Dynamic Logical Drive Expansion.



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

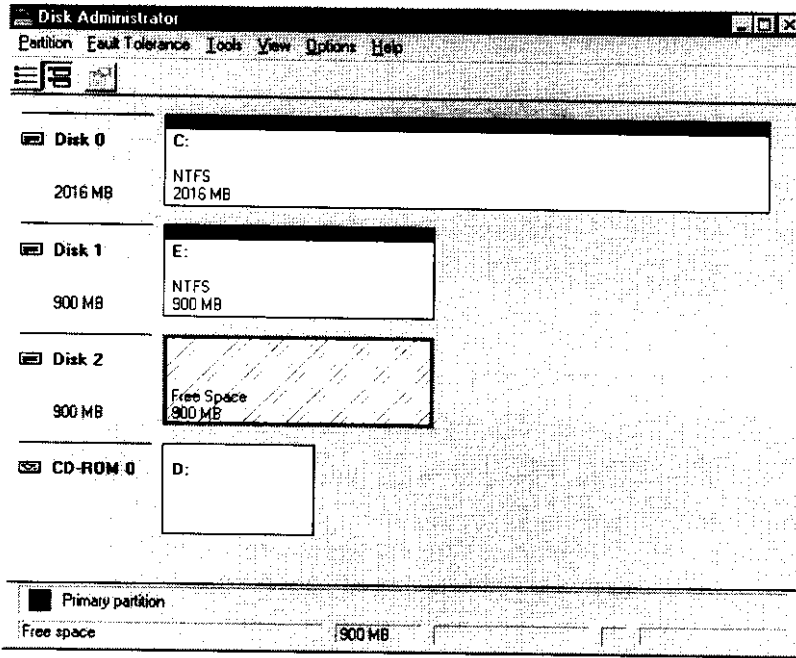


From the menu, select Partition Logical Drive. You will see that the 1800MB logical drive is composed of two 900MB partitions.

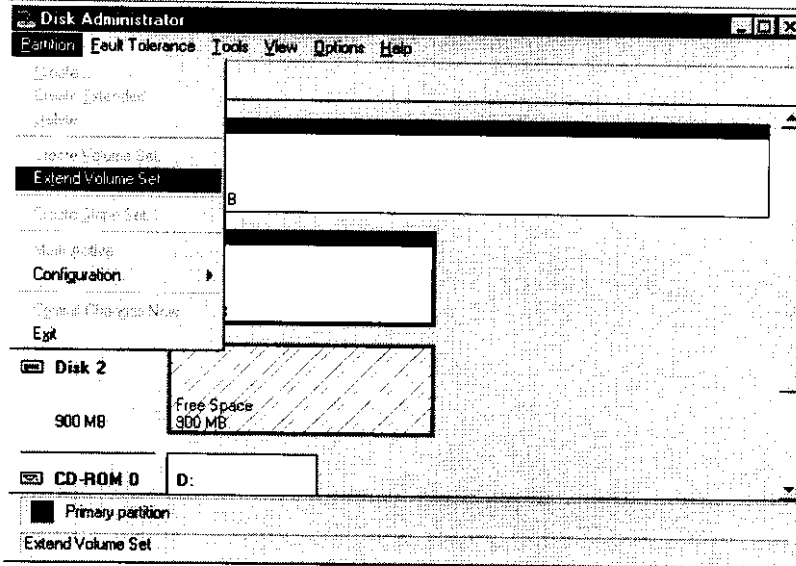


Follow the directions in section 7.3.1 to map the new partition to a Host LUN. The new partition must be mapped to a host LUN in order for the HBA (host-bus adapter) to see it. Once you have mapped the partition, reboot Windows NT. The HBA should be able to detect an additional "disk."

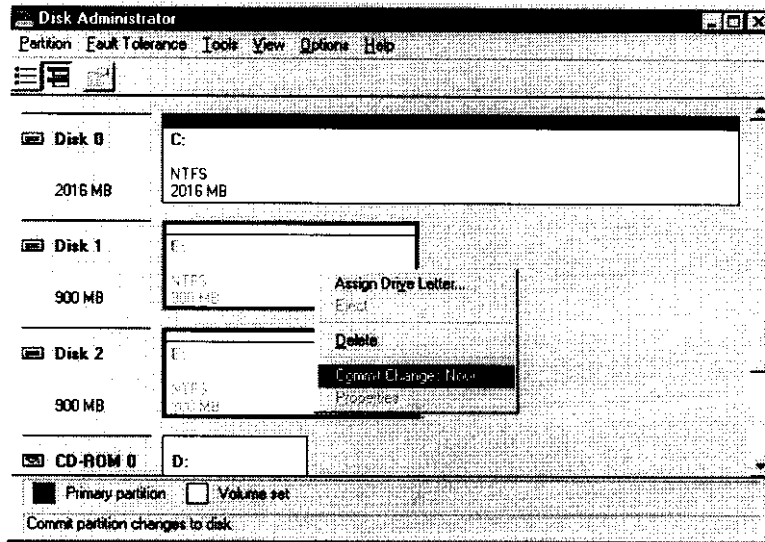
Return to Windows NT Server's Disk Administrator. There now exists a Disk 2 with 900MB of free space. Click on Disk 2 to select it.



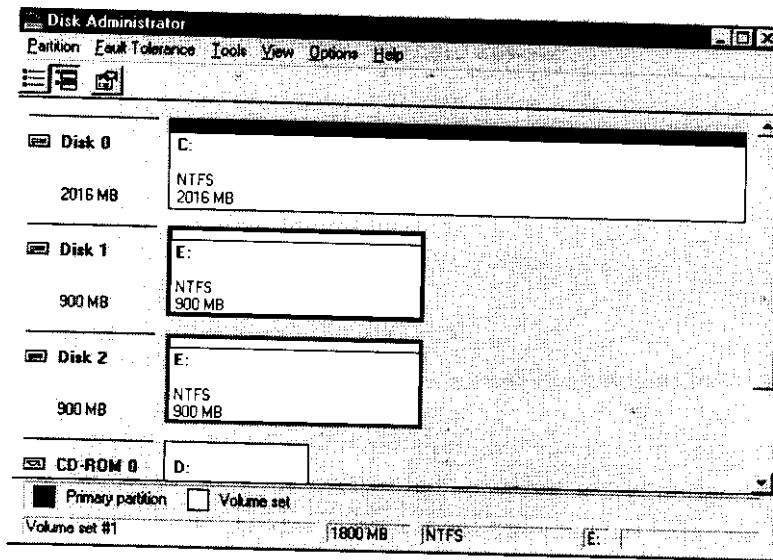
From the "Partition" menu, select "Extend Volume Set."



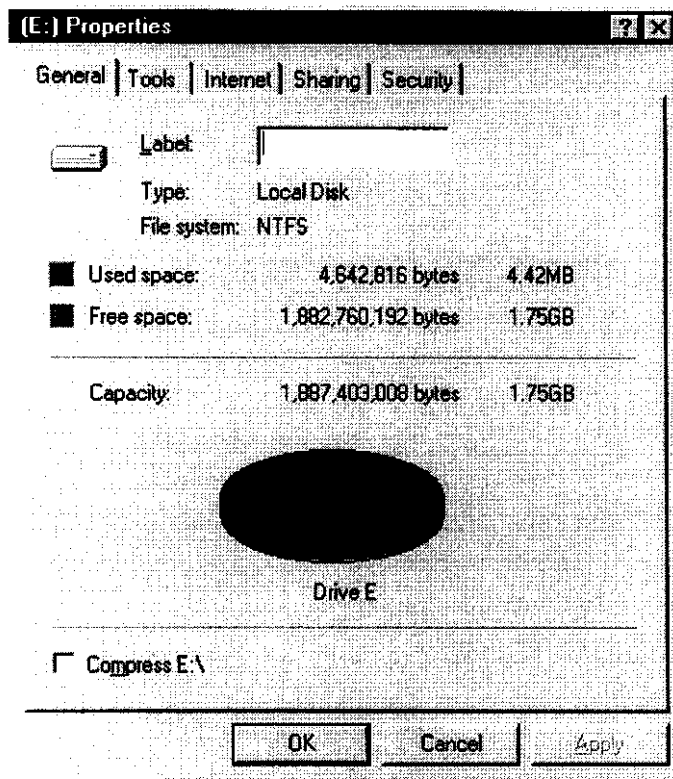
The screen will display that volume set of Drive E: has been extended by the 900MB in Disk2. Move the cursor to "Commit Changes Now" to confirm that you want the free space to become a part of the same logical drive.



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.

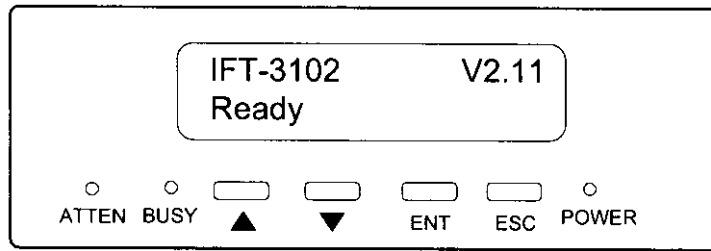


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Chapter 4 Hardware Installation

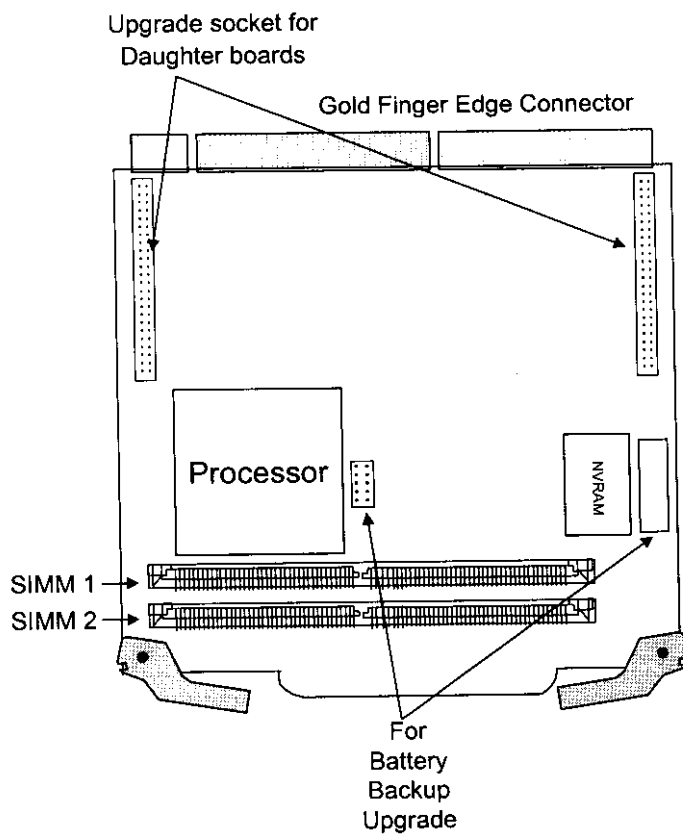
4.1 Locations of the Parts



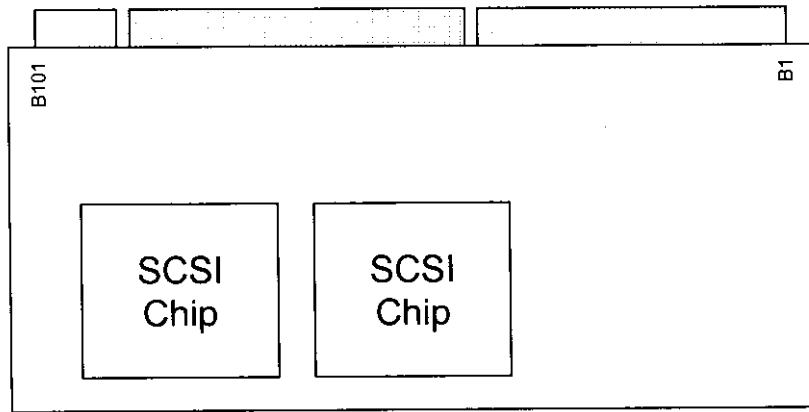
4.1.1 Front View

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 execute an option.
ESC button	Returns to previous menu or cancel selection.
2 x 16 LCD	Two-line LCD display
■ ■ ■ ■ ■	Displays throughput during normal operation, approximately 256Kbytes/sec per division. Displays message for configuration and management.

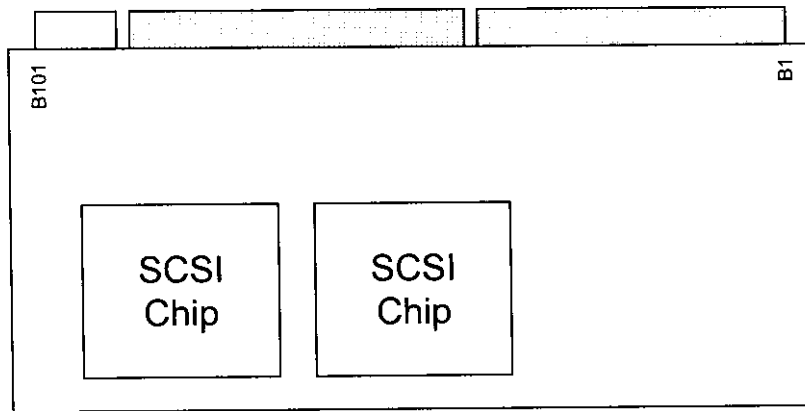
4.1.2 The Mainboard



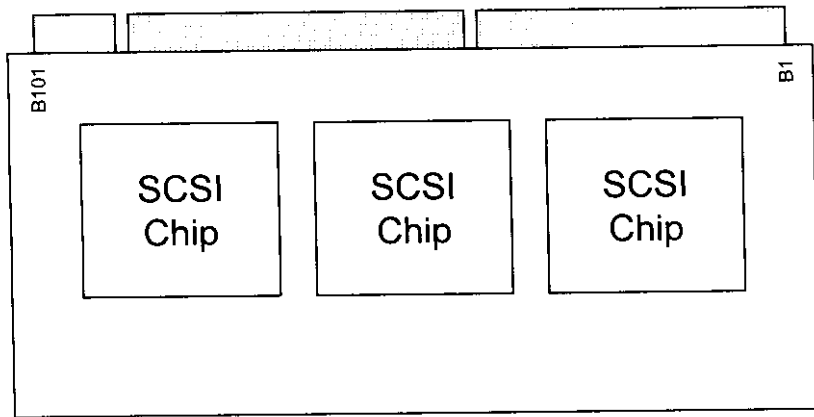
4.1.3 The Daughterboards



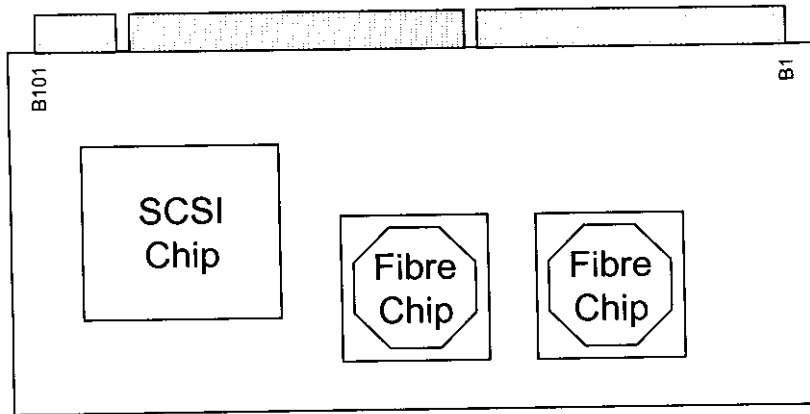
IFT-9064US



IFT-9064UD

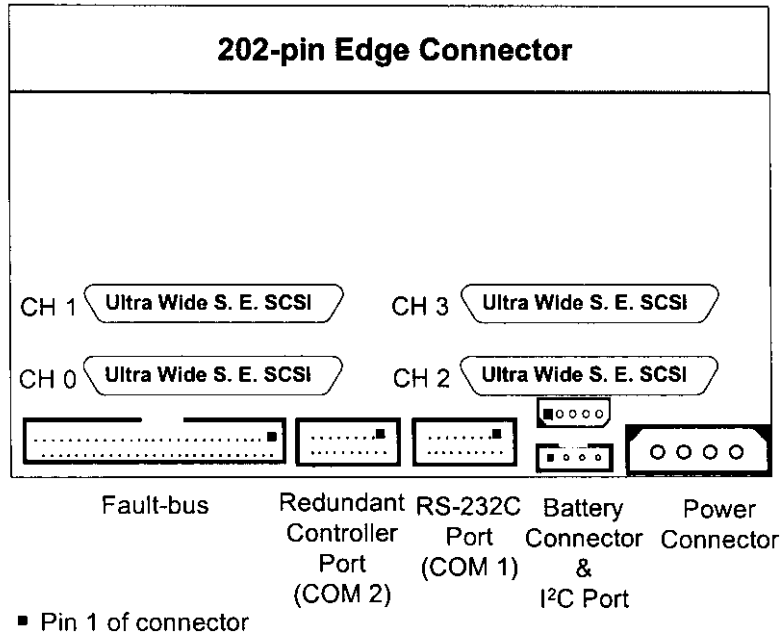


IFT-9064UL



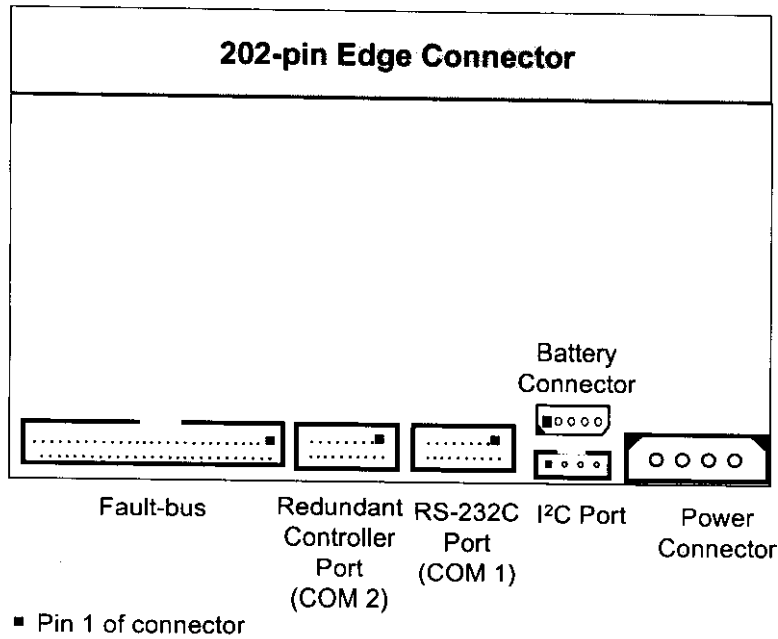
IFT-9064UF

4.1.4 The Backplane Boards

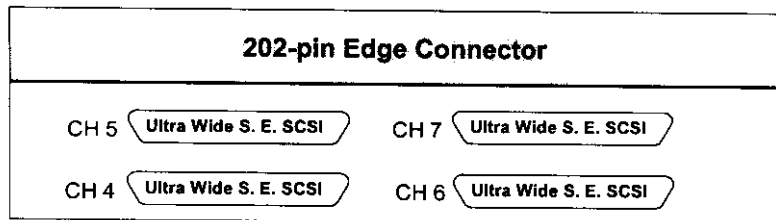


IFT-9078B4USA

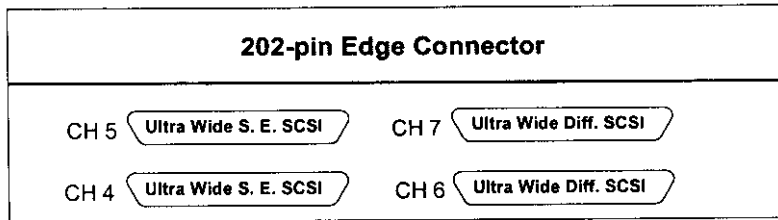
(Connects to the IFT-3102UG mainboard)



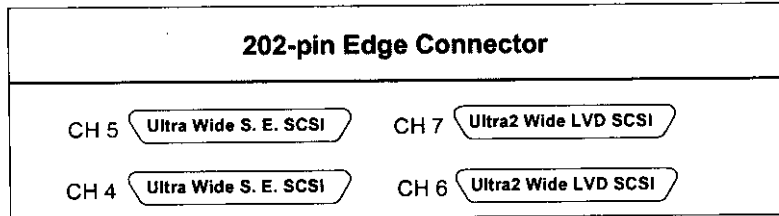
IFT-9078B0
 (Connects to the IFT-3102UGN mainboard)



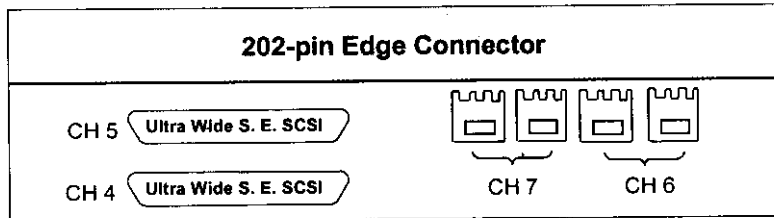
IFT-9078B4USB
 (Connects to the IFT-9064US daughterboard)



IFT-9078B4UD
 (Connects to the IFT-9064UD daughterboard)



IFT-9078B4UL
 (Connects to the IFT-9064UL daughterboard)



IFT-9078B4UF
 (Connects to the IFT-9064UF daughterboard)

4.2 Installing DRAM SIMM



IMPORTANT:

The IFT-3102UG controller requires a minimum of 8 Mbytes (or a minimum 16 Mbytes if using redundant controller) 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.

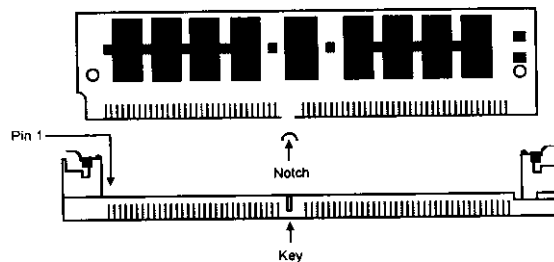
The following are guidelines on using DRAMs:

- ✓ 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 installed 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 total DRAM size is 128 Mbytes.

To install the DRAM SIMM:

1. Power off the system and disconnect the power connector.
2. Position the SIMM above the socket with the "notch" in the module aligned with the "key" on the socket.
3. Seat the module at a 45° angle into the bank. Make sure it is completely seated. Tilt the module upright until it locks in place in the socket.



4.3 Installing a SCSI Channel Upgrade Daughterboard

The IFT-3102UG mainboard supports 4 single-ended SCSI channels while the IFT-3102UGN mainboard does not come with any SCSI channels.

Installing a SCSI channel upgrade daughterboard onto the mainboard allows you to expand up to a total of 8 SCSI channels. (Only one daughterboard can be mounted at a time). All channels supported by the mainboard and daughterboard are physically visible as connecting ports located on the backplane board.

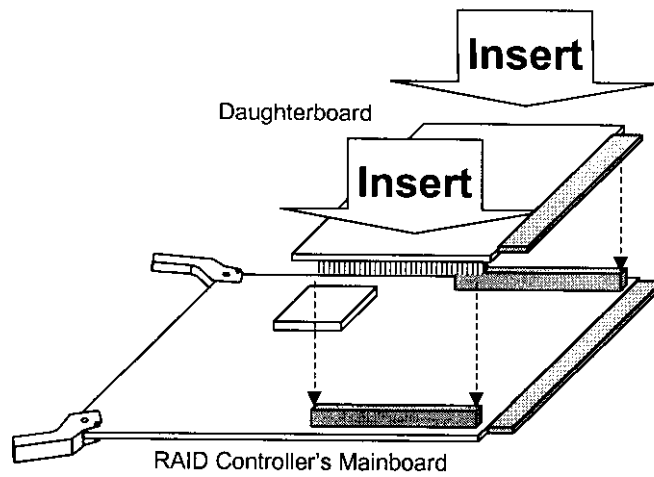
The table below lists the number and type of channels supported by each daughterboard.

Daughterboards	Single-Ended	Differential	LVD	Fibre
IFT-9064US	4	-	-	-
IFT-9064UD	2	2	-	-
IFT-9064UL	2	-	2	-
IFT-9064UF	2	-	-	2 single-loop or 1 dual-loop

Refer to section 4.1.3 of this chapter for the illustration of these daughterboards.

To install the SCSI channel upgrade daughterboard:

1. Make sure the power of the controller and drives are off.
2. Align the connector pins on the daughterboard with the two header connectors on the mainboard.
3. Press both sides of the daughterboard downward so that the connector pins on the daughterboard insert into the header connectors on the mainboard. Make sure the daughterboard is seated properly.



Installing a Daughterboard onto the Mainboard

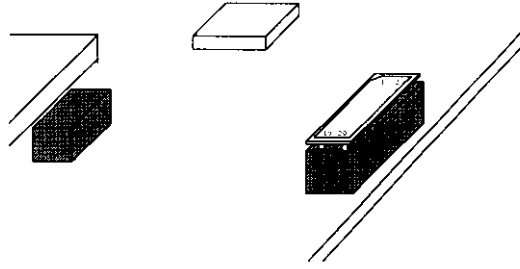
4.4 Battery Backup

The IFT-3102UG 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.

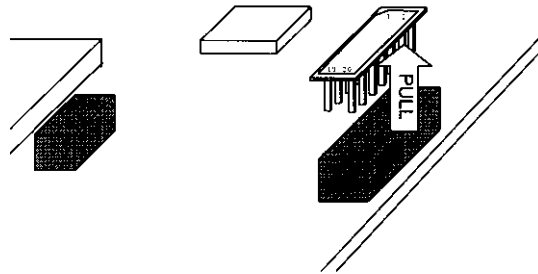
To avoid this, a battery backup solution (IFT-9070 + IFT-9010) is available to provide up to 100 hours of back-up time. The IFT-9070 is a battery backup daughterboard that plugs into the mainboard. The IFT-9010 is a battery pack that connects to the battery connector located on the backplane board, or connects directly to the IFT-9070 battery backup daughterboard. Two IFT-9010 can be daisy chained to provide long hours of operation over unattended period of days.

To install the battery backup daughterboard and battery pack:

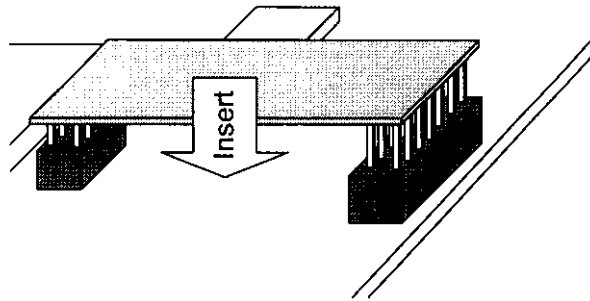
1. Make sure the power of the controller and drives are off.



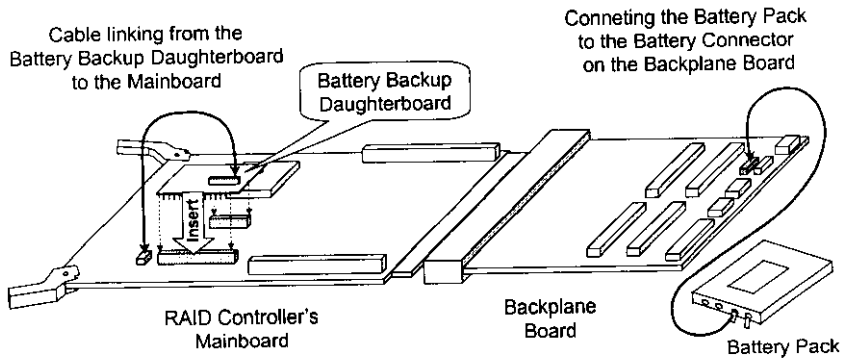
2. Locate for the female pin socket (JP13) on the IFT-3102UG mainboard. Remove the socket plug that is on JP13. (Keep the socket plug in a safe place for future use; pin socket JP-13 must be installed with either the socket plug or the battery backup daughterboard.)



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



- Connect one end of the cable (which came with the package) to JP10 located on IFT-9070 and the other end to the mainboard (JP16). Refer to the figure below.

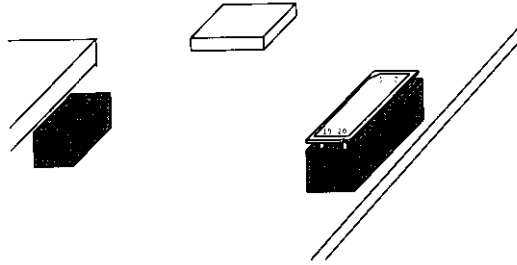


- Connect the IFT-9010 battery pack to the battery connector located on the backplane board.



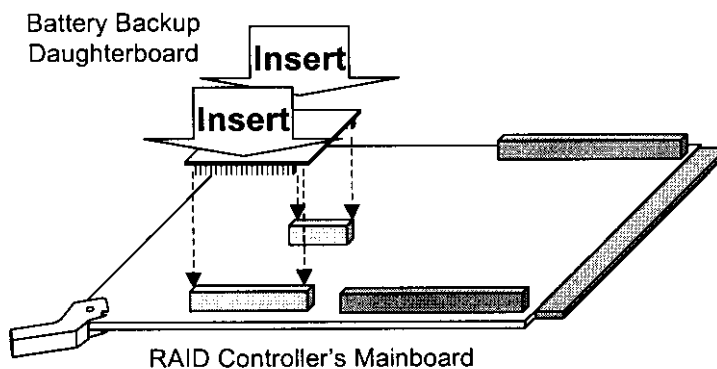
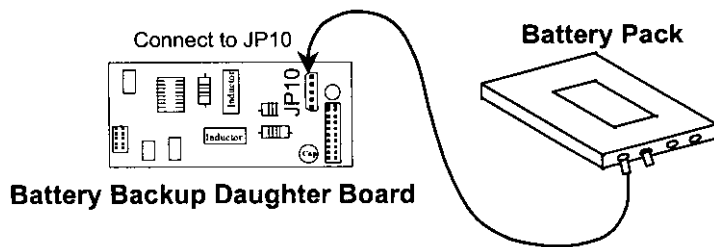
NOTE:

You must to install the socket plug back to JP13 once you have removed the IFT-9070 battery backup daughterboard. The controller will not work if you fail to do so. Also, pin 1 of the socket plug must be installed to



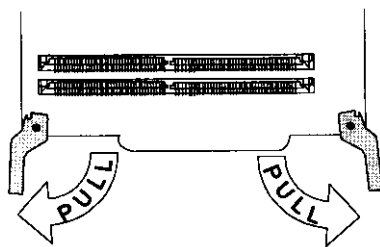
pin 1 of the JP13.

6. If there is sufficient space, you can also connect the battery pack directly to the battery backup daughterboard. Refer to the figure below on connecting the battery pack directly to the battery backup daughterboard.

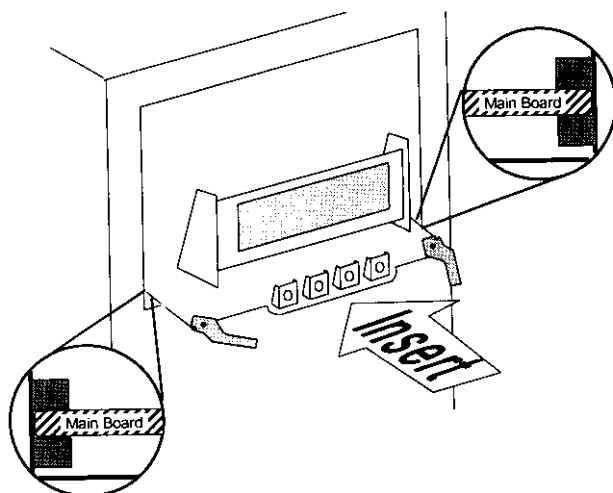


4.5 *Installing the Controller's Mainboard*

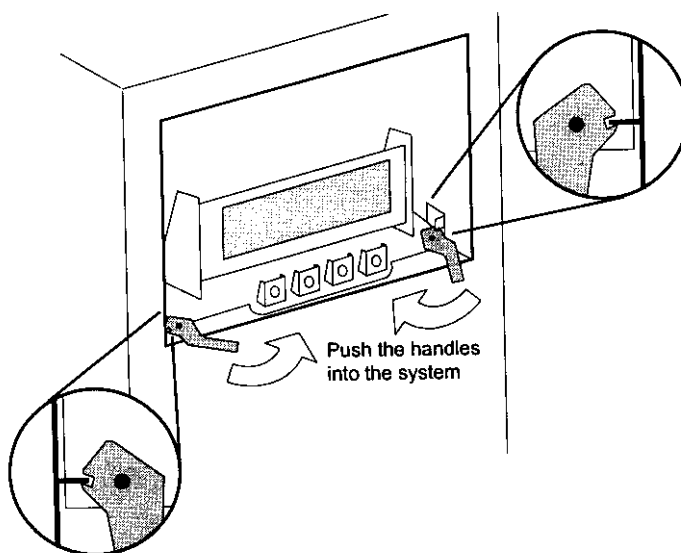
1. Pull the "tabs", located near the SIMM sockets of the mainboard, to the side. Make sure to pull each "tab" sideways to as far as it will go.



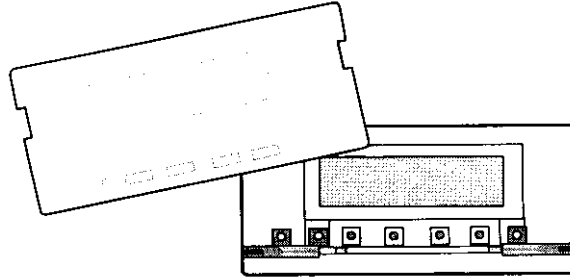
2. Gently slide the mainboard into the enclosure. Make sure the mainboard reaches the end of the enclosure and that it is inserted properly into the metal grooves on each side of the enclosure.



3. Push the "tabs" toward the center, moving them inward as shown below. While at it, make sure the squarish notch of the "tab" locks into the edge of the metal groove.

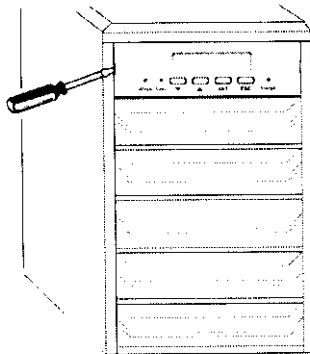


4. Install the bezel back to its original position.



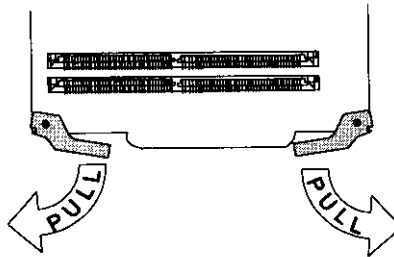
Removing the controller

1. Gently remove the bezel.

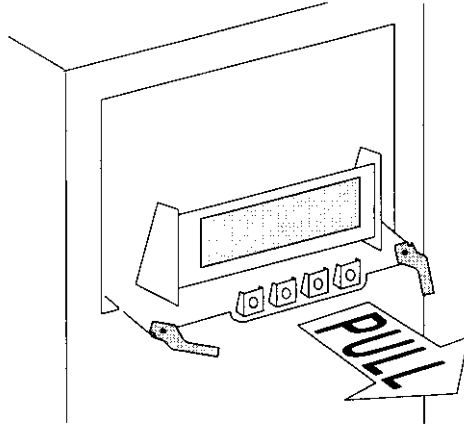


Notice the two notches on the bezel (see the previous illustration.) Insert a flathead (or "minus") screwdriver into the left notch. Use the screwdriver as a lever: gently apply pressure until the bezel pops off.

2. Pull the "tabs" sideways.



3. You may now pull out the RAID controller's mainboard.



4.6 Daughterboards and Backplane Boards

The connector on the rear side of the backplane board, which is used for connecting the 202-pin gold-finger edge connector of the mainboard, also serves as the rear panel of the controller.

The backplane board is equipped with:

- Fault-bus, I²C port, redundant controller port, RS-232C port, battery connector, and power connector
- SCSI ports (refer to the table below)

The table below lists the types of channels supported by the backplane boards and the mainboard or daughterboard that corresponds to the backplane boards.

Backplane Boards	Single-Ended	Differential	LVD	Connects to...
IFT-9078B4USA	4	-	-	IFT-3102UG mainboard
IFT-9078B0	-	-	-	IFT-3102UGN mainboard
IFT-9078B4USB	4	-	-	IFT-9064US daughterboard
IFT-9078B4UD	2	2	-	IFT-9064UD daughterboard
IFT-9078B4UL	2	-	2	IFT-9064UL daughterboard
IFT-9078B4UF	2	-	-	IFT-9064UF daughterboard

* Channel 0 on each backplane board can be configured as either a SCSI port or Synchronized Cache port for controller redundancy.

If you are using the IFT-3102UG mainboard, you must install it with the IFT-9078B4USA backplane board. If you are using the IFT-3102UGN mainboard, you must install it with the IFT-9078B0 backplane board.

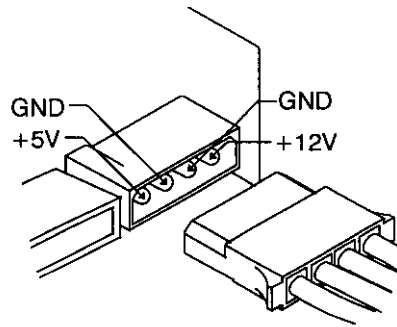
4.6.1 Selecting an Appropriate Backplane Board

The table below lists the backplane board needed for the corresponding mainboard that is installed with a daughterboard.

Mainboard	Daughterboard	Backplane Board	Single-Ended	Differential	LVD	Fibre
IFT-3102UG	none	IFT-9078B4USA	4	-	-	-
	IFT-9064US	IFT-9078B4USA + IFT-9078B4USB	8	-	-	-
	IFT-9064UD	IFT-9078B4USA + IFT-9078B4UD	6	2	-	-
	IFT-9064UL	IFT-9078B4USA + IFT-9078B4UL	6	-	2	-
	IFT-9064UF	IFT-9064UF + IFT-9078B4UF	6	-	-	2
IFT-3102UGN	IFT-9064US	IFT-9078B0 + IFT-9078B4USB	4	-	-	-
	IFT-9064UD	IFT-9078B0 + IFT-9078B4UD	2	2	-	-
	IFT-9064UL	IFT-9078B0 + IFT-9078B4UL	2	-	2	-
	IFT-9064UF	IFT-9064UF + IFT-9078B4UF	2	-	-	2

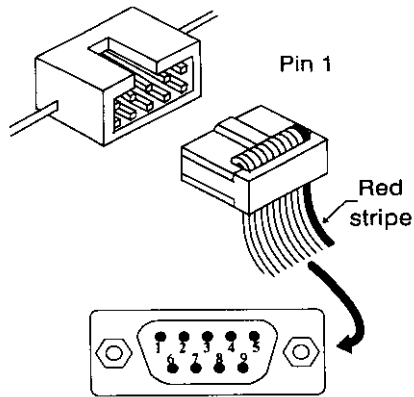
4.7 Power Connection

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



4.8 Serial Port Connection and Set-Up

The IFT-3102UG 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 COM 1 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 "Hyper Terminal" icon in the Accessories window.

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

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 ..

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

Communication Parameters ..

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

RS-232 Configuration ..

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

COM1 Configuration ..

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

Baud-rate 9600
..

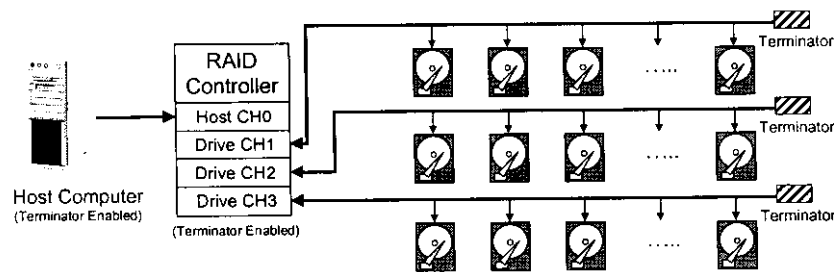
Press ▼ or ▲ to select the baud rate, then press ENT for 2 seconds to confirm the selected baud rate.

Baud-rate 9600
Change to 38400?

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

4.9 Basic Operational Set-Up

An example of the operational setup is shown below:



- The total length of the SCSI cable may not exceed 3 meters.
- Channel 0 is connected to the Host system.
- Drives are connected to drive channels 1, 2 and/or 3.
- 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 SCSI port using a suitable SCSI cable.



NOTE:

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 SCSI ID of the host bus adapter is usually ID '7'.
5. Connect one end of the drive SCSI cable to one of the remaining drive 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.

4.10 In-band SCSI

4.10.1 What is it and why do you need it?

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

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

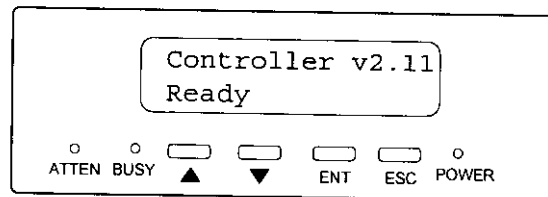
How does it use the SCSI cable? In-band SCSI technology translates the original commands into standard SCSI commands. These SCSI

commands are then sent to and received from the SCSI raid controller. The GUI RAID Manager can administrate the RAID controller just as it could before via RS-232C. (Note: It is assumed that users of In-band SCSI possess the following: a third-party SCSI adapter and a channel on their Infortrend 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.)

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

4.10.2.1 RAID Controller Adjustments

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

View and Edit
Config Parm

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

Host-side SCSI
Parameters ..

You will need to make adjustments in the following four submenu's: 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>.

```
Periph      Dev
Type Parameters
```

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

```
Device Type -
No Device (0x7f)
```

Press ▼ or ▲ to choose "Unknown Device - 1f".

```
Set Device Type?
Unknown (0x1f)
```

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's.

```
Device Qualifier
Connected
```

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

```
SupportRemovable
Media - Disabled
```

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

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

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

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

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

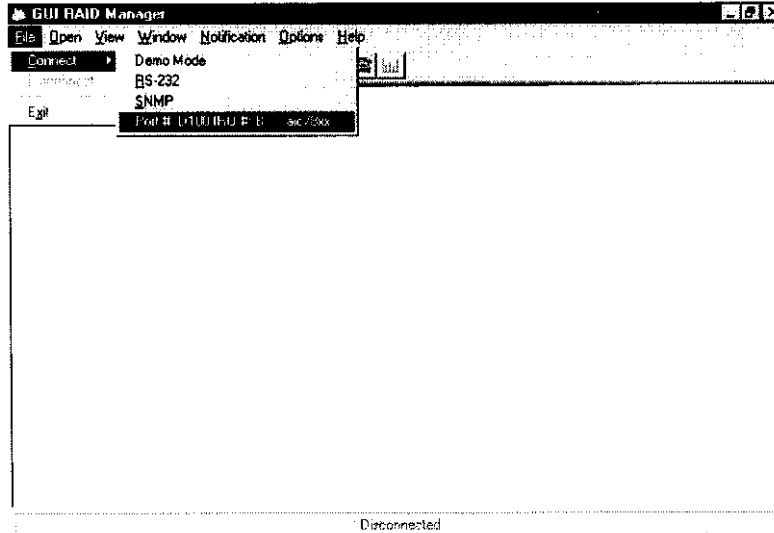
```
LUN Application-
Undefine LUN-0's
```

The RAID controller adjustments necessary to use In-band SCSI have been completed. For locally accessing the host computer (see section 4.10.3.1, *Local Connection – SNMP Not Required*), all steps have been completed. For remotely accessing the host computer, further adjustments must be made (see section 4.10.3.2, *Remote Connection – SNMP Required*).

4.10.3 Using In-band SCSI in GUI RAID Manager

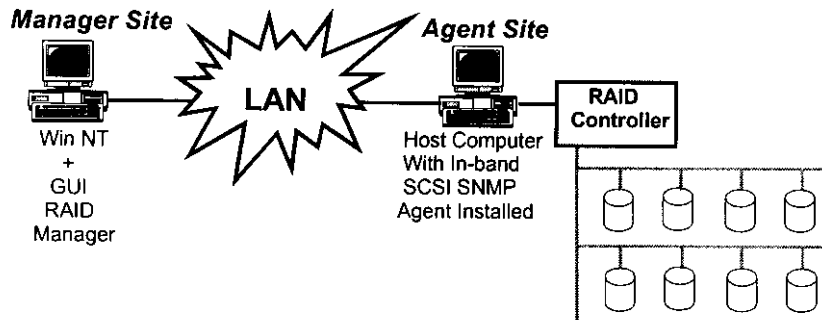
4.10.3.1 Local Connection — SNMP Not Required

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



4.10.3.2 Remote Connection — SNMP Required

SNMP Service is required to administrate a RAID controller installed in a remote computer. This passage describes how to establish a connection from the GUI RAID Manager to a RAID controller that is connected to a remote host via In-band SCSI. For information regarding other operations and of the GUI RAID Manager, please refer to the *GUI RAID Manager User Guide*.



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

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

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

Basic Procedures to Establish the Connection

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

Checklist for Agent Site

1. The host computer is connected to the RAID controller via the host SCSI cable (the cable which is used to transfer data between the host computer and the RAID – there'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.

IMPORTANT:



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

Checklist for Manager Site

1. The system is running Windows NT (Workstation or Server) and has SNMP Service installed.
2. The Infortrend GUI RAID Manager was installed with the "SNMP Manager Site" option selected.
3. The GUI RAID Manager is running.

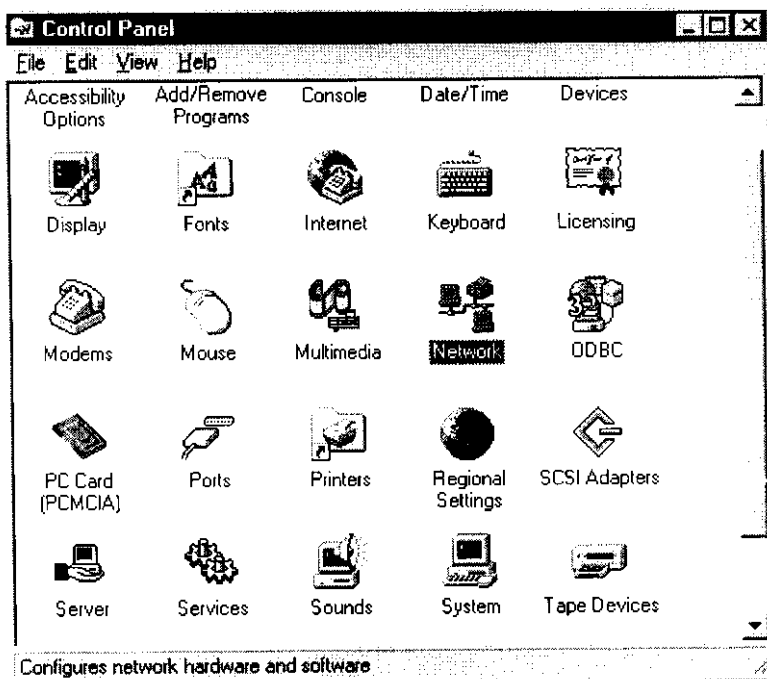
IMPORTANT:



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

Example Settings for Agent Site Using Windows NT

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



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

IMPORTANT:



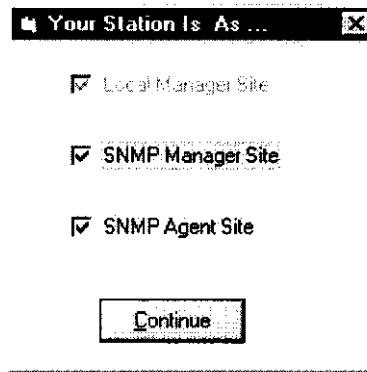
This following applies to Windows NT 4.0 with Service Pack 3: if the "SNMP Service" is installed after the Service Pack 3 has been installed, Service Pack 3 must be re-installed in order for the SNMP service to work properly.

2. Install the SNMP Agents and GUI RAID Manager. The GUI RAID Manager can install the In-band SCSI SNMP Agent during installation. During GUI RAID Manager installation, be sure to select both the "SNMP Manager Site" and "SNMP Agent Site"

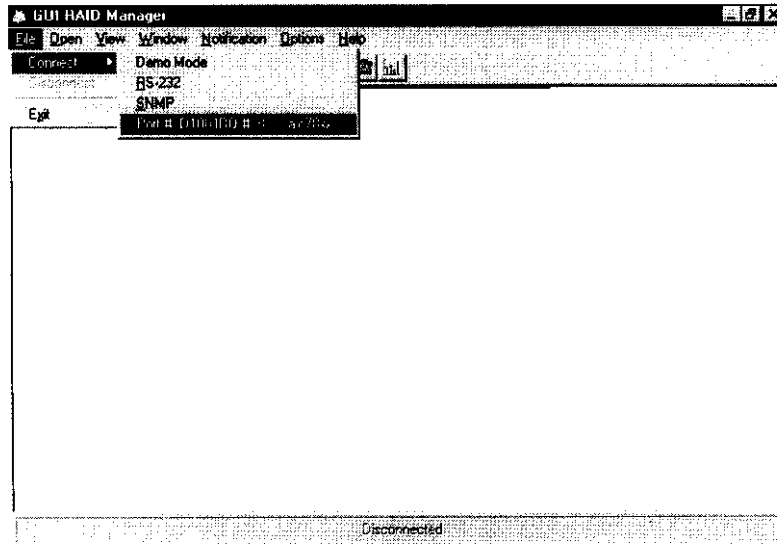
options. Complete the installation by following the on-screen instructions.

Example Settings for Manager Site

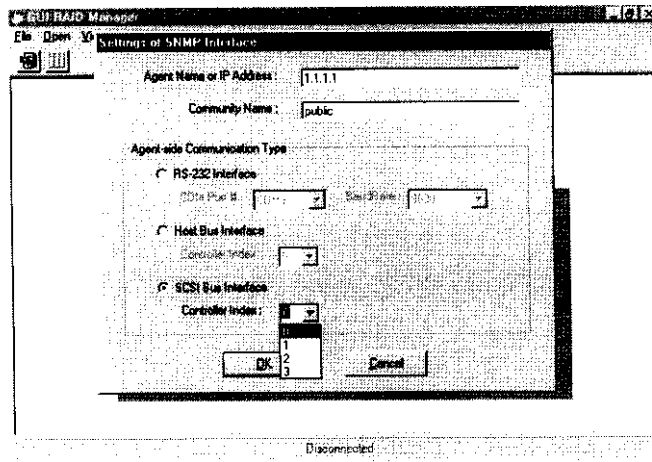
1. Install the SNMP manager and GUI RAID Manager. During the installation of GUI RAID Manager, click to select the option "SNMP Manager Site." Complete the installation by following the on-screen instructions.



2. Run the GUI 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 GUI RAID Manager are the same as before (please refer to the *GUI RAID Manager User Guide* for complete details on its operation.)

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Chapter 5 Quick Setup



NOTE:

A "Logical Drive" is a set of drives grouped together to operate under a given RAID level and appears as a single contiguous drive. The IFT-3102UG 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.

5.1 Front Panel Configuration

The IFT-3102UG 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.



IMPORTANT:

Quick Setup assumes there is only one host channel.

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

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

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

```
Set TDRV=4 with
LG RAID5+Spare ?
```

```
Init Parity 10%
Please Wait!
```

The RAID levels available are as follows:

- 1 Drive = NRAID (Disk Spanning)
- 2 Drives = RAID0 or RAID1
- 3 Drives = RAID0
RAID1 + Spare
RAID3
RAID5
- >3 Drives = RAID0
(Odd) RAID1 (0+1)+ Spare
RAID3
RAID3 + Spare
RAID5
RAID5 + Spare
- >3 Drives = RAID0
(Even) RAID1 (0 + 1)
RAID3
RAID3 + Spare
RAID5
RAID5 + Spare

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

```
LG=0 RAID5 DRV=3  
4123MB GD SB=1
```

5.2 RS-232 Terminal Interface

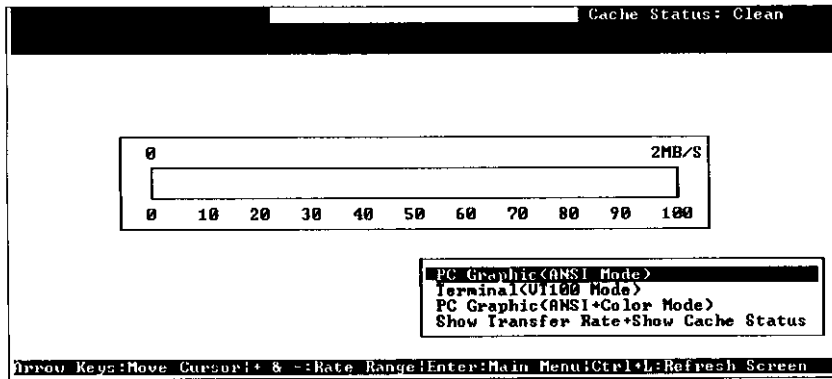
The keys used when operating via the terminal are as follows:

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



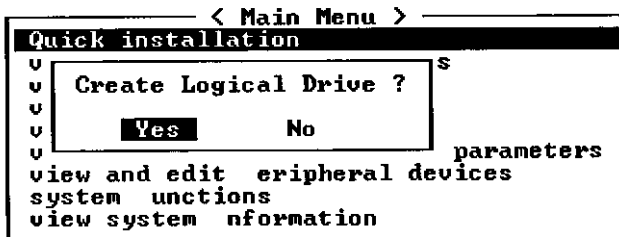
IMPORTANT:

If you connected the RS-232 cable after the controller has been powered-on, press [Ctrl] [L] to refresh the screen information.

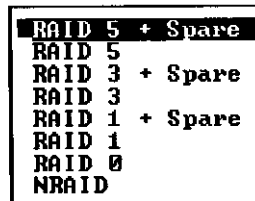


The initial screen appears when the controller is powered-on. Use \uparrow \downarrow arrow keys to select the desired terminal emulation mode, then press [ENTER] to enter the Main Menu.

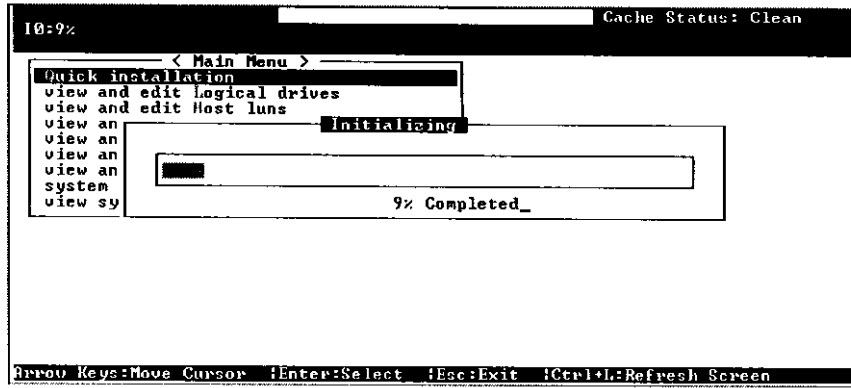
Type Q or use the \uparrow \downarrow keys to select "Quick installation", then press [Enter]. Choose Yes to create a logical drive.



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



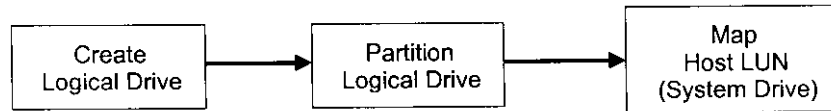
The controller will start initialization and automatically map the logical drive to LUN 0 of the first host channel.



Chapter 6 Configuring RAID

6.1 Starting to Build a RAID System Drive

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



When power is turned on, the IFT-3102UG 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.

NOTE:

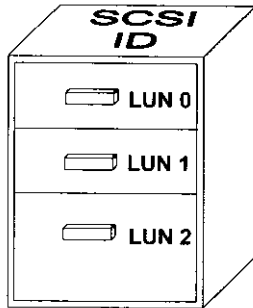


A "Logical Drive" is a set of drives grouped together to operate under a given RAID level and appears as a single contiguous drive. The IFT-3102UG controller is capable of grouping connected drives to as many as 8 logical drives, each configured on the same or different RAID levels. A logical drive can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

6.2 How Does the RAID Controller Work?

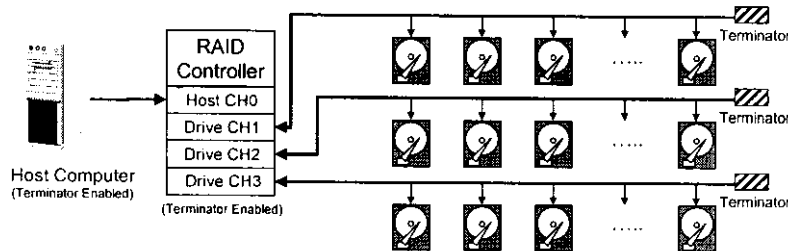
6.2.1 SCSI Channel, SCSI ID and LUN

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.



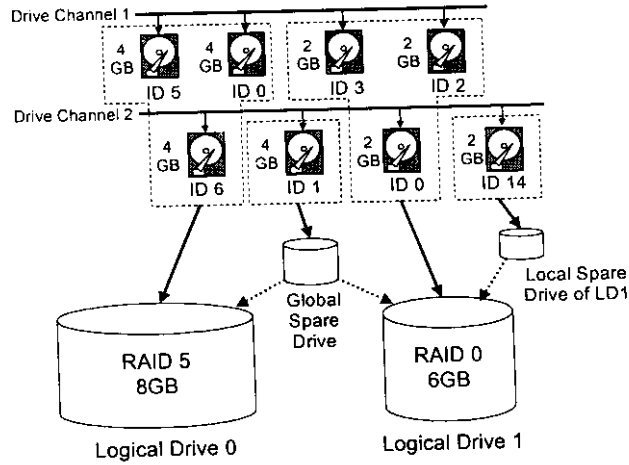
The figure on the left is a very good example. If you are to file document into a cabinet, you must put the document into one of the drawer. From a SCSI's point of view, a SCSI ID is like a cabinet, and the drawers are the LUNs. Each SCSI ID can have up to 32 LUNs (Logical Unit). Data can be stored into one of the LUNs of the SCSI ID. Most SCSI host adapters treat a LUN like another SCSI device.

6.2.2 Understanding Step by Step

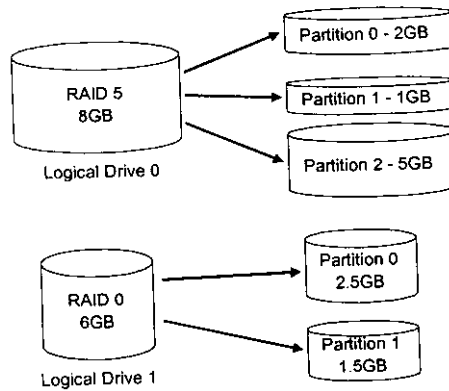


Physical connection should look similar to the figure shown above. The channel connected to the host adapter is the host channel, and the channels connected to the drives are the drive channels.

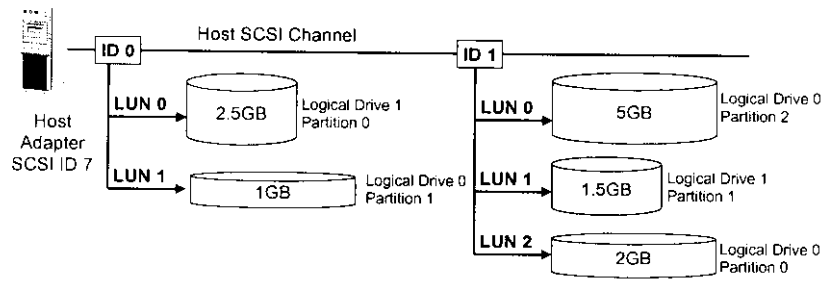
A Logical Drive consists of a group of SCSI drives. Drives in one logical drive do not have to come from the same SCSI channel. Also, each logical drive can be configured a different RAID level.



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



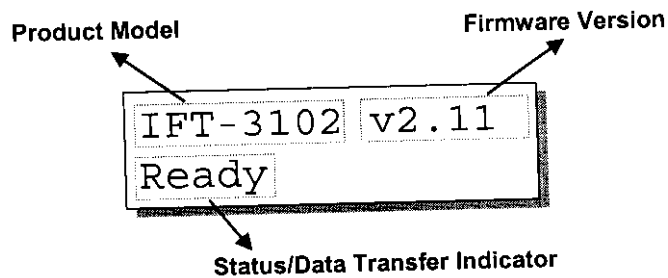
You may divide a logical drive into several partitions, or use the entire logical drive as one single partition.



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

7.1 Understanding the Information on the LCD

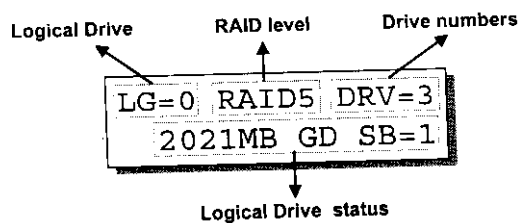


7.1.1 The Initial Screen

Status/Data Transfer Indicator:

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

7.1.2 Logical Drive Status

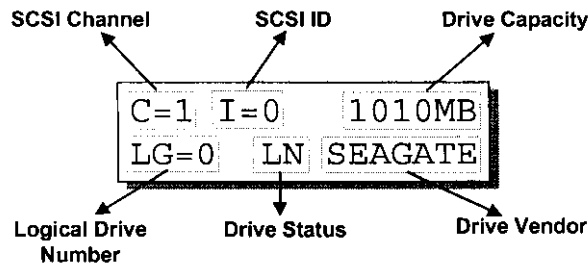


Logical Drive:	The Logical Drive number.
RAID level:	The RAID level used in this logical drive.
Drive numbers:	The number of SCSI drives contained in this logical drive.

Logical Drive status:

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.

7.1.3 SCSI Drive Status

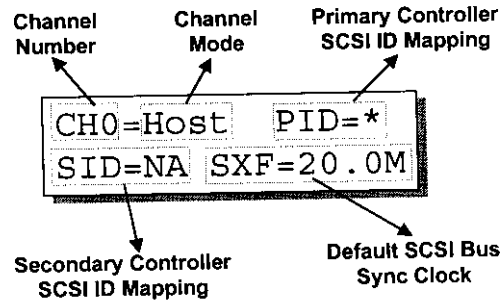


Drive Status:

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

7.1.4 SCSI Channel Status



Channel Mode:

Host Host Channel mode
 Drive Drive Channel mode

Default SCSI Bus Sync Clock:

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

Primary Controller SCSI ID Mapping:

* Multiple SCSI ID's 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 ID's 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)

7.2 Viewing and Editing Logical Drives

7.2.1 Creating a Logical Drive

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

```
View and Edit
Logical Drives ↓
```

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

```
LG=0
Not Defined   ?
```

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.

```
TDRV=4 Create
LG Level=RAID5 ?
```

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".

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

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.

```
Create Logical
Drive         ?
```

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

```
Change Logical
Drive Parameter?
```

Choose "Maximum Drive Capacity", then press ENT.

```
Maximum Drive
Capacity    ..
```

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

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

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

```
Spare Drive
Assignments ..
```

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

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

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

```
Create Logical
Drive ?
```

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

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

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

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



IMPORTANT:

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

7.2.2 Viewing Logical Drives and Drive Members

Press ENT for two seconds to enter the Main Menu. Press ▼ or ▲ to select "View

```
View and Edit
Logical Drives ↓
```

and Edit Logical Drives..", then press ENT.

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
```

7.2.3 Deleting a Logical Drive

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

```
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 .

```
Delete Logical
Drive ..
```

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

```
LG=0
Not Defined ?
```

7.2.4 Partitioning a Logical Drive

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

```
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 "Partition Logical Drive", then press ENT.

```
Partition
Logical Drive ..
```

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

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

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

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

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

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

7.2.5 Deleting a Partition of a Logical Drive

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

```
View and Edit
Logical Drives ↓
```

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

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

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

```
Partition
Logical Drive ..
```

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

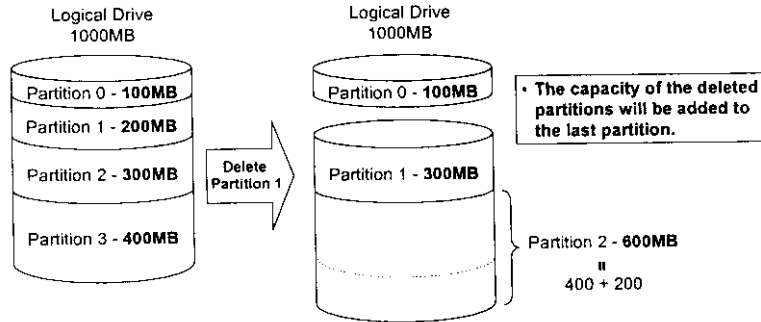
```
LG=0 Partition=1
200MB ?
```

Use ▼ or ▲ to change the number of the flashing digit to "0", then press ENT to move to the next digit. After changing all the digits, press ENT for two seconds.

```
LG=0 Partition=1
      300MB      ?
```

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

```
LG=0 Partition=2
      600MB      ?
```



IMPORTANT:

- The capacity of the deleted partition will be added to the last partition.
- As long as there is a partition change, all host LUN mappings will be removed. Therefore every time a partition has been changed, it is necessary to re-configure all host LUN mappings.

7.2.6 Assigning a Logical Drive Name

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

```
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.

```
Logical Drive
Name ..
```

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.

```
Enter LD Name:
█
```

7.2.7 Rebuilding a Logical Drive

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

```
View and Edit
Logical Drives ↓
```

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

```
LG0 RAID5 DRV=3
2012MB FL SB=0
```

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

```
Rebuild Logical
Drive ..
```

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

```
Rebuild Logical
Drive ?
```

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

```
Rebuilding 25%
Please Wait!
```

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

```
LG0 RAID5 DRV=3
2012MB RB SB=0
```

```
Rebuild Progress
..
```



IMPORTANT:

- The Rebuild function will appear only if a logical drive (with RAID level 1, 3 or 5) has a failed member drive.
- Refer to section "3.2.3 Automatic Rebuild and Manual Rebuild" of this manual for more information on the rebuilding process.

7.2.8 Dynamic Logical Drive Expansion

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

```
View and Edit
Logical Drives
```

The logical drive will be displayed. If there is more than one logical drive, use the ▼ or ▲ to select the drive which is to be expanded; and then press <ENT>.

```
LG0 RAID5 DRV=3
4095MB GD SB=0
```

Before the the logical drive can be expanded, a SCSI hard disk drive must be added and scanned in (see section 7.4.1 for details on scanning in a drive.)

```
C=1 I=0 2291MB
NEW DRV FUJITSU
```

Use ▼ or ▲ to "Add SCSI Drives," and then press <ENT>.

```
Add SCSI Drives
..
```



IMPORTANT:

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

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

```
Add Drv Selected  
To select drives
```

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

```
C=1 I=0 2291MB  
NEW DRV FUJITSU
```

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

```
Add Drives 17%  
Please Wait !
```

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

```
LG=0 RAID5 DRV=4  
6142MB GD SB=0
```

-- 7.2.9 Logical Drive Parity Check

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

```
View and Edit  
Logical Drives
```

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

```
LG0 RAID5 DRV=3  
4095MB GD SB=0
```

-- Press ▼ or ▲ to select "Check Parity" and
-- then press <ENT>.

```
Check Parity  
..
```

IMPORTANT:



If a Logical Drive Parity Check is stopped by a drive failure, the parity check cannot restart until logical drive rebuild has been completed.

7.3 Viewing and Editing Host LUNs

7.3.1 Mapping a Logical Drive to a Host LUN

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

```
View and Edit
Host Luns      ↓
```

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

```
Map Channel=0 ?
```

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

```
Map Channel=0
ID=0 Pri. Ctrl?
```

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

```
Ch=0 ID=0 LUN=0
Not Mapping
```

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

```
Map Host LUN ?
```

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

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

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

```
LG=0 PART=0
100MB      ?
```

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?
```

7.3.2 Viewing and Deleting LUN Mappings

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

```
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
```

7.3.3 Pass-through SCSI Commands

Pass-through SCSI commands facilitate functions like downloading firmware for drives or devices (not firmware), setting SCSI drive mode parameters, or monitoring a SAF-TE device directly from the host. To perform such a function, the SCSI device must be mapped to a host SCSI ID.

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

```
View and Edit
Host Luns
```

If you have primary and secondary controllers, use the ▼ or ▲ to select the controller for the device that you would like to map.

```
Map Channel=0
ID=0 Pri Ctrl ?
```

Press ▼ or ▲ to choose to map a SCSI ID to "Physical Drive" or other device and then press <ENT>.

```
Map to
Physical Drive ?
```

WARNING:



- *Pass-through SCSI Commands are only intended to perform maintenance functions for a drive or device on the drive side. Do not perform any destructive commands to a disk drive (i.e., any commands that write data to a drive media). If a disk drive is a spare drive or a member of a logical drive, such a destructive command may cause a data inconsistency.*
- *When a drive/device is mapped to a host SCSI ID so that Pass-through SCSI Commands can be used, the data on that drive/device will not be protected by the controller. Users who employ Pass-through SCSI Commands to perform any write commands to drive media do so at their own risk.*

7.4 Viewing and Editing SCSI Drives

7.4.1 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.

```
Clear Drive  
Status ..
```

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

```
Clear Drive  
Status ?
```

7.4.2 Viewing Drive Information

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

```
View and Edit  
SCSI Drives ↓
```

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

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

Press ▼ or ▲ to select "View Drive Information", then press ENT.

```
View Drive  
Information ..
```

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

```
Revision Number:  
0274
```

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

```
Serial Number:  
003071550TJ2FG
```

Disk Capacity will be shown (in blocks) on the LCD. Each block refers to 512K Bytes.

```
Disk Capacity:  
2069589 blocks
```



IMPORTANT:

- Drives of the same brand/model/capacity might not have the same block number.
- The basic read/write unit of a hard drive is Block. If the drive members in one logical drive have different block numbers (capacity), the minimum block number among all the member drives will be chosen as the maximum block number for the RAID configuration.
- You may assign a Local/Global Spare Drive to a logical drive whose member drive's block number is smaller or equal to the Local/Global Spare Drive's block number but you may not do it vice versa.

7.4.3 Adding a Local Spare Drive

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

```
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.

```
LG0 RAID5 DRV=3
2012MB GD SB=0
```

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

```
Add Local Spare
Drive Successful
```

7.4.4 Adding Global Spare Drive

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

```
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 yet, then press ENT. Press ▼ or ▲ to select "Add Global Spare Drive", then press ENT.

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

```
Add Global Spare
Drive ..
```

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

```
Add Global Spare
Drive Successful
```

7.4.5 Identifying a Drive

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

```
View and Edit
SCSI Drives ↓
```

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

```
C=1 I=0 1010MB
GlobalSB SEAGATE
```

Press ▼ or ▲ to select "Identify Drive", then press ENT to continue.

```
Identify Drive
..
```

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.

```
Flash All SCSI
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.

```
Flash Selected
SCSI Drives ?
```

7.4.6 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.

```
View and Edit
SCSI Drives ↓
```

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

```
C=1 I=0 1010MB
GlobalSB SEAGATE
```

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

```
Delete Spare
Drive ..
```

Press ENT for two seconds to delete the spare drive.

```
Delete Spare
Drive Successful
```

7.4.7 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 ..
```

7.4.7.1 SCSI Drive Low-level Format

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

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


WARNING:



- Do not switch the controller's and/or SCSI disk drive's power off during the SCSI Drive Low-level Format. If any power failure occurs during a drive low-level format, the formatting must be performed again when power resumes.
- All of the data stored in the SCSI disk drive will be destroyed during a low-level format.
- The SCSI disk drive on which a low-level disk format will be performed cannot be a spare drive (local or global) nor a member drive of a logical drive. The "SCSI Drive Low-level Format" option will not appear if the drive is not a "New Drive" or a "Used Drive".

7.4.7.2 SCSI Drive Read/Write Test

If you would like to perform a drive/read write test to the drive, press ▼ or ▲ to select "Drive Read/Write Test"; and then press <ENT>.

```
Drive Read/Write
Test ..
```



IMPORTANT:

- The option to run these utilities disappears after you have created a logical drive. This is because running these utilities will destroy data on a hard disk drive.

7.5 Viewing and Editing SCSI Channels

7.5.1 Viewing and Redefining a Channel Mode

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

```
View and Edit
SCSI Channels ↓
```

SCSI Channel information will be displayed on the LCD. Press ▼ or ▲ to browse through the information of every

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

SCSI channels. Press ENT on the channel you wish the channel mode changed.

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
```



IMPORTANT:

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

7.5.2 Setting a SCSI Channel's ID / Host Channel

Viewing a SCSI Channel's ID

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

```
View and Edit
SCSI Channels ↓
```

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

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

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

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

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

```
CHL=0 ID=0
Primary Ctrl ..
```

Adding a SCSI Channel's ID

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

```
Add Channel
SCSI ID      ..
```

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

```
Primary
Controller   ?
```

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

```
Add CHL=0 ID=2
Primary Ctlr  ?
```



IMPORTANT:

- 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  ?
```



IMPORTANT:

- 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's can be applied to the Host channel while the Drive channel, one SCSI ID or no SCSI ID.
- Multiple SCSI ID's are supported in firmware versions 2.11 and above.
- At least a controller's SCSI ID has to be present on the SCSI bus.

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

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

```
View and Edit
SCSI Channels ↓
```

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

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

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

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

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

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



IMPORTANT:

- Every time you change a channel's SCSI ID, you must reset the 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's can be applied to the Host channel while the Drive channel, one SCSI ID or no SCSI ID.
- Multiple SCSI ID's are supported in firmware versions 2.11 and above.
- At least a controller's SCSI ID has to be present on the SCSI bus.

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

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

View and Edit
SCSI Channels ↓

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

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

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

Set SCSI Channel
Secondary 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 ?



IMPORTANT:

- 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's can be applied to the Host channel while the Drive channel, one SCSI ID or no SCSI ID.
- Multiple SCSI ID's are supported in firmware versions 2.11 and above.
- At least a controller's SCSI ID has to be present on the SCSI bus.

7.5.5 Setting a SCSI Channel's Terminator

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

```
View and Edit
SCSI Channels  ↓
```

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

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

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

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

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

```
SCSI Terminator
Enabled  ..
```

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

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

7.5.6 Setting the Transfer Speed

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

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

```
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 speed changed.

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

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

```
Set Transfer
Speed ..
```

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.

```
CHL=0 Clk=20.0M
Change to=20.0M?
```



IMPORTANT:

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

7.5.7 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

```
View and Edit
SCSI Channels ↓
```

and Edit SCSI Channels", then press ENT.

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

```
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 ?
```



IMPORTANT:

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

7.5.8 Viewing and Editing a SCSI Target / Drive Channel

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

```
View and Edit
SCSI Channels ↓
```

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

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

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

```
View and Edit
SCSI Target ..
```

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

```
SCSI Target
CHL=1 ID=0 ..
```


Slot Number

To set the Slot number of the SCSI target, choose "Slot Assignment", then press ENT. The current slot number will be displayed on the LCD.

```
Slot Assignment
Default No Set..
```

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

```
Slot Assignment
Set to # 9 ?
```

Maximum Synchronous Transfer Clock

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

```
SCSI Target
CHL=1 ID=0 ..
```

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.

```
Max Synchronous
Xfer Clock# 12..
```

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.

```
Period 4ns units
Def= 12 ?
```

Maximum Transfer Width

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

```
SCSI Target
CHL=1 ID=0 ..
```

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

```
Max Xfer Wide
Supported ..
```

clock setting will be displayed on the LCD.

Press ENT for two seconds to change the setting.

Max Xfer Narrow
Only ?

Parity Check

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

SCSI Target
CHL=1 ID=0 ..

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

Parity Check
Enabled ..

Press ENT for two seconds to change the setting.

Disable
Parity Checking?

Disconnecting Support

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

SCSI Target
CHL=1 ID=0 ..

Choose "Disconnect Support", then press ENT. The current clock setting will be displayed on the LCD.

Disconnect
Support Enabled

Press ENT for two seconds to change the setting.

Disable Support
Disconnect ?

Maximum Tag Count

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

SCSI Target
CHL=1 ID=0 ..

Choose "Max Tag Count", then press ENT. The current clock setting will be displayed on the LCD.

```
Max Tag Count:
Default ( 32) ..
```

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

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



IMPORTANT:

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

Restoring the Default Setting

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

```
SCSI Target
CHL=1 ID=0 ..
```

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

```
Restore to
Default Setting.
```

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

```
Restore to
Default Setting?
```

7.6 Viewing and Editing Configuration Parameters

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

```
View and Edit
Config Parm  ↓
```

Press ▼ or ▲ to select the desired option.

7.6.1 Communication Parameters

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

7.6.2 Caching Parameters

7.6.2.1 Write-Back Cache Enable/Disable

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

Caching
Parameters ..

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

Write-Back Cache
Enabled ..

Press ENT for two seconds to change the current setting.

Disable Write
-Back Cache ?



IMPORTANT:

- Every time you change the Cache Parameters, you must reset the 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.

7.6.2.2 Optimization for Sequential / Optimization for Random

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

Caching
Parameters ..

Press ▼ or ▲ to select "Optimization I/O", then press ENT. The current setting (Random or Sequential) will be displayed on the LCD.

Optimization I/O
Random ..

Press ENT for two seconds to change the current setting.

Optimization for
Sequential I/O ?



IMPORTANT:

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

7.6.3 Host-side SCSI Parameters

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

Host-side SCSI
Parameters ..

7.6.3.1 Maximum Queued I/O Count

Press ▼ or ▲ to select "Maximum Queued I/O Count", then press ENT. The current setting will be displayed on the LCD.

Maximum Queued
I/O Count - 256..

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

Maximum Queued
I/O Count - Auto ?



IMPORTANT:

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

7.6.3.2 LUNs per Host SCSI ID

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

LUNs per Host
SCSI ID - 8 ..

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

LUNs per Host
SCSI ID - 4 ?



IMPORTANT:

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

7.6.4 Drive-side SCSI Parameters

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

Drive-side SCSI
Parameters ..

7.6.4.1 SCSI Motor Spin-Up

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

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

Press ENT for two seconds to confirm the setting.

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



IMPORTANT:

- *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 "3.5.1 SCSI Motor Spin-Up" for more information.*

7.6.4.2 SCSI Reset at Power-Up

Press ▼ or ▲ to select "Reset at Power-Up", then press ENT. The current setting will be displayed on the LCD.

```
Reset at Power
-Up Enabled ..
```

Press ENT for two seconds to confirm the setting.

```
Disable Reset
at Power-Up ?
```



IMPORTANT:

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

7.6.4.3 Disk Access Delay Time

Press ▼ or ▲ to select "Init Disk Access Delay", then press ENT. The current setting will be displayed on the LCD.

```
Init Disk Access
Delay - 15secs..
```

Press ▼ or ▲ to select between 5 and 75 seconds or "No delay", then press ENT for two seconds.

```
Init Disk Access
delay - 5secs..
```



IMPORTANT:

- *Every time you change this setting, you must reset the controller for the changes to take effect.*
- *Refer to "3.5.3 Disk Access Delay Time" for more information.*

7.6.4.4 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 ..
```



IMPORTANT:

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

7.6.4.5 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 ?

7.6.4.6 *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 Parm

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

7.6.4.7 *Idle Drive Failure Detection*

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

View and Edit
Config Parm

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

Drive-side SCSI
Parameters ..

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

```
Periodic Drive
ChkTime -Disable
```

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

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



IMPORTANT:

- *By choosing a time value to enable the "Periodic Drive Check Time", the controller will poll all of the connected drives in the controller'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.*

7.6.5 Disk Array Parameters

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

```
Disk Array
Parameters ..
```

7.6.5.1 Rebuilding Priority

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

```
Rebuild Priority
Low ..
```

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

```
Rebuild Priority
High ?
```

7.6.5.2 Verification on Writes

Press ▼ or ▲ to select "Verification on Writes", then press ENT.

```
Verification
on Writes ..
```

Verification on Logical Drive's Initialization Writes

Press ▼ or ▲ to select "On LD Initialize Writes", then press ENT. The current setting will be displayed on the LCD.
Press ENT for two seconds to confirm the setting.

On LD Initializa
Writes Disabled.

Enable VerifyOn
LD Init Writes ?



IMPORTANT:

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

Verification on Logical Drive Rebuild Writes

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

On LD Rebuild
Writes Disabled.

Press ENT for two seconds to confirm the setting.

Enable VerifyOn
LD rebu Writes ?



IMPORTANT:

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

Verification on Normal Drive Writes

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

On Normal Drive
Writes Disabled.

Press ENT for two seconds to confirm the setting.

Enable VerifyOn
Drive Writes ?



IMPORTANT:

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

7.6.6 Controller Parameters

7.6.6.1 Controller Name

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

```
Controller
Parameters ..
```

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

```
Controller Name:
Not Set
```

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

```
Enter Ctlr Name:
█
```

7.7 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.

7.8 System Functions

7.8.1 Mute Beeper

This function does not permanently turn off the beeper. It mutes the beeper once and will bring back the beep alarm on the next event.

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

```
System Functions
↓
```

Press ▼ or ▲ to select "Mute Beeper", then press ENT.

```
Mute Beeper
..
```

Press ENT for two seconds to mute the beeper.

```
Mute Beeper
?
```

7.8.2 Changing the Password

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

System Functions
↓

Press ▼ or ▲ to select "Change Password", then press ENT.

Change Password ..

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.

Old Password:
█

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.

New Password:
█

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

Re-Ent Password:
█

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

Change Password
Successful

7.8.3 Resetting the Controller

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

System Functions
↓

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

Reset This
Controller ..

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

```
Reset This  
Controller   ?
```

7.9 Viewing System Information

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

```
View System  
Information  ↓
```

Press ▼ or ▲ to browse through the following:

```
RAM Type:   DRAM  
RAM Size:   8MB
```

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

```
Serial Number:  
xxxxxxx
```

7.10 Viewing and Editing Event Logs

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

```
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
```



IMPORTANT:

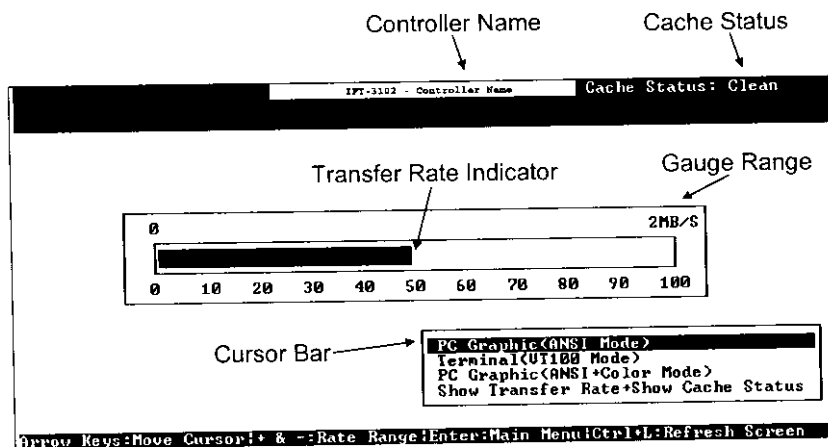
- The event log will be cleared after the controller resets.

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Chapter 8 RS-232C Terminal Interface

8.1 Understanding the Information on the Screen

8.1.1 The Initial Screen



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

Controller Name: Identifies the type of controller.

Transfer Rate Indicator: Indicates the current data transfer rate.

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

Cache Status: Indicates the current cache status.

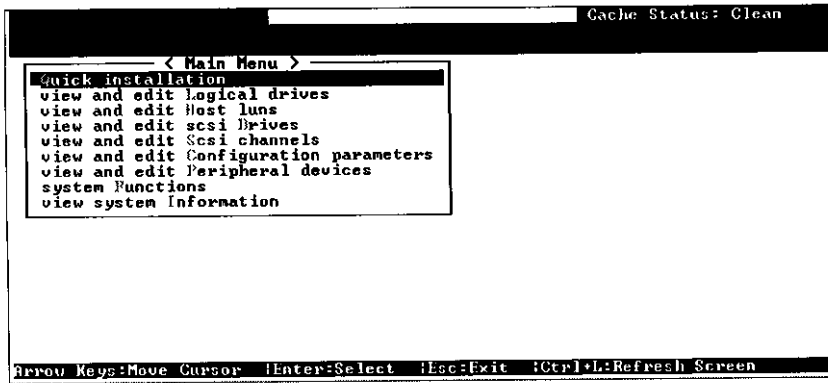
PC Graphic (ANSI Mode): Enters the Main Menu and operates in ANSI mode.

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

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

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

8.1.2 Main Menu



Use the arrow keys to move the cursor bar through the menu item, then press ENTER to choose a menu, or ESC to return to the previous menu/screen.

8.1.3 Logical Drive's Status

LG	RAID	Size(MB)	Status	#OnLine	#STB	#Fail	NAME
P0	RAID0	2021	INITING	3	1	0	
1	NONE						
2	NONE						
3	NONE						
4	NONE						
5	NONE						
6	NONE						
7	NONE						

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.

INCOMPLETE Two or more drives failed in the logical drive.

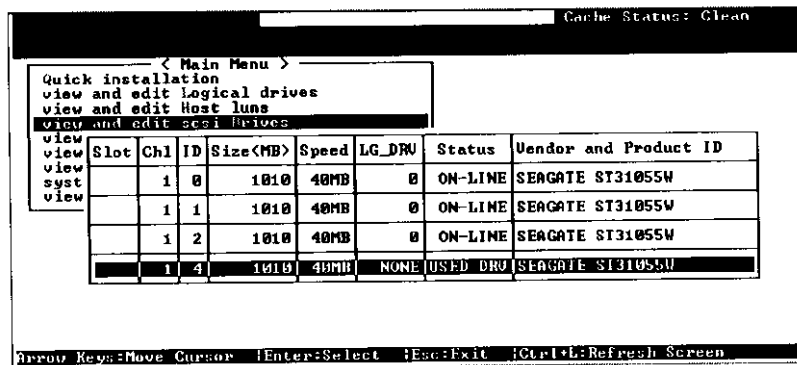
#OnLine Total drive members in the logical drive.

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

#Fail Failed physical drive in the logical drive.

Name Logical drive name.

8.1.4 SCSI Drive's Status



The screenshot shows a terminal window with a menu titled "< Main Menu >". The menu options are: "Quick installation", "view and edit logical drives", "view and edit Host luns", and "view and edit scsi drives". The "view and edit scsi drives" option is selected. Below the menu is a table with the following columns: Slot, Chl, ID, Size<MB>, Speed, LG_DRU, Status, and Vendor and Product ID. The table contains four rows of data. The first three rows show drives with status "ON-LINE", and the fourth row shows a drive with status "NONE USED DRU".

Slot	Chl	ID	Size<MB>	Speed	LG_DRU	Status	Vendor and Product ID
	1	0	1010	40MB	0	ON-LINE	SEAGATE ST31055W
	1	1	1010	40MB	0	ON-LINE	SEAGATE ST31055W
	1	2	1010	40MB	0	ON-LINE	SEAGATE ST31055W
	1	4	1010	40MB	NONE	USED DRU	SEAGATE ST31055W

At the bottom of the terminal window, there is a legend: "F1:Help Keys:Move Cursor |Enter:Select |Esc:Exit |Ctrl+L:Refresh Screen".

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 logical drive x. If the Status column showed "STAND-BY", the SCSI drive is a Local Spare Drive of logical drive x.
	Global	The SCSI drive is a Global Spare Drive.
Status	INITING	Processing initialization.
	ON-LINE	The drive is in good condition.
	REBUILD	Processing Rebuild.
	STAND-BY	Local Spare Drive or Global Spare Drive. The Local Spare Drive's LG_DRV column will show the logical drive number. The Global Spare Drive's LG_DRV column will show "Global".
	NEW DRV	The new drive has not been configured to any logical drive or as a spare drive.
	USED DRV	The used drive has not been configured to any logical drive or as a spare drive.
	BAD	Failed drive.
	ABSENT	Drive does not exist.
	MISSING	Drive once exist, but is missing now.
	SB-MISS	Spare drive missing.
Verdor and Product ID	The vendor and product model information of the drive.	

8.1.5 SCSI Channel's Status

Cache Status: Clean								
< Main Menu >								
Quick installation								
view and edit logical drives								
view and edit Host luns								
view and edit scsi Drives								
view and edit scsi channels								
Chl	Mode	PID	SID	DefSynClk	DefWid	Term	CurSynClk	CurWid
0	Host	0	NA	20.8MHz	Wide	On	Async	Narrow
1	Drive	7	NA	20.8MHz	Wide	On	20.8MHz	Wide
2	Drive	7	NA	20.8MHz	Wide	On	Async	Narrow

Arrow Keys:Move Cursor |Enter:Select |Esc:Exit |Ctrl+L:Refresh Screen

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 ID's 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 ID's were applied (Host Channel mode only).

(ID number) The Primary Controller is using the SCSI ID for host LUN mapping.

NA No SCSI ID applied (Drive Channel mode only).

DefSynClk Default SCSI bus sync clock:

???.?M The default setting of the SCSI channel is ??? Mhz in Synchronous mode.

Async The default setting of the SCSI channel is Asynchronous mode.

DefWid Default SCSI Bus Width:

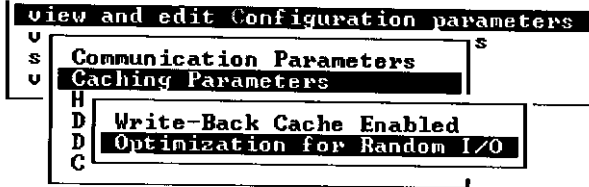
	Wide	16-bit SCSI
	Narrow	8-bit SCSI
Term	Terminator Status:	
	On	Terminator is enabled.
	Off	Terminator is disabled.
	Diff	The channel is a Differential channel. The terminator can only be installed/removed physically.
CurSynClk	Current SCSI bus sync clock:	
	???.?M	The default setting of the SCSI channel is ??? Mhz in Synchronous mode.
	Async	The default setting of the SCSI channel is Asynchronous mode.
	(empty)	The default SCSI bus sync clock has changed. Reset the controller for the changes to take effect.
CurWid	Current SCSI Bus Width:	
	Wide	16-bit SCSI
	Narrow	8-bit SCSI
	(empty)	The default SCSI bus width has changed. Reset the controller for the changes to take effect.



IMPORTANT:

- Only a terminator with Single-Ended channel can be enabled/disabled through the above setting.
- A terminator with Differential channel must be removed/installed physically.

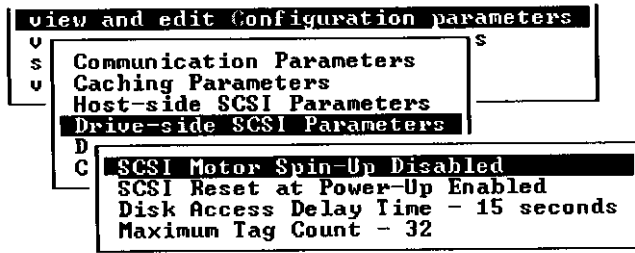
8.1.6 Viewing the Current Setting of Each Function



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

In the example shown above:

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



In the example shown above:

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

8.2 Viewing and Editing Logical Drives

8.2.1 Creating a Logical Drive

								Cache Status: Clean	
Q	LG	RAID	Size(MB)	Status	#OnLine	#STB	#Fail	NAME	
U	0	NONE							
U	Create Logical Drive ?								
U		Yes	No						
U	3	NONE							
U	4	NONE							
U	5	NONE							
U	6	NONE							
U	7	NONE							

Arrow Keys: Move Cursor | Enter: Select | Esc: Exit | Ctrl+L: Refresh Screen

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].

Cache Status: Clean

Q	LG	RAID	Size(MB)	Status	#OnLine	#STB	#P	RAID 5	NAME
U	0	NONE						RAID 3	
U	1	NONE						RAID 1	
U	2	NONE						RAID 0	
U	3	NONE						NRaid	
U	4	NONE							
U	5	NONE							
U	6	NONE							
U	7	NONE							

Arrow Keys:Move Cursor !Enter:Select !Esc:Exit !Ctrl*L:Refresh Screen

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

Cache Status: Clean										
1 of 4 Selected										
Q	LG	RAID	Size(MB)		Status	#OnLine	#STB	#F	RAID 5	NAME
U	0		Slot	Chl	ID	Size(MB)	Speed	LG_DRU	Status	Vendor and Product ID
U	1	*	1	0		1010	40MB	NONE	USED DRU	SEAGATE ST31055W
U	2		1	1		1010	40MB	NONE	USED DRU	SEAGATE ST31055W
U	3		1	2		1010	40MB	NONE	USED DRU	SEAGATE ST31055W
U	4		1	4		1010	40MB	NONE	USED DRU	SEAGATE ST31055W
U	5	NONE								
U	6	NONE								
U	7	NONE								

Arrow Keys: Move Cursor | Enter: Select | Esc: Confirm | Ctrl+L: Refresh Screen

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

Cache Status: Clean										
U	LG	RAID	Size(MB)		Status	#OnLine	#STB	#Fail	NAME	
U	0	NONE								
U			Maximum Drive Capacity :		1010MB					
U			Assign Spare Drives							
U			Logical Drive Assignments							
U	3	NONE								
U	4	NONE								
U	5	NONE								
U	6	NONE								
U	7	NONE								

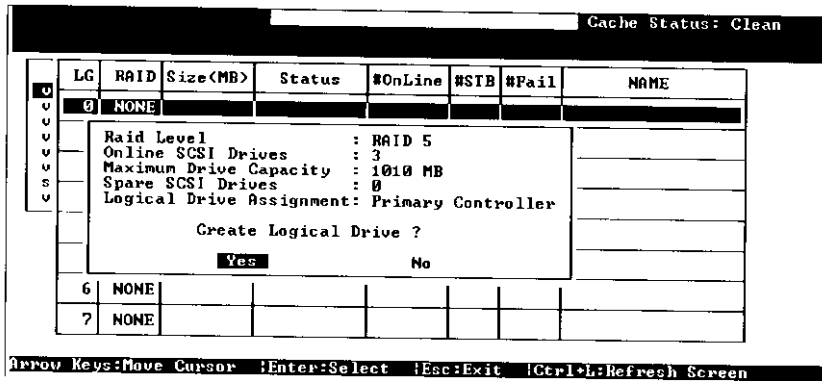
Arrow Keys: Move Cursor | Enter: Select | Esc: Confirm | Ctrl+L: Refresh Screen

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.

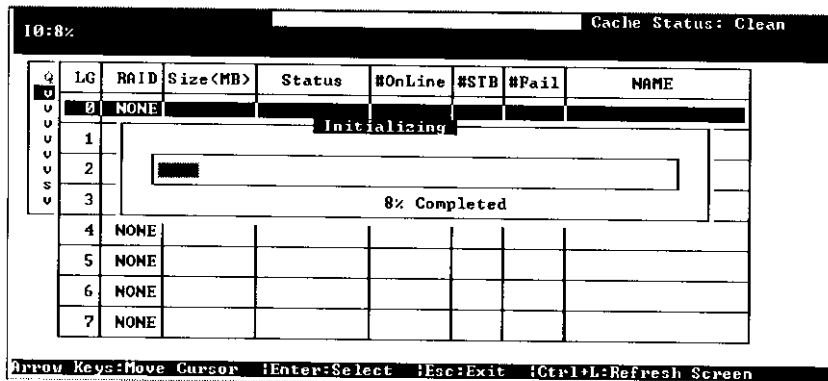
You can assign a Local Spare Drive by choosing "Assign Spare Drives" in the above screen. A list of available drives will be displayed on the screen. Mark an asterisk (*) on the drive(s) that will be assigned by moving the cursor bar to that device, then pressing [Enter]. Press [ESC] when done.

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.



8.2.2 Viewing Logical Drives and Drive Members

Choose "View and Edit Logical Drives" in the Main Menu. The current logical drive configuration and status will be displayed on the screen. Refer to "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].

Cache Status: Clean							
LG	RAID	Size<MB>	Status	#OnLine	#STB	#Fail	NAME
P0	RAID5	2021	GOOD	3	0	0	
View scsi drives							
Delete logical drive							
Partition logical drive							
logical drive Name							
logical drive Assignments							
4	NONE						
5	NONE						
6	NONE						
?	NONE						

Arrow Keys:Move Cursor !Enter:Select !Esc:Exit !Ctrl+L:Refresh Screen

Choose "View SCSI Drives". The member drive information will be displayed on the screen. Refer to "8.1.4. SCSI Drive's Status" for the detailed descriptions of each item.

8.2.3 Deleting a Logical Drive

From the main menu (see fig. 8.1.2), choose View and Edit Logical Drives; then press [Enter]. Select the logical drive that you wish to delete; then press [Enter]. Choose Delete Logical Drive. Choose Yes to confirm.

8.2.4 Partitioning a Logical Drive

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

Cache Status: Clean							
LG	RAID	Size<MB>	Status	#OnLine	#STB	#Fail	NAME
P0	RAID5	2021	GOOD	3	0	0	
View scsi drives							
Delete logical drive							
Partition logical drive							
Partition Logical Drive ?							
Yes No							
4	NONE						
5	NONE						
6	NONE						
?	NONE						

Arrow Keys:Move Cursor !Enter:Select !Esc:Exit !Ctrl+L:Refresh Screen

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.

Cache Status: Clean							
LG	RAID	Size(MB)	Status	Partition	Offset(MB)	Size(MB)	
P0	RAIDS	2021	GOOD	0	0	2021	
View scsi drives Delete logical drive Partition logical drive logical drive Name logical drive Assignments				Partition Size (MB):			
				3			
4	NONE			4			
5	NONE			5			
6	NONE			6			
7	NONE			7			

Arrow Keys:Move Cursor |Enter:Select |Esc:Exit |Ctrl+L:Refresh Screen

8.2.5 Deleting a Partition of a Logical Drive

Cache Status: Clean							
LG	RAID	Size(MB)	Status	Partition	Offset(MB)	Size(MB)	
P0	RAIDS	2021	GOOD	0	0	100	
				1	100	200	
View scsi drives Delete logical drive Partition logical drive logical drive Name logical drive Assignments				Partition Size (MB): 0			
4	NONE			4	1000	1021	
5	NONE			5			
6	NONE			6			
7	NONE			7			

Arrow Keys:Move Cursor |Enter:Select |Esc:Exit |Ctrl+L:Refresh Screen

Choose the logical drive that has a partition which 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.

R0:22% Cache Status: Clean

LG	RAID	Size(MB)	Status	#OnLine	#STB	#Fail	NAME
00	RAID5	2021	REBUILDING	3	0	0	
u	View scsi drives						
u	Delete logical drive						
u	Partition logical drive						
u	Logical drive Name						
u	Rebuild progress						
u	Logical drive assignments						
5	NONE						
6	NONE						
7	NONE						

Arrow Keys: Move Cursor | Enter: Select | Esc: Exit | Ctrl+L: Refresh Screen

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



IMPORTANT:

- The Rebuild function will appear only when a logical drive (with RAID level 1, 3 or 5) has a failed drive member.
- Refer to "3.2.3 Automatic Rebuild and Manual Rebuild" for more information.

8.3 Viewing and Editing Host LUNs

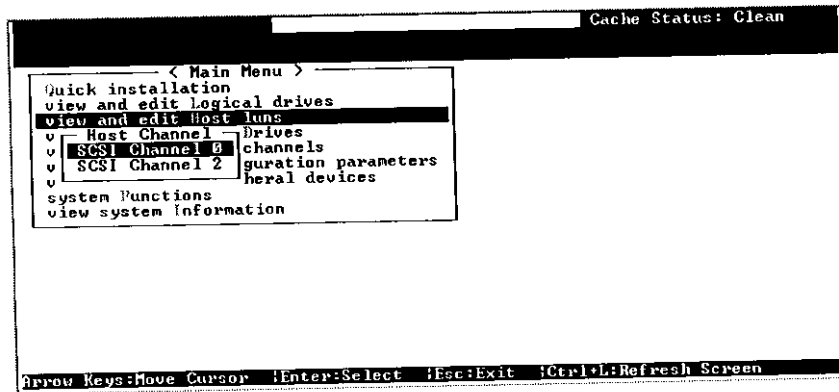
8.3.1 Mapping a Logical Drive to a Host LUN

Cache Status: Clean

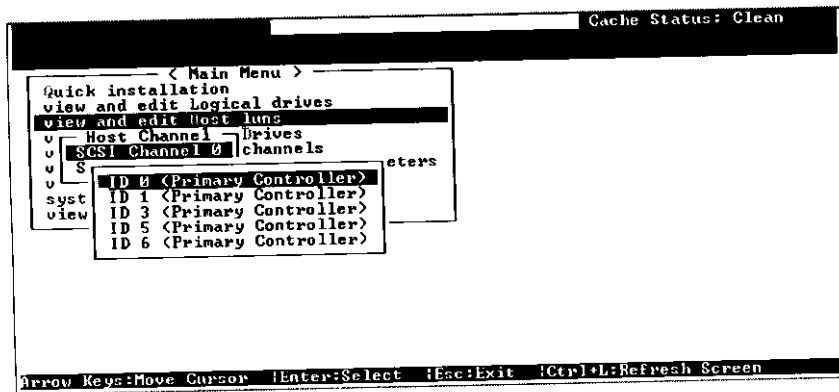
< Main Menu >	
Quick installation	
view and edit logical drives	
view and edit Host luns	
u	Map Logical Drive ?
u	Yes No
u	els
u	ion parameters
u	devices
s	view system information

Arrow Keys: Move Cursor | Enter: Select | Esc: Exit | Ctrl+L: Refresh Screen


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

 **Note:** Multiple SCSI ID's are supported in firmware versions 2.11 and above.

Cache Status: Clean					
< Main Menu >					
Quick installation	LUN	LG_DRU	Partition	Size(MB)	RAID
view and edit Logical drives	0				
view and edit Host luns:					
Host Channel Drives					
SCSI Channel 0 channels	1				
ID 0 (Primary Controller)	2				
ID 1 (Primary Controller)	3				
ID 3 (Primary Controller)	4				
ID 5 (Primary Controller)	5				
ID 6 (Primary Controller)	6				
	7				

Arrow Keys:Move Cursor !Enter:Select !Esc:Exit !Ctrl+L:Refresh Screen

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].

Cache Status: Clean										
< Main Menu >										
Quick installation	LUN	LG_DRU	Partition	Size(MB)	RAID					
view and edit Logical drives	0									
view and edit Host luns:										
Host										
SCSI	LG	RAID	Size(MB)	Status	#OnLine	#STB	#Fail	NAME		
ID	P0	RAID5	2021	GOOD	3	0	0			
ID										
ID 3 (Primary Controller)	3									
ID 5 (Primary Controller)	4									
ID 6 (Primary Controller)	5									
	6									
	7									

Arrow Keys:Move Cursor !Enter:Select !Esc:Exit !Ctrl+L:Refresh Screen

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

Cache Status: Clean					
< Main Menu >					
quick installation	LUN	LG_DRU	Partition	Size(MB)	RAID
view and edit logical drives	0	0	2	300	RAIDS
view and edit Host luns	1	0	0	100	RAIDS
Host Channel Drives					
SCSI Channel 0 channels					
ID 0 (Primary Controller)	Delete Host Lun ?		200	RAIDS	
ID 1 (Primary Controller)	Yes No		400	RAIDS	
ID 3 (Primary Controller)	4	0	4	1021	RAIDS
ID 5 (Primary Controller)	5				
ID 6 (Primary Controller)	6				
	7				

Arrow Keys:Move Cursor |Enter:Select |Esc:Exit |Ctrl+L:Refresh Screen

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.

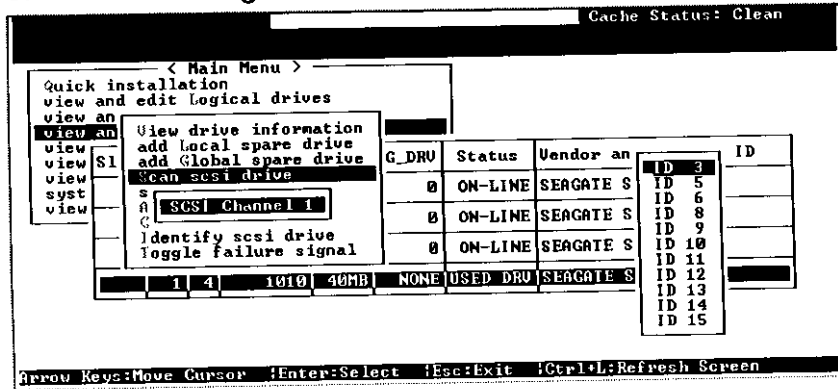
8.4 Viewing and Editing SCSI Drives

Cache Status: Clean								
< Main Menu >								
quick installation								
view and edit logical drives								
view and edit Host luns								
view and edit scsi drives								
view	Slot	Chl	ID	Size(MB)	Speed	LG_DRU	Status	Vendor and Product ID
view		1	0	1010	40MB	0	ON-LINE	SEAGATE ST31055W
view		1	1	1010	40MB	0	ON-LINE	SEAGATE ST31055W
view		1	2	1010	40MB	0	ON-LINE	SEAGATE ST31055W
view		1	4	1010	40MB	NONE	USED DRU	SEAGATE ST31055W

Arrow Keys:Move Cursor |Enter:Select |Esc:Exit |Ctrl+L:Refresh Screen

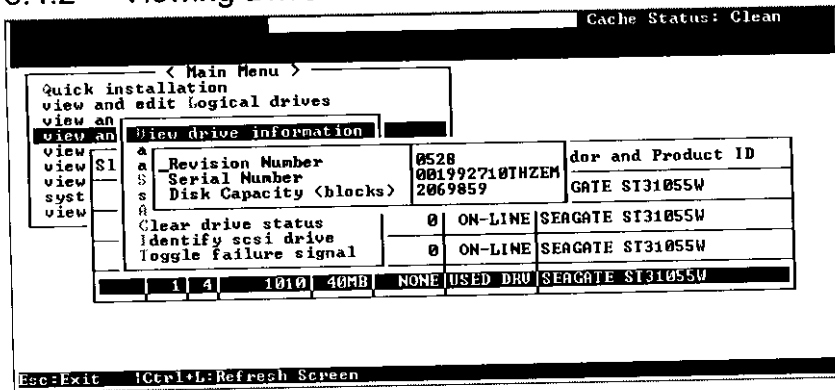
Choose "View and Edit SCSI Drives" in the Main Menu. All drives attached to the drive channels will be displayed on the screen. Refer to "8.1.4 SCSI Drive's Status" for detailed descriptions of each column.

8.4.1 Scanning a New SCSI Drive



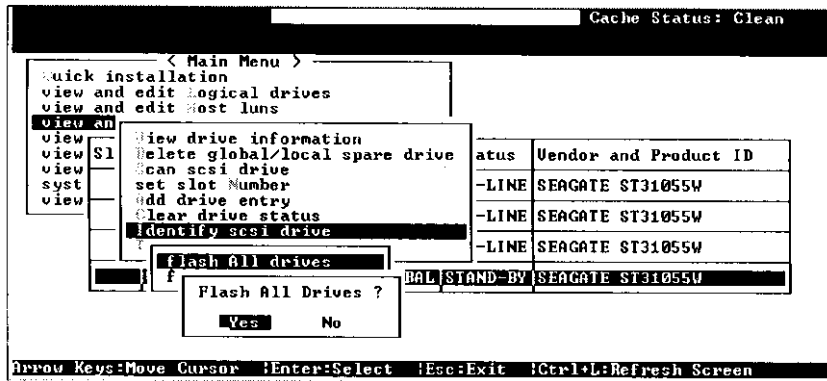
Choose View and edit scsi drive in the main menu; then press [Enter]. Choose "Scan SCSI drive", then press [Enter]. The menu may vary according to the drive status. Choose the drive channel and SCSI ID of the drive you wish to scan, then press [Enter].

8.4.2 Viewing Drive Information

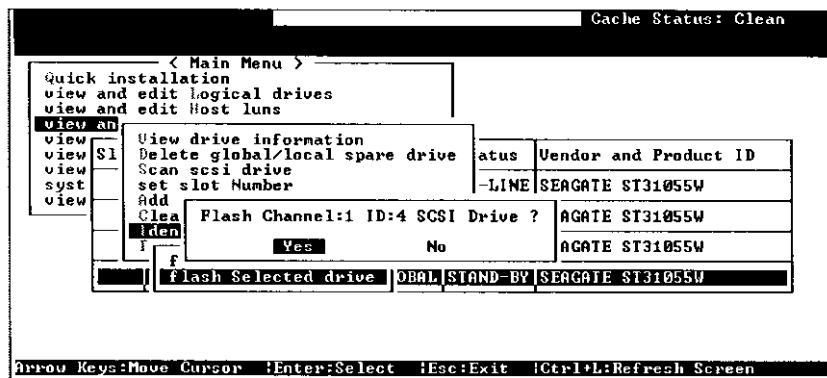


Choose the SCSI drive you wish to view, then press [Enter]. Select "View drive information". The revision number, serial number and disk capacity (counts in block; one block refers to 512K) of the drive will be displayed on the screen.

8.4.5 Identifying a Drive



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



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

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

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

Cache Status: Clean

< Main Menu >

Quick installation
view and edit logical drives
view and edit Host luns
view and edit scsi drives

view
view S1
view S
view S
view S
view S
view S
view S
view S

View drive information
Delete global/local spare drive
Delete Spare Drive ?
Yes No
Toggle failure signal

atus	Vendor and Product ID
-LINE	SEAGATE ST31055W
-LINE	SEAGATE ST31055W
-LINE	SEAGATE ST31055W

1	4	1010	40MB	GLOBAL	STAND-BY	SEAGATE ST31055W
---	---	------	------	--------	----------	------------------

Arrow Keys:Move Cursor !Enter:Select !Esc:Exit !Ctrl+L:Refresh Screen

8.5 Viewing and Editing SCSI Channels

Cache Status: Clean

< Main Menu >

Quick installation
view and edit logical drives
view and edit Host luns
view and edit scsi Drives
view and edit scsi channels

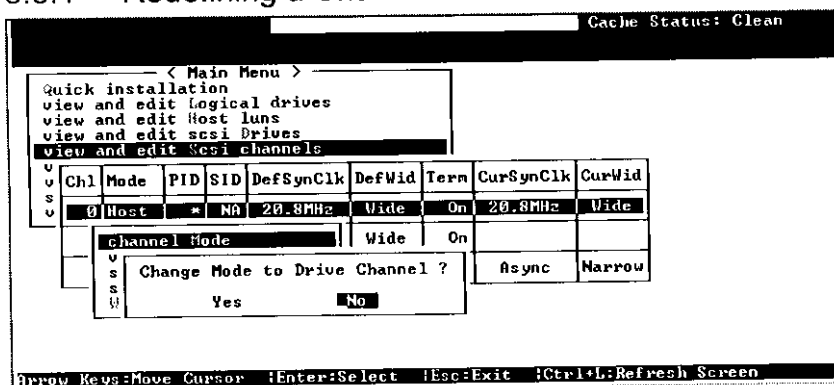
u
v
s
v

Ch1	Mode	PID	SID	DefSynClk	DefWid	Term	CurSynClk	CurWid
0	Host	*	NA	20.8MHz	Wide	On	Async	Narrow
1	Drive	7	NA	20.8MHz	Wide	On	20.8MHz	Wide
2	Host	0	NA	20.8MHz	Wide	On	Async	Narrow

Arrow Keys:Move Cursor !Enter:Select !Esc:Exit !Ctrl+L:Refresh Screen

Choose "View and Edit SCSI Channels" in the Main Menu. A list of all the channels will be displayed on the screen. Refer to "8.1.5 SCSI Channel Status" for detailed information.

8.5.1 Redefining a Channel Mode



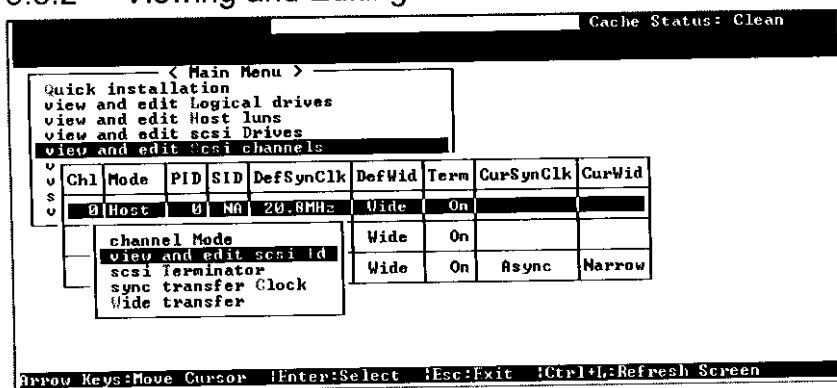
Choose the channel you wish to change, then press [Enter]. Choose "Channel Mode", then press [Enter]. A dialog box will appear asking you to confirm the change. Select Yes to change the mode of the selected SCSI channel.



IMPORTANT:

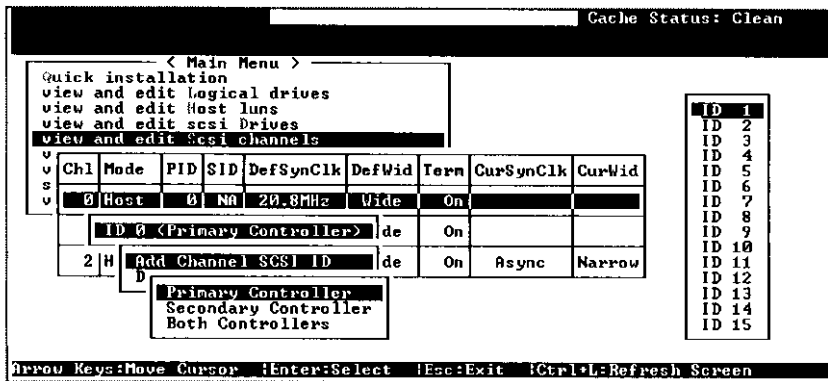
- Every time you change the channel mode, you must reset the controller for the changes to take effect.

8.5.2 Viewing and Editing a SCSI ID / Host Channel



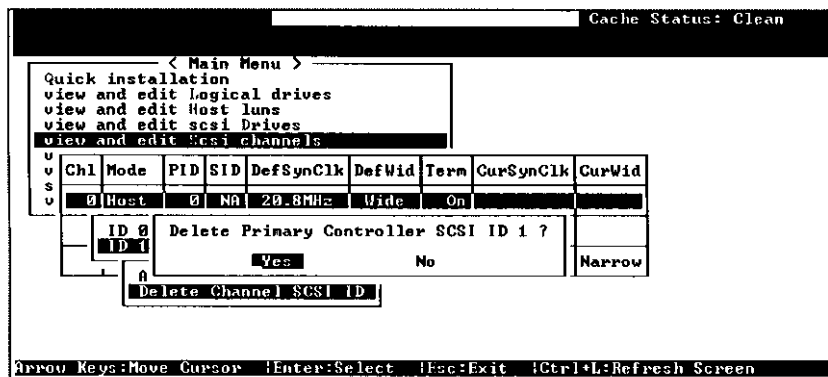
Choose a Host channel, then press [Enter]. Choose "View and Edit SCSI ID". A list of the existing ID(s) will be displayed on the screen.

Adding a SCSI ID



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

Deleting a SCSI ID



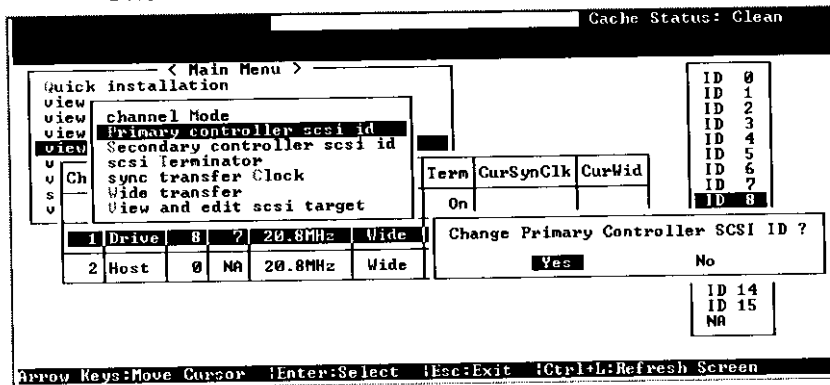
Choose the SCSI ID you wish to delete. Choose "Delete Channel SCSI ID". The dialog box "Delete Primary Controller SCSI ID?" will appear. Select Yes, then press [Enter] to delete.



IMPORTANT:

- Every time you change a channel's SCSI ID, you must reset the 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's can be applied to the Host channel while the Drive channel can have one SCSI ID or no SCSI ID.
- Multiple SCSI ID's are supported in firmware versions 2.11 and above.
- At least one controller's SCSI ID has to be present on the SCSI bus.

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



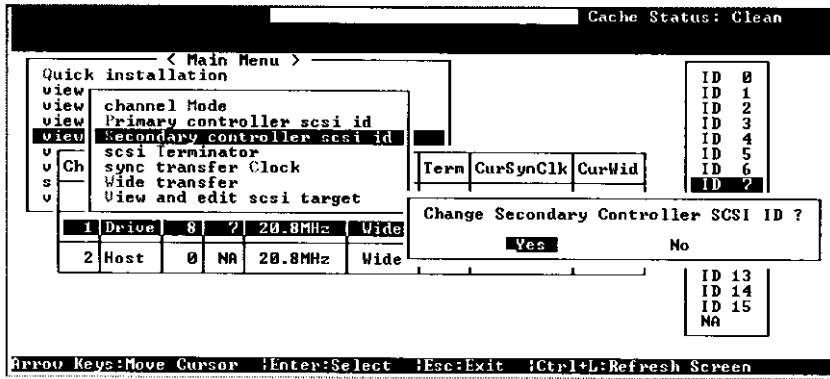
Choose a Drive channel, then press [Enter]. Choose "Primary Controller SCSI ID". A list of SCSI IDs will be displayed on the screen. Only one SCSI ID can be assigned to the drive channel of a controller. Now choose a SCSI ID for the drive channel of the Primary Controller. The dialog box "Change Primary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



IMPORTANT:

- Every time you change a channel's SCSI ID, you must reset the 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's can be applied to the Host channel while the Drive channel can have one SCSI ID or no SCSI ID.
- Multiple SCSI ID's are supported in firmware versions 2.11 and above.
- At least one controller's SCSI ID has to be present on the SCSI bus.

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



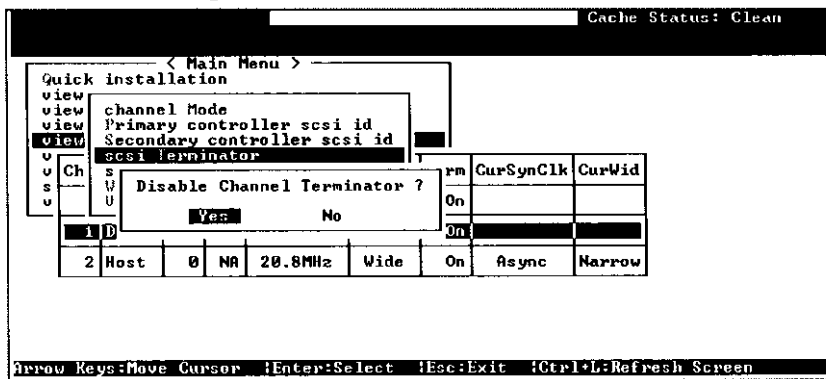
Choose a Drive channel, then press [Enter]. Choose "Secondary Controller SCSI ID". A list of SCSI IDs will be displayed on the screen. Only one SCSI ID can be assigned to the drive channel of a controller. Now choose a SCSI ID for the drive channel of the Secondary Controller. The dialog box "Change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



IMPORTANT:

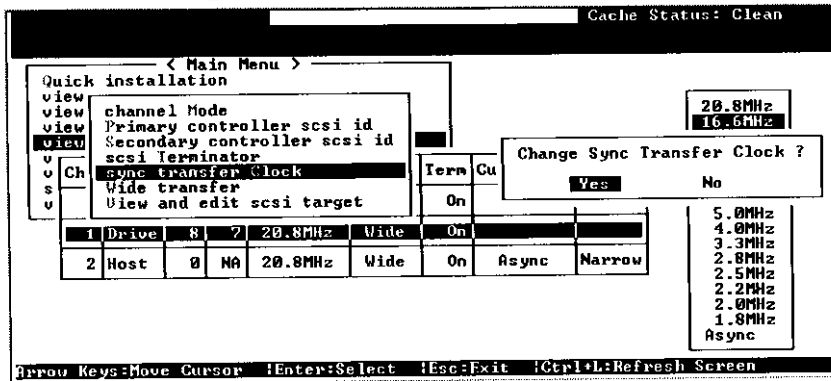
- Every time you change a channel's SCSI ID, you must reset the controller for the changes to take effect.
- The default SCSI ID of the Host channel is 0, the Drive channel is 7.
- If only one controller exist, you must set the Secondary Controller's SCSI ID to "NA". If a secondary controller exist, you need to set a SCSI ID.
- Multiple SCSI ID's can be applied to the Host channel while the Drive channel can have one SCSI ID or no SCSI ID.
- Multiple SCSI ID's are supported in firmware versions 2.11 and above.
- At least one controller's SCSI ID has to be present on the SCSI bus.

8.5.5 Setting a SCSI Channel's Terminator



Choose the channel that has a terminator which you want to enable or disable; then press [Enter]. Choose "SCSI Terminator", then press [Enter]. A dialog box will appear. Choose Yes, then press [Enter].

8.5.6 Setting a Transfer Speed



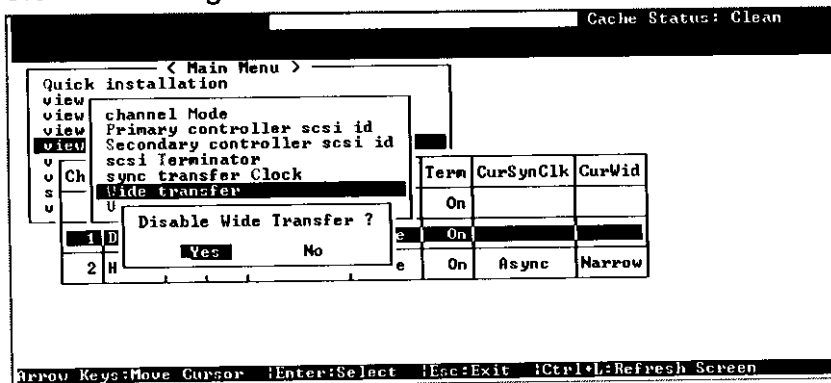
Move the cursor bar to a channel, then press [Enter]. Choose "Sync Transfer Clock", then press [Enter]. A list of the clock speed will appear. Move the cursor bar to the desired speed and press [Enter]. A dialog box "Change Sync Transfer Clock?" will appear. Choose Yes.



IMPORTANT:

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

8.5.7 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.



IMPORTANT:

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

8.5.8 Viewing and Editing SCSI Target / Drive Channel

Cache Status: Clean

< Main Menu >

```

Quick installation
view channel Mode
view Primary controller scsi id
view Secondary controller scsi id
u Ch
s v
v
  
```

	Term	CurSynClk	CurWid
1 Drive 8 7 20.0MHz Wide	On		
2 Host 0 NA 20.0MHz Wide	On	Async	Narrow

View and edit scsi target

Arrow Keys: Move Cursor | Enter: Select | Esc: Exit | Ctrl+L: Refresh Screen

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

Cache Status: Clean

```

Quick installation
view view
view view
view view
u Ch
s v
v
  
```

Slot	Chl	ID	SyncClk	XfrWid	ParityChk	Disconnect	TagCount
9	1	0	12	Wide	Enabled	Enabled	Def(32)
					bled	Enabled	Def(32)
					bled	Enabled	Def(32)
					bled	Enabled	Def(32)
					bled	Enabled	Def(32)
	1	5	12	Wide	Enabled	Enabled	Def(32)
	1	6	12	Wide	Enabled	Enabled	Def(32)
	1	9	12	Wide	Enabled	Enabled	Def(32)

Slot number
maximum sync. xfer Clock
maximum xfer Width
Parity check
Disconnect support
maximum Tag count
Restore to default setting

Arrow Keys: Move Cursor | Enter: Select | Esc: Exit | Ctrl+L: Refresh Screen

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

Cache Status: Clean

Quick view view view view	Slot	Chl	ID	SyncClk	XfrWid	ParityChk	Disconnect	TagCount
	9	1	0	12	Wide	Enabled	Enabled	Def<32>
	Slot number					bled	Enabled	Def<32>
Ch	Slot Number : _					bled	Enabled	Def<32>
u	Restore to default setting					bled	Enabled	Def<32>
v	1	5		12	Wide	Enabled	Enabled	Def<32>
view	1	6		12	Wide	Enabled	Enabled	Def<32>
	1	9		12	Wide	Enabled	Enabled	Def<32>

Enter:Clear Slot Number !Esc:Exit !Ctrl+L:Refresh Screen

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

Cache Status: Clean

Quick view view view view	Slot	Chl	ID	SyncClk	XfrWid	ParityChk	Disconnect	TagCount
	9	1	0	12	Wide	Enabled	Enabled	Def<32>
	Slot number					bled	Enabled	Def<32>
Ch	Maximum Sync. Xfer Clock							2)
u	Synchronous Transfer Period in 4ns units							2)
v	Maximum Sync. Xfer Clock:							2)
view	1	5		12	Wide	Enabled	Enabled	Def<32>
	1	6		12	Wide	Enabled	Enabled	Def<32>
	1	9		12	Wide	Enabled	Enabled	Def<32>

Enter:Set to Default !Esc:Exit !Ctrl+L:Refresh Screen

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

Cache Status: Clean								
Quick view view view view view	Slot	Chl	ID	SyncClk	XfrWid	ParityChk	Disconnect	TagCount
	9	1	0	12	Wide	Enabled	Enabled	Def(32)
	Slot number					bled	Enabled	Def(32)
	maximum sync. xfer Clock					bled	Enabled	Def(32)
	maximum xfer Width					bled	Enabled	Def(32)
	Set SCSI Target Maximum Xfer Narrow only ?							f(32)
	Yes							No
		1	5	12	Wide	Enabled	Enabled	Def(32)
		1	6	12	Wide	Enabled	Enabled	Def(32)
		1	9	12	Wide	Enabled	Enabled	Def(32)

Arrow Keys: Move Cursor | Enter: Select | Esc: Exit | Ctrl+L: Refresh Screen

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

Parity Check

Cache Status: Clean								
Quick view view view view view view	Slot	Chl	ID	SyncClk	XfrWid	ParityChk	Disconnect	TagCount
	9	1	0	12	Wide	Enabled	Enabled	Def(32)
	Slot number					bled	Enabled	Def(32)
	maximum sync. xfer Clock					bled	Enabled	Def(32)
	maximum xfer Width					bled	Enabled	Def(32)
	Parity check					ed	Enabled	Def(32)
	Disable Parity Checking ?							ed
	Yes							No
		1	6	12	Wide	Enabled	Enabled	Def(32)
		1	9	12	Wide	Enabled	Enabled	Def(32)

Arrow Keys: Move Cursor | Enter: Select | Esc: Exit | Ctrl+L: Refresh Screen

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

Disconnecting Support

Cache Status: Clean								
Quick view	Slot	Chl	ID	SyncClk	XfrWid	ParityChk	Disconnect	TagCount
view	9	1	0	12	Wide	Enabled	Enabled	Def<32>
view	Slot number					bled	Enabled	Def<32>
view	maximum sync. xfer Clock					bled	Enabled	Def<32>
view	maximum xfer Width					bled	Enabled	Def<32>
view	Parity check					bled	Enabled	Def<32>
view	Disconnect support					bled	Enabled	Def<32>
view	Disallow target disconnect ?					bled	Enabled	Def<32>
view	Yes No					bled	Enabled	Def<32>
view	1	6		12	Wide	Enabled	Enabled	Def<32>
view	1	9		12	Wide	Enabled	Enabled	Def<32>

Arrow Keys: Move Cursor | Enter: Select | Esc: Exit | Ctrl+L: Refresh Screen

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

Maximum Tag Count

Cache Status: Clean								
Quick view	Slot	Chl	ID	SyncClk	XfrWid	ParityChk	Disconnect	TagCount
view	9	1	0	12	Wide	Enabled	Enabled	Def<32>
view	Slot number					bled	Enabled	Def<32>
view	maximum sync. xfer Clock					bled	Enabled	Def<32>
view	maximum xfer Width					bled	Enabled	Def<32>
view	Parity check					bled	Enabled	Def<32>
view	Disconnect support					bled	Enabled	Def<32>
view	maximum tag count					bled	Enabled	Default
view	Restore to default setting					bled	Enabled	Set Maximum Tag Count ?
view						bled	Enabled	Yes No
view	1	5		12	Wide	Enabled	Enabled	16
view	1	6		12	Wide	Enabled	Enabled	32
view	1	9		12	Wide	Enabled	Enabled	64
view								128

Arrow Keys: Move Cursor | Enter: Select | Esc: Exit | Ctrl+L: Refresh Screen

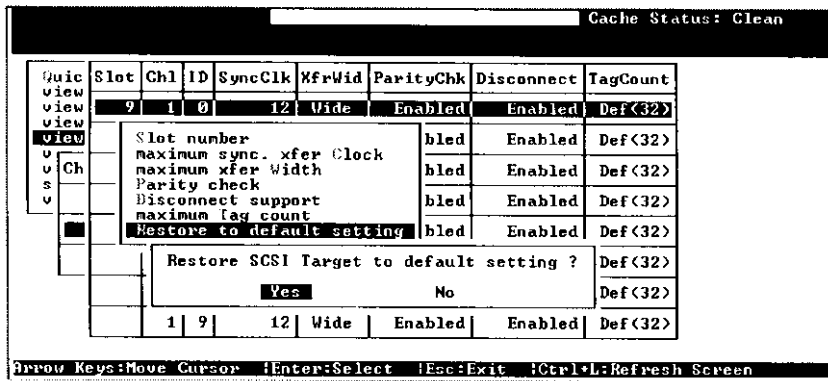
Choose "Maximum Tag Count", then press [Enter]. A list of available tag count numbers will appear. Move the cursor bar to a number, then press [Enter]. Choose Yes in the dialog box that followed to confirm the setting.



IMPORTANT:

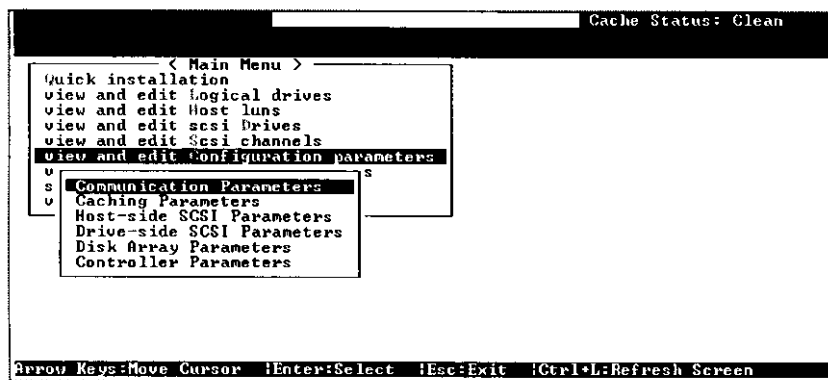
- Disabling the Maximum Tag Count will disable the internal cache of the SCSI drive.

Restoring the Default Setting



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

8.6 Viewing and Editing Configuration Parameters



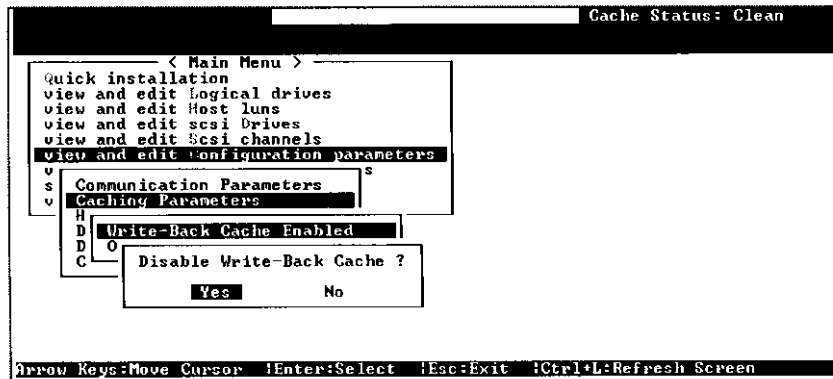
Choose “View and Edit Configuration Parameters”, then press [Enter]. Move the cursor bar to the desired item, then press [Enter].

8.6.1 Communication Parameters

Refer to Chapter 11, Remote Administration for more information.

8.6.2 Caching Parameters

Write-Back Cache Enable/Disable



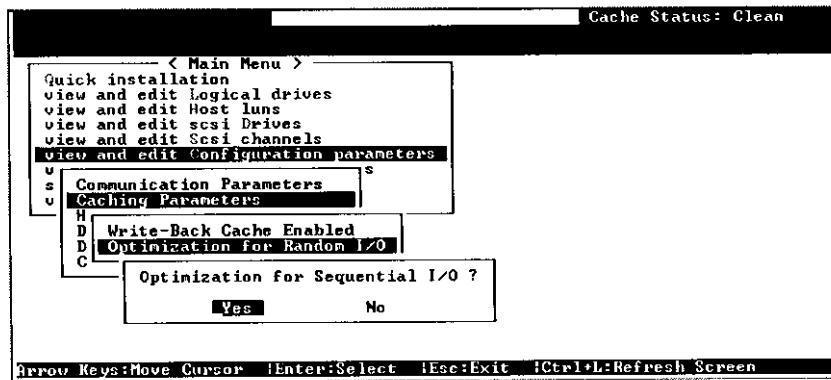
Choose "Caching Parameters", then press [Enter]. Select "Write-Back Cache", then press [Enter]. "Enabled" or "Disabled" will display the current setting of the Write-Back Cache. Choose Yes in the dialog box that followed to confirm the setting.



IMPORTANT:

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

Optimization for Random or Sequential I/O



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

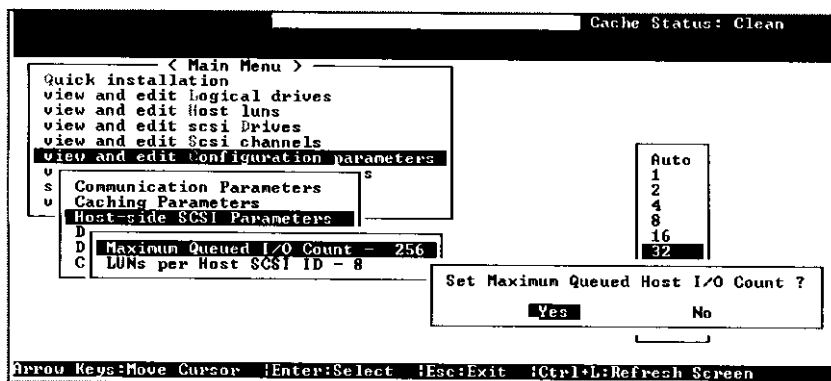


IMPORTANT:

- Every time you change this setting, you must reset the controller for the changes to take effect.
- Refer to "3.4.1 Optimal for Sequential or Random I/O" for more information.

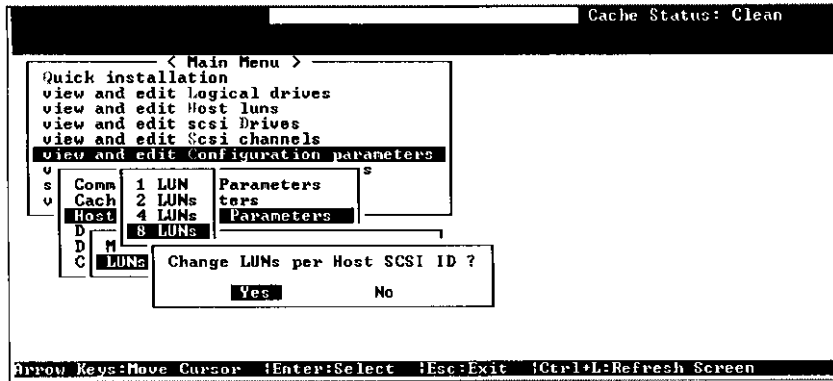
8.6.3 Host-side SCSI Parameters

Maximum Queued I/O Count



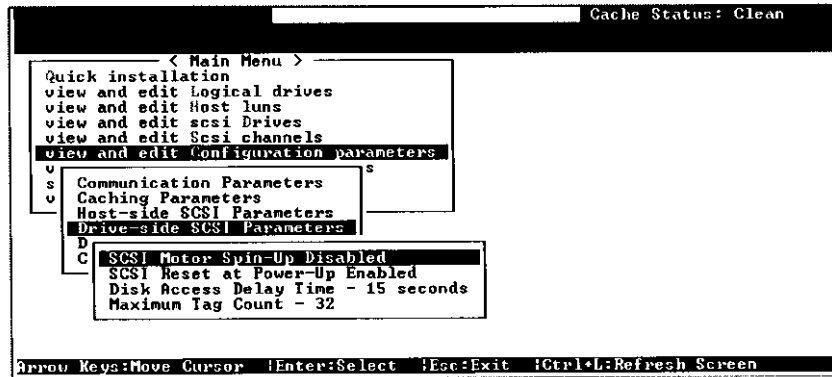
Choose "Host-side SCSI Parameters", then press [Enter]. Choose "Maximum Queued I/O Count", then press [Enter]. A list of available selections will appear. Move the cursor bar to an item, then press [Enter]. Choose Yes in the dialog box that followed to confirm the setting.

LUNs per Host SCSI ID



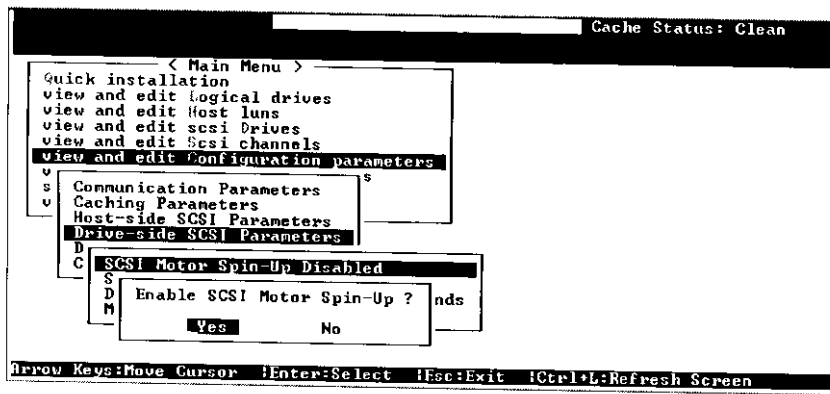
Choose "LUNs per Host SCSI ID", then press [Enter]. A list of selections will appear. Move the cursor bar to an item, then press [Enter]. Choose Yes in the dialog box that followed to confirm the setting.

8.6.4 Drive-side SCSI Parameters



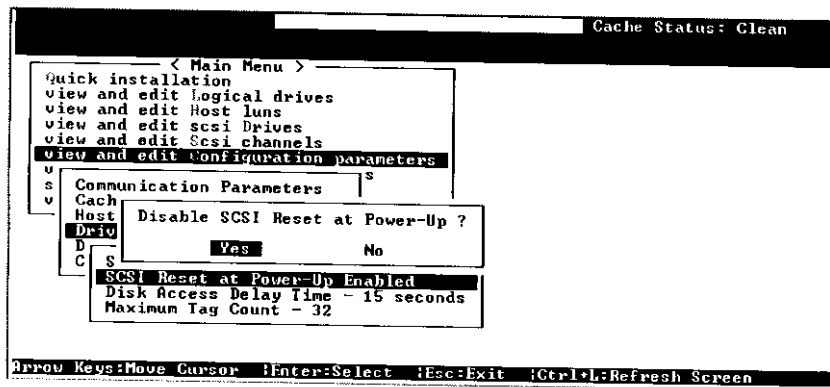
Choose "Drive-side SCSI Parameters", then press [Enter]. The Drive-side SCSI parameters menu will appear.

SCSI Motor Spin-Up



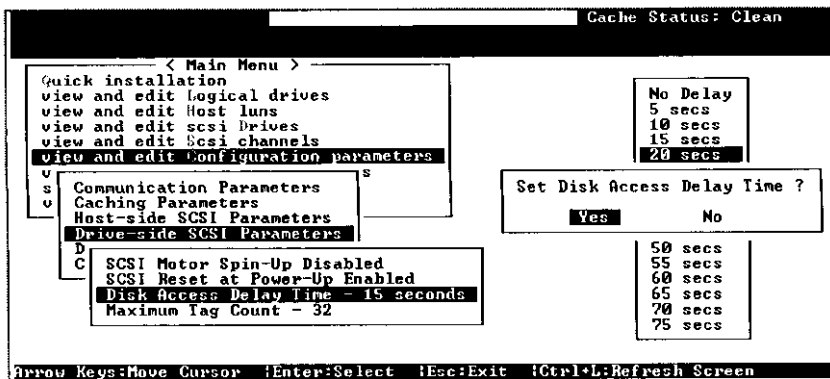
Choose "SCSI Motor Spin-Up", then press [Enter]. Choose Yes in the dialog box that followed to confirm the setting.

SCSI Reset at Power-Up



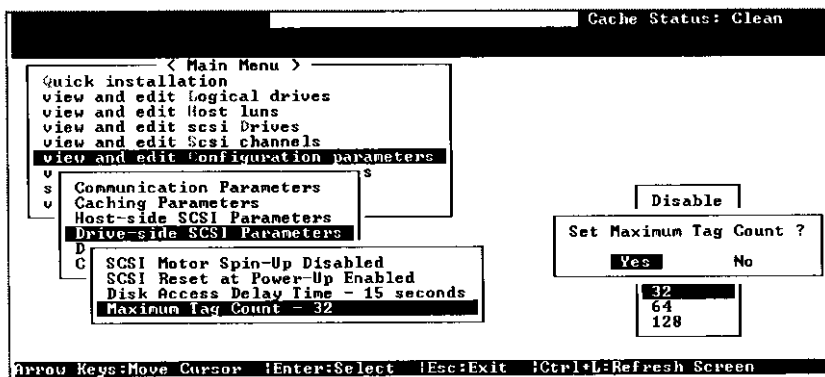
Choose "SCSI Reset at Power-Up", then press [Enter]. Choose Yes in the dialog box that followed to confirm the setting.

Disk Access Delay Time



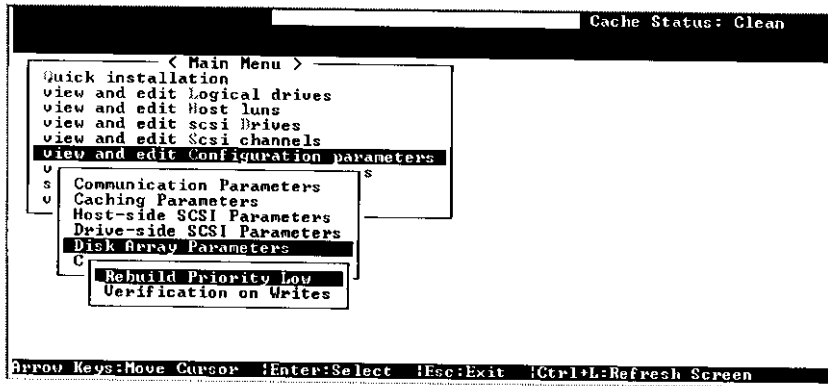
Choose "Disk Access Delay Time", then press [Enter]. A list of selections will appear. Move the cursor bar on a selection, then press [Enter]. Choose Yes in the dialog box that followed to confirm the setting.

Maximum Tag Count



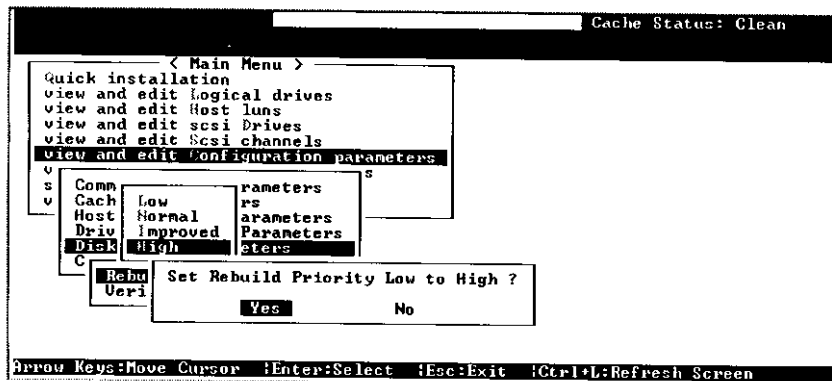
Choose "Maximum Tag Count", then press [Enter]. A list of selections will appear. Move the cursor bar to a selection, then press [Enter]. Select Yes in the dialog box that followed, then press [Enter] to confirm the setting.

8.6.5 Disk Array Parameters



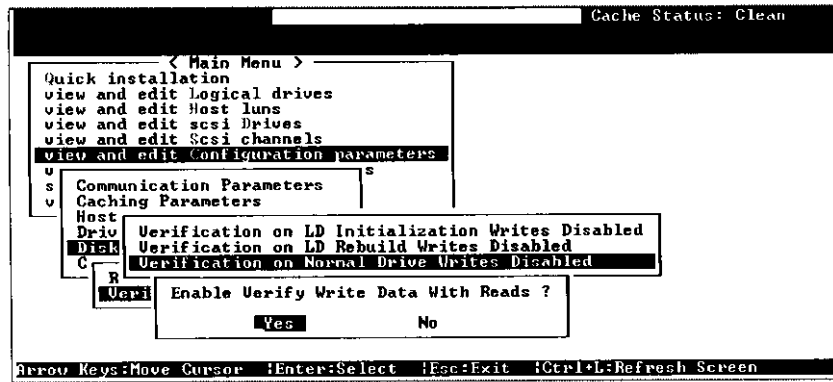
Choose "Disk Array Parameters", then press [Enter]. The Disk Array Parameters menu will appear.

Rebuild Priority



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

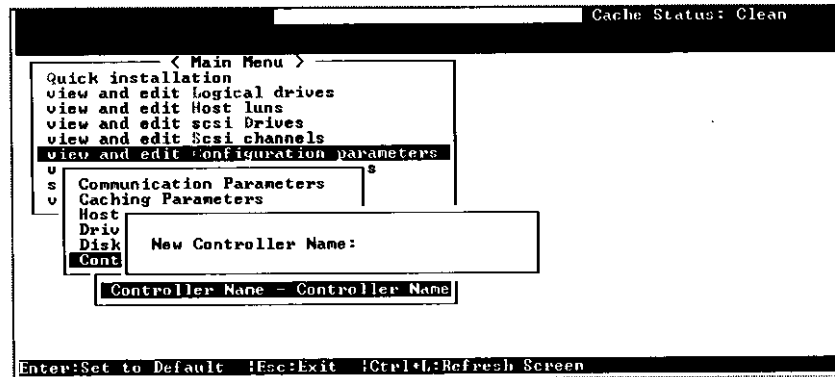
Verification On Writes



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

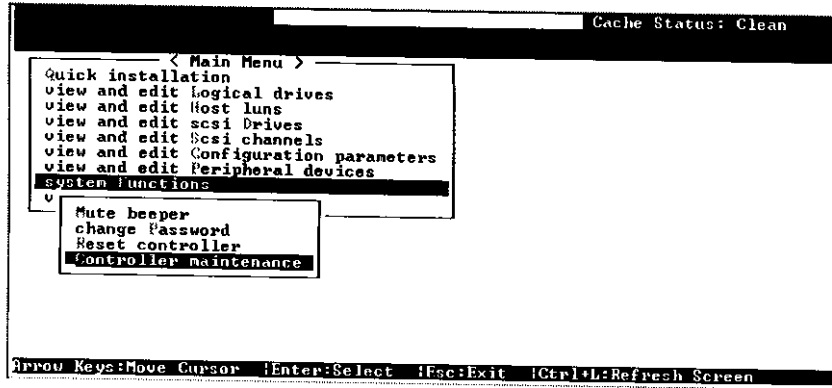
8.6.5 Controller Parameters

Controller Name



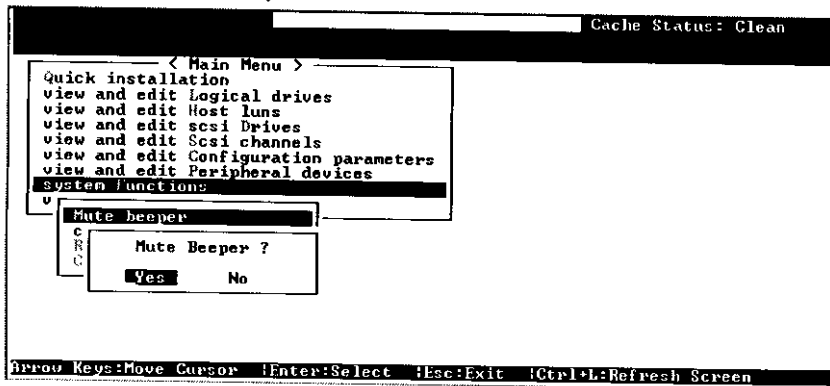
Choose "Controller Parameters", then press [Enter]. The current controller name will be displayed. Press [Enter]. Enter the new controller name in the dialog box that followed, then press [Enter].

8.7 System Functions



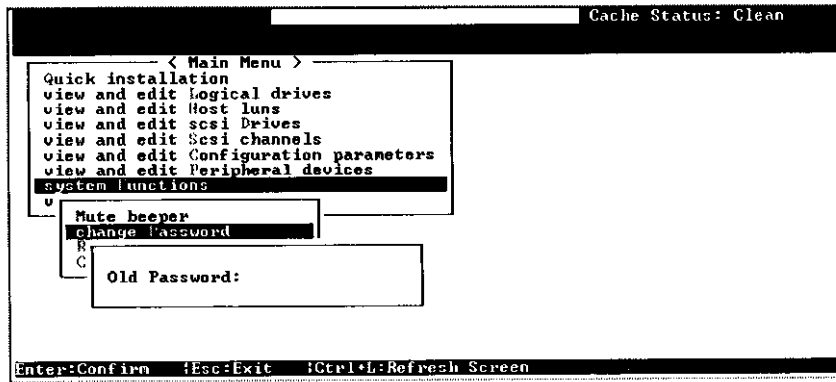
Choose "System Functions" in the Main Menu, then press [Enter]. The System Functions menu will appear. Move the cursor bar to an item, then press [Enter].

8.7.1 Mute Beeper



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

8.7.2 Change Password



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



IMPORTANT:

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

Changing the Password

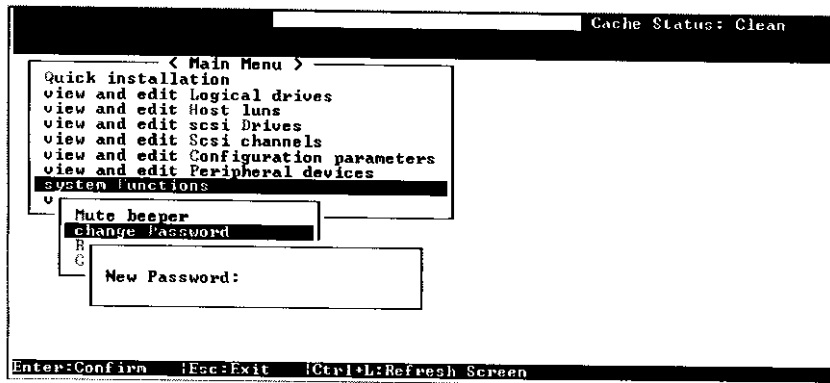
To set or change the controller password, move the cursor bar to "Change Password", then press [Enter].

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

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

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

Setting a New Password



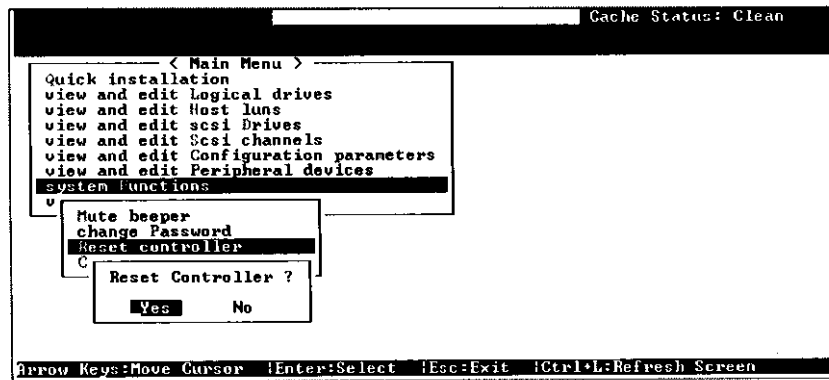
Enter the desired password in the column, then press [Enter]. The next dialog box will display "Re-Enter Password". Enter the password again and press [Enter].

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

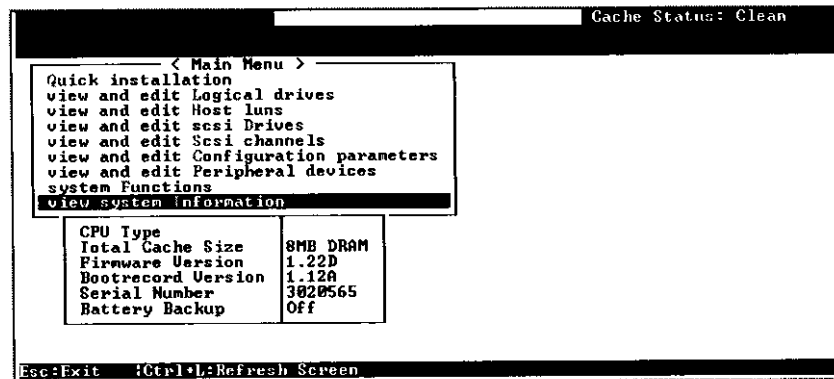
To disable or delete the password, press [Enter] only in the password column that is used for entering a new password. The existing password will be deleted. No password checking will occur when entering the Main Menu from the Initial screen.

8.7.3 Reset Controller



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

8.8 Viewing System Information



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

A list of information will appear.

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

Total Cache Size	The total DRAM size installed in the controller.
Firmware Version	The version of the firmware.
Bootrecord Version	The version of the boot record.
Serial Number	The serial number of the controller.
Battery Backup	
On	When the battery pack (IFT-9010) and the battery daughter board (IFT-9070) are installed and functioning normally, "On" appears in this column.
Off	When the battery pack (IFT-9010) and the battery daughter board (IFT-9070) are not installed, or are not functioning normally, "Off" appears in this column.

Chapter 9 Redundant Controller

9.1 Before You Begin...

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

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

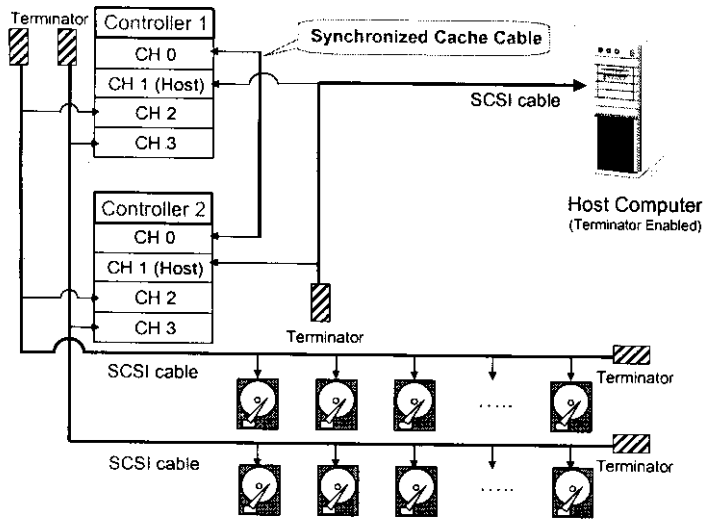
All electronic components have its lifetime. A simple memory parity error may sometimes cause the controller to completely hang up. This is the reason why we need a redundant controller - to minimize the down-time chance of a RAID system.

What can the cache memory do for a redundant controller?

There are always a lot of data stored in the cache memory. Normally, when a controller fails, data stored in the cache memory are lost; but this is not the case with the IFT-3102UG controller series. The controller has a dedicated hardware that performs cache synchronization. Using SCSI channel 0 as a synchronized cache port for synchronizing the cache memory, data stored in the cache memory will not be lost if one of the controllers fails.

Write-Back Cache: Enabled or Disabled?

When using the IFT-3102UG in a redundant controller configuration, Write-Back mode can be enabled when SCSI cable is used for redundant controller communication, which allows the cache data of the controllers to be synchronized. (Synchronizing the cache memories also achieves the goal of avoiding data loss if a controller fails to function.) However, if RS-232C cable is used with the IFT-3102UG for redundant controller communication, Write-Back Cache must be disabled. (*Refer to figure below for configuring IFT-3102UG Active-active redundant controllers with synchronized write-back cache.*)



What is Primary controller and Secondary controller?

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

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

When should I choose Primary, Secondary or Autocfg mode?

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

Limitations

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

Quick Start

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

- Cable connections
 - Redundant controller cable
 - RS-232C cable (for Terminal Interface Operation*)
 - SCSI cables
- Controller settings
 - Communication Parameters
 - Redundant Configuration

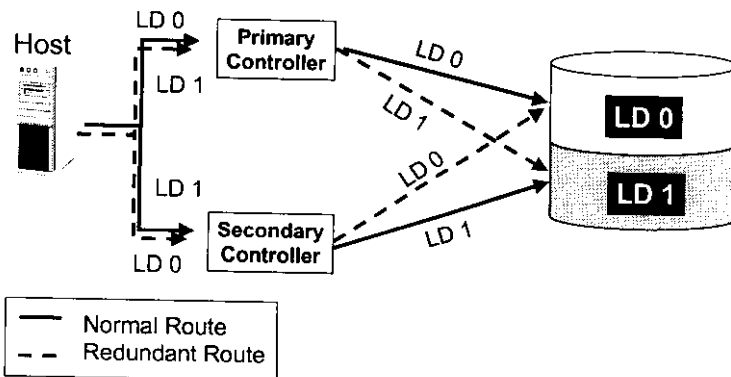
**The redundant function of the controllers can be enabled via the front panel or a terminal emulation program. Section 9.2 describes the procedures for using the front panel. The same menus and messages are displayed when using the terminal interface. The same result can be achieved regardless of the method used.*

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

9.2 Setting Up The 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, with the other SCSI channels assigned as the drive channels.

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

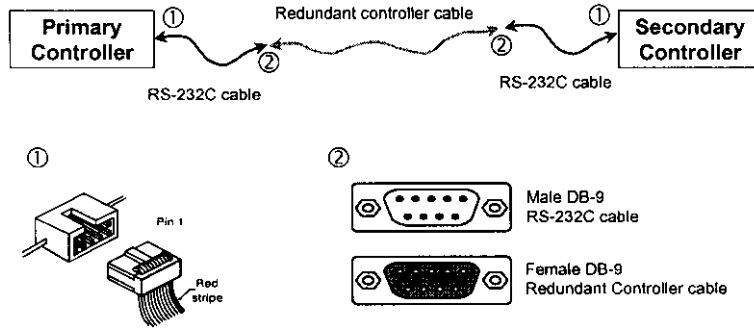
Cables and Connections

The following items will be used in this example:

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

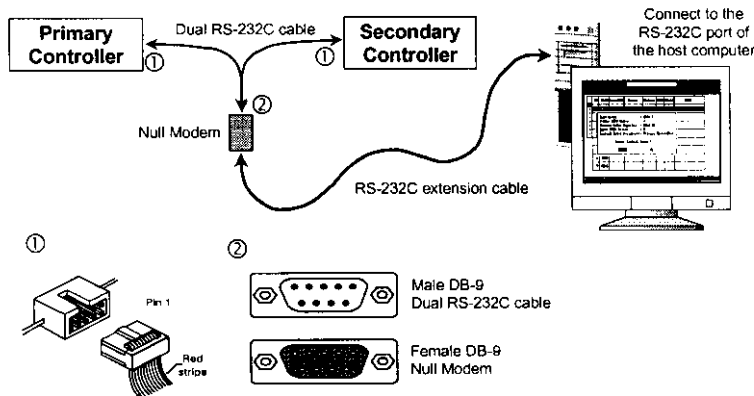
Connecting the Redundant Controller Cable

- Connect one end of the IFT-9016 cable (RS-232C cable) to the IFT-9013 cable (redundant controller cable). Now connect the other end of IFT-9016 (the 2x5-box header end) to each of the controller's Redundant Controller port located on the backplane board.
- Connect IFT-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 IFT-9015 (Dual RS-232C cable) to IFT-9011 (Null Modem) and connect the other two 2x5 headers to the COM 1 serial port of each controller. Connect one end of the IFT-9012 (RS-232C extension cable) to IFT-9011 (Null Modem) and the other end to the RS-232C port of your host computer.

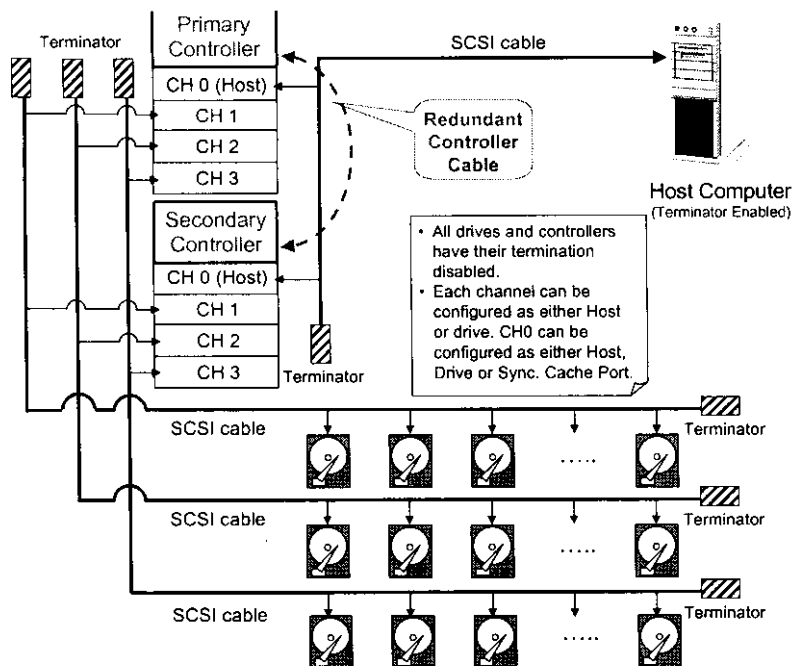


Connecting the SCSI Cable to the Host Computer

- 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 both controllers' host channel SCSI terminations.
- The channels of the two controllers that are both connected to a Host Channel SCSI cable must be the same. For example: If controller 1 uses channel 0, controller 2 must also use 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 end of the SCSI cable with an external SCSI terminator.
- Connect the other connectors of the SCSI cable to hard drives and controllers.
- The channels of the two controllers that are connected to a Drive Channel SCSI cable must be the same. For example: If controller 1 uses channel 0, controller 2 must also use channel 0.
- Repeat the above steps for the other drive channels.
- Connect a power connector to each controller.
- Refer to the figure below for the illustration.



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.

View and Edit
Peripheral Dev

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

Set Peripheral
Devices Entry

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

Redundant Ctlr
Function Disable

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."

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

The message "Redundant Ctlr Autocfg Inactive" will appear.

```
Redundant Ctlr:
Autocfg Inactive
```

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.

```
View and Edit
Peripheral Dev
```

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

```
Set Peripheral
Devices Entry
```

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.)

Redundant Ctlr
Function Disable

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."

Enable Redundant
Ctlr: Autocfg ?

The message "Redundant Ctlr Primary Inactive" will appear.

Redundant Ctlr
Primary Inactive

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

Redundant Ctlr
Secndry Inactive

Power-off Controller 2.

Starting-up the Redundant Controllers

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

RC connecting...
<ENT> to cancel



IMPORTANT:

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 IFT-9013 Redundant Controller Cable (IFT-3101U and IFT-3102U) or through the synchronized cache SCSI cable on channel 0 (IFT-3102UG only). For the IFT-3102UG, write-back cache is still enabled if SCSI channel 0 is used as the synchronized cache channel.

The Write-Back mode of the cache memory will automatically be disabled and the cache memory will work in Write-through mode. The settings on the LCD or terminal interface will show that the default Write-back setting has been disabled, and cannot be changed (IFT-3101U and IFT-3102U only).

Please refer to the section in Chapter 9, "Connecting the Controllers to the Terminal Interface," for details on using the IFT-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 IFT-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.

View and Edit
Logical Drives

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.

Logical Drive
Assignment..

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.

Redud Ctlr LG
Assign Sec Ctlr?

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.



IMPORTANT:

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.

9.3 When One of the Controller Fails...

What will happen when the one of the controllers fails?

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

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

```
Redundant Ctlr
Failure Detected
```

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.

```
View and Edit
Peripheral Dev
```

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

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


Choose "Redundant Ctlr Function__", then press ENT.

Redundant Ctlr
Function__

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

Redundant Ctlr
Autocfg Degraded

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

Deassert Reset
on Failed Ctlr?

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

Redundant Ctlr
Scanning

The new controller will then start to initialize.

Initializing...
Please Wait...

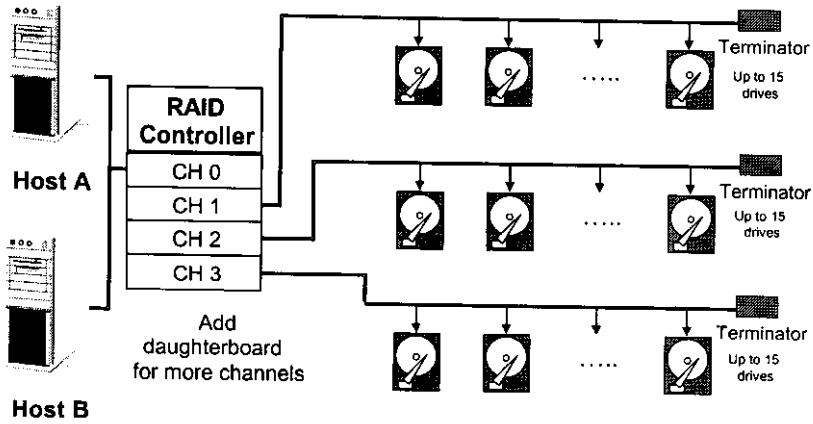
Once initialized, it will begin acting as the Secondary Controller.

IFT-3102 v2.11
■■■■■■■■

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Chapter 10 Redundant Host, Multiple Host

10.1 Redundant Host



The IFT-3102UG RAID controller can be connected to serve redundant host computers. The figure above is an example of redundant hosts.

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

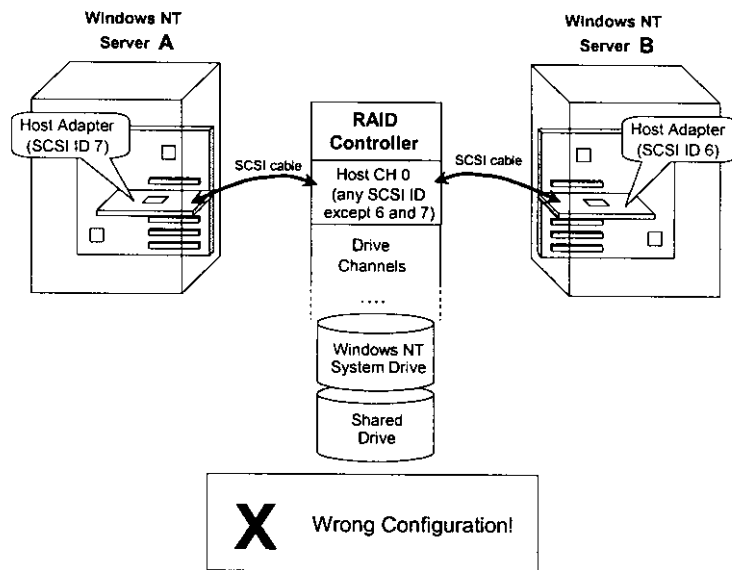
10.2 Using Microsoft Cluster Server (MSCS)

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

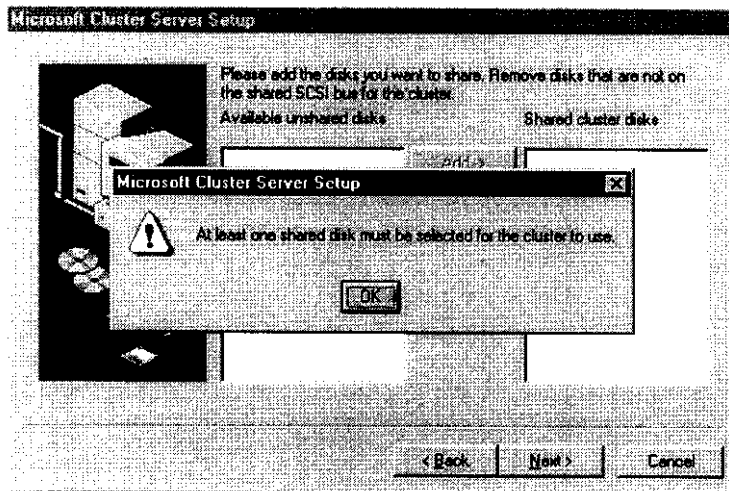
The IFT-3102UG RAID controller series is compliant with Microsoft Cluster Server and can be used with it perfectly well.

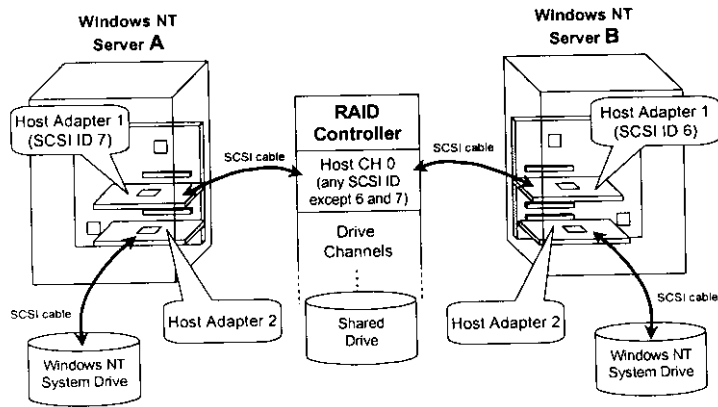
According to released documentation about Microsoft Cluster Server, the following guidelines should be followed:

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



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

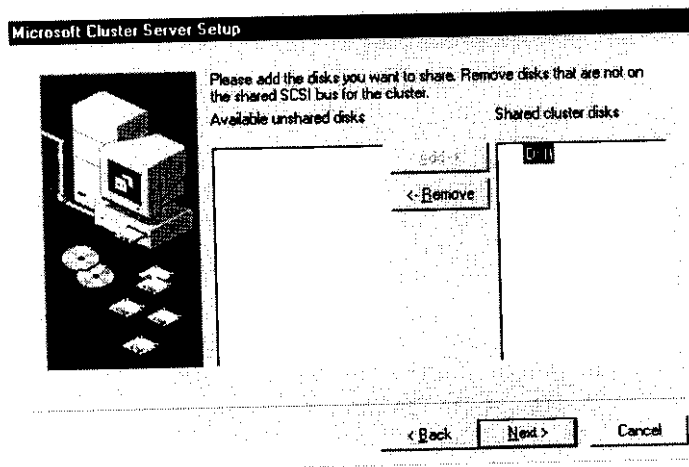




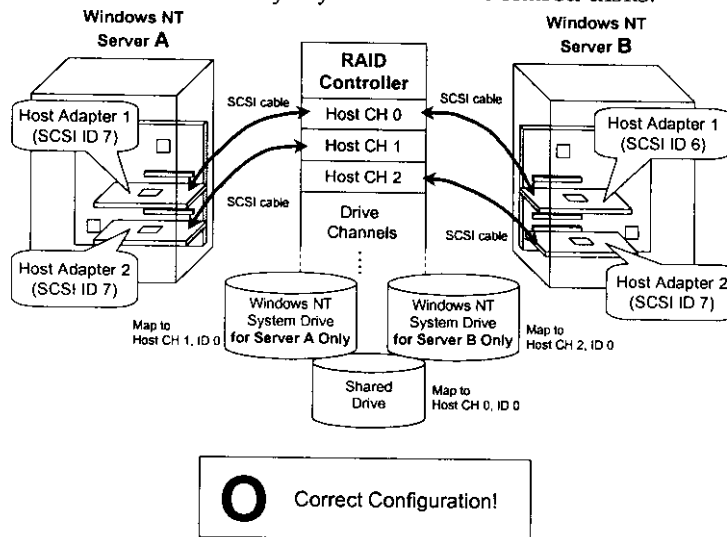
O Correct Configuration!

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

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



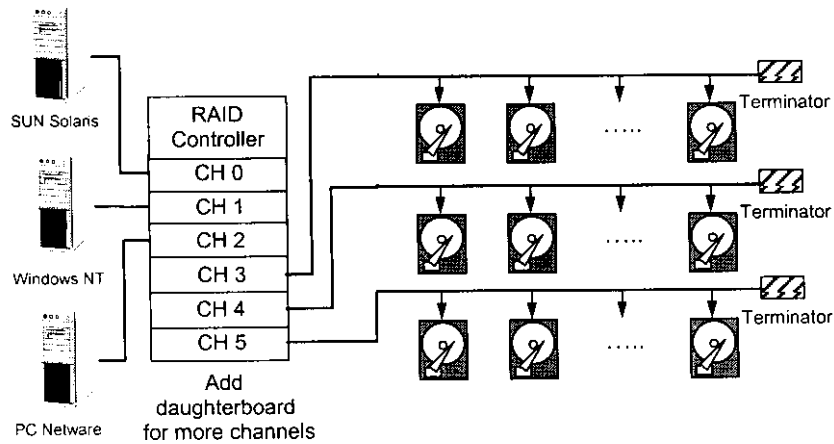
With the correct configuration, the installation program will add the shared drive to the "Shared cluster disks" automatically. You can add or remove them manually if you have more shared disks.



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

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

10.3 Multiple Host



The IFT-3102UG RAID controller can be connected to simultaneously serve more than one host computer. The figure above is an example of connecting to multiple hosts.

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

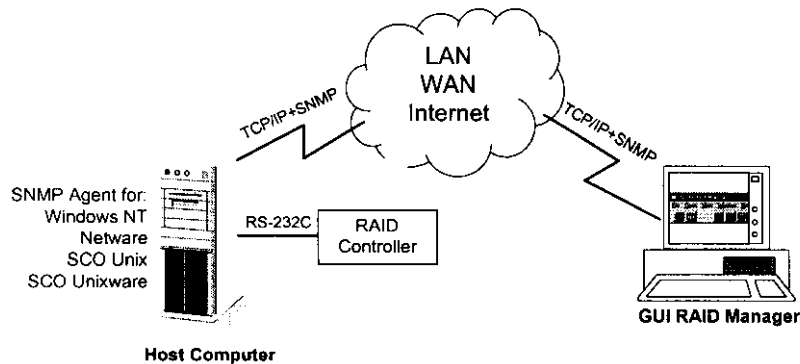
Chapter 11 Remote Administration

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

There are several options for remote administration.

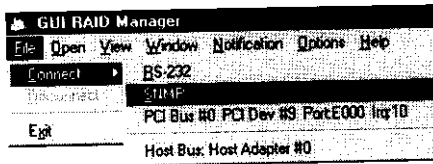
- GUI RAID Manager using SNMP service
- Remote Terminal Emulation using PPP+Telnet
- Remote Terminal Emulation using Modem
- Dial-out pager for event notifications

11.1 GUI RAID Manager Using SNMP Service

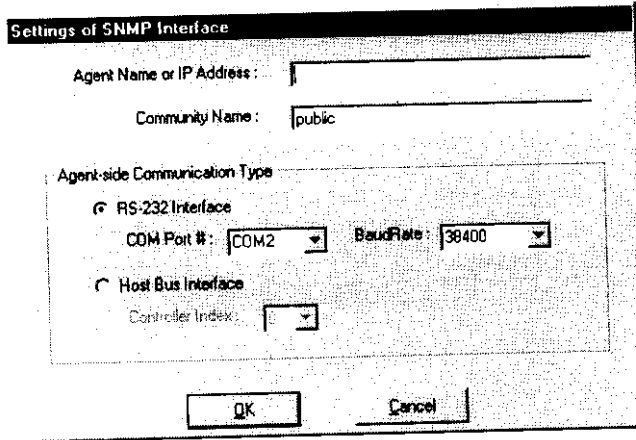


Connect the IFT-3102UG RAID controller to the host computer via the RS-232C interface. Install the SNMP agent that corresponds to the operating system on the Host computer and enable the SNMP service. The client computer running with GUI RAID Manager will be able to remotely administer the IFT-3102UG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

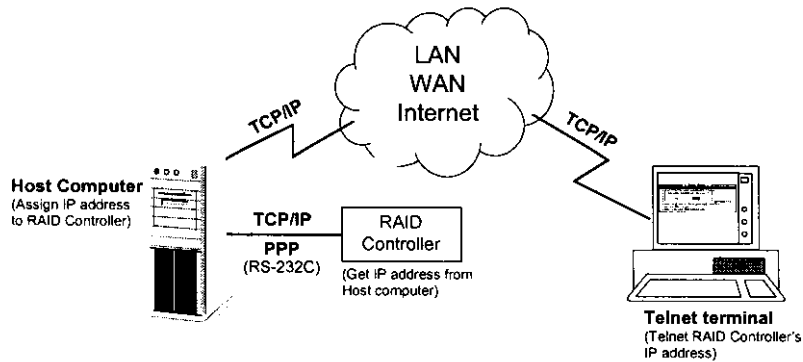
Click on the select button in front of "RS-232 Interface" to select. Choose the COM port of the host computer connected to the IFT-3102UG RAID controller, and choose the baud rate speed of the RAID controller. Press "OK" to establish the connection. After the connection has been established, all operations will act exactly the same as executing the GUI RAID Manager from the host computer. The Fault-bus error signals and drive failure signals will also pass through the SNMP.



IMPORTANT:

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

11.2 Remote Terminal Emulation Using PPP+Telnet



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

```
View and Edit
Config Parm  ↓
```

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

```
Communication
Parameters ..
```

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

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

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

```
COM1
Configuration ..
```

Select "Baud-rate ", then press ENT.

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

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

```
Baud-rate 9600
Change to 38400?
```

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

Enable Terminal Emulation

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

```
View and Edit
Config Parm
```

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

```
Communication
Parameters ..
```

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

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

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

```
COM1
Configuration ..
```

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.

```
Term Emul Disab
..
```

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

```
Term Emul Disab
Change to Enab ?
```

Setting PPP ID, PPP Password

To establish connection between IFT-3102UG 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.

```
View and Edit
Config Parm  ↓
```

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

```
Communication
Parameters ..
```

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

```
PPP
Configuration ..
```

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

```
PPP Name
..
```

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.

Enter PPP Name:
█

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

PPP Password ..

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.

Enter Password:
█

Data Routing Through PPP, Data Routing Direct to Port

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



IMPORTANT:

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

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

View and Edit
Config Parm

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

Communication
Parameters ..

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

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

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

```
COM1
Configuration ..
```

Select "Comm Route Dir", then press ENT.

```
Comm Route Dir
..
```

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

```
Comm Route Dir
Change to PPP ?
```

Establish Connection Between the Host Computer and IFT-3102UG

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

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.

```
View and Edit
Config Parm
```

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

```
Communication
Parameters ..
```

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

```
Communication
Status ..
```

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

```
PPP Status
..
```

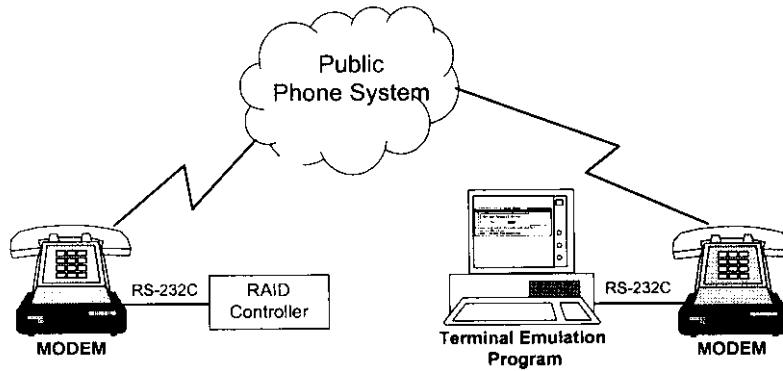
Press ENT to view the IP address of IFT-3102UG, then press ▼ or ▲ to view the Gateway IP address.

IP Packets being Routed
Local IP Addr: . . .
Gateway IP Addr: . . .

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 IFT-3102UG. The terminal emulation screen will display the client Telnet program, as well as when using terminal emulation locally.

11.3 Remote Terminal Emulation Using Modem



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

There is no need to install a RAS (Remote Access Server) to IFT-3102UG. Simply connect a modem to IFT-3102UG. IFT-3102UG can manage by itself the dial-in remote administration and dial-out event notifications through the proper settings.

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



IMPORTANT:

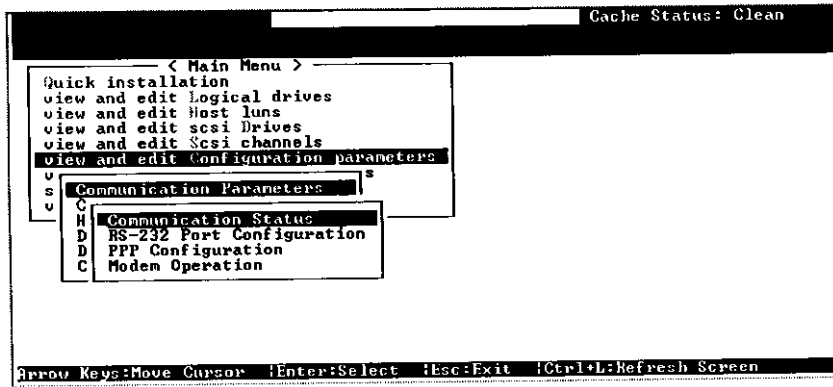
- *Always keep the terminal emulation screen on the Initial screen for security checking. The controller's password will be asked for verification only when entering the Main Menu from the Initial screen.*
- *The terminal emulation screen for both COM 1 and COM 2 connections are synchronized. Users connected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

Hardware Connection for IFT-3102UG

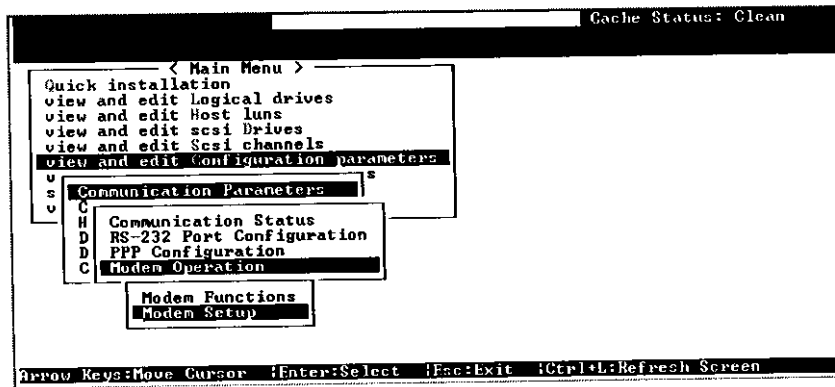
Pick up a standard external modem which uses standard AT command set. Connect the modem to COM 1 or COM 2 of the IFT-3102UG RAID controller. Complete the other connections of the modem (power cables and phone wires) and switch on the power of the Modem.

Setting IFT-3102UG using the RS-232C Terminal Interface

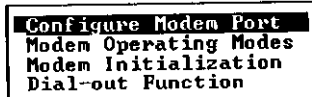
The following example shows connecting COM 1 to the local terminal emulation, and COM 2 to the modem:



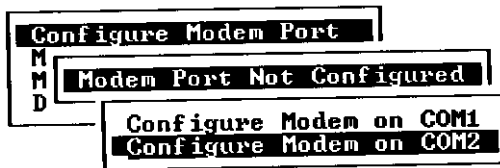
Configuring the Modem Port



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.



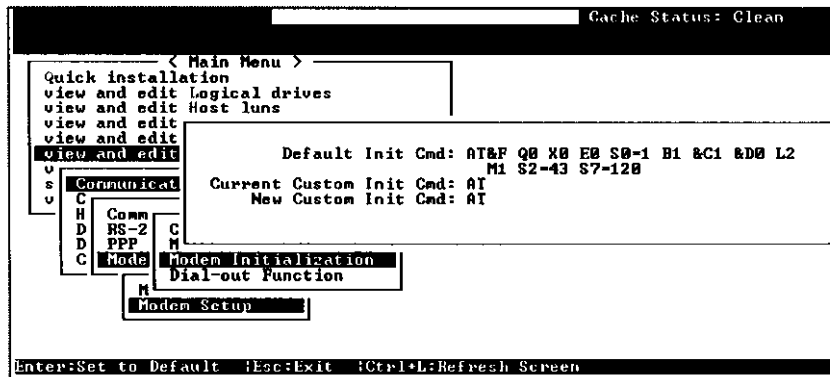
The current setting of the modem port will be displayed on the screen. If there is no modem port configured yet, it will display "Modem Port Not Configured". Press [Enter] on the selection, and choose "Configure Modem on COM 2" by pressing [Enter].



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"

Conf Mode M D	None <Default Used>
	Replace Default
	Append to Default
Custom Modem Initialization - None <Default Used>	

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



IMPORTANT:

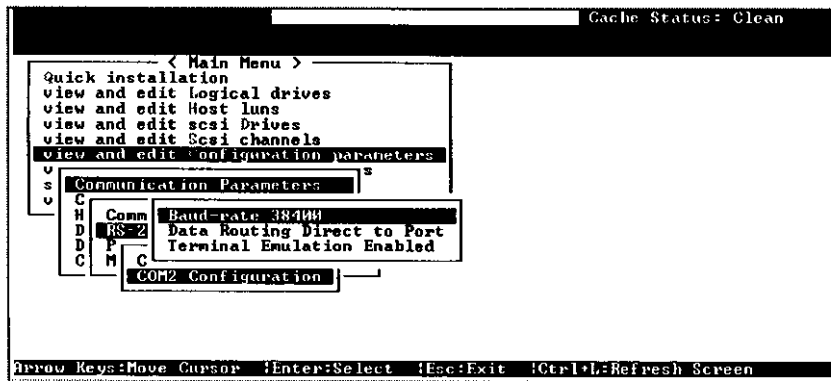
- *It is a must to enable "Auto answer mode" of the connected modem in order to answer the dial-in calls and establish the connections automatically.*

Initializing Modem

Comm RS-2 PPP Mode	Scan/Init Modem ?
	<input checked="" type="radio"/> Yes <input type="radio"/> No
	Modem Functions Modem Setup

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 IFT-3102UG 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.



IMPORTANT:

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

Establish the Connection from the Remote Terminal

Use a terminal emulation program that supports ANSI or VT-100 terminal emulation modes. From the remote terminal program, dial the phone number of the modem connected to the IFT-3102UG 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?



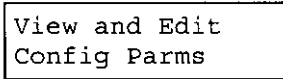
Choose "Communication Status" from the Communication Parameters menu and press [Enter]. The configured COM port and its current status will be shown on the screen. The message "Modem Present and Connected" means the modem is connected now.

Setting IFT-3102UG Using the Front Panel

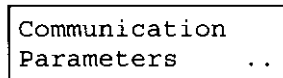
Here is an example of connecting COM 1 to the modem:

Configure Modem Port

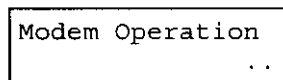
Press ENT for two seconds to enter the Main Menu. Press ▼ or ▲ to select "View and Edit Config Parm", then press ENT.



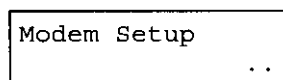
Select "Communication Parameters ..", then press ENT.



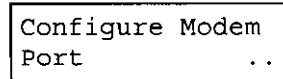
Select "Modem Operation ..", then press ENT.



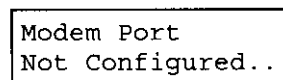
Select "Modem Setup ..", then press ENT.



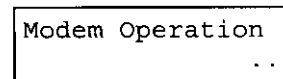
Select "Configure Modem Port ..", then press ENT.



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

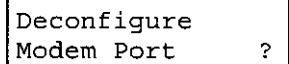


Select "Configure Modem on COM1?", then press ENT for two seconds to set.



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

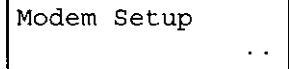
Select "Deconfigure Modem Port", then press ENT for two seconds to delete.



Deconfigure
Modem Port ?

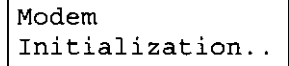
Modem Initialization Command

In the "Modem Setup" menu, press ENT.



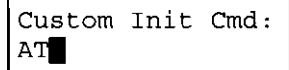
Modem Setup
..

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



Modem
Initialization..

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



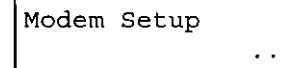
Custom Init Cmd:
AT

Modem Operating Modes

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

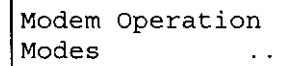
- Sending Default Init command only - "None"
- Sending Custom Init command only - "Replace"
- Sending Default Init command plus Custom Init command - "Append"

In the "Modem Setup" menu, press ENT.



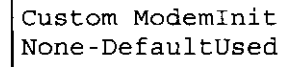
Modem Setup
..

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



Modem Operation
Modes ..

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



Custom ModemInit
None-DefaultUsed

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

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



IMPORTANT:

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

Initializing Modem

In the "Modem Operation" menu, press ENT.

```
Modem Operation
..
```

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

```
Modem Functions
..
```

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

```
Re-Init Modem ?
```

Baud Rate, Data Routing and Enable Terminal Emulation

Set the desired baud rate, Data Routing direct to port and enable the Terminal Emulation. Please refer to Chapter 11.2 on how to set the Baud rate, Data Routing and Terminal Emulation. The modem is now ready to answer the dial-in connection.

Establish the Connection from the Remote Terminal

Use a terminal emulation program that supports ANSI or VT-100 terminal emulation modes. In the remote terminal program, dial the phone number of the modem connected to the IFT-3102UG 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.

```
Communication
Parameters ..
```

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

```
Communication
Status ..
```

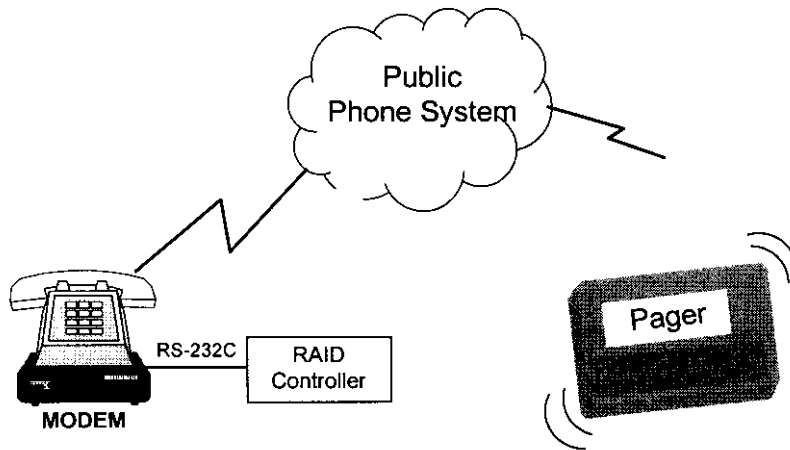
Select "Modem Status..", then press ENT.

```
Modem Status
..
```

The current connection status will be shown on the LCD.

```
Modem on COM1
Connected
```

11.4 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.

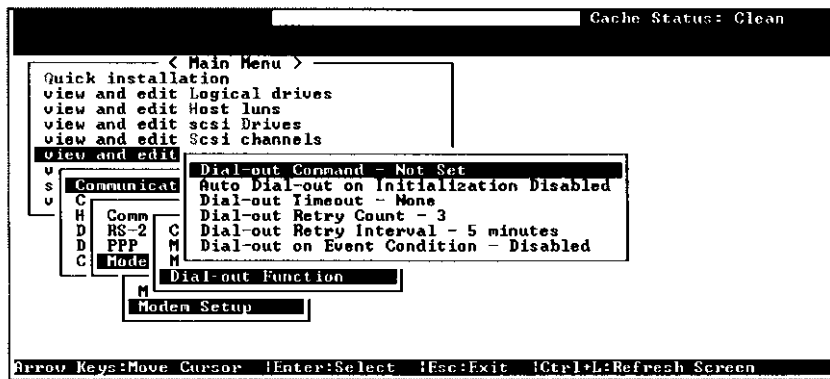
Configure the controller in order to use the remote terminal with the modem. Please refer to Chapter 11.3, Remote Terminal Emulation Using Modem, for details.



IMPORTANT:

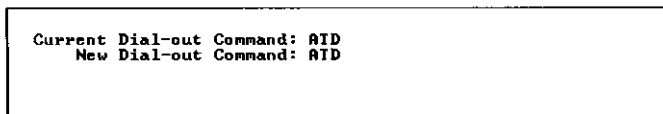
- If the controller is dialing-out to a pager, the Terminal Emulation of the corresponding COM port must be disabled.
- If the controller is dialing-out to a remote administration terminal, the Terminal Emulation of the corresponding COM port must be enabled.

Setting Dial-out Function Through the Terminal Emulation



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

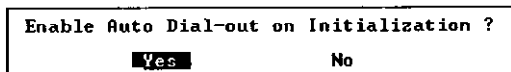
Dial-out Command



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.

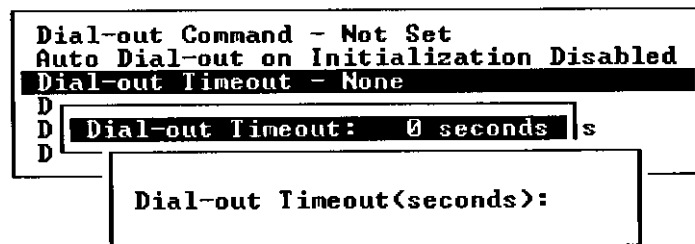
Auto Dial-out on Initialization



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

```
Dial-out Command - Not Set
Auto Dial-out on Initialization Disabled
Dial-out Timeout - None
Dial-out Retry Count - 3
D
D Dial-out Retry Count: 3 minutes Disabled
```

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.

```
Dial-out Command - Not Set
Auto Dial-out on Initialization Disabled
Dial-out Timeout - None
Dial-out Retry Count - 3
Dial-out Retry Interval - 5 minutes
D
D Dial-out Retry Interval: 5 minutes
```

Dial-out Retry Interval(minutes):

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

```
Dial-out Command - Not Set
Auto Dial-out on Initialization Disabled
Dial-out Timeout - None
Dial-out Retry Count - 3
Dial-out Retry Interval - 5 minutes
Dial-out on Event Condition - Disabled
```

```
Disabled
Critical Events Only
Critical Events and Warnings
All Events, Warnings and Notifications
```

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 by the Front Panel

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

```
View and Edit
Config Parm
```

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

```
Communication
Parameters ..
```

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

```
Modem Operation
..
```

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

```
Modem Setup
..
```

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

```
Dial-out
Functions ..
```

Dial-out Command

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

```
Dial-out Command
..
```

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.

```
Dial-out Cmd:
ATD█
```

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

Auto Dial-out on Initialization

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

```
Auto Dial-out
on Init Disabled
```

Press ENT for two seconds to set.

```
Enable Auto
DialOut on Init?
```

Dial-out Timeout

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

```
Dial-out Timeout
None ..
```

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.

```
Dial-out Timeout
█ seconds ?
```

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.

```
Dial-out Retry
Count - 3 ..
```

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.

```
Dial-out Retry
Count - █ ?
```

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

Dial-out Retry Interval

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

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

```
Retry Interval
5 minutes ..
```

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.

```
Retry Interval-
█ minutes ?
```

Dial-out on Event Condition

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

```
Event Condition
Disabled
```

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

Event Condition?
Critical Events

There are four options in this column:

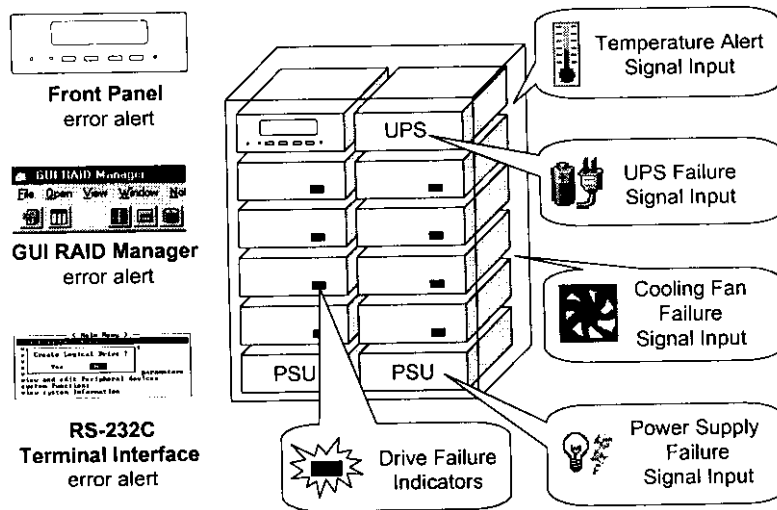
- | | |
|------------------|--|
| Disabled | Disable |
| Critical Events | Critical Events Only |
| Critical&Warning | Critical Events and Warnings |
| All Events | All Events, Warnings and Notifications |

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

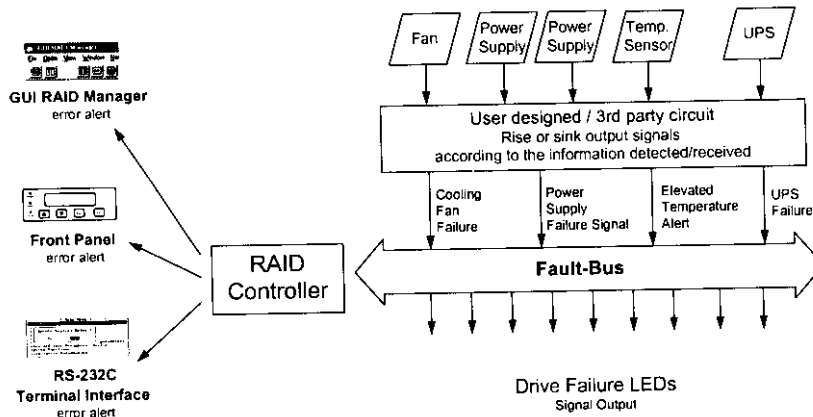
12.1 What is Fault-Bus? Why Do I Need Fault-Bus?

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



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

12.2 How Does the Fault-Bus Work?



Error Signals Input

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

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

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

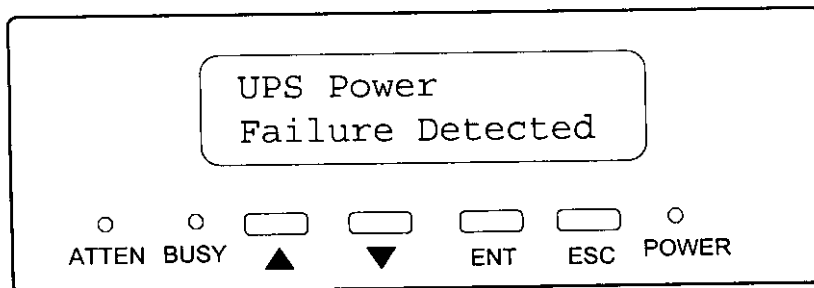
- Detect the temperature in the enclosure, then activate or deactivate the "temperature" signal of the Fault-bus according to the detected information. When the temperature goes too high, activate the signal. When the temperature goes back to normal, keep the signal inactive. If more than one temperature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

Drive Failure Signals Output

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

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

12.2.1 Fault-Bus Error Alert



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



IMPORTANT:

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

UPS Power Failure Detected

The input signal from the UPS has been activated.

Power Supply Failure Detected

The input signal from the power supply has been activated.

Cooling Fan Failure Detected

The input signal from the cooling fan has been activated.

Elevated Temperature Alert

The input signal from the temperature sensor in the enclosure has changed.

12.3 How Do I Setup the Fault-bus?

12.3.1 Hardware

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

12.3.2 Configuring the Controller by the Front Panel

Assign Each SCSI Drive or Canister a Slot Number

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

View and Edit SCSI Drives ↓

Assign a Slot Number to an Existing SCSI Drive

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

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

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

```
Slot Number
Assignments ..
```

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

```
Slot Def # 1
Change to # █ ?
```

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

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

Assign a Slot Number to an Empty Canister

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

Add Drive Entry

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

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

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

```
Add Drive Entry
..
```

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

```
Add Channel=1
Drive Entry  ?
```

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

```
Add Channel=1
ID= 3 Drv Entry?
```

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.

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

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

```
Slot Number
Assignments ..
```

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

```
Slot Def # 1
Change to # █ ?
```

Remove Empty Drive Entry

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

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

```
C=1 I=3 ABSENT
```

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

```
Clear Drive
Status ..
```

Press ENT for two seconds to confirm.

```
Clear Drive
Status      ?
```

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

Choose "View and Edit Periph Parm's" to enter the Main Menu, then press ENT.

```
View and Edit
Periph Parm's  ↓
```

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

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

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

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

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

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

Enable Each Fault-bus Error Signal Input

Choose "View and Edit Periph Parm's" to enter the Main Menu, then press ENT.

```
View and Edit
Periph Parm's  ↓
```

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

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

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

```
Power Supply
Status Disabled
```

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

```
Enable Power
Supply Status  ?
```

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.

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

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

```
Toggle Failure
Signal ..
```

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

```
Toggle 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 Parm" in the Main Menu, then press ENT.

```
View and Edit
Periph Parm ↓
```

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

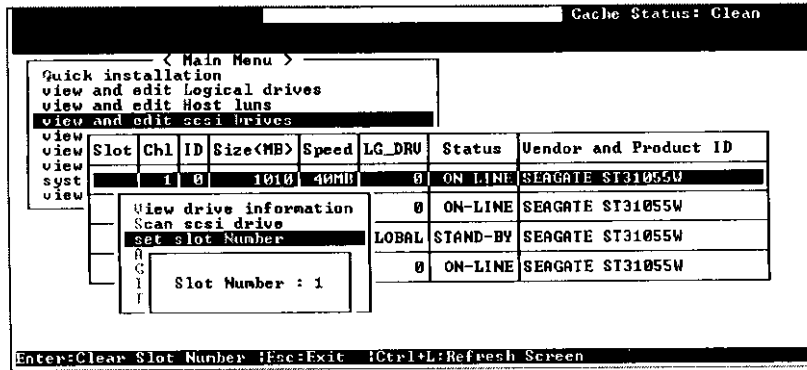
```
View Peripheral
Devices Status..
```

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

```
Power Supply
Status Normal
```

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

Assign Each SCSI Drive or Canister a Slot Number

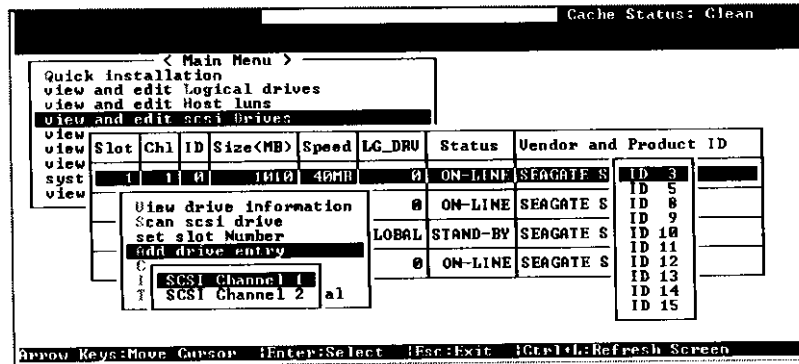


Choose "View and Edit SCSI Drives" in the Main Menu, then press [Enter]. A list of the connected SCSI drives will appear. The "Slot" column indicates the current slot number of each SCSI drive.

Assign a Slot Number to an Existing SCSI Drive

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

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.

Cache Status: Clean

< Main Menu >

Quick installation
 view and edit logical drives
 view and edit Host luns
view and edit scsi Drives
 view
 view
 view
 view
 syst
 view

Slot	Ch1	ID	Size(MB)	Speed	LG_DRU	Status	Vendor and Product ID
					0	ON-LINE	SEAGATE ST31055W
					0	ON-LINE	SEAGATE ST31055W
					GLOBAL	STAND-BY	SEAGATE ST31055W
						ABSENT	
	1	4	1010	40MB	0	ON-LINE	SEAGATE ST31055W

Arrow Keys: Move Cursor !Enter: Select !Esc: Exit !Ctrl+L: Refresh Screen

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

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

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

Remove Empty Drive Entry

Cache Status: Clean

< Main Menu >

Quick installation
view and edit logical drives
view and edit Host luns
view and edit scsi Drives
view
view
view
syst
view

Slot	Chl	ID	Size(MB)	Speed	LG_DRU	Status	Vendor and Product ID
					0	ON-LINE	SEAGATE ST31055W
					0	ON-LINE	SEAGATE ST31055W
					GLOBAL	STAND-BY	SEAGATE ST31055W
	1	3				ABSENT	
	1	4	1010	40MB	0	ON-LINE	SEAGATE ST31055W

Scan scsi drive
set slot Number
Add drive entry
Clear drive status
Toggle failure signal

Arrow Keys: Move Cursor | Enter: Select | Esc: Exit | Ctrl+L: Refresh Screen

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

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



IMPORTANT:

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

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

Cache Status: Clean

< Main Menu >

Quick installation
view and edit Logical drives
view and edit Host luns
view and edit scsi Drives
view and edit Scsi channels
view and edit Configuration parameters
view and edit Peripheral devices

S
U
View Peripheral Device Status
Set Peripheral Device Entry
Define Peripheral Device Active Signal

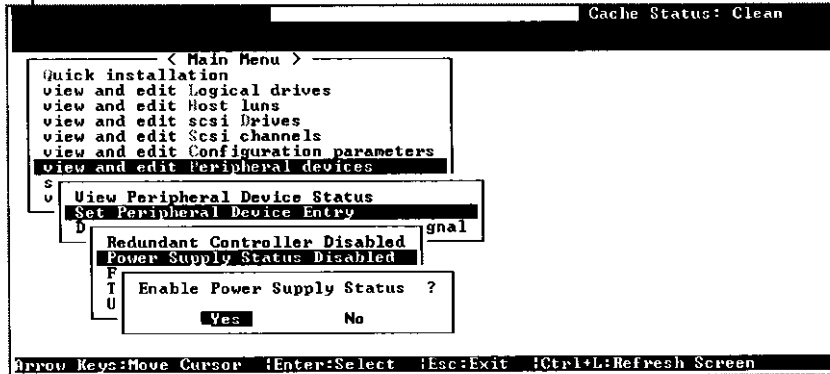
Power Supply Fail Signal Active Low
Fan Fail Signal Active Low
Temperature Alert Signal Active Low
UPS Power Fail Signal Active Low
Drive Failure Outputs Active High

Arrow Keys: Move Cursor | Enter: Select | Esc: Exit | Ctrl+L: Refresh Screen

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

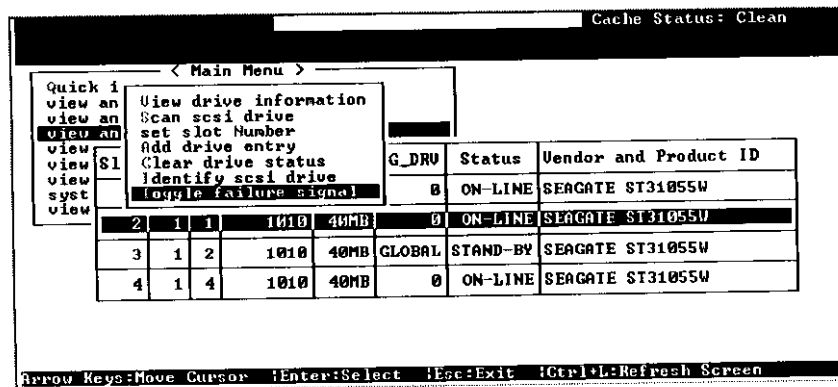
Move the cursor to the item you wish to change, then press [Enter]. Choose "Yes" when prompted to confirm, then press [Enter] to set. Each error signal input can be individually set as active high or active low. The drive failure signal output can also be set as active high or active low.

Enable Each Fault-bus Error Signal Input



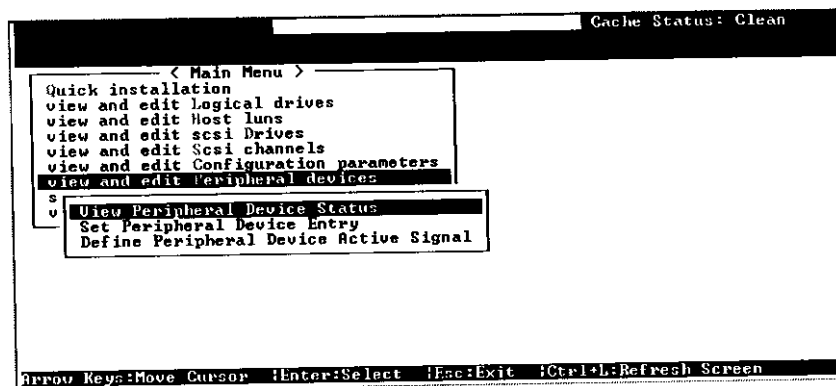
Each item of the error signal input can be individually enabled or disabled. Choose "View and Edit Peripheral Devices" in the Main Menu, then press [Enter]. Select "Set Peripheral Device Entry", then press [Enter]. Move the cursor to the desired item to enable or disable, and press [Enter]. Choose "Yes"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

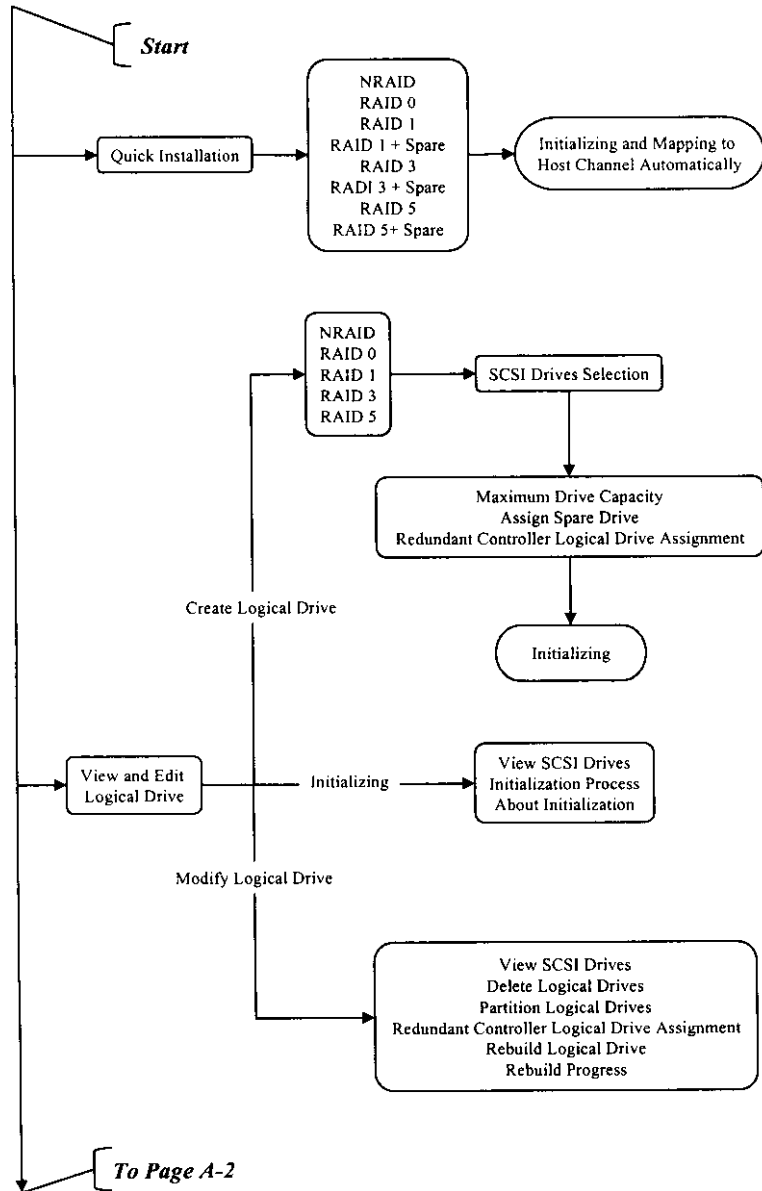


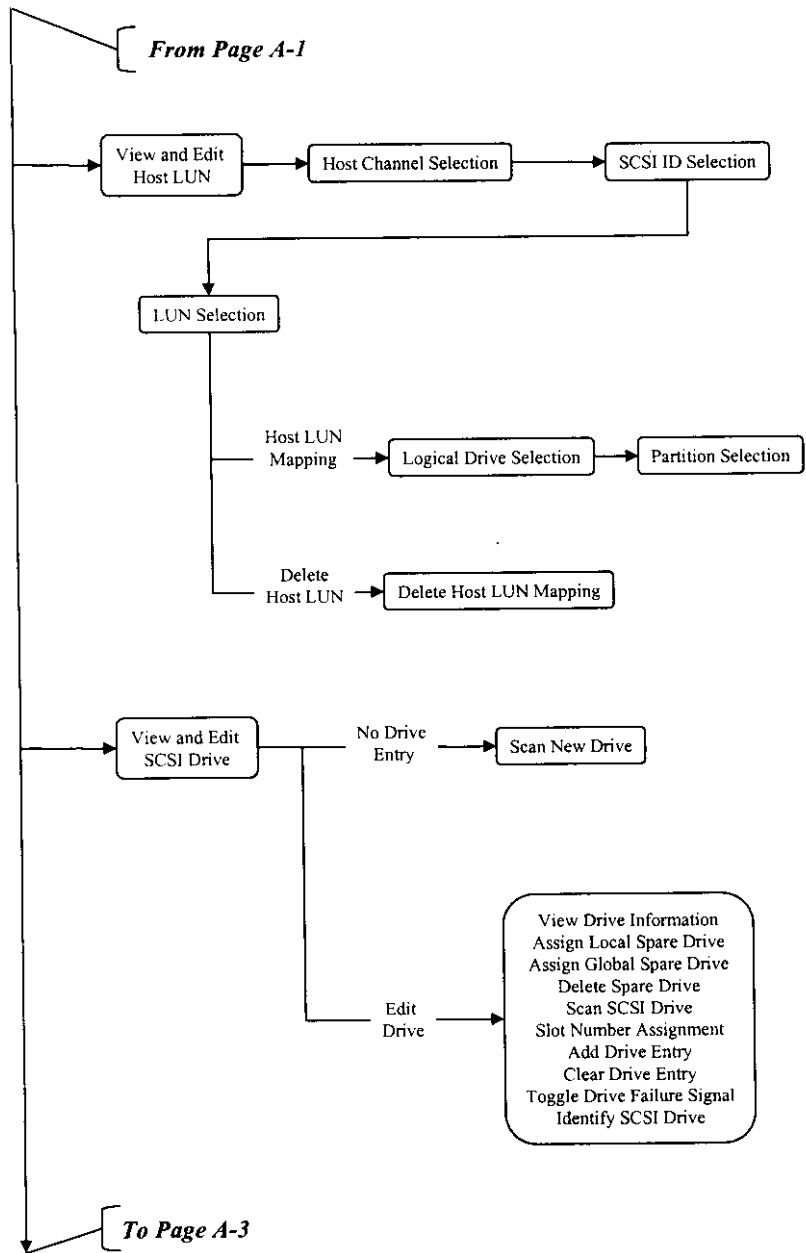
Choose "View and Edit Peripheral Devices" in the Main Menu and press [Enter]. Select "View Peripheral Device Status" in the menu and press [Enter].

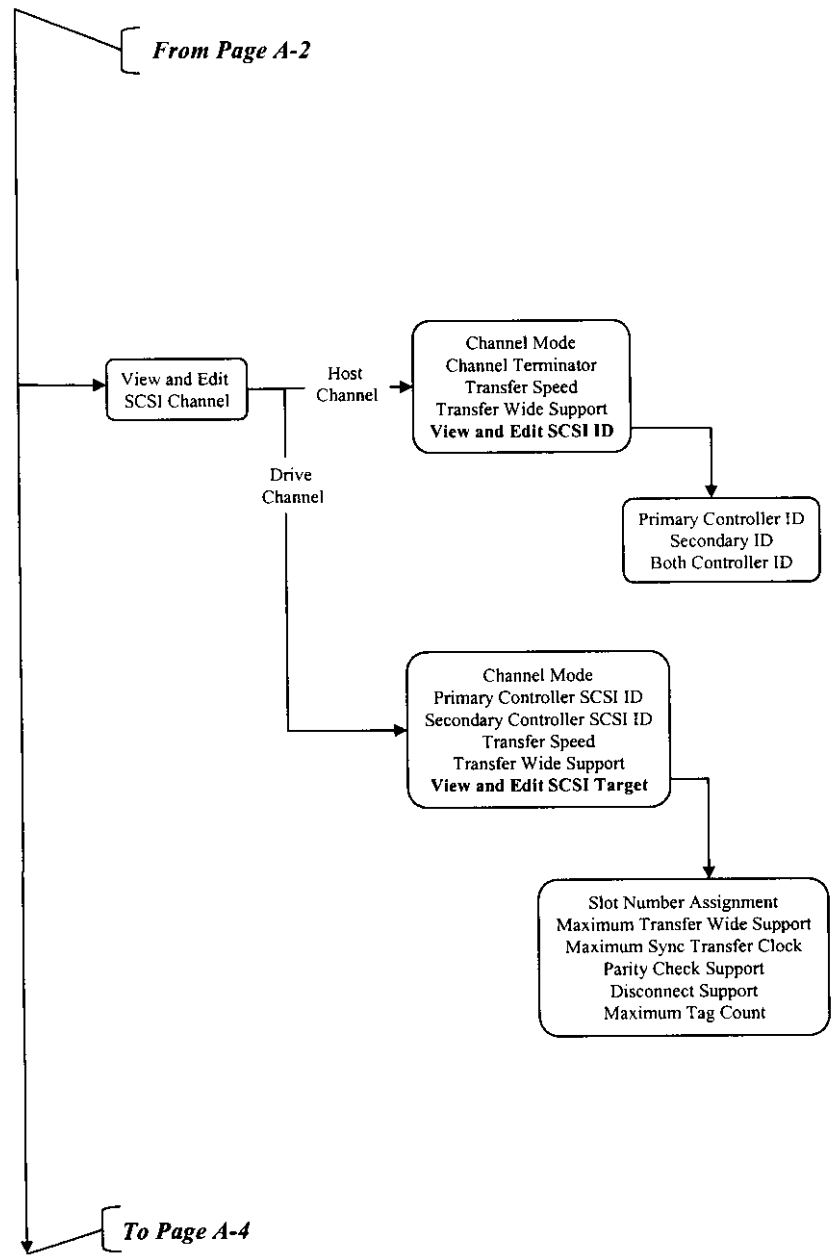
ITEM	STATUS	LOCATION
Redundant Controller	Disabled	
Power Supply Status	Normal	FaultBus
Fan Status	Failed	FaultBus
Temperature Status	Alert	FaultBus
UPS Status	Normal	FaultBus

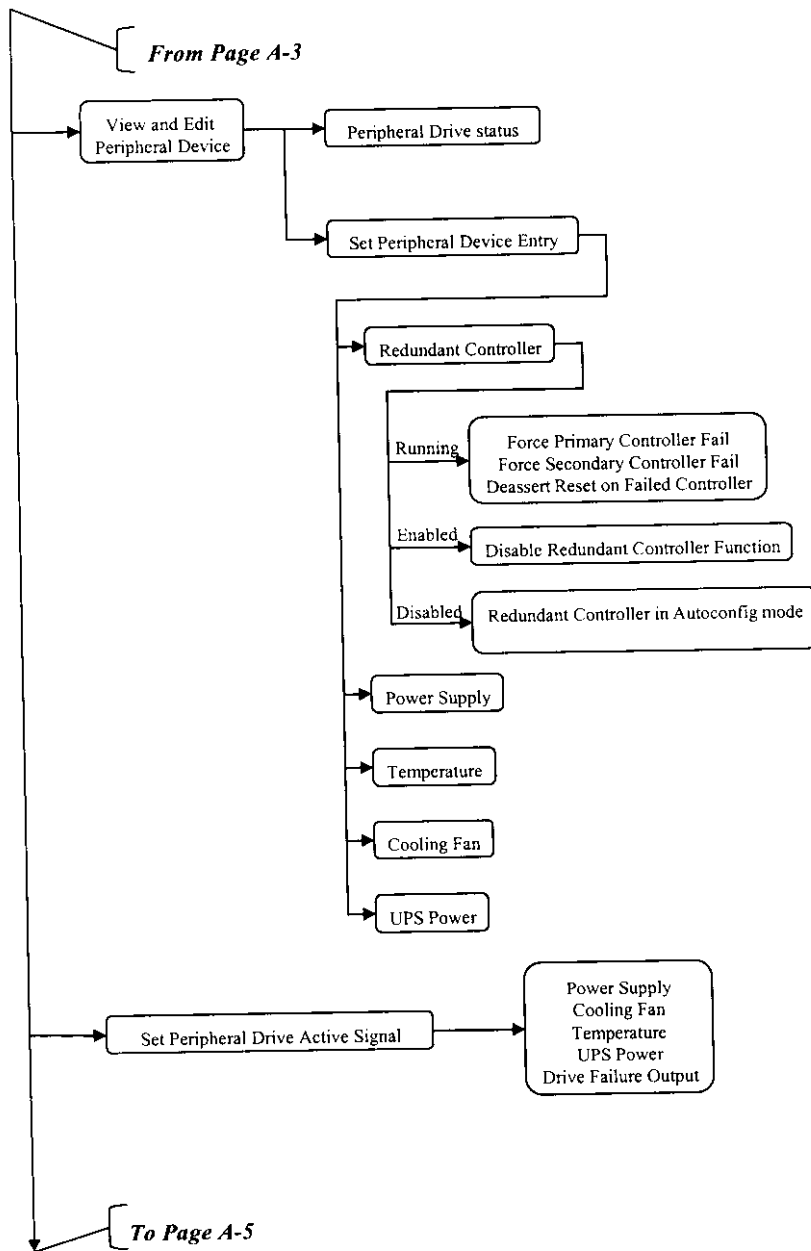
The current status of each enabled Fault-bus error signal input is listed. Try to emulate the errors and view the status of each item as described above.

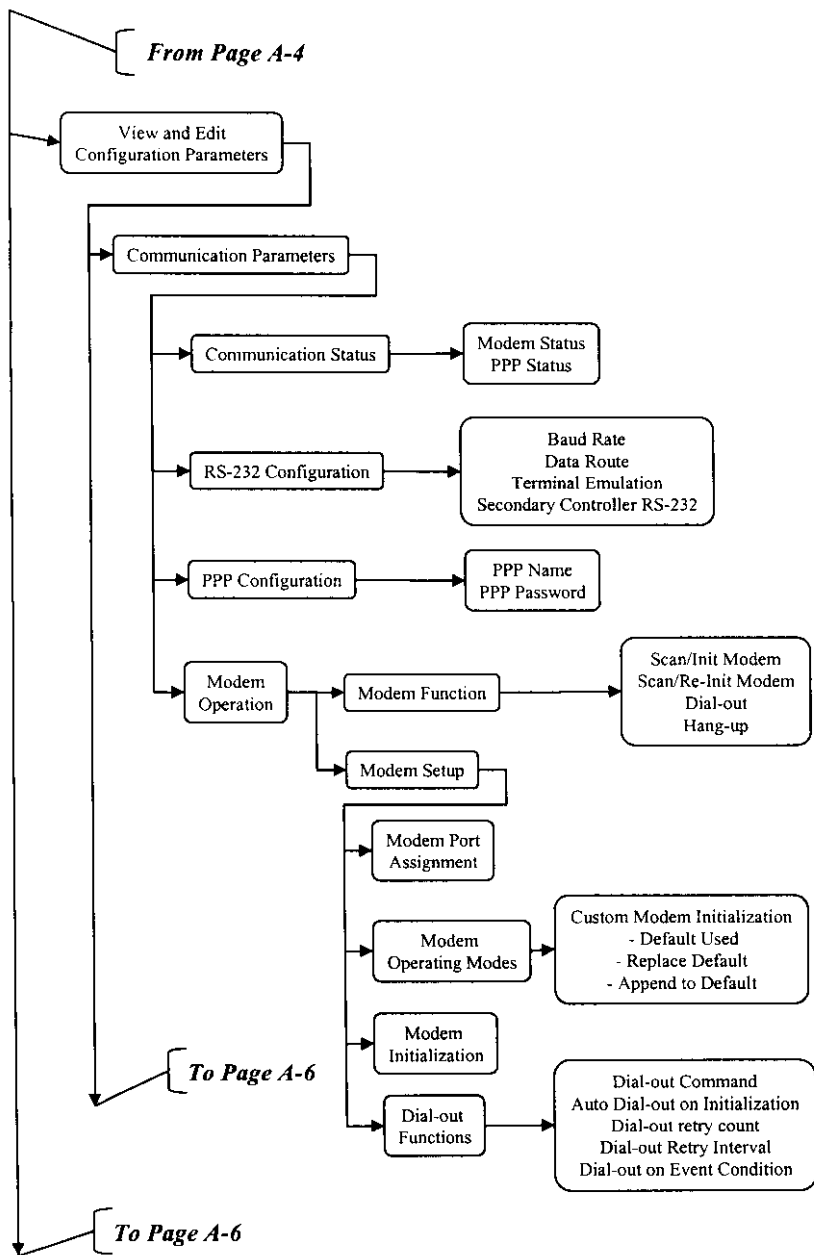
Appendix A: Front Panel Navigation Map

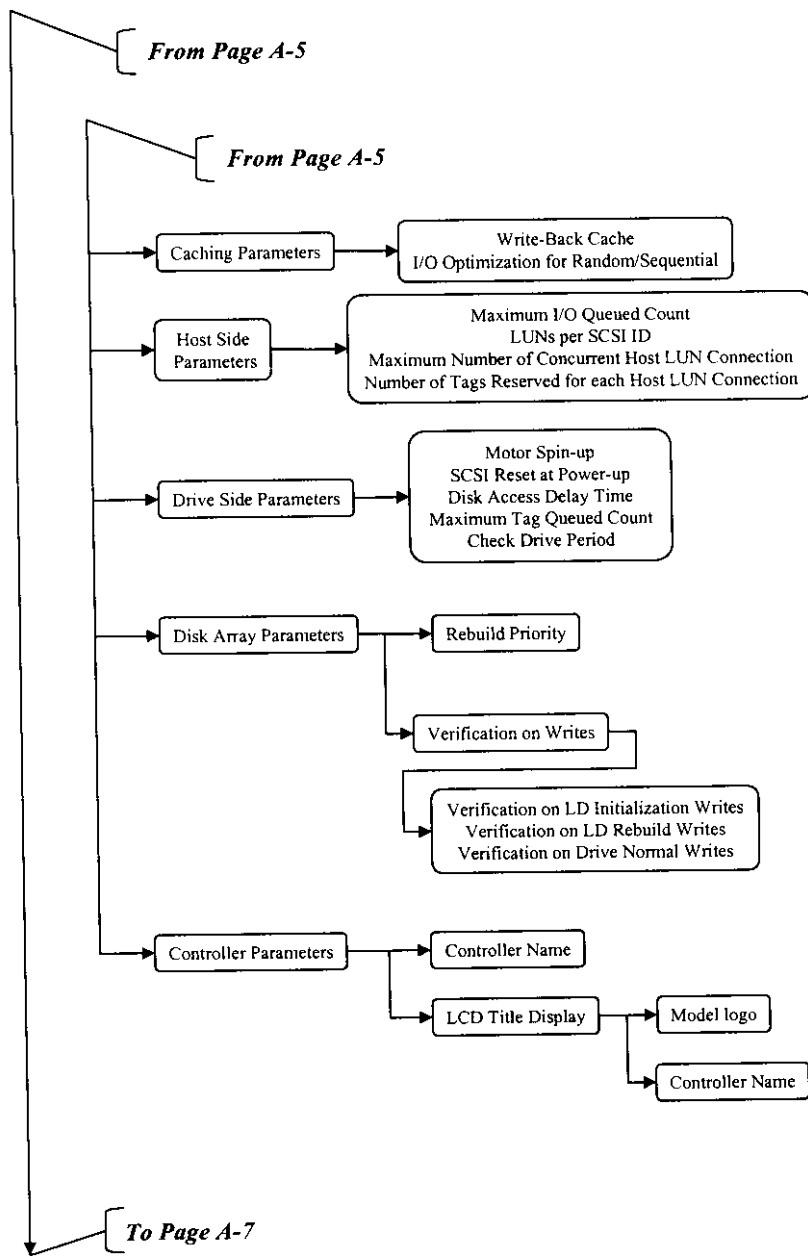


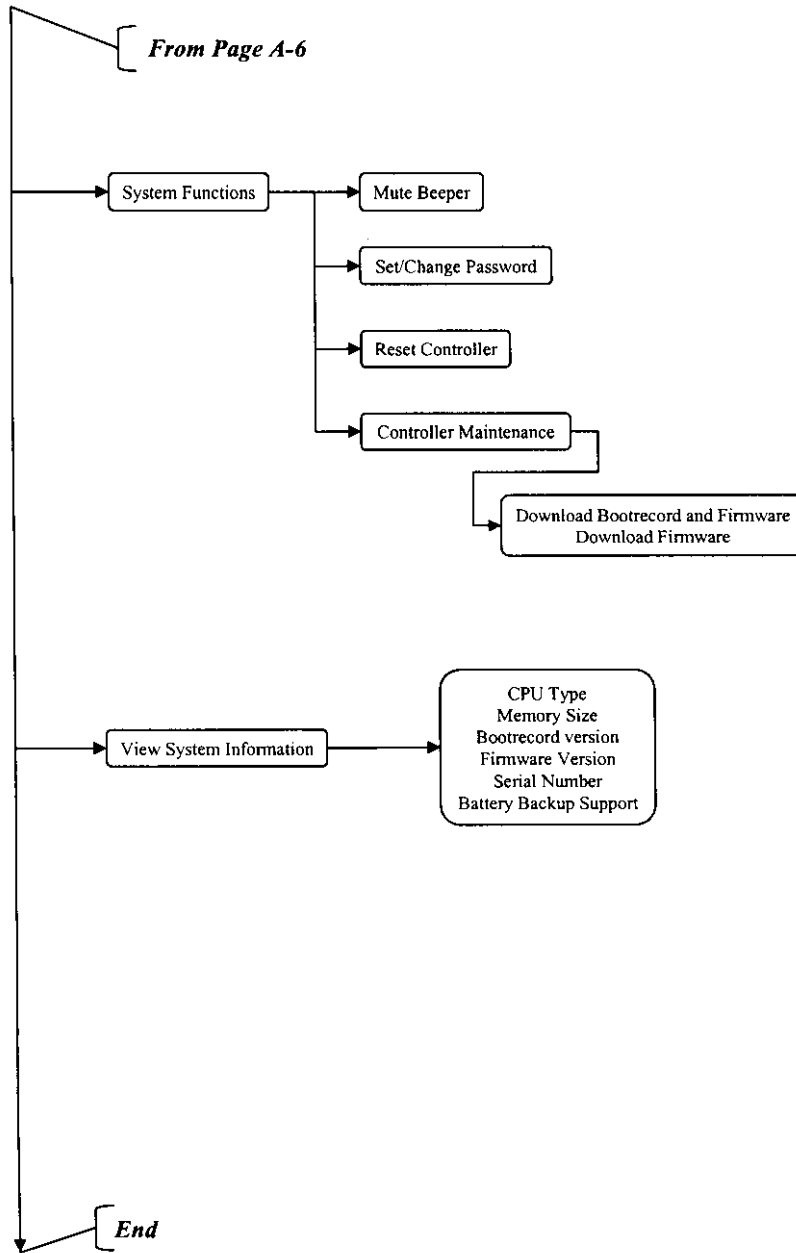












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Appendix B: SCSI/Fibre Cable Specifications

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.)

The Fibre cable recommended for IFT-9064UF:

- Material: Copper
- Maximum length: 30M between each device
- Impedance: 150 Ω
- Connector type: AMP 3-position header, male, right-angle
- The "Maximum length" mentioned above is the distance between two devices. Up to 126 devices can be daisy chained.
- Using a converter to convert the copper cable to fibre-optic cable. The maximum length between two devices is 10km when using fibre-optic cable.

SCSI/Fibre Standards, Cable Length and Corresponding Maximum Possible Drive Connections

	Single-Ended	Differential	LVD	Fibre*	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	-	-	12 m	-	16
Fibre (Copper cable)	-	-	-	30 m	126
Fibre (Fibre-optic cable)	-	-	-	10 Km	126

* The cable length in the Fibre column is the distance between two devices. The cable length in the SCSI columns (Single-Ended, Differential or LVD) is the total cable length from the first device to the last device.

** IFT-9064UF can only use the copper cable. The copper cable can connect to fiber-optic cable with an MIA (Media Interface Adapter) in between.

SCSI/Fibre Bus Width and Maximum Throughput

	Bus Width	SCSI Bus Sync. Frequency	Max. Bus Throughput
SCSI-1	8-bit	Asynchronous	5 MB/Sec
(Fast) SCSI-2	8-bit	10 Mhz	10 MB/Sec
(Fast) Wide SCSI-2	16-bit	10 Mhz	20 MB/Sec
Ultra SCSI-2	8-bit	20 Mhz	20 MB/Sec
Ultra Wide SCSI-2	16-bit	20 Mhz	40 MB/Sec
Ultra2 Wide SCSI	16-bit	40 Mhz	80MB/Sec
Fibre	1-bit	1 Ghz	100 MB/Sec

Appendix C Upgrading Firmware

The IFT-3102U 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 in the "pub" directory of Infortrend's FTP site or on a 5.25" or 3.5" diskette. The file available at the FTP site is usually a self-extracting file that contains the following:

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

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



IMPORTANT:

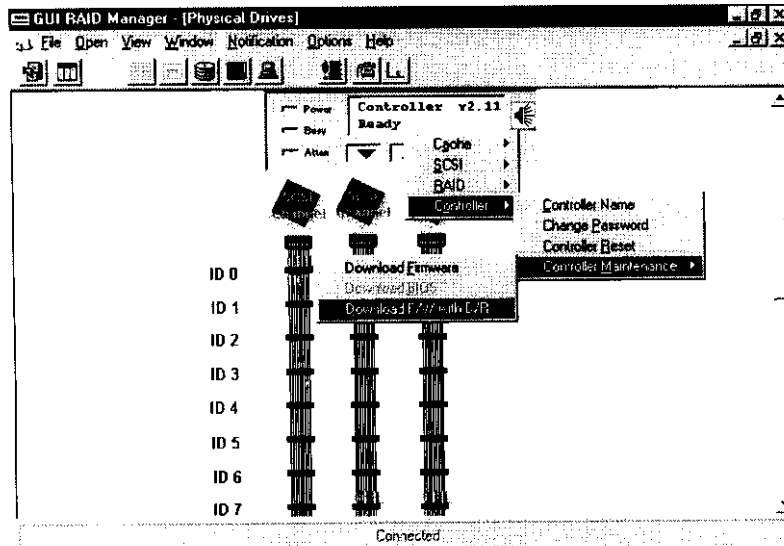
- *Allow the downloading process to finish. Do not reset or turn off the computer or the controller while it is downloading the file. Doing so may result in an unrecoverable error that requires the service of the manufacturer.*
- *While the firmware is new, the boot record that comes with it may be the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

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

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

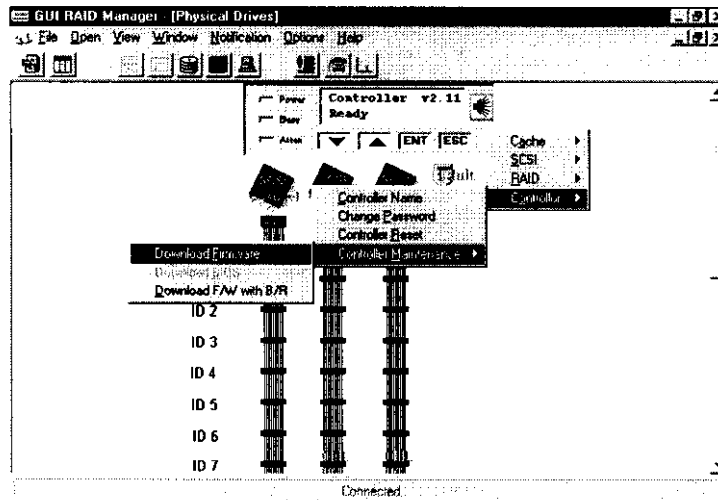
Establish the In-band SCSI connection in GUI RAID Manager
Please refer to section 4.10.3 for details on establishing the In-band SCSI connection in GUI RAID Manager.

Upgrade Both Boot Record and Firmware Binaries



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

Upgrade the Firmware Binary Only



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

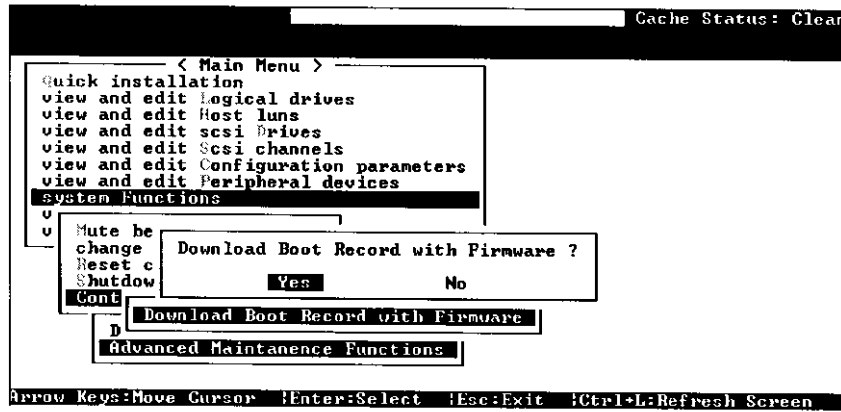
Upgrading the firmware using RS-232 Terminal Emulation

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

Establishing the connection for the RS-232 Terminal Emulation

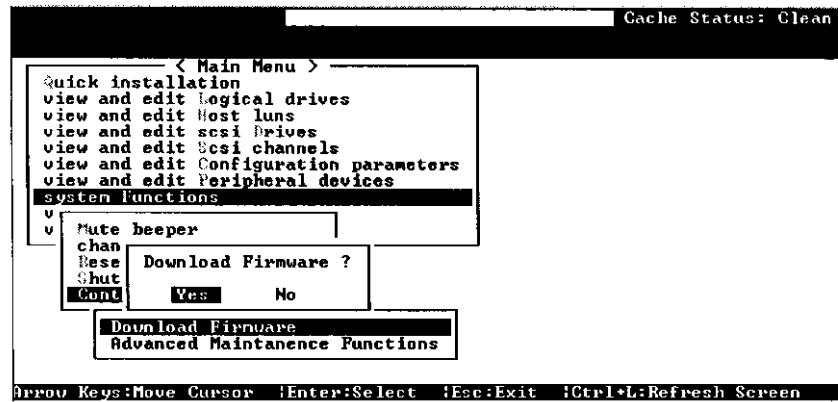
Please refer to chapter 4.6, *Serial Port Connection and Set-up*, for details on establishing the connection.

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.

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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:

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

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

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
6	41.6 Mhz	50	5.0 Mhz
8	31.2 Mhz	62	4.0 Mhz
10	25.0 Mhz	75	3.3 Mhz
12	20.8 Mhz	88	2.8 Mhz
15	16.6 Mhz	100	2.5 Mhz
18	13.8 Mhz	110	2.2 Mhz
25	10.0 Mhz	120	2.0 Mhz
31	8.0 Mhz	135	1.8 Mhz
37	6.7 Mhz	0	Asynchronous
43	5.8 Mhz		

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Appendix E Troubleshooting Guide



NOTE:

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

<u>PROBLEM</u>	<u>CHECK</u>
LCD is off.	<ol style="list-style-type: none">1. Check the power connections of the board and LCD panel.2. Requires a minimum of 8 MB DRAM SIMM installed.
7-segment LED flashes "F".	<ol style="list-style-type: none">1. SIMM module not installed yet.2. Null board (pin plug) for the battery backup connector is not installed, or its pin 1 is not installed to pin 1 of JP14.
SCSI channel failure detected upon start-up (SCSI cables connected). LCD = SCSI CHLs fail CHL=x,x,x	<ol style="list-style-type: none">1. Check ID numbers (must be unique for each device on the same SCSI channel).2. Make sure the terminators are properly installed.3. Check the voltage output of the power supply.
Initialization failure.	<ol style="list-style-type: none">1. Check ID numbers (must be unique for each device on the same SCSI channel).2. Make sure terminators are properly installed.
Cannot detect SCSI drive.	<ol style="list-style-type: none">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 IFT-3102UG.	<ol style="list-style-type: none"> 1. Check host SCSI cable connections. 2. Check SCSI port to LUN assignment. 3. Check logical drive mapping to LUN. 	<p>—</p> <p>—</p> <p>—</p> <p>—</p>
Parity error detected.	<ol style="list-style-type: none"> 1. DRAM SIMM should be replaced. 	<p>—</p> <p>—</p>
Logical drive failure detected during boot-up.	<ol style="list-style-type: none"> 1. Check proper installation or connection of the drives (use the "View SCSI drives" function to help locate the problem). 	<p>—</p> <p>—</p>
System is not stable after running for a period of time.	<ol style="list-style-type: none"> 1. SCSI cable must be shorter than 3 meters. 2. Make sure the terminators are properly installed. 3. Power supply voltage must be within specification. 4. Check the enclosure's inner temperature. 	<p>—</p> <p>—</p> <p>—</p> <p>—</p>
When using "Scan New SCSI Drive" and the desired ID is empty, an empty drive entry appears.	<ol style="list-style-type: none"> 1. Refer to Chapter 7.4.1 or 8.4.1, Scan New SCSI Drive, on how to remove the empty drive entry. 	<p>—</p> <p>—</p> <p>—</p>
The RS-232C Terminal Interface is not working.	<ol style="list-style-type: none"> 1. Check RS-232C cable connections. 2. Check Baud Rate. 3. Enable Terminal Emulation. 4. Data Routing Direct to Port. 	<p>—</p> <p>—</p> <p>—</p> <p>—</p>
When choosing "Configure Modem Port", the screen is full of "Comm Buffer Overflow".	<ol style="list-style-type: none"> 1. "Terminal Emulation" should be enabled after all modem configuration are completed. 	<p>—</p> <p>—</p>

<p>The logical drive states "INVALID".</p>	<ol style="list-style-type: none"> 1. "Optimization for ... I/O", when creating a 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.
<p>In "View and Edit SCSI Channels", the speed is only "20.8Mhz", not "40Mhz".</p>	<ol style="list-style-type: none"> 1. "20.8Mhz" is the SCSI sync frequency, not the transfer rate. 2. Refer to Appendix B, SCSI Cable Specifications, for details.
<p>All settings are too complex to remember.</p>	<ol style="list-style-type: none"> 1. After completing system installation, write down all the settings and related information in "Appendix H Record the Settings" for future reference.
<p>Upon replacing the failed controller with a new one during Redundant controller connection, nothing appears on the LCD of the new controller.</p>	<ol style="list-style-type: none"> 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.
<p>The host adapter recognizes the controller in every SCSI ID.</p>	<ol style="list-style-type: none"> 1. There is a SCSI ID conflict. 2. The host channel's SCSI ID should not be identical to the host adapter's SCSI ID.
<p>When connecting two host computers with the same host channel, the SCSI bus hangs.</p>	<ol style="list-style-type: none"> 1. The host channel's SCSI ID and host adapter's SCSI ID in the two host computers should be different.

"Power supply unstable or NVRAM failed!" appears on the LCD.

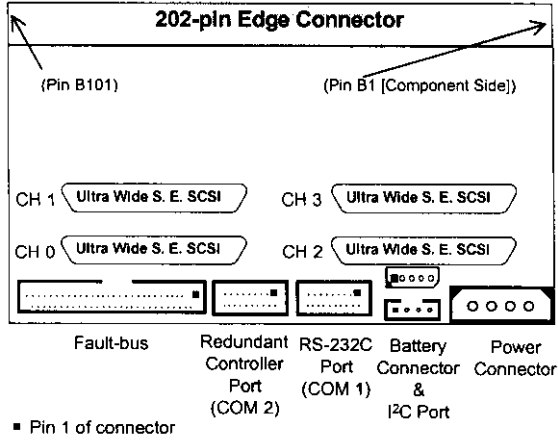
1. The voltage input of the RAID controller is lower than 4.75V.
2. Check the +5V voltage.
3. If the voltage drops to lower than 4.75V when attaching/detaching a drive, check the power supply.

Cannot find 'Rebuild logical drive' in the menu.

1. The 'Rebuild' option only appears when the logical drive has a failed drive.

Appendix F: Pin Assignments

(The IFT-3102UG is shown here as an example.)



F.1 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

F.2 Redundant Controller Port

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

F.3 I²C Port

Pin	Descriptions
1	I ² C CLK
2	GND
3	VCC
4	I ² C DATA

F.4 Battery Connector

Pin	Descriptions
1	VBATT_P
2	VBATT_P
3	VBATT_THM
4	VBATT_N
5	VBATT_N

F.5 Fault-bus Port

Pin	Descriptions	Pin	Descriptions
1	COMM_PIN0	2	COMM_PIN4
3	COMM_PIN1	4	COMM_PIN5
5	COMM_PIN2	6	COMM_PIN6
7	COMM_PIN3	8	FBUS_RST
9	GND	10	GND
11	COMM_PIN7	12	N/C
13	COMM_PIN8	14	N/C
15	COMM_PIN9	16	N/C
17	N/C	18	ALARM
19	GND	20	GND
21	UPSOUT-	22	N/C
23	POWER-	24	TEMP-
25	UPSIN-	26	FAN-

The 202-pin edge connector has 10 pins whose signals vary in accordance to its function, as LCD or Fault-bus. These are pins COMM_PIN0 to COMM_PIN9. Refer to the table below for descriptions of the pins.

Pin	LCD	Fault-bus
COMM_PIN0	LCD0	SLOT1
COMM_PIN1	LCD1	SLOT2
COMM_PIN2	LCD2	SLOT3
COMM_PIN3	LCD3	SLOT4
COMM_PIN4	LCD4	SLOT5
COMM_PIN5	LCD5	SLOT6
COMM_PIN6	LCD6	SLOT7
COMM_PIN7	LCD7	SLOT8
COMM_PIN8	N/C	SLOT9
COMM_PIN9	N/C	SLOT10

JP26 LCD Pin Header (16 x 1) for 4-line LCD module

Pin	Descriptions
1	GND
2	LCDVCC
3	LCDLVO
4	LCDDI-
5	LCDRW-
6	LCDENABLE
7	LCD0
8	LCD1
9	LCD2
10	LCD3
11	LCD4
12	LCD5
13	LCD6
14	LCD7
15	+12V
16	GND

JP27 LCD Pin Header (17 x 2) for 2-line LCD Module

Pin	Description	Pin	Description
1	LCD7	2	LCD6
3	LCD5	4	LCD4
5	LCD3	6	LCD2
7	LCD1	8	LCDO
9	LCDENABLE	10	LCDRW-
11	LCDDI-	12	LCDLVO
13	GND	14	LCDVCC
15	N/C	16	N/C
17	DOWNPUSH	18	POWERLED
19	UPPUSH	20	BUSYLED
21	ENTPUSH	22	ATTENLED
23	ESCPUSH	24	GND
25	N/C	26	N/C
27	N/C	28	N/C
29	VCC	30	N/C
31	N/C	32	N/C
33	N/C	34	N/C

F.6 202-pin Edge Connector of the Mainboard (Side A)

Pin	Description	Pin	Description	Pin	Description
A1	VCC	A35	TPWR 1	A69	3SD13-
A2	0SD10-	A36	VCC	A70	TPWR 3
A3	0SD8-	A37	2SD10-	A71	VCC
A4	0SREQ-	A38	2SD8-	A72	IICDATA
A5	0SSEL-	A39	2SREQ-	A73	IICCLK
A6	0SRST-	A40	2SSEL-	A74	COMMPIN 0
A7	VCC	A41	2SRST-	A75	COMMPIN 1
A8	0SBSY-	A42	VCC	A76	COMMPIN 2
A9	0SDP0-	A43	2SBSY-	A77	COMMPIN 3
A10	0SD6-	A44	2SDP0-	A78	VCC
A11	0SD4-	A45	2SD6-	A79	COMMPIN 4
A12	0SD2-	A46	2SD4-	A80	UPSIN-
A13	GND	A47	2SD2-	A81	UPSOUT-
A14	0SD0-	A48	GND	A82	ALARM
A15	0SD15-	A49	2SD0-	A83	DCD1
A16	0SD13-	A50	2SD15-	A84	RXD1
A17	TPWR 0	A51	2SD13-	A85	VCC
A18	TPWR 0	A52	TPWR 2	A86	TXD1
A19	1SD10-	A53	TPWR 2	A87	DTR1
A20	VCC	A54	3SD10-	A88	DSR1
A21	1SD8-	A55	VCC	A89	RTS1
A22	1SREQ-	A56	3SD8-	A90	CTS1
A23	1SSEL-	A57	3SREQ-	A91	RI1
A24	1SRST-	A58	3SSEL-	A92	VCC
A25	VCC	A59	3SRST-	A93	ESCPUSH
A26	1SBSY-	A60	VCC	A94	ENTPUSH
A27	1SDP0-	A61	3SBSY-	A95	UPPUSH
A28	1SD6-	A62	3SDP0-	A96	DOWNPUSH
A29	1SD4-	A63	3SD6-	A97	VCC
A30	1SD2-	A64	3SD4-	A98	ATTENLED
A31	GND	A65	3SD2-	A99	VBATT N
A32	1SD0-	A66	GND	A100	VBAT THM
A33	1SD15-	A67	3SD0-	A101	V12V
A34	1SD13-	A68	3SD15-		

(Note: The "A" side is the bottom side of the PCB; the "B" side is the top side (the side with components) of the PCB.)

202-pin Edge Connector of the Mainboard (Side B)

Pin	Description	Pin	Description	Pin	Description
B1	GND	B35	TPWR_1	B69	3SD12-
B2	0SD11-	B36	GND	B70	TPWR_3
B3	0SD9-	B37	2SD11-	B71	GND
B4	0SIO-	B38	2SD9-	B72	FRI_RST
B5	0SCD	B39	2SIO-	B73	FRI_RST
B6	0SMSG-	B40	2SCD-	B74	RI_RST
B7	GND	B41	2SMSG-	B75	COMMPIN5
B8	0SACK-	B42	GND	B76	COMMPIN6
B9	0SATN-	B43	2SACK-	B77	COMMPIN7
B10	0SD7-	B44	2SATN-	B78	GND
B11	0SD5-	B45	2SD7-	B79	COMMPIN8
B12	GND	B46	2SD5-	B80	COMMPIN9
B13	0SD3-	B47	GND	B81	FAN-
B14	0SD1-	B48	2SD3-	B82	POWER-
B15	0SDP1-	B49	2SD1-	B83	TEMP-
B16	0SD14-	B50	2SDP1-	B84	DCD2
B17	0SD12-	B51	2SD14-	B85	GND
B18	GND	B52	2SD12-	B86	RXD2
B19	1SD11-	B53	GND	B87	TXD2
B20	1SD9-	B54	3SD11-	B88	DTR2
B21	1SIO-	B55	3SD9-	B89	DSR2
B22	1SCD-	B56	3SIO-	B90	RTS2
B23	1SMSG-	B57	3SCD-	B91	CTS2
B24	1SACK-	B58	3SMSG-	B92	GND
B25	GND	B59	GND	B93	LCDRW-
B26	1SATN-	B60	3SACK-	B94	LCDLVO
B27	1SD7-	B61	3SAIN-	B95	LCDEN
B28	1SD5-	B62	3SD7-	B96	SA2
B29	GND	B63	3SD5-	B97	GND
B30	1SD3-	B64	GND	B98	VBATT_P
B31	1SD1-	B65	3SD3-	B99	POWERLED
B32	1SDP1-	B66	3SD1-	B100	BUSYLED
B33	1SD14-	B67	3SDP1-	B101	V12V
B34	1SD12-	B68	3SD14-		

**F.7 202-pin Edge Connector of the IFT-9064UD
Daughterboard (Side A)**

Pin	Description	Pin	Description	Pin	Description
A1	GND	A35	5SD14-	A69	6SD12-
A2	4SD11-	A36	5SD12-	A70	6SD11-
A3	4SD9-	A37	GND	A71	6SD10-
A4	4SIO-	A38	6SD11-	A72	GND
A5	GND	A39	6SD10-	A73	7SD9-
A6	4SCD-	A40	6SD9-	A74	7SD8-
A7	4SMSG-	A41	6SD8-	A75	7SIO-
A8	4SACK-	A42	6SIO-	A76	7SREQ-
A9	GND	A43	6SREQ-	A77	7SCD-
A10	4SATN-	A44	6SCD-	A78	GND
A11	4SD7-	A45	GND	A79	7SSEL-
A12	4SD5-	A46	6SSEL-	A80	7SMSG-
A13	4SD3-	A47	6SMSG-	A81	7SRST-
A14	GND	A48	6SRST-	A82	7SACK-
A15	4SD1-	A49	6SACK-	A83	7SBSY-
A16	4SDP1-	A50	6SBSY-	A84	7SATN-
A17	4SD14-	A51	6SATN-	A85	7SDP0-
A18	4SD12-	A52	6SDP0-	A86	7DIFFSENS
A19	GND	A53	6DIFFSENS	A87	GND
A20	5SD11-	A54	GND	A88	7SD7-
A21	5SD9-	A55	6SD7-	A89	7SD6-
A22	5SIO-	A56	6SD6-	A90	7SD5-
A23	GND	A57	6SD5-	A91	7SD4-
A24	5SCD-	A58	6SD4-	A92	7SD3-
A25	5SMSG-	A59	6SD3-	A93	7SD2-
A26	5SACK-	A60	GND	A94	7SD1-
A27	GND	A61	6SD2-	A95	GND
A28	5SATN-	A62	6SD1-	A96	7SD0-
A29	5SD7-	A63	6SD0-	A97	7SDP1-
A30	5SD5-	A64	6SDP1-	A98	7SD15-
A31	5SD3-	A65	6SD15-	A99	7SD14-
A32	GND	A66	GND	A100	7SD13-
A33	5SD1-	A67	6SD14-	A101	7SD12-
A34	5SDP1-	A68	6SD13-		

**202-pin Edge Connector of the IFT-9064UD
Daughterboard (Side B)**

Pin	Description	Pin	Description	Pin	Description
B1	GND	B35	5SD13-	B69	6SD12
B2	4SD10-	B36	TPWR 5	B70	7SD11
B3	4SD8-	B37	TPWR 5	B71	7SD10
B4	4SREQ-	B38	6SD11	B72	GND
B5	GND	B39	6SD10	B73	7SD9
B6	4SSEL-	B40	6SD9	B74	7SD8
B7	4SRST-	B41	6SD8	B75	7SIO
B8	4S7Y	B42	6SIO	B76	7SREQ
B9	GND	B43	6SREQ	B77	7SCD
B10	4SDP0-	B44	6SCD	B78	GND
B11	4SD6-	B45	GND	B79	7SSEL
B12	4SD4-	B46	6SSEL	B80	7SMMSG
B13	4SD2-	B47	6SMMSG	B81	7SRST
B14	GND	B48	6SRST	B82	7SACK
B15	4SD0-	B49	6SACK	B83	7SBSY
B16	4SD15-	B50	6SBSY	B84	7SATN
B17	4SD13-	B51	6SATN	B85	7SDP0
B18	TPWR 4	B52	6SDP0	B86	TPWR 7
B19	TPWR 4	B53	TPWR 6	B87	TPWR 7
B20	5SD10-	B54	TPWR 6	B88	7SD7
B21	5SD8-	B55	6SD7	B89	7SD6
B22	5SREQ-	B56	6SD6	B90	7SD5
B23	GND	B57	6SD5	B91	7SD4
B24	5SSEL-	B58	6SD4	B92	7SD3
B25	5SRST-	B59	6SD3	B93	7SD2
B26	5S7Y-	B60	GND	B94	7SD1
B27	GND	B61	6SD2	B95	GND
B28	5SDP0-	B62	6SD1	B96	7SD0
B29	5SD6-	B63	6SD0	B97	7SDP1
B30	5SD4-	B64	6SDP1	B98	7SD15
B31	5SD2-	B65	6SD15	B99	7SD14
B32	GND	B66	GND	B100	7SD13
B33	5SD0-	B67	6SD14	B101	7SD12
B34	5SD15-	B68	6SD13		

**F.8 202-pin Edge Connector of the IFT-9064UL
Daughterboard (Side A)**

Pin	Description	Pin	Description	Pin	Description
A1	GND	A35	5SD14-	A69	6SD12-
A2	4SD11-	A36	5SD12-	A70	7SD11-
A3	4SD9-	A37	GND	A71	7SD10-
A4	4SIO-	A38	6SD11-	A72	GND
A5	GND	A39	6SD10-	A73	7SD9-
A6	4SCD-	A40	6SD9-	A74	7SD8-
A7	4SMSG-	A41	6SD8-	A75	7SIO-
A8	4SACK-	A42	6SIO-	A76	7SREQ-
A9	GND	A43	6SREQ-	A77	7SCD-
A10	4SATN-	A44	6SCD-	A78	GND
A11	4SD7-	A45	GND	A79	7SSEL-
A12	4SD5-	A46	6SSEL-	A80	7SMSG-
A13	4SD3-	A47	6SMSG-	A81	7SRST-
A14	GND	A48	6SRST-	A82	7SACK-
A15	4SD1-	A49	6SACK-	A83	7SBSY-
A16	4SDP1-	A50	6SBSY-	A84	7SATN-
A17	4SD14-	A51	6SATN-	A85	7SDP0-
A18	4SD12-	A52	6SDP0-	A86	7DIFFSENS
A19	GND	A53	6DIFFSENS	A87	GND
A20	5SD11-	A54	GND	A88	7SD7-
A21	5SD9-	A55	6SD7-	A89	7SD6-
A22	5SIO-	A56	6SD6-	A90	7SD5-
A23	GND	A57	6SD5-	A91	7SD4-
A24	5SCD-	A58	6SD4-	A92	7SD3-
A25	5SMSG-	A59	6SD3-	A93	7SD2-
A26	5SACK-	A60	GND	A94	7SD1-
A27	GND	A61	6SD2-	A95	GND
A28	5SATN-	A62	6SD1-	A96	7SD0-
A29	5SD7-	A63	6SD0-	A97	7SDP1-
A30	5SD5-	A64	6SDP1-	A98	7SD15-
A31	5SD3-	A65	6SD15-	A99	7SD14-
A32	GND	A66	GND	A100	7SD13-
A33	5SD1-	A67	6SD14-	A101	7SD12-
A34	5SDP1-	A68	6SD13-		

**202-pin Edge Connector of the IFT-9064UL
Daughterboard (Side B)**

Pin	Description	Pin	Description	Pin	Description
B1	GND	B35	5SD13-	B69	6SD12
B2	4SD10-	B36	TPWR 5	B70	7SD11
B3	4SD8-	B37	TPWR 5	B71	7SD10
B4	4SREQ-	B38	6SD11	B72	GND
B5	GND	B39	6SD10	B73	7SD9
B6	4SSEL-	B40	6SD9	B74	7SD8
B7	4SRST-	B41	6SD8	B75	7SIO
B8	4S7SY-	B42	6SIO	B76	7SREQ
B9	GND	B43	6SREQ	B77	7SCD
B10	4SDP0-	B44	6SCD	B78	GND
B11	4SD6-	B45	GND	B79	7SSEL
B12	4SD4-	B46	6SSEL	B80	7SMSG
B13	4SD2-	B47	6SMSG	B81	7SRST
B14	GND	B48	6SRST	B82	7SACK
B15	4SD0-	B49	6SACK	B83	7SBSY
B16	4SD15-	B50	6SBSY	B84	7SATN
B17	4SD13-	B51	6SATN	B85	7SDP0
B18	TPWR 4	B52	6SDP0	B86	TPWR 7
B19	TPWR 4	B53	TPWR 6	B87	TPWR 7
B20	5SD10-	B54	TPWR 6	B88	7SD7
B21	5SD8-	B55	6SD7	B89	7SD6
B22	5SREQ-	B56	6SD6	B90	7SD5
B23	GND	B57	6SD5	B91	7SD4
B24	5SSEL-	B58	6SD4	B92	7SD3
B25	5SRST-	B59	6SD3	B93	7SD2
B26	5SBSY-	B60	GND	B94	7SD1
B27	GND	B61	6SD2	B95	GND
B28	5SDP0-	B62	6SD1	B96	7SD0
B29	5SD6-	B63	6SD0	B97	7SDP1
B30	5SD4-	B64	6SDP1	B98	7SD15
B31	5SD2-	B65	6SD15	B99	7SD14
B32	GND	B66	GND	B100	7SD13
B33	5SD0-	B67	6SD14	B101	7SD12
B34	5SD15-	B68	6SD13		

**F.9 202-pin Edge Connector of the IFT-9064/9065US
Daughterboard (Side A)**

Pin	Description	Pin	Description	Pin	Description
A1	GND	A35	5SD14-	A69	7SD1-
A2	4SD11-	A36	5SD12-	A70	7SDP1-
A3	4SD9-	A37	GND	A71	7SD14-
A4	4SIO-	A38	6SD11-	A72	7SD12-
A5	GND	A39	6SD9-	A73	GND
A6	4SCD-	A40	6SIO-	A74	GND
A7	4SMMSG-	A41	6SCD-	A75	8SD11-
A8	4SACK-	A42	6SMMSG-	A76	8SD9-
A9	GND	A43	GND	A77	8SIO-
A10	4SATN-	A44	6SACK-	A78	GND
A11	4SD7-	A45	6SATN-	A79	8SCD-
A12	4SD5-	A46	6SD7-	A80	8SMMSG-
A13	4SD3-	A47	6SD5-	A81	8SACK-
A14	GND	A48	6SD3-	A82	GND
A15	4SD1-	A49	GND	A83	8SATN-
A16	4SDP1-	A50	6SD1-	A84	8SD7-
A17	4SD14-	A51	6SDP1-	A85	8SD5-
A18	4SD12-	A52	6SD14-	A86	GND
A19	GND	A53	GND	A87	GND
A20	5SD11-	A54	6SD12-	A88	8SD3-
A21	5SD9-	A55	GND	A89	8SD1-
A22	5SIO-	A56	7SD11-	A90	8SDP1-
A23	GND	A57	7SD9-	A91	8SD14-
A24	5SCD-	A58	7SIO-	A92	9SD12-
A25	5SMMSG-	A59	GND	A93	N/C
A26	5SACK-	A60	7SCD-	A94	GND
A27	GND	A61	7SMMSG-	A95	GND
A28	5SATN-	A62	7SACK-	A96	GND
A29	5SD7-	A63	GND	A97	GND
A30	5SD5-	A64	7SATN-	A98	GND
A31	5SD3-	A65	7SD7-	A99	GND
A32	GND	A66	7SD5-	A100	GND
A33	5SD1-	A67	7SD3-	A101	GND
A34	5SDP1-	A68	GND		

**202-pin Edge Connector of the IFT-9064/9065US
Daughterboard (Side B)**

Pin	Description	Pin	Description	Pin	Description
B1	GND	B35	5SD13-	B69	7SD0-
B2	4SD10-	B36	TPWR 5	B70	7SD15-
B3	4SD8-	B37	TPWR 5	B71	7SD13-
B4	4SREQ-	B38	6SD10-	B72	GND
B5	GND	B39	6SD8-	B73	TPWR 7
B6	4SSEL-	B40	6SREQ-	B74	TPWR 7
B7	4SRST-	B41	6SSEL-	B75	8SD10-
B8	4SBSY-	B42	6SRST-	B76	8SD8-
B9	GND	B43	GND	B77	8SREQ-
B10	4SDP0-	B44	6SBSY-	B78	GND
B11	4SD6-	B45	6SDP0-	B79	8SSEL-
B12	4SD4-	B46	6SD6-	B80	8SRST-
B13	4SD2-	B47	6SD4-	B81	8SBSY-
B14	GND	B48	6SD2-	B82	GND
B15	4SDP0-	B49	GND	B83	8SDP0-
B16	4SD15-	B50	6SD0-	B84	8SD6-
B17	4SD13-	B51	6SD15-	B85	8SD4-
B18	TPWR 4	B52	6SD13-	B86	N/C
B19	TPWR 4	B53	TPWR 6	B87	N/C
B20	5SD10-	B54	TPWR 6	B88	8SD2-
B21	5SD8-	B55	GND	B89	8SD0-
B22	5SREQ-	B56	7SD10-	B90	8SD15-
B23	GND	B57	7SD8-	B91	8SD13-
B24	5SSEL-	B58	7SREQ-	B92	TPWR 8
B25	5SRST-	B59	GND	B93	TPWR 8
B26	5SBSY-	B60	7SSEL-	B94	GND
B27	GND	B61	7SRST-	B95	GND
B28	5SDP0-	B62	7SBSY-	B96	GND
B29	5SD6-	B63	GND	B97	GND
B30	5SD4-	B64	7SDP0-	B98	GND
B31	5SD2-	B65	7SD6-	B99	GND
B32	GND	B66	7SD4-	B100	GND
B33	5SD0-	B67	7SD2-	B101	GND
B34	5SD15-	B68	GND		