

**FCC ID : LC83102U2**

**IFT-3102U2**

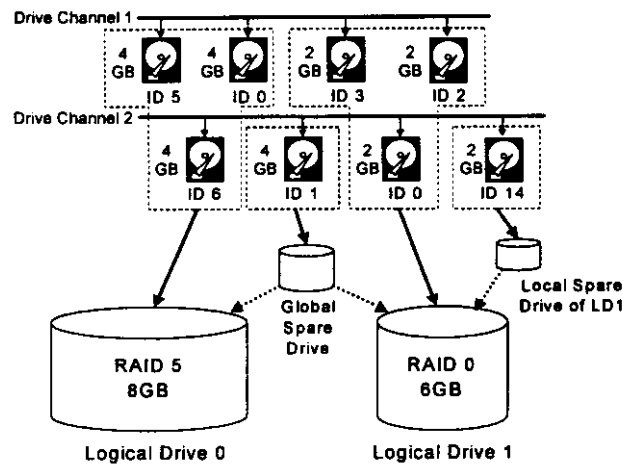
Ultra2-to-Ultra2 SCSI RAID Controller

**Instruction Manual**

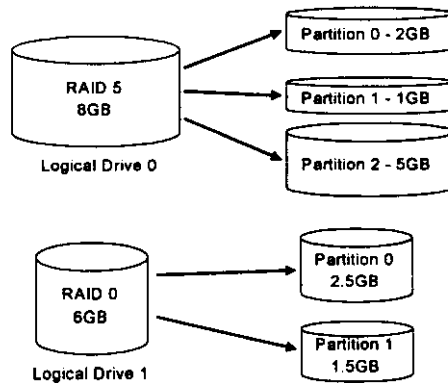
Revision 1.1

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

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



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



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

## Federal Communications Commission (FCC) Statement

---

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

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

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

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

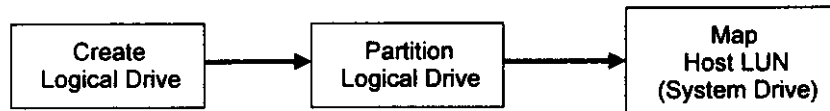
You are cautioned that changes or modifications not expressly approved by the party responsible for compliance could void your authority to operate the equipment.

---

## 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-3102U2 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:

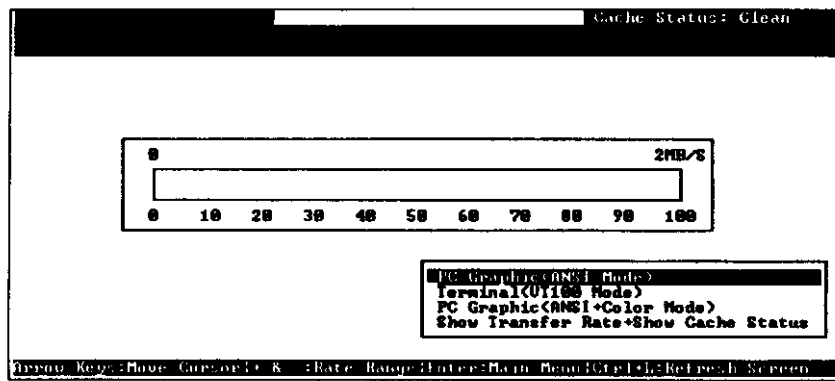


A "Logical Drive" is a set of drives grouped together to operate under a given RAID level and appears as a single contiguous drive. The IFT-3102U2 controller is capable of grouping connected drives to as many as 8 logical drives, each configured on the same or different RAID levels. A logical drive can 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.

# Table of Contents

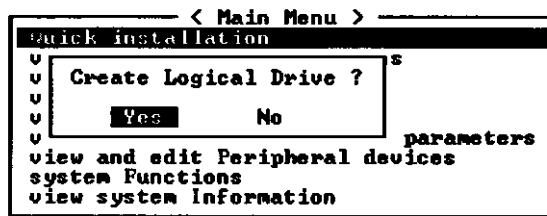
<b>Chapter 1</b>	<b>Introduction</b> .....	<b>1-1</b>
<b>Chapter 2</b>	<b>Features</b> .....	<b>2-1</b>
<b>Chapter 3</b>	<b>Configuration Options</b> .....	<b>3-1</b>
3.1	RAID Management.....	3-1
3.2	Drive Failure Management.....	3-5
3.3	Disk Array Parameters.....	3-11
3.4	Cache Parameters.....	3-12
3.5	Drive-Side SCSI Parameters.....	3-12
3.6	Dynamic Logical Drive Expansion.....	3-16
<b>Chapter 4</b>	<b>Hardware Installation</b> .....	<b>4-1</b>
4.1	Locations of the Parts.....	4-1
4.2	Installing DRAM SIMM.....	4-4
4.3	Installing the SCSI Channel Upgrade Daughterboard.....	4-6
4.4	Battery Back-up.....	4-7
4.5	Power Connection.....	4-9
4.6	Serial Port Connection and Setup.....	4-10
4.7	Basic Operational Setup.....	4-12
4.10	In-band SCSI.....	4-13
<b>Chapter 5</b>	<b>Quick Setup</b> .....	<b>5-1</b>
5.1	Front Panel.....	5-1
5.2	RS-232 Terminal Interface.....	5-2
<b>Chapter 6</b>	<b>Configuring RAID</b> .....	<b>6-1</b>
6.1	Starting to Build a RAID System Drive.....	6-1
6.2	How the RAID Controller Works?.....	6-2
<b>Chapter 7</b>	<b>General Front Panel Operation</b> .....	<b>7-1</b>
7.1	Understanding the Information on the LCD.....	7-1
7.2	Viewing and Editing Logical Drives.....	7-4
7.3	Viewing and Editing Host LUNs.....	7-12
7.4	Viewing and Editing SCSI Drives.....	7-14
7.5	Viewing and Editing SCSI Channels.....	7-19
7.6	Viewing and Editing Configuration Parameters.....	7-29
7.7	Viewing and Editing Peripheral Devices.....	7-37
7.8	System Functions.....	7-37
7.9	Viewing System Information.....	7-38
7.10	Viewing and Editing Event Logs.....	7-39
<b>Chapter 8</b>	<b>RS-232C Terminal Interface</b> .....	<b>8-1</b>
8.1	Understanding the Information on the Screen.....	8-1
8.2	Viewing and Editing Logical Drives.....	8-8
8.3	Viewing and Editing Host LUNs.....	8-19
8.4	Viewing and Editing SCSI Drives.....	8-24
8.5	Viewing and Editing SCSI Channels.....	8-30
8.6	Viewing and Editing Configuration Parameters.....	8-41
8.7	System Functions.....	8-54
8.8	Viewing System Information.....	8-57

---

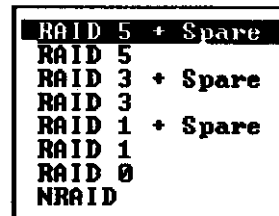


The initial screen appears when the controller is powered-on. Use ↑ ↓ arrow keys to select the desired terminal emulation mode, then press [ENTER] to enter the Main Menu.

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



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



## **Chapter 1 Introduction**

The IFT-3102U2 is an Ultra2-to-Ultra2 SCSI RAID controller specifically designed to provide RAID 0, 1(0+1), 3, 5 or JBOD 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 an AMD 5x86 CPU coupled with high-speed DRAMs and firmware in flash memory. In effect, it endows the host system with a high-speed and fault-tolerant disk storage operation using the RAID technology. It is an ideal solution for weaving several hard disks into one contiguous volume.

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

The controller has been designed with ease of integration and maintenance in mind. All major features are described in the next chapter. The IFT-3102U2 already includes all the major operational requirements of a RAID subsystem. The overall features of a fully-built RAID subsystem will, however, depend on the actual components used and the creativity of the integrator.

## Chapter 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-3102U2 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

The IFT-3102U2 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!
```



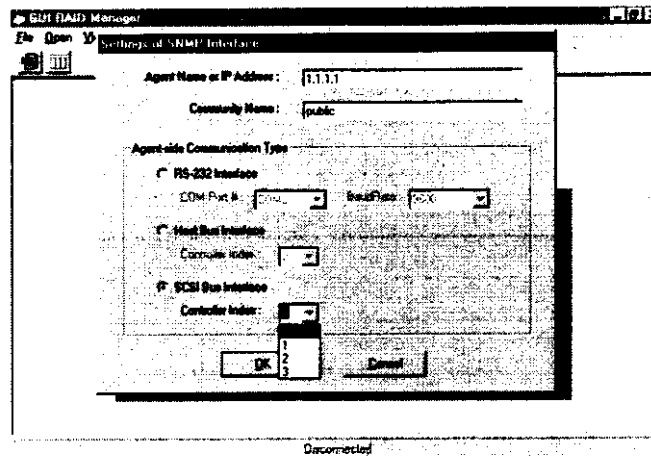
## Chapter 2 Features

Five operating modes:

JBOD	Just a Bunch of Drives
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.
- ✓ 5.25" drive profile allows easy integration into external subsystem enclosures or directly into the host system's drive bay.
- ✓ Up to five drive channels (optional 3-channel upgrade) for a total of 75 connected drives.
- ✓ Supports up to 15 SCSI IDs per channel.
- ✓ Three optional upgrade daughterboards:
  - IFT-9073UWS: 3 Ultra Wide, single-ended, SCSI channels
  - IFT-9072UWD: 2 Ultra Wide, differential, SCSI channels
  - IFT-9073U2: 3 Ultra2 Wide SCSI channels
- ✓ Up to 8 logical drives, each with independent RAID modes; up to 32 LUN's per SCSI ID (multiple SCSI ID's per channel are supported)
- ✓ 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.

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.)

## Chapter 3 Configuration Options

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-3102U2 RAID controller provides complete RAID functionality and enhanced drive failure management.

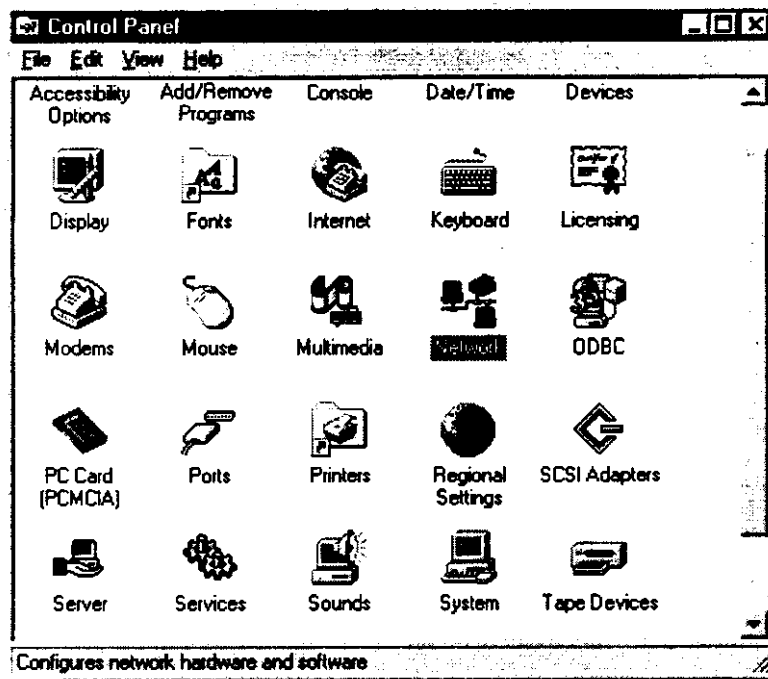
### 3.1 RAID Management

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	Drives	Parity	Read Performance	Write Performance
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



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:**

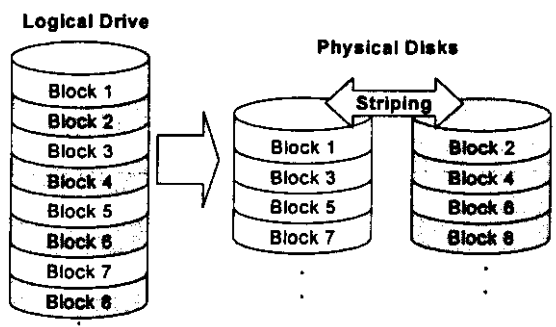


*This following applies to Windows NT 4.0 with Service Pack 3: if the "SNMP Service" is installed after the Service Pack 3 has been installed, Service Pack 3 must be re-installed in order for the SNMP service to work properly.*

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.

**RAID 0**  
Disk Striping

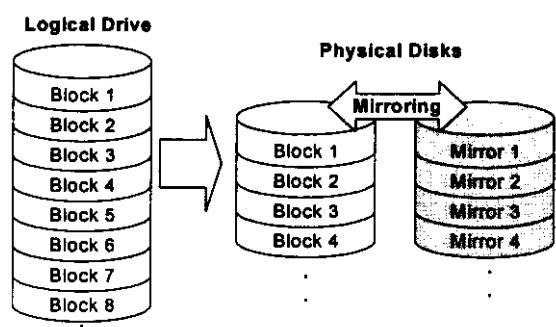
RAID 0	
Minimum Disks required	2
Capacity	N
Redundancy	No



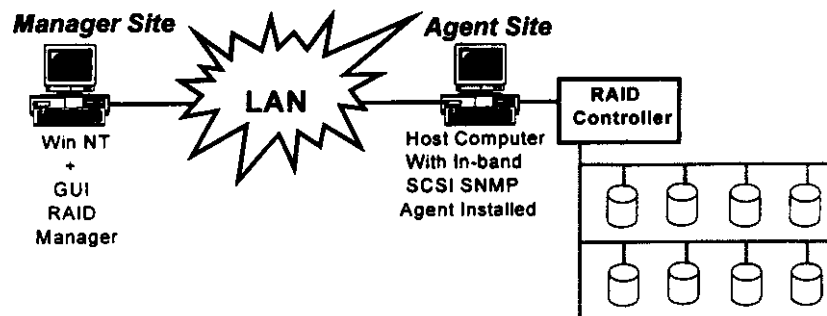
RAID 0 provides the highest performance but no redundancy. Data in the logical drive is striped (distributed) across several physical drives.

**RAID 1**  
Disk Mirroring

RAID 1	
Disks required	2
Capacity	N/2
Redundancy	Yes



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



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*

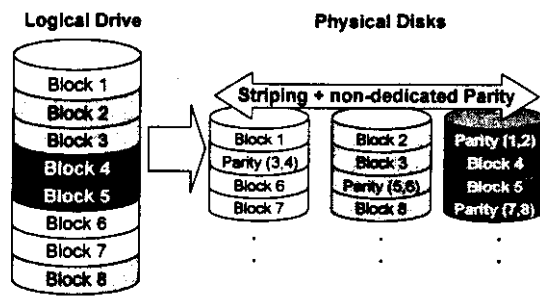
The following criteria must be met for the Agent Site and Manager Site:

#### **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.

**RAID 5**  
Striping with  
Interspersed Parity

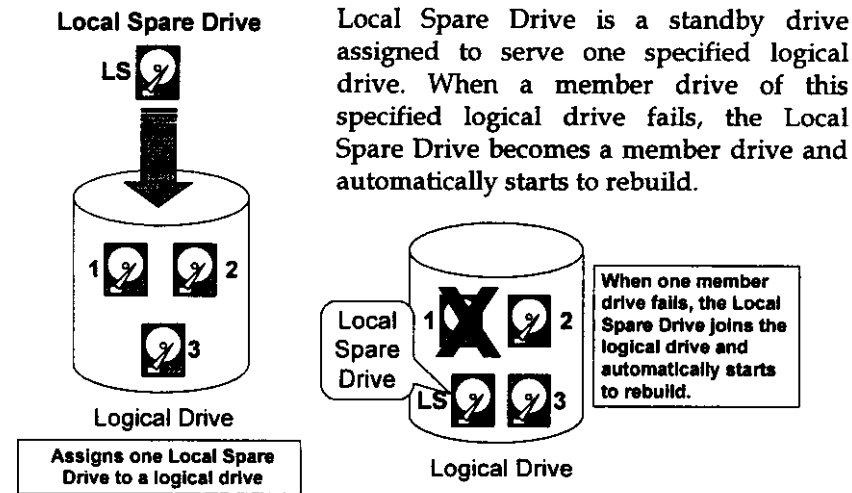
RAID 5	
Minimum Disks required	3
Capacity	N-1
Redundancy	Yes



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

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

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
```

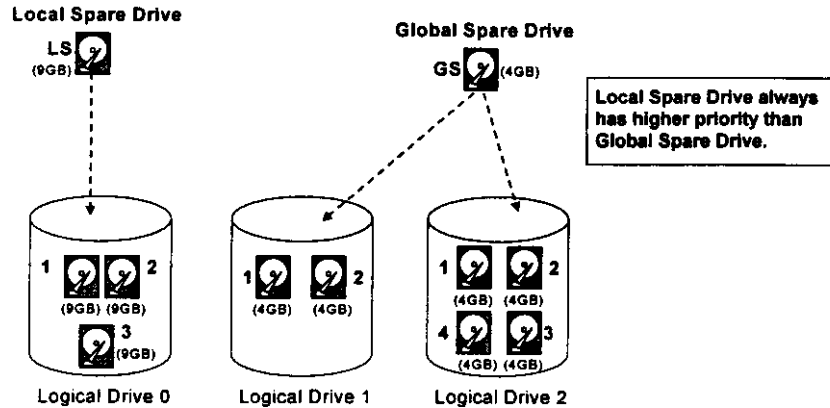
Press <Enter> to accept. The screen should display the following message.

```
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*).



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.

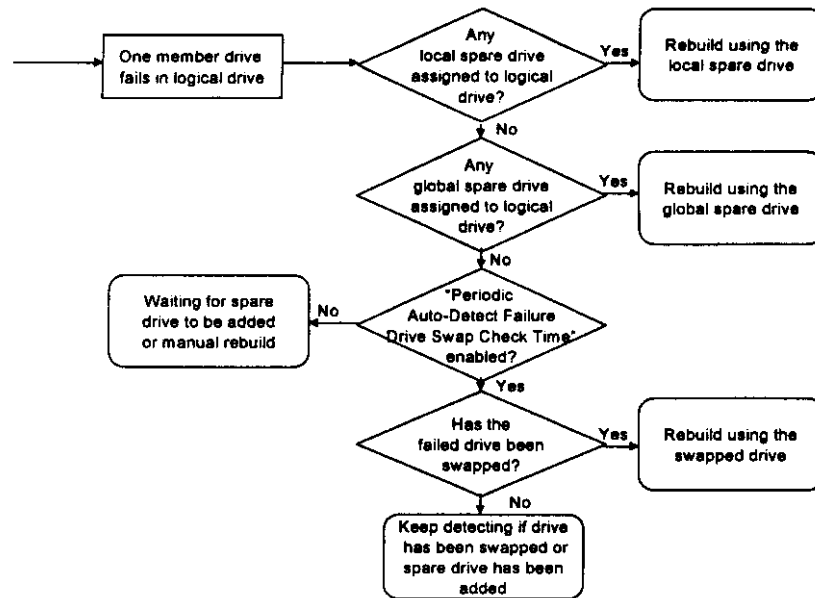
You will need to make adjustments in the following four submenus: Peripheral Device Type, Peripheral Device Qualifier, Device Support for Removable Media, and LUN Application. Different host operating systems require different adjustments. Look at the table below to find the proper settings for your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

**Peripheral Device Type Parameters Reference  
for Various Operating Systems:**

<b>Operating System</b>	<b>Peripheral Device Type</b>	<b>Peripheral Device Qualifier</b>	<b>Device Support for Removable Media</b>	<b>LUN Applicability</b>
NT 4.0	1f	connected	disabled	All Undefined LUNs
NT 5.0	3	connected	enabled	All Undefined LUNs
NetWare 4.x	3	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

### 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.



**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 default ID of the controller's channel 0 is '7'.
5. Connect the other end of the drive SCSI cable to one of the remaining channel on the controller.
6. Connect the connectors located at the middle of the drive SCSI cable to the hard disk(s).
7. Terminate the SCSI cable by installing an external terminator on the last connector. Terminators on all the hard drives must be removed so that removing a hard drive will not affect cable termination.

## **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

## 3.3 Disk Array Parameters

### 3.3.1 Rebuild Priority

Rebuilding time will depend on the capacity of the logical drive. The IFT-3102U2 RAID controller provides background rebuilding ability. Meaning, the controller is able to serve other I/O requests while rebuilding the logical drives. The rebuilding process is totally transparent to the host computer or the operating system.

The background rebuild process has four priority options:

- Low
- Normal
- Improved
- High

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

Rebuild priority can be configured through the RS-232C Terminal Interface, 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.*

select "View and Edit Configuration ..", then press ENT.

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.

instructions on configuring the hard drive using the "Spin-up by SCSI command". The procedure for each brand/model of hard drive should vary.

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



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

### 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.

### 3.5.4 SCSI I/O Timeout

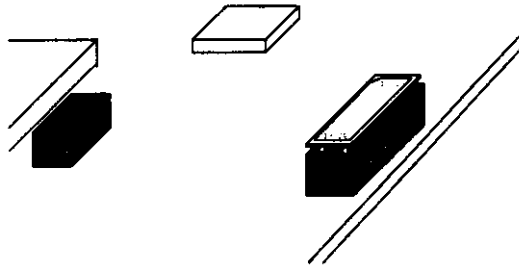
The "SCSI I/O Timeout" is the time interval that the controller waits for a drive to respond. If the controller attempts to read data from or write data to a drive, but the drive does not respond within the SCSI I/O timeout value, the drive will be judged to be a failed drive.

When the drive itself detects a media error while reading from the drive platter, it will retry the previous reading or recalibrate the head. When the drive has encountered a bad block on the media, it has to



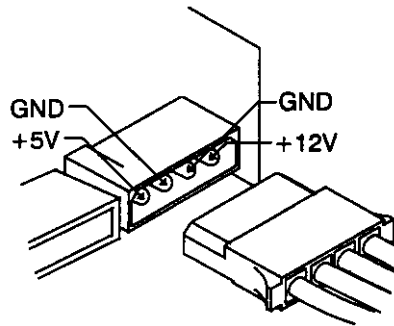
**NOTE:**

*It is a must to install the socket plug back to JP2 once you have removed the IFT-9070 battery backup daughterboard. The controller will not work if you fail to do so.*



#### **4.5 Power Connection**

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



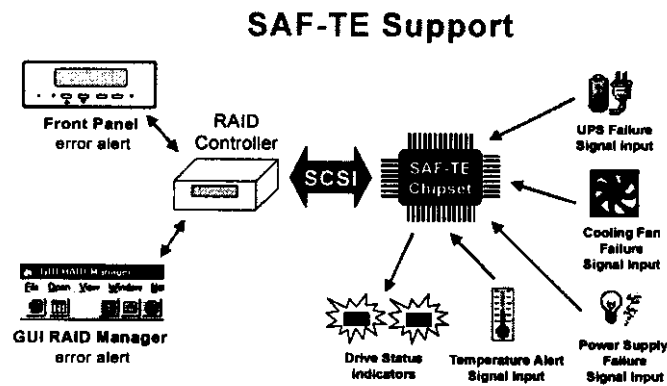


with the controller. A SAF-TE-compliant enclosure monitors the fan temperature, power supply, UPS and also provides drive status LED's.

#### How does it work?

The SAF-TE device, which is 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 the BIOS configuration utility, Text RAID Manager and the GUI RAID Manager programs. The RAID controller communicates with the SAF-TE enclosure with standard SCSI commands, polling the device in order to get SAF-TE information.

The default value for "Periodic SAF-TE Device Check Time" is "Disabled". If the enclosure does have a SAF-TE device and features, enable the controller to poll the device by selecting a time interval. The RAID controller will then check the SAF-TE device status at that interval.



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

### 3.5.8 Periodic Auto-Detect Failure Drive Swap Check Time

The "Drive-Swap Check Time" is the interval at which the controller checks to see whether a failed drive has been swapped. When a logical drive's member drive fails, the controller will detect the failed drive

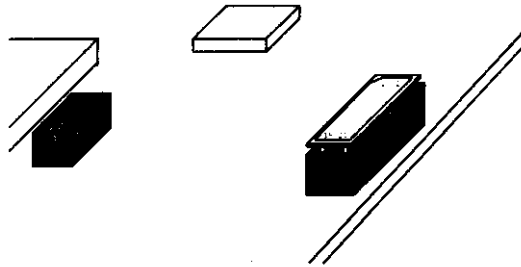
## 4.4 Battery Back-up

The IFT-3102U2 controller operates using cache memory. However, when power failure occurs, the cache memory may contain buffered data that has not yet been written to the hard disks. These buffered data are not retrievable when power returns.

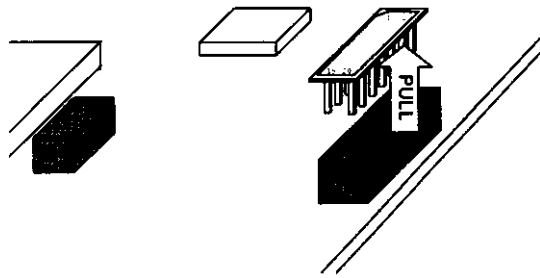
To avoid this from happening, a battery back-up solution (IFT-9070 and IFT-9010) is available to provide up to 100 hours of back-up time. The IFT-9070 is a battery backup daughter board that plugs into the controller. The IFT-9010 is a battery pack that connects to the IFT-9070 battery backup daughter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

**To install the battery backup daughter board and battery pack:**

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

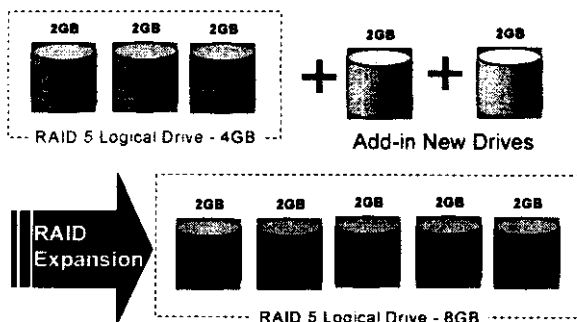


2. Locate for the female pin socket (JP2) on the IFT-3102U2 mainboard. Remove the socket plug that is on JP2.



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-stripped onto the original and newly added disks.

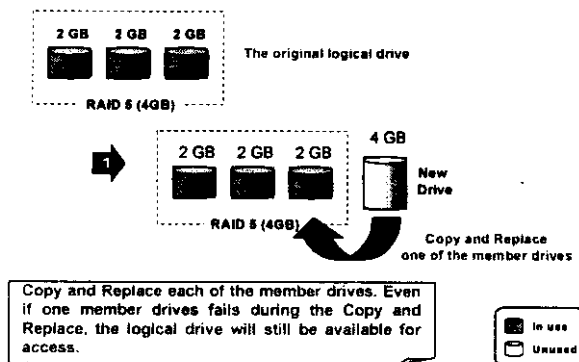
### RAID Expansion - Mode 1



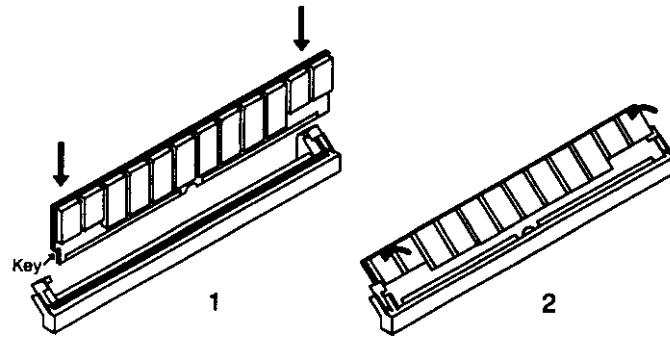
In the figure above, new drives are added to increase the capacity of a 4-Gigabyte RAID 5 logical drive. The two new drives increase the capacity to 8 Gigabytes.

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)



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



**IMPORTANT:**

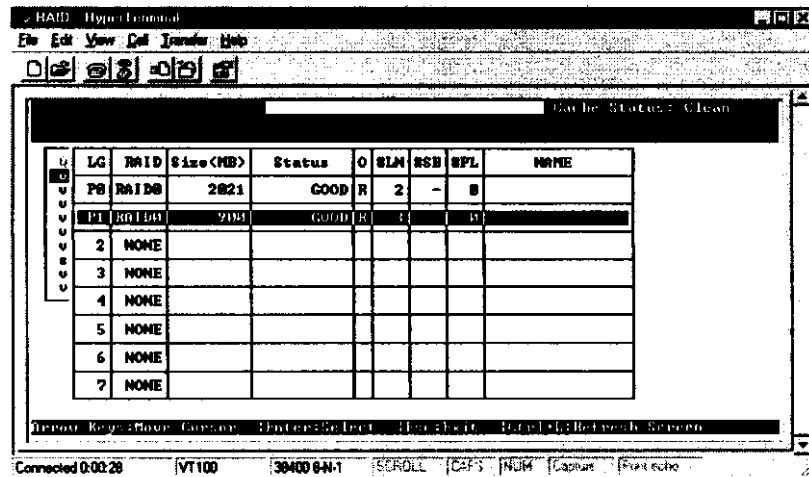
- The increased capacity from Mode 1 Expansion of a logical drive will be a new partition.
- At the time of this printing, the firmware does not support the "Copy and Replace" function that is required for Mode 2 Expansion. Third-party hard disk utilities may be used for Mode 2 Expansion of logical drives.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

**3.6.3 Example: RAID Expansion in Windows NT® Server***Limitations When Using Windows NT® 4.0*

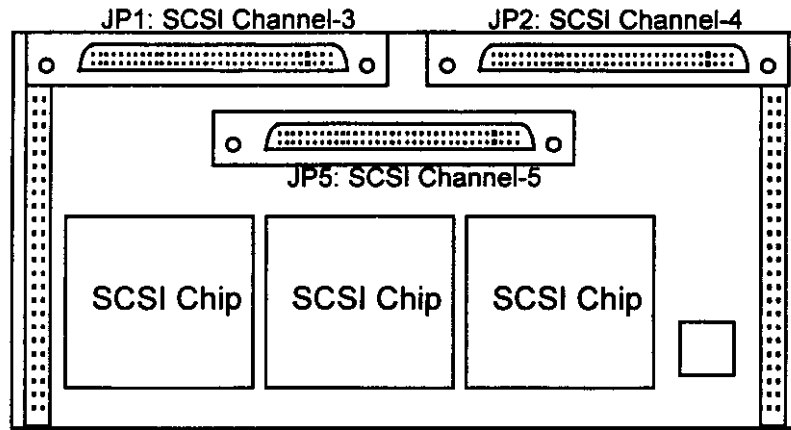
1. Only the Windows NT® Server Disk Administrator includes the Extend Volume Set function; Windows NT® Workstation does not have this feature.
2. The system drive (boot drive) of a Windows NT® system cannot be extended.
3. The drive that will be extended should be using the NTFS file system.

*The Example:*

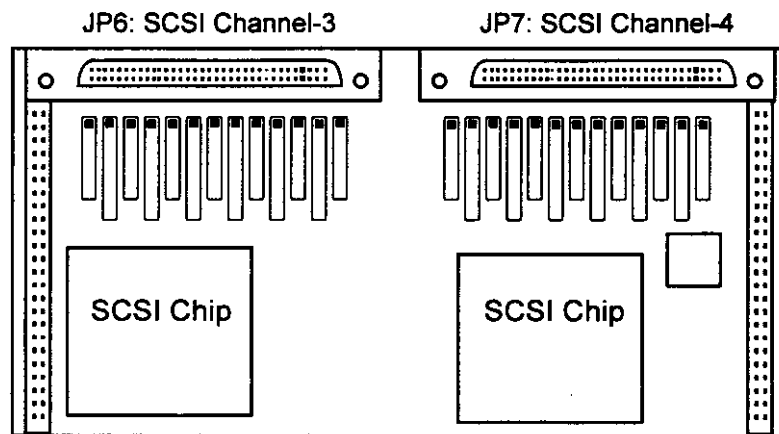
The following example demonstrates the expansion of a 900MB RAID 0 logical drive. The HyperTerminal emulation software that comes with Windows 95®/Windows NT® is used to connect to the RAID controller via RS-232.



#### 4.1.4 Top View of the Daughter Board (IFT-9073UWS)

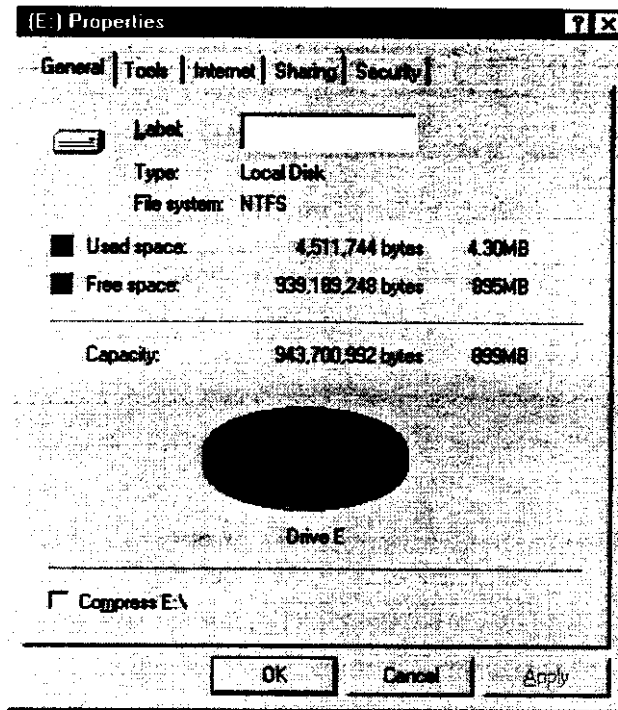


#### 4.1.5 Top View of the Daughter Board (IFT-9072UWD)



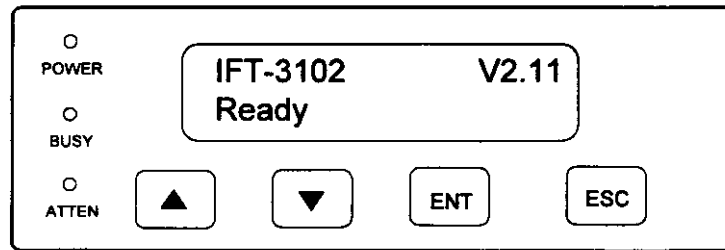
- Pin 1 of the terminator resistors

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.



## Chapter 4 Hardware Installation

### 4.1 Locations of the Parts

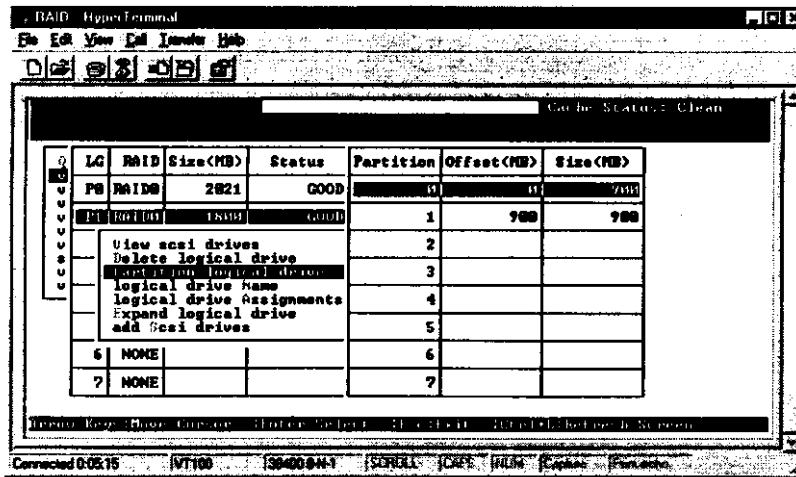


#### 4.1.1 Front View

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

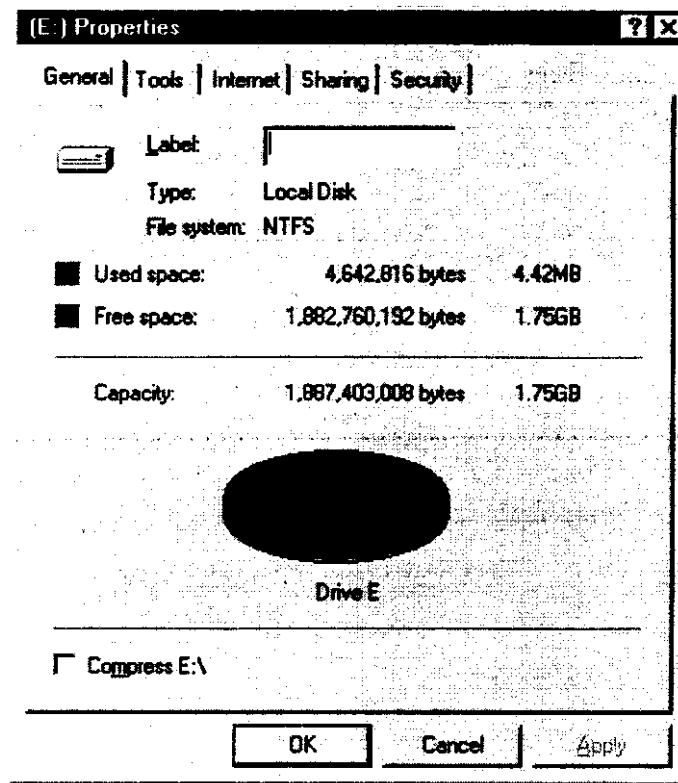


From the menu, select Partition Logical Drive. You will see that the 1800MB logical drive is composed of two 900MB partitions.

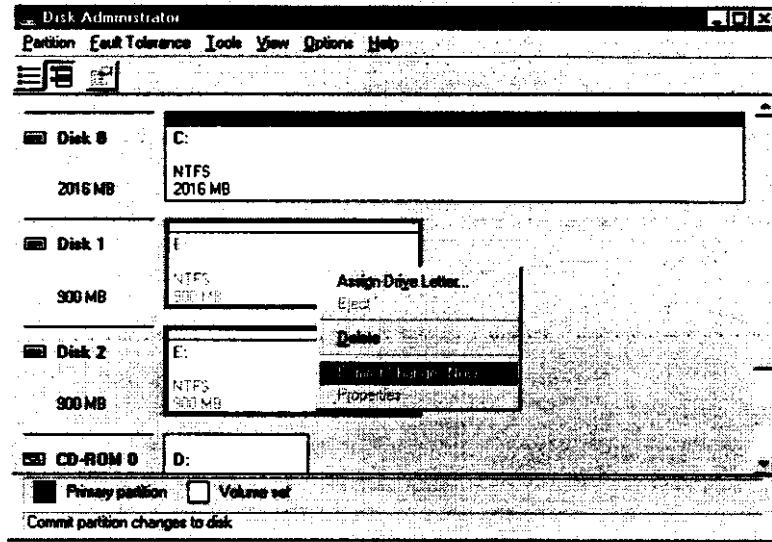


Follow the directions in section 7.3.1 to map the new partition to a Host LUN. The new partition must be mapped to a host LUN in order for the HBA (host-bus adapter) to see it. Once you have mapped the partition, reboot Windows NT®. The HBA should be able to detect an additional "disk."

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

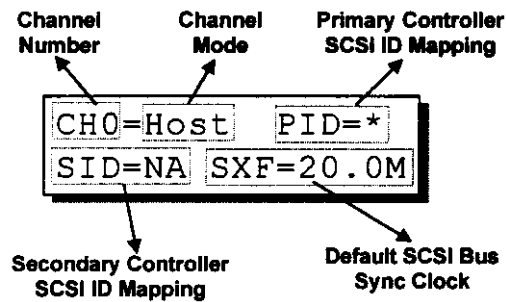


The screen will display that volume set of Drive E: has been extended by the 900MB in Disk2. Move the cursor to "Commit Changes Now" to confirm that you want the free space to become a part of the same logical drive.



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:

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 ↓
```

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 ?
```

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
..
```

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.*



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 ?
```

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
```

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 ↓
```

**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>.



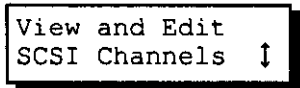
**IMPORTANT:**

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.

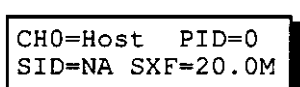
**7.5 Viewing and Editing SCSI Channels**

**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.



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



### 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.
- 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 ?

## 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 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
```

ENT. The current slot number will be displayed on the LCD.

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

```
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 clock setting will be displayed on the LCD.

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

Press ENT for two seconds to change the setting.

```
Max Xfer Narrow
Only ?
```



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 Params", then press ENT.

```
View and Edit
Config Params ↓
```

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 ..
```

### 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 ?

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

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

```
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 ParmS
```

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

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



**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**

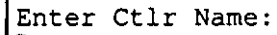
Press ▼ or ▲ to select "On LD Initialize Writes", then press ENT. The current setting will be displayed on the LCD.

On LD Initialize Writes Disabled.

Press ENT for two seconds to confirm the setting.

Enable VerifyOn LD Init Writes ?

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 Ctrl Name:  
█

## 7.7 Viewing and Editing Peripheral Devices

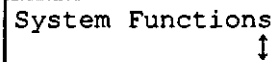
Refer to Chapter 9 for information on the Redundant Controller and Chapter 12 for information on the Fault-bus operation.

## 7.8 System Functions

### 7.8.1 Mute Beeper

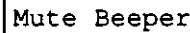
This function does not permanently turn off the beeper. It mutes the beeper once and will bring back the beep alarm on the next event.

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  
..

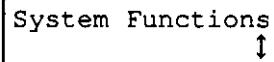
Press ENT for two seconds to mute the beeper.



Mute Beeper  
?

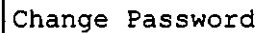
### 7.8.2 Changing the Password

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



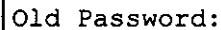
System Functions  
↓

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



Old Password:  
█

Press ▼ or ▲ to browse through the following:

1. CPU type
2. RAM type (DRAM or EDO) and size
3. Firmware version
4. Bootrecord version
5. Serial number
6. Battery backup status
7. Controller name

RAM Type: DRAM  
RAM Size: 8MB

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.*



<b>Status</b>	Logical Drive Status.
<b>INITING</b>	The logical drive is now initializing.
<b>INVALID</b>	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".
<b>GOOD</b>	The logical drive is in good condition.
<b>DRV FAILED</b>	A drive member failed in the logical drive.
<b>REBUILDING</b>	Rebuilding the logical drive.
<b>DRV ABSENT</b>	One of the drives cannot be detected.
<b>INCOMPLETE</b>	Two or more drives failed in the logical drive.
<b>#OnLine</b>	Total drive members in the logical drive.
<b>#STB</b>	Standby drives available for the logical drive. This includes all the spare drives available for the logical drive.
<b>#Fail</b>	Failed drive member in the logical drive.
<b>Name</b>	Logical drive name.



The Global Spare Drive's LG\_DRV column will show "Global".

**NEW DRV** The new drive has not been configured to any logical drive or as a spare drive.

**USED DRV** The used drive has not been configured to any logical drive or as a spare drive.

**BAD** Failed drive.

**ABSENT** Drive does not exist.

**MISSING** Drive once exist, but is missing now.

**SB-MISS** Spare drive missing.

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

### 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	NR	20.0MHz	Wide	On	Async	Narrow
1	Drive	7	NR	20.0MHz	Wide	On	20.0MHz	Wide
2	Drive	7	NR	20.0MHz	Wide	On	Async	Narrow

Arrow Keys: Move Cursor    Enter: Select    Esc: Exit    F1/F2/F3: 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:

(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

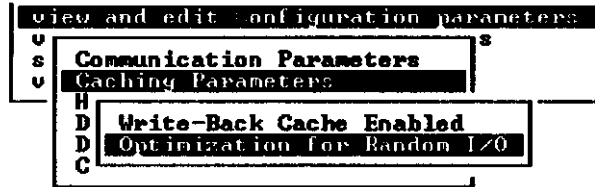
(empty) The default SCSI bus width has changed. Reset the controller for the changes to take effect.



**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".

Cache Status: Clean

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

Display Key: Move Cursor: Enter>Select: Esc|Quit: F6|Ctrl-Alt-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	#P	RAID Lvl	NAME
0									
1									
2									
3									
4									
5		NONE							
6		NONE							
7		NONE							

Q	Slot	Chl	ID	Size(MB)	Speed	LG_DRU	Status	Vendor and Product ID
1	1	3		1010	3000	NONE	USED DRU	SEAGATE ST31055W
2	1	1		1010	3000	NONE	USED DRU	SEAGATE ST31055W
3		1	2	1010	4000	NONE	USED DRU	SEAGATE ST31055W
4		1	4	1010	4000	NONE	USED DRU	SEAGATE ST31055W
5								
6								
7								

Display Key: Move Cursor: Enter>Select: Esc|Quit: F6|Ctrl-Alt-Refresh: Screen

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

displayed on the screen. After initialization is done, the created logical drive is also complete.

JB:8z Cache Status: Clean

Q	LG	RAID	Size(MB)	Status	#OnLine	#STB	#Fail	NAME
0	0	NONE		Initializing				
1								
2								
3				8x Completed				
4	NONE							
5	NONE							
6	NONE							
7	NONE							

Temp Key: Move Cursor (Enter): Select (Esc): Exit (Ctrl): Refresh Screen

## 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

Q	LG	RAID	Size(MB)	Status	#OnLine	#STB	#Fail	NAME
0	0	RAID	2024	GOOD	0	0	0	
1								
2								
3								
4	NONE							
5	NONE							
6	NONE							
7	NONE							

Temp Key: Move Cursor (Enter): Select (Esc): Exit (Ctrl): 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.



Cache Status: Clean

RG:44z

Q	LG	RAID	Size(MB)	Status	#Online	#StB	#Fail	NAME
0	PD	RAID5	2021	REBUILDING	3	0	0	
1				Rebuilding				
2								
3								
4								
5								
6								
7								

44x Completed\_

U  
D  
P  
I

Enter: Key: Move Cursor Enter: Select Help: Exit F0: F1: Refresh Screen

The rebuilding progress will be displayed on the screen.

Cache Status: Clean

RG:22z

Q	LG	RAID	Size(MB)	Status	#Online	#StB	#Fail	NAME
0	PD	RAID5	2021	REBUILDING	3	0	0	
1								
2								
3								
4								
5								
6								
7								

View scsi drives  
Delete logical drive  
Partition logical drive  
logical drive Name  
Rebuild progress  
logical drive assignments

U  
D  
P  
I

Enter: Key: Move Cursor Enter: Select Help: Exit F0: F1: 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.

Cache Status: Clean

Q	LG	RAID	Size(MB)	Status	O	SLM	SSB	SFL	NAME	
0	PM	RAID0	2048	GOOD	R	2		R		
1				Adding						
2				25x Completed_						
3										
4	NONE									
5	NONE									
6	NONE									
7	NONE									

Report Key: Home, Control, F1:Enter/Select, F2:Exit, F3:OK, Release Screen

A status bar will indicate the progress of adding the SCSI drives.

Cache Status: Clean

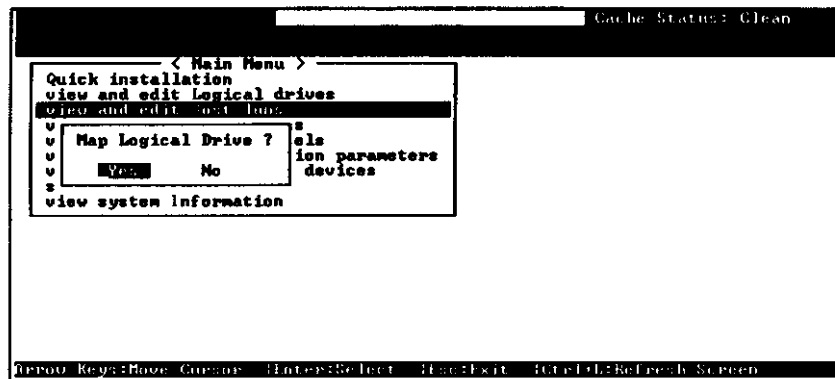
Q	LG	RAID	Size(MB)	Status	O	SLM	SSB	SFL	NAME	
0	PM	RAID0	4096	GOOD	R	4		R		
1	NONE			NOTIFICATION						
2	NONE			[210A] Add SCSI Drive to Logical Drive 0 Completed						
3	NONE									
4	NONE									
5	NONE									
6	NONE									
7	NONE									

ESCSI New Next Message: F0:ESC:Clean/ESC:Message: F0:ESC:Release Screen

Upon completion the new volume will be displayed for the logical drive.

## 8.3 Viewing and Editing Host LUNs

### 8.3.1 Mapping a Logical Drive to a Host LUN



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



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



Cache Status: Clean

< Main Menu >

Quick installation  
view and edit Logical drives

LUN	LG_DRU	Partition	Size(MB)	RAID
0				

view and edit Logical drives

Host	LG	RAID	Size(MB)	Status	SOOnline	SSTB	SFail	NAME
0	0	RAID0	2021	GOOD	1	0	0	
1								
2								
3								
4								
5								
6								
7								

Host  
0  
1  
2  
3  
4  
5  
6  
7

view  
sys  
view

ID 3 (Primary Controller) 3  
ID 5 (Primary Controller) 4  
ID 6 (Primary Controller) 5  
ID 6 (Primary Controller) 6  
ID 6 (Primary Controller) 7

INFO Key: F1-F6 Cursor Enter>Select Esc Exit Ctrl-D: 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  
view and edit Logical drives

LUN	LG_DRU	Partition	Size(MB)	RAID
0				

view and edit Logical drives

Host	LG	RAID	Size(MB)	Status	SOOnline	SSTB	SFail	NAME
0	0	RAID0	2021	GOOD	1	0	0	
1								
2								
3								
4								
5								
6								

Host

ID	Partition	Offset(MB)	Size(MB)	F	R	B
0						
1						
2						
3						
4						
5						
6						

ID  
ID 3  
ID 5  
ID 6

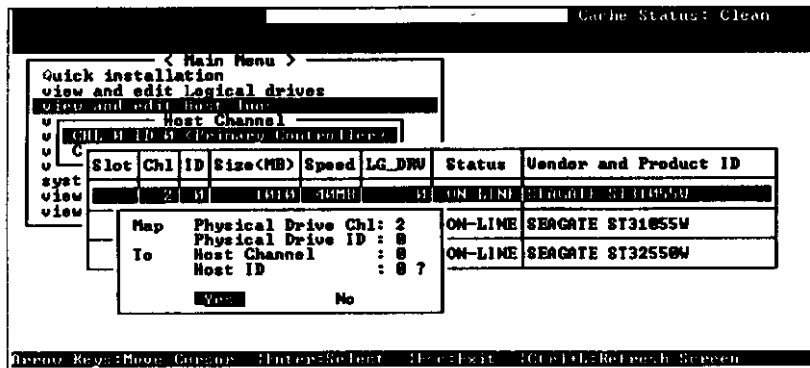
view  
sys  
view

ID 3  
ID 5  
ID 6

INFO Key: F1-F6 Cursor Enter>Select Esc Exit Ctrl-D: Refresh Screen

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

### 8.3.3 Pass-through SCSI Commands



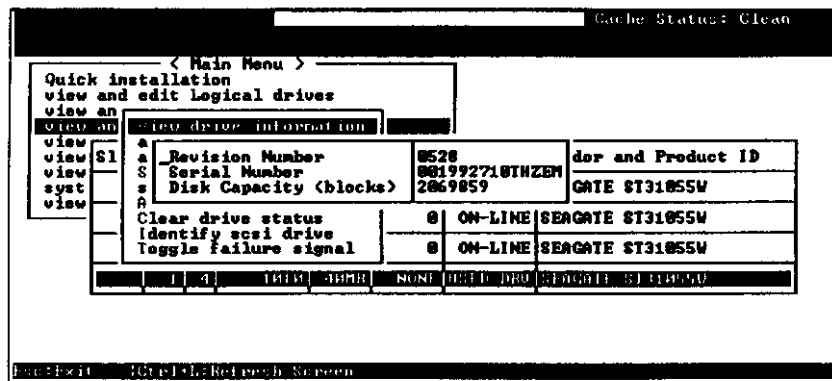
If you have primary and secondary controllers, move the cursor to the controller for the device that you wish to map; then press [Enter]. You will be prompted to map a SCSI ID to a physical drive.

#### WARNING:



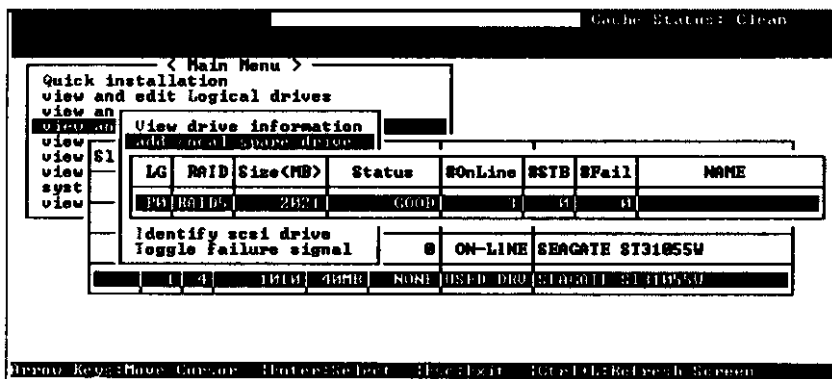
- *Pass-through SCSI Commands are only intended to perform maintenance functions for a drive or device on the drive side. Do not perform any destructive commands to a disk drive (i.e., any commands that write data to a drive media). If a disk drive is a spare drive or a member of a logical drive, such 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.*

## 8.4.2 Viewing Drive Information



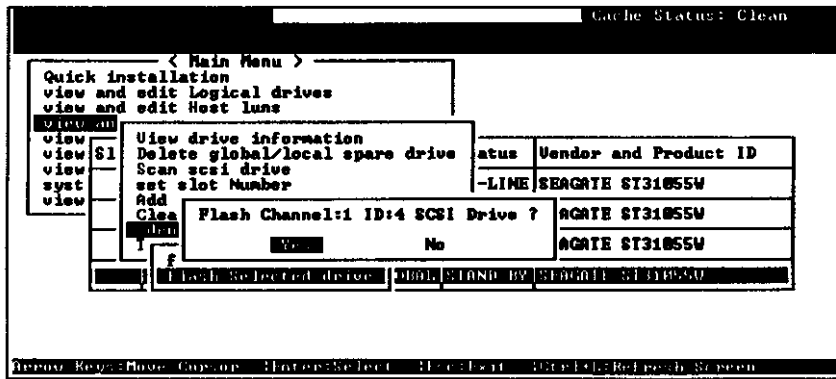
Choose the SCSI drive you wish to view, then press [Enter]. Select "View drive information". The revision number, serial number and disk capacity (counts in block; one block refers to 512K) of the drive will be displayed on the screen.

## 8.4.3 Adding a Local Spare Drive



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

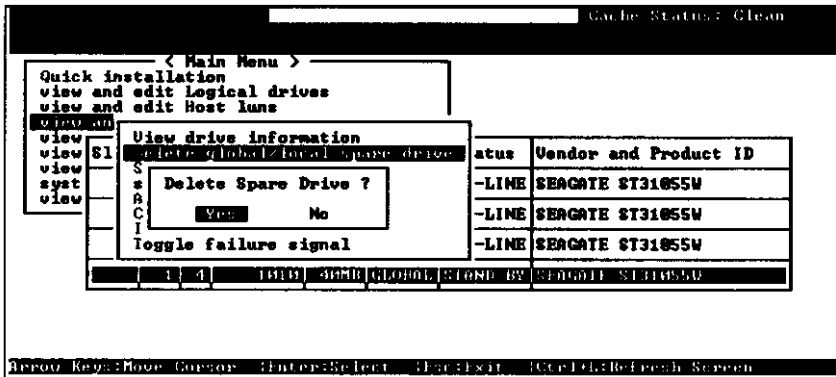
When prompted with "Add Local Spare Drive?", choose Yes.



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.





**IMPORTANT:**

- 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".

**Read/Write Test**

Cache Status: Clean

< Main Menu >

Quick installation  
view and edit logical drives  
view and edit Host luns  
view and edit SCSI Drives:

Slot	Chl	ID	Size(MB)	Speed	LG_DRU	Status	Vendor and Product ID
2	0	0	1024	3000	NONE	RAW TEST	SEAGATE ST31055W
							SEAGATE ST32550W

Scan sc  
set  
add  
Clear  
[ESC]

Execute Drive Testing ?  
Yes No  
abled - Disabled its

Execute Drive Testing  
Read/Write Test

Home, Help, Exit, Cancel, Enter to go to, Esc to exit, F1 for Help, Refresh Screen

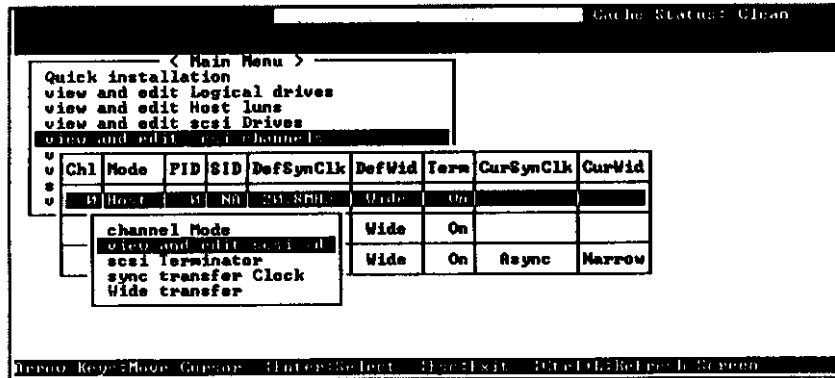
Choose "Read/Write Test"; then press [Enter]. The following options are available for the test: the automatic reassignment of bad blocks (choose "Enabled" or "Disabled"), aborting the test when an error occurs (choose "Enabled" or "Disabled"), and testing the drive for "Read and Write" or for "Read Only". To begin the test choose "Execute Read/Write Test"; confirm by selecting Yes.



**IMPORTANT:**

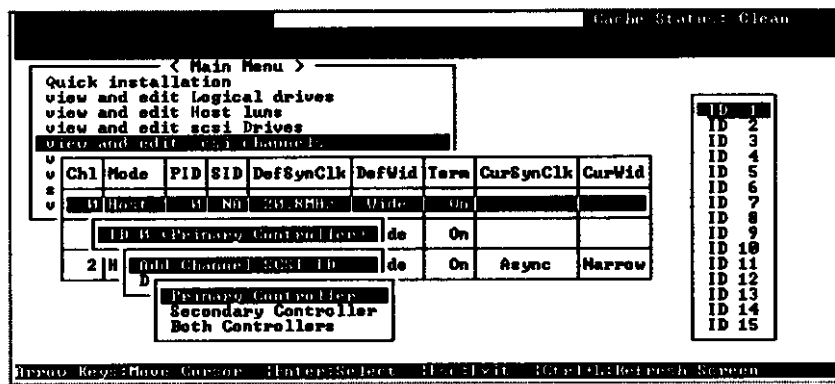
The option to run these utilities disappears after you have created a logical drive. This is because running these utilities will destroy data on a hard disk drive.

## 8.5.2 Viewing and Editing a SCSI ID / Host Channel



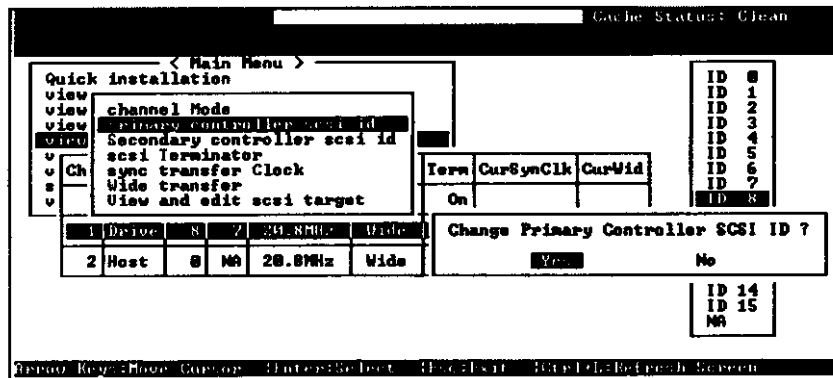
Choose a Host channel, then press [Enter]. Choose "View and Edit SCSI ID". A list of the existing ID(s) will be displayed on the screen.

### 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.

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



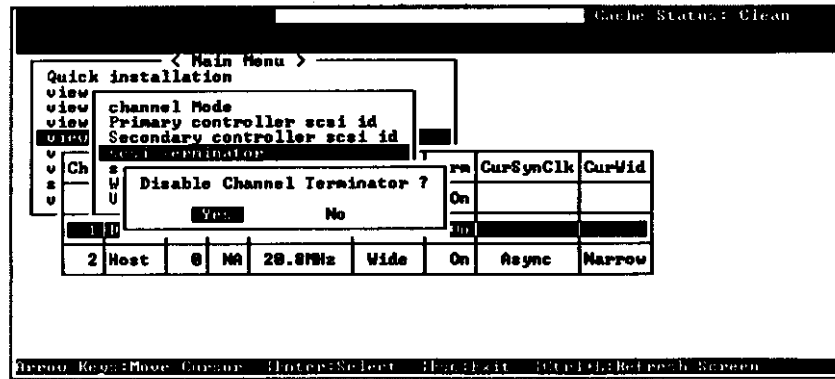
Choose a Drive channel, then press [Enter]. Choose "Primary Controller SCSI ID". A list of SCSI IDs will be displayed on the screen. Only one SCSI ID can be assigned to the drive channel of a controller. Now choose a SCSI ID for the drive channel of the Primary Controller. The dialog box "Change Primary 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 can be applied to the Host channel while the Drive channel, one SCSI ID or no SCSI ID.
- At least a controller's SCSI ID has to be present on the SCSI bus.

## 8.5.5 Setting a SCSI Channel's Terminator



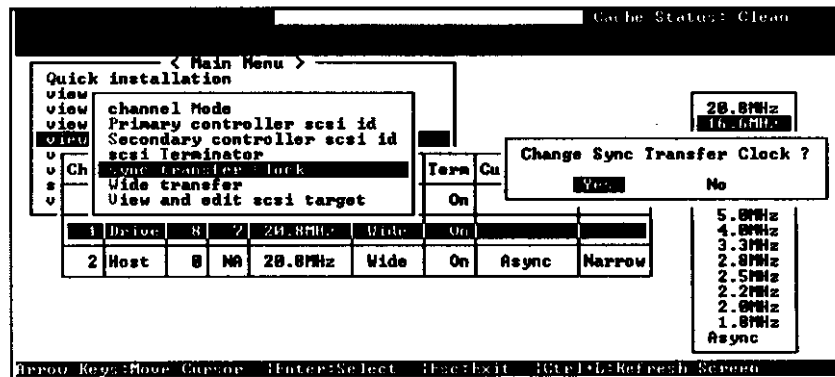
Choose the channel you wish the terminator enabled or disabled, then press [Enter]. Choose "SCSI Terminator", then press [Enter]. A dialog box will appear. Choose Yes, then press [Enter].



### IMPORTANT:

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

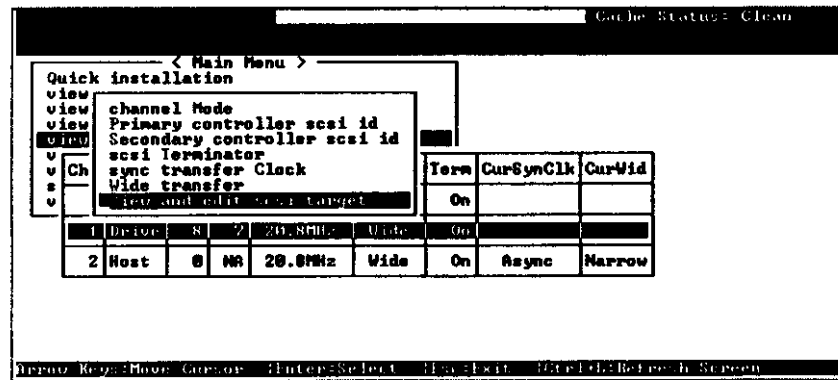
## 8.5.6 Setting a Transfer Speed



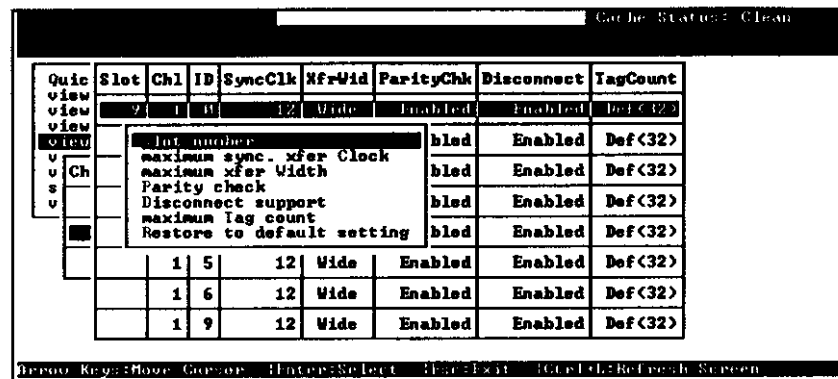
Move the cursor bar to a channel, then press [Enter]. Choose "Sync Transfer Clock", then press [Enter]. A list of the clock speed will



## 8.5.8 Viewing and Editing SCSI Target / Drive Channel



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



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.



## Restoring the Default Setting

Cache Status: Clean								
Quick view	Slot	Chl	ID	SyncClk	NfrWid	ParityChk	Disconnect	TagCount
view	2	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	Def(32)
view	Restore to default setting?					bled	Enabled	Def(32)
	Restore SCSI Target to default setting ?							Def(32)
	Yes					No		Def(32)
	1	9		12	Wide	Enabled	Enabled	Def(32)

Arrow: Move Cursor Enter: Select F1:Exit F2:Label Refresh Screen

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.

## 8.6 Viewing and Editing Configuration Parameters

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 Communication Parameters							
view and edit Caching Parameters							
view and edit Host-side SCSI Parameters							
view and edit Drive-side SCSI Parameters							
view and edit Disk Array Parameters							
view and edit Controller Parameters							

Arrow: Move Cursor Enter: Select F1:Exit F2:Label Refresh Screen

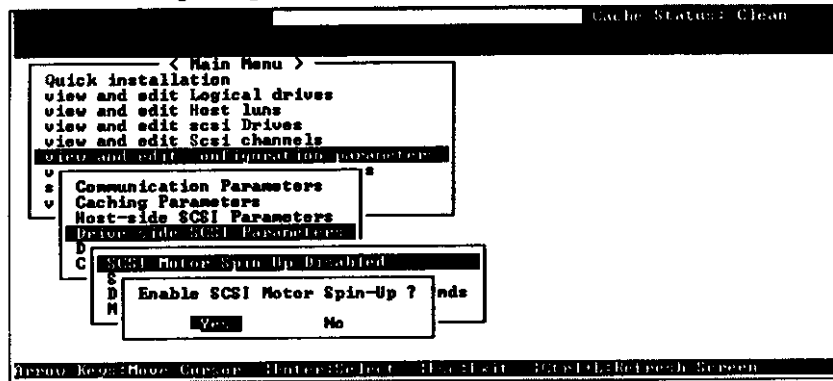
Choose "View and Edit Configuration Parameters", then press [Enter]. Move the cursor bar to the desired item, then press [Enter].

### 8.6.1 Communication Parameters

Refer to Chapter 11, Remote Administration for more information.

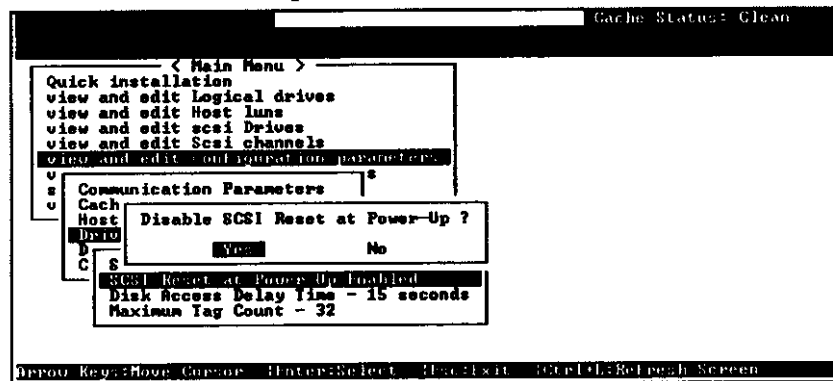


## SCSI Motor Spin-Up



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



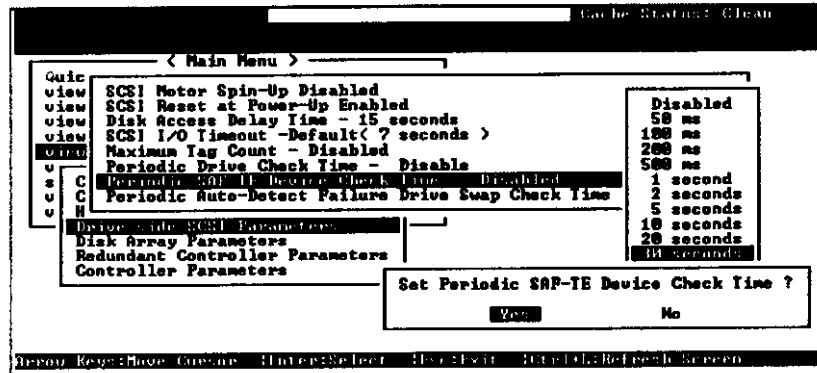
Choose "SCSI Reset at Power-Up", then press [Enter]. Choose Yes in the dialog box that followed to confirm the setting.



**IMPORTANT:**

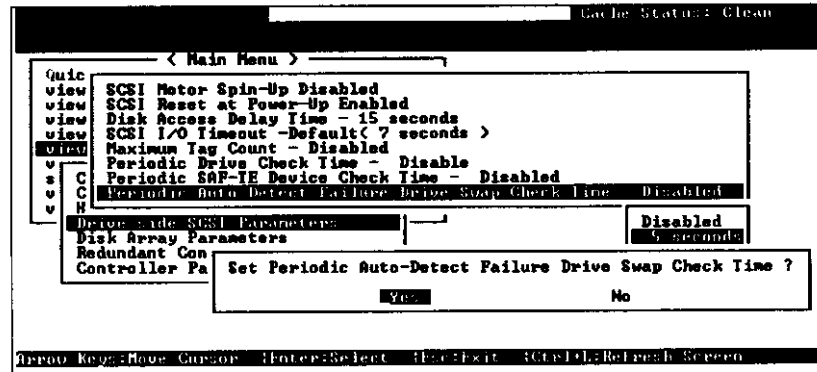
- Every time you change this setting, you must reset the controller for the changes to take effect.
- Disabling Tag Command Queuing will disable the Write-Back cache built in the hard drive.

**SAF-TE Enclosure Monitoring**



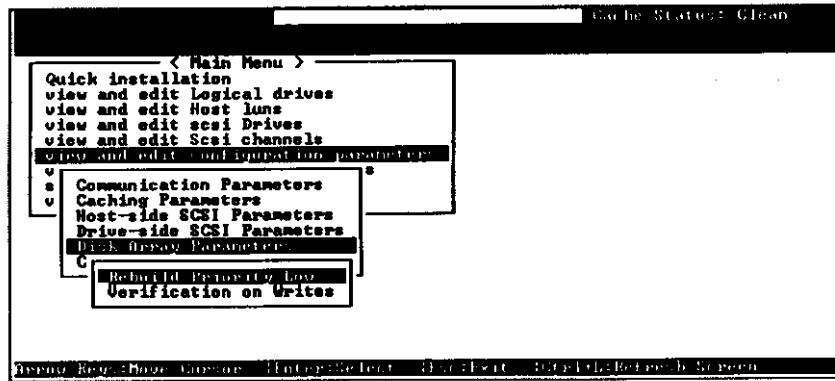
Choose "Periodic SAF-TE Device Check Time - Disabled"; then press [Enter]. Move the cursor to the desired interval; then press [Enter]. Choose Yes in the dialog box that follows to confirm the setting.

**Detection of Drive Hot Swap Followed by Auto Rebuild**



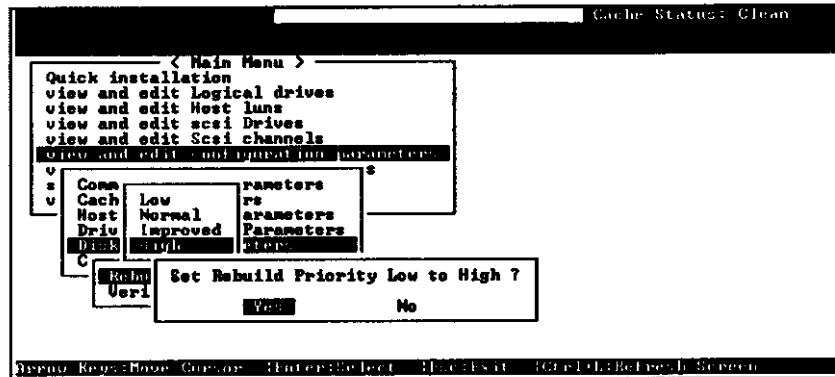
Choose "Periodic Auto-Detect Failure Drive Swap Check Time"; then press [Enter]. Move the cursor to the desired interval; then press [Enter]. Choose Yes in the dialog box that follows to confirm the setting.

## 8.6.5 Disk Array Parameters



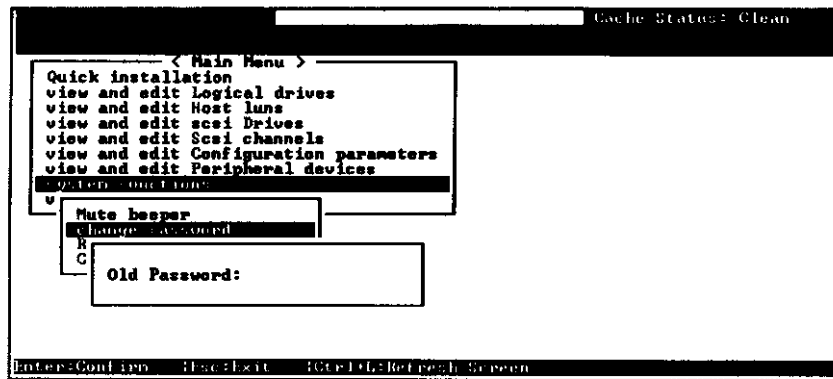
Choose "Disk Array Parameters", then press [Enter]. The Disk Array Parameters menu will appear.

### Rebuild Priority



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

## 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

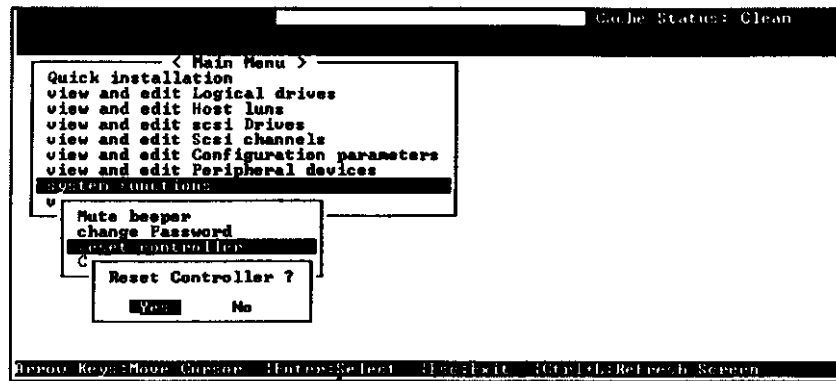
To set or change the controller password, move the cursor bar to "Change Password", then press [Enter].

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

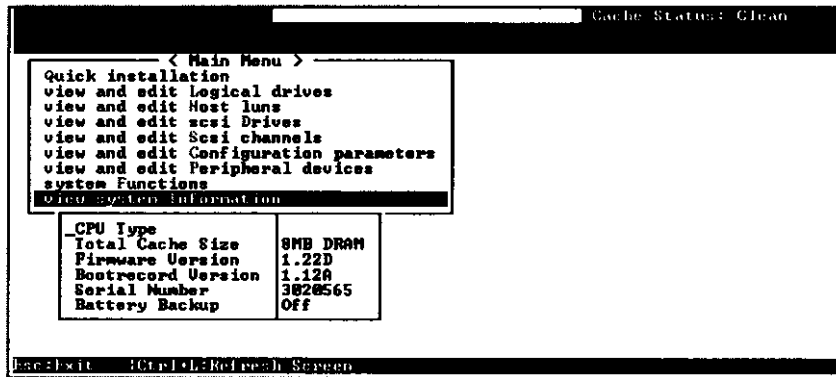


### 8.7.3 Reset Controller



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.

## 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 a lifetime. A simple memory parity error may sometimes cause a controller to completely hang up. This is the logic behind having a redundant controller - to minimize the chance of down time for the 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-3102U2 controller series. The controller has a dedicated hardware that performs cache synchronization. Using SCSI channel 0 as a cache synchronizing port, 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-3102U2 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-3102U2 for redundant controller communication, Write-Back Cache must be disabled. (*Refer to figure below for configuring IFT-3102U2 Active-active redundant controllers with synchronized write-back cache.*)

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**

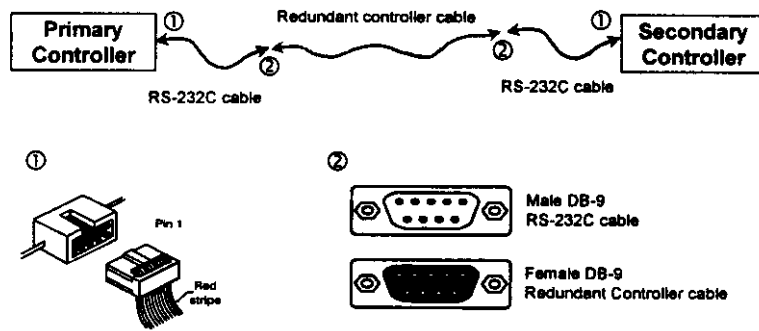
To set up the redundant function of the controllers, you must perform a few basic steps. These steps will be described later in this chapter.

- 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.*

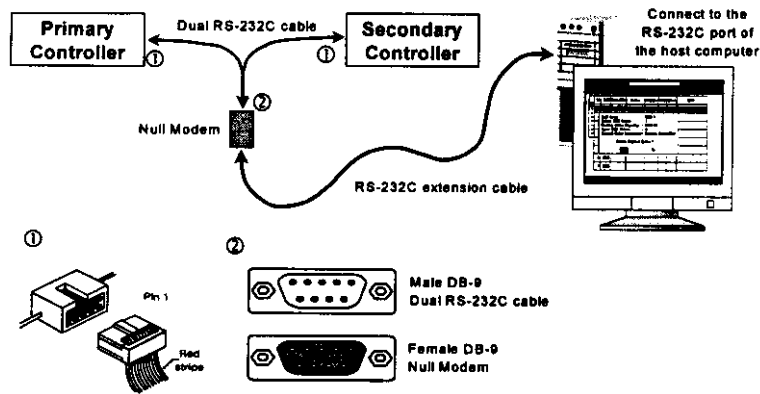
*Connecting a RS-232C cable when using the terminal interface is highly recommended but is not essential for the redundant controller's functionality.*

- Connect IFT-9013 (redundant controller cable) to the redundant controller ports of the primary and secondary controllers.



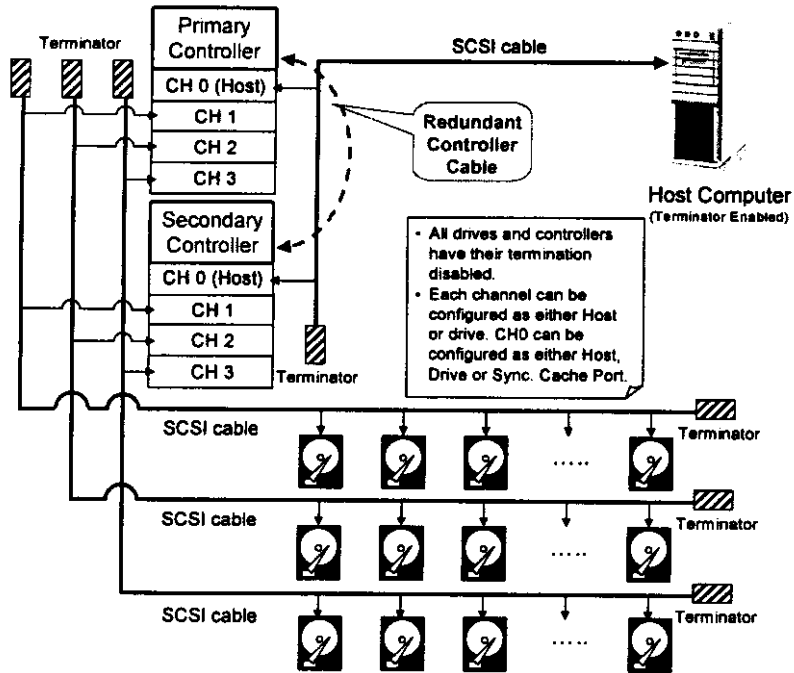
### Connecting the Controllers to the Terminal Interface

- 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.



## 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

Redundant Ctlr  
Function Disable

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

RC connecting...  
<ENT> to cancel

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.

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...

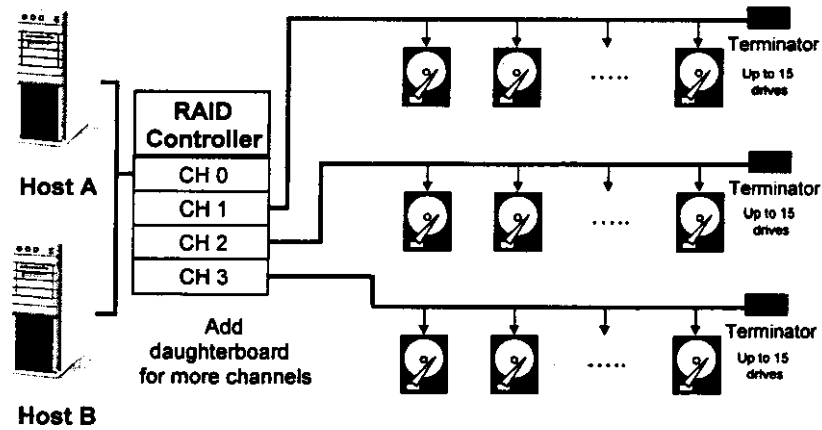
Once initialized, it will begin acting as the Secondary Controller.

IFT-3102 v2.11  
■■■■■■■



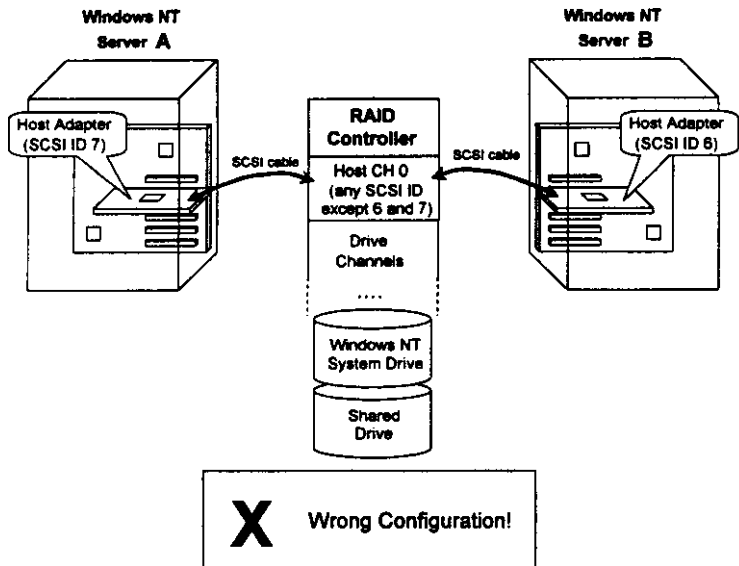
# Chapter 10 Redundant Host, Multiple Host

## 10.1 Redundant Host

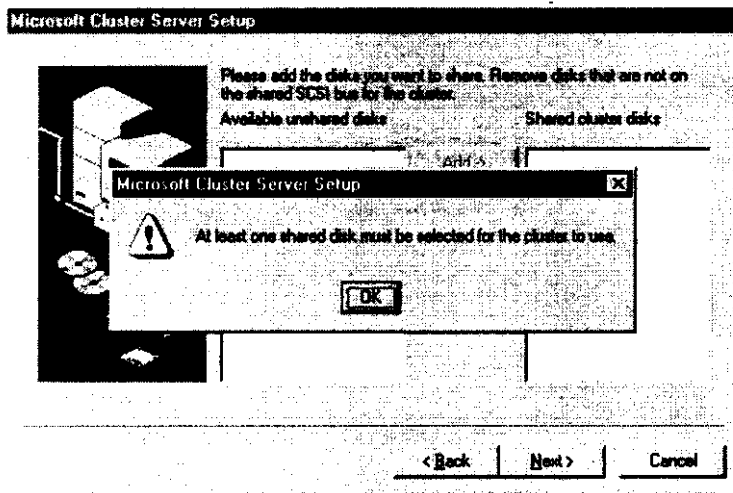


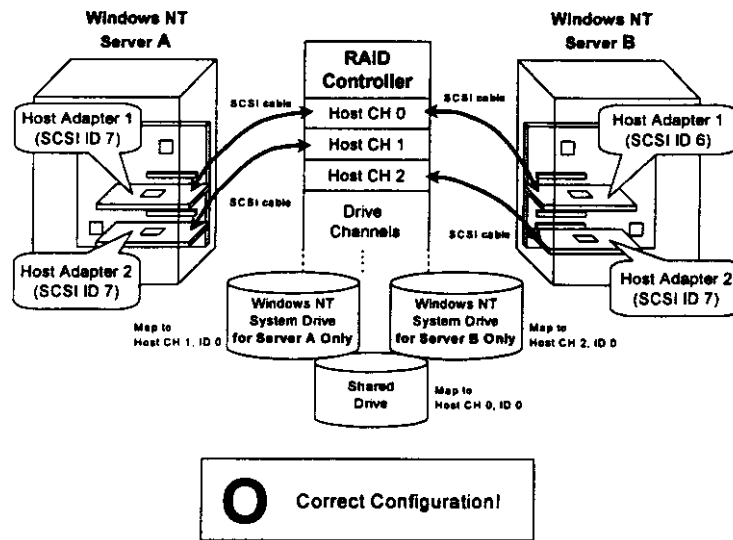
The IFT-3102U2 RAID controller can be connected to serve redundant host computers. The figure above is an example of redundant hosts.

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.



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





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.

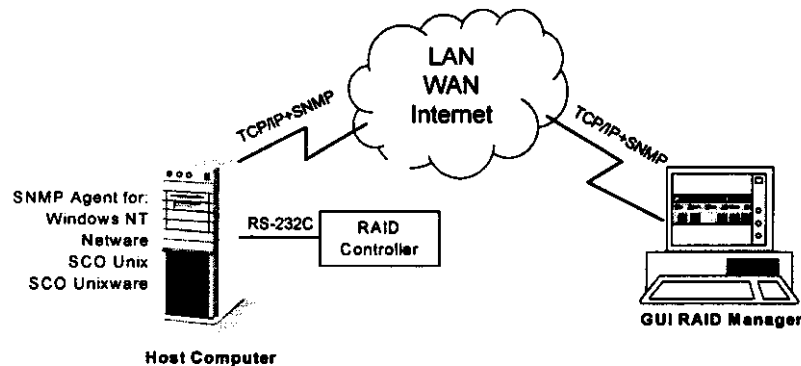
## Chapter 11 Remote Administration

The IFT-3102U2 RAID Controller can be administered remotely. When an event, warning or controller notification occurs, IFT-3102U2 will dial out to a pager to inform the administrator to take the appropriate measures.

There are several ways of administrating the controller remotely:

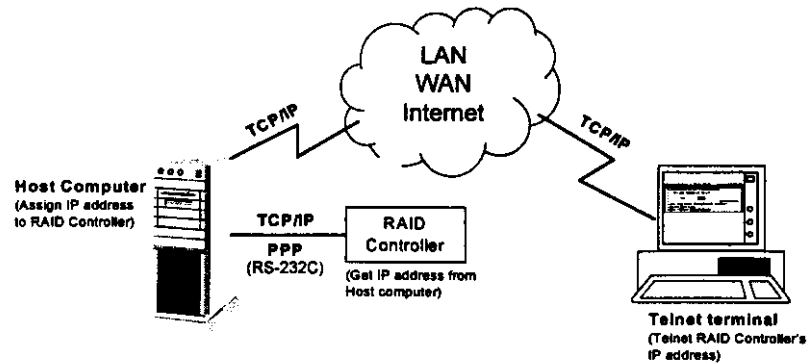
- GUI RAID Manager using SNMP service
- Remote Terminal Emulation using PPP+Telnet
- Remote Terminal Emulation using Modem
- Dial-out pager for event notifications

### 11.1 GUI RAID Manager Using SNMP Service



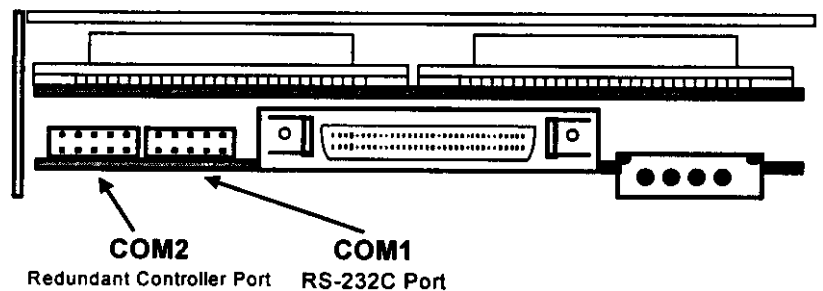
Connect the IFT-3102U2 RAID controller to the host computer via the RS-232C interface. Install the SNMP agent that corresponds to the operating system on the Host computer and enable the SNMP service. The client computer running with GUI RAID Manager will be able to remotely administer the IFT-3102U2 RAID controller.

## 11.2 Remote Terminal Emulation Using PPP+Telnet



Connect IFT-3102U2 to the host computer. Assign IFT-3102U2 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-3102U2. IFT-3102U2 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-3102U2'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.

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-3102U2 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
..
```

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 ?
```

### ***Establishing Connection Between the Host Computer and IFT-3102U2***

After setting the data routing through PPP, IFT-3102U2 will now wait for PPP to connect to the host computer. If the establishment succeeded, an IP will be given to IFT-3102U2.

### **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
..
```

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-3102U2**

Pick up a standard external modem which uses standard AT command set. Connect the modem to COM 1 or COM 2 of the IFT-3102U2 RAID controller. Complete the other connections of the modem (power cables and phone wires) and switch on the power of the Modem.

**Setting IFT-3102U2 using the RS-232C Terminal Interface**

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



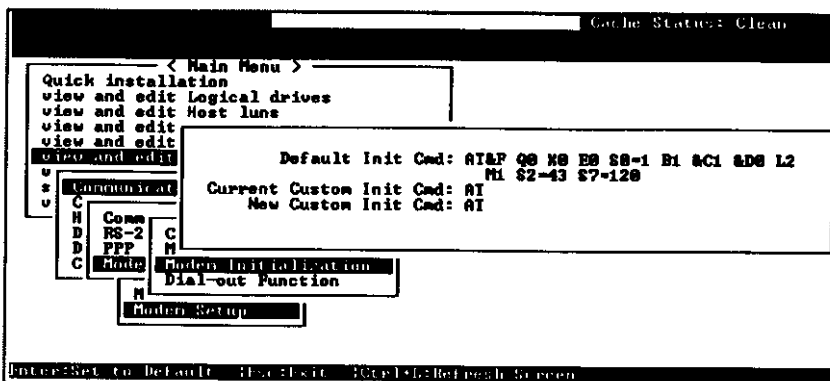
The current setting of the modem port will be displayed on the screen. If there is no modem port configured yet, it will display "Modem Port Not Configured". Press [Enter] on the selection, and choose "Configure Modem on COM 2" by pressing [Enter].



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



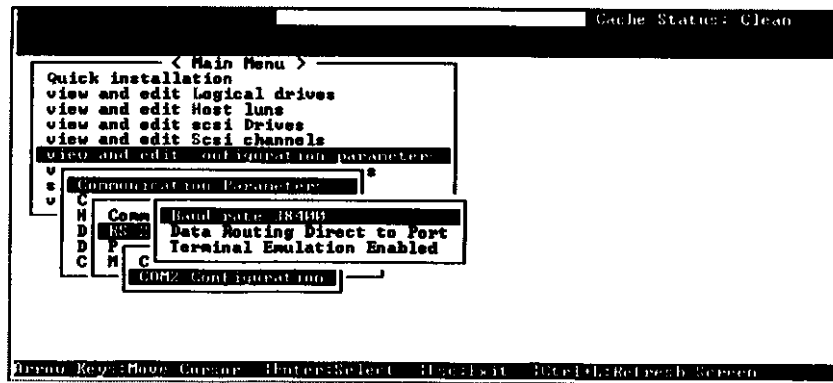
In the Modem Setup menu, choose "Modem Initialization". A dialog box will appear showing the default initialization command and the current custom initialization command. Enter the AT command in the "New Custom Init Cmd" field, if required.

### 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"

## 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-3102U2 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-3102U2 RAID controller. The modem should answer the call and start “handshaking” with the modem on the remote site. After the

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

```
Modem Operation
..
```

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 ..
```

**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 ..

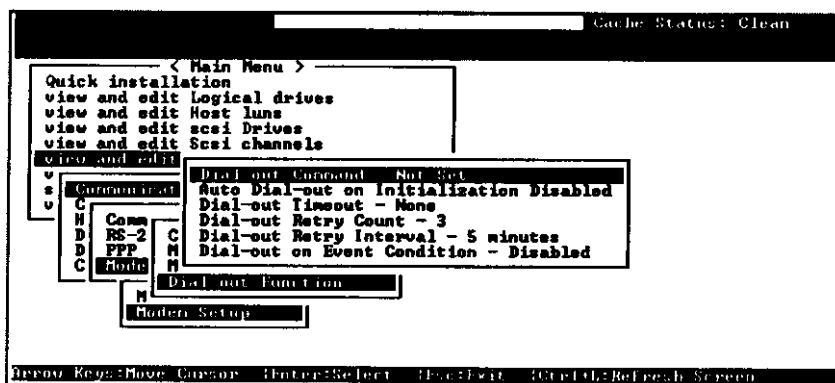
Select "Modem Status..", then press ENT.

Modem Status ..

The current connection status will be  
shown on the LCD.

Modem on COM1  
Connected

## 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].

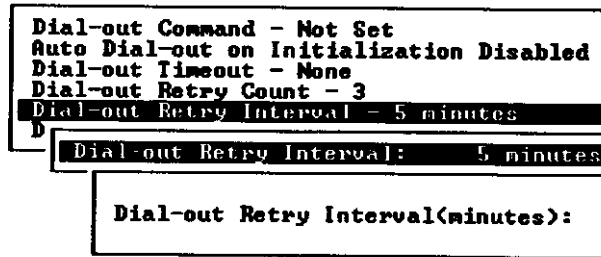
The Dial-out command is the only command that will be sent to the modem when dialing-out. If it's dialing to a pager, the pager number and message (if applicable) have to be composed in this column. If it's dialing to a remote terminal, the phone number of the remote modem has to be entered in this column.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

will appear for entering the Dial-out Retry Count. Enter the desired Dial-out Retry count in this column.

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

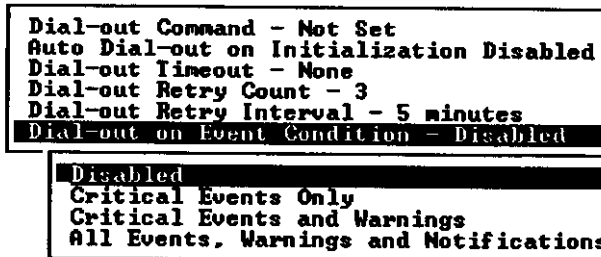
### Dial-out Retry Interval

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



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

### Dial-out on Event Condition



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

### 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.

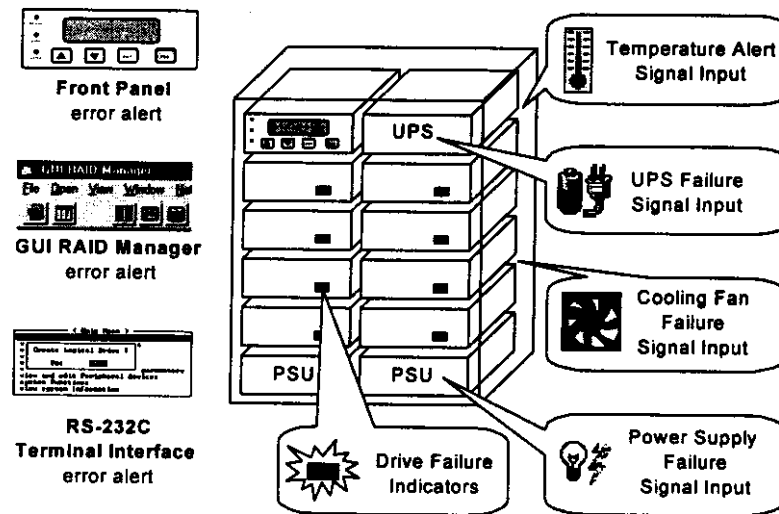
```
Dial-out Retry
Count -  ?
```

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

## Chapter 12 Fault-Bus

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

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



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



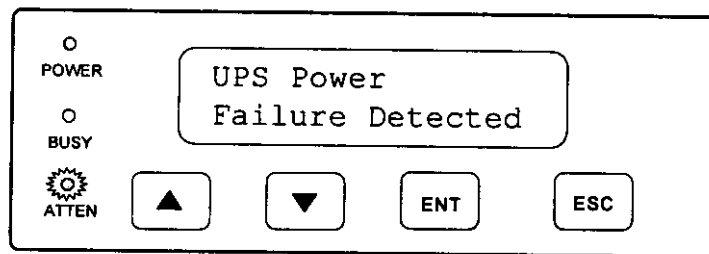
- Detect the temperature in the enclosure, and rise up or sink down the "temperature" signal of the Fault-bus (pin 24 in the Fault-bus connector) according to the detected information. When the temperature goes too high, activate the signal. When the temperature goes back to normal, keep the signal inactive. If more than one temperature sensor is supported in this enclosure, collect the temperature information from each sensor and combine them into one signal.
- Receive the UPS status from the UPS, and rise up or sink down the "UPS" signal of the Fault-bus (pin 25 in the Fault-bus connector) according to the received information. When UPS reports a power failure, activate the signal. When UPS reports that power failure has recovered, keep the signal inactive.

### Drive Failure Signal Outputs

Each SCSI drive can assign a slot number. There are 14 slot signal outputs in the Fault-bus connector. When the RAID controller has detected that a SCSI drive has failed, the corresponding slot number signal will be activated for the failed drive indicated.

The controller will report the Fault-bus error signals to the user through 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.

## 12.3.2 Configuring the Controller through the Front Panel

### Assign Each SCSI Drive or Canister a Slot Number

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

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

```
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.

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?

## Viewing the Status of Each Fault-bus Error Signal Input

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

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

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 on the Controller through the RS-232C Terminal Interface

#### Assign Each SCSI Drive or Canister a Slot Number

Cache Status: Clean

< Main Menu >

Quick installation  
view and edit Logical drives  
view and edit Host lun's  
view and edit SCSI drives

view  
view  
view  
sys  
view

Slot	Chl	ID	Size(MB)	Speed	LG_DRU	Status	Vendor and Product ID
0	0	0000	40960	0	0	ON-LINE	SEAGATE ST31055W
0	0	0000	40960	0	0	ON-LINE	SEAGATE ST31055W
0	0	0000	40960	0	0	ON-LINE	SEAGATE ST31055W

View drive information  
Scan scsi drive  
Set slot number

Slot Number : 1

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

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

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

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

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

### Remove Empty Drive Entry

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	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
						RESINI	
	1	4	1010	40MB	0	ON-LINE	SEAGATE ST31055W

Press Key: Move Cursor    Enter>Select    Esc Exit    F10/F11 Refresh Screen

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

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

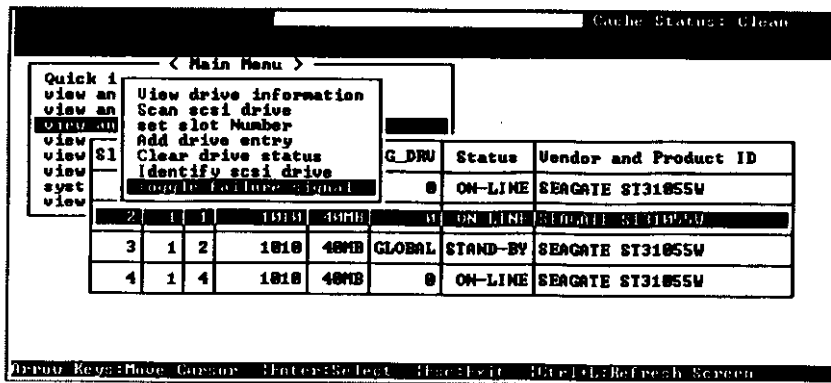


**IMPORTANT:**

*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.*

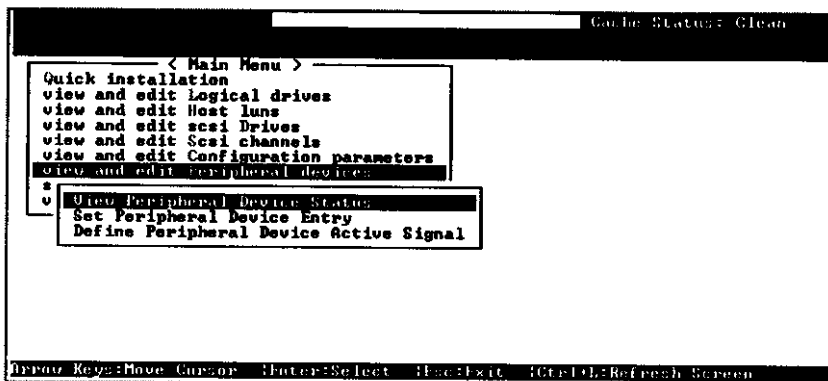
press [Enter]. Move the cursor to the desired item to enable or disable, and press [Enter]. Choose "Yes" in the following dialog box, then press [Enter] to set.

### Test Drive Failure LED for Each Drive Canister



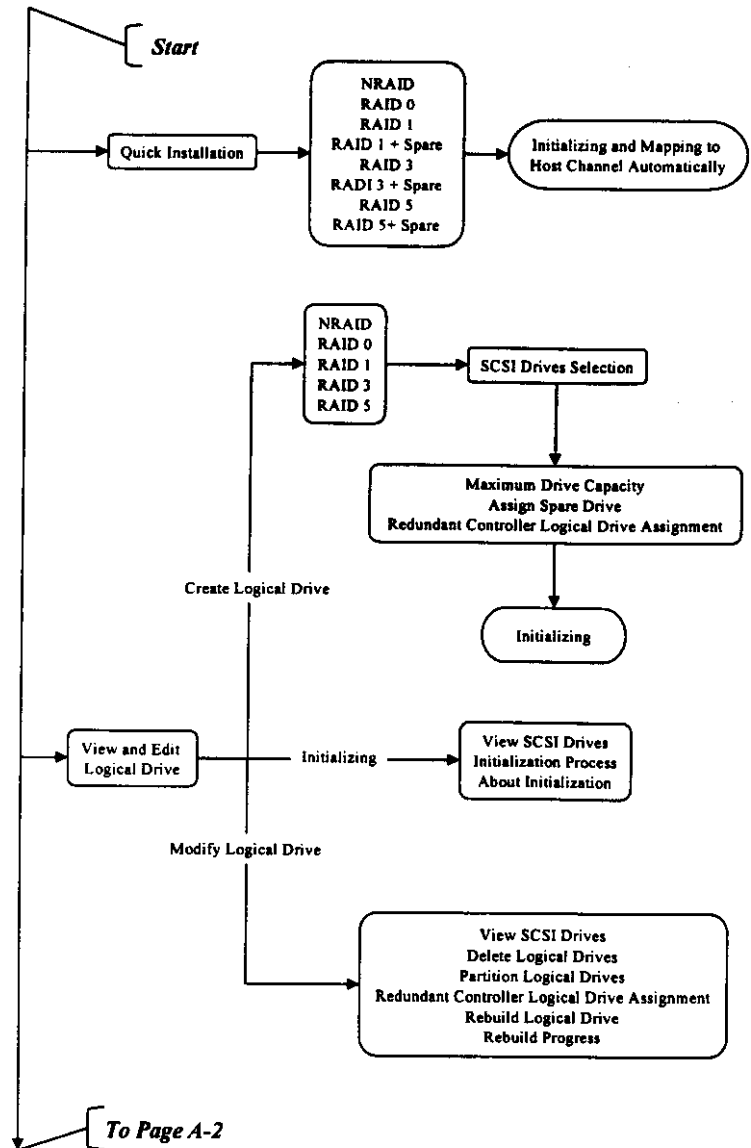
Choose the desired SCSI drive or empty drive entry from the drive information list, and press [Enter]. Choose "Toggle Failure Signal" in the menu, then press [Enter] to toggle the drive failure signal. The drive failure LED should light on or off followed with the toggle.

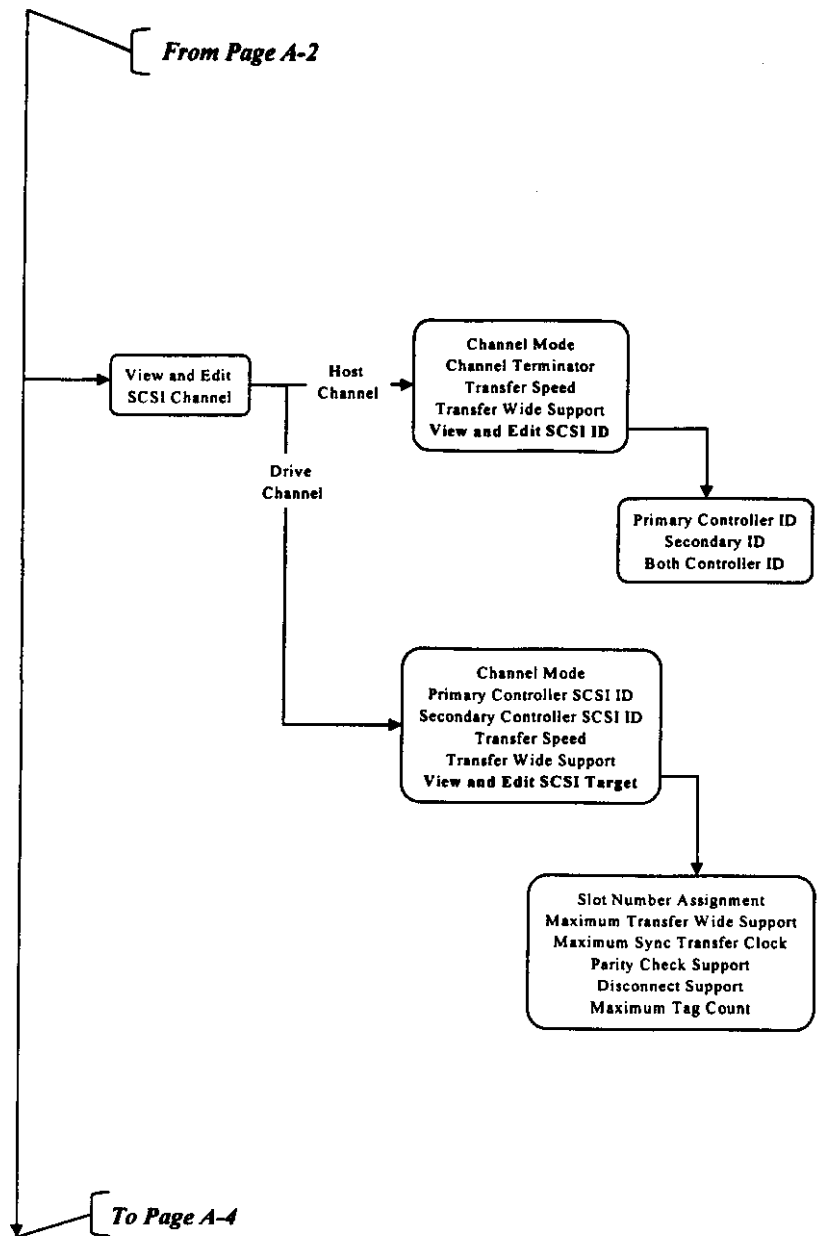
### Viewing the Status of Each Fault-bus Error Signal Input



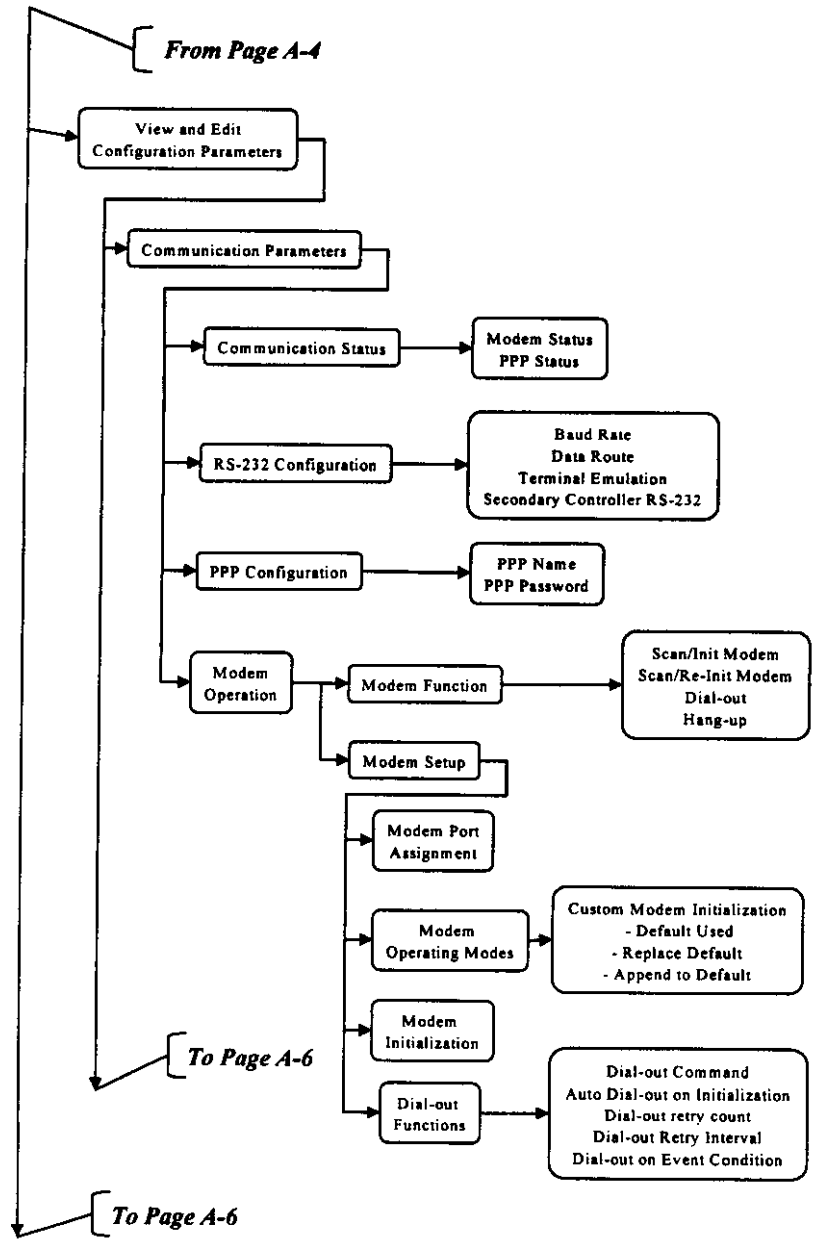
Choose "View and Edit Peripheral Devices" in the Main Menu and press [Enter]. Select "View Peripheral Device Status" in the menu and press [Enter].

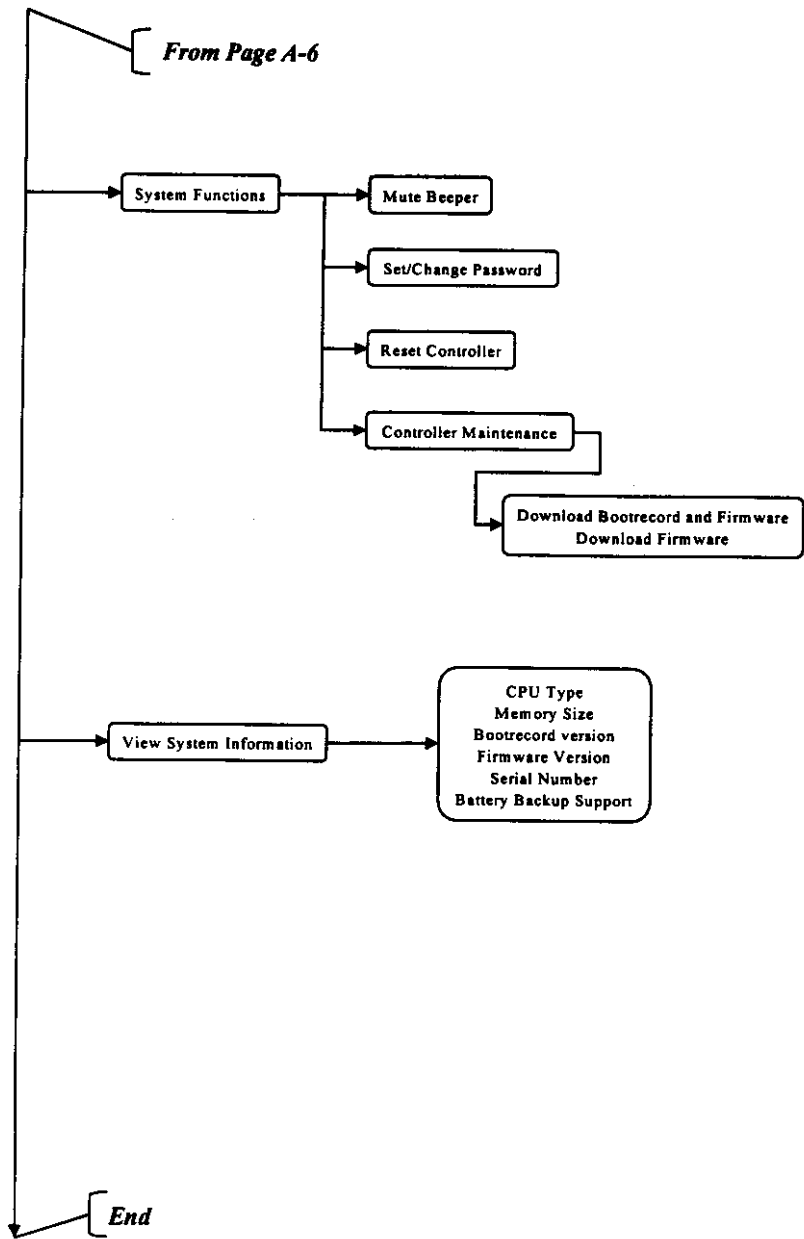
# Appendix A Front Panel Navigation Map











## Appendix B SCSI Cable Specifications

The recommended SCSI cable for an Ultra2 Wide SCSI-2 operating at a transfer rate of 80 Mbytes/sec. is described below.

Electrical	
Impedance	110Ω
Capacitance	15.9 pf / ft @ 1MHz
Propagation Delay	1.59ns / ft nom
DC Resistance	95Ω / 1000 ft @ 20°C
Delay Skew	0.035ns / ft (max.)

### SCSI Standards, Cable Length and Corresponding Maximum Possible Drive Connections

	Single-Ended	Differential	Ultra2	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

### SCSI Bus Width and Maximum Throughput

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

## Appendix C Upgrading the Firmware

The IFT-3102U2 RAID controller's firmware resides in flash memory that can be updated through the COM ports or via 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:

FW30Dxyz      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:**

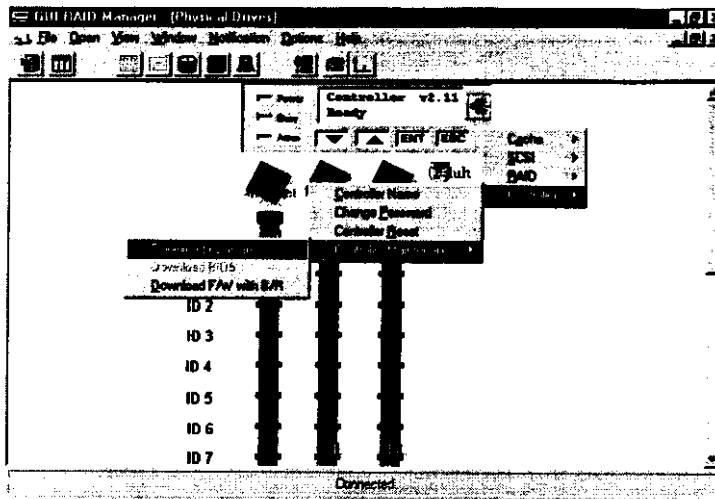
- *Allow the downloading process to finish. Do not reset or turn off the computer or the controller while it is downloading the file. Doing so may result in an unrecoverable error that requires the service of the manufacturer.*
- *While the firmware is new, the boot record that comes with it may be the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

### **Upgrading firmware using In-band SCSI + GUI RAID Manager**

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 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.

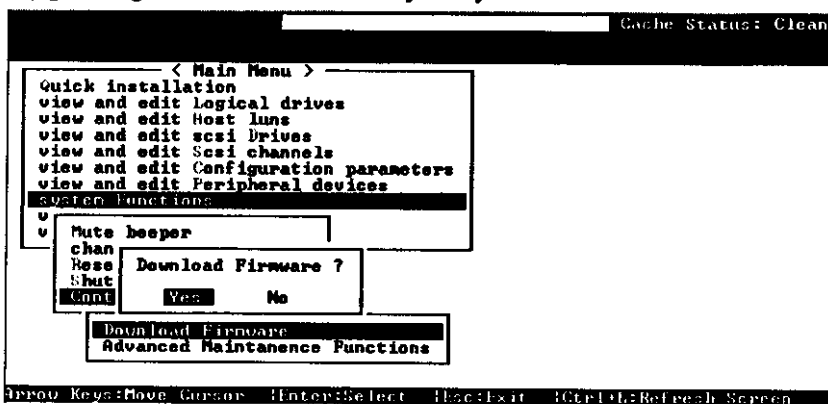
### ***Upgrading firmware using RS-232 Terminal Emulation***

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 the Firmware Binary Only



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

## Appendix D Sync. Clock Period & Sync. Clock Frequency

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

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

Sample equation:

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

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

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		

## 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"><li>1. Check power connections of the board and LCD panel.</li><li>2. Requires minimum of 4 MB DRAM SIMM installed.</li></ol>
7-segment LED flashes "F"	<ol style="list-style-type: none"><li>1. SIMM module not installed yet.</li><li>2. Null board (pin plug) for battery backup connector, JP16, is not installed.</li></ol>
SCSI channel failure detected upon start-up (SCSI cables connected). LCD = SCSI CHLs fail CHL=x,x,x	<ol style="list-style-type: none"><li>1. Check ID numbers (must be unique for each device on the same SCSI channel).</li><li>2. Make sure terminators are properly installed.</li><li>3. Check the voltage output of the power supply.</li></ol>
Initialization failure	<ol style="list-style-type: none"><li>1. Check ID numbers (must be unique for each device on the same SCSI channel).</li><li>2. Make sure terminators are properly installed.</li></ol>
Cannot detect SCSI drive	<ol style="list-style-type: none"><li>1. Check drive power connections.</li><li>2. Check drive SCSI cable connections.</li><li>3. Check ID numbers (must be unique for each device on the same SCSI channel).</li></ol>



The logical drive states "INVALID".

1. "Optimization for ... I/O", when creating the logical drive in Cache Parameter, is different from the current setting.
2. Change "Optimization for ...I/O" to the opposite setting and reset the controller.

In "View and Edit SCSI Drives" or "View and Edit SCSI Channels", the speed is only "20.8Mhz", not "40Mhz"

1. "20.8Mhz" is SCSI sync frequency, not transfer rate.
2. Refer to Appendix B, SCSI cable Specification, for details.

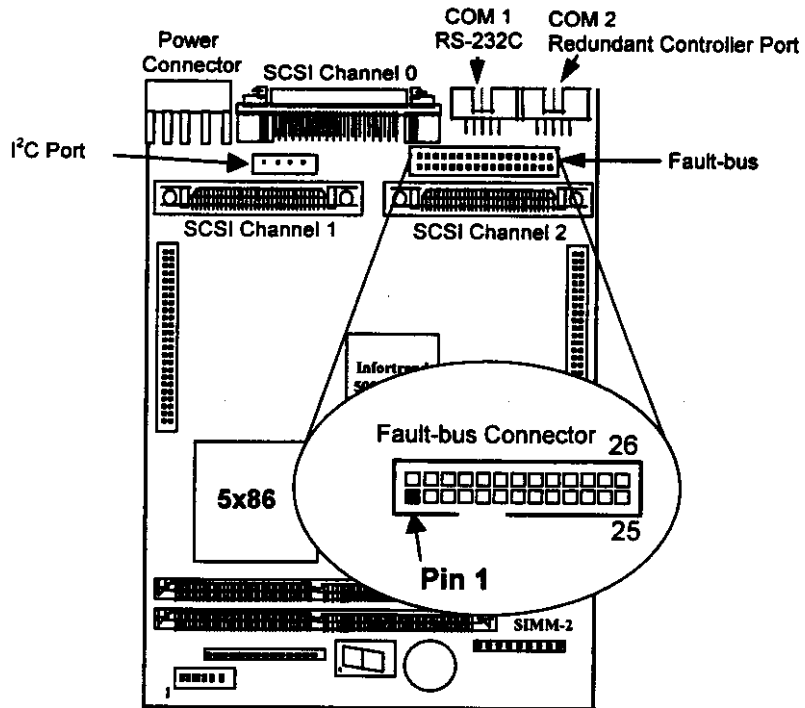
All settings are too complex to remember.

1. After the system installation completes, write down all the settings and related information in "Appendix H Take Record of the Settings" for future reference.

Upon replacing the failed controller with a new one during Redundant controller connection, nothing appears on the LCD of the new controller.

1. Set the new controller as "redundant controller enabled" before connecting to the active controller.
2. Connect the new controller to the active controller and choose "Deassert failed controller" on the active controller.
3. Refer to "Chapter 9 Redundant Controller" for more details.

## Appendix F Pin Assignments



### RS-232C Port

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

## IFT-9012 RS-232C Extension Cable

Extend the cable length only, no wire swap.
---

## IFT-9013 Redundant Controller Cable

Swap pin-2 and pin-3
----------------------

Swap pin-4 and pin-6
----------------------

Swap pin-7 and pin-8
----------------------

## Appendix G Specifications

RAID level	0, 1 (0+1), 3, 5, spanning and/or JBOD
Failure management	Bad sector reassignment, hot-swapping, spare drive operation (Global and Local Spare), background rebuilding
Failure indicator	Via front panel, RS-232 terminal, Text RAID Manager, GUI RAID Manager
Host OS compatibility	OS independent
Cache size	8 to 128 Mbytes
Host interface	Ultra-Wide-SCSI
Host channels	Up to 5 (add IFT-9073U2 or IFT-9073UWS)
Hard disk interface	Ultra2 SCSI
Hard disk channels	Up to 5 (with IFT-9073U2 or IFT-9073UWS)
Channel Terminator	Active, software programmable
SCSI protocol	SCSI-1, SCSI-2, Ultra-Wide SCSI-1 or -2 (auto-match), Ultra2 SCSI
Ultra2 Wide SCSI transfer rate	Up to 80 Mbytes/sec
Ultra-Wide-SCSI transfer rate	40 Mbytes/sec synchronous 10 Mbytes/sec asynchronous
Max. SCSI drives	75
No. of logical drives	8, capable of different RAID levels
Partitions	8 per logical drive, total of 64
No. of LUNs	Up to 32 per SCSI ID (multiple SCSI ID's per channel are supported); total of 64 (dynamic mapping to logical drives or partitions)
Control	Front panel, RS-232 terminal interface, Text RAID Manager, GUI RAID Manager
Ultra2 Wide SCSI connectors	68-pin header (host and drive side)
Ultra-Wide-SCSI connectors	68-pin header (host and drive side)
Ultra-Wide-SCSI cabling	Single-ended
Voltage/Current	+5 Volts/3.5A +12 Volts/500mA
Operating Temperature	5 to 44 °C
Relative Humidity	10-96%, non-condensing
Operating Altitude	Sea level to 10,000 ft.
Dimensions (inches)	8.82(L) x 5.75(W) x 1.62(H) (5.25" half-height drive profile)



## View and Edit SCSI Channels

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

## View and Edit Configuration Parameters

### Communication Parameters

#### RS-232 Port Configuration

##### COM 1 (RS-232 Port)

Baud Rate	<input type="checkbox"/> 2400 <input type="checkbox"/> 4800 <input type="checkbox"/> 9600 <input type="checkbox"/> 19200 <input type="checkbox"/> 38400
Data Routing	<input type="checkbox"/> Direct to Port <input type="checkbox"/> Through PPP
Terminal Emulation	<input type="checkbox"/> Enabled <input type="checkbox"/> Disabled

##### COM 2 (Redundant Controller Port)

Baud Rate	<input type="checkbox"/> 2400 <input type="checkbox"/> 4800 <input type="checkbox"/> 9600 <input type="checkbox"/> 19200 <input type="checkbox"/> 38400
Data Routing	<input type="checkbox"/> Direct to Port <input type="checkbox"/> Through PPP
Terminal Emulation	<input type="checkbox"/> Enabled <input type="checkbox"/> Disabled

#### PPP Configuration

PPP Access Name	
PPP Access Password	

#### Modem Operation → Modem Setup

Configure Modem Port	<input type="checkbox"/> Modem Port Not Configured <input type="checkbox"/> COM1 <input type="checkbox"/> COM2
Modem Operation Mode	<input type="checkbox"/> None (Default Used) <input type="checkbox"/> Replace Default <input type="checkbox"/> Append to Default
Modem Initialization - Custom Init. Command	AT
Dial-out Command	AT

## View and Edit Peripheral Devices

### Set Peripheral Device Entry

Redundant Controller	<input type="checkbox"/> Enabled <input type="checkbox"/> Disabled
Power Supply Status	<input type="checkbox"/> Enabled <input type="checkbox"/> Disabled
Fan Status	<input type="checkbox"/> Enabled <input type="checkbox"/> Disabled
Temperature Status	<input type="checkbox"/> Enabled <input type="checkbox"/> Disabled
UPS Status	<input type="checkbox"/> Enabled <input type="checkbox"/> Disabled

### Define Peripheral Device Active Signal

Power Supply Fail Signal	<input type="checkbox"/> Active High <input type="checkbox"/> Active Low
Fan Fail Signal	<input type="checkbox"/> Active High <input type="checkbox"/> Active Low
Temperature Alert Signal	<input type="checkbox"/> Active High <input type="checkbox"/> Active Low
UPS Power Fail Signal	<input type="checkbox"/> Active High <input type="checkbox"/> Active Low
Drive Failure Outputs	<input type="checkbox"/> Active High <input type="checkbox"/> Active Low

### View System Information

Total Cache Size	<input type="checkbox"/> EDO DRAM <input type="checkbox"/> Normal DRAM _____ MB
Firmware Version	
Bootrecord Version	
Serial Number	
Battery Backup	<input type="checkbox"/> On <input type="checkbox"/> Off

# Index

---

## **A**

- adding
  - drive entry, 12-6
  - global spare drive, 8-26
  - local spare drive, 8-25
- altitude
  - operating, G-1
- AMD 5x86 CPU, 2-2
- automatic rebuild, 3-9

---

## **B**

- backward compatibility, 2-2
- basic operational setup, 4-12
- battery back-up, 4-7
- baud rate, 4-10, 11-4
- beeper
  - mute, 7-37, 8-54
- bus width, B-1

---

## **C**

- cable specifications
  - SCSI, B-1
- cache parameters, 3-12, 7-29, 8-42
- capacitance, B-1
- changing
  - assword, 8-55
  - password, 7-37
- channel
  - mode, 7-3
  - mode, redefining, 8-30
  - SCSI, status, 7-3, 8-5
- channel mode
  - viewing and redefining, 7-19
- check time
  - periodic auto-detection of failed drive swap, 3-15
  - periodic drive, 3-14
- clustering
  - Microsoft® Cluster Server, 10-2
- communication parameters, 7-29, 8-41
- configuring RAID

---



SCSI, viewing and editing, 8-24  
drive-side SCSI parameters, 3-12, 7-31, 8-44  
dynamic logical drive expansion, 3-16, 7-10, 8-16

---

## ***E***

event logs  
  viewing and editing, 7-39  
event notification  
  dial-out to pager or terminal, 11-18  
expansion  
  logical drive, 8-16  
  RAID, 3-16

---

## ***F***

fault-bus  
  configuring via RS-232, 12-9  
  enabling error signal inputs, 12-8  
  how to setup, 12-4  
  port, F-2  
  setting error signal inputs to active-high or -low, 12-7  
  testing failure LED's for drive cannisters, 12-8  
  viewing status of error signal inputs, 12-9  
firmware, 1-1, 2-2  
  upgrading, C-1  
flash memory, 1-1, C-1  
flashing  
  all SCSI drives, 3-8  
  selected SCSI drives, 3-8  
format  
  low-level, 7-18, 8-28  
front panel  
  navigation map, A-1

---

## ***G***

global spare drive, 3-5  
  adding, 7-16, 8-26  
  deleting, 8-27  
GUI RAID Manager  
  upgrading firmware with, C-1  
  via in-band SCSI, 4-18

---

---

## *L*

- LCD, 2-2
- LCD panel
  - the initial screen, 7-1
- local spare drive, 3-5
  - adding, 7-16, 8-25
  - deleting, 8-27
- logical drive, 2-1
  - assigning a name, 7-8, 8-14
  - creating, 7-4, 8-8
  - deleting, 7-6, 8-12
  - expansion, 7-10, 8-16
  - expansion in Windows NT<sup>®</sup> Server, 3-19
  - mapping to a host LUN, 8-19
  - mode 1 expansion of, 3-17
  - mode 2 expansion of, 3-17
  - partitioning, 7-6
  - parity check, 7-11, 8-18
  - partitioning, 8-12
  - rebuilding, 7-9, 8-14
  - status, 7-1, 8-2
  - verification on rebuild writes, 7-36
  - viewing and editing, 7-4
  - viewing drive members, 7-5, 8-11
- low-level format, 7-18, 8-28
- LUN, 2-1
  - explained, 6-2
  - mappings, viewing and deleting, 7-12, 8-22
  - per host SCSI ID, 7-31, 8-44
  - viewing and editing, 7-12, 8-19

---

## *M*

- main board
    - rear view, 4-2
    - top view, 4-2
  - main menu (terminal), 8-2
  - management
    - drive failure, 3-5
  - manual rebuild, 3-9
  - maximum
    - queued I/O count, 7-31, 8-43
  - maximum synchronous transfer clock, 7-27, 8-38
  - maximum tag count, 3-14, 7-28, 8-40, 8-46, 8-50
  - maximum transfer width, 7-27, 8-39
  - Microsoft<sup>®</sup> Cluster Server, 10-2
  - mode 1
-

- parity check, 7-28, 8-39
  - logical drive, 7-11, 8-18
- partition
  - logical drive, deleting, 7-7, 8-13
  - mapping to host LUN, 6-4
  - number of, 2-1
- partitioning
  - logical drive, 7-6, 8-12
- pass-through SCSI commands, 7-13, 8-23
- password
  - changing, 7-37, 8-55
  - disabling, 8-56
  - setting a new, 8-56
- periodic drive check time, 3-14
- periodic drive swap auto check, 3-15
- peripheral devices
  - parameter reference for various operating systems, 4-15
  - types of, 4-16
- pin assignments, F-1
- power connection, 4-9
- PPP
  - plus telnet for remote administration, 11-3
- primary controller
  - setting SCSI ID/drive channel for, 8-33
- primary ID
  - SCSI channel, setting, 7-22
- propagation delay, B-1

---

## **Q**

- queued I/O count
  - maximum, 7-31, 8-43
- quick setup, 5-1

---

## **R**

- RAID
  - advantages, 3-1
  - management, 3-1
  - What are the levels?, 3-1
- RAID (0+1)
  - concurrent rebuild in, 3-10
  - disk striping with mirroring, 3-4
- RAID 0
  - disk striping, 3-3
- RAID 1
  - disk mirroring, 3-3
- RAID 3

---

## SCSI

- cable specifications, B-1
- channel ID, deleting, 7-21
- channel ID, setting, 7-20
- channel primary ID, setting, 7-22
- channel secondary ID, setting, 7-23
- channel status, 7-3, 8-5
- channel terminator, 7-24, 8-35
- channel, explained, 6-2
- channels, viewing and editing, 8-30
- commands, pass-through, 7-13, 8-23
- drive status, 7-2, 8-4
- drive utilities, 7-18, 8-28
- drive, scanning a new one, 7-14, 8-24
- drives, viewing and editing, 7-14, 8-24
- I/O timeout, 3-13
- ID, deleting, 8-32
- ID, explained, 6-2
- motor spin-up, 3-12, 7-31, 8-45
- parameters, drive-side, 3-12
- reset at power up, 3-13, 7-32, 8-45
- synchronous clock period, D-1
- target/drive channel, viewing and editing, 7-26
- secondary controller
  - setting SCSI ID/drive channel for, 8-34
- secondary ID
  - SCSI channel, setting, 7-23
- sequential I/O
  - optimization for, 3-12
- serial port
  - connection and setup, 4-10
- SIMM, 4-4
- slot number, 7-26, 8-38
  - assigning to an empty cannister, 12-5
- SNMP
  - diagram showing, 11-1
- spare drive, 3-5
  - adding a global, 7-16
  - adding a local, 7-16
- specifications, G-1
- system information
  - viewing, 7-38

---

## T

- tag command queuing, 7-32
- tag count
  - maximum, 3-14, 7-28, 8-40, 8-46, 8-50

**This page is intentionally left blank.**

- logical drive expansion, 3-17
- mode 2
  - logical drive expansion, 3-17
- modem
  - initializing, 11-16
  - remote terminal emulation via, 11-8
- motor spin-up
  - SCSI, 7-31, 8-45
- multiple host
  - diagram showing, 10-6
- mute
  - beeper, 7-37, 8-54

---

## ***N***

- naming
  - controller, 7-36, 8-53
  - logical drive, 7-8
- navigation keys
  - in terminal emulation, 5-2
  - on front panel, 4-1
- normal drive writes
  - verification on, 7-36
- NRAID
  - disk spanning, 3-2
- null modem, F-2

---

## ***O***

- operating temperature, G-1
- optimization
  - for sequential or random I/O, 3-12, 7-30
- outputs
  - drive failure signal, 12-3

---

## ***P***

- pager
  - event notification, 11-18
- parameters
  - cache, 3-12, 7-29, 8-42
  - communication, 7-29, 8-41
  - controller, 8-53
  - disk array, 3-11, 7-35, 8-49
  - drive-side SCSI, 3-12, 7-31, 8-44
  - host-side SCSI, 7-30, 8-43

---

---

## ***H***

- host channel
  - setting, 7-20
- host LUN
  - mapping a logical drive to, 8-19
  - viewing and editing, 7-12, 8-19
- host-side SCSI parameters, 7-30, 8-43
- hot swap
  - drive, detection of followed by auto rebuild, 7-33, 8-52
- How does it work?
  - fault-bus, 12-1
  - In-band SCSI, 4-13
  - logical drive expansion, 3-16
  - SAF-TE, 3-15
  - the RAID controller, 6-2

---

## ***I***

- I/O timeout
  - SCSI, 3-13
- ID
  - SCSI, deleting, 8-32
- identifying drives, 3-7, 7-17, 8-26
- idle drive failure detection, 7-34, 8-48
- IFT-9070 daughterboard
  - installation of battery back-up, 4-7
- IFT-9072UWD daughterboard
  - top view, 4-3
- IFT-9073U2 daughterboard
  - top view, 4-4
- IFT-9073UWS daughterboard
  - top view, 4-3
- impedance, B-1
- in-band SCSI, 4-13
- initializing modem, 11-16
- input
  - error signals, 12-2

---

## ***J***

- JBOD
    - single drive control, 3-2
-

- flow chart, 6-1
- controller
  - naming, 7-36, 8-53
  - parameters, 8-53
  - reset, 7-38, 8-57
- CPU, 1-1
- current, G-1
- current settings
  - viewing, 8-7

---

## **D**

- data cache, 2-2
- data rebuilding, 2-1
- daughterboard
  - installation of, 4-6
- DC resistance, B-1
- default setting
  - restoring, 7-29, 8-41
- delay skew, B-1
- deleting
  - logical drive, 8-12
  - LUN mappings, 7-12
  - partition of logical drive, 7-7, 8-13
  - SCSI channel ID, 7-21
  - SCSI ID, 8-32
  - slot number, 12-6
  - spare drive, global or local, 7-17, 8-27
- detection
  - idle drive failure, 7-34, 8-48, 8-52
  - of drive hot swap followed by auto rebuild, 7-33, 8-52
- dial-out
  - automatically on initialization, 11-23
  - command, 11-22
  - conditions, 11-21
  - for event notification, 11-18
  - retry count, 11-20, 11-23
  - retry interval, 11-21
  - setting via front panel, 11-22
  - setting via terminal emulation, 11-19
  - timeout, 11-20, 11-23
- dimensions, G-1
- disconnecting support, 8-40
- disk access delay time, 3-13, 3-14, 7-32, 8-46
- disk array
  - parameters, 3-11, 7-35, 8-49
- drive status
  - SCSI, 7-2, 8-4
- drives

---



**This page is intentionally left blank.**

---

Auto Dial-out on Initialization	<input type="checkbox"/> Enabled <input type="checkbox"/> Disabled
Dial-out Timeout	Seconds
Dial-out Retry Count	Retry _____ times
Dial-out Retry Interval	Minutes
Dial-out on Event Condition	<input type="checkbox"/> Disabled <input type="checkbox"/> Critical Events Only <input type="checkbox"/> Critical Events and Warnings <input type="checkbox"/> All Events, Warnings and Notifications

### Caching Parameters

Write-back Cache	<input type="checkbox"/> Enabled <input type="checkbox"/> Disabled
Optimization for	<input type="checkbox"/> Random I/O <input type="checkbox"/> Sequential I/O

### Host Side SCSI Parameters

Maximum Queued I/O Count	<input type="checkbox"/> Auto <input type="checkbox"/> _____
LUNs per Host SCSI ID	<input type="checkbox"/> 1 LUN <input type="checkbox"/> 2 LUNs <input type="checkbox"/> 4 LUNs <input type="checkbox"/> 8 LUNs

### Drive Side SCSI Parameters

SCSI Motor Spin-up	<input type="checkbox"/> Enabled <input type="checkbox"/> Disabled
SCSI Reset at Power Up	<input type="checkbox"/> Enabled <input type="checkbox"/> Disabled
Disk Access Delay Time	<input type="checkbox"/> No Delay <input type="checkbox"/> _____ Seconds
Maximum Tag Count	<input type="checkbox"/> Disabled <input type="checkbox"/> _____

### Disk Array Parameters

Rebuild Priority	<input type="checkbox"/> Low <input type="checkbox"/> Normal <input type="checkbox"/> Improved <input type="checkbox"/> High
Verifications on Writes	
Verifications on LD Initialization Writes	<input type="checkbox"/> Enabled <input type="checkbox"/> Disabled
Verifications on LD Rebuild Writes	<input type="checkbox"/> Enabled <input type="checkbox"/> Disabled
Verifications on Normal Drive Writes	<input type="checkbox"/> Enabled <input type="checkbox"/> Disabled

### Controller Parameters

Controller Name	<input type="checkbox"/> Not Set <input type="checkbox"/> _____
-----------------	---



**This page is intentionally left blank.**

---

**This page is intentionally left blank.**

---

## Redundant Controller Port

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

## Fault-bus Plus Port

Pin	Descriptions	Pin	Descriptions
1	Slot 1	2	Slot 5
3	Slot 2	4	Slot 6
5	Slot 3	6	Slot 7
7	Slot 4	8	FBUS_RST
9	GND	10	GND
11	Slot 8	12	Slot 12
13	Slot 9	14	Slot 13
15	Slot 10	16	Slot 14
17	Slot 11	18	N/C
19	GND	20	GND
21	UPSOUT#	22	N/C
23	POWER#	24	TEMP#
25	UPSIN#	26	FAN#

## IFT- 9011 Null Modem

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

**This page is intentionally left blank.**

---

Host cannot detect IFT-3102U	<ol style="list-style-type: none"> <li>1. Check host SCSI cable connections.</li> <li>2. Check SCSI port to LUN assignment.</li> <li>3. Check logical drive mapping to LUN.</li> </ol>	- - -
Parity error detected	<ol style="list-style-type: none"> <li>1. DRAM SIMM should be replaced.</li> </ol>	-
Logical drive failure detected during boot-up	<ol style="list-style-type: none"> <li>1. Check proper installation or connection of the drives (use the "View SCSI drives" function to help locate the problem).</li> </ol>	- - -
System is not stable after running for a period of time.	<ol style="list-style-type: none"> <li>1. SCSI cable must be shorter than 3 meters.</li> <li>2. Make sure terminators are proper installed.</li> <li>3. Power supply voltage must be within specification.</li> <li>4. Check the enclosure's inner temperature.</li> </ol>	- - - -
When using "Scan New SCSI Drive" and the desired ID is empty, an empty drive entry appears.	<ol style="list-style-type: none"> <li>1. Refer to Chapter 7.4.1 or 8.4.1, Scan New SCSI Drive, on how to remove the empty drive entry.</li> </ol>	- - -
The RS-232C Terminal Interface is not working.	<ol style="list-style-type: none"> <li>1. Check RS-232C cable connections.</li> <li>2. Check Baud Rate.</li> <li>3. Enable Terminal Emulation.</li> <li>4. Data Routing Direct to Port.</li> </ol>	- - -
When choosing "Configure Modem Port", the screen is full of "Comm Buffer Overflow".	<ol style="list-style-type: none"> <li>1. "Terminal Emulation" should be enabled after all modem configuration are completed.</li> </ol>	- -



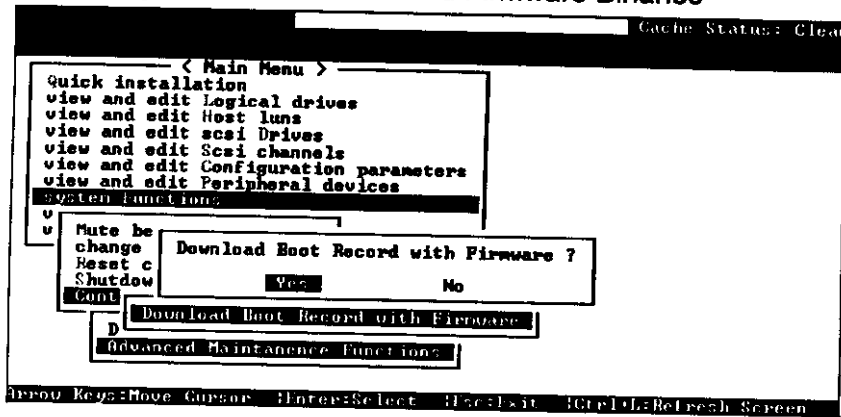
**This page is intentionally left blank.**

---

**This page is intentionally left blank.**

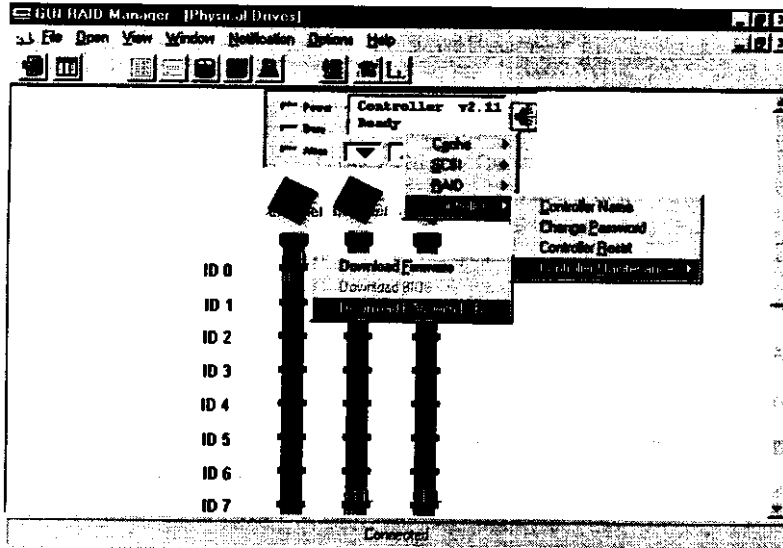
---

## 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.

## Upgrade Both Boot Record and Firmware Binaries



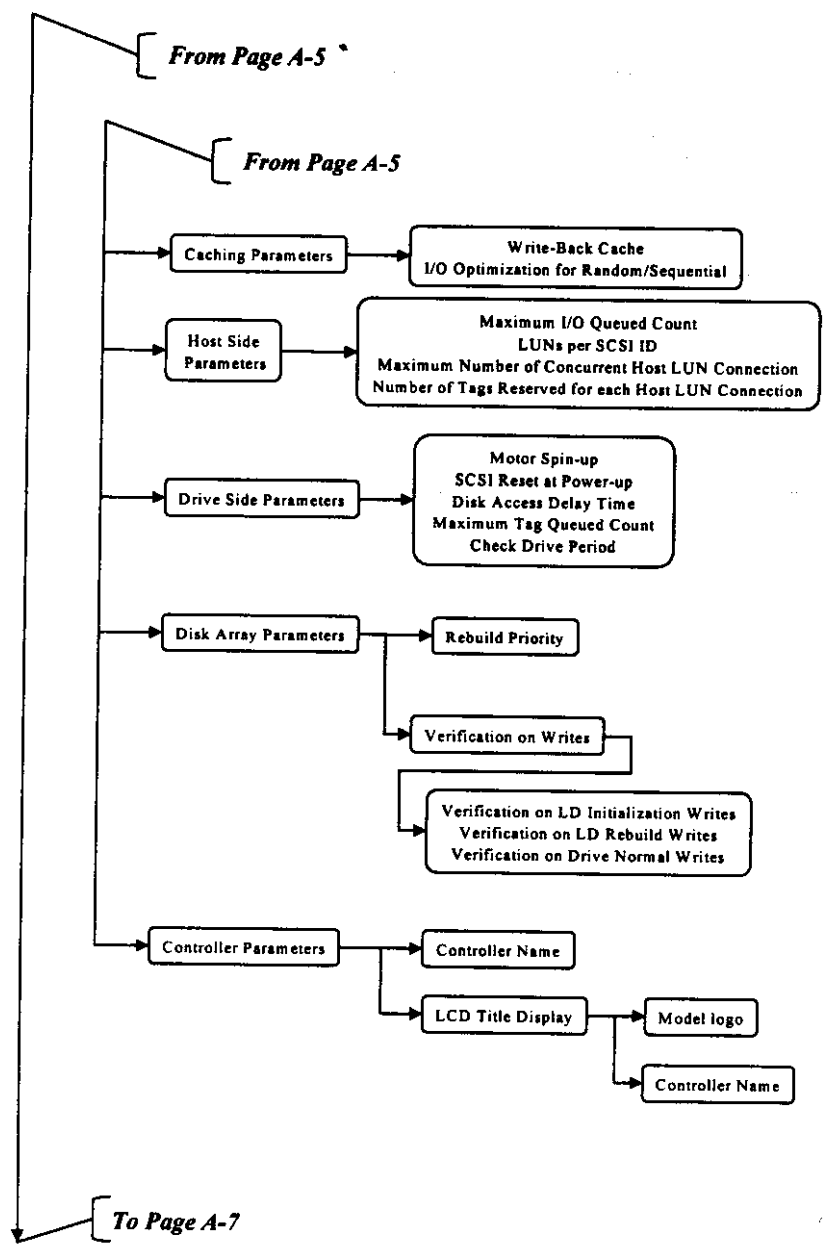
1. Double click on the controller panel to get the menu appears. Choose "Controller Maintenance" > "Advanced Maintenance" -> "Download Boot Record and Firmware".
2. Provide the boot record binary filename, the GUI RAID Manager will start to download the boot record binary to the controller.
3. After 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.

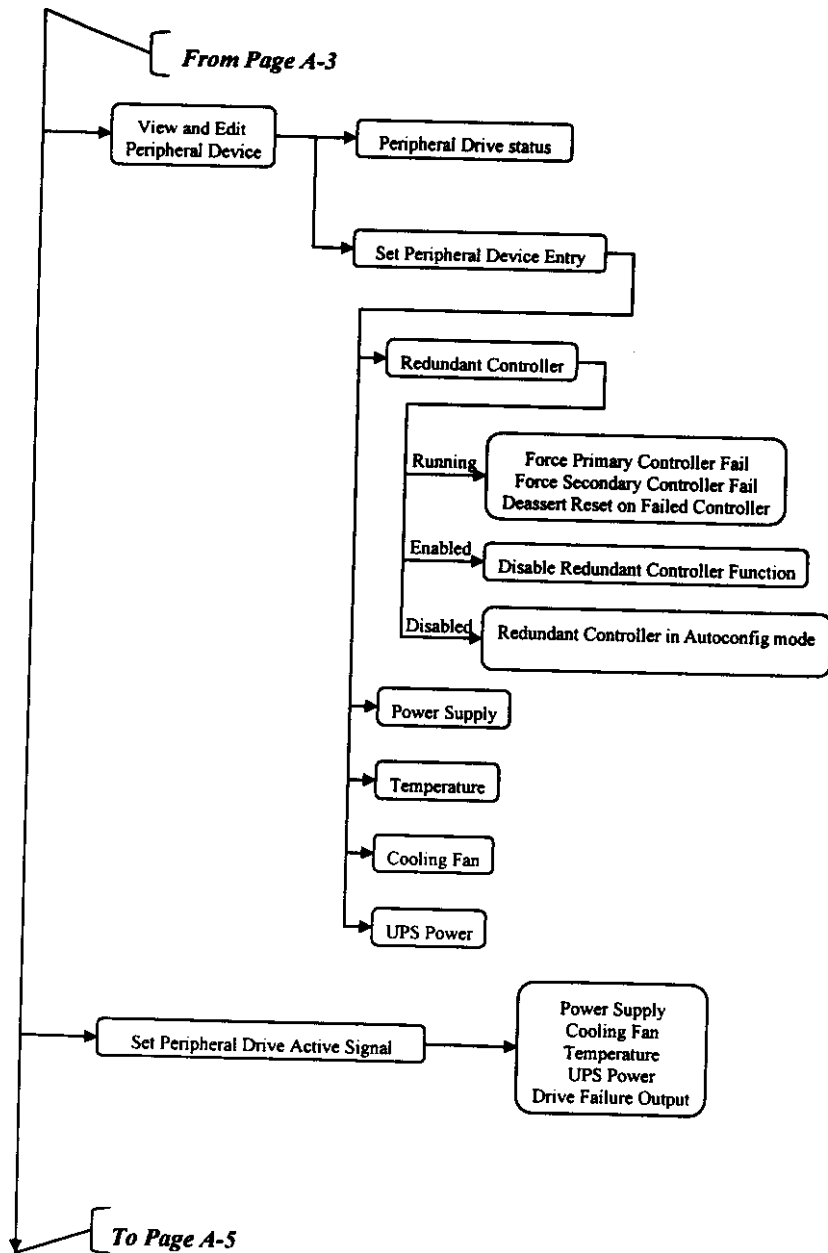
**This page is intentionally left blank.**

---

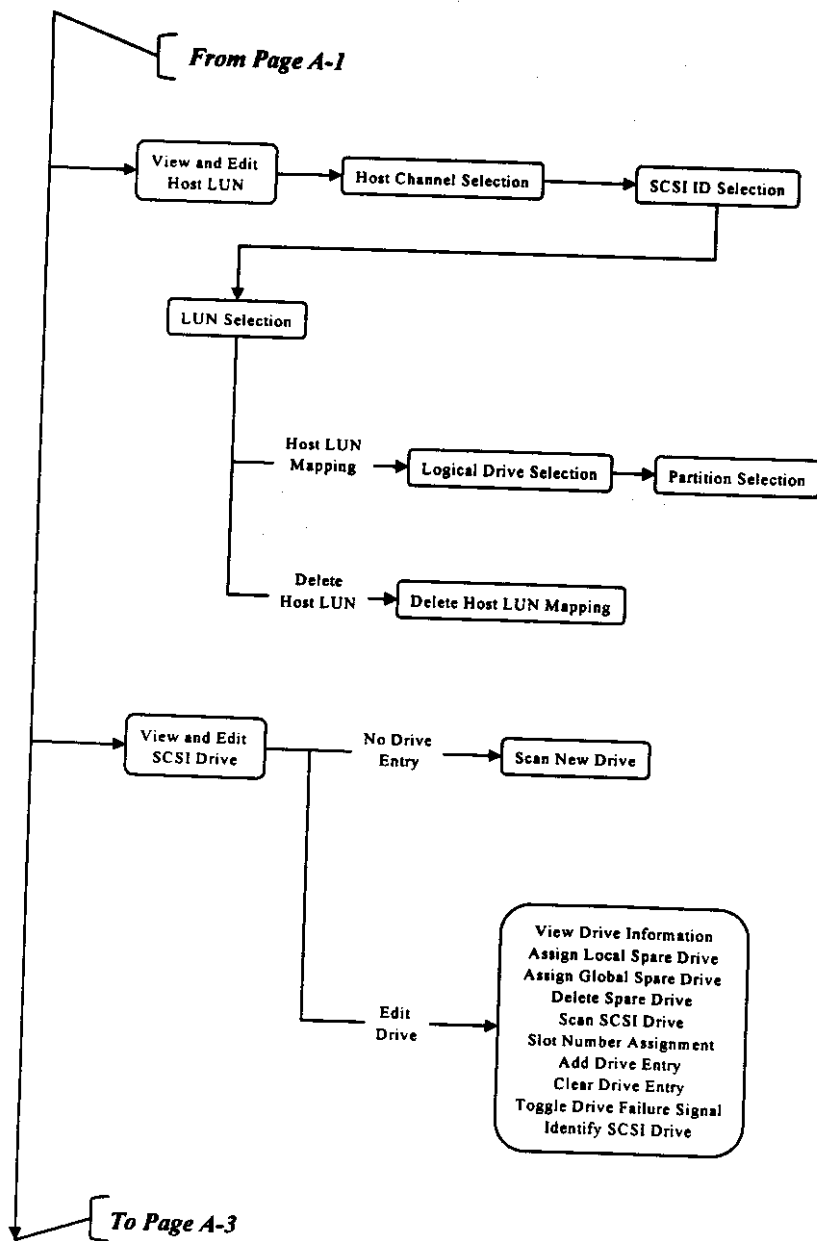
**This page is intentionally left blank.**

---





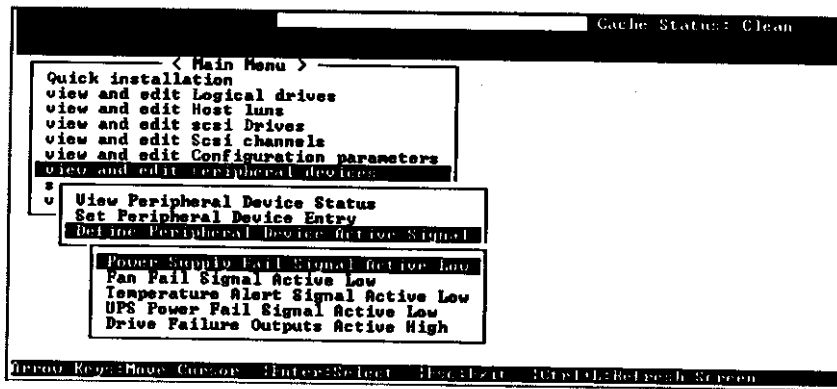




ITEM	STATUS	LOCATION
Redundant Controller	Disabled	
Power Supply Status	Normal	FaultBus
Fan Status	Failed	FaultBus
Temperature Status	Alert	FaultBus
UPS Status	Normal	FaultBus

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

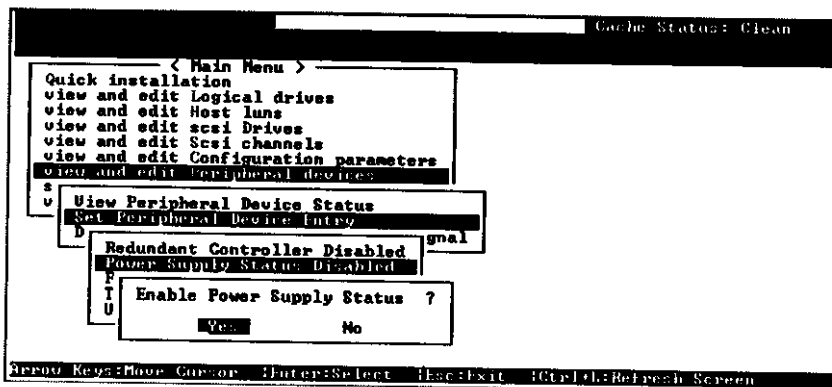
## Set Each Fault-bus Error Signal Input as Active-high or Active-low



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

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

## Enable Each Fault-bus Error Signal Input



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



## Enable Each Fault-bus Error Signal Input

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

```
View and Edit  
Periph Params  ↓
```

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.

### 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 # 0 ?
```

### Remove Empty Drive Entry

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



**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 triggered.

Power Supply  
Failure Detected

The input signal from the power supply has been triggered.

Cooling Fan  
Failure Detected

The input signal from the cooling fan has been triggered.

Elevated  
Temperature Alert

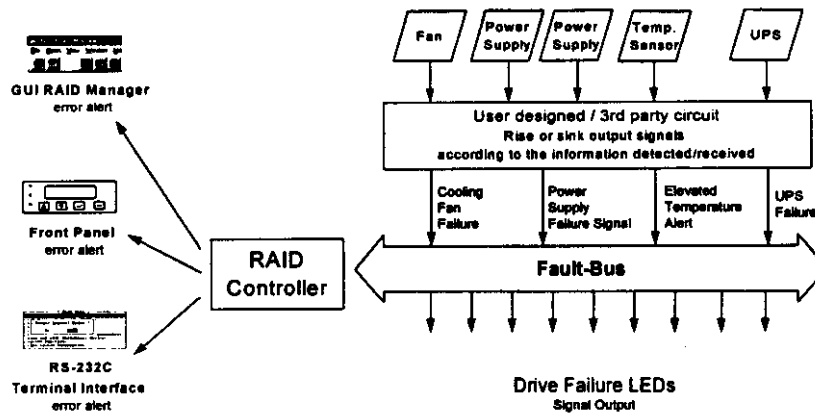
The input signal from the temperature sensor in the enclosure has changed.

### **12.3 How to 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 LED of the failed drive, located in front of the drive canister, to the Fault-bus. Record the slot number connected to each canister.
3. If there is a "Drive failed" LED in front of the enclosure which presumably indicate a drive member failed, connect the "Drive failed" LED in front of the enclosure to pin 27 of the left Fault-bus connector.
4. Make sure the drive failure LED signal required is according to the drive failure LED circuit, active high or active low.

## 12.2 How Does the Fault-Bus Work?



### Error Signals Input

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

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

- Detect the fan rotation, and rise up or sink down the "fan" signal of the Fault-bus (pin 26 in the Fault-bus connector) 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, and rise up or sink down the "power" signal of the Fault-bus (pin 23 in the Fault-bus connector) according to the detected information. When a power supply failed, activate the signal. When the power supply is working properly, keep the signal inactive. If the enclosure supports the redundant power supply feature (with more than one power supply), detect the status of each power supply and combine them into one signal.



the controller will retry the dial-out process three times after the first dial-out process failed.

### Dial-out Retry Interval

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

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

```
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.

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

### **Setting Dial-out Function Through the Front Panel**

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

```
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 composed in this column. If it's dialing to a remote terminal, the phone number of the remote modem has to be entered in this column. Refer to your modem's manual for the AT command set.

## Auto Dial-out on Initialization

Enable Auto Dial-out on Initialization ?	
<input checked="" type="radio"/> Yes	<input type="radio"/> No

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

Dial-out Command - Not Set	
Auto Dial-out on Initialization Disabled	
Dial-out Timeout - None	
D	Dial-out Timeout: 0 seconds
D	
D	

Dial-out Timeout(seconds):

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.

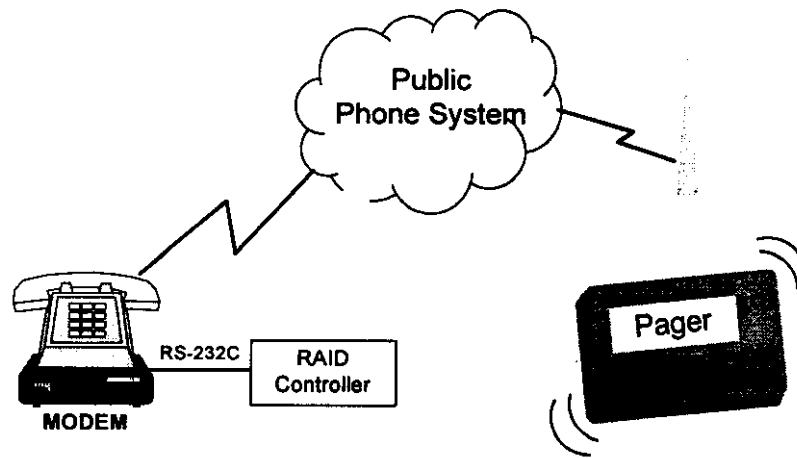
## Dial-out Retry Count

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

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

## 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 12.3, 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.*

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-3102U2 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.

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-3102U2 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.

A screenshot of a menu titled "View and Edit Config Parm".

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

A screenshot of a menu titled "Communication Parameters ..".

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

A screenshot of a menu titled "Modem Operation ..".

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

A screenshot of a menu titled "Modem Setup ..".

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

A screenshot of a menu titled "Configure Modem Port ..".

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

A screenshot of a message titled "Modem Port Not Configured..".

- 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.



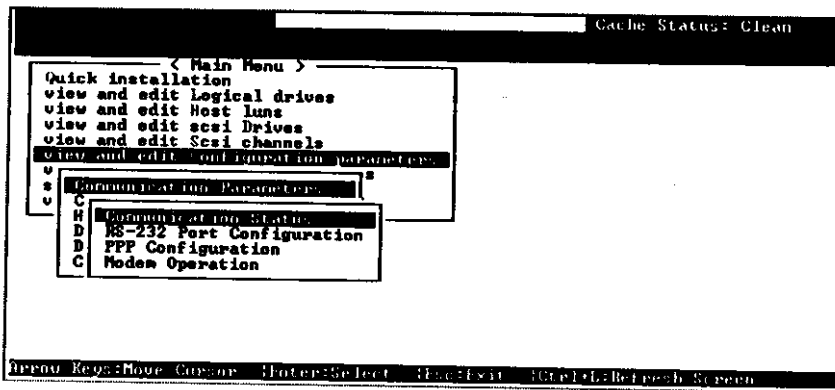
**IMPORTANT:**

- *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.*

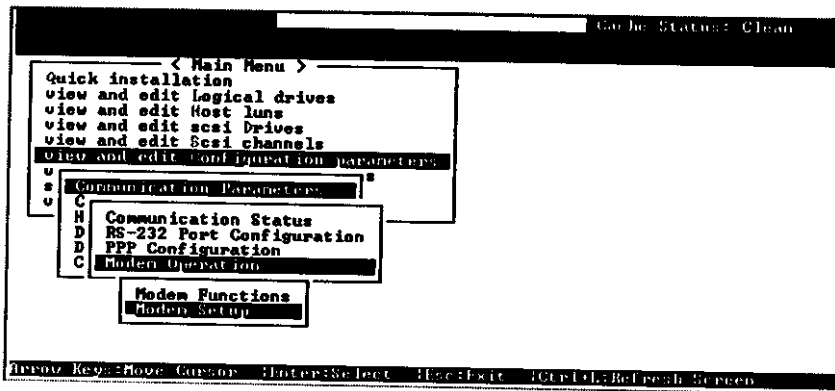
**Initializing Modem**

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

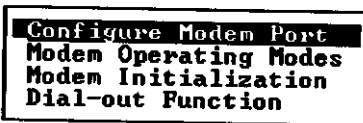
Choose "Modem Operations" in the Communication Parameters menu, then select "Modem Functions". A dialog box will appear. Choose Yes to scan and send initialization command to the Modem.



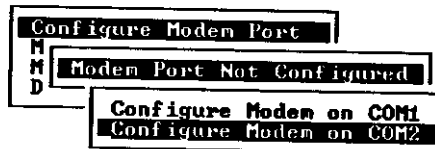
## Configuring the Modem Port



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.





Press ENT to view the IP address of IFT-3102U2, then press ▼ or ▲ to view the Gateway IP address.

IP Packets  
being Routed

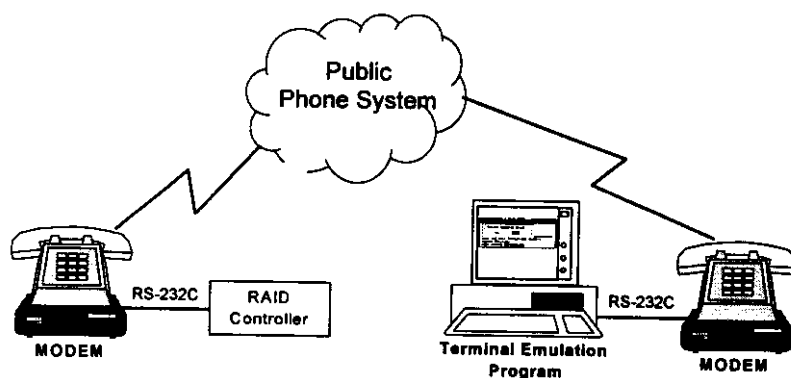
Local IP Addr:  
. . .

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-3102U2. 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 the controller. Simply connect a modem to IFT-3102U2. The controller can manage by itself the dial-in remote administration and dial-out event notifications through the proper settings.

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 ..

## 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

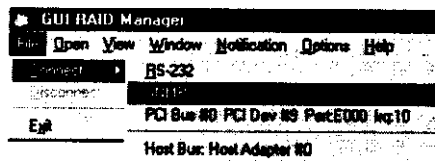
Press ENT for two seconds to enter the Main Menu. Press ▼ or ▲ to select "View and Edit Config Parm", then press ENT.

```
View and Edit
Config Parm
```

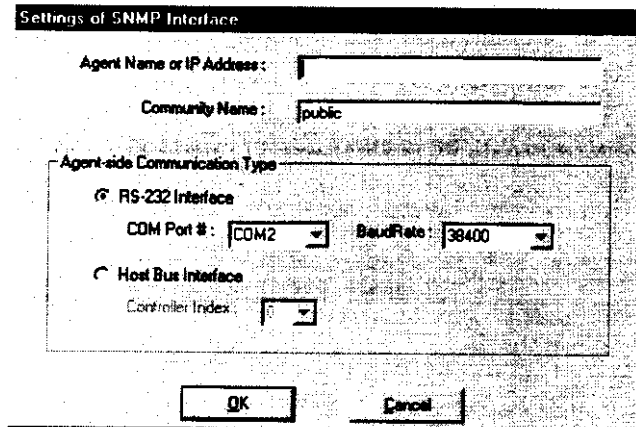
Select "Communication Parameters ..", then press ENT.

```
Communication
Parameters ..
```

## 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.

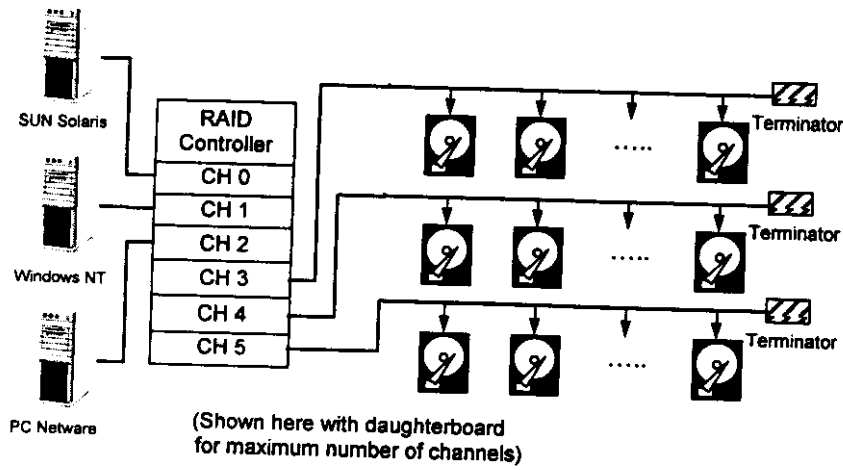
Click on the select button in front of "RS-232 Interface" to select. Choose the COM port of the host computer connected to the RAID controller, and choose the baud rate speed of the RAID controller. Press "OK" to establish the connection. After the connection has been established, all operations will 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:

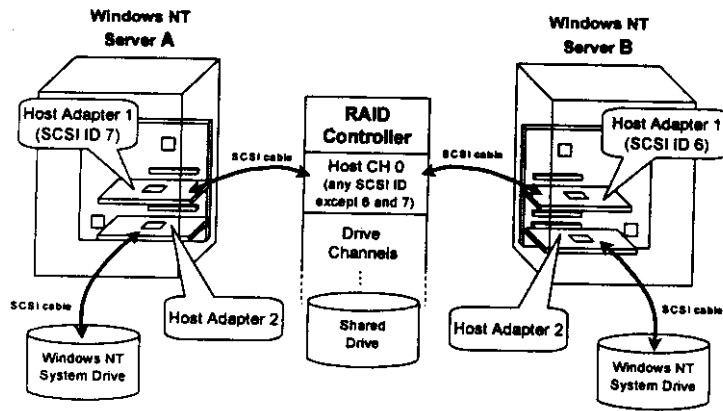
- *The baud rate of both the RAID controller and GUI RAID Manager must be the same in order to establish the connection.*

### 10.3 Multiple Host



The IFT-3102U2 RAID controller can be connected to simultaneously serve more than one host computer. The figure above is an example of connecting to multiple hosts.

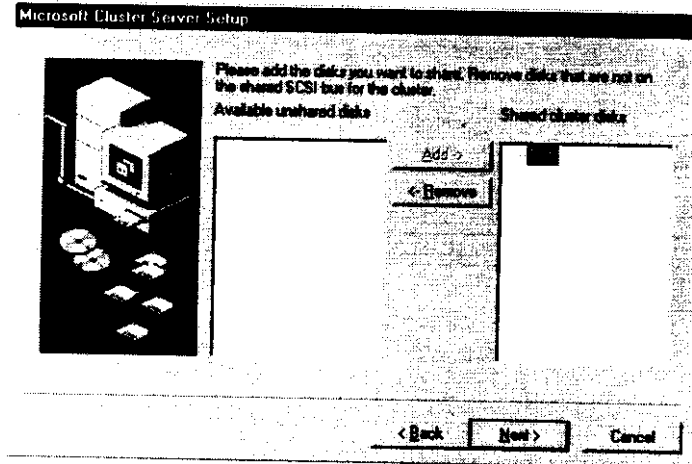
All host computers share the RAID facilities of a controller but access different logical drives. Accessing the same logical drive will cause data conflict. To prevent data conflict that arises from sharing the same logical drive, a 3rd party "HA" management hardware or software is required.



**○ 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.

## **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-3102U2 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).

**This page is intentionally left blank.**

---



### 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 Ctr Failure Detected" will appear on the LCD. The beeper in the controller will start to beep.

```
Redundant Ctr  
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 ..
```

controller will be similar to the LCD display on the Primary controller.

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 or through the synchronized cache SCSI cable on channel 0. For the IFT-3102U2, write-back cache is still enabled if SCSI channel 0 is used as the synchronized cache channel.

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

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 Ctr Function Disable" will be displayed on the LCD. Press ENT to go to the next step.)

The message "Enable Redundant Ctr: 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  
Ctr: Autocfg ?

The message "Redundant Ctr Autocfg Inactive" will appear.

Redundant Ctr:  
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

- 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.

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 ..
```



**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 ↓
```

**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!
```

## 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 ?
```





**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:**

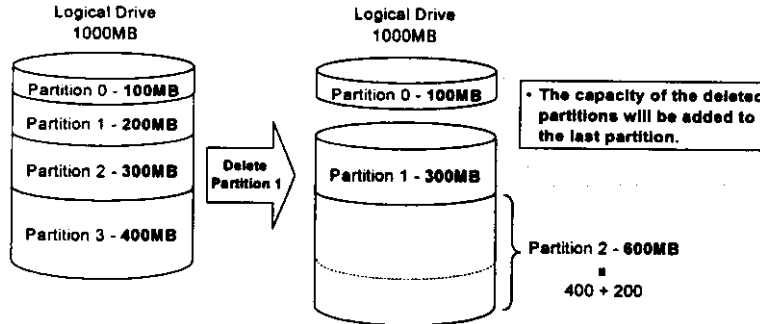
- *Mode 1 Expansion can only be performed on RAID 0, 3 and 5 logical drives. Mode 1 Expansion cannot be performed on an NRAID or RAID 1 logical drive.*
- *Mode 1 Expansion (Expanding logical drives by adding more SCSI hard disk drives) cannot be canceled once started. If a power failure occurs, the Mode 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 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
```

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 ↓
```

- \* 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 ..
```

**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.

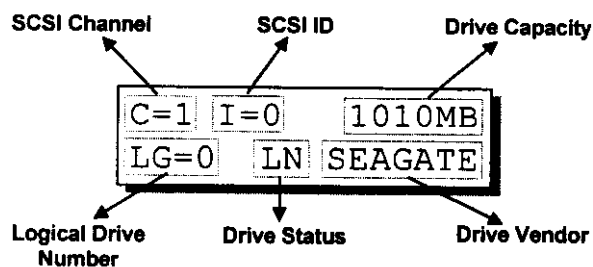
xxxxMB DRVMISS

One of the drives cannot be detected.

INCOMPLETE ARRAY

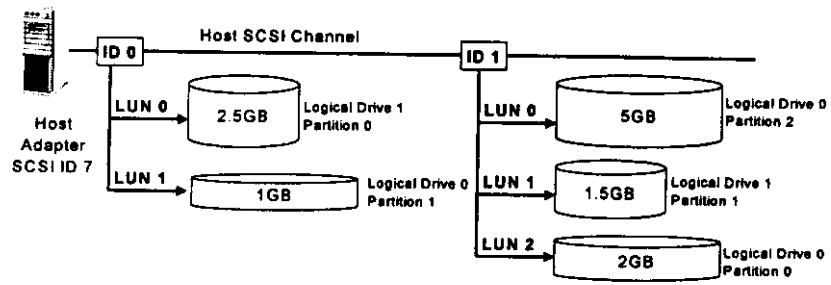
Two or more drives failed in this logical drive.

### 7.1.3 SCSI Drive Status



**Drive Status:**

LG=x IN    Initializing

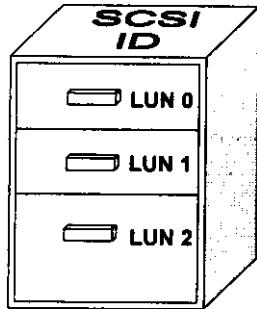


Map each partition to a host LUN. The LUN will then virtually appear to the host SCSI adapter as an individual hard drive.

## 6.2 How the RAID Controller Works?

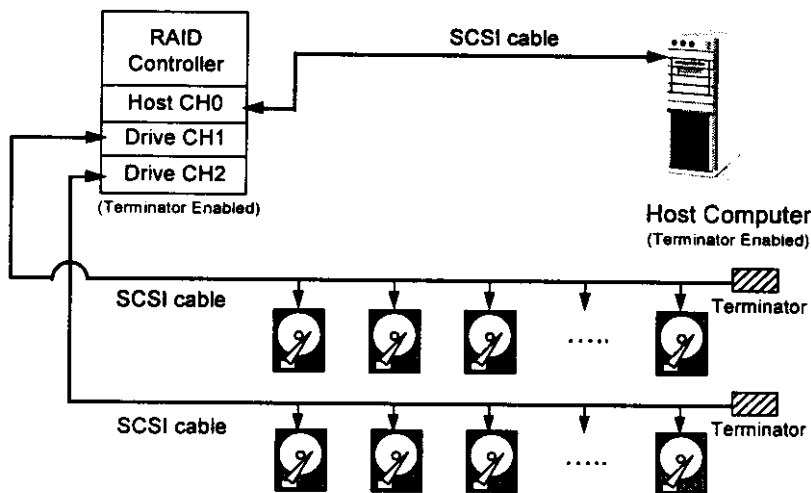
### 6.2.1 SCSI Channel, SCSI ID and LUN

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.

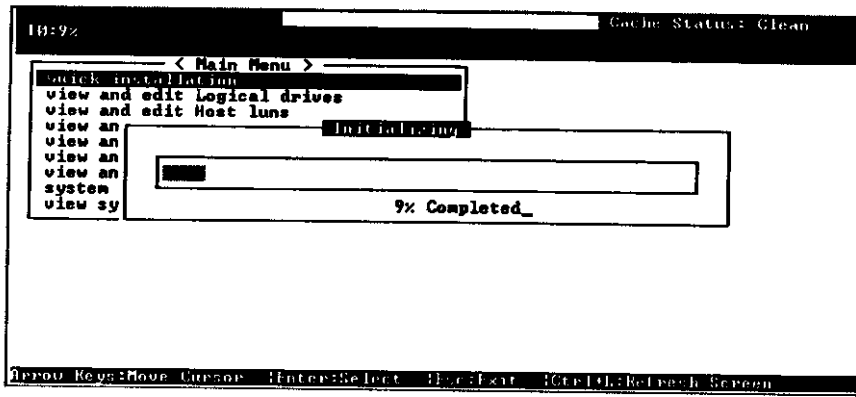


The figure on the left is a very good example. If you are to file document into a cabinet, you must put the document into one of the drawer. From a SCSI's point of view, a SCSI ID is like a cabinet, and the drawers are the LUNs. Each SCSI ID can have up to 32 LUNs (Logical Unit). Data can be stored into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



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





The RAID levels available are as follows:

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

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

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

## 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:

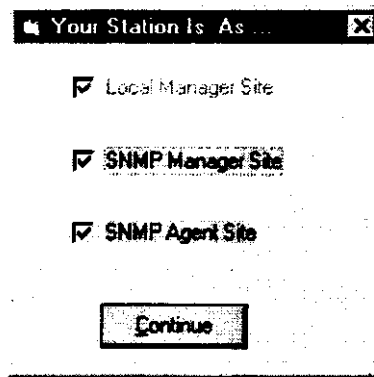
*If the RS-232 cable is connected while the controller is powered on, press [Ctrl] [L] to refresh the screen information.*

**This page is intentionally left blank.**

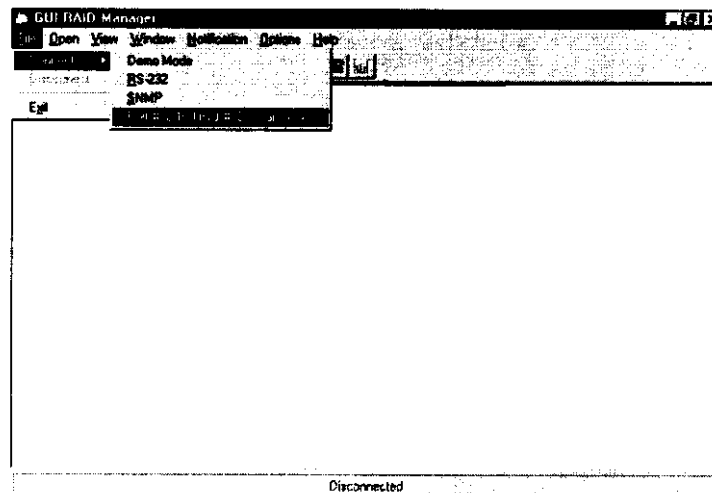
---

## 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

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.*

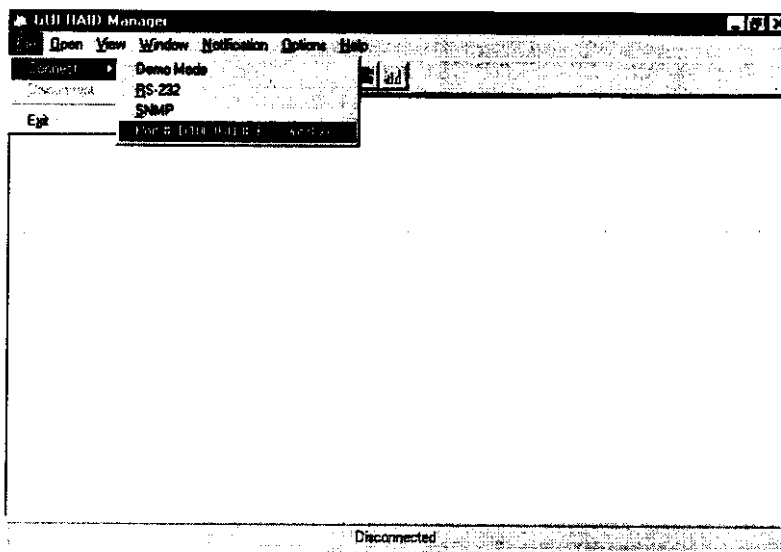
**Example Settings for Agent Site Using Windows NT**

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.

## 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*.

### 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)
```

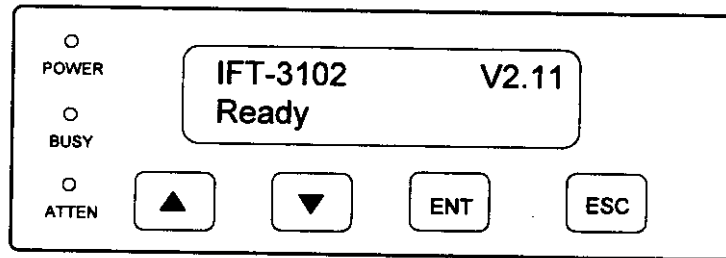
Press <Enter> to confirm the selection. Now that we have changed the Peripheral Device Type, let us set the Peripheral Device Qualifier. Press <Esc> to return to the sub-menu's mentioned above. Use the

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 the 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. (The 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."

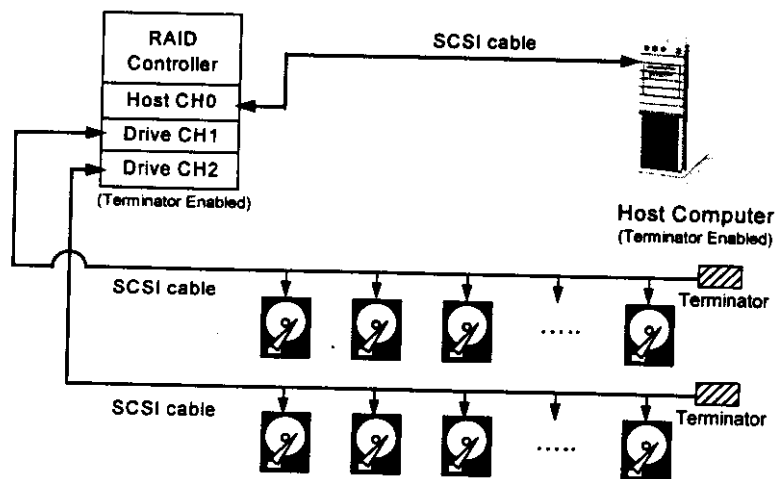
View and Edit  
Config Params

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

Host-side SCSI  
Parameters ..

## 4.7 Basic Operational Setup

An example of the operational setup is shown below:



- The SCSI cable must be shorter than 12 meters using high-quality SCSI cable and terminators.
- Channel 0 is connected to the Host system.
- Drives are connected to drive channels 1 and/or 2.
- SCSI nodes on the same channel have their own unique ID number.
- Both the Host and drive SCSI cables are properly terminated.
- The terminator of all the hard drives must be disabled.
- The power supply is attached.
- All operation parameters are properly set.

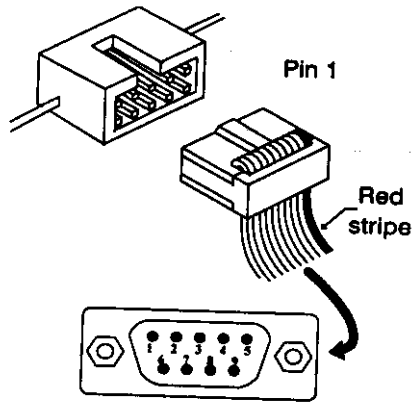
### To connect the components:

1. Make sure power is off or the power connector is disconnected.
2. Connect channel 0 of the controller to the Host system's SCSI port using a suitable SCSI cable.



## 4.6 Serial Port Connection and Setup

The IFT-3102U2 controller can be configured via a PC running a VT-100 terminal emulation program, or a VT-100 compatible terminal. The provided interface cable converts the RS-232 signal of the 10-pin header connector on the controller into a 9-pin D-Sub male connector. The pin layout of the 9-pin D-Sub male connector is similar to that of a PC's serial port and is set as a DTE device. The proper connection of the cable and pin layout is shown below.



The following are guidelines on using the serial port:

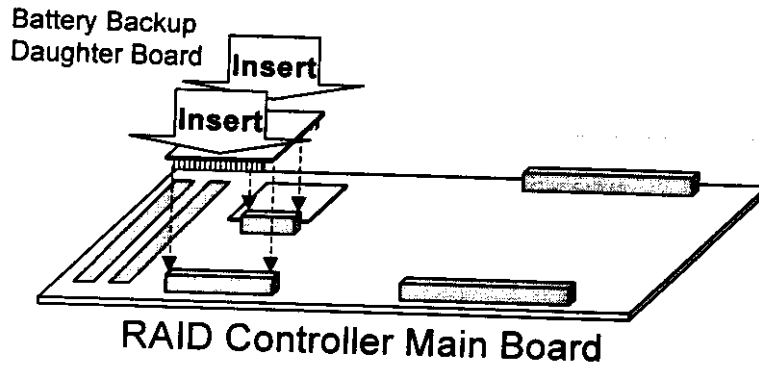
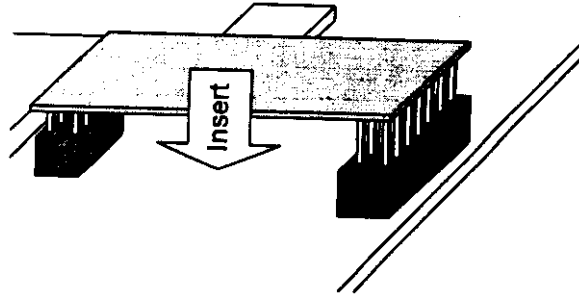
- The serial port's default is set at 9,600 baud, 8 bit, 1 stop bit and no parity. Use the COM1 serial port of the controller.
- In most cases, connecting RD, TD and SG are enough to establish communication with a terminal.
- If you are using a PC as a terminal, any of the VT-100 terminal emulation software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

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

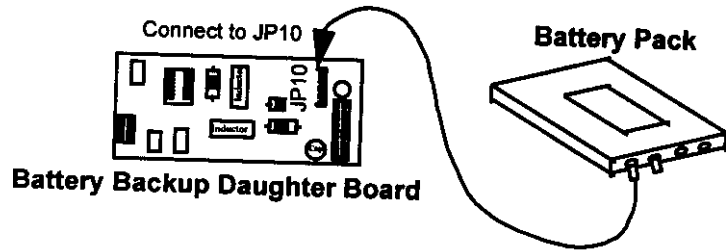
Press ENT for two seconds to enter the Main Menu. Press ▼ or ▲ to

View and Edit Configuration ..

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



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



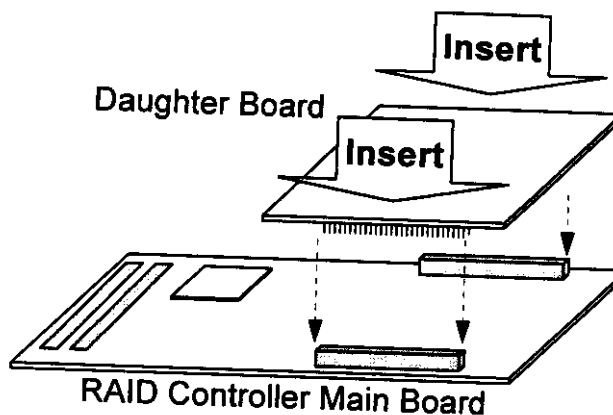
### 4.3 Installing the SCSI Channel Upgrade Daughterboard

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

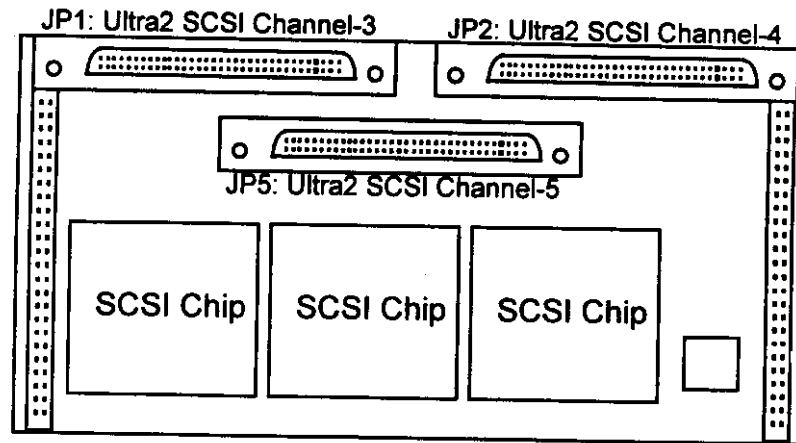
IFT-9073UWS:	3 Single-Ended Ultra Wide SCSI Channels
IFT-9072UWD:	2 Differential Ultra Wide SCSI Channels
IFT-9073U2:	3 Ultra2 Wide SCSI Channels

#### To install the SCSI channel upgrade daughterboard:

1. Make sure the power of the host system and drives are off.
2. Position the daughter board so that the SCSI connectors are facing the rear of the controller.
3. While at it, make sure the connector pins on the daughter board are aligned with the two header connectors on the controller's main board.
4. Press both sides of the daughter board downward so that the connector pins on the daughter board insert into the header connectors on the main board. Make sure the daughter board is seated properly.



#### 4.1.6 Top View of the Daughter Board (IFT-9073U2)



#### 4.2 Installing DRAM SIMM



**IMPORTANT:**

*The IFT-3102U2 controller requires a minimum of 8 Mbytes DRAM SIMM (with or without parity function) installed in a SIMM socket in order for it to operate. The controller is normally delivered without any DRAM installed.*

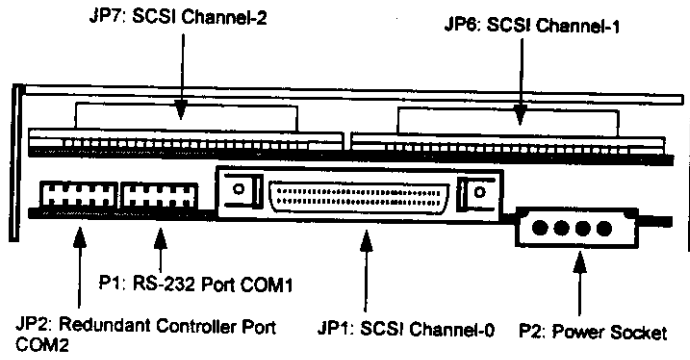
**The following are guidelines on using DRAMs:**

- ✓ Use 72-pin 60ns DRAM or 60ns 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 8 MBytes installed in a SIMM socket, however 16 Mbytes is recommended.
- ✓ The controller supports 8 MB, 16 MB, 32 MB, 64 MB and 128MB DRAM SIMM modules. Maximum DRAM size is 128 MBytes.

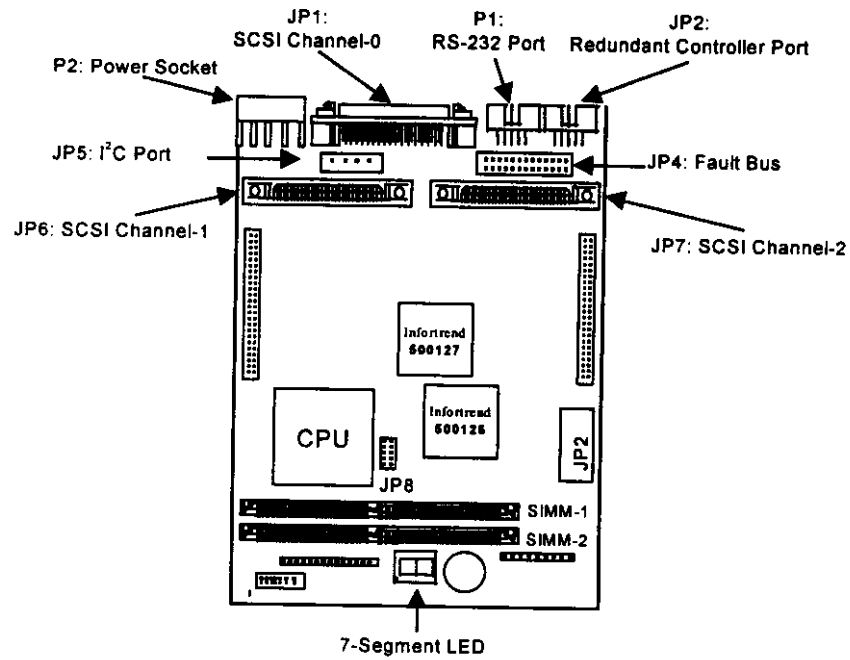
**To install the DRAM SIMM:**

1. Power off the system and disconnect the power connector.

### 4.1.2 Rear View of the Main Board



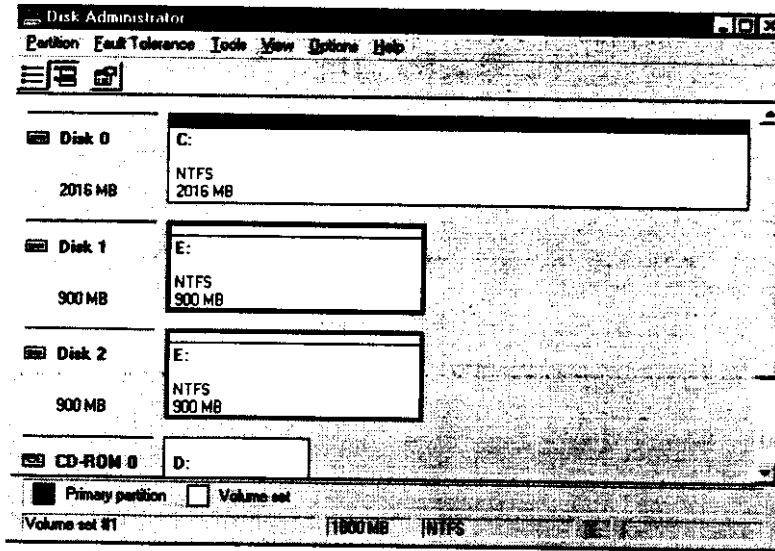
### 4.1.3 Top View of the Main Board



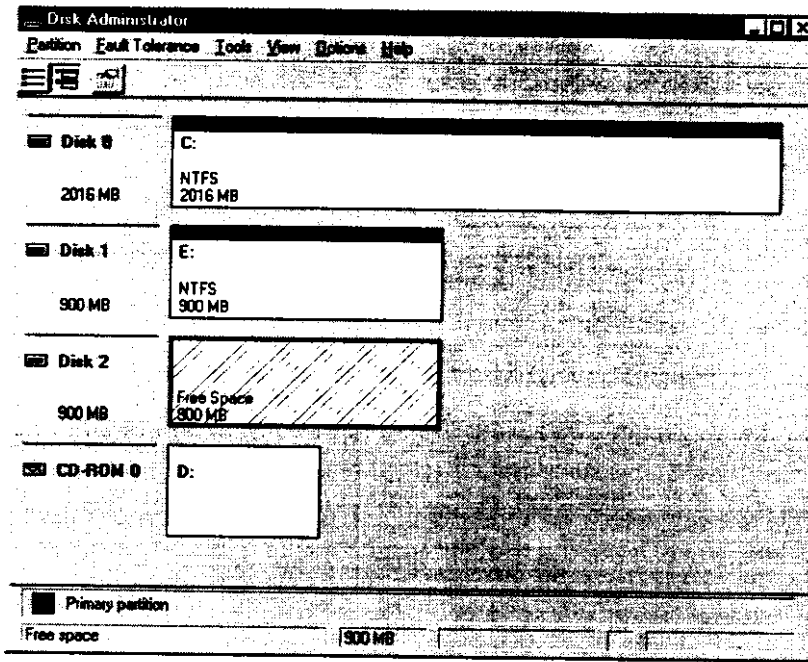
**This page is intentionally left blank.**

---

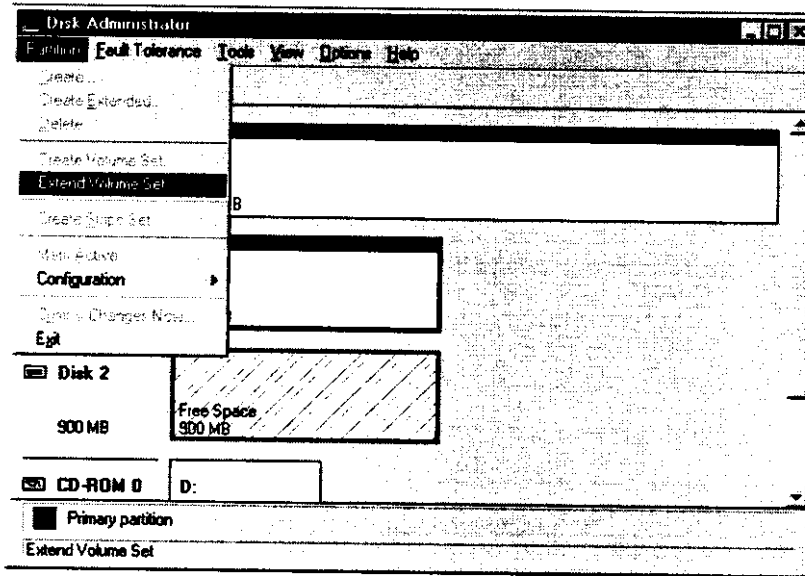
Logical Drive E: is now composed of two 900MB partitions with a total volume of 1800MB. To see this, hold down on the <Ctrl> key and select both Disk 1 and Disk2; then right-click your mouse and select "Properties."



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.

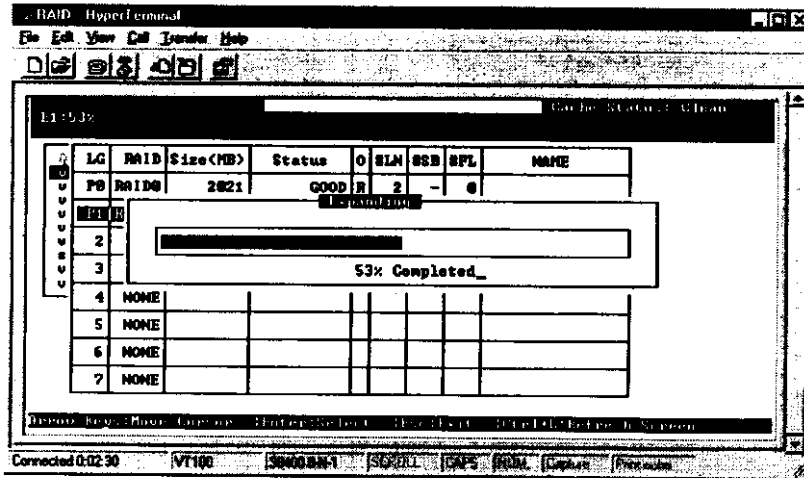


From the "Partition" menu, select "Extend Volume Set."

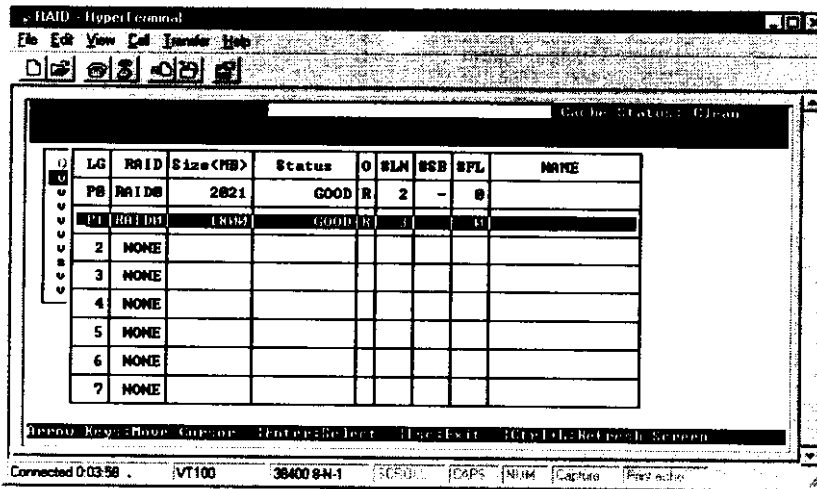




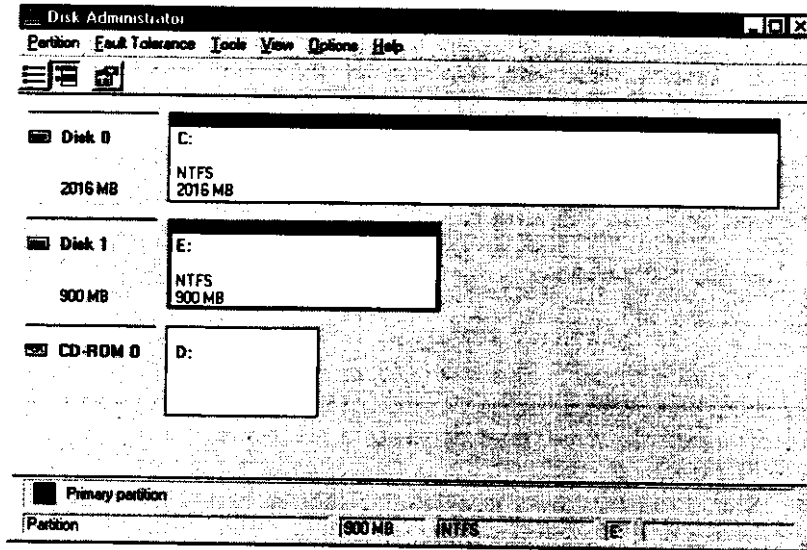
Follow the steps described in section 7.2.8 to add SCSI disk drives and perform Mode 1 Dynamic Logical Drive Expansion.



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

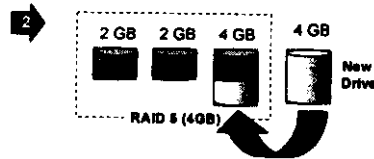


You can view information about this drive in the Windows NT® Server's Disk Administrator.



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)



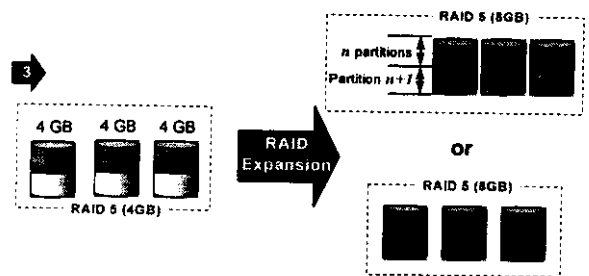
Copy and Replace the other member drives one by one until all the member drives have been replaced

Copy and Replace each member drive. After all the member drives have been replaced, execute the "RAID Expansion" to use the additional capacity.



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)



After the RAID Expansion, the additional capacity will appear as another partition. Adding the extra capacity into the existing partition requires OS support.



(at the selected time interval). Once the failed drive has been swapped with a drive that has adequate capacity to rebuild the logical drive, the rebuild will begin automatically.

The default setting is "Disabled," meaning that that the controller will not Auto-Detect the swap of a failed drive. To enable this feature, select a time interval.

### **3.6 Dynamic Logical Drive Expansion**

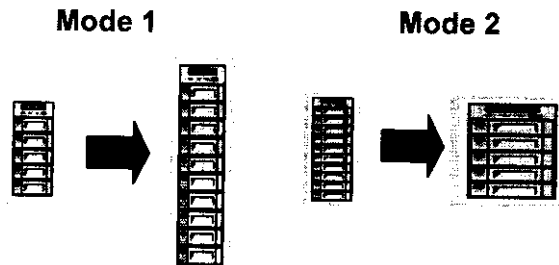
#### **3.6.1 What Is It and How Does It Work?**

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 allows users to add new SCSI hard disk drives and expand a RAID 0, 3 or 5 Logical Drive without powering down the system.

#### **3.6.2 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**



reassign the bad block to another spare block. However, all of this takes time. The time to perform these operations can vary between different brands and models of drives.

During SCSI bus arbitration, a device with higher priority can utilize the bus first. A device with lower priority will sometimes get a SCSI I/O timeout when higher priority devices keep utilizing the bus.

The default setting for "SCSI I/O Timeout" is 7 seconds. It is highly recommended not to change this setting. Setting the timeout to a lower value will cause the controller to judge a drive as failed a drive is still retrying or while a drive is unable to arbitrate the SCSI bus. Setting the timeout to a greater value will cause the controller to keep waiting for a drive, and it may sometimes cause a host timeout.

### 3.5.5 Maximum Tag Count

The maximum number of tags that can be sent to each drive at the same time. A drive has a built-in cache that is used to sort all of the I/O requests ("tags") which are sent to the drive, allowing the drive to finish the requests faster. The cache size and maximum number of tags varies between different brands and models of drive. Using the default setting - "32" - is highly recommended. Changing the maximum tag count to "Disable" will cause the internal cache of the drive to be ignored (i.e., not used).

### 3.5.6 Periodic Drive Check Time

The "Periodic Drive Check Time" is an interval for the controller to check all of the drives that were on the SCSI bus at controller startup (a list of all the drives that were detected can be seen under "View and Edit SCSI Drives"). The default value is "Disabled". "Disabled" means that if a drive is removed from the bus, the controller will not be able to know - so long as no host accesses that drive. Changing the check time to any other value allows the controller to check - at the selected interval - all of the drives that are listed under "View and Edit SCSI Drives." If any drive is then removed, the controller will be able to know - even if no host accesses that drive.

### 3.5.7 SAF-TE Enclosure Monitoring

**What is SAF-TE?**

SAF-TE stands for SCSI Accessed Fault-Tolerant Enclosures. It is an enclosure management technology that uses the SCSI bus to interact

## 3.4 Cache Parameters

### 3.4.1 Optimization for Sequential or Random I/O

When using RAID with applications such as video or image oriented applications, the application reads/writes from the drive using large-block, sequential files instead of small-block, random access files. The IFT-3102U2 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.*

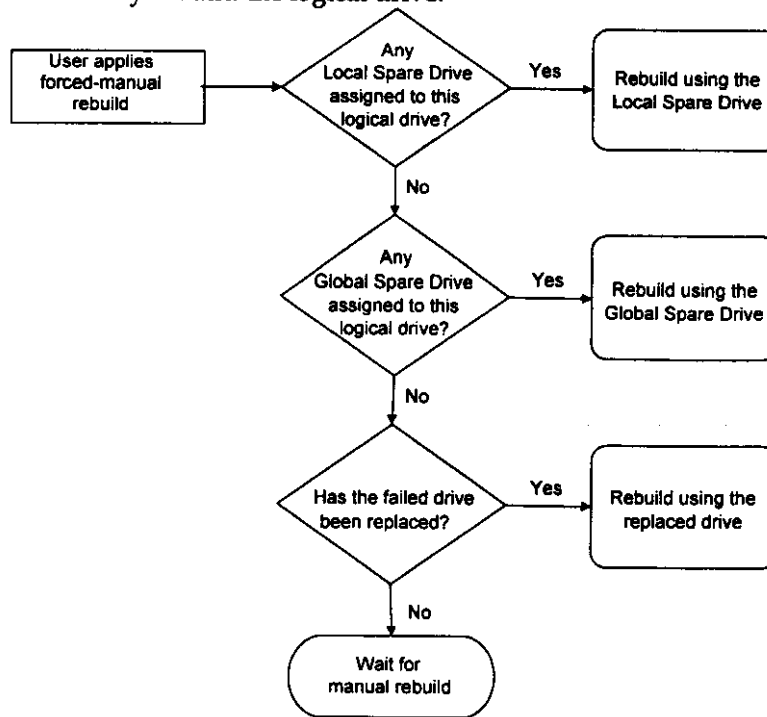
## 3.5 Drive-Side SCSI Parameters

### 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

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



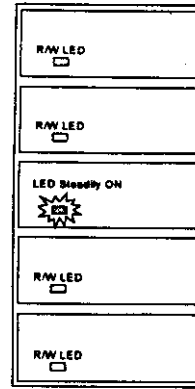
If neither Local Spare Drive nor Global Spare Drive is available, the controller will detect the SCSI channel and ID of the failed drive. Once the failed drive has been replaced by a new drive/used drive, it starts to rebuild using the replaced drive. If there is no available drive for rebuilding, the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

### 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).

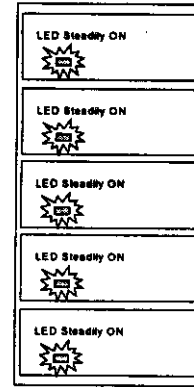
### Flash Selected SCSI Drive

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

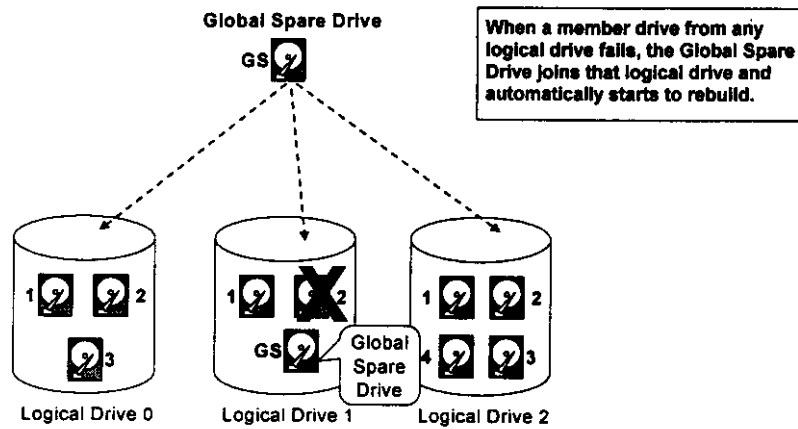
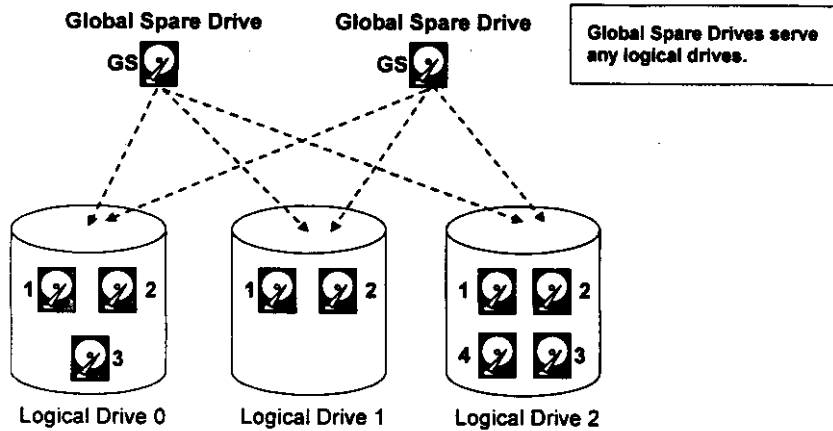


### Flash All SCSI Drives

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



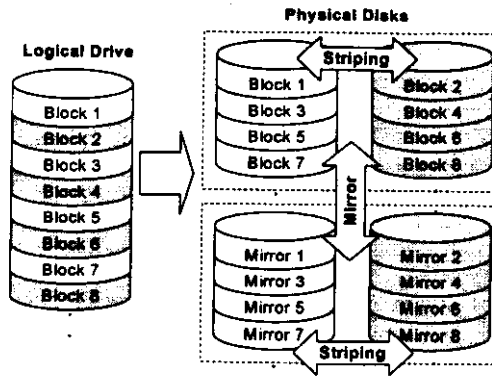




The IFT-3102U2 RAID controller provides both Local Spare Drive and Global Spare Drive functions. On certain occasions, applying these two functions together will better fit various needs. Take note though that the Local Spare Drive always has higher priority than the Global Spare Drive.

**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.

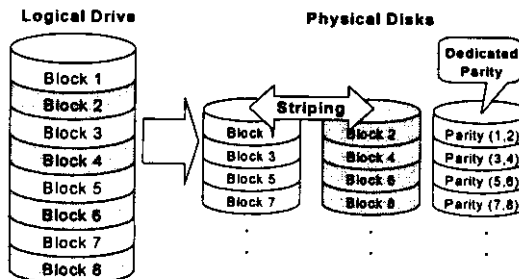


**IMPORTANT:**

"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

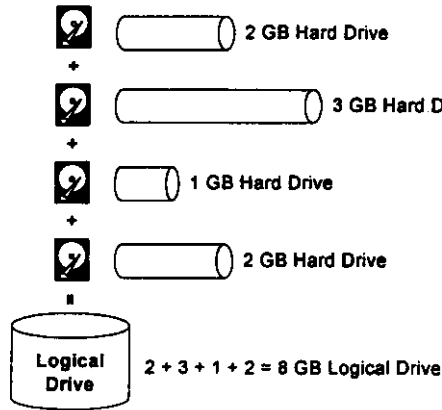
RAID 3	
Minimum Disks required	3
Capacity	N-1
Redundancy	Yes



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.

**NRAID**  
Disk Spanning

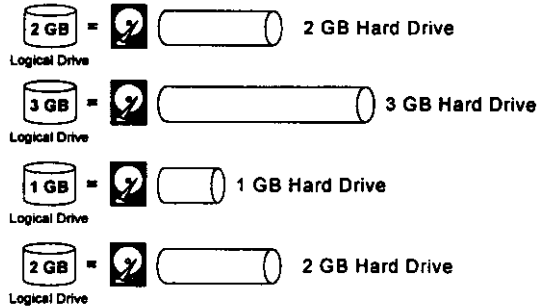
NRAID	
Minimum Disks required	1
Capacity	N
Redundancy	No



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

**JBOD**  
Single Drive Control

JBOD	
Minimum Disks required	1
Capacity	1
Redundancy	No



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

- ✓ Concurrent/Background logical drive initialization.
- ✓ Performance optimization for Sequential or Random I/O.
- ✓ Allows multiple drive failure and concurrent multiple drive rebuild of a RAID (0+1) logical drive.
- ✓ Configuration of individual SCSI target parameters.
- ✓ Controller can be assigned a name for ease of identification.
- ✓ Prior to first disk access, it allows adjustment of delay time during controller initialization to enhance compatibility with slow-initial drives
- ✓ All channels are Ultra2-Wide SCSI-2 (backward compatible to SCSI-1) and can be configured as either a host or drive interface
- ✓ Two or more SCSI channels can be simultaneously set as host interface for redundant host system operation
- ✓ Compatible and will automatically match any SCSI hard disks with SCSI-1, SCSI-2 or (Ultra)-Wide-SCSI (1 or 2) specification.
- ✓ Full Ultra2-Wide-SCSI-2 implementation including Tagged Command Queuing and Multi-Threaded I/O
- ✓ Uses AMD 5x86CPU with all executable firmware downloaded into high-speed DRAM
- ✓ EDO DRAM supported for enhanced performance.
- ✓ Up to 128 Mbytes of intelligent Read-Ahead/Write-Back cache with optional battery backup.
- ✓ Optional battery backup module to protect data in Write-Back cache when a power failure occurs:
  - IFT-9010: battery backup module
  - IFT-9070: battery backup daughter board that connects to IFT- 9010
- ✓ Firmware resides in easy-to-update flash memory
- ✓ Front panel LCD and push buttons for configuration and message display
- ✓ Modem supported on either of the COM port.
- ✓ Supports TELNET with PPP protocol for remote administration
- ✓ GUI RAID Manager and RS-232 terminal interface for RAID management
- ✓ SAF-TE support
- ✓ Supports Fault-bus for enclosure management.

**This page is intentionally left blank.**

---

<b>Chapter 9 Redundant Controller .....</b>	<b>9-1</b>
9.1 Before You Begin.....	9-1
9.2 Setting Up The Redundant Controllers.....	9-4
9.3 When One of the Controller Fails.....	9-12
<b>Chapter 10 Redundant Host, Multiple Host.....</b>	<b>10-1</b>
10.1 Redundant Host.....	10-1
10.2 Using Microsoft® Cluster Server (MSCS) .....	10-2
10.3 Multiple Host.....	10-6
<b>Chapter 11 Remote Administration .....</b>	<b>11-1</b>
11.1 GUI RAID Manager Using SNMP Service.....	11-1
11.2 Remote Terminal Emulation Using PPP+Telnet .....	11-3
11.3 Remote Terminal Emulation Using Modem.....	11-8
11.4 Dial-out for Event Notifications .....	11-18
<b>Chapter 12 Fault-Bus .....</b>	<b>12-1</b>
12.1 What is Fault-Bus? Why the Need for Fault-Bus? .....	12-1
12.2 How Does the Fault-Bus Work? .....	12-2
12.3 How to Setup the Fault-bus? .....	12-4
<b>Appendix A Front Panel Navigation Map.....</b>	<b>A-1</b>
<b>Appendix B SCSI Cable Specifications.....</b>	<b>B-1</b>
<b>Appendix C Upgrading the Firmware.....</b>	<b>C-1</b>
Upgrading firmware using In-band SCSI + GUI RAID Manager....	C-1
Upgrading firmware using RS-232 Terminal Emulation .....	C-3
<b>Appendix D Sync. Clock Period &amp; Sync. Clock Frequency.....</b>	<b>D-1</b>
<b>Appendix E Troubleshooting Guide.....</b>	<b>E-1</b>
<b>Appendix F Pin Assignments.....</b>	<b>F-1</b>
RS-232C Port.....	F-1
Redundant Controller Port.....	F-2
Fault-bus Port.....	F-2
IFT- 9011 Null Modem.....	F-2
IFT-9012 RS-232C Extension Cable .....	F-3
IFT-9013 Redundant Controller Cable .....	F-3
<b>Appendix G Specifications.....</b>	<b>G-1</b>
<b>Appendix H Record the Settings .....</b>	<b>H-1</b>
View and Edit Logical Drives .....	H-1
View and Edit Host LUNs .....	H-2
View and Edit SCSI Drives .....	H-2
View and Edit SCSI Channels .....	H-3
View and Edit Configuration Parameters.....	H-3
View and Edit Peripheral Devices.....	H-5
<b>Index</b>	

---

Infortrend Corp.  
149 Stony Circle, Ste. 210  
Santa Rosa, CA 95401  
USA  
www.infortrend.com

Infortrend Technology, Inc.  
10F, No. 33, San Min Rd., Sec. 2  
Pan Chiao City, Taipei Hsien  
Taiwan, R.O.C.  
www.infortrend.com.tw

Copyright © 1998

**This Edition First Published 1998**

All rights reserved. No part of this publication may be reproduced, transmitted, transcribed, stored in a retrieval system, or translated into any language or computer language, in any form or by any means, electronic, mechanical, magnetic, optical, chemical, manual or otherwise, without the prior written consent of Infortrend Technology, Inc.

**Disclaimer**

Infortrend Technology makes no representations or warranties with respect to the contents hereof and specifically disclaims any implied warranties of merchantability or fitness for any particular purpose. Furthermore, Infortrend Technology reserves the right to revise this publication and to make changes from time to time in the content hereof without obligation to notify any person of such revisions or changes.

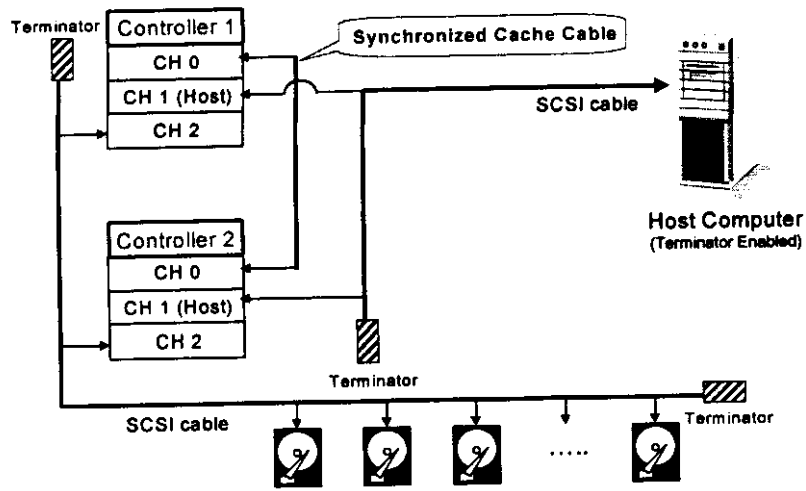
**Trademarks**

IFT-3102U2, IFT-9073UWS, IFT-9072UWD and IFT-9073U2 are trademarks of Infortrend Technology, Inc. All other names, brands, products or services are trademarks or registered trademarks of their respective companies.

Printed in Taiwan

---





**What is Primary controller and Secondary controller?**

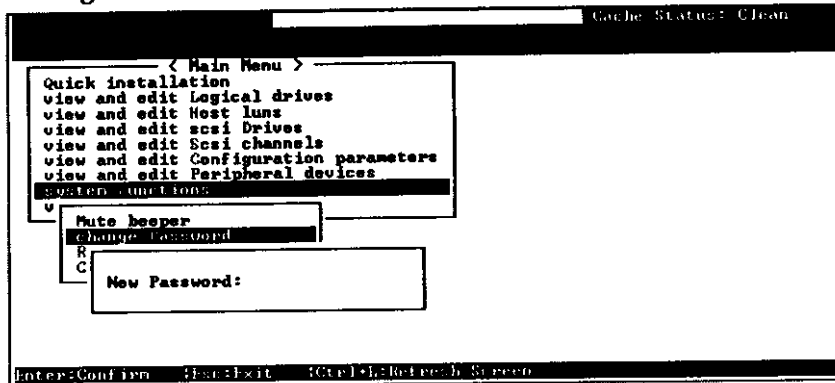
The Primary and Secondary controllers are used to serve the host computer's I/O requests. Take note that the configurations and settings can only be done on the Primary controller. The Secondary controller then synchronizes the configuration information of the Primary controller, making the configurations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

<b>Total Cache Size</b>	The total DRAM size installed in the controller.	-
<b>Firmware Version</b>	The version of the firmware.	-
<b>Bootrecord Version</b>	The version of the boot record.	-
<b>Serial Number</b>	The serial number of the controller.	-
<b>Battery Backup</b>		-
	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.	-

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



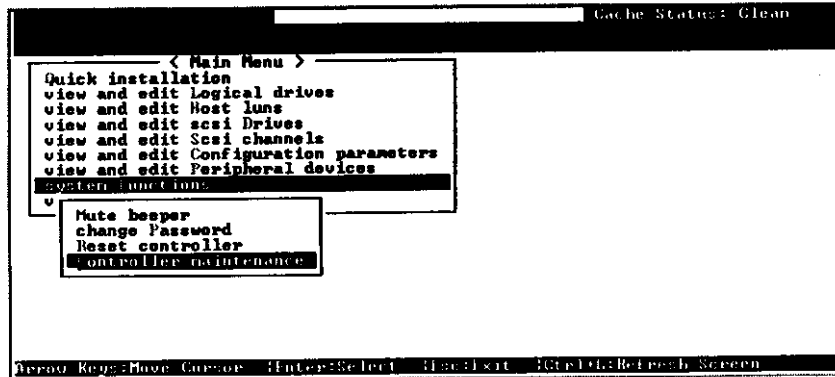
Enter the desired password in the column, then press [Enter]. The next dialog box will display "Re-Enter Password". Enter the password again and press [Enter].

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

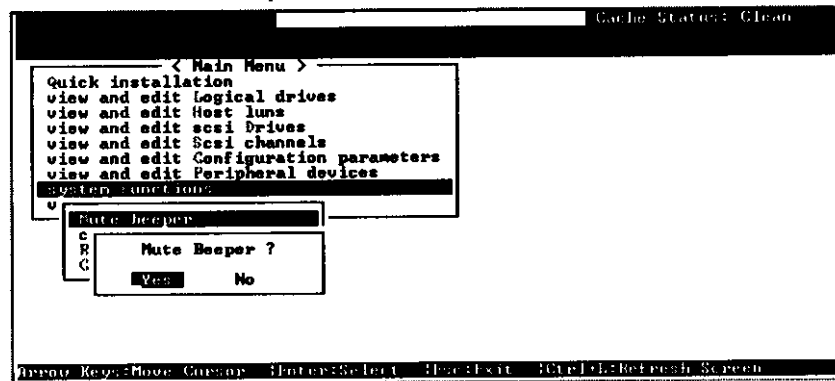
To disable or delete the password, press [Enter] only in the password column that is used for entering a new password. The existing password will be deleted. No password checking will occur when entering the Main Menu from the Initial screen.

## 8.7 System Functions



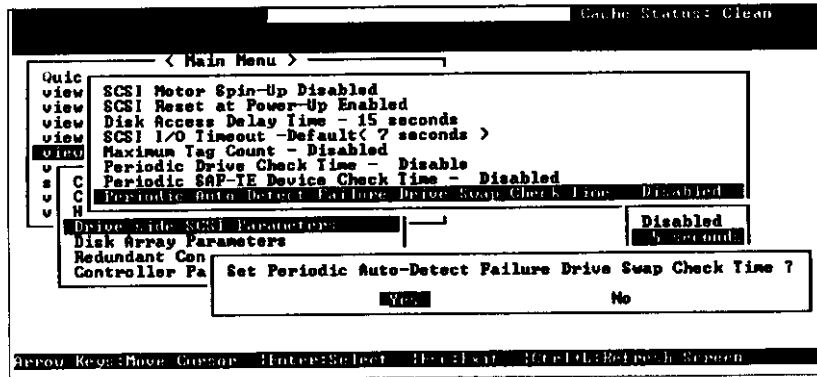
Choose "System Functions" in the Main Menu, then press [Enter]. The System Functions menu will appear. Move the cursor bar to an item, then press [Enter].

### 8.7.1 Mute Beeper



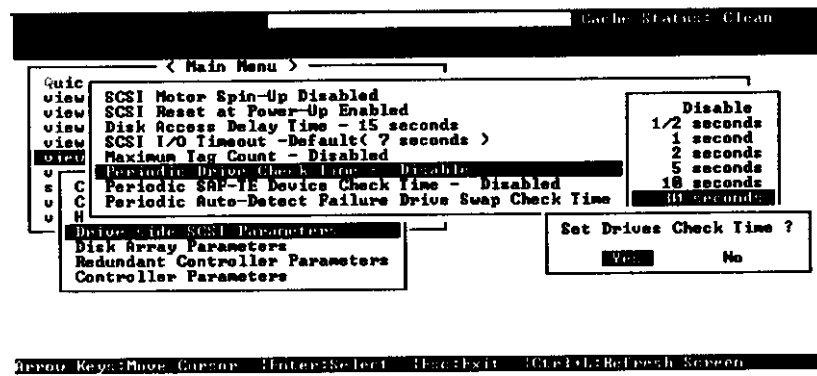
When the controller's beeper has been activated, choose "Mute beeper", then press [Enter]. Choose "Yes" and press [Enter] in the next dialog box to turn the beeper off temporarily. The beeper will still activate on the next event.

## Detection of Drive Hot Swap Followed by Auto Rebuild



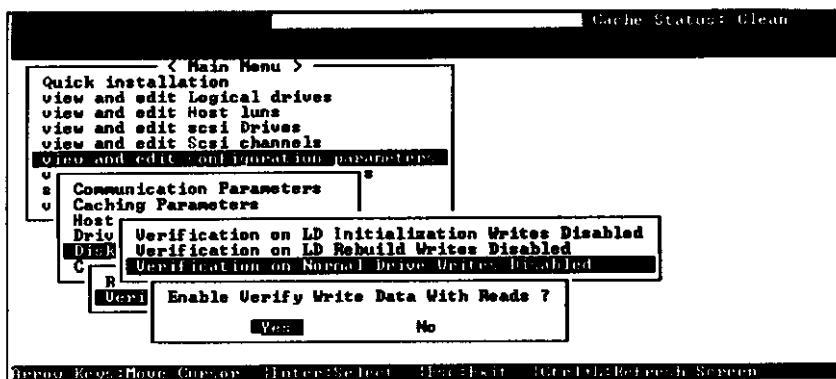
Choose "Periodic Auto-Detect Failure Drive Swap Check Time"; then press [Enter]. Move the cursor to the desired interval; then press [Enter]. Choose Yes in the dialog box that follows to confirm the setting.

## Idle Drive Failure Detection



Choose "Periodic Drive Check Time - Disable"; then press [Enter]. Move the cursor to the desired interval; then press [Enter]. Choose Yes in the dialog box that follows to confirm the setting.

## Verification On Writes



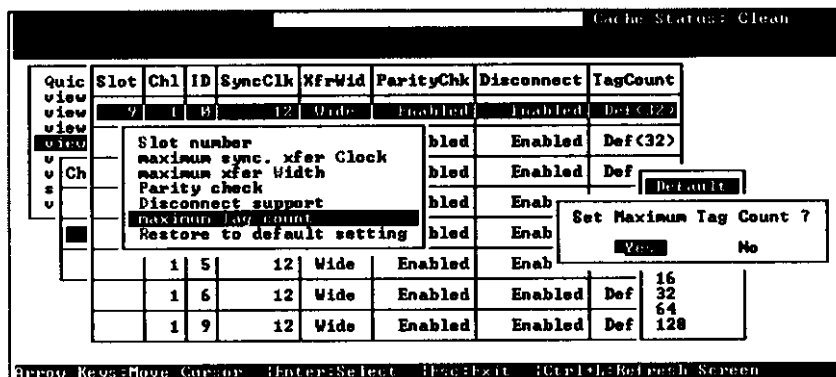
Choose "Verification on Writes", then press [Enter]. Move the cursor bar to an item, then press [Enter]. Choose Yes in the dialog box that followed to confirm the setting. (Refer to section 3.3.2 for more information.)



### 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.

## Maximum Tag Count (Tag Command Queuing)



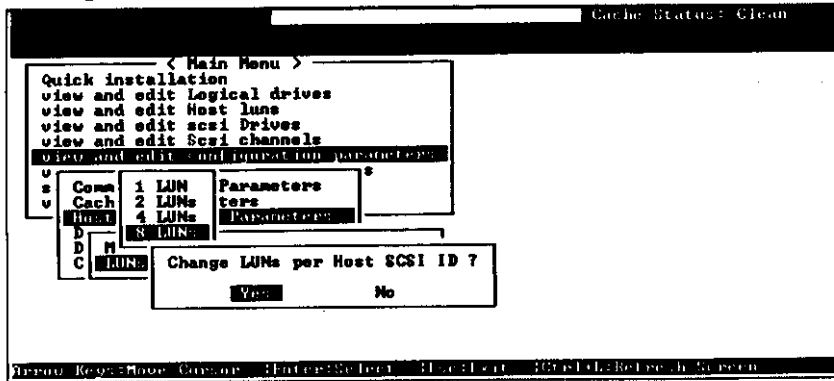
The controller (with Firmware 2.11 and above) supports tag command queuing with an adjustable maximum tag count from 1 to 128. The default setting is "Enabled" with a maximum tag count of 32. This





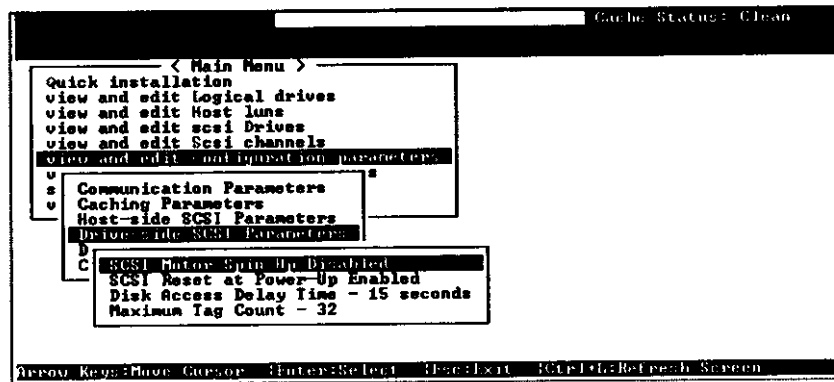


## LUNs per Host SCSI ID



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.

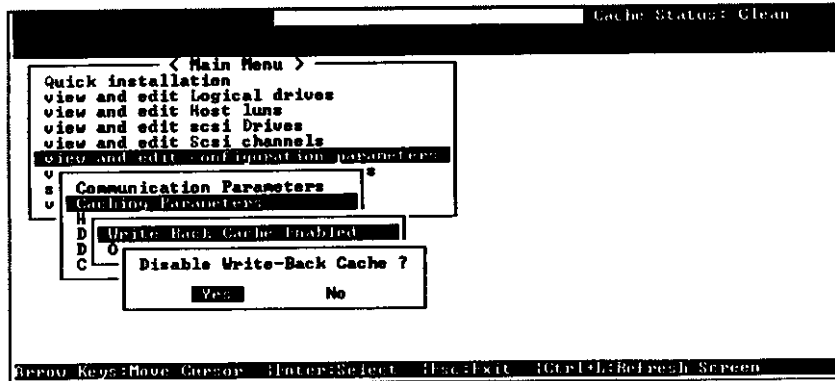
### 8.6.4 Drive-side SCSI Parameters



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

## 8.6.2 Caching Parameters

### Write-Back Cache Enable/Disable



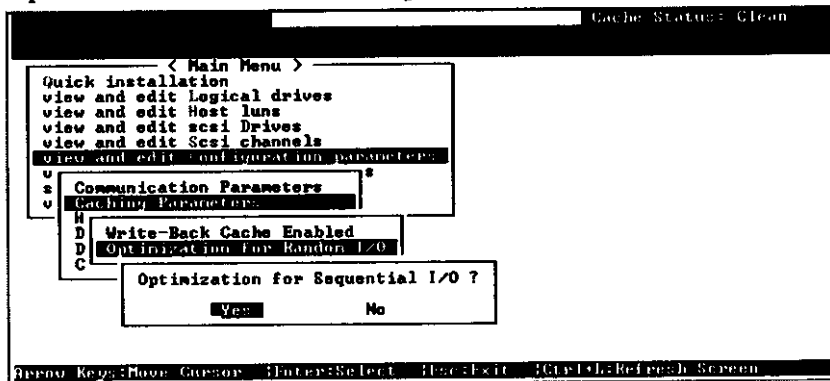
Choose "Caching Parameters", then press [Enter]. Select "Write-Back Cache", then press [Enter]. "Enabled" or "Disabled" will display the current setting of the Write-Back Cache. Choose Yes in the dialog box that followed to confirm the setting.



#### 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"





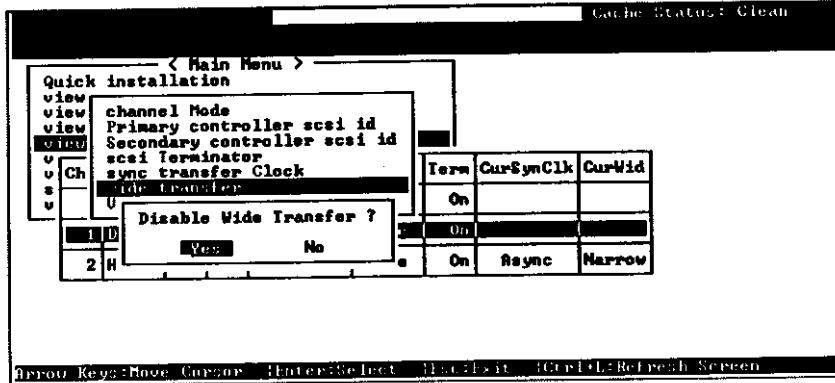
appear. Move the cursor bar to the desired speed and press [Enter]. A dialog box "Change Sync Transfer Clock?" will appear. Choose Yes.



**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**



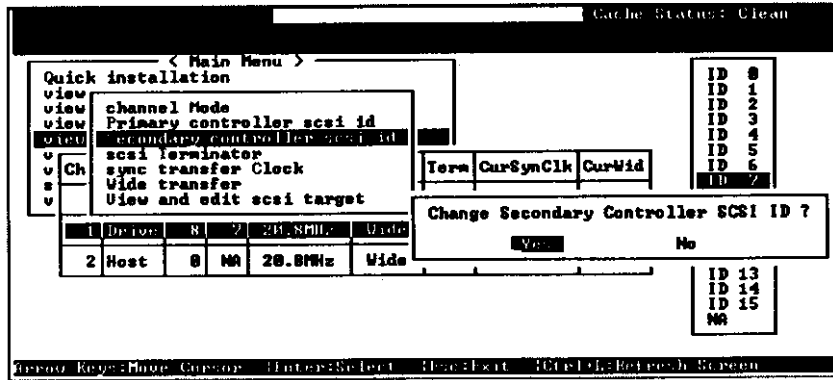
Move the cursor bar to a channel, then press [Enter]. Select "Wide Transfer", then press [Enter]. A dialog box "Disable Wide Transfer?" or "Enable Wide Transfer?" will appear. Choose Yes.



**IMPORTANT:**

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

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



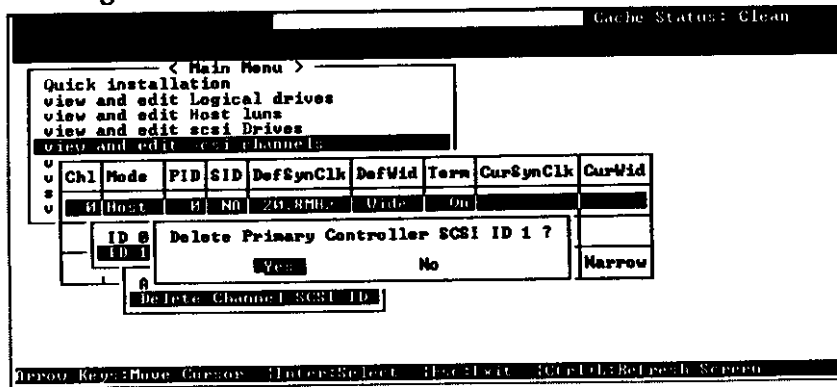
Choose a Drive channel, then press [Enter]. Choose "Secondary Controller SCSI ID". A list of SCSI IDs will be displayed on the screen. Only one SCSI ID can be assigned to the drive channel of a controller. Now choose a SCSI ID for the drive channel of the Secondary Controller. The dialog box "Change 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 can be applied to the Host channel while the Drive channel, one SCSI ID or no SCSI ID.
- At least a controller's SCSI ID has to be present on the SCSI bus.

## 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 can be applied to the Host channel while the Drive channel, one SCSI ID or no SCSI ID.
- At least a controller's SCSI ID has to be present on the SCSI bus.

## 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**

Chl	Mode	PID	SID	DefSynClk	DefWid	Term	CurSynClk	CurWid
0	Host	7	NA	20.8MHz	Wide	On	20.8MHz	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=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

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	7	NA	20.8MHz	Wide	On	20.8MHz	Wide

Channel Mode: Wide    On

Change Mode to Drive Channel ?

Yes    No

Arrow Keys: Move Cursor    Enter=Select    Esc=Exit    Ctrl=Refresh Screen

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.*







## 8.4 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

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

Arrow Key: Move Cursor    Enter: Select    Esc: Exit    Ctrl-D: 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

Cache Status: Clean

< Main Menu >

Quick installation  
 view and edit Logical drives  
 view an  
 view an  
 view an  
 view an  
 view an  
 view an  
 view an

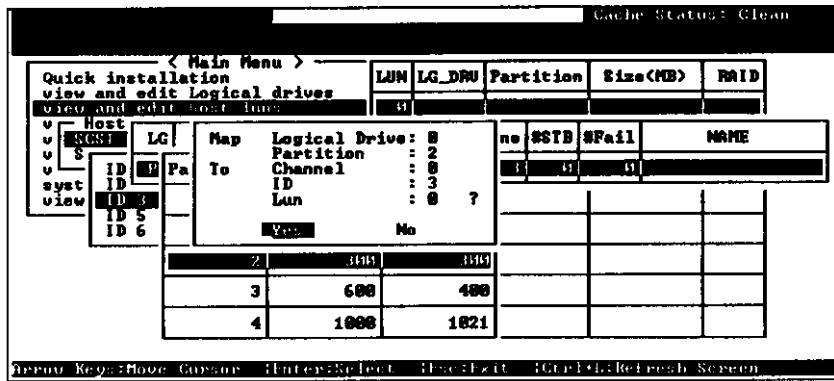
View drive information  
 add Local spare drive  
 add Global spare drive  
 scan SCSI drive  
 SCSI Channel 1  
 Identify scsi drive  
 Toggle failure signal

G_DRU	Status	Vendor an	ID
0	ON-LINE	SEAGATE S	ID 5
			ID 6
0	ON-LINE	SEAGATE S	ID 8
			ID 9
0	ON-LINE	SEAGATE S	ID 10
			ID 11
			ID 12
			ID 13
			ID 14
			ID 15

Slot	Chl	ID	Size(MB)	Speed	LG_DRU	Status	Vendor and Product ID
	1	4	1010	40MB	NONE	USED DRU	SEAGATE S

Arrow Key: Move Cursor    Enter: Select    Esc: Exit    Ctrl-D: Refresh Screen

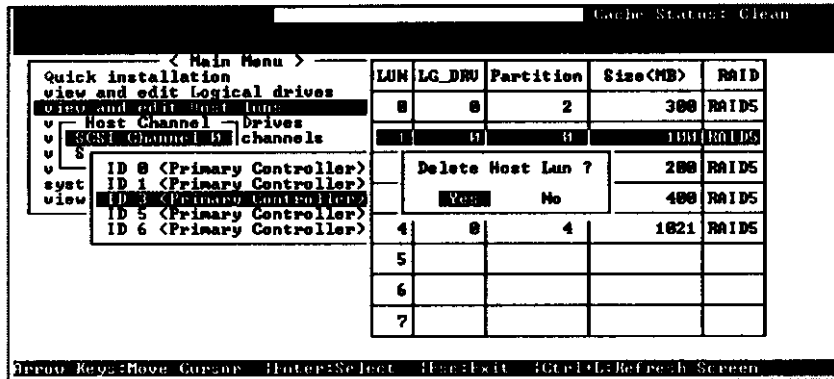
Choose a drive and press [Enter]. Choose "Scan SCSI drive", then press [Enter]. The menu may vary according to the drive status. Choose the drive channel and SCSI ID of the drive you wish to scan, then press [Enter].



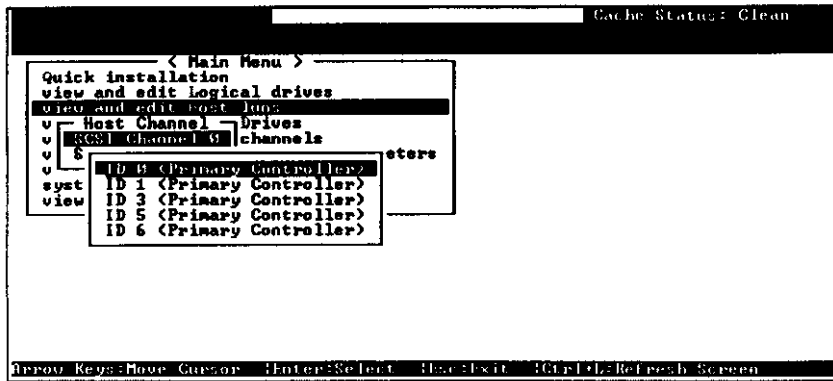
The prompt shown above will display the mapping you wish to create. Choose Yes to create the LUN mapping you selected. In the example above, partition 2 of logical drive 0 will map to LUN 0 of SCSI ID 3 on host channel 0.

### 8.3.2 Viewing and Deleting the LUN Mappings

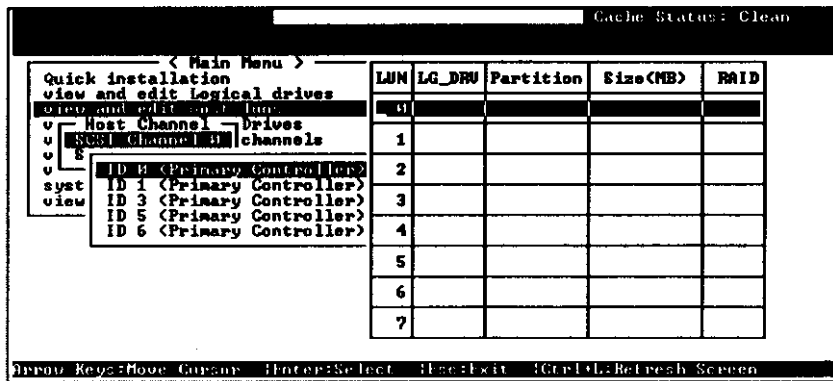
Choose the host channel and SCSI ID of the LUN mapping you wish to view or delete.



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



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



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].



**IMPORTANT:**

- Mode 1 Expansion (as described in Chapter 3) 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.

### 8.2.9 Logical Drive Parity Check

Cache Status: Clean

LG	RAID	Size(MB)	Status	O	SLM	SSB	SPL	NAME
0	RAID0	2048	GOOD	R	0	0	0	
1								
2								
3								
4								
5								
6								
7								

View scsi drives  
 Delete logical drive  
 Partition logical drive  
 logical drive Name  
 logical drive Assignments  
 Expand logical drive  
 add Scsi drives  
**check parity?**

Check Logical Drive Parity ?  
 Yes  No

Arrow: Move Cursor    F1:Enter:Select    Esc:Exit    F10:Refresh Screen

Choose the logical drive that you would like to check the parity for, and then press [Enter]. Choose "Check Parity", then press [Enter]. When prompted with "Check Logical Drive Parity?", select Yes.



**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.

## 8.2.8 Dynamic Logical Drive Expansion

Cache Status: Clean									
Q	LG	RAID	Size(MB)	Status	O	SLN	SSB	SPL	NAME
0	RAID	RAID DB	2048	GOOD	R	2		0	
1									
2									
3									
4									
5									
6									
7	NONE								

View scsi drives  
 Delete logical drive  
 Partition logical drive  
 logical drive Name  
 logical drive Assignments  
 Expand logical drive  
 Add SCSI drives

5 Add Drives to Logical Drive ?

6 Yes No

7 NONE

Arrow Keys: Move Cursor Enter: Select F10: Continue F10+D: Refresh Screen

Choose the logical drive that you will add SCSI drives to; then press [Enter]. Choose "Add SCSI Drives"; then press [Enter].

Cache Status: Clean									
1 of 1 Selected									
Q	LG	RAID	Size(MB)	Status	O	SLN	SSB	SPL	NAME
0	RAID	RAID DB	2048	GOOD	R	2		0	
1									
2									
3									
4									
5									
6	*								
7	NONE								

View scsi drives  
 Delete logical drive  
 Partition logical drive  
 logical drive Name  
 logical drive Assignments  
 Expand logical drive  
 Add SCSI drives

5	Slot	Chl	ID	Size(MB)	Speed	LG_DRU	Status	Vendor and Product ID
6	*	2	2	2047	20MB	NONE	NEU DRU	SI06011 SI120350
7	NONE							

Arrow Keys: Move Cursor Enter: Select F10: Continue F10+D: Refresh Screen

Press [Enter] to select the SCSI drive(s) that you will add to the logical drive; then press [Enter]. An asterisk (\*) will appear by each of the drives selected. When you have finished selecting, press [Esc]. Confirm that these SCSI drives are to be added to the logical drive by selecting Yes.

## 8.2.6 Assigning a Logical Drive Name

Cache Status: Clean

Q	LG	RAID	Size(MB)	Status	#OnLine	#STB	#Fail	NAME
0	PM	RAID1	2021	GOOD	3	0	0	
1								
2								
3								
4								
5								
6	NONE							
7	NONE							

View scsi drives  
 Delete logical drive  
 Partition logical drive  
 logical drive Name  
 Rebuild logical drive

Current Logical Drive Name:  
 New Logical Drive Name: 2GB-1\_

Enter:Select to Default    Esc:Exit    Ctrl+F:Refresh Screen

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

## 8.2.7 Rebuilding Logical Drive

Cache Status: Clean

Q	LG	RAID	Size(MB)	Status	#OnLine	#STB	#Fail	NAME
0	PM	RAID1	2021	DRU FAILED	3	0	1	
1								
2								
3								
4								
5								
6	NONE							
7	NONE							

View scsi drives  
 Delete logical drive  
 Partition logical drive  
 logical drive Name  
 Rebuild logical drive

Rebuild Logical Drive ?

Yes    No

Enter:Move Cursor    Enter:Select    Esc:Exit    Ctrl+F:Refresh Screen

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





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

Arrow Key: Move Cursor    Enter: Select    Esc: Quit Menu    Ctrl-D: 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.

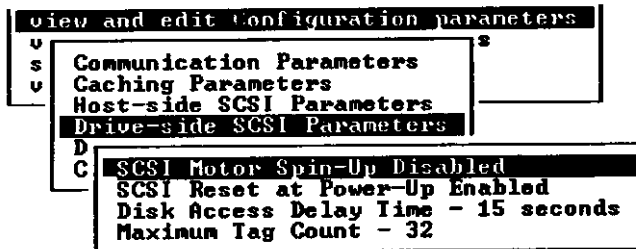
To exit this menu, press [ESC].

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

Cache Status: Clean							
LG	RAID	Size(MB)	Status	#OnLine	#STB	#Fail	NAME
0	NONE						
Raid Level : RAID 5 Online SCSI Drives : 3 Maximum Drive Capacity : 1010 MB Spare SCSI Drives : 0 Logical Drive Assignment: Primary Controller Create Logical Drive ? Yes                   No							
6	NONE						
7	NONE						

Arrow Key: Move Cursor    Enter: Select    Esc: Exit    Ctrl-D: Refresh Screen

When a fault-tolerant RAID level (1, 3 or 5) has been selected, the controller will start initializing parity. A progress indicator will be

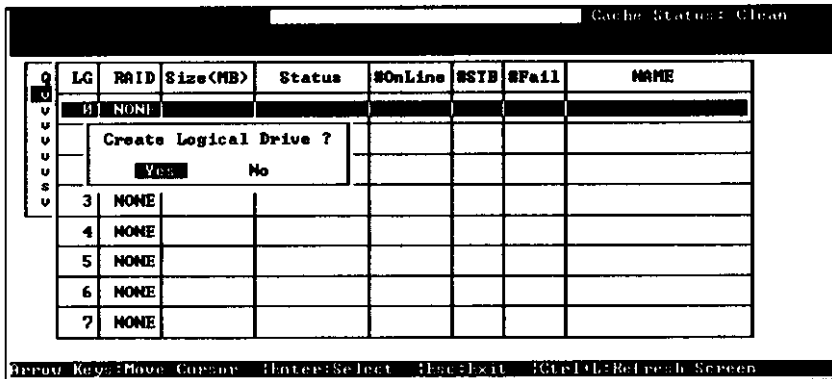


In the example shown above:

- 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



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].

	*	Multiple SCSI IDs were applied (Host Channel mode only).
	(ID number)	The Primary Controller is using the SCSI ID for host LUN mapping.
	NA	No SCSI ID applied (Drive Channel mode only).
<b>SID</b>	Secondary controller's SCSI ID mapping:	
	*	Multiple SCSI IDs were applied (Host Channel mode only).
	(ID number)	The Primary Controller is using the SCSI ID for host LUN mapping.
	NA	No SCSI ID applied (Drive Channel mode only).
<b>DefSynClk</b>	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.
<b>DefWid</b>	Default SCSI Bus Width:	
	Wide	16-bit SCSI
	Narrow	8-bit SCSI
<b>Term</b>	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.
<b>CurSynClk</b>	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.

## 8.1.4 SCSI Drive's Status

Cache Status: Clean

< Main Menu >

Quick installation  
view and edit Logical drives  
view and edit Host luns  
view and edit host adapters

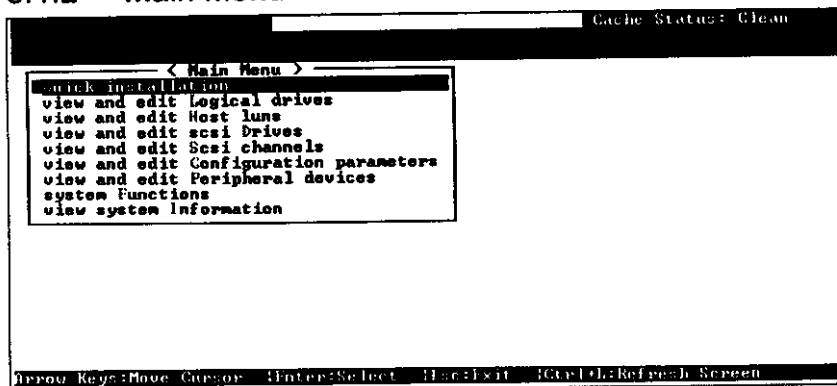
view	Slot	Chl	ID	Size(MB)	Speed	LG_DRV	Status	Vendor and Product ID
view		1	0	1818	48MB	0	ON-LINE	SEAGATE ST31055U
view		1	1	1818	48MB	0	ON-LINE	SEAGATE ST31055U
view		1	2	1818	48MB	0	ON-LINE	SEAGATE ST31055U
view		1	3	1818	48MB	NONE	USED DRU	SEAGATE ST31055U

Arrow Keys: Move Cursor    Enter: Select    Esc: Exit    Ctrl+F4: Release Screen

<b>Slot</b>		Slot number of the SCSI drive. Refer to Chapter 12, Fault-Bus, for details.
<b>Chl</b>		The SCSI Channel of the connected drive.
<b>ID</b>		The SCSI ID of the drive.
<b>Size (MB)</b>		Drive Capacity.
<b>Speed</b>	xxMB	The maximum sync. transfer rate of this drive.
	Async	The drive is using asynchronous mode.
<b>LG_DRV</b>	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.
<b>Status</b>	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.

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
0	RAID 0	2021	IN LING	1	1	0	P0
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.

**This page is intentionally left blank.**

---