RAID-800I

SCSI-to-IDE Disk Array Subsystem

Installation Reference Guide

Copyright Notice

CE

Part No. 2002080000

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Packing List

Before you begin installing your unit, please make sure that the following materials have been shipped:

- RAID-800I series subsystem unit
- One power cord
- One 120 cm external SCSI cable
- One 9P-female to 9P-female RS-232 cable
- Installation reference guide
- Spare screws, etc.
- Eight keys (six for mobile rack, two for power supply)

If any of these items are missing or damaged, contact your distributor or sales representative immediately.

We have carefully inspected the RAID-800I mechanically and electrically before shipment. It should be free of marks and scratches and in perfect working order upon receipt.

As you unpack the RAID-800I, check it for signs of shipping damage. (For example, damaged box, scratches, dents, etc.) If it is damaged or it fails to meet the specifications, notify our service department or your local sales representative immediately. Also notify the carrier. Retain the shipping carton and packing material for inspection by the carrier. After inspection, we will make arrangements to repair or replace the unit.

Additional Information and Assistance

1. Visit the Advantech web sites at **www.advantech.com** or **www.advantech.com.tw** where you can find the latest information about the product.
2. Contact your distributor, sales representative, or Advantech's customer service center for technical support if you need additional assistance. Please have the following information ready before you call:
   - Product name and serial number
   - Description of your peripheral attachments
   - Description of your software (operating system, version, application software, etc.)
   - A complete description of the problem
   - The exact wording of any error messages

Safety Instructions

1. Read these safety instructions carefully.
2. Keep this installation reference guide for later reference.
3. Disconnect this equipment from any AC outlet before cleaning. Do not use liquid or spray detergents for cleaning. Use a damp cloth.
4. For pluggable equipment, the power outlet must be installed near the equipment and must be easily accessible.
5. Keep this equipment away from humidity.
6. Put this equipment on a reliable surface during installation. Dropping it or letting it fall could cause damage.
7. The openings on the enclosure are for air convection. Protect the equipment from overheating. DO NOT COVER THE OPENINGS.
8. Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
9. Position the power cord so that people cannot step on it. Do not place anything over the power cord.
10. All cautions and warnings on the equipment should be noted.
11. If the equipment is not used for a long time, disconnect it from the power source to avoid damage by transient over-voltage.
12. Never pour any liquid into an opening. This could cause fire or electrical shock.
13. Never open the equipment. For safety reasons, the equipment should be opened only by qualified service personnel.
14. If any of the following situations arises, get the equipment checked by service personnel:
    a. The power cord or plug is damaged.
    b. Liquid has penetrated into the equipment.
    c. The equipment has been exposed to moisture.
    d. The equipment does not work well, or you cannot get it to work according to the installation reference guide.
    e. The equipment has been dropped and damaged.
    f. The equipment has obvious signs of breakage.
15. DO NOT LEAVE THIS EQUIPMENT IN AN UNCONTROLLED ENVIRONMENT WHERE THE STORAGE TEMPERATURE IS BELOW -20° C (-4° F) OR ABOVE 60° C (140° F). IT MAY DAMAGE THE EQUIPMENT.

The sound pressure level at the operator's position according to IEC 704-1:1982 is equal to or less than 70 dB(A).

DISCLAIMER: This set of instructions is given according to IEC 704-1. Advantech disclaims all responsibility for the accuracy of any statements contained herein.

Wichtige Sicherheishinweise

1. Bitte lesen sie Sich diese Hinweise sorgfältig durch.
2. Heben Sie diese Anleitung für den späteren Gebrauch auf.
3. Vor jedem Reinigen ist das Gerät vom Stromnetz zu trennen. Verwenden Sie Keine Flüssig-oder Aerosolreiniger. Am besten dient ein angefeuchtetes Tuch zur Reinigung.
4. Die NetzanschluBsteckdose soll nahe dem Gerät angebracht und leicht zugänglich sein.
5. Das Gerät ist vor Feuchtigkeit zu schützen.
6. Bei der Aufstellung des Gerätes ist auf sicheren Stand zu achten. Ein Kippen oder Fallen könnte Verletzungen hervorrufen.
7. Die Belüftungsöffnungen dienen zur Luftzirkulation die das Gerät vor überhitzung schützt. Sorgen Sie dafür, daB diese Öffnungen nicht abgedeckt werden.
8. Beachten Sie beim AnschluB an das Stromnetz die AnschluBwerte.
9. Verlegen Sie die NetzanschluBleitung so, daB niemand darüber fallen kann. Es sollte auch nichts auf der Leitung abgestellt werden.
10. Alle Hinweise und Warnungen die sich am Geräten befinden sind zu beachten.
11. Wird das Gerät über einen längeren Zeitraum nicht benutzt, sollten Sie es vom Stromnetz trennen. Somit wird im Falle einer Überspannung eine Beschädigung vermieden.
12. Durch die Lüftungsöffnungen dürfen niemals Gegenstände oder Flüssigkeiten in das Gerät gelangen. Dies könnte einen Brand bzw. elektrischen Schlag auslösen.
13. Öffnen Sie niemals das Gerät. Das Gerät darf aus Gründen der elektrischen Sicherheit nur von authorisiertem Servicepersonal geöffnet werden.
14. Wenn folgende Situationen auftreten ist das Gerät vom Stromnetz zu trennen und von einer qualifizierten Servicestelle zu überprüfen:

    a - Netzkabel oder Netzstecker sind beschädigt.

    b - Flüssigkeit ist in das Gerät eingedrungen.

    c - Das Gerät war Feuchtigkeit ausgesetzt.

    d - Wenn das Gerät nicht der Bedienungsanleitung entsprechend funktioni ert oder Sie mit Hilfe dieser Anleitung keine Verbesserung erzielen.

    e - Das Gerät ist gefallen und/oder das Gehäuse ist beschädigt.

    f - Wenn das Gerät deutliche Anzeichen eines Defektes aufweist.

Der arbeitsplatzbezogene Schalldruckpegel nach DIN 45 635 Teil 1000 beträgt 70dB(A) oder weiger.

DISCLAIMER: This set of instructions is given according to IEC704-1. Advantech disclaims all responsibility for the accuracy of any statements contained herein.

Contents

CHAPTER 1

General Information

This chapter gives background information on the RAID-800I.

- Introduction
- Key Features
- Unpacking Your System
- Front Panel
- RAID Disk Array Controller (RAID-800I)
- Mobile Racks
- Rear Panel

1.1 Introduction

The RAID-800I series is a SCSI-to-EIDE RAID (Redundant Array of Independent Disks) Disk Array subsystem. A disk array is two or more disks grouped together to appear as a single disk to the host system.

This “host independent” RAID subsystem supports RAID levels 0, 1, 0+1, and 5. All of these levels provide improved data availability and reliability. Regardless of the RAID level your subsystem is configured to, each RAID array consists of a set of disks which to the user appears to be a single large disk.

One unique feature of these RAID levels is that data is spread across separate disks as a result of the redundant manner in which data is stored in a RAID disk array. If a disk in the RAID array fails, your subsystem continues to function without any risk of data loss. This is because redundant information is stored separately from the data. This redundant information will then be used to reconstruct any data that was stored on a failed disk. In other words, your subsystem can tolerate the failure of a drive without losing data because the disks also operate independently of one another.

The RAID-800I series supports a wide range of brands, capacities, models and access time hard disk drives. Its modular design allows hot-swapping of hard drives without interrupting subsystem operation.

1.2 Key Features

- Two 16-character LCD-backlight display panels
- Four easy-to-use push buttons on front panel (SEL, ESC, Up, Down)
- Selectable RAID levels (Level 0, Level 1, Level 0+1, and Level 5)
- 8 MB default cache memory, can be upgraded to 128 MB
- One SCSI (Fast SCSI-II or Ultra Wide) host channel
- Six enhanced IDE channels (compliant with ATA-3)
- Supports Ultra DMA with data transfer rate of 33 MB/sec
- Multi-host attachment (supported in future revision)
- Disk drive failure rebuilding
  - Hot standby disk drive and automatic rebuild
  - Hot-swap and automatic on-line rebuild
- Bad sector reassignment
- Concurrent I/O tagged command queuing (host channel)
- Two RS-232 serial ports for controller management, and for direct modem connection and remote notification (FAX and pager)
- Flash EEPROM for easy firmware upgrade
- Hot-swappable with fail-over capability controller (available soon)

1.3 Unpacking Your Subsystem

Before removing your RAID-800I series subsystem from the shipping carton, you should visually inspect the physical condition of the carton. Exterior damage to the shipping carton may indicate that its contents has been damaged. If any damage is found, do not remove the components. Contact the dealer where you purchased your subsystem for further instructions.

If the shipping carton appears to be in good order, unpack it and verify that the RAID-800I series subsystem and accessories are all there and in good condition.

Your package should contain the following items:

- RAID-800I series subsystem unit
- One power cord
- One 120 cm external SCSI cable
- One 9P-female to 9P-female RS-232 cable
- Installation reference guide
- Spare screws, etc.
- Eight keys (six for mobile rack, two for power supply)

If any item is missing or damaged, please contact your dealer or sales representative for assistance.

Note: Before you begin to use your RAID-800I series subsystem, read Sections 1.4 to 1.7 to learn about the major components installed in the subsystem and how they can be used.

1.4 The Front Panel

The front panel shows the RAID disk array controller and the mobile racks.

Figure 1-1: Front panel

1.5 RAID Disk Array Controller (RAID-800I)

The RAID disk array controller is the major component of the entire RAID-800I series subsystem. This is where you will configure the RAID disk array and RAID level of your subsystem.

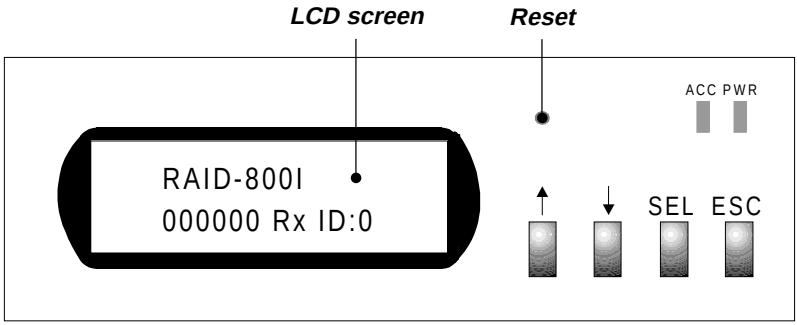


Figure 1-2: Disk array controller - front view

Part	Function
LCD screen	The LCD screen on the left displays the configuration of your subsystem such as the memory size, firmware version, as well as the brand and capacity of the hard drives installed in your subsystem. Through this screen, you will also be able to enter the Main Menu to further configure your subsystem.
Up or Down arrow keys	Use the Up or Down arrow keys to go through the information on the LCD display screen. This is also used to move between each menu when you configure your subsystem.
SEL button	This is used to enter the option you have selected.
ESC button	Press this button to return to the previous menu.
ACC LED	Red flashing LED indicates data is being accessed.
PWR LED	Green LED indicates power is on.
Reset	This is used to restart the disk array controller.

1.6 Mobile Racks

Your subsystem is equipped with 6 mobile racks installed in locations Disk 1 through Disk 6. These mobile racks, which are plastic frame versions, are used to house hard drives.

1.6.1 Front View of the Mobile Rack

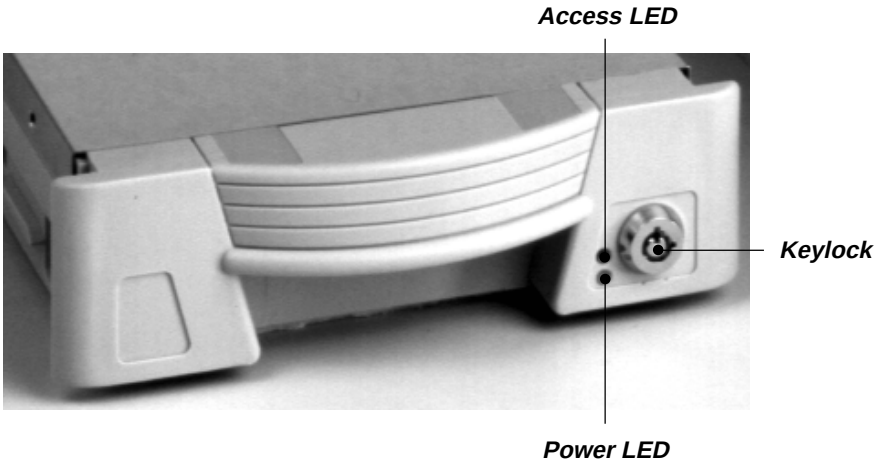


Figure 1-3: Mobile rack front view - plastic frame

Part	Function
Keylock	Used to turn the power of the hard drive on or off, and locks the mobile rack to the subsystem.
Power LED	Green LED indicates power is on. If there is no power, the LED is red.
Access LED	Flashing LED indicates data is being accessed from the hard drive. If the hard drive is not being accessed, the LED will not illuminate.

1.6.2 Internal Structure of the Mobile Rack

A mobile rack consists of a cartridge and the top cover of the cartridge. Your subsystem comes with 6 mobile racks. Each rack is mounted with a U-shaped frame that holds the mobile rack in place.

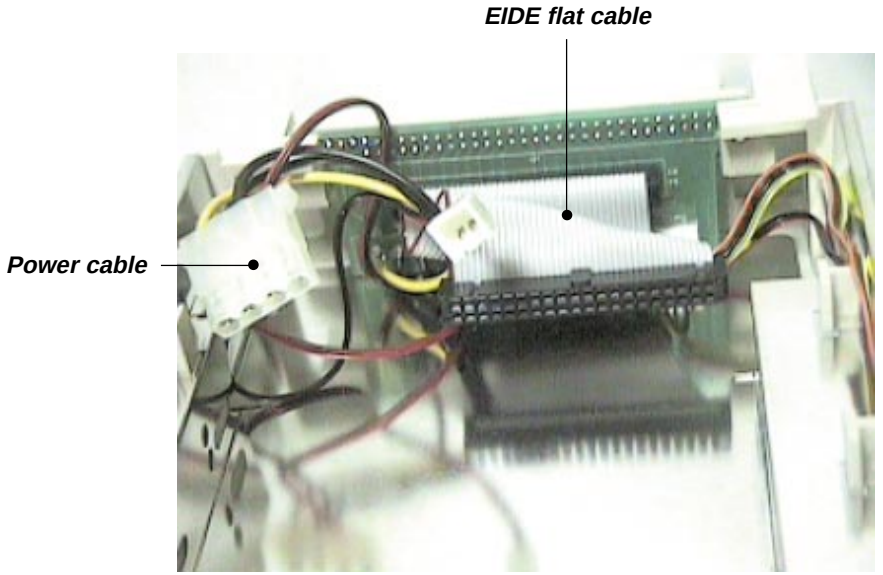


Figure 1-4: Internal structure of the mobile rack

Refer to Section 3.2 for more information.

1.7 The Rear Panel

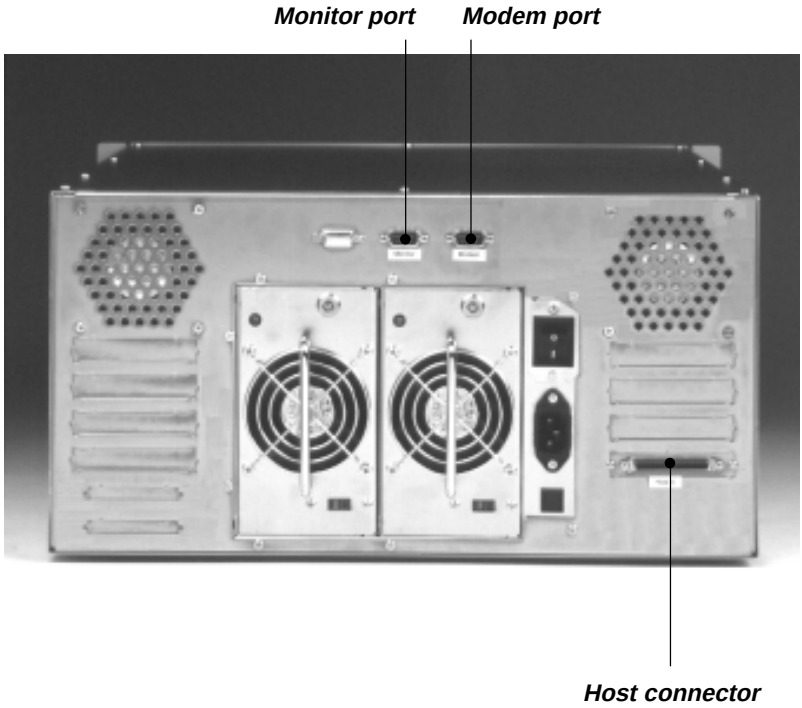


Figure 1-5: Rear panel

Refer to Chapter 9 for the rear panel of an Ultra Wide SCSI subsystem.

1.7.1 Power Supplies

Your subsystem comes with two power supplies (Power Supply 1 and Power Supply 2) located at the rear of the subsystem. During normal operation, the color of the “Power 1” and “Power 2” LEDs (located on the front panel) are green. You may use only one power supply, but if it fails or is damaged, you will not have backup power for your subsystem.

If two power supplies are in use and one fails to function, an audible alarm will warn you of the power failure. Press the Reset button, located on the rear panel, to stop the alarm. The LED of the power supply that needs to be replaced will not be illuminated. The color will return to normal (green) only after you have replaced the defective power supply.

1.7.2 Fans

Your subsystem is equipped with two fans (Fan 1 and Fan 2) located at the rear of the system unit. They provide good airflow and heat dissipation inside the chassis.

1.7.3 Host Channel

Your subsystem is equipped with one host channel allowing you to connect external SCSI devices. The host channel is connected a 68-pin connector. Refer to Section 3.3 for more information.

1.7.4 Monitor Port

Your subsystem is equipped with a serial monitor port allowing you to connect a PC or terminal. Refer to Section 3.7 for more information.

1.7.5 Modem Port

Your subsystem is equipped with a serial modem port allowing you to connect a modem. Refer to Section 3.8 for more information.

CHAPTER 2

RAID Controller

- Features of the Controller Unit
- Functions of the Controller Unit
- Components of the Controller Unit
- Controller Firmware
- Bus Interface
- User to RAID-800I Interface
- SCSI Functions
- RAID Management
- Drive Management

2.1 Features of the Controller Unit

- Full RAID/SCSI disk array configuration and management
- No special software or drivers needed
- Highly flexible user interface, including a full-function external monitor control or built-in front panel key controls and LCD display
- Automatic rebuild function without user intervention
- Automatic fault monitoring and recovery function

2.2 Functions of the Controller Unit

2.2.1 RAID/SCSI Disk Array Management

- Supports multiple RAID Levels (0, 1, 0+1, and 5) which enables you to select your own storage capacity, data availability (redundancy) and I/O transfer performance for any data application
- Supports almost any type of server or operating system
- Drives can be grouped, or managed individually as a single drive group
- Supports IDE hard drive

2.2.2 Highly Flexible User Interface

- Front panel key controls and LCD screen can be used for all disk array configuration and management functions, regardless of the kind of host system
- Monitor port located on the back panel of the subsystem allows array configuration through a terminal or a PC system.

2.2.3 RAID Function Automation

- Automatic detection of failed hard drives
- Automatic array rebuild function after a disk failure, using a standby disk
- Automatic rebuild function of failed hard drives
- Automatic error detection and correction of parity errors, bad blocks, etc.
- Automatic remapping of sectors to recover defective media and correct data errors

2.2.4 SCSI Performance Enhancement

- High performance SCSI interface provides faster data transfers
- Tagged-command queuing to the host allows up to 64 simultaneous data requests to be processed
- Variable stripe width may be defined by the user
- Enhanced SCSI bus performance

2.2.5 Systems Performance Monitoring

- Built-in controller and drive fault monitoring diagnostics
- Critical condition notification via status messages and alarms
- Backup power supply option in case of power interruption

2.3 Components of the Controller Unit

Important components of the controller unit include the following:

- 486DX processor
- DRAM cache memory
- SCSI and I/O subsystems
- Memory subsystem
- Modem and monitor I/O subsystem

2.3.1 486DX Processor

The subsystem's CPU is an 486DX microprocessor. Its function is to control all controller functions such as SCSI bus transfers, RAID operation and configuration, data stripping, error recovery, and drive rebuild.

2.3.2 Memory Subsystem and DRAM Cache

The subsystem can support up to a maximum of 128 MB cache memory. Its main function is to control the memory and addresses. Unless otherwise requested, the subsystem is supplied with 8 MB DRAM. The memory control unit provides a fast interface between the 486DX CPU and the cache memory DRAM.

Note: Cache memory expansion should not be performed by the user, since further tests are required after expansion.

2.4 Controller Firmware

The subsystem's firmware contains various programs executed by the 486DX microprocessor. This firmware, which resides in the on-board Flash EPROM, stores information even after powering off. It can be upgraded by simply overwriting the previous information, without the need for any hardware replacement.

2.5 Bus Interface

The SCSI bus interface allows the controller to communicate with the host system. The EIDE bus interface on the other hand allows the controller to read or write data on several drives. Each EIDE channel connects to one disk drive. Thus the 6 EIDE channels are connected to each of 6 disk drives. The subsystem can work with all SCSI platforms.

2.6 User to RAID-800I Interface

The user can communicate with the subsystem by way of:

1. The key controls and LCD screen located on the RAID disk array controller unit's front panel; or
2. Using a terminal or PC connected to the subsystem via the monitor port.

2.7 SCSI Functions

The controller provides a SCSI bus interface with the host system. Ultra Wide SCSI 40 MB/sec (68-pin connector) format is supported.

The host channel must be assigned a unique SCSI ID ranging from 0 to 7 (0 ~ 15 for Ultra Wide SCSI). The default value is ID0.

2.8 RAID Management

The subsystem implements different versions of RAID (redundant array of Independent Disks) technology. Each version is commonly referred to as a RAID level, and is selected when the logical units are defined and created based on the following:

- disk capacity
- data availability (fault tolerance or redundancy)
- disk performance

The subsystem supports RAID levels 0, 1, 0+1 and 5. RAID implementation and the disk drives' physical configuration is transparent to the host operating system. This means that the host operating system drivers and software utilities are not in any way affected by any RAID level.

To properly configure the subsystem, a proper understanding of RAID technology is an advantage. RAID levels are described in detail in Appendix A of this manual.

2.9 Drive Management

2.9.1 Hot-Swap Drive Replacement

The subsystem supports hot-swapping of drives while the system is on. A disk may be disconnected, removed or replaced with a different disk without turning off the system.

2.9.2 Disk Failure Detection

The subsystem can automatically detect disk failures. The controller unit monitors disk activity, such as elapsed time on all commands issued to the disks, parity error, and other potential problems.

A time-out will reset the disk and retry the command. If the command time-out occurs again, the disk will fail. Any disk with too many errors will be temporarily disabled by the controller unit so that the disk can be replaced.

2.9.3 Cache Management

The subsystem provides data transfer performance enhancement via its on-board cache memory. It supports up to 128 MB cache memory for read cache and write cache. Write cache policy is user selectable for maximum performance in specific applications.

2.9.4 Read Cache

The controller unit's read cache is always enabled. Its operation is transparent and requires no user intervention.

2.9.5 Write Back Cache

Write back cache is a caching strategy whereby write operations result in a completion status being sent to the host operating system as soon as the cache (not the disk drive) receives the data to be written. The target drive will receive the data at a more appropriate time in order to increase the controller's performance. To use the write back cache function, cache must be enabled.

2.9.6 Write Through Cache

Write through cache refers to a cache writing strategy whereby data is written to the drive before a completion status is returned to the host operating system. This caching strategy is considered more secure because power failure will be less likely to cause any data loss. However, write through cache results in a slightly lower performance in most environments. To use the write through cache function, cache must be disabled.

CHAPTER 3

Installation Overview

- Powering On Your Subsystem
- Installing Hard Disk Drives
- Connecting External SCSI Devices
- Replacing a Power Supply
- Replacing a Fan
- Memory Upgrades
- Connecting a PC or Terminal
- Connecting a Modem

3.1 Powering On Your Subsystem

1. Plug the power cord of the two power supplies, located at the rear of the subsystem, into a power outlet.
2. Turn on the power of the power supplies.
3. The power supplies installed in your subsystem are able to operate using 115 V or 230 V. Configure each voltage selector for the type of power you are using. (See Figure 3-1.) Failure to do so may cause severe damage to your subsystem.

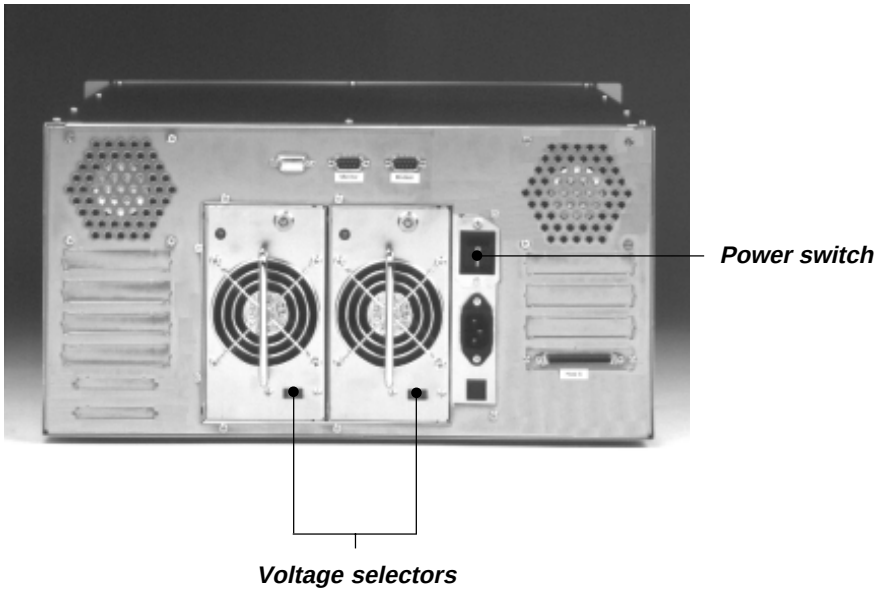


Figure 3-1: Power supply voltage selectors

3.2 Installing Hard Disk Drives

This section describes the locations of the device channels and the number of hard drives supported by your subsystem. It also provides instructions on installing a hard drive.

3.2.1 Device Channels

Your subsystem is equipped with six device channels (EIDE channels 1 to 6) located in the RAID disk array controller. Each device channel is connected to a hard drive. Refer to Section 9.3 for the locations of the device channels.

3.2.2 How the Device Channels are Connected

Your subsystem uses 6 EIDE device cables, one for each EIDE device channel. One end of the device cable is connected to a device channel of the controller unit, and the other end is connected to the U-shaped frame of the mobile rack. (A U-shaped frame holds a mobile rack that houses a hard drive.)

3.2.3 Installation

Your subsystem supports hot-swapping, allowing you to install or replace your hard drive while the subsystem is running.

Warning! Electrostatic discharge (ESD) can damage your drive or other components without causing any signs of physical damage. To provide ESD protection, ground yourself by touching a metallic part of the subsystem chassis.

1. Pull out an empty mobile rack. (You can install a hard drive into any available slot.) Refer to Chapter 1 for the locations of the mobile racks.
2. Unpack your hard drive.
3. Remove the top cover of the cartridge. The cover is snapped securely onto the cartridge. In some cases, you may need to exert slight force to remove the cover.

Note: Refer to Chapter 1 for the internal structure of the mobile rack.

4. Connect the power cable.
5. Connect the 40-pin EIDE flat data cable. Align the colored edge of the cable with pin 1 of the connector.
6. Place the hard drive in the cartridge.
7. Install the mounting screws on each side to secure the drive in the cartridge.
8. Replace the cover. The cables must be properly placed inside the cartridge, away from the edge of the cartridge. This is to prevent the cables from being pressed when you replace the cover. Make sure the cover snaps into place, otherwise you will not be able to insert the rack into the slot.
9. Slide the cartridge into a slot until it clicks into place. The mobile rack's power LED (lower LED) will immediately turn red.
10. Insert the key (included in your package) into the keylock located on the right of the mobile rack and turn it clockwise. This will lock your mobile rack to your subsystem providing data security. If you are replacing a new hard drive, make sure to unlock it by turning the key counter-clockwise.
11. The power LED will turn green after the hard drive has been detected by the subsystem. If the LED does not turn green, check the following:
    a. Make sure the cables at the rear of your hard drive are connected properly.
    b. Make sure your hard drive is in good condition.
12. The access LED flashes only when the hard drive is being accessed. If the hard drive is not being accessed, the LED will not illuminate.

3.2.4 LEDs on the Mobile Rack

The two LEDs indicate the status of the hard drives installed in the subsystem.

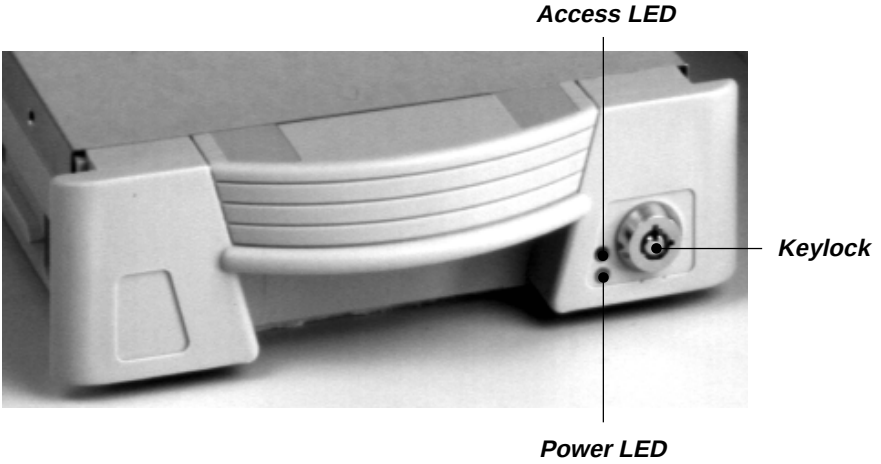


Figure 3-2: LEDs on the mobile rack

Access LED
This is the upper of the two LEDs. It will flash red only when the hard drive is being accessed.

Power LED
This is the lower of the two LEDs. It indicates the status of the hard drives. The color of the LED changes according to the operating status.

LED Color	Description
Green	Normal operation.
Orange	Drive failure.
Red	Hard drive is powered off, or no drive is installed in the slot.

3.3 Connecting External SCSI Devices

Your system supporting Ultra Wide SCSI provides very fast (40 Mbps) transfer rate using a 16-bit SCSI bus. It allows you to connect a wide range of SCSI devices such as CD-ROMs, hard drives, tape drives and optical devices. This section describes the location of the host channel, and provides instructions on connecting external SCSI devices.

3.3.1 Host Channel

Your subsystem is equipped with one host channel located in the RAID disk array controller. Refer to Section 9.3 for the location of the host channel.

3.3.2 How the Host Channel is Connected

Your subsystem uses an internal SCSI cable. One end of the internal SCSI cable is connected to the host channel and the other end is mounted at the rear of the subsystem.

3.3.3 Connecting an External SCSI Device

1. Configure the SCSI ID of each device. (Refer to Chapters 4 to 6 for more information.)
2. Connect the external SCSI device between the host and the RAID-800I subsystem, and enable the terminator on the setup menu of the RAID-800I. (The RAID-800I subsystem should always be put farther away from the host than all other external SCSI devices.)

Note: When one or more SCSI devices are connected, the total length of all cables (internal or external) must not exceed 3 meters (9.8 ft.). This will ensure reliable operation.

3.4 Replacing a Power Supply

1. When either of the power supplies is defective, you will hear the audible alarm, and the power status LED will no longer be illuminated.
2. Press the "Reset" button on the rear panel of the power supply to stop the audible alarm. The power status LED will remain unilluminated.
3. Use the key to unlock the defective power supply at the rear panel. Pull out the defective power supply.
4. The replacement power supply should be 300 W. Slide it into the cavity until it clicks into place.
5. Use the key to lock in the replacement power supply. The power status LED will now be illuminated.

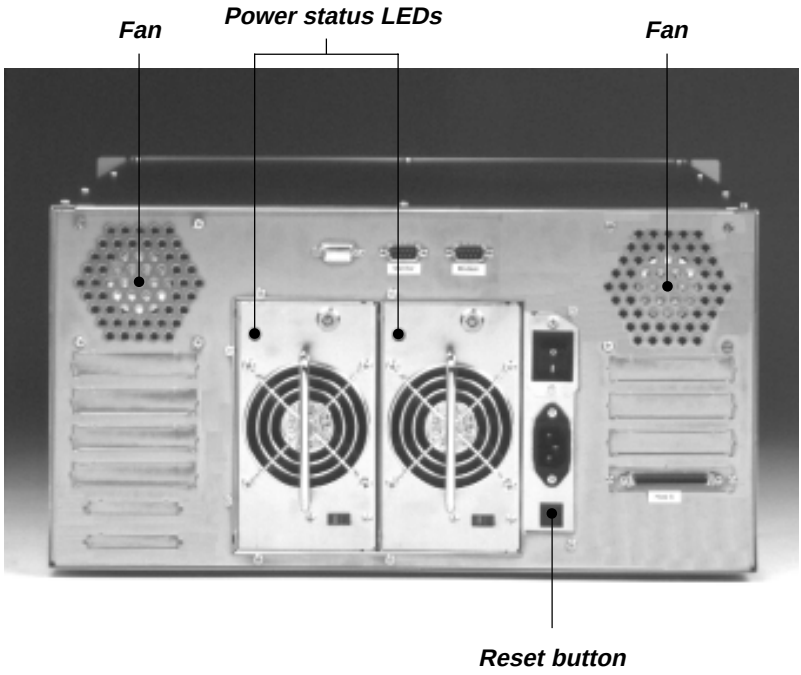


Figure 3-3: Replacing a power supply

3.5 Replacing a Fan

1. Remove the screws to open the top cover.
2. Remove the four screws on the rear cover of the defective fan. Put these screws in a safe place, as you will need them later when you install the new fan.
3. Disconnect the power cable.
4. Replace the defective fan, connect the power cable, and put back the four screws you removed in step 2.
5. Put the top cover back on, and put back the screws you removed in step 1.

3.6 Memory Upgrades

Your subsystem is equipped with two SIMM sockets located in the RAID disk array controller. The standard system unit comes with 8 MB of memory. It is upgradeable to 128 MB by installing 4 MB, 8 MB, 16 MB, 32 MB or 64 MB 72-pin SIMMs.

- Our Ultra Wide SCSI controller supports both FPM (Fast Page Mode) and EDO (Extended Data Output) SIMMs.
- A 60 ns SIMM is recommended.
- You may install parity or non-parity SIMMs.
- You may install SIMMs in either bank.
- Memory expansion should be performed by Advantech.

3.7 Connecting a PC or Terminal

Your subsystem is equipped with a serial monitor port located at the rear of the system unit. This serves as an alternative display when accessing the setup utility.

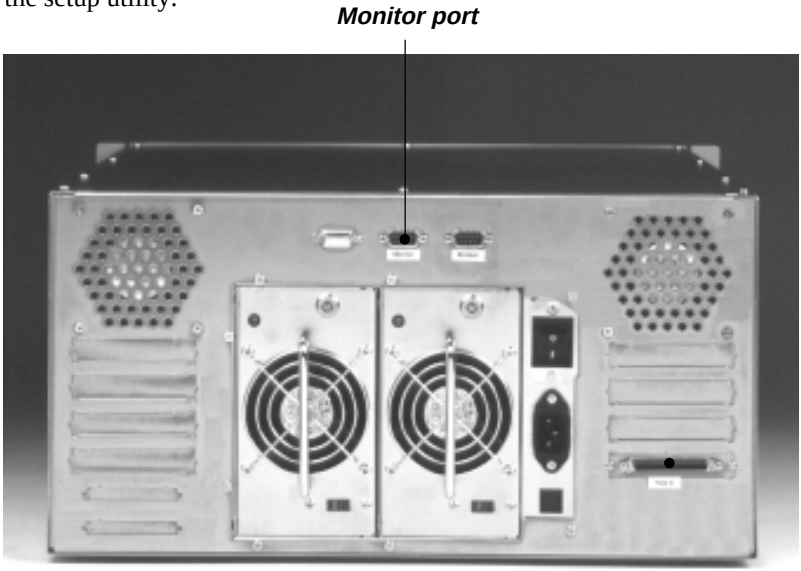


Figure 3-4: Connecting a PC or terminal

Table 3-1: Serial monitor port pin descriptions

Pin	Description
1	Data Carrier Detect (DCD)
2	Receive Data (RD)
3	Transmit Data (TD)
4	Data Terminal Ready (DTR)
5	Signal Ground (SG)
6	Data Set Ready (DSR)
7	Ready To Send (RTS)
8	Clear To Send (CTS)
9	Ring Indicator (RI)

Refer to Chapter 6 for instructions on accessing the setup utility through a PC or terminal, as well as instructions on setting the baud rate, stop bit, data bit and parity of your monitor or terminal.

3.8 Connecting a Modem

Your subsystem is equipped with a serial modem port located at the rear of the system unit.

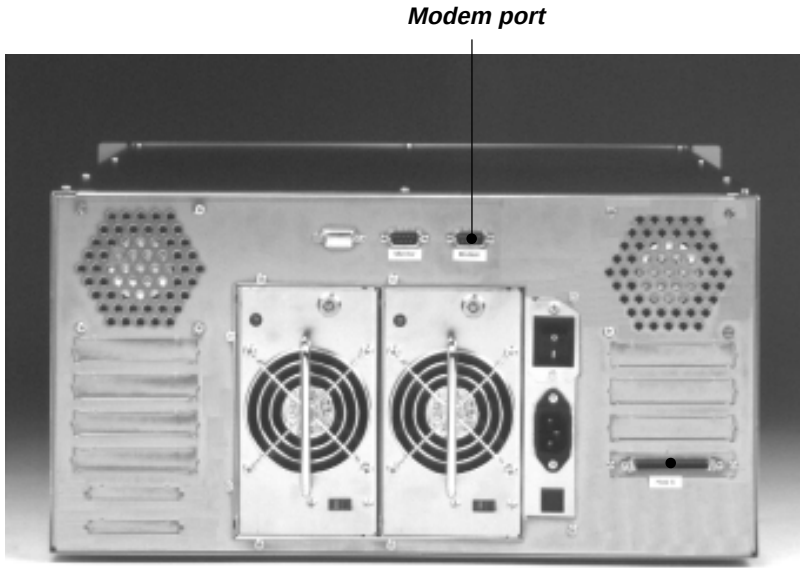


Figure 3-5: Connecting a modem

Table 3-2: Modem port pin descriptions

Pin	Description
1	Data Carrier Detect (DCD)
2	Receive Data (RD)
3	Transmit Data (TD)
4	Data Terminal Ready (DTR)
5	Signal Ground (SG)
6	Data Set Ready (DSR)
7	Ready To Send (RTS)
8	Clear To Send (CTS)
9	Ring Indicator (RI)

Refer to Chapter 6 for instructions on setting up your pager or fax, as well as instructions on setting the baud rate, stop bit, data bit and parity of your modem.

CHAPTER 4

SCSI Configuration Guidelines

Before configuring your subsystem, you must first understand basic SCSI concepts, to ensure that your subsystem and SCSI devices will function properly.

- SCSI IDs
- Terminators

4.1 SCSI IDs

A SCSI ID is an identifier assigned to a SCSI device that enables it to communicate with a computer when it is attached to a host adapter via a SCSI bus. Each SCSI device, and the host adapter itself, must have a SCSI ID number (Fast SCSI-2 = 0 ~ 7, Ultra Wide SCSI = 0 ~ 15). The ID will define each SCSI device on the SCSI bus. If there is more than one SCSI adapter in the host subsystem, each adapter forms a separate SCSI bus. SCSI IDs can be reused as long as the ID is assigned to a device on a separate SCSI bus. Refer to the documentation that came with your peripheral device to determine its ID and how to change it.

Note: SCSI IDs have nothing to do with the order in which devices are cabled to the host adapter.

4.2 Terminators

According to SCSI specifications, each SCSI bus must be terminated at both ends. Therefore, devices that are connected to the ends of a SCSI bus must have their bus terminators enabled. Devices connected in the middle of a SCSI bus must have their terminators disabled. Proper termination allows data and SCSI commands to be transmitted reliably on the SCSI bus. Your host adapter and the SCSI devices attached to it must be properly terminated, or they will not work reliably.

Terminators are installed in the SCSI devices at each end of the bus. Some SCSI devices require you to manually insert or remove terminators. Other devices have built-in terminators that are enabled or disabled via switches or software commands. Refer to your device's documentation on how to enable or disable termination.

CHAPTER 5

Quick Setup Guide

- Preliminary
- Quick Setup of the Subsystem

5.1 Preliminary

The quick setup guide in this chapter is intended as a shortcut so that experienced users can get their RAID disk array subsystem started as quickly as possible. If this is your first time you are configuring the subsystem, the screen on the disk array controller will appear as shown below once you power on the subsystem.

Before configuring the subsystem, make sure the controller is able to detect all the hard drives installed in the subsystem. This is to ensure that the mobile racks and hard drives are functioning normally. As the subsystem progressively detects the hard drives after it is powered on, the first six characters turn from “X” to “I” and will become “S” or “O” for the hard drives that have been detected. The screen will appear as shown below after the hard drives have been detected.

First Six Characters

The first six characters on the second line of the screen denote the status of the six independent Enhanced IDE channels connected to the slots where the hard drives are installed. The first character refers to the first slot, the second character refers to the second slot, and so on.

“X”	No hard drive is installed in the slot.
“I”	Detecting for the hard drive in the slot.
“S”	The hard drive in the slot is a spare drive or an on-line spare drive.
“O”	The hard drive is on-line or operational.
“A”	Rebuilding the newly replaced drive.
“R”	The previous on-line drive has been removed.

RX

“X”	No RAID level has been configured.
“0”, “1”, "0+1" or “5”	Indicates the RAID level that has been configured.

ID:0

Refers to the SCSI ID of the host channel.

“□” moving up and down at the lower right corner of the screen indicates that the controller is functioning normally. The “□” becomes “zZ” if the host is accessing the subsystem. It becomes “wW” when memory is writing cache to your hard drive. If “□” is not moving, something is wrong with the controller. Use the end of a paper clip or pin to press the Reset button located a few millimeters above the Up arrow key.

Refer to Section 1.5 for the locations and functions of the Up and Down arrow keys, and the SEL, ESC and Reset buttons.

Note: We strongly recommend that only experienced users reset the subsystem.

5.2 Quick Setup of the Subsystem

1. Use the Up or Down arrow key to view the configuration of your subsystem. For example, firmware version, memory size, hard drives installed, serial number, etc.
2. Press the "Sel" button to enter the Main Menu. The screen will appear as shown below. (RAID Params is the first field in the Main Menu.)

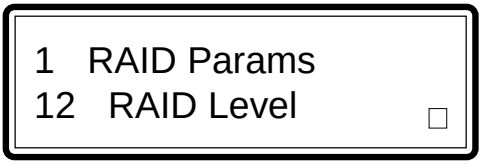
Note: The number which appears in front of the menu item indicates the position of that item in the Main Menu hierarchy. For more information about the hierarchical structure of the Main Menu, see Section 6.2.

3. Press "Sel" again to enter the RAID Params menu.

4. Press "Sel" to enter the Re-Conf RAID menu

5. Press the Down arrow key to select Yes, then press "Sel".

6. You will return to the RAID Params menu. Press the Down arrow key to select RAID Level.

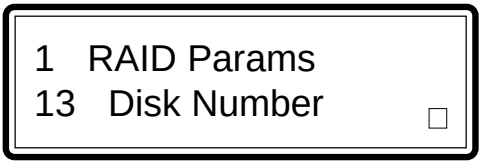


7. Press “Sel” to enter the RAID Level menu.

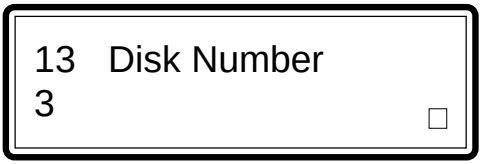
8. Press the Down arrow key to select “5”, then press “Sel”.

   We recommend that you select Level 5 because it is faster and safer. Refer to Appendix A for descriptions of the RAID levels.

9. You will return to the RAID Params menu. Press the Down arrow key to select Disk Number.



10. Press “Sel” to enter the Disk Number menu.



11. Press “Sel” to select 3. (If you selected Level 5 in step 8, you should select “3” now because Level 5 requires at least 3 drives to constitute a RAID array.)

Note: It would be best if you have more than 3 drives installed. An additional drive will serve as a backup drive in case another drive becomes defective.

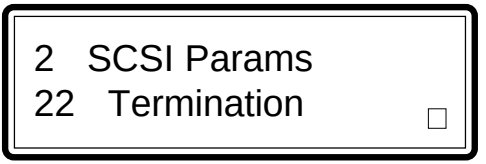
12. Press <Esc> to return to the Main Menu. Press the Down arrow key to select SCSI Params.

13. Press “Sel” to enter the SCSI Params menu.

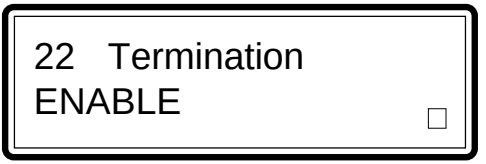
14. Press “Sel” to enter the Set SCSI ID menu.

15. Use the Up or Down arrow keys to select a SCSI ID, then press “Sel”. Make sure you select an ID that is not yet used by the SCSI bus. Refer to Chapter 4 for more information on selecting a SCSI ID.

16. You will return to the SCSI Params menu. Press the Down arrow key to select Termination.

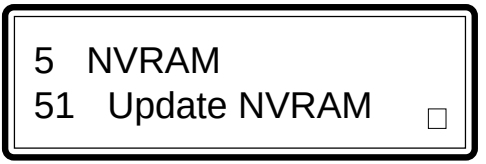


17. Press “Sel” to enter the Termination menu. The default setting is ENABLE. If the subsystem will be the last SCSI device, do not change this setting. Otherwise, set it to DISABLE. Refer to Chapter 4 for more information on terminating SCSI devices.

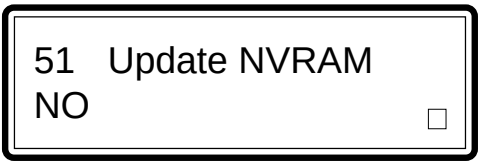


18. Press <Esc> to return to the Main Menu. Press the Down arrow key to select NVRAM.

19. Press “Sel” to enter the NVRAM menu.



20. Press “Sel” to enter the Update NVRAM menu.



21. Press the Down arrow key to select Yes, then press “Sel”.
22. You will return to the NVRAM menu. Press the Down arrow key to select Restart.
23. Press “Sel” to enter the Restart menu.

24. Press the Down arrow key to select Yes, then press “Sel”.
25. The controller will now restart and initialize in order for the settings to become effective.

CHAPTER 6

Configuring the Subsystem

Your RAID-800I series subsystem has a setup utility built into the controller's firmware. It contains important information about the configuration and settings for various optional functions in the subsystem. This chapter explains how to use and make changes to the setup utility.

- Configuration Methods
- Main Menu
- Creating a New RAID or Reconfiguring an Existing RAID
- Changing the Host Channel's SCSI ID
- Erasing an Existing Configuration
- Formatting Hard Drives
- Configuring the Terminal
- Setting a Password
- R5 (RAID Level 5) Consistency Check
- Configuring an Ultra Wide SCSI Subsystem

6.1 Configuration Methods

There are two methods of configuring your subsystem. You may configure your subsystem through the LCD panel on the disk array controller or by connecting a terminal to the serial monitor port located at the rear of the subsystem.

Note: You cannot access the utility using both methods at the same time. The controller allows you to access the utility using only one method at a time.

6.1.1 Configuring Through the Disk Array Controller

If you are configuring your subsystem using the disk array controller, refer to Chapter 1 for descriptions of the LCD screen and the function buttons. Refer to Chapter 5 for the quick setup guide to configuring your subsystem using the controller.

6.1.2 Configuring Through a Terminal

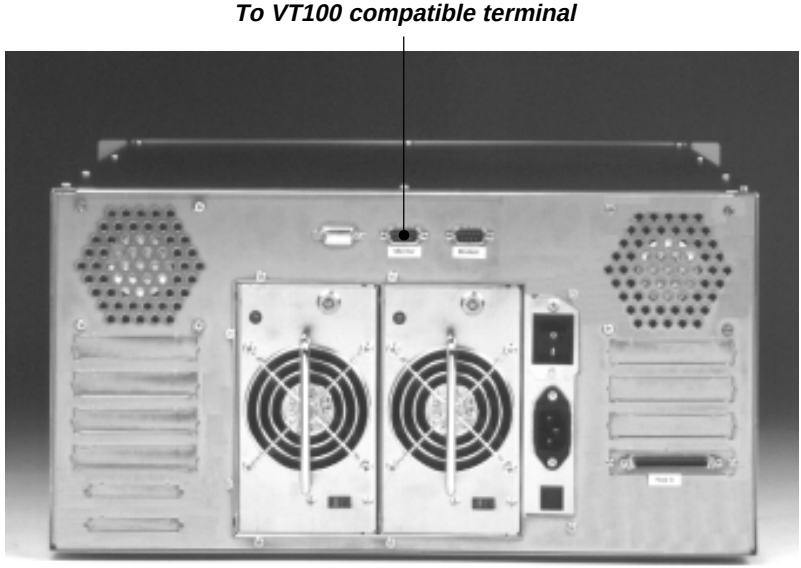


Figure 6-1: Connecting to a VT100 compatible terminal

Configuring through a terminal will allow you to avail the same configuration options and functions that are available from the disk array controller. To start up:

1. Connect a VT100 compatible terminal or a PC operating in an equivalent terminal emulation mode to the monitor port located at the rear of the subsystem.

Note: You may connect a terminal even while the subsystem's power is on.

2. Power on the terminal.
3. Run the VT100 program or an equivalent terminal program.
4. Change the settings of the VT100 terminal to match the default settings of the RAID-800I, namely:

   Baud rate: 19,200
   Stop bit: 1
   Data bit: 8
   Parity: None

5. Reset the disk array controller. Refer to Section 1.5 for the location of the Reset button.
6. If the following screen pops up, then the connection has been set up successfully. If the screen does not appear, check the current settings of the monitor port using the quick setup menu, and then try step 5 again.

Figure 6-2: Configuring through a terminal

"AZSX": "A" - Move to the line above

"Z" - Move to the next line

"S" - Page Up

"X" - Page Down

"Tab": Move between the left column (MENU) and the right column (OUTPUT)

"MENU" in the left column of the screen consists of 6 menus that allow you to configure your subsystem. "OUTPUT" in the right column shows the status of the subsystem, as well as basic information concerning the subsystem.

6.2 Main Menu

The Main Menu consists of the following menus: RAID Params, SCSI Params, RS232 Params, System Params, NVRAM and RAID Funcs.

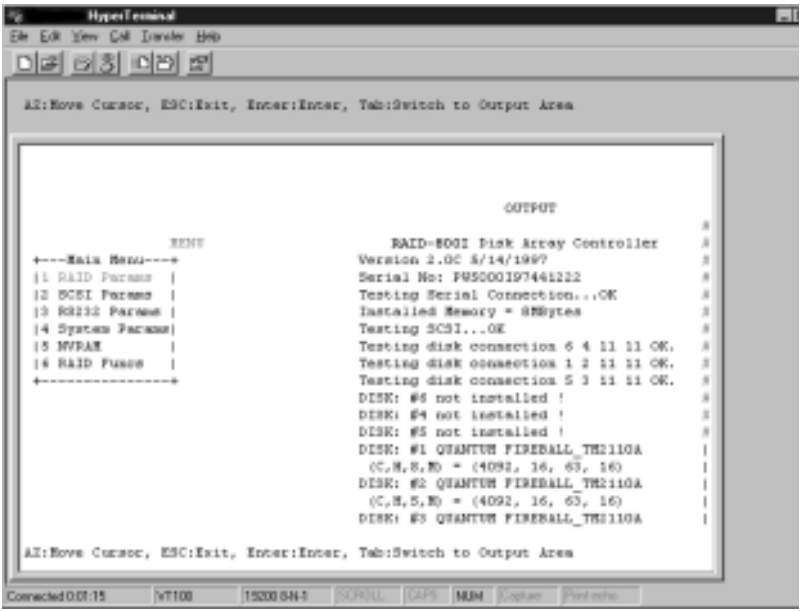


Figure 6-3: Main Menu

6.2.1 Hierarchical Structure of Main Menu

1. RAID Params

11. Re-Conf RAID (NO/YES) ____

12. RAID Level _____
(5, NONE, 0, 1)

13. Disk Number (1 ~ 6) _____

14. Slice
141. Slice0
142. Slice1
143. Slice2
144. Slice3
145. Slice4
146. Slice5
147. Slice6
148. Slice7

15. Stripe Size _____
(4, 8, 16, 32, 64, 128)

16. Write Buffer
(ENABLE/DISABLE)

17. IDE DMA Mode (0, 1, 2) ____
171. Disk1
172. Disk2
173. Disk3
174. Disk4
175. Disk5
176. Disk6
177. ALL

Note:
IDE DMA Mode
0 = 4 MB/sec
1 = 16 MB/sec
2 = 33 MB/sec
(Ultra DMA)

18. IDE LBA Mode
(ENABLE/DISABLE)

19. IDE Ultra DMA
(ENABLE/DISABLE)

2. SCSI Params

21. Set SCSI ID (0 ~ 15) _____

22. Termination
(ENABLE/DISABLE)

23. Tag Queueing
(ENABLE/DISABLE)

24. Ultra
(ENABLE/DISABLE)

25. Wide
(ENABLE/DISABLE)

26. Lun Map
261. Lun0
262. Lun1
263. Lun2
264. Lun3
265. Lun4
266. Lun5
267. Lun6
268. Lun7

(Slice0 ~ Slice7, DISABLE)

3. RS232 Params

31. MODEM Port
311. Baud Rate _____
(1200, 2400, 4800,
9600, 19200, 38400)
312. Stop Bit (1, 2) _____
313. Data Bit (7, 8) _____
314. Parity
(NONE ,ODD, EVEN)

32. Terminal Port
321. Baud Rate _____
(1200, 2400, 4800,
9600, 19200, 38400)
322. Stop Bit (1, 2) _____
323. Data Bit (7, 8) _____
324. Parity
(NONE ,ODD, EVEN)

4. System Params

41. Passwd Info
- 411. Passwd Check (ENABLE/DISABLE)
- 412. Set Passwd (Up to 16 characters)

42. Pager Info
- 421. Paging (ENABLE/DISABLE)
- 422. Pager1 No. (Tel No. / Pin No.) (Up to 16 characters)
- 423. Pager2 No. (Tel No. / Pin No.) (Up to 16 characters)
- 424. Code (Up to 16 characters)
- 425. Repeat # (5, 10, 15, 20)
- 426. Interval (5, 10, 15, 20)
- 427. Page Now (YES/NO)

43. FAX info
- 431. FAX (ENABLE/DISABLE)
- 432. FAX Class (1, 2)
- 433. FAX1 No.
- 434. FAX2 No.
- 435. Retry # (5, 10, 15, 20)
- 436. FAX Now (YES/NO)

44. Company Info
- 441. String 1
- 442. String 2

5. NVRAM

51. Update NVRAM _____
(NO, YES)

52. Erase NVRAM _____
(NO, YES)

53. Restart _____
(YES/NO)

6. RAID Funcs

61. Format Disk (STOP, START)
- 611. Format Disk1
- 612. Format Disk2
- 613. Format Disk3
- 614. Format Disk4
- 615. Format Disk5
- 616. Format Disk6
- 617. Format ALL

62. Init RAID5
(STOP ,START)

63. R5 Check
(STOP ,START)

64. Beeper
(CLEAR, ENABLE, DISABLE)

65. Stop Modem
(YES/NO)

66. Add Disk
(Disk1 ~ Disk6)

67. Remove Disk
(Disk1 ~ Disk6)

68. Statistic

69. Update ROM

6.2.2 RAID Params Menu

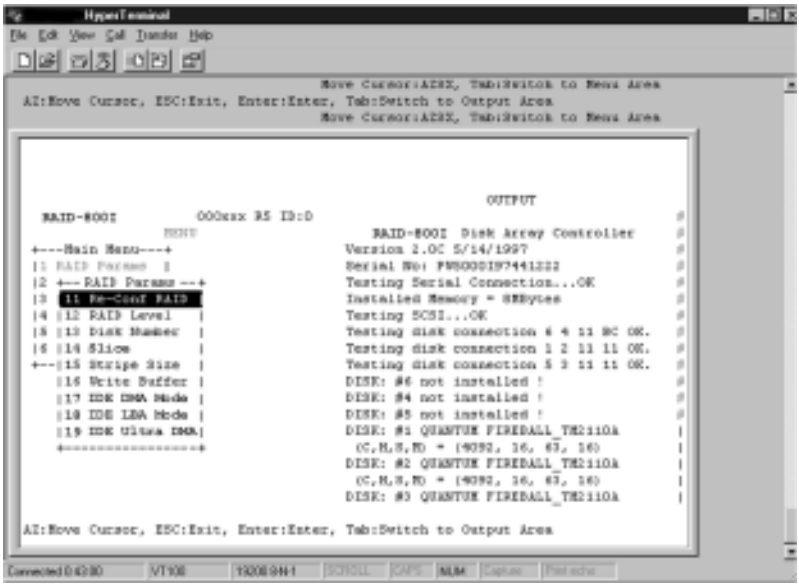


Figure 6-4: RAID Params menu

Re-Conf RAID
Set this field to YES every time you wish to create a new RAID or change the previously configured RAID.

RAID Level
This is used to define the RAID level of the drives to be configured. Refer to Appendix A for descriptions of the RAID levels.

Disk Number
This is used to define the total number of disks to be included in the RAID configuration. The other disks will be configured as hot spare disks.

Slice
Slice is just like partition in a hard drive. The RAID-800I allows slice numbers from 0 to 7.

Stripe Size
The options are 4, 8, 16, 32, 64 and 128. The recommended stripe size is 64, which is the default setting. Stripe size will affect the overall system performance.

Write Buffer
This function must be enabled. Enabling this function provides faster data transmission because the settings are transmitted to the cache memory first before being transmitted to the hard drives. If this function is disabled, data will be transmitted directly to the hard drives, which is slower.

IDE DMA Mode
This is used to select the DMA mode of the hard drives installed in the subsystem. The available mode settings and corresponding bus speeds are:
0 = 4 MB/sec
1 = 16 MB/sec
2 = 33 MB/sec (Ultra DMA)

We strongly recommend that you select mode 2, because it delivers the best performance for your subsystem.

IDE LBA Mode
The available settings are ENABLE/DISABLE. We recommend that you select ENABLE, which makes full use of the space available on the hard drives.

IDE Ultra DMA
The available settings are ENABLE/DISABLE. We recommend that you select ENABLE, because it delivers the best performance for your subsystem.

6.2.3 SCSI Params Menu

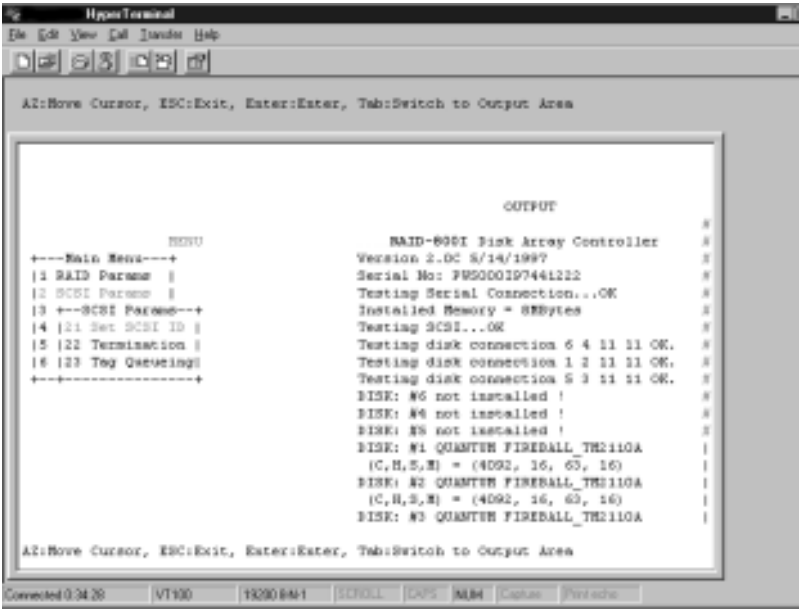


Figure 6-5: SCSI Params menu

Set SCSI ID

This is used to assign a SCSI ID for the subsystem. Refer to Chapter 4 for more information on selecting a SCSI ID.

Termination

If the subsystem will be the last SCSI device, enable this function. Refer to Chapter 4 for more information on terminating a SCSI device.

Tag Queueing

When enabled, the SCSI channel is able to queue the SCSI connected.

Ultra, Wide

For each of these items, the available settings are ENABLE/DISABLE. We strongly recommend that you select ENABLE, because it delivers the best performance for your subsystem.

LUN Map

The RAID-800I allows Logic Unit Numbers (LUNs) from 0 to 7. Any LUN number can be mapped to any slice number of the RAID-800I.

6.2.4 RS232 Params Menu

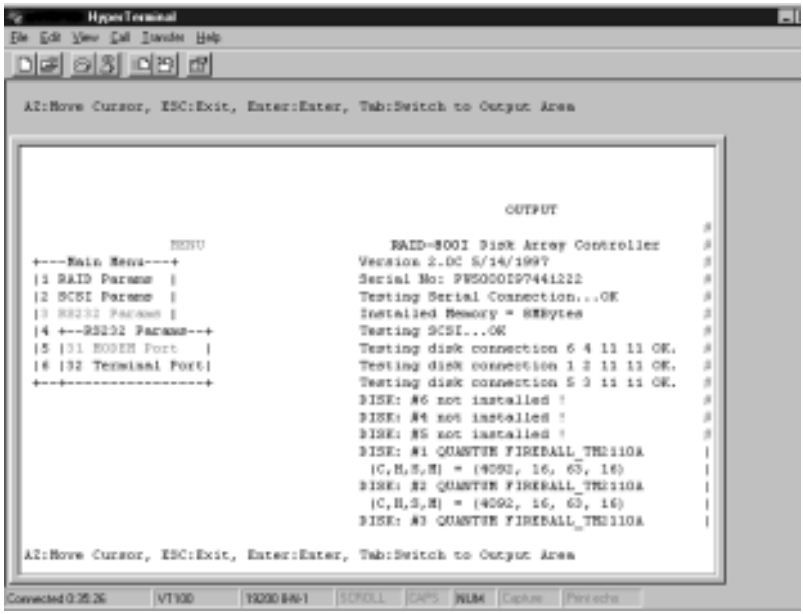


Figure 6-6: RS232 Params menu

Modem Port

This is used to define the baud rate, stop bit, data bit and parity of the modem port of the subsystem.

Terminal Port

This is used to define the baud rate, stop bit, data bit and parity of the terminal port of the subsystem.

6.2.5 System Params Menu

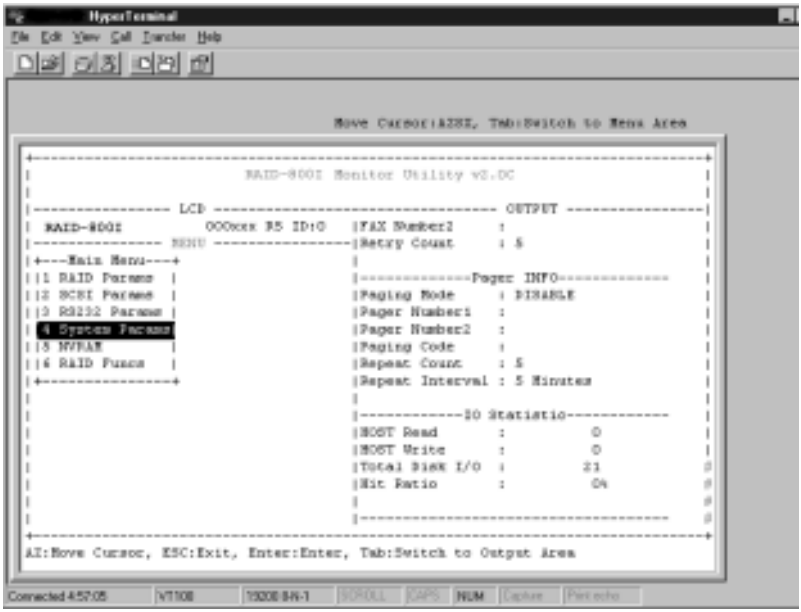


Figure 6-7: System Params menu

Passwd Info

If you wish to secure the settings you have done, enable this function in the Passwd Check menu, and then set a password in the Set Passwd menu.

Pager Info

This function allows you to set two pager numbers. If a hard drive fails to function, your pager will “beep” you to inform you that a problem has arisen. You can set the number of times your pager will page you, as well as the time interval between each page.

FAX Info

This function allows you to set two fax numbers. If a hard drive fails to function, a message will be transmitted to your fax machine informing you that a problem has arisen. You can set the number of times it will retry, in case the line is busy.

Company Info

This is used to enter company information. This information will be included in any fax message transmitted.

6.2.6 NVRAM Menu

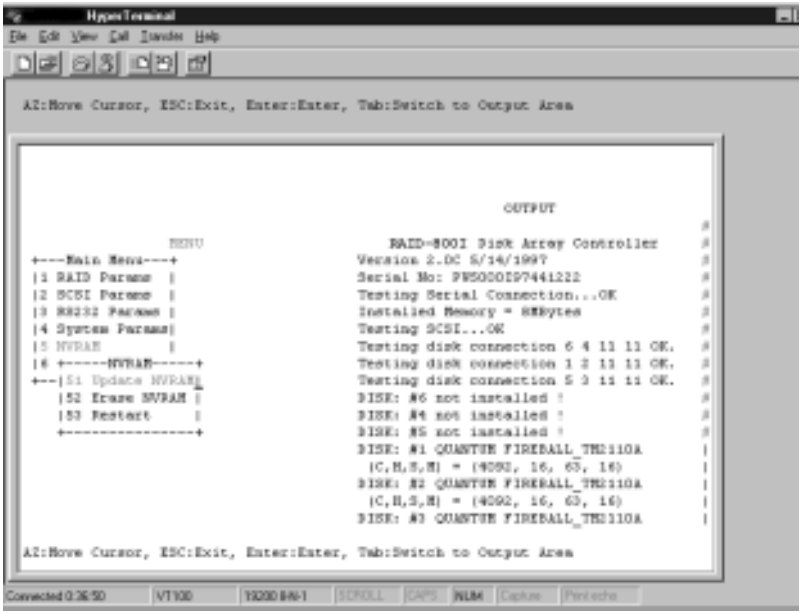


Figure 6-8: NVRAM menu

Update NVRAM

When you have made changes to the setup utility, remember to always save the new or modified configuration before you exit the utility.

Erase NVRAM

This is used to erase an existing configuration.

Restart

Restarting the controller will activate the settings.

6.2.7 RAID Funcs Menu

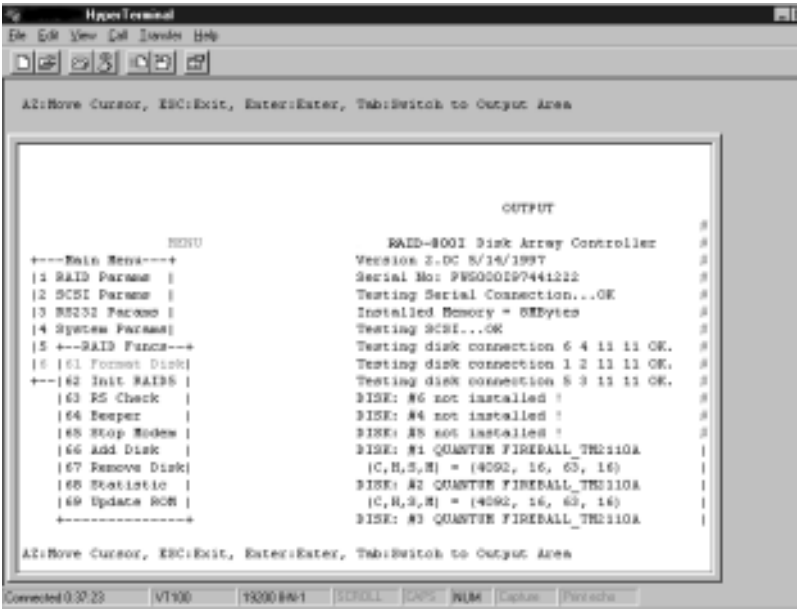


Figure 6-9: RAID Funcs menu

Format Disk

This is used to format the hard drives installed in the subsystem.

Note: Most disks have already been formatted in the factory, and so do not require formatting.

Init RAID5

Use this function only once during installation to initialize the hard drives grouped for RAID 5.

R5 Check

If the RAID level you selected is Level 5, which supports parity check, you can select this function to check the parity.

Beeper

You should enable this function, so that an alarm will sound in case of failure.

Stop Modem

If you wish to be able to stop the transmission of data at any time, set this function to YES.

Add Disk, Remove Disk

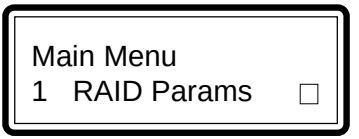
Since the subsystem is able to auto-detect any slot that has had drives added or removed, you may ignore these two items.

Update ROM

This is used to update the firmware residing in the controller.

6.3 Creating a New RAID or Reconfiguring an Existing RAID

1. In the Main Menu, select RAID Params.



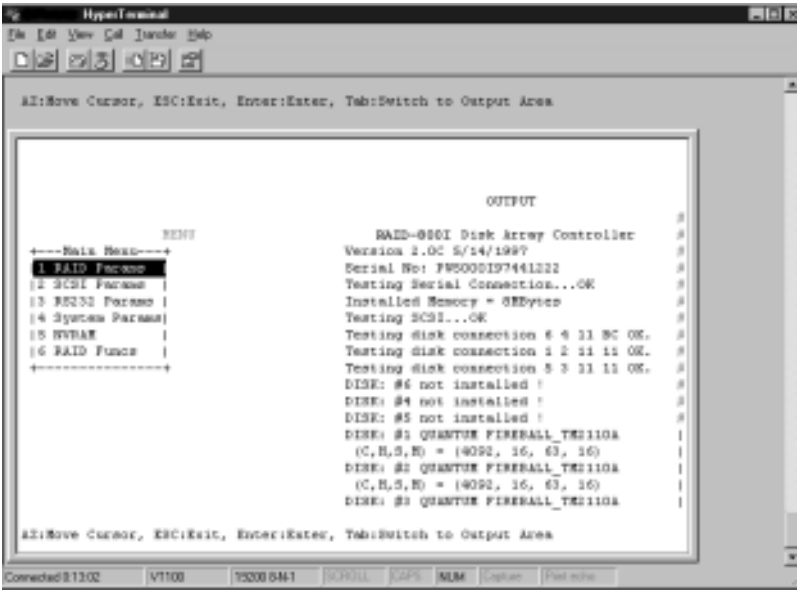
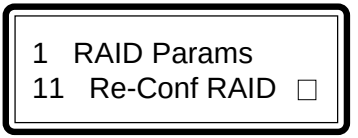


Figure 6-10: Selecting RAID Params in Main Menu

2. In the RAID Params menu, select Re-Conf RAID.



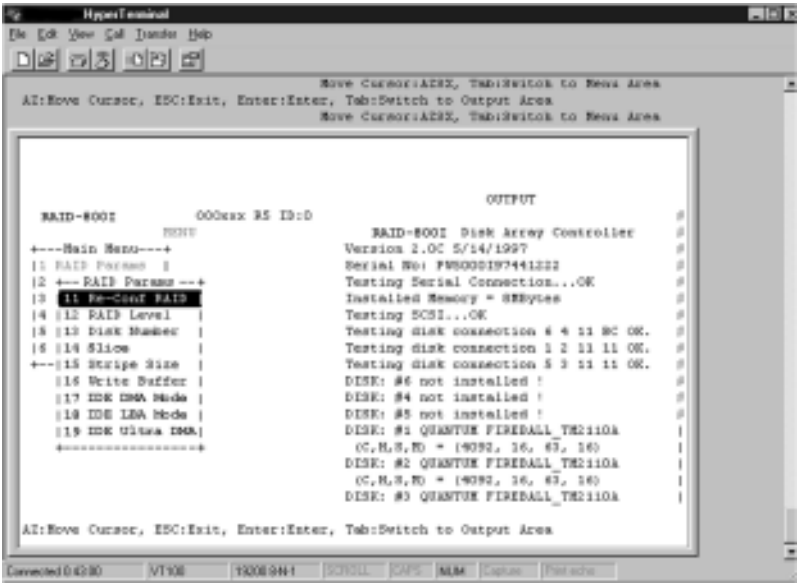


Figure 6-11: Selecting Re-Conf RAID in RAID Params menu

3. In the Re-Conf RAID menu, select YES.

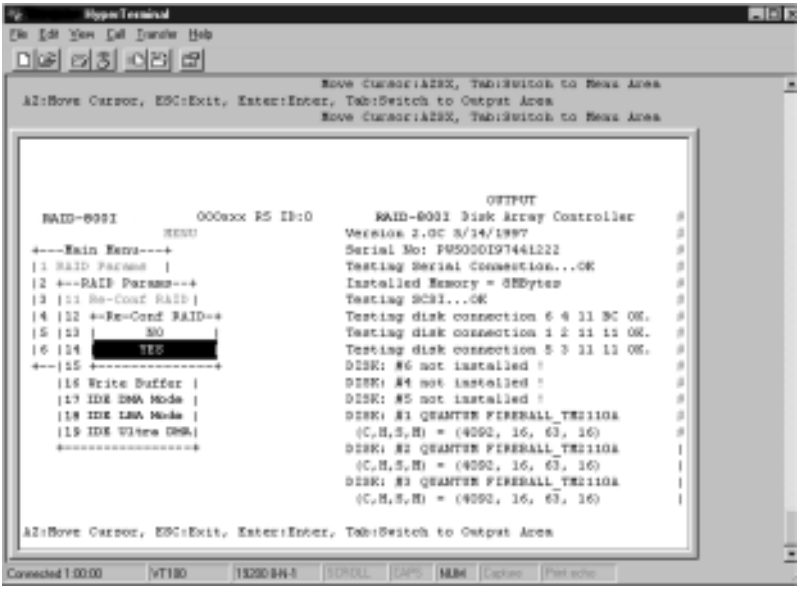
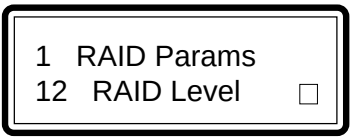


Figure 6-12: Selecting YES in Re-Conf RAID menu

4. You will return to the RAID Params menu. Select RAID Level.



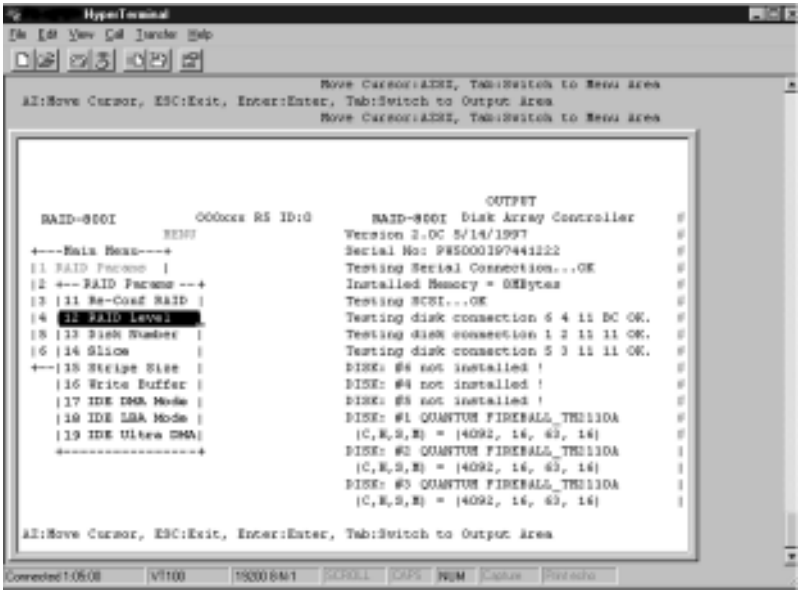
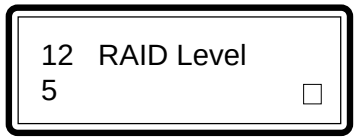


Figure 6-13: Selecting RAID Level in RAID Params menu

5. In the RAID Level menu, select 5.



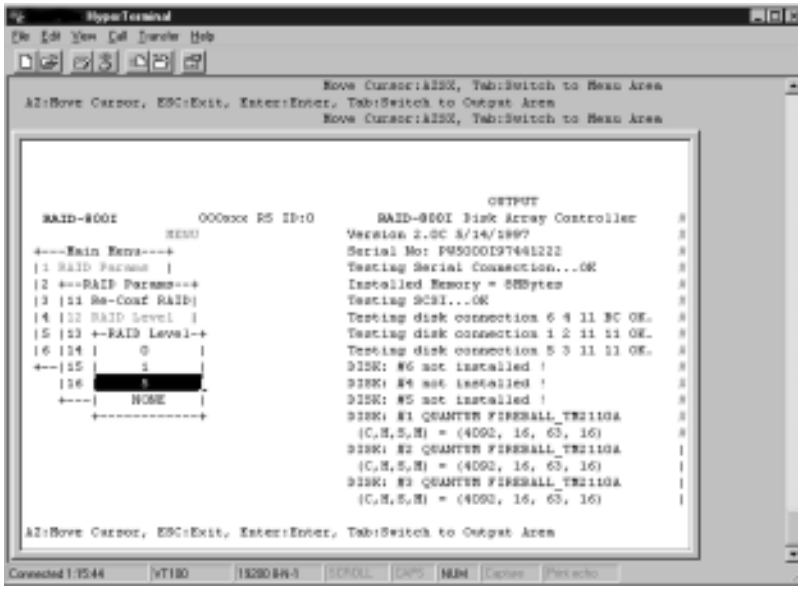
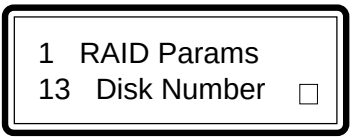


Figure 6-14: Selecting 5 in RAID Level menu

6. You will return to the RAID Params menu, select Disk Number.



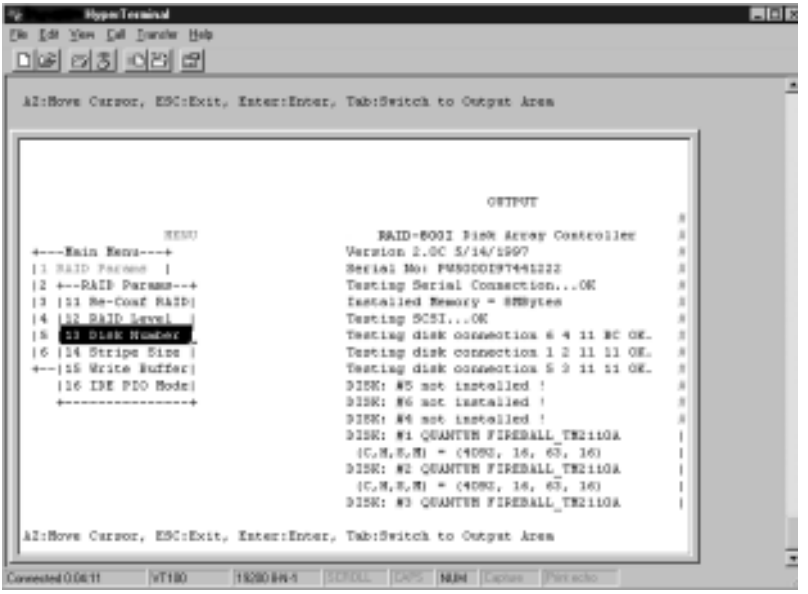


Figure 6-15: Selecting Disk Number in RAID Params menu

7. In the Disk Number menu, select the number of hard drives to be included in the RAID group.

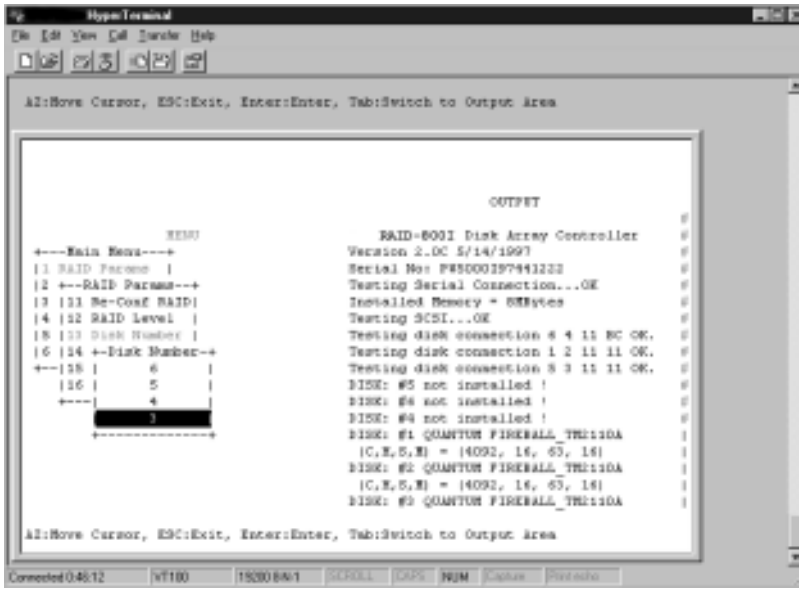


Figure 6-16: Selecting number of hard drives in Disk Number menu

8. Press <Esc> to return to the Main Menu. Select SCSI Params.

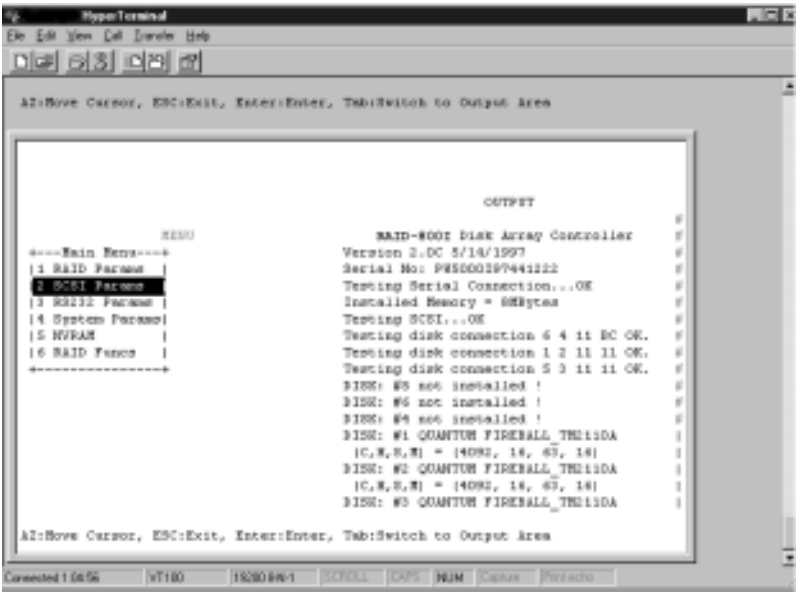
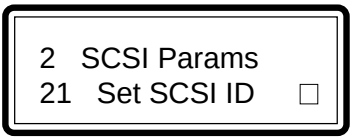


Figure 6-17: Selecting SCSI Params in Main Menu

9. In the SCSI Params menu, select Set SCSI ID.



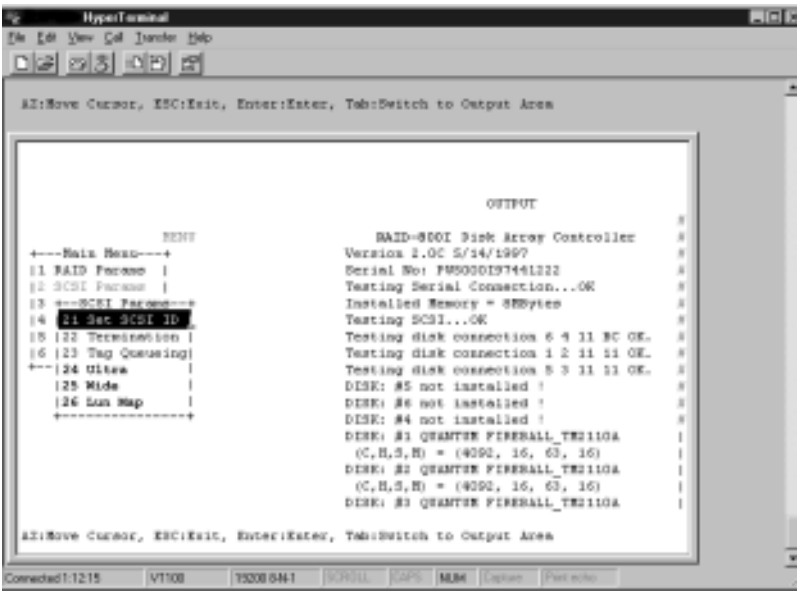


Figure 6-18: Selecting SCSI ID in SCSI Params menu

10. In the Set SCSI ID menu, select a SCSI ID. Make sure you select an ID that is not yet used by the SCSI bus. Refer to Chapter 4 for more information on selecting a SCSI ID.

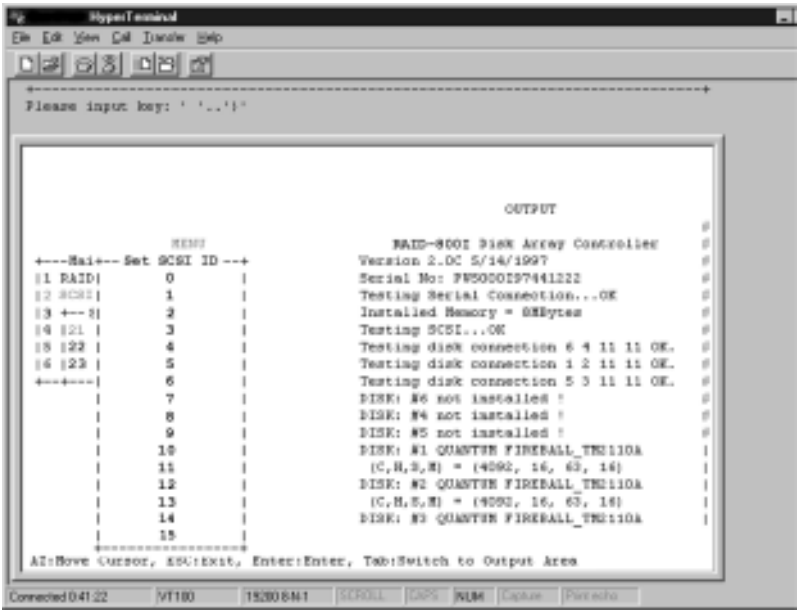
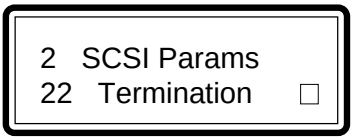


Figure 6-19: Selecting a SCSI ID in Set SCSI ID menu

11. You will return to the SCSI Params menu. Select Termination.



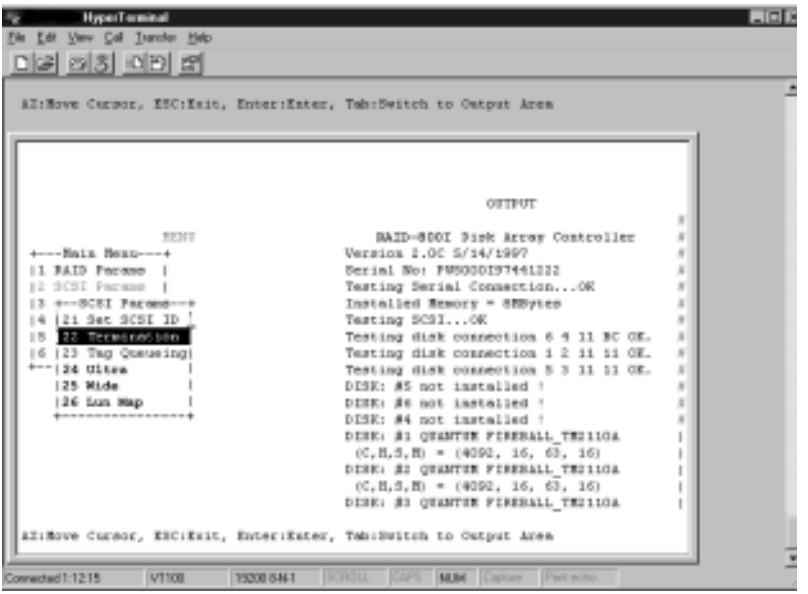
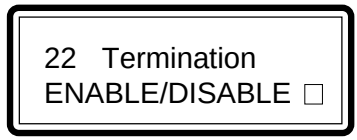


Figure 6-20: Selecting Termination in SCSI Params menu

12. In the Termination menu, select ENABLE or DISABLE. If the subsystem will be the last SCSI device, enable this function. Refer to Chapter 4 for more information on terminating SCSI devices.



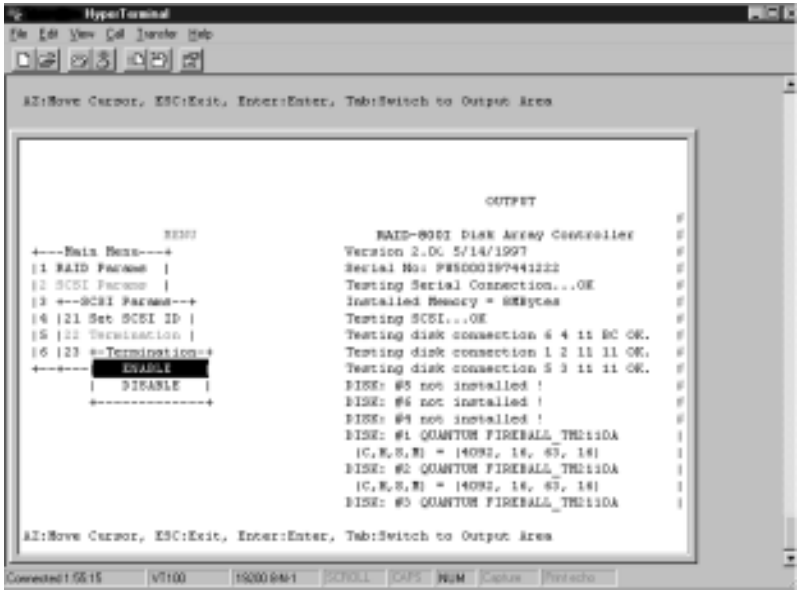
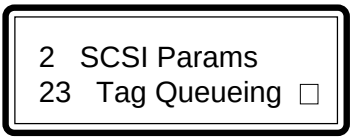


Figure 6-21: Selecting ENABLE/DISABLE in Termination menu

13. You will return to the SCSI Params menu. Select Tag Queueing (sic).



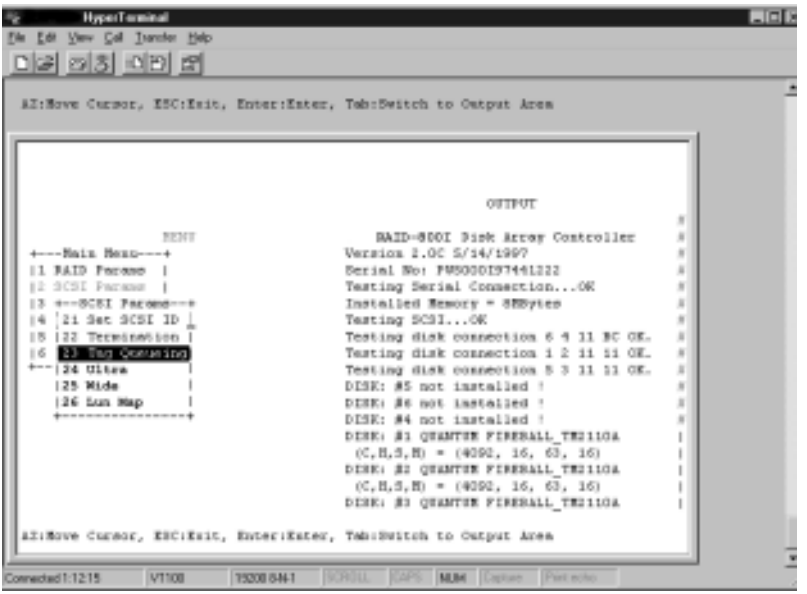


Figure 6-22: Selecting Tag Queueing (sic) in SCSI Params menu

14. In the Tag Queueing (sic) menu, select ENABLE. When enabled, the SCSI channel is able to queue SCSI connect.

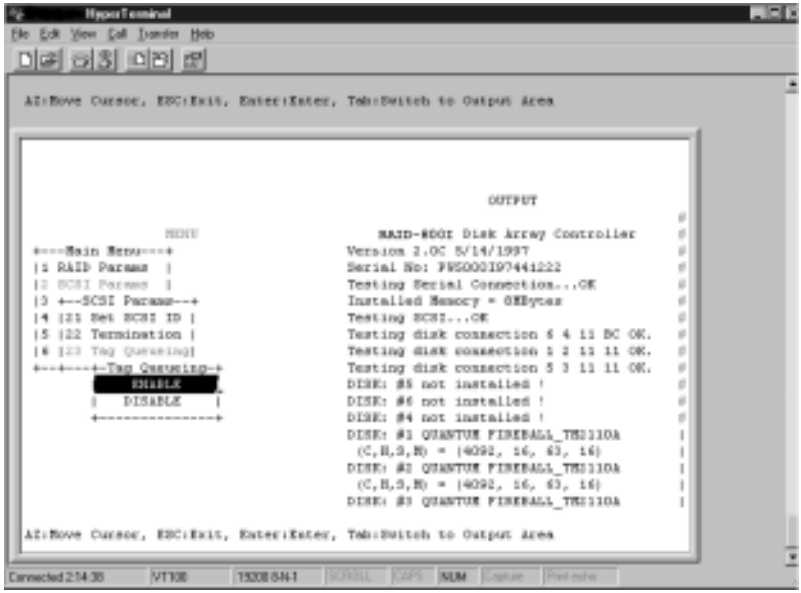


Figure 6-23: Selecting ENABLE in Tag Queueing (sic) menu

15. Press <Esc> to return to the Main Menu. Select NVRAM.

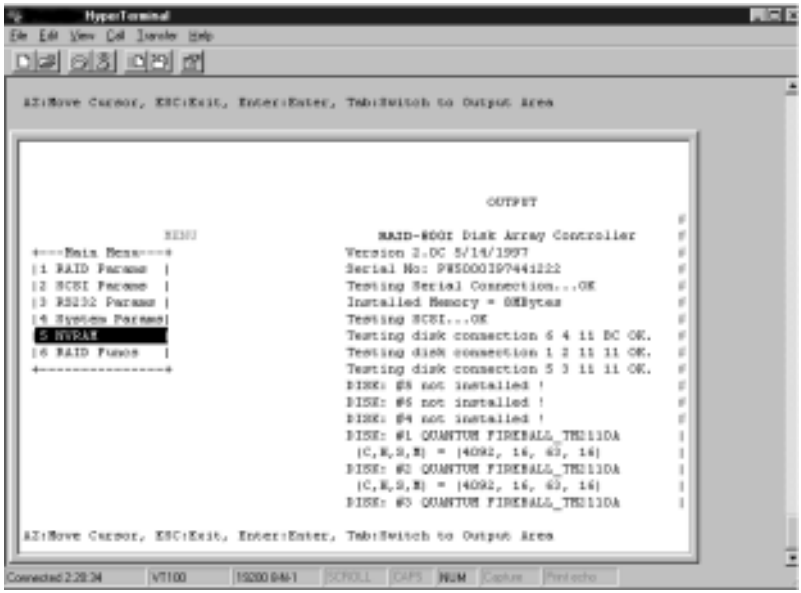
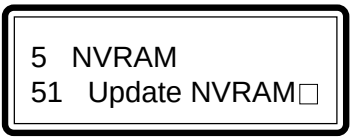


Figure 6-24: Selecting NVRAM in Main Menu

16. In the NVRAM menu, select Update NVRAM.



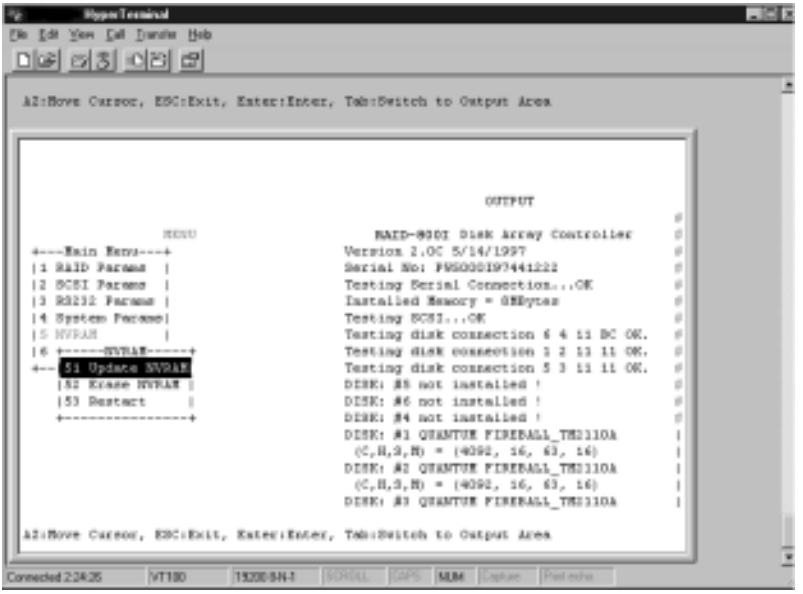


Figure 6-25: Selecting Update NVRAM in NVRAM Menu

17. In the Update NVRAM menu, select YES.

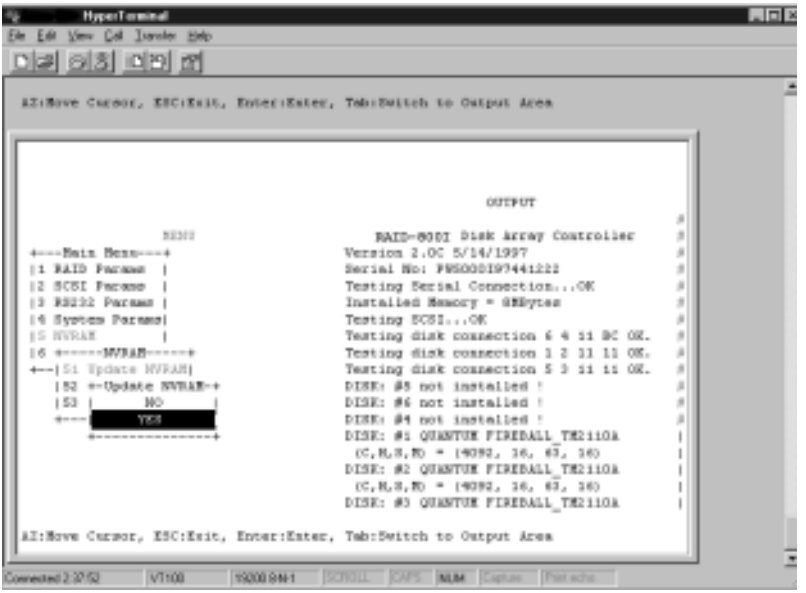


Figure 6-26: Selecting YES in Update NVRAM menu

18. You will return to the NVRAM menu. Select Restart.

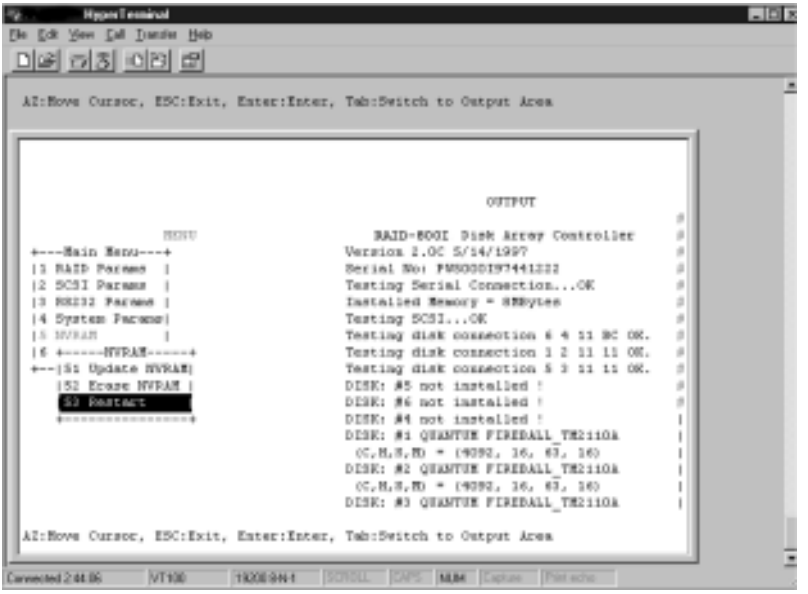


Figure 6-27: Selecting Restart in NVRAM menu

19. In the Restart menu, select YES. Your subsystem will restart and initialize.

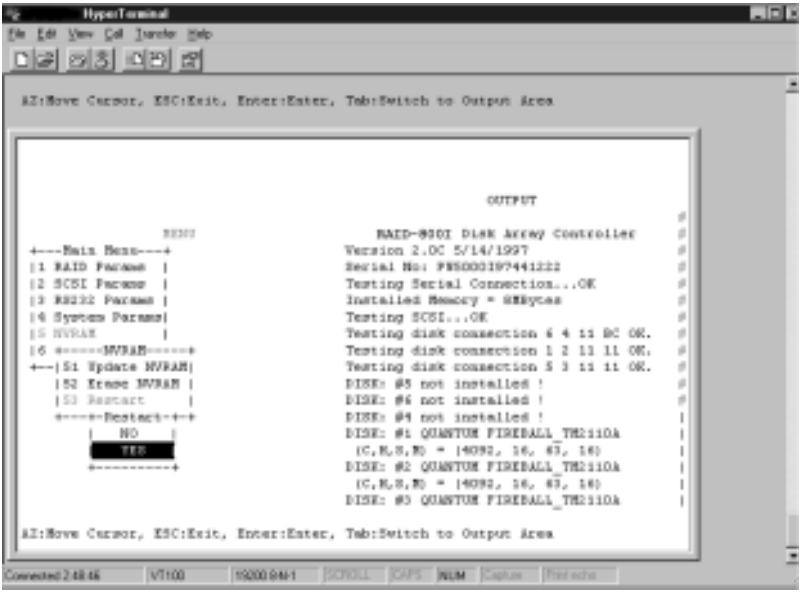


Figure 6-28: Selecting YES in Restart menu

6.4 Changing the Host Channel's SCSI ID

If you discovered that the SCSI ID you selected earlier has been used by a device in the same SCSI bus, you can change the SCSI ID by following the steps below.

1. In the Main Menu, select SCSI Params.

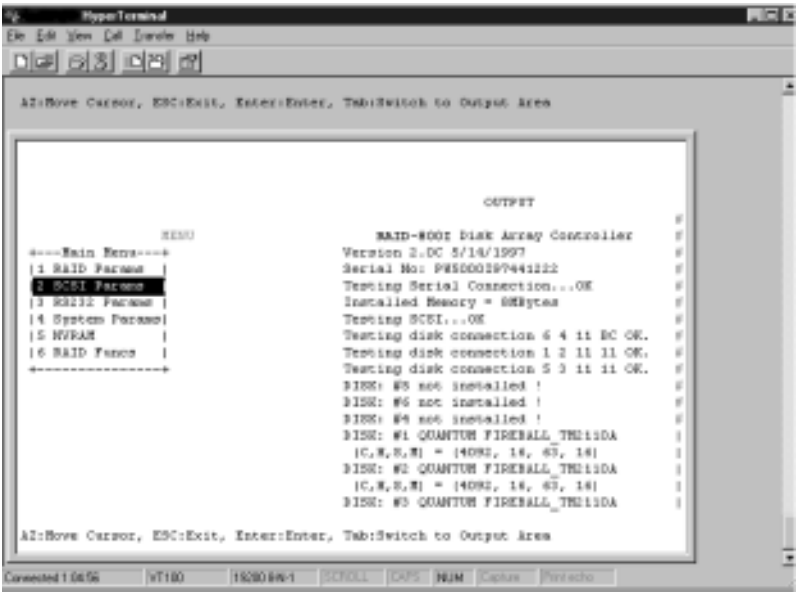
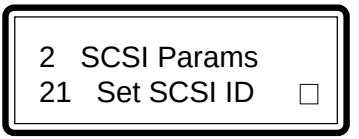


Figure 6-29: Selecting SCSI Params in Main Menu

2. In the SCSI Params menu, select Set SCSI ID.



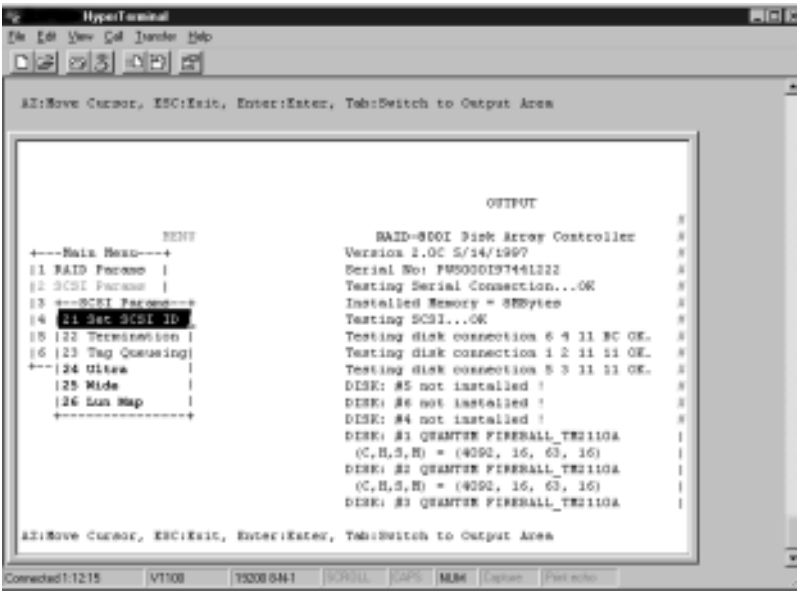


Figure 6-30: Selecting Set SCSI ID in SCSI Params menu

3. In the Set SCSI ID menu, select a SCSI ID. The SCSI ID that was selected in the example below is 2.

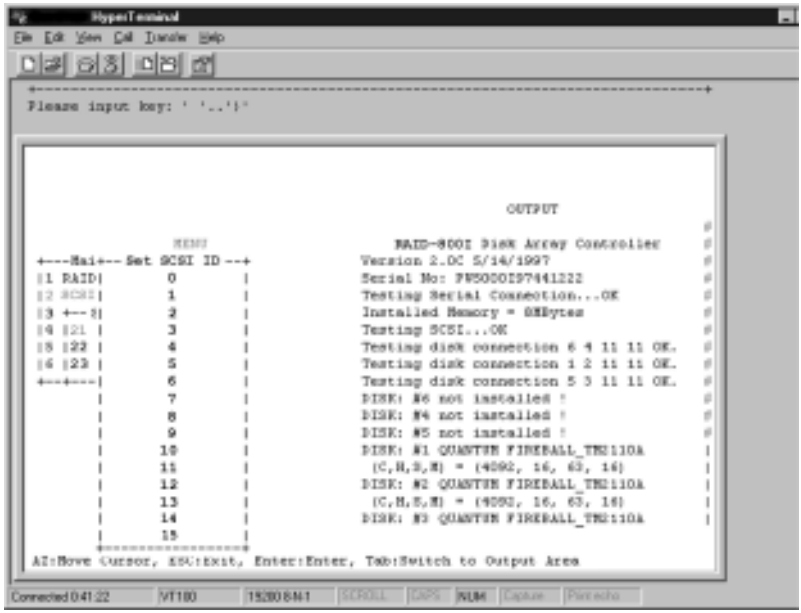
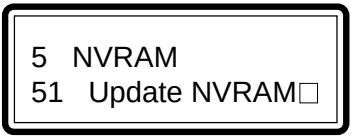


Figure 6-31: Selecting a SCSI ID in Set SCSI ID menu

4. In the NVRAM menu, select Update NVRAM.



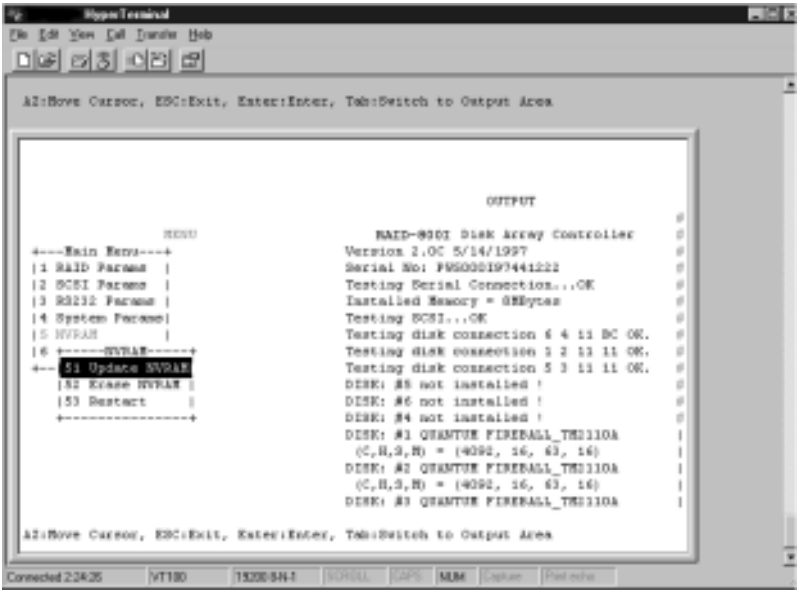


Figure 6-32: Selecting Update NVRAM in NVRAM menu

5. In the Update NVRAM menu, select YES.

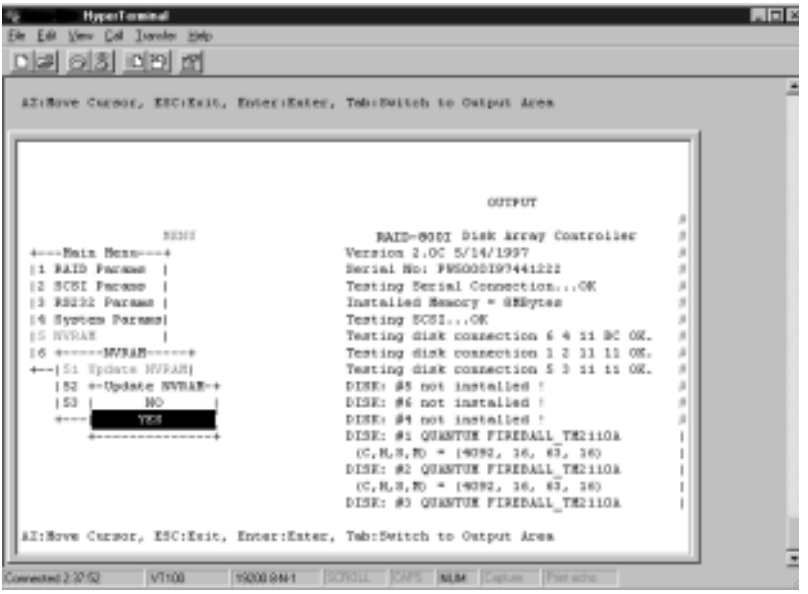


Figure 6-33: Selecting YES in Update NVRAM menu

6. You will go back to the NVRAM menu. Select Restart.

6.5 Erasing an Existing Configuration

1. In the Main Menu, select NVRAM.

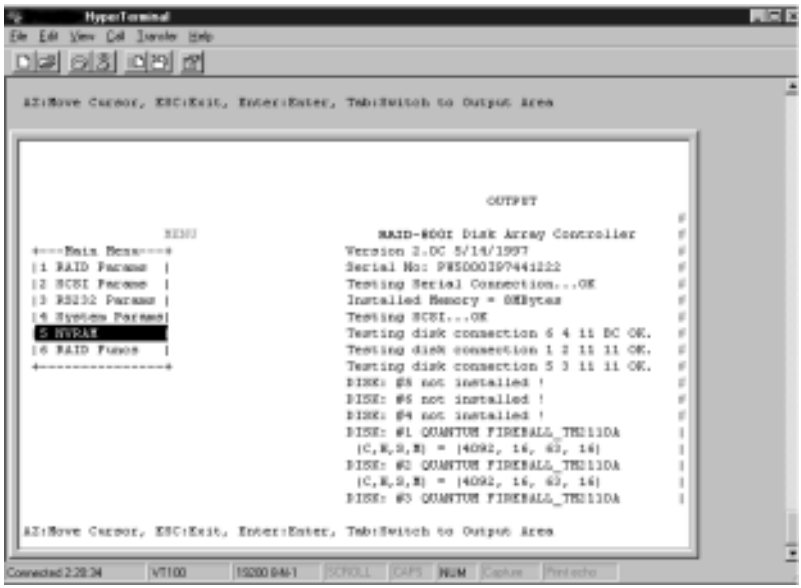


Figure 6-34: Selecting NVRAM in Main Menu

2. In the NVRAM menu, select Erase NVRAM.

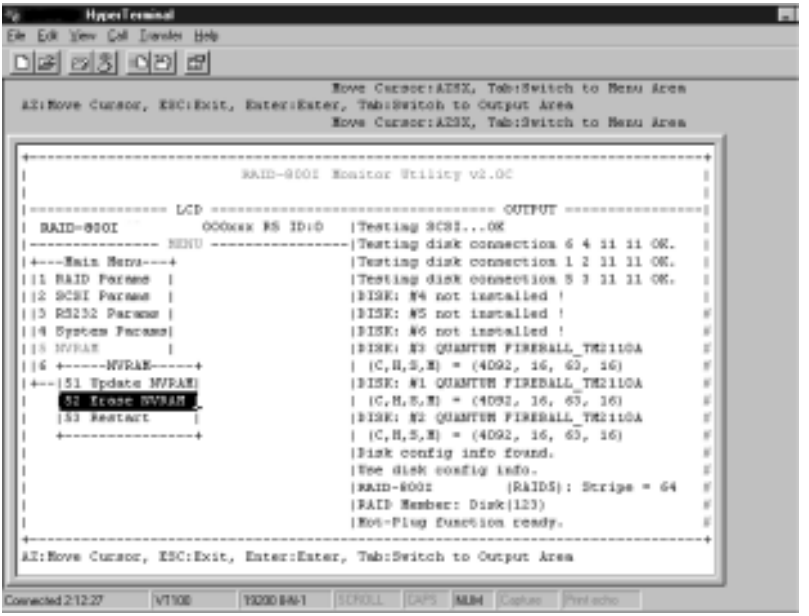
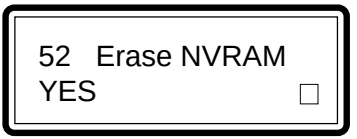


Figure 6-35: Selecting Erase NVRAM in NVRAM menu

3. In the Erase NVRAM menu, select YES.



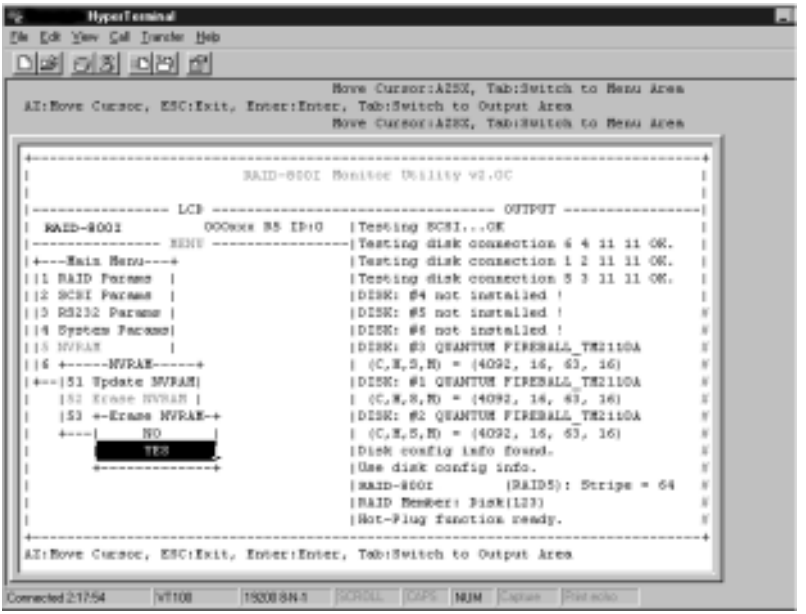


Figure 6-36: Selecting YES in Erase NVRAM menu

4. You will go back to the NVRAM menu. Select Restart.

5. You will go back to the Main Menu. Select NVRAM.

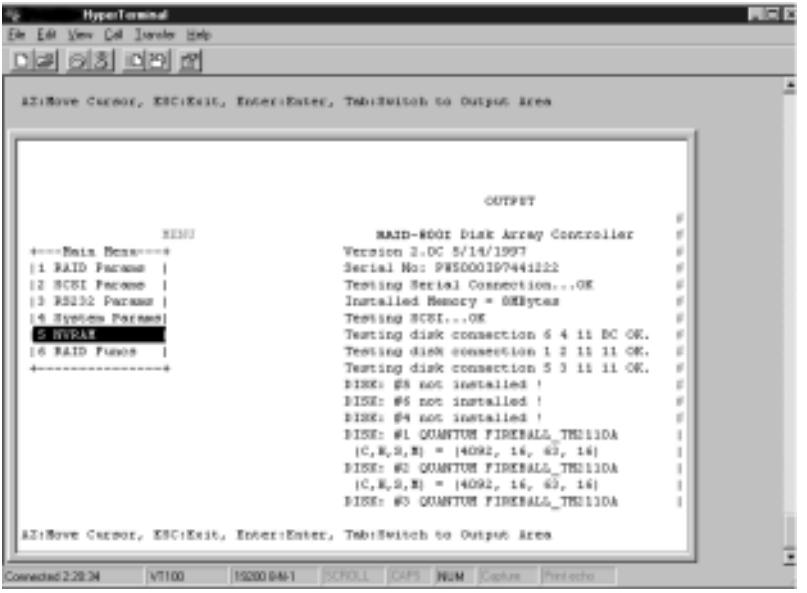
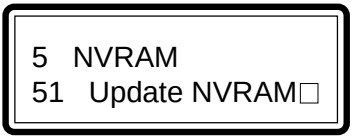


Figure 6-37: Selecting NVRAM in Main Menu

6. In the NVRAM menu, select Update NVRAM.



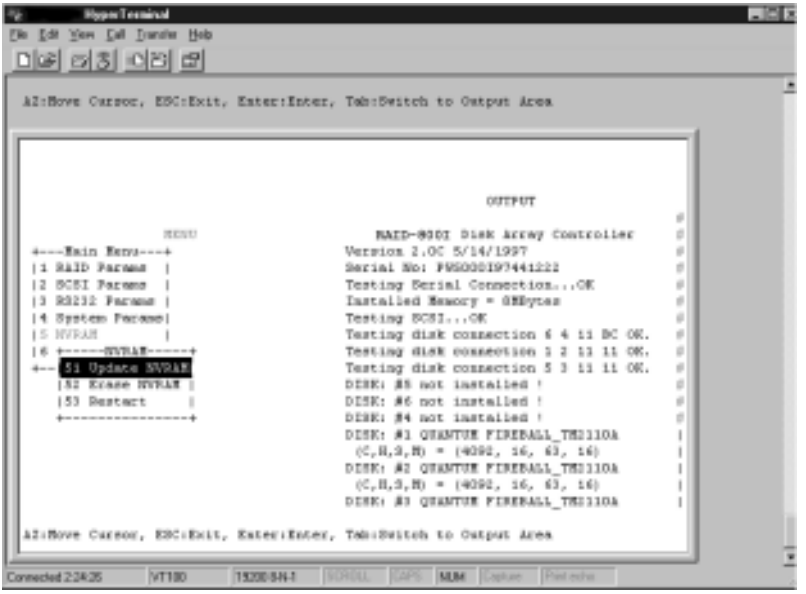


Figure 6-38: Selecting Update NVRAM in NVRAM menu

7. In the Update NVRAM menu, select YES.

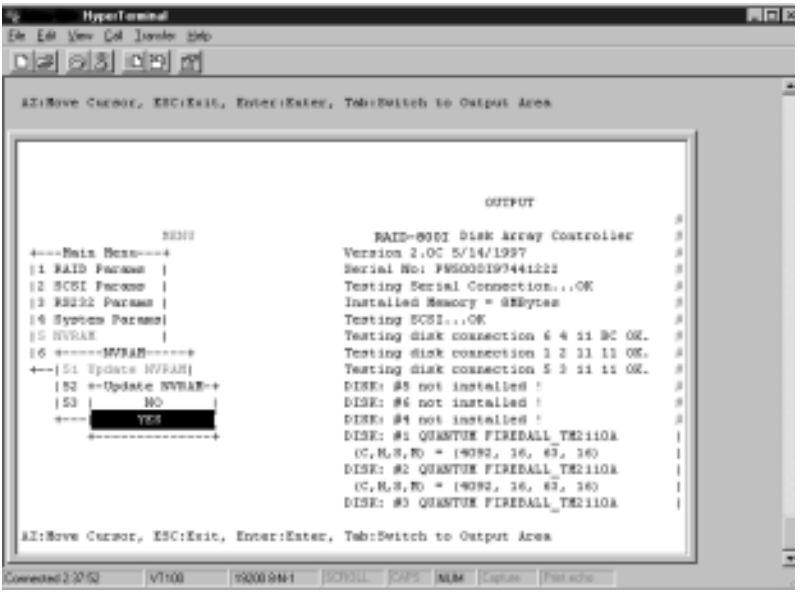


Figure 6-39: Selecting YES in Update NVRAM menu

6.6 Formatting Hard Drives

1. In the Main Menu, select RAID Funcs.

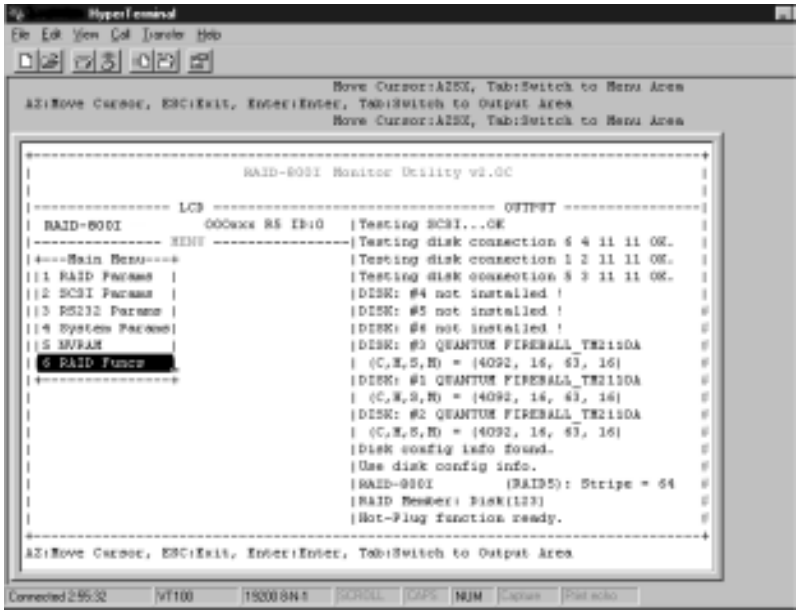
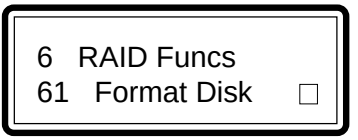


Figure 6-40: Selecting RAID Funcs in Main Menu

2. In the RAID Funcs menu, select Format Disk.



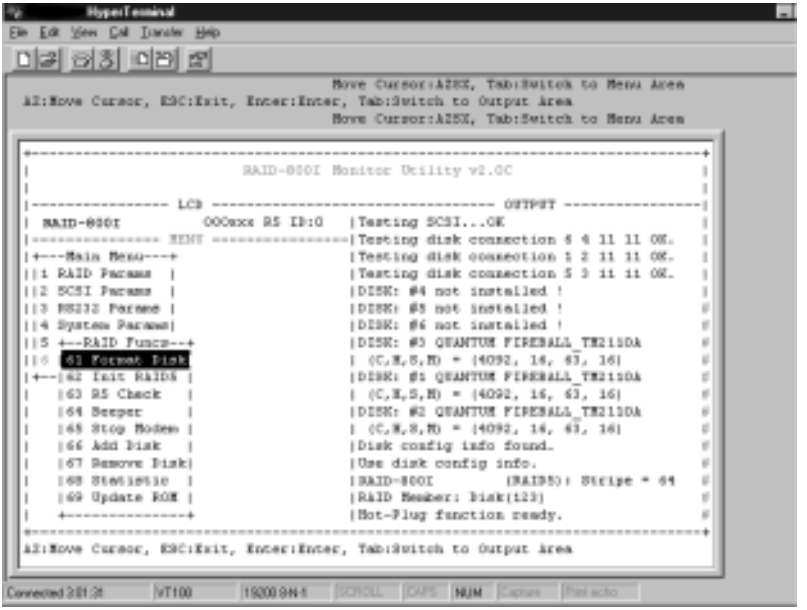


Figure 6-41: Selecting Format Disk in RAID Funcs menu

3. In the Format Disk menu, select the hard drive you want to format. If you wish to format all the hard drives in your subsystem, select Format All. The hard drive that was selected in the example below is the drive in the first slot.

61 Format Disk
611 Format Disk1 □

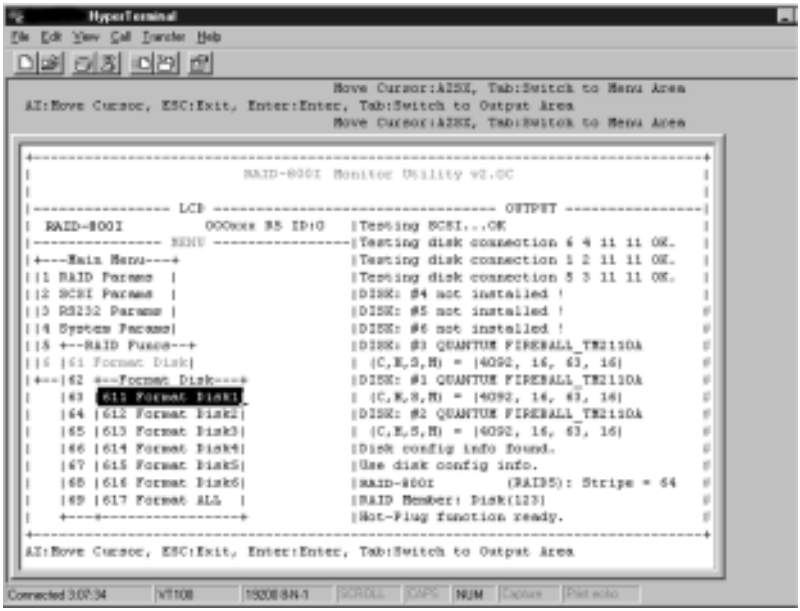


Figure 6-42: Selecting a hard drive in Format Disk menu

4. In the Format Disk1 menu, select START.

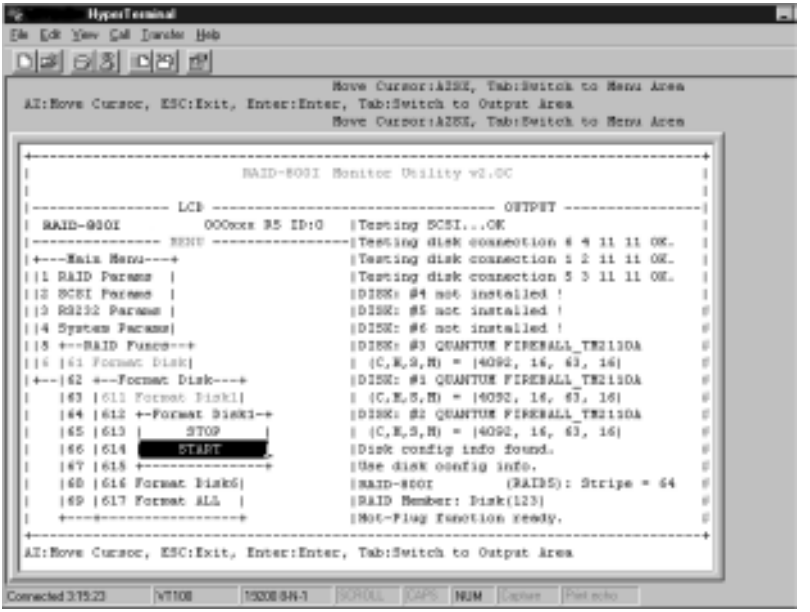


Figure 6-43: Selecting START in Format Disk1 menu

5. Press <Esc> until you return to the Main Menu. Select NVRAM.

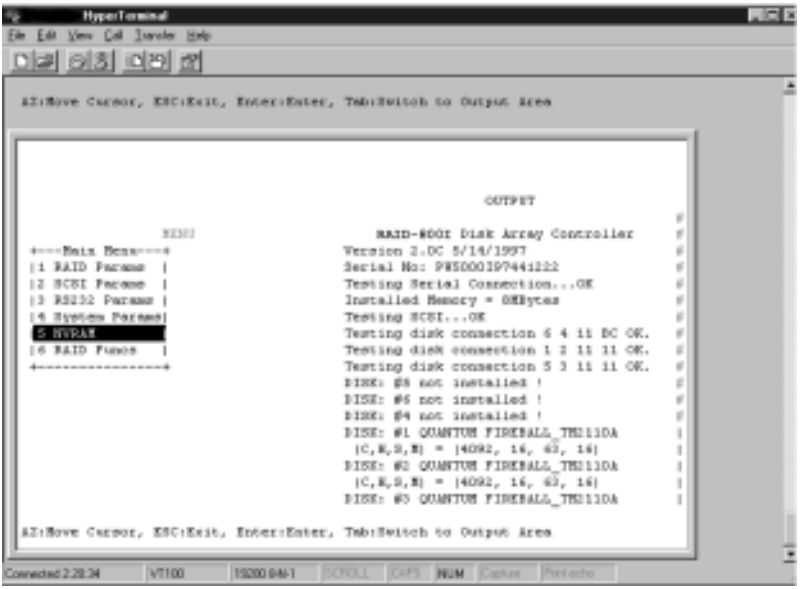


Figure 6-44: Selecting NVRAM in Main Menu

6. In the NVRAM menu, select Update NVRAM.

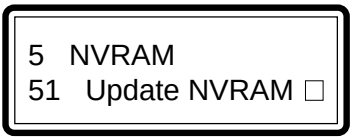


Figure 6-45: Selecting Update NVRAM in NVRAM menu

7. In the Update NVRAM menu, select YES.

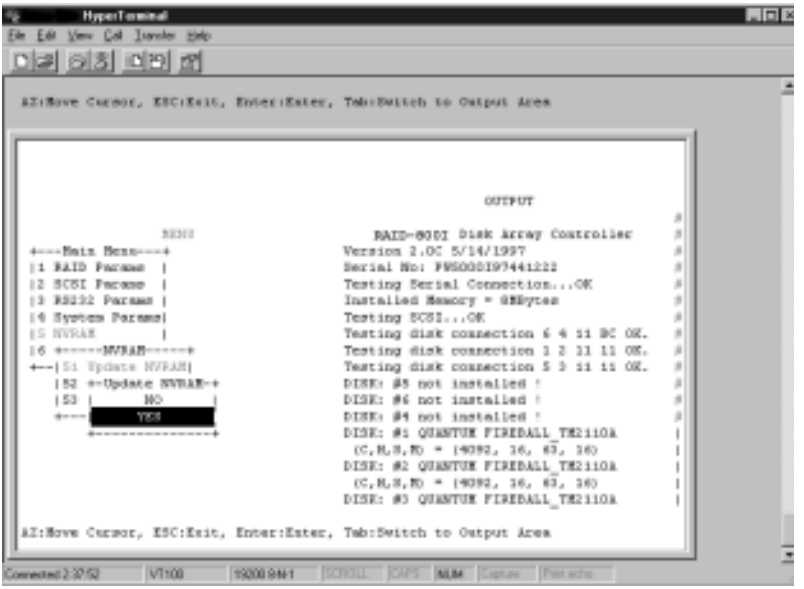


Figure 6-46: Selecting YES in Update NVRAM menu

6.7 Configuring the Terminal

1. In the Main Menu, select RS232 Params.

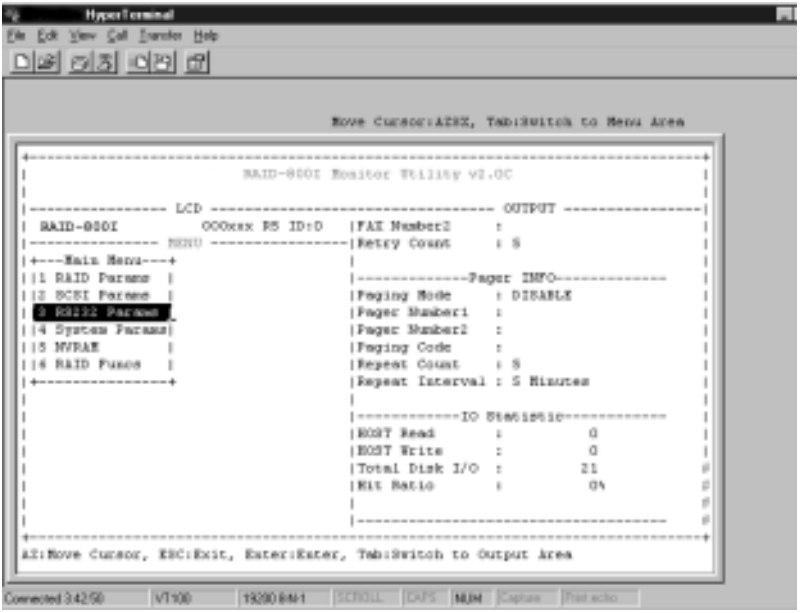
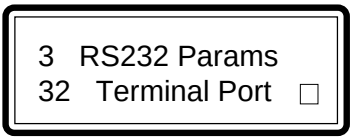


Figure 6-47: Selecting RS232 Params in Main Menu

2. In the RS232 Params menu, select Terminal Port.



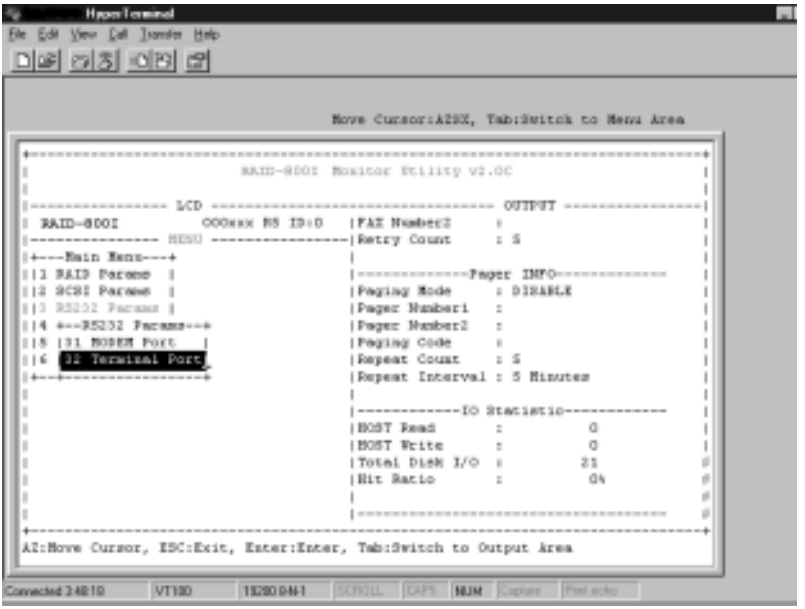


Figure 6-48: Selecting Terminal Port in RS232 Params menu

3. In the Terminal Port menu, select Baud Rate.

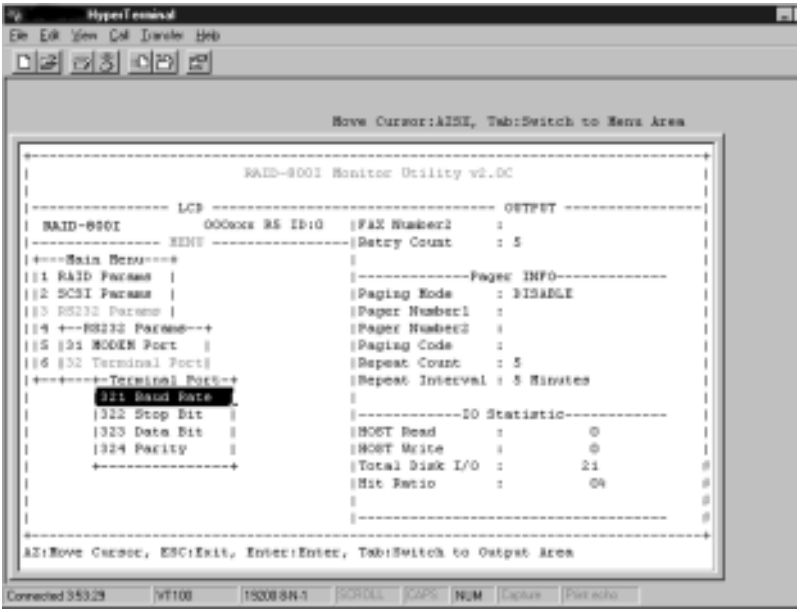


Figure 6-49: Selecting Baud Rate in Terminal Port menu

4. In the Baud Rate menu, select the baud rate of your terminal. The default baud rate for Terminal Port is "19200".

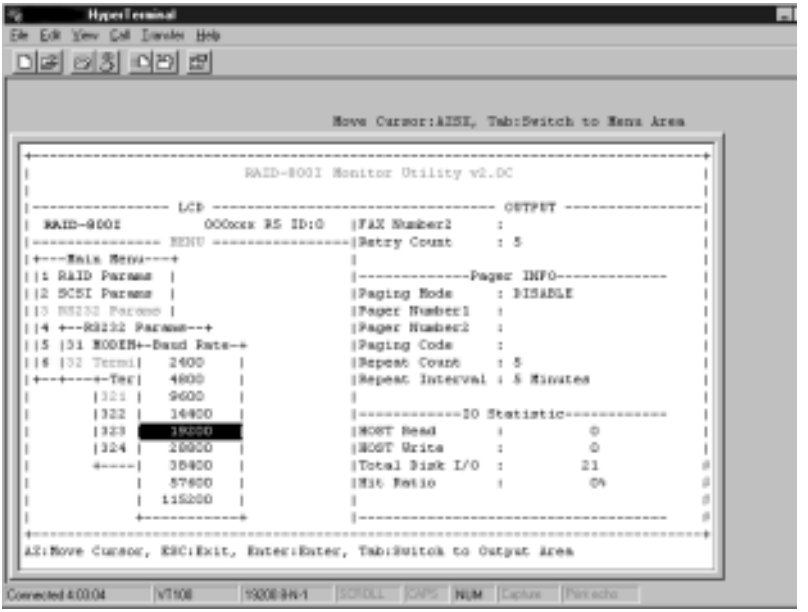


Figure 6-50: Selecting the baud rate in Baud Rate menu

5. You will return to the Terminal Port menu. Select Stop Bit.

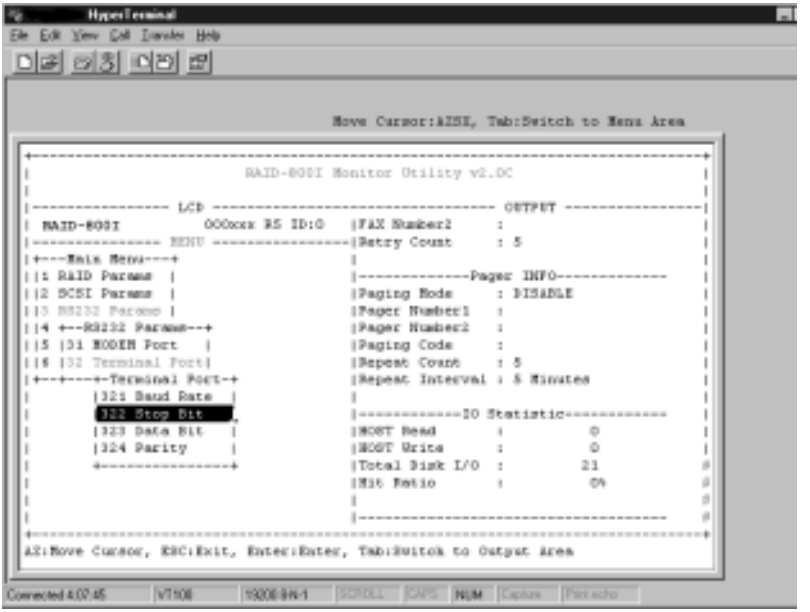


Figure 6-51: Selecting Stop Bit in Terminal Port menu

6. In the Stop Bit menu, select the appropriate stop bit. The default stop bit is "1".

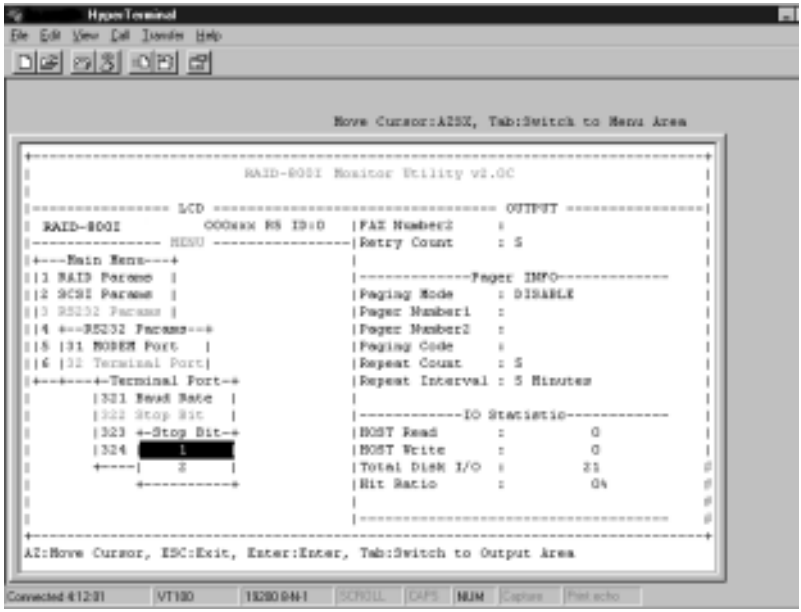


Figure 6-52: Selecting the appropriate stop bit in Stop Bit menu

7. You will return to the Terminal Port menu. Select Data Bit.

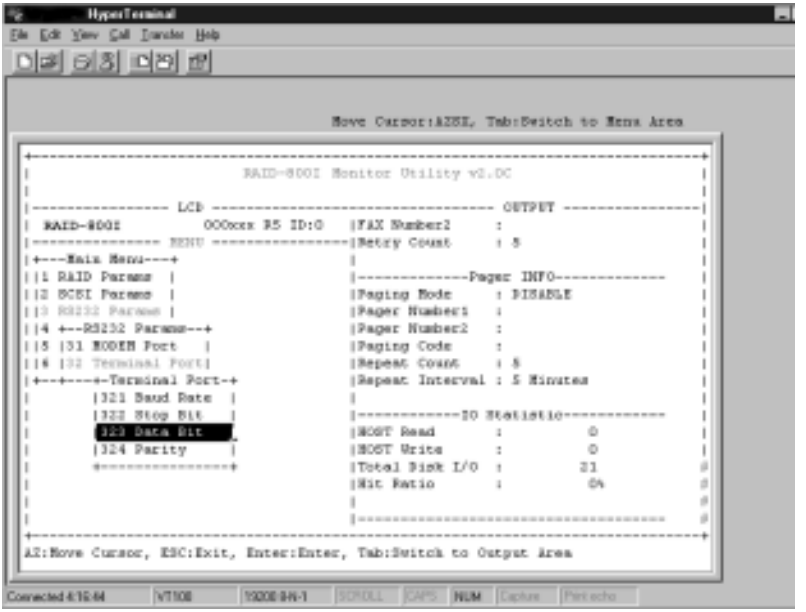


Figure 6-53: Selecting Data Bit in Terminal Port menu

8. In the Data Bit menu, select the appropriate data bit. The default data bit is "8".

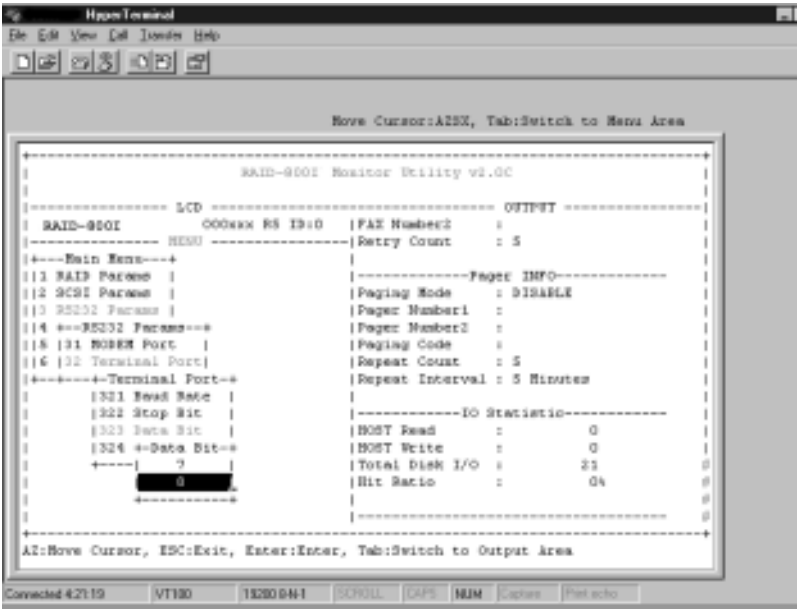


Figure 6-54: Selecting the appropriate data bit in Data Bit menu

9. You will return to the Terminal Port menu. Select Parity.

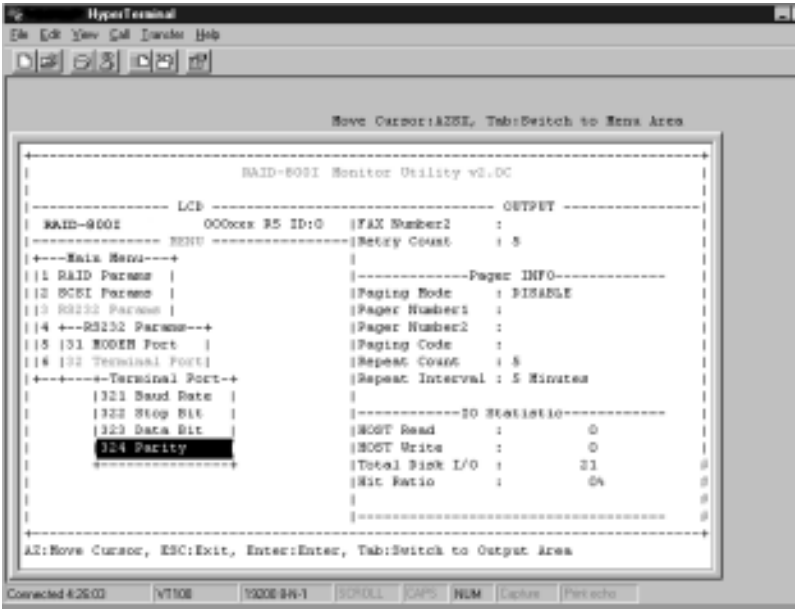


Figure 6-55: Selecting Parity in Terminal Port menu

10. In the Parity menu, select ODD, EVEN or NONE. The default parity setting is "NONE".

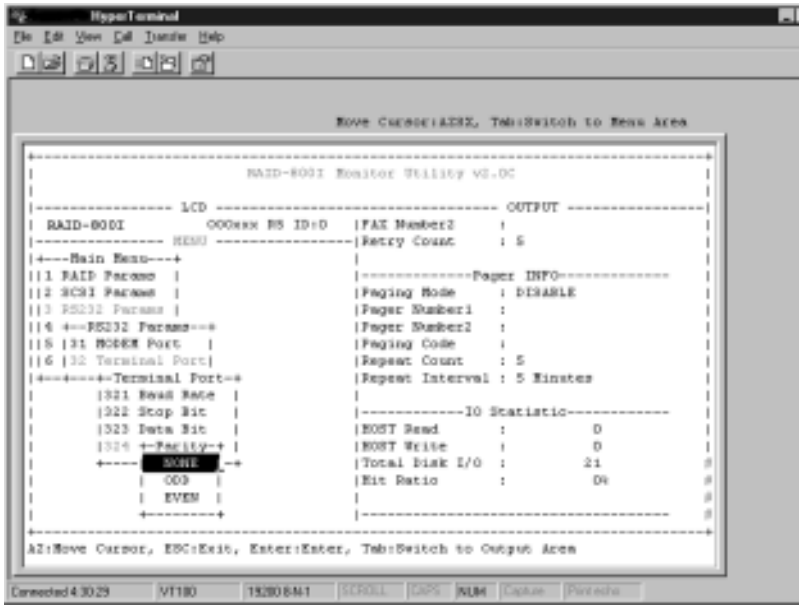


Figure 6-56: Selecting ODD, EVEN or NONE in Parity menu

11. Press <Esc> until you return to the Main Menu. Select NVRAM.

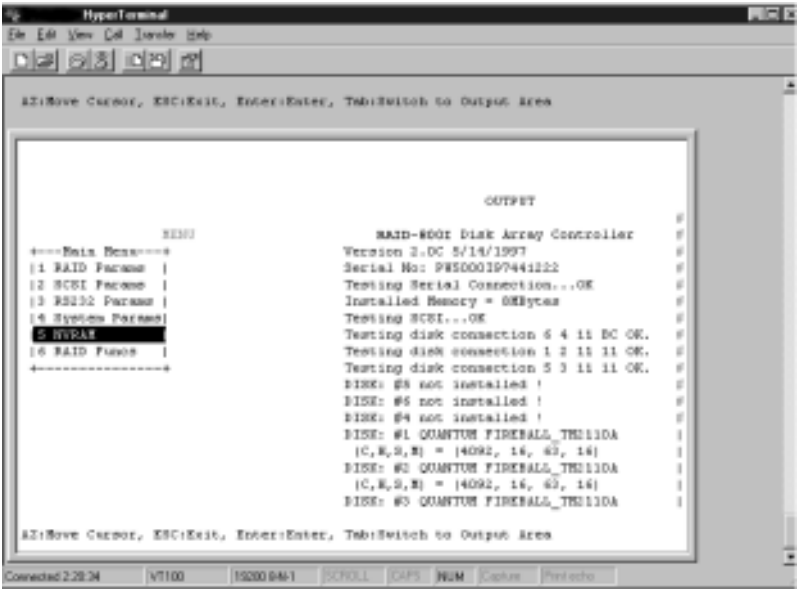


Figure 6-57: Selecting NVRAM in Main Menu

12. In the NVRAM menu, select Update NVRAM.

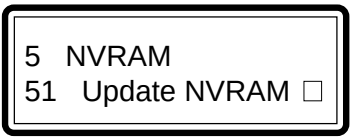


Figure 6-58: Selecting Update NVRAM in NVRAM menu

13. In the Update NVRAM menu, select YES.

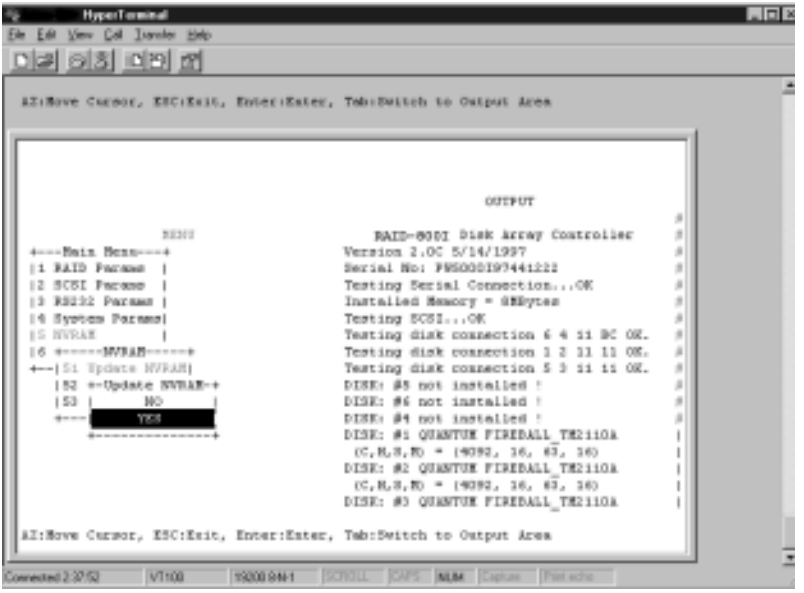


Figure 6-59: Selecting YES in Update NVRAM menu

6.8 Setting a Password

1. In the Main Menu, select System Params.

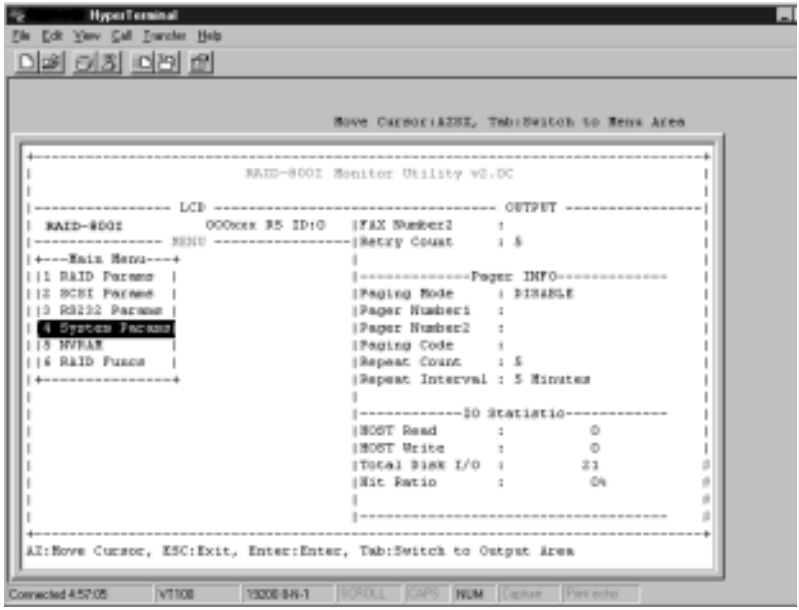
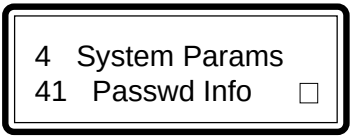


Figure 6-60: Selecting System Params in Main Menu

2. In the System Params menu, select Passwd Info.



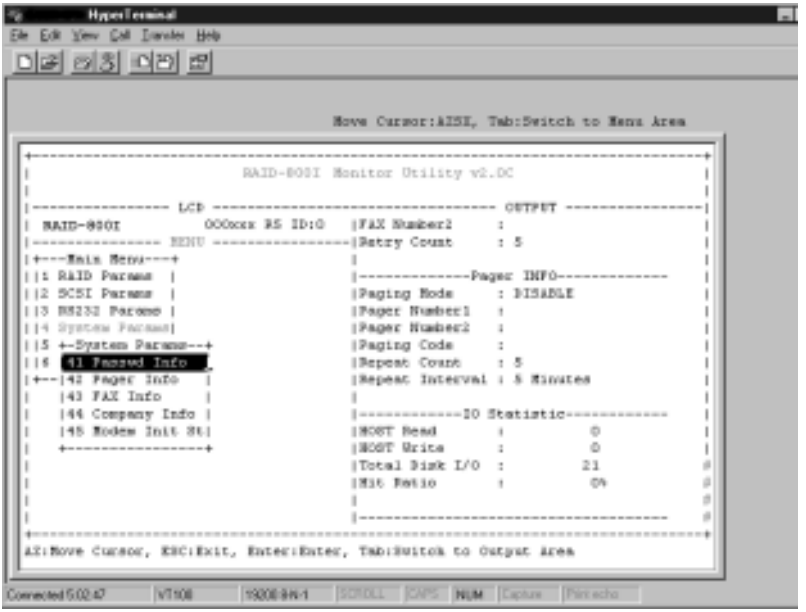
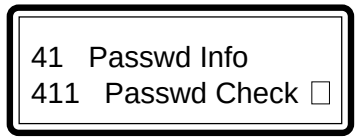


Figure 6-61: Selecting Passwd Info in System Params menu

3. In the Passwd Info menu, select Passwd Check.



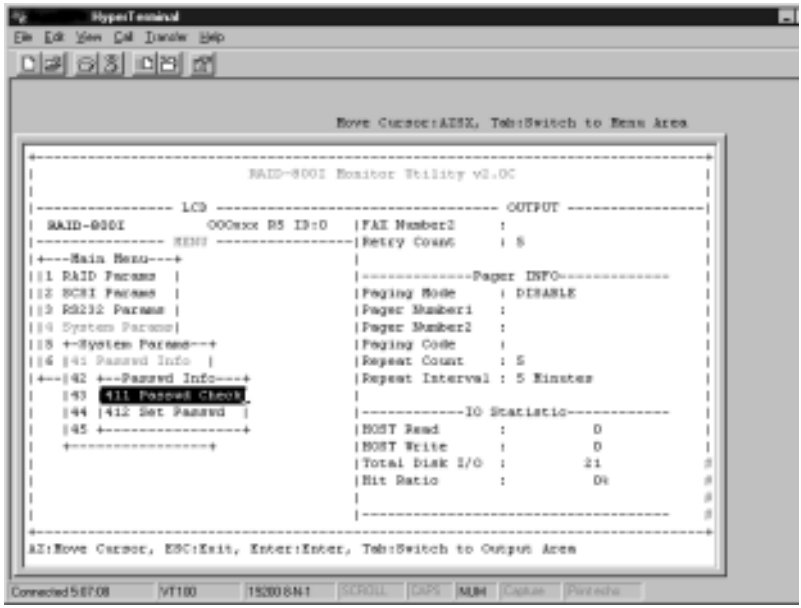
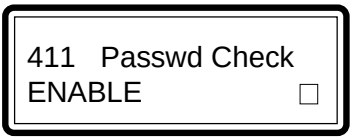


Figure 6-62: Selecting Passwd Check in Passwd Info menu

4. In the Passwd Check menu, select ENABLE.



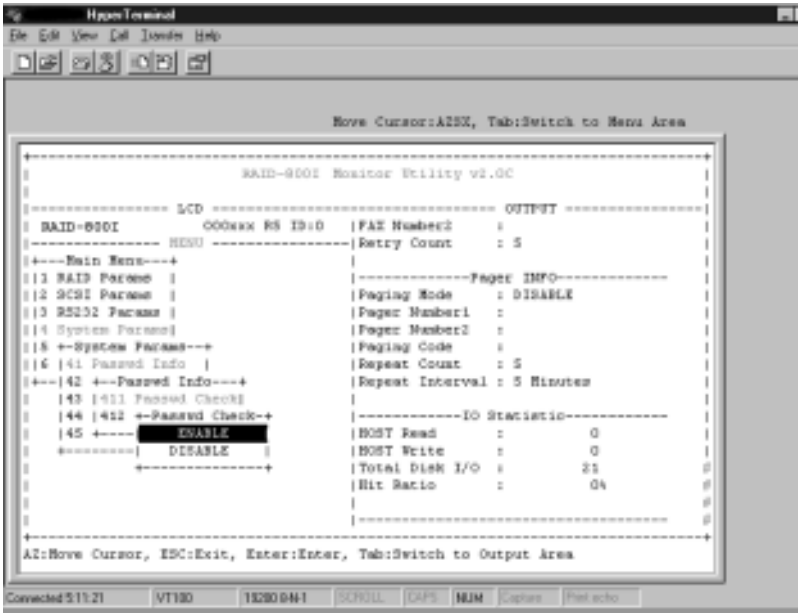
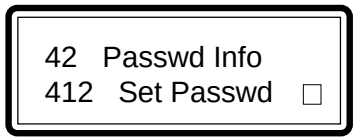


Figure 6-63: Selecting ENABLE in Passwd Check menu

5. You will return to the Passwd Info menu. Select Set Passwd.



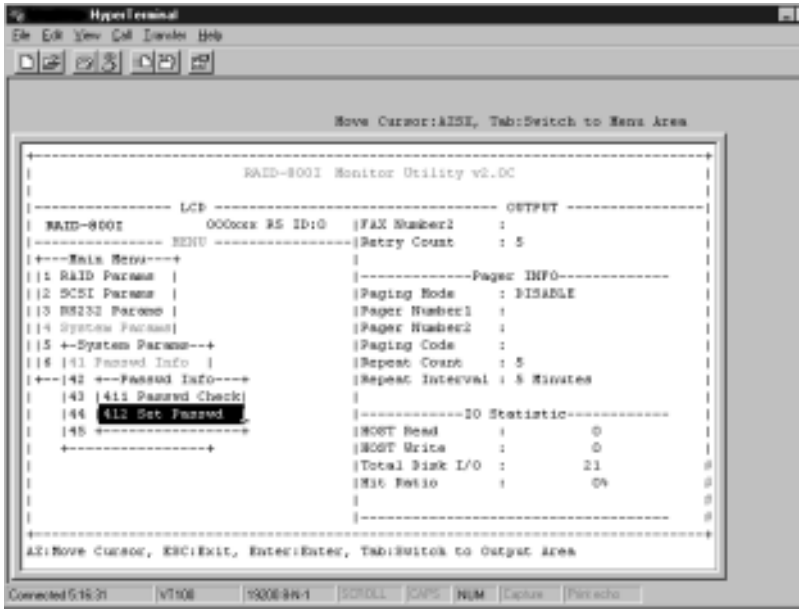


Figure 6-64: Selecting Set Password in Passwd Info menu

6. In the Set Passwd menu, enter your password.

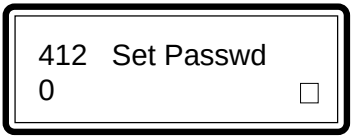


Figure 6-65: Entering a password in Set Passwd menu

7. Press <Esc> until you return to the Main Menu. Select NVRAM.

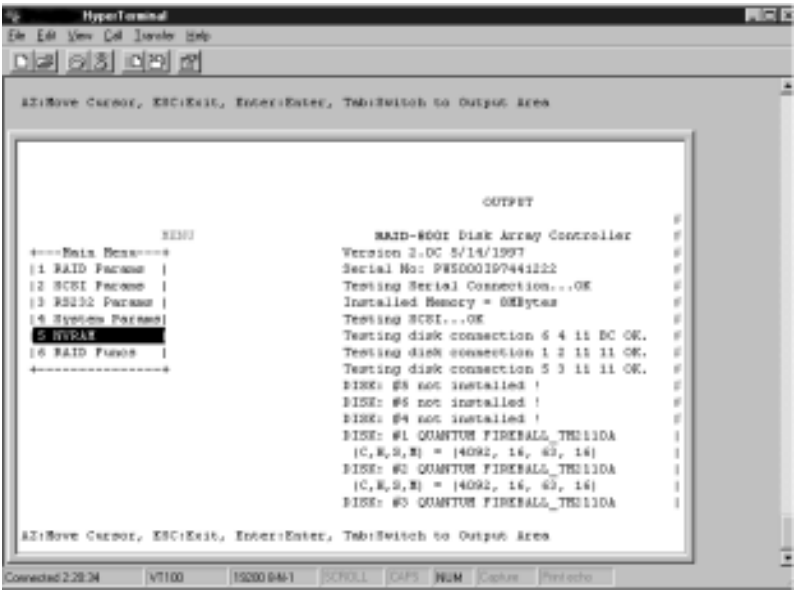


Figure 6-66: Selecting NVRAM in Main Menu

8. In the NVRAM menu, select Update NVRAM.

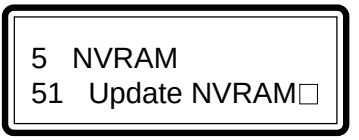


Figure 6-67: Selecting Update NVRAM in NVRAM menu

9. In the Update NVRAM menu, select YES.

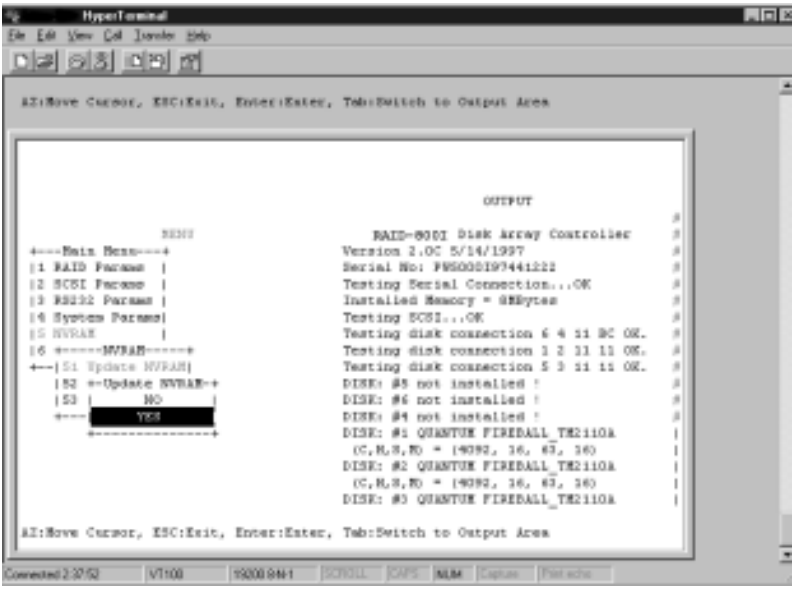


Figure 6-68: Selecting YES in Update NVRAM menu

6.9 R5 (RAID Level 5) Consistency Check

This function is used to verify the integrity of the initialized RAID system.

1. In the Main Menu, select RAID Funcs.

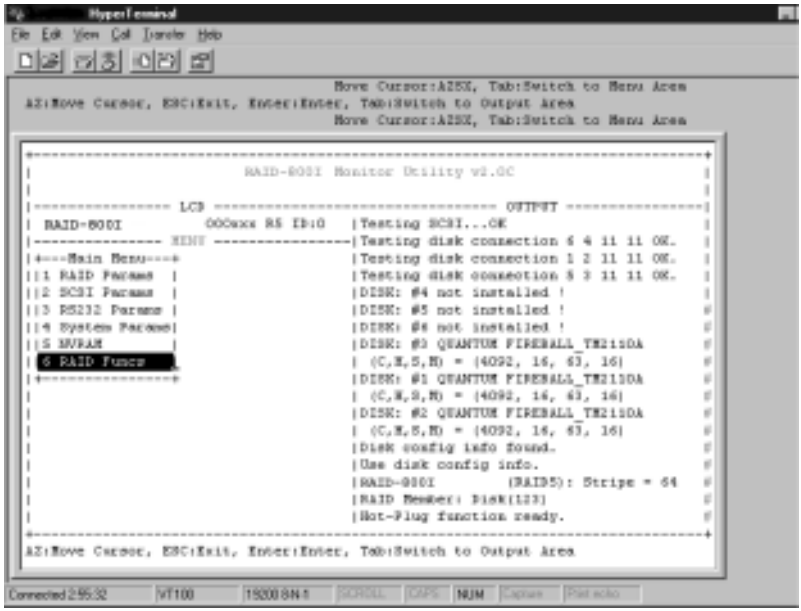
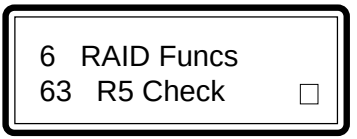


Figure 6-69: Selecting RAID Funcs in Main Menu

2. In the RAID Funcs menu, select R5 Check.



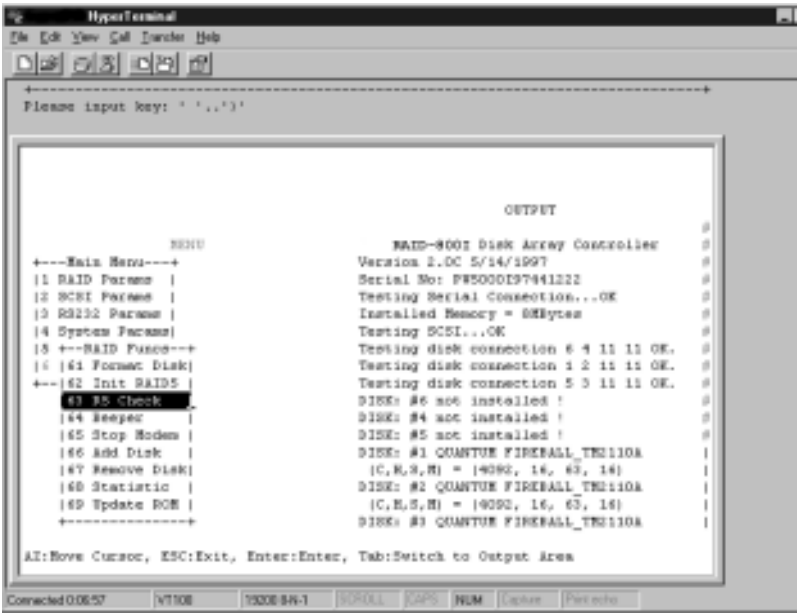


Figure 6-70: Selecting R5 Check in RAID Funcs menu

3. In the R5 Check menu, select START. The controller will then start to verify that the checksum data matches all the original data.

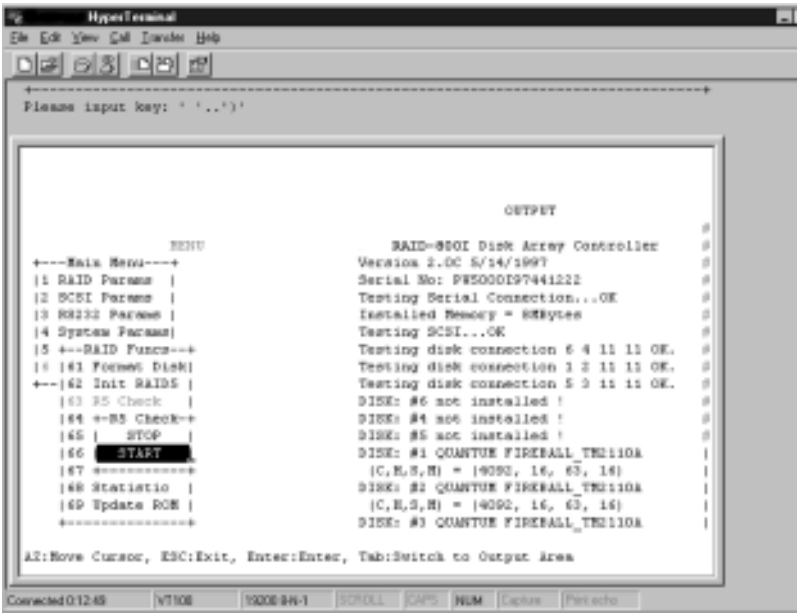


Figure 6-71: Selecting START in R5 Check menu

6.10 Configuring an Ultra Wide SCSI Subsystem

Configuring an Ultra Wide SCSI Subsystem is very similar to configuring a Fast SCSI-2 subsystem.

1. In the Main Menu, select SCSI Params.

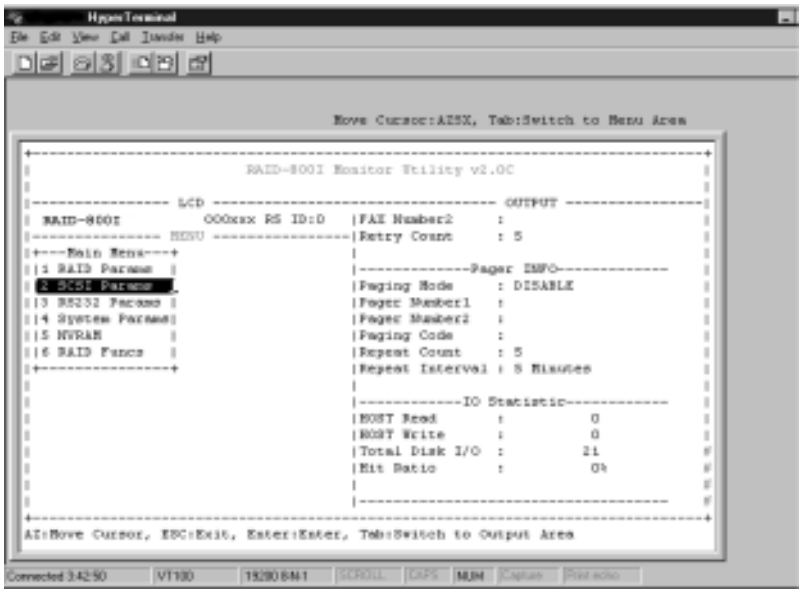


Figure 6-72: Selecting SCSI Params in Main Menu

2. In the SCSI Params Menu, select Set SCSI ID.

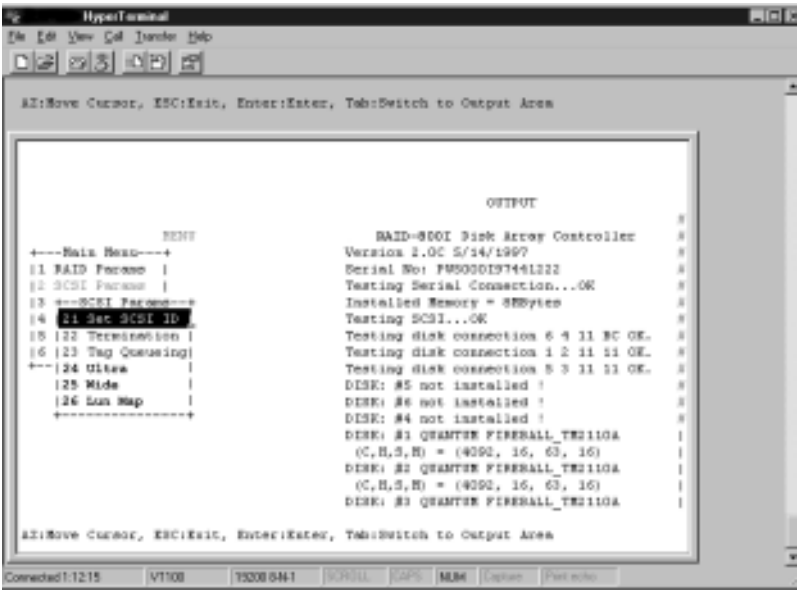


Figure 6-73: Selecting Set SCSI ID in SCSI Params menu

3. In the Set SCSI ID menu, select a SCSI ID. Make sure you select an ID that is not yet used by the SCSI bus. Refer to Chapter 4 for more information on selecting a SCSI ID.

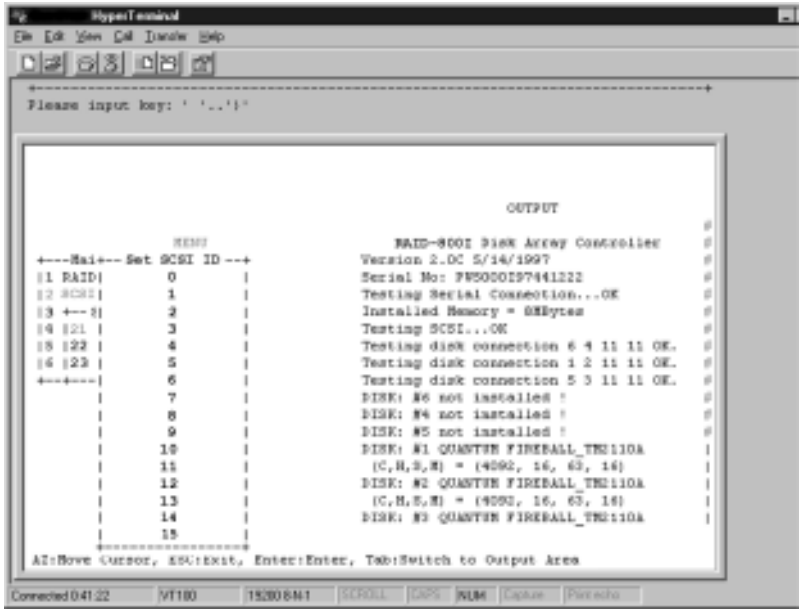


Figure 6-74: Selecting a SCSI ID in Set SCSI ID menu

CHAPTER 7

Configuring Faxes and Pagers

Before going on, make sure your modem is properly connected to the serial modem port at the rear of the system unit.

This chapter will guide you in configuring the modem connected to your subsystem, and show you the steps in configuring your faxes and pagers.

- Configuring the Modem Port
- Configuring Your Pager
- Configuring Your Fax

7.1 Configuring the Modem Port

1. In the Main Menu, select RS232 Params.

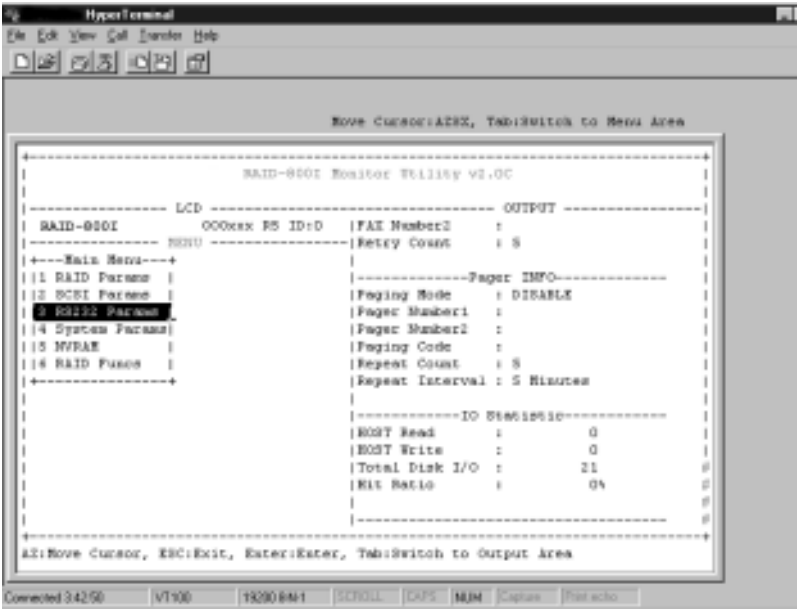


Figure 7-1: Selecting RS232 Params in Main Menu

2. In the RS232 Params menu, select Modem Port.

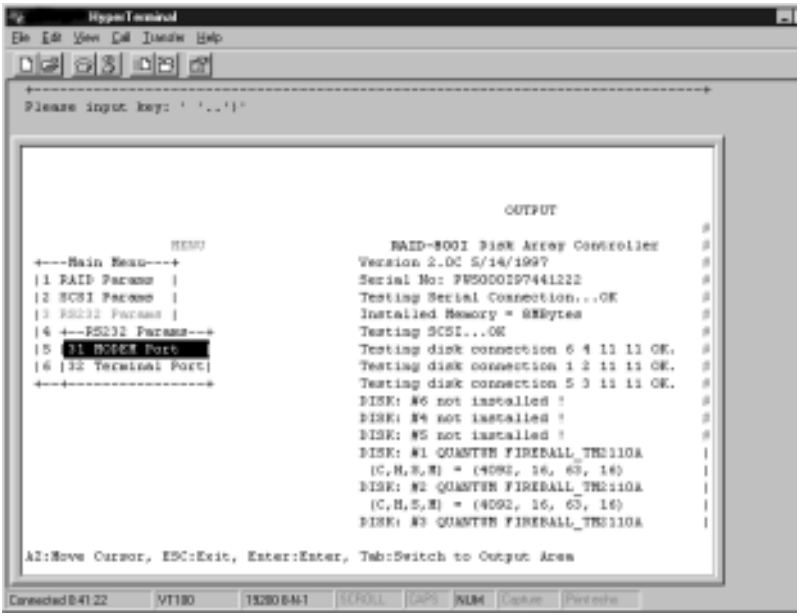


Figure 7-2: Selecting Modem Port in RS232 Params menu

3. In the Modem Port menu, select Baud Rate.

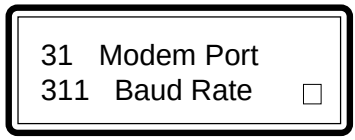


Figure 7-3: Selecting Baud Rate in Modem Port menu

4. In the Baud Rate menu, select the baud rate of the modem port.

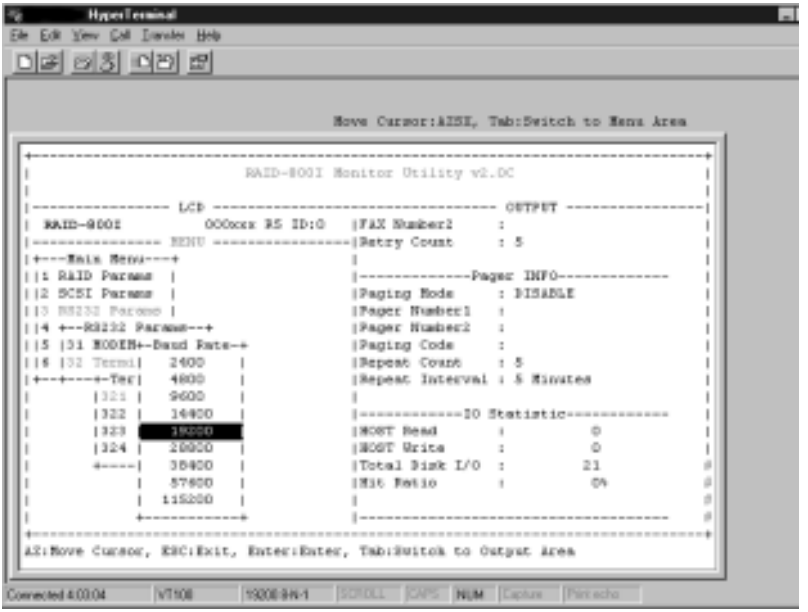


Figure 7-4: Selecting the modem baud rate in Baud Rate menu

5. You will return to the Modem Port menu. Select Stop Bit.

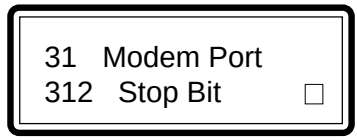


Figure 7-5: Selecting Stop Bit in Modem Port menu

6. In the Stop Bit menu, select the appropriate stop bit.

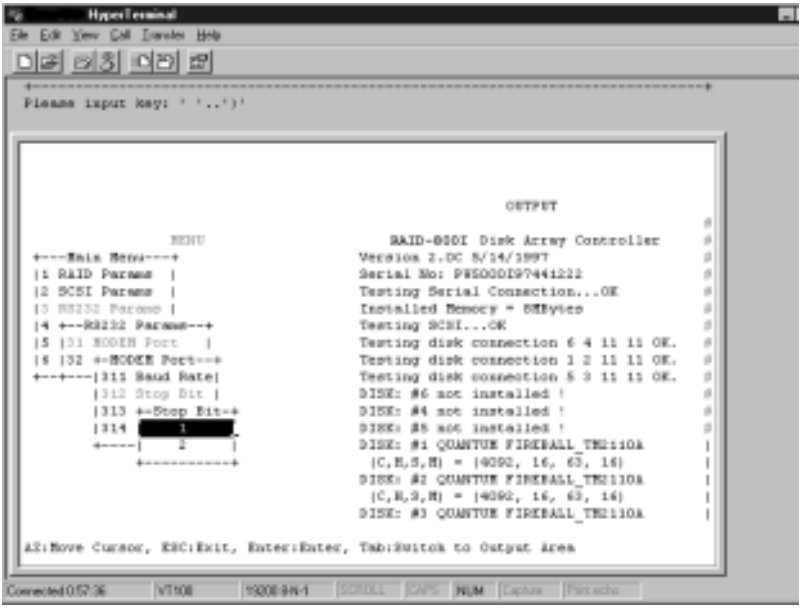


Figure 7-6: Selecting the appropriate stop bit in Stop Bit menu

7. You will return to the Modem Port menu. Select Data Bit.

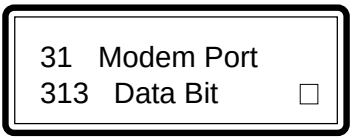


Figure 7-7: Selecting Data Bit in Modem Port menu

8. In the Data Bit menu, select the appropriate data bit.

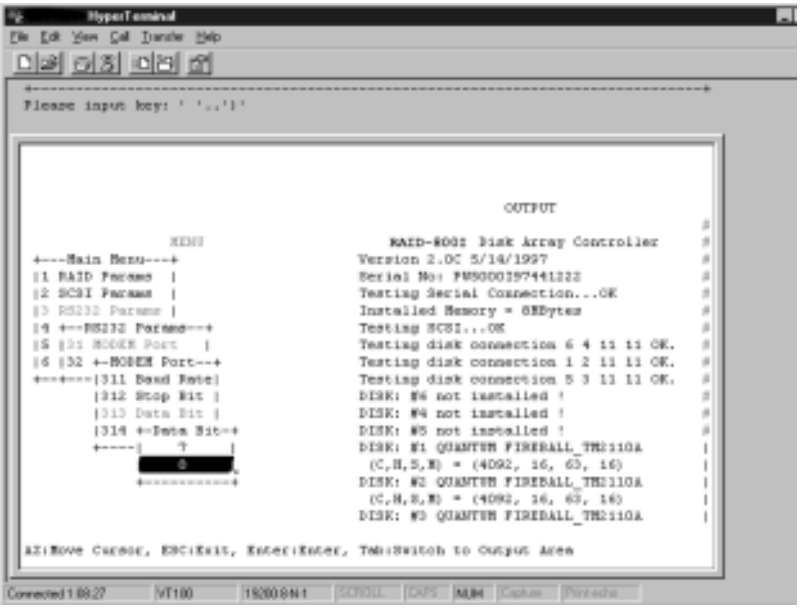


Figure 7-8: Selecting the appropriate data bit in Data Bit menu

9. You will return to the Modem Port menu. Select Parity.

Figure 7-9: Selecting Parity in Modem Port menu

10. In the Parity menu, select NONE, ODD, or EVEN. Then enter Update NVRAM to save this change.

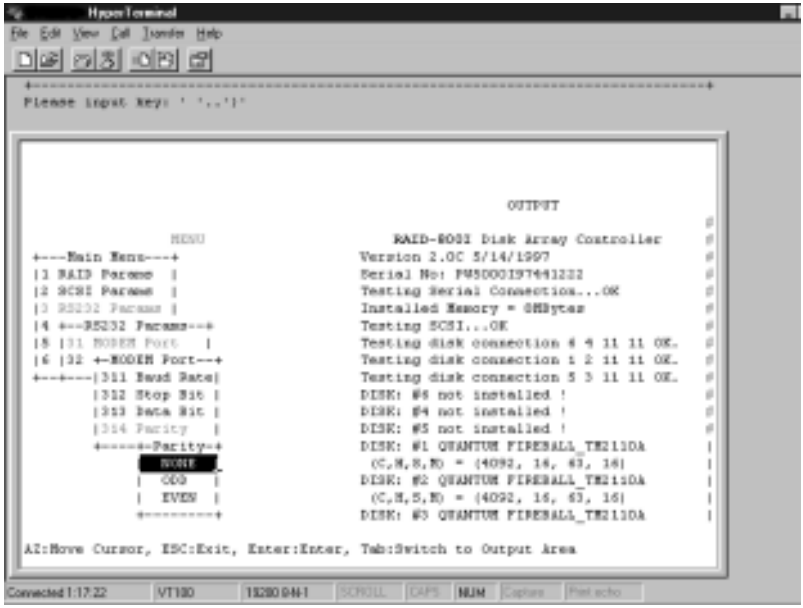


Figure 7-10: Selecting NONE, ODD, or EVEN in Parity menu

7.2 Configuring Your Pager

Your subsystem supports two pager numbers. In case a hard drive fails to function, your pager will “beep” you informing that a problem has arisen. You can set the number of times your pager will page you and the time interval between each page.

1. In the Main Menu, select System Params.

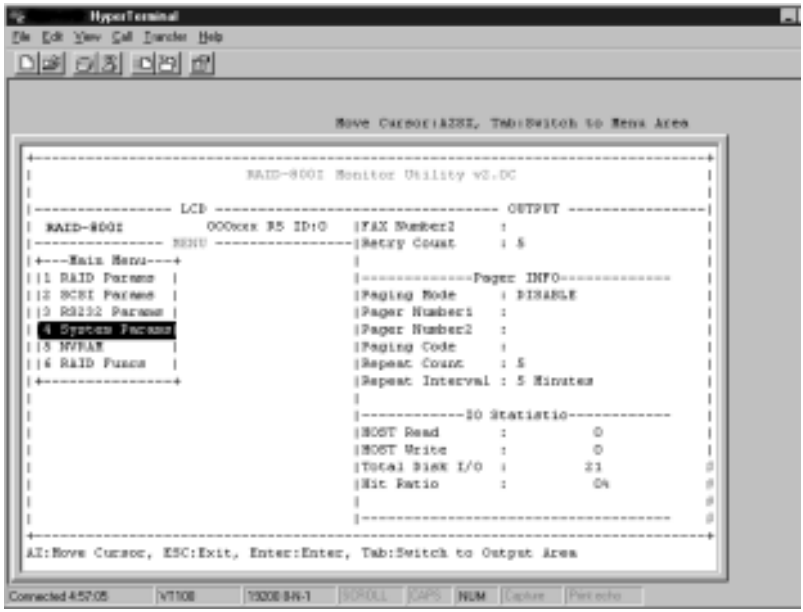


Figure 7-11: Selecting System Params in Main Menu

2. In the System Params menu, select Pager Info.

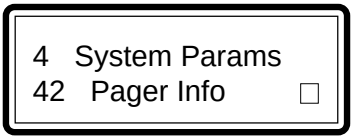
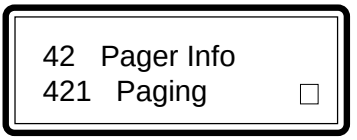


Figure 7-12: Selecting Pager Info in System Params menu

3. In the Pager Info menu, select Paging.



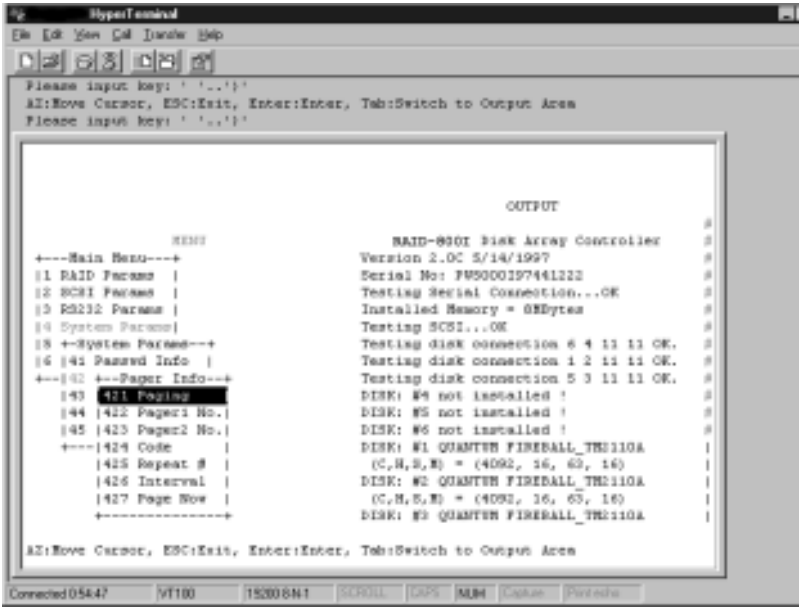
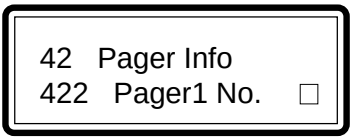


Figure 7-13: Selecting Paging in Pager Info menu

4. In the Paging menu, select ENABLE.

Figure 7-14: Selecting ENABLE in Paging menu

5. You will return to the Pager Info menu. Select Pager1 No.



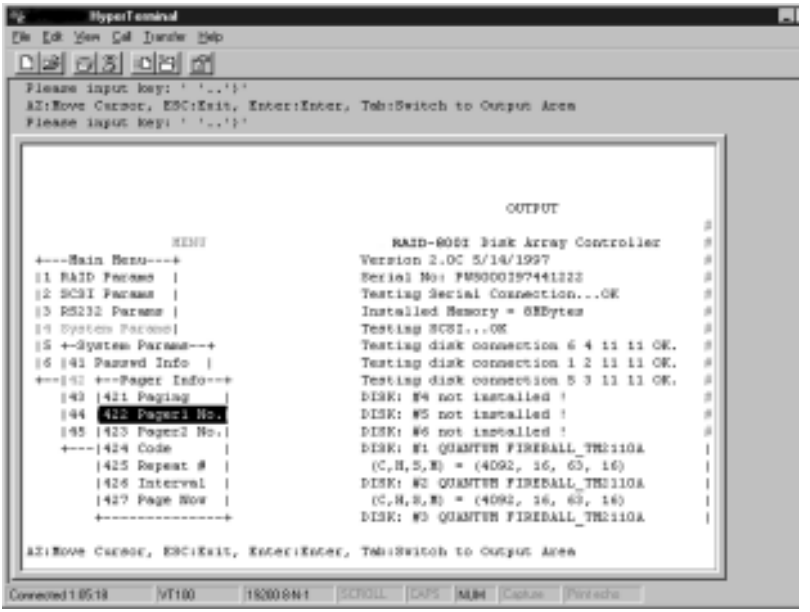


Figure 7-15: Selecting Pager1 No. in Pager Info menu

6. In the Pager1 No. menu, select Tel No.

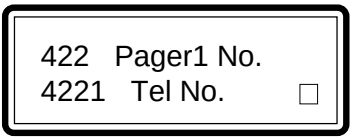


Figure 7-16: Selecting Tel No. in Pager1 No. menu

7. In the Tel No. menu, type in the pager number. You can enter a maximum of 16 characters.

Figure 7-17: Typing in the pager number in Tel No. menu

8. You will return to the Pager1 No. menu. Select Pin No.

422 Pager1 No.
4222 Pin No. □

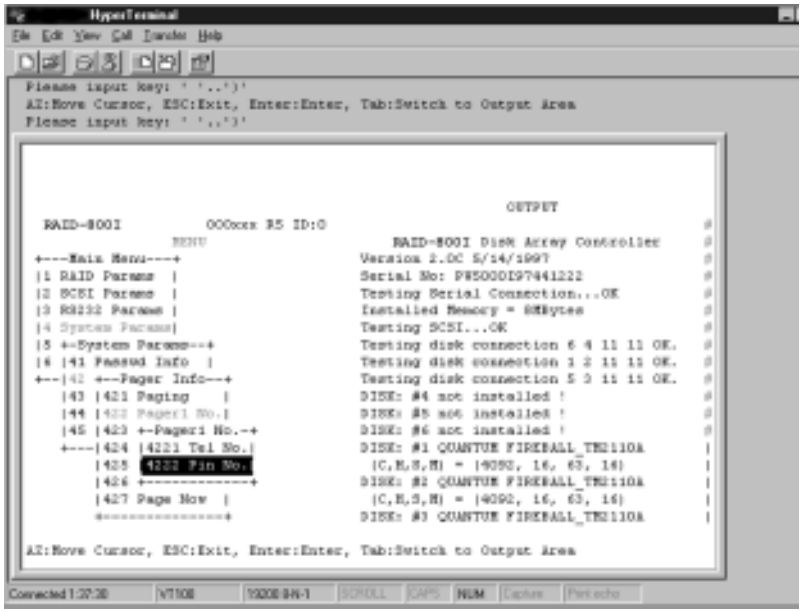
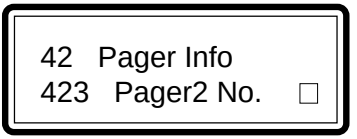


Figure 7-18: Selecting Pin No. in Pager1 No. menu

9. In the Pin No. menu, type in the pin number. You can enter a maximum of 16 characters.

Figure 7-19: Typing in the pin number in Pin No. menu

10. Press <Esc> to return to the Pager Info menu. If you wish to enter another pager number, select Pager2 No.



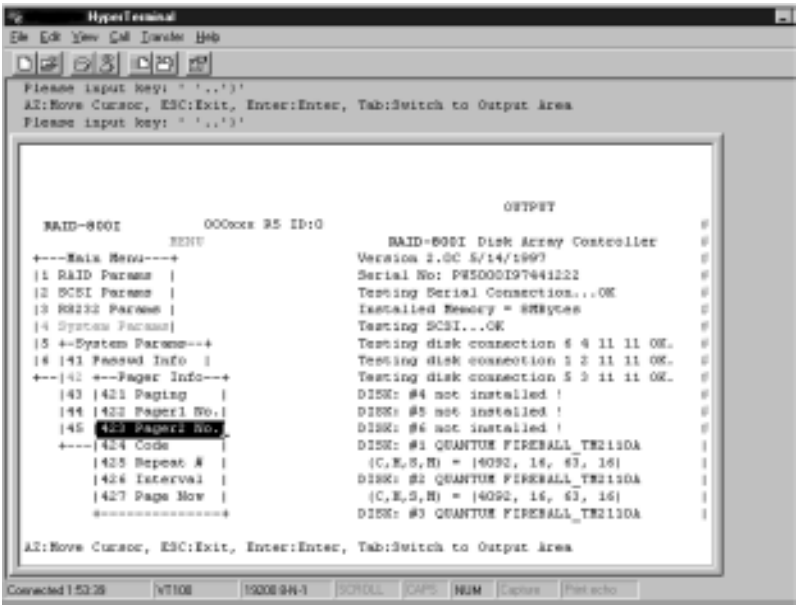
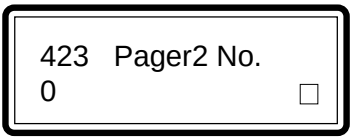


Figure 7-20: Selecting Pager2 No. in Pager Info menu

11. In the Pager2 No. menu, select Tel No.



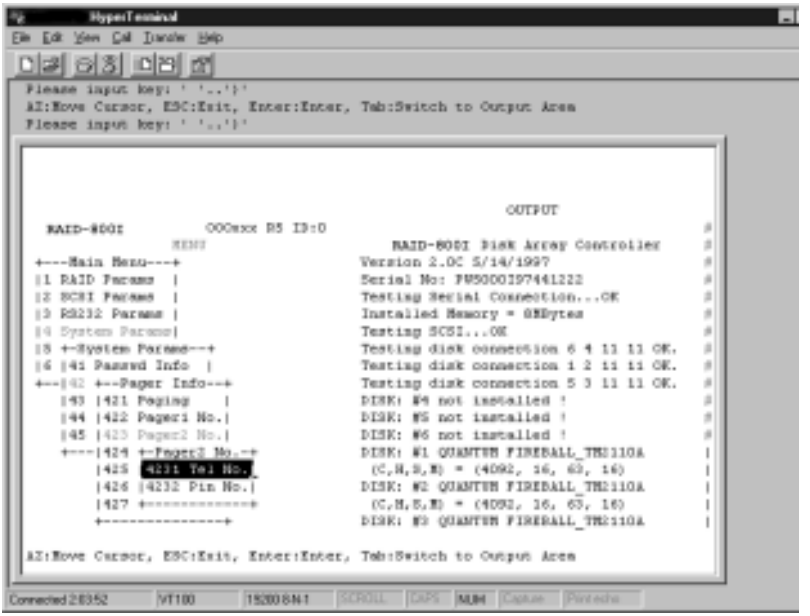


Figure 7-21: Selecting Tel No. in Pager2 No. menu

12. In the Tel No. menu, type in the pager number. You can enter a maximum of 16 characters.

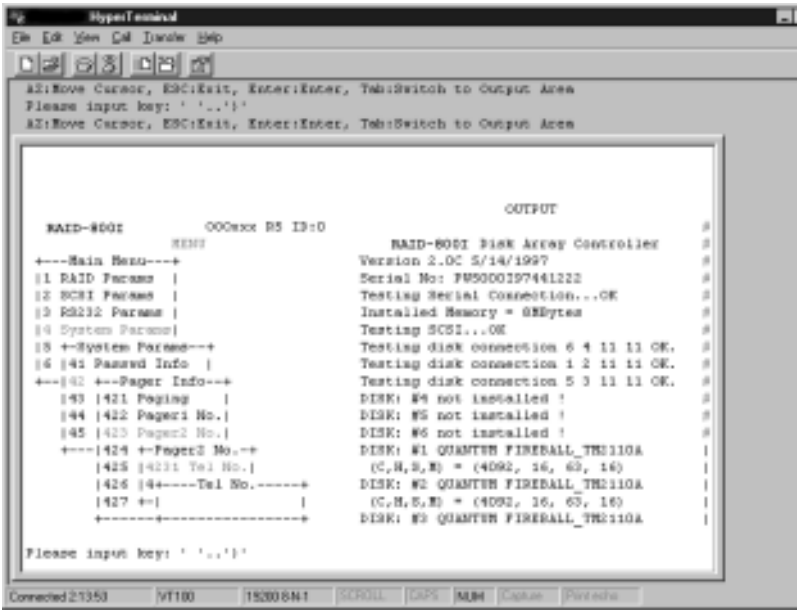


Figure 7-22: Typing in the pager number in Tel No. menu

13. You will return to the Pager2 No. menu. Select Pin No.

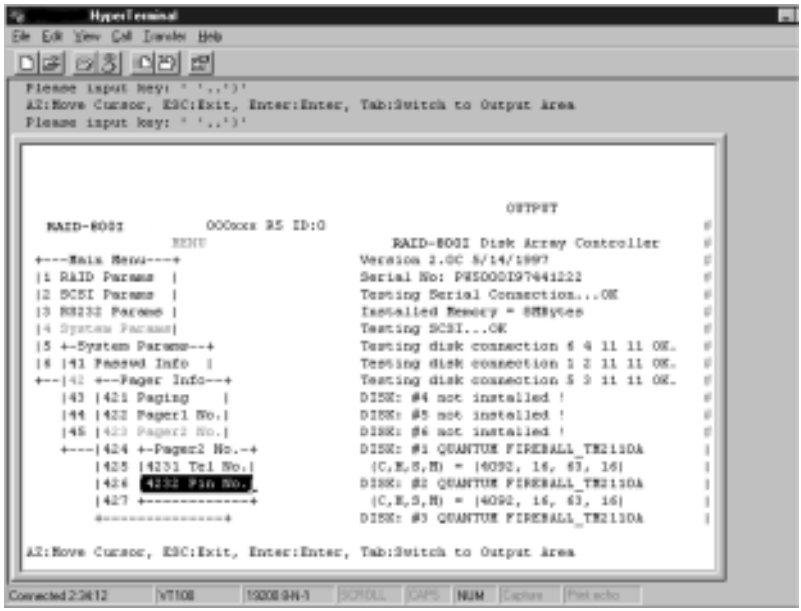
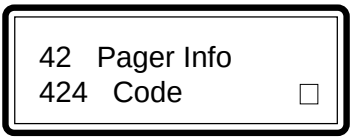


Figure 7-23: Selecting Pin No. in Pager2 No. menu

14. In the Pin No. menu, type in the pin number. You can enter a maximum of 16 characters.

Figure 7-24: Typing in the pin number in Pin No. menu

15. Press <Esc> to return to the Pager Info menu. Select Code.



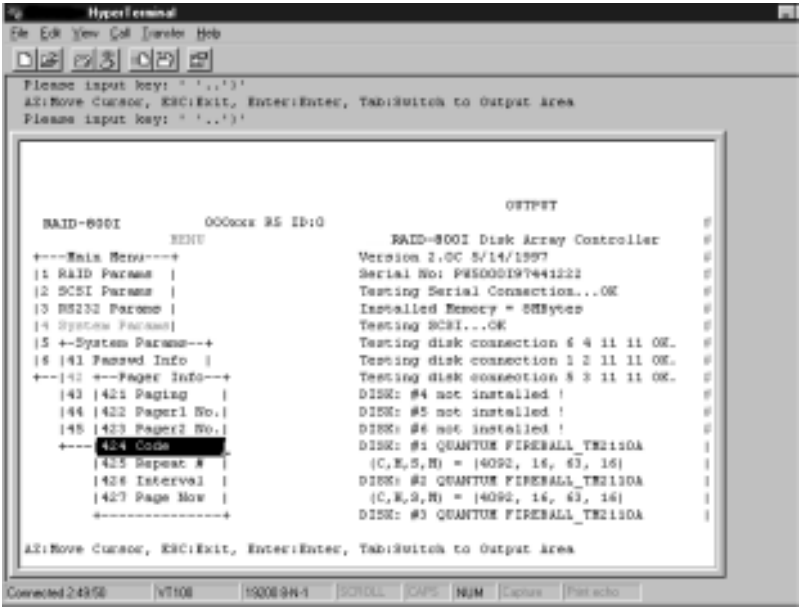
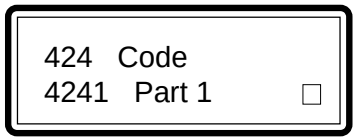


Figure 7-25: Selecting Code in Pager Info menu

16. The Code menu allows you to enter 2 messages. To enter the first message, select Part 1.



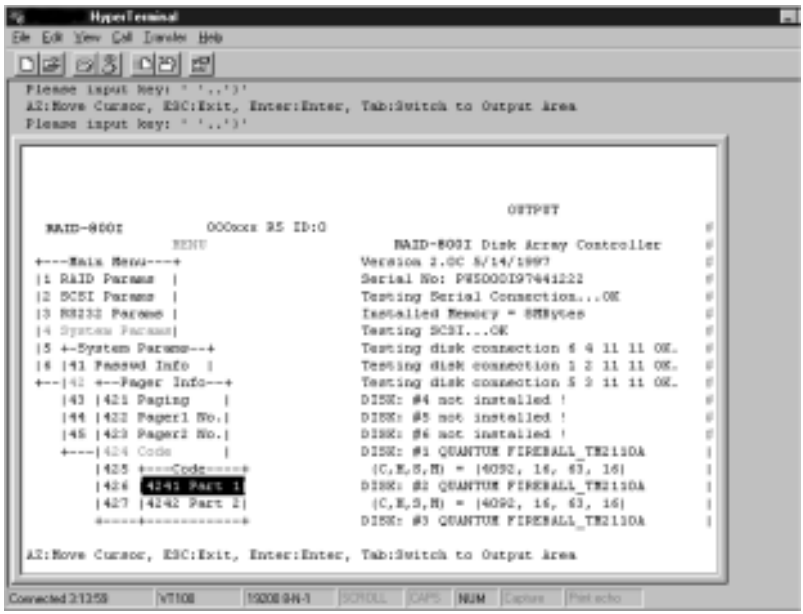


Figure 7-26: Selecting Part 1 in Code menu

17. In the Part 1 menu, type in your message (code) by entering a maximum of 16 alphanumeric characters.

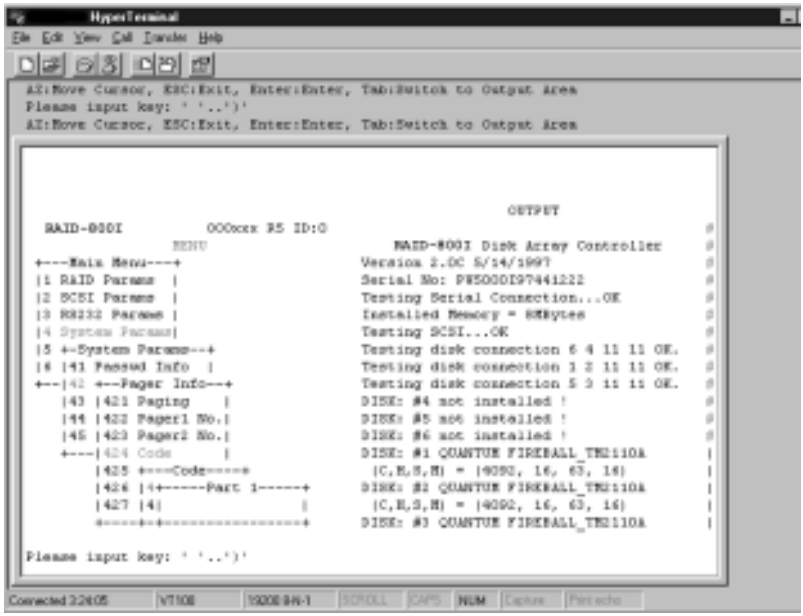
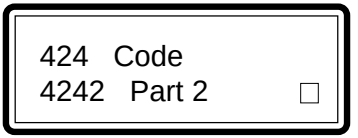


Figure 7-27: Entering first message in Part 1 menu

18. You will return to the Code menu. If you wish to enter a second message, select Part 2.



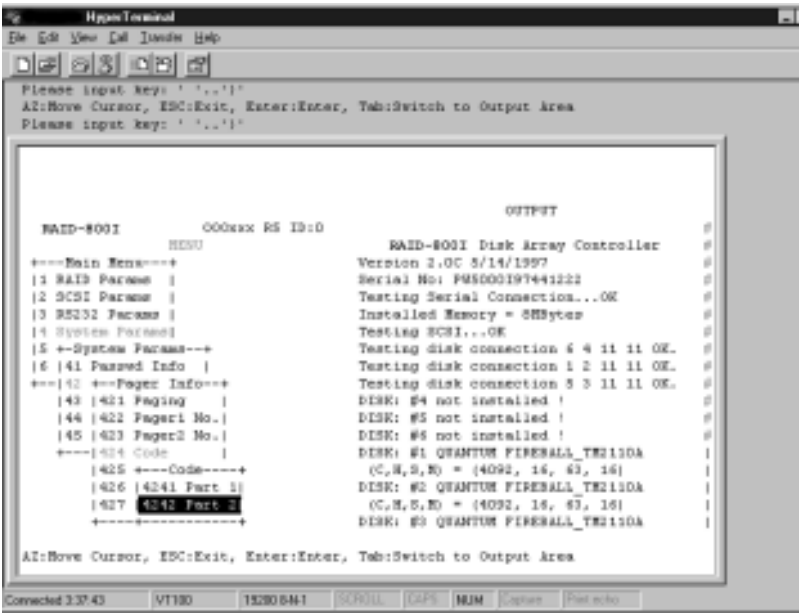
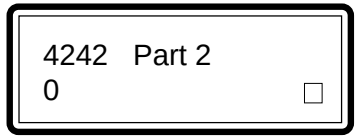


Figure 7-28: Selecting Part 2 in Code menu

19. In the Part 2 menu, type in your message (code) by entering a maximum of 16 alphanumeric characters.



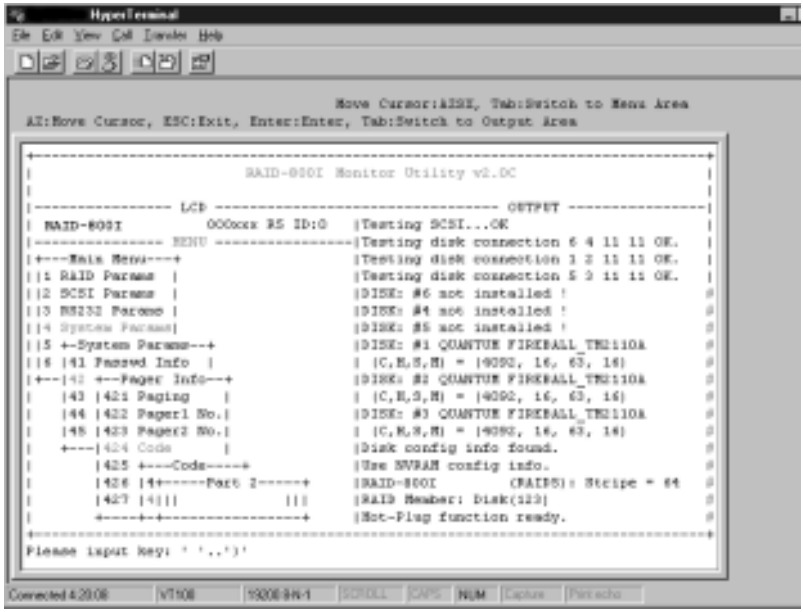
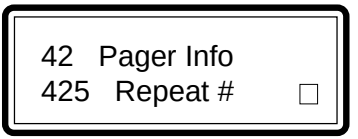


Figure 7-29: Entering second message in Part 2 menu

20. Press <Esc> to return to the Pager Info menu. Select Repeat #.



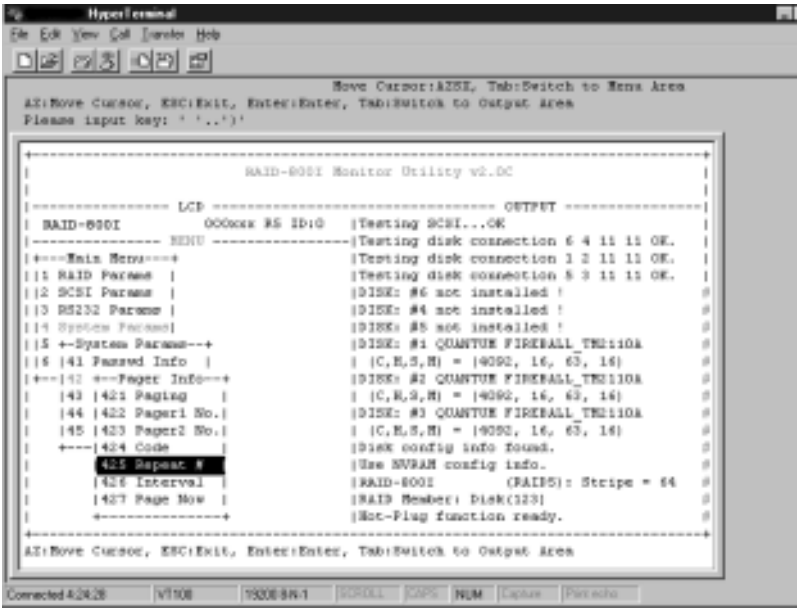


Figure 7-30: Selecting Repeat # in Pager Info menu

21. In the Repeat # menu, select the number of times you would like the pager to re-dial the number.

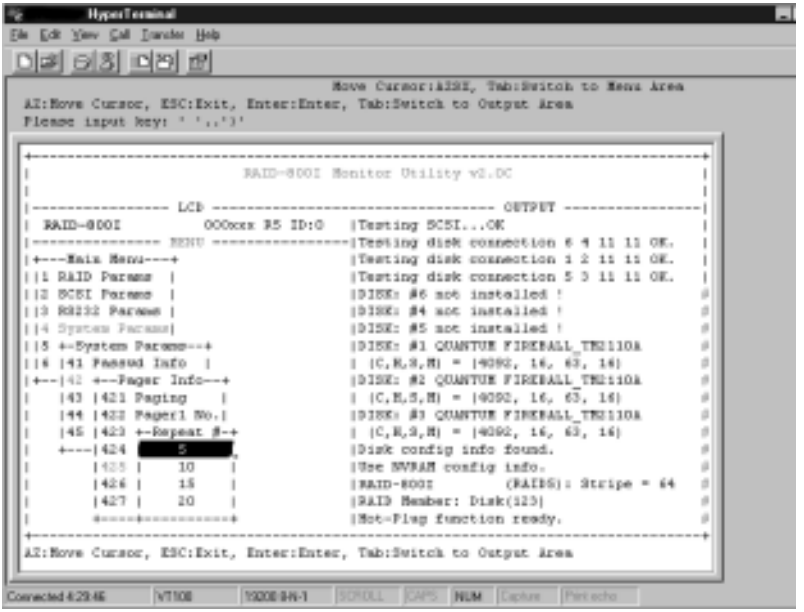
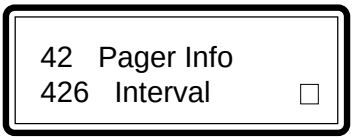


Figure 7-31: Selecting number of pager re-dials, in Repeat # menu

22. You will return to the Pager Info menu. Select Interval.



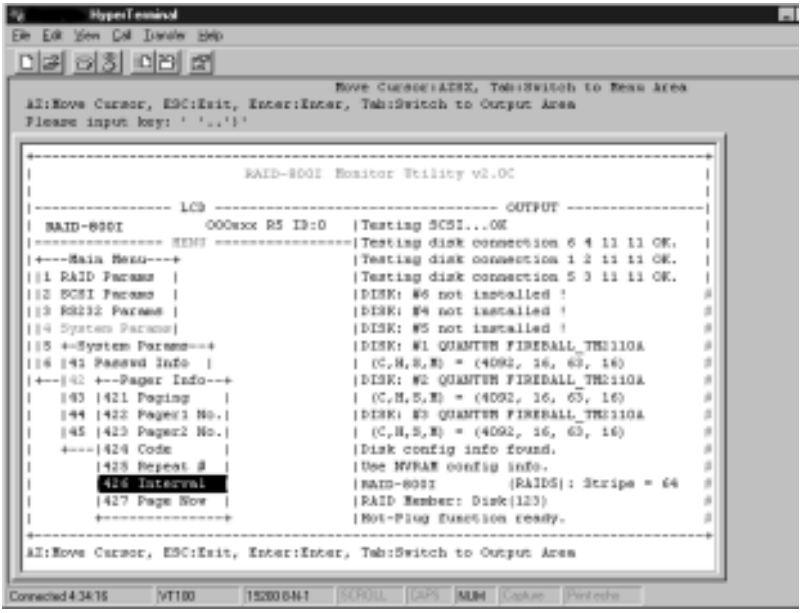


Figure 7-32: Selecting Interval in Pager Info menu

23. In the Interval menu, select the time interval (in minutes) between each page.

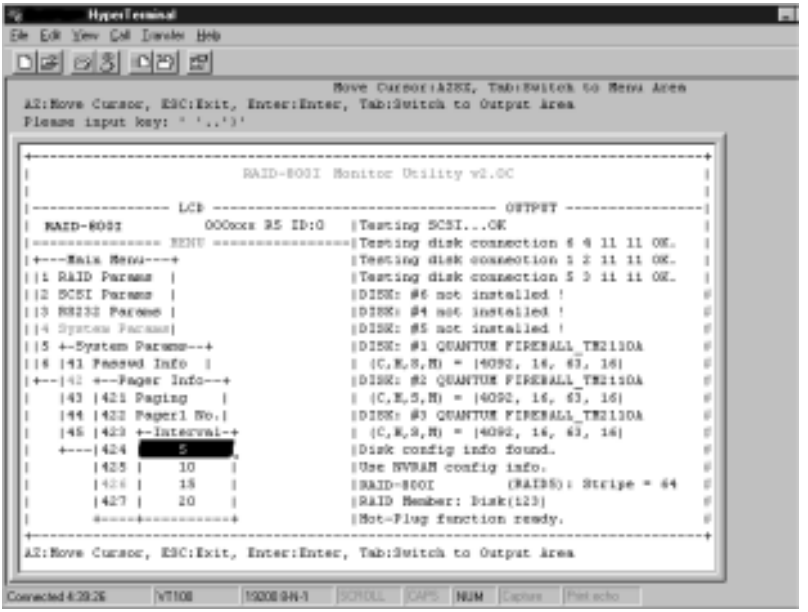


Figure 7-33: Selecting time interval between pager re-dials, in Interval menu

24. You will return to the Pager Info menu. Select Page Now. This is to check that your page number is correct and that your pager is working normally.

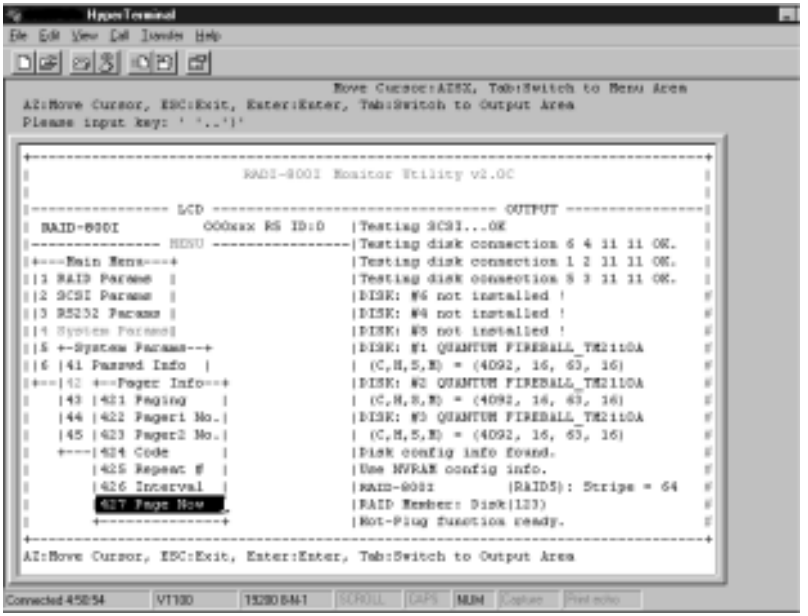


Figure 7-34: Selecting Page Now in Pager Info menu

7.3 Configuring Your Fax

Your subsystem supports two fax numbers. In case a hard drive fails to function, a message will be transmitted to your fax machine informing you that a problem has arisen. You can set the number of times it will retry, in case the line is busy.

1. In the Main Menu, select System Params.

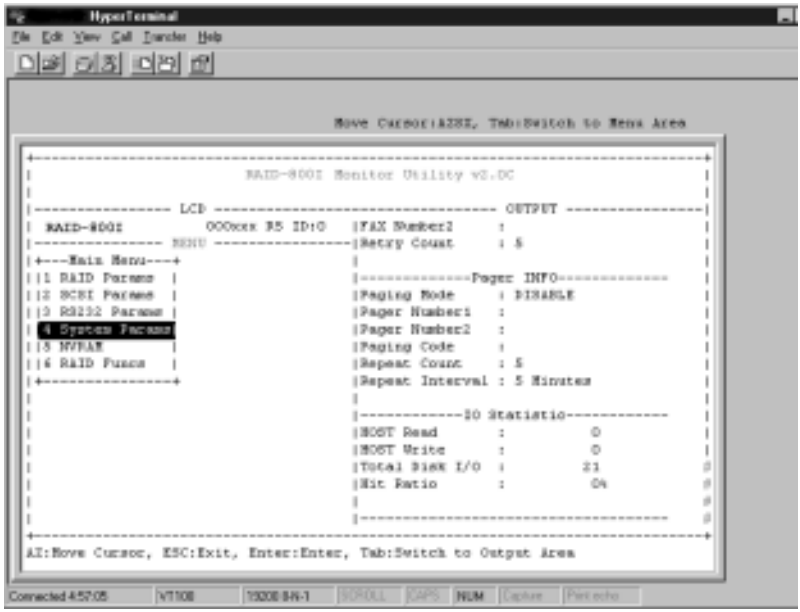
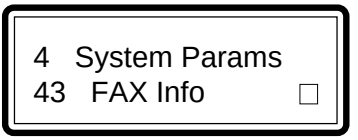


Figure 7-35: Selecting System Params in Main Menu

2. In the System Params menu, select FAX Info.



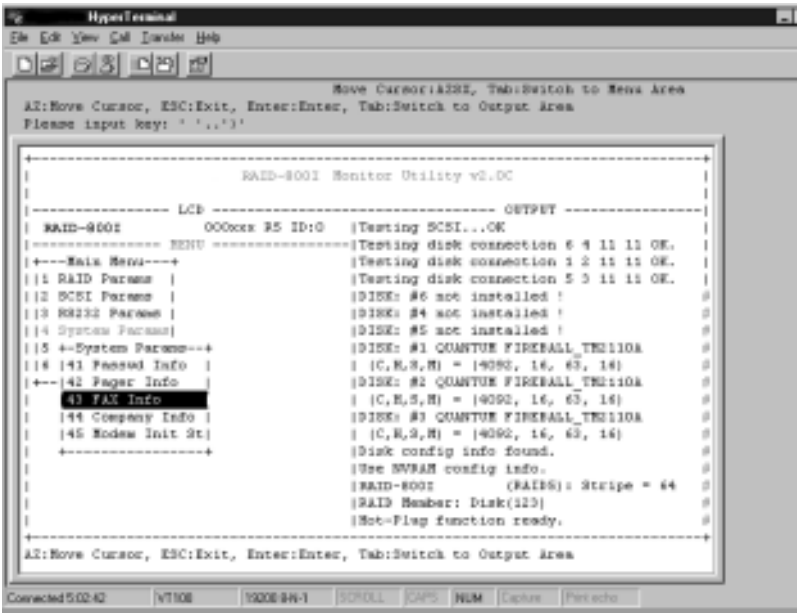


Figure 7-36: Selecting FAX Info in System Params menu

3. In the FAX Info menu, select FAX.

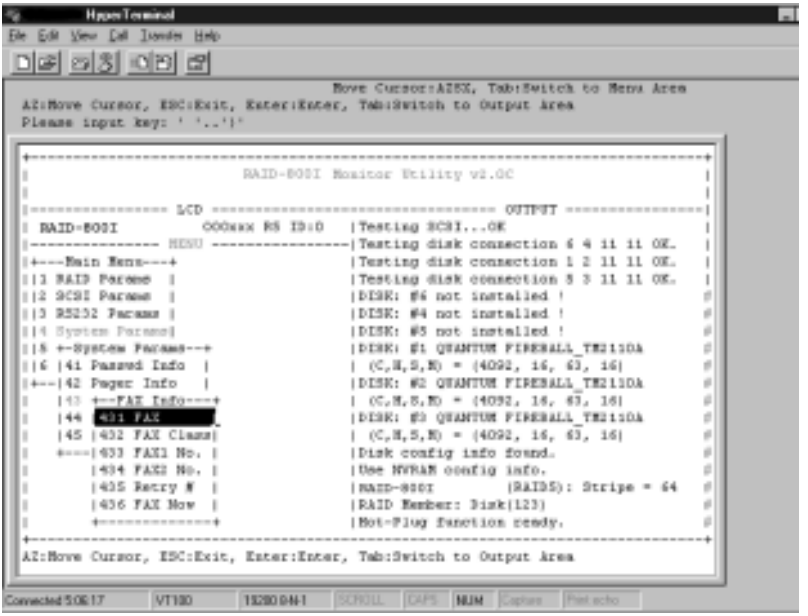


Figure 7-37: Selecting FAX in FAX Info menu

4. In the FAX menu, select ENABLE.

Figure 7-38: Selecting ENABLE in FAX menu

5. You will return to the FAX Info menu. Select FAX1 No.

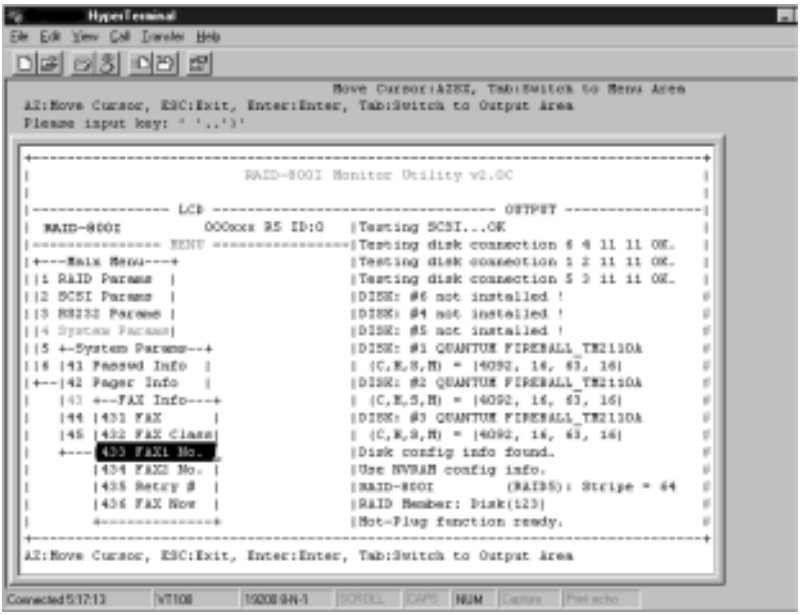
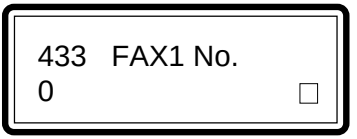


Figure 7-39: Selecting FAX1 No. in FAX Info menu

6. In the FAX1 No. menu, type in the fax number. You can enter a maximum of 16 characters.



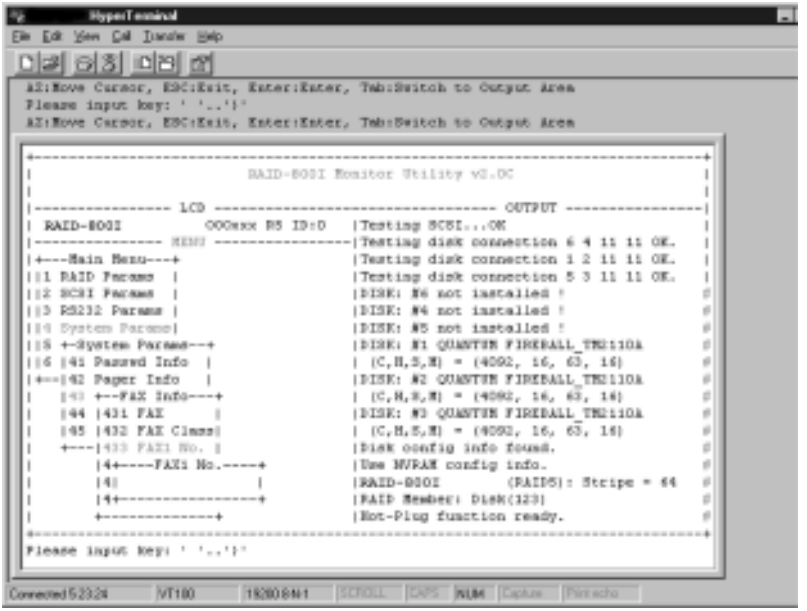


Figure 7-40: Typing in the fax number in FAX1 No. menu

7. You will return to the FAX Info menu. If you wish to enter another fax number, select FAX2 No.

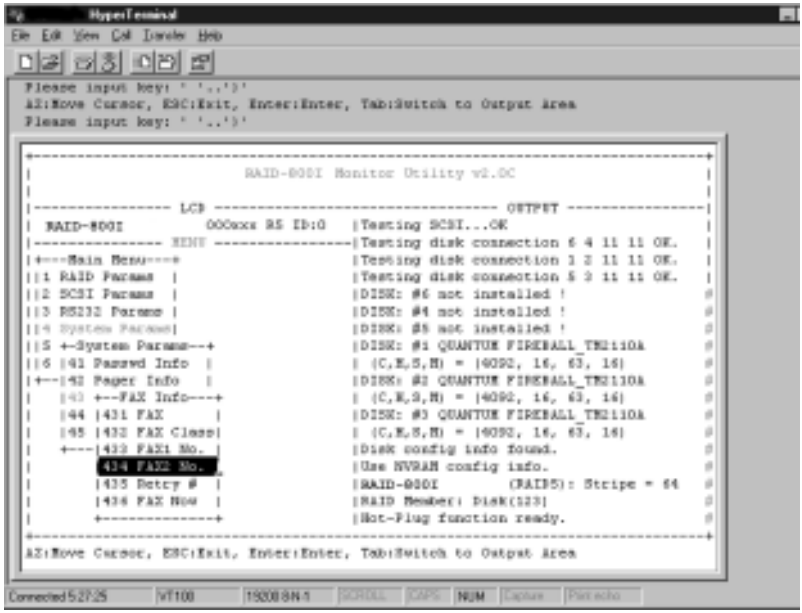
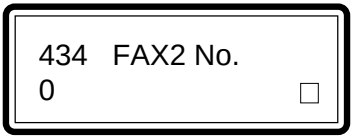


Figure 7-41: Selecting FAX2 No. in FAX Info menu

8. In the FAX2 No. menu, type in the fax number. You can enter a maximum of 16 characters.



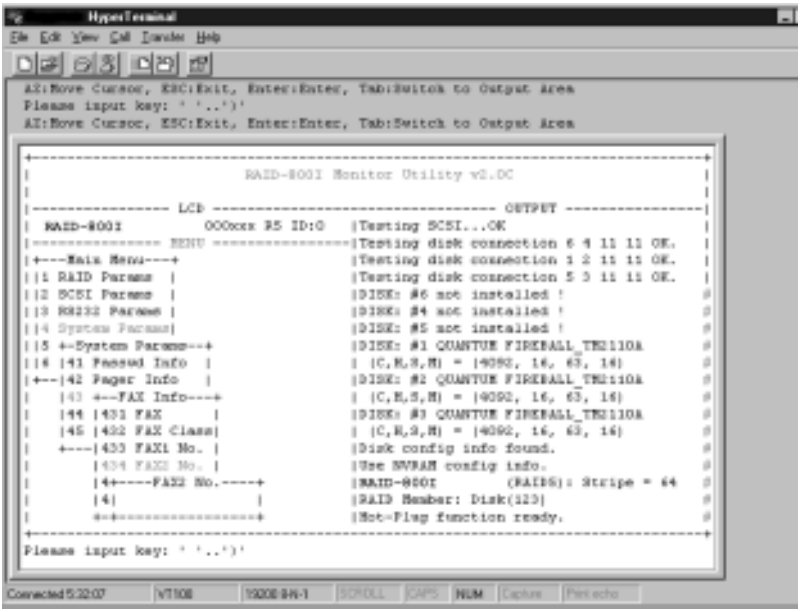


Figure 7-42: Typing in the fax number in FAX2 No. menu

9. You will return to the FAX Info menu. Select Retry #.

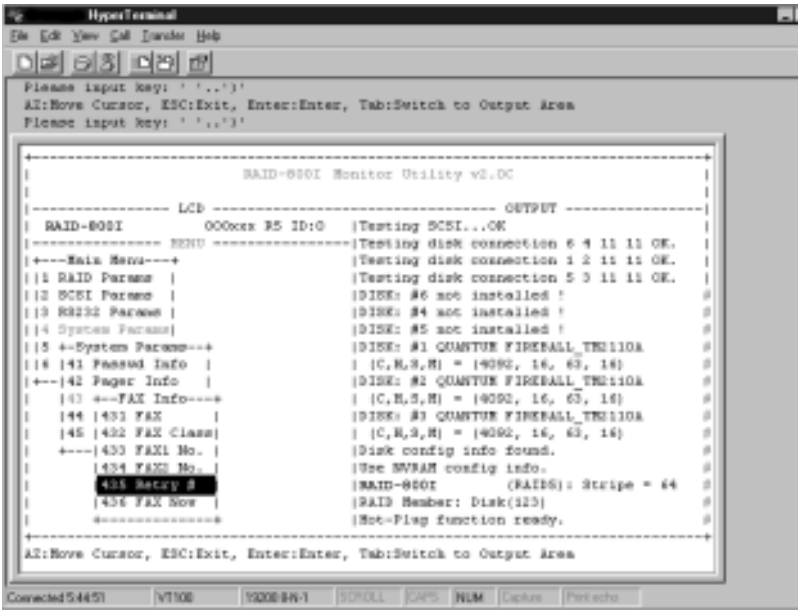


Figure 7-43: Selecting Retry # in FAX Info menu

10. In the Retry # menu, select the number of times you would like to retry transmitting the fax.

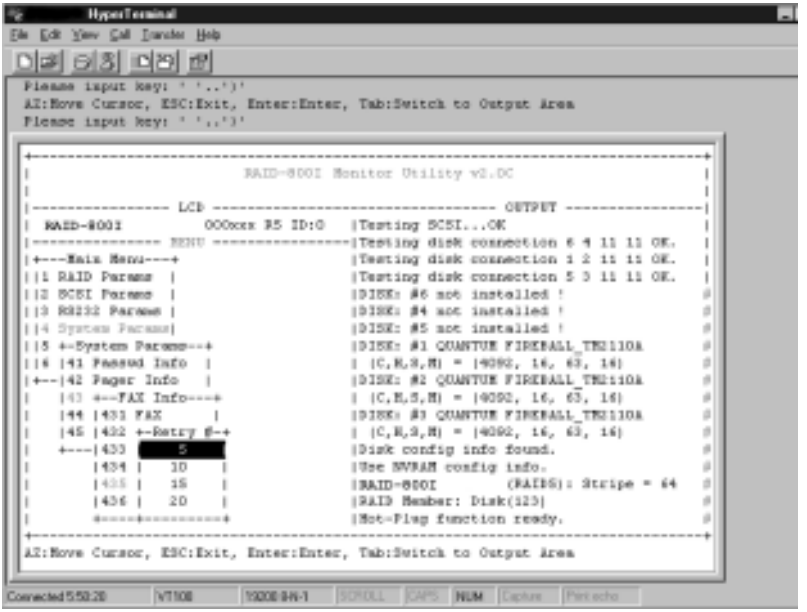


Figure 7-44: Selecting number of fax transmission retries, in Retry # menu

11. You will return to the FAX Info menu. Select FAX Now. This is to check that the fax number is correct and that the fax machine is working normally.

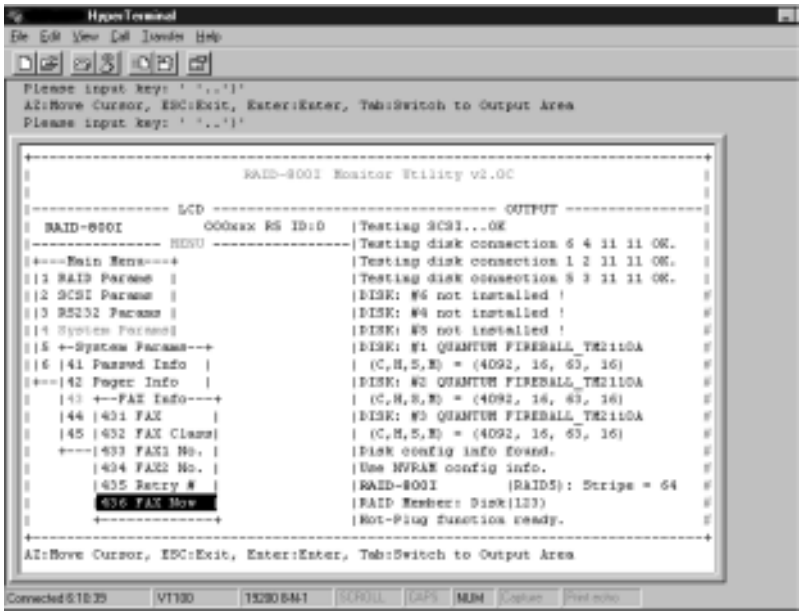


Figure 7-45: Selecting FAX Now in Fax Info menu

12. You will return to the System Params menu. Select Company Info.

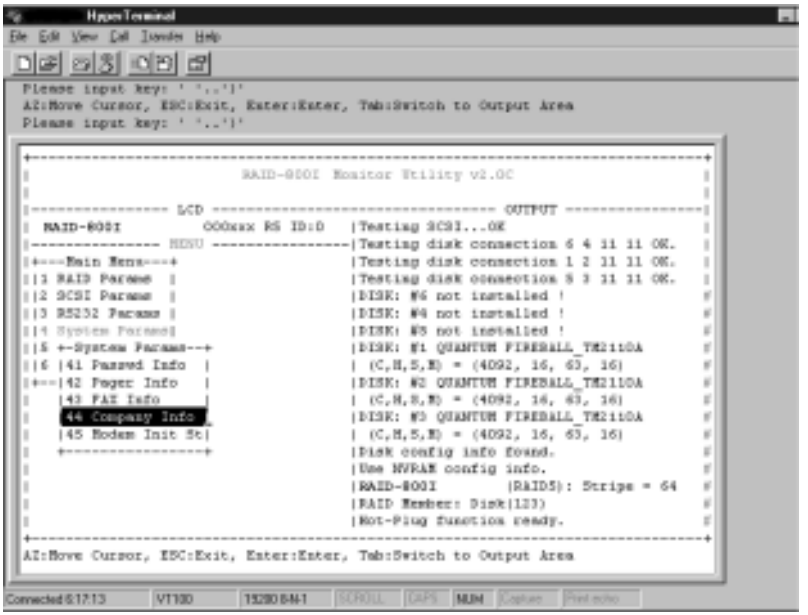
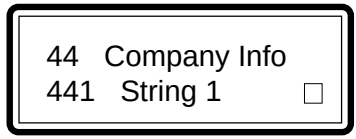


Figure 7-46: Selecting Company Info in System Params menu

13. The Company Info menu allows you to enter 2 sets of company information. To enter the first set of company information, select String 1.



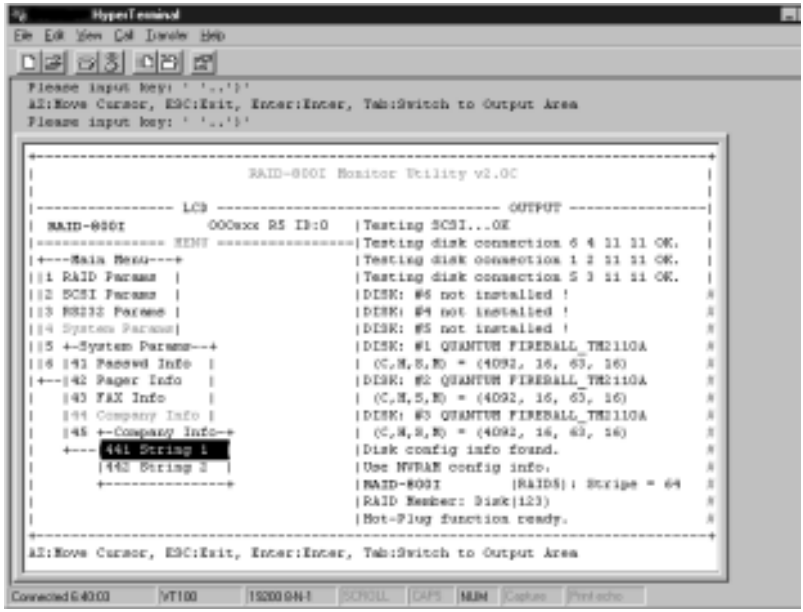
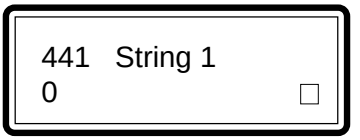


Figure 7-47: Selecting String 1 in Company Info menu

14. In the String 1 menu, enter the company information.



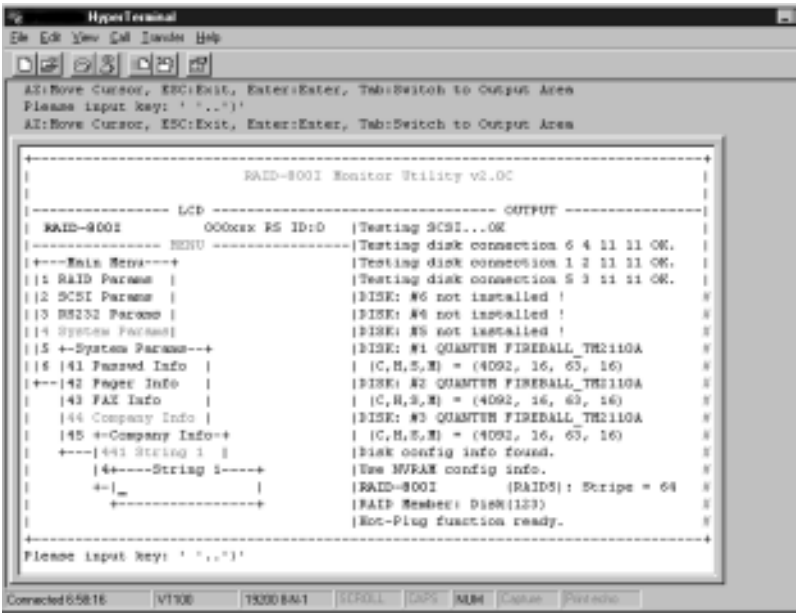
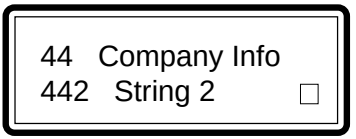


Figure 7-48: Entering the company information in String 1 menu

15. You will return to the Company Info menu. To enter the second set of company information, select String 2.



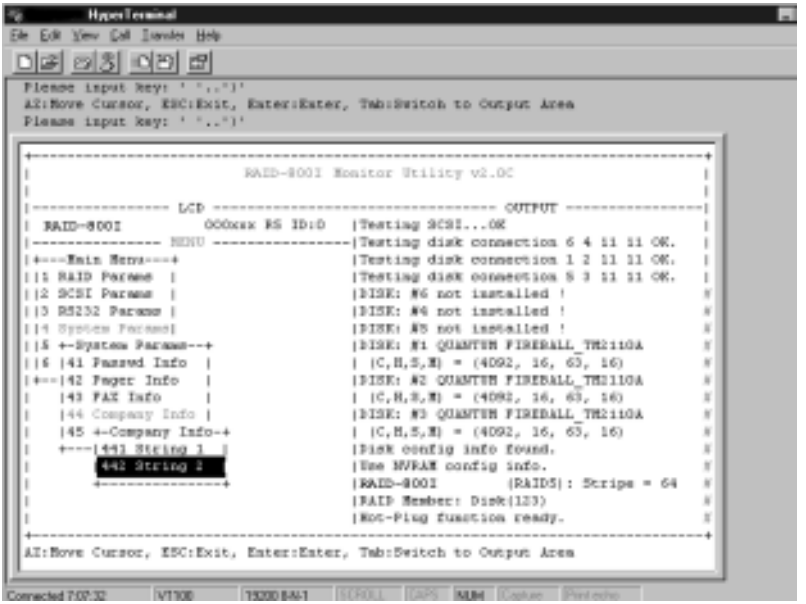
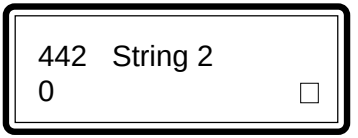


Figure 7-49: Selecting String 2 in Company Info menu

16. In the String 2 menu, enter the company information.



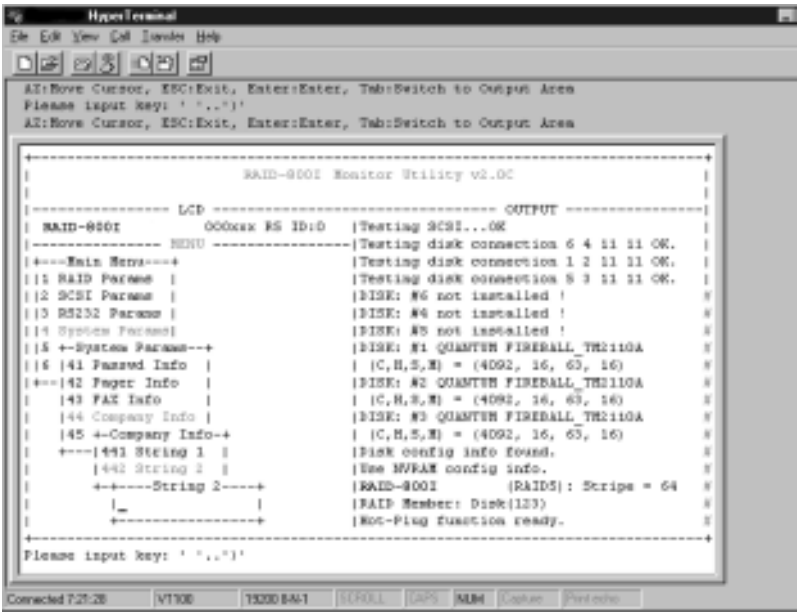


Figure 7-50: Entering the company information in String 2 menu

CHAPTER 8

Upgrading Your Firmware

The RAID-800I series subsystem allows you to upgrade your firmware. You may download the latest firmware from Advantech's web site. The address is: **http:/www.advantech.com**

Upgrading Your Firmware

The RAID-800I series subsystem allows you to upgrade your firmware. You may download the latest firmware from Advantech's's web site. The address is: **www.advantech.com**

To upgrade your firmware, follow the steps below:

1. In the Main Menu, select RAID Funcs.

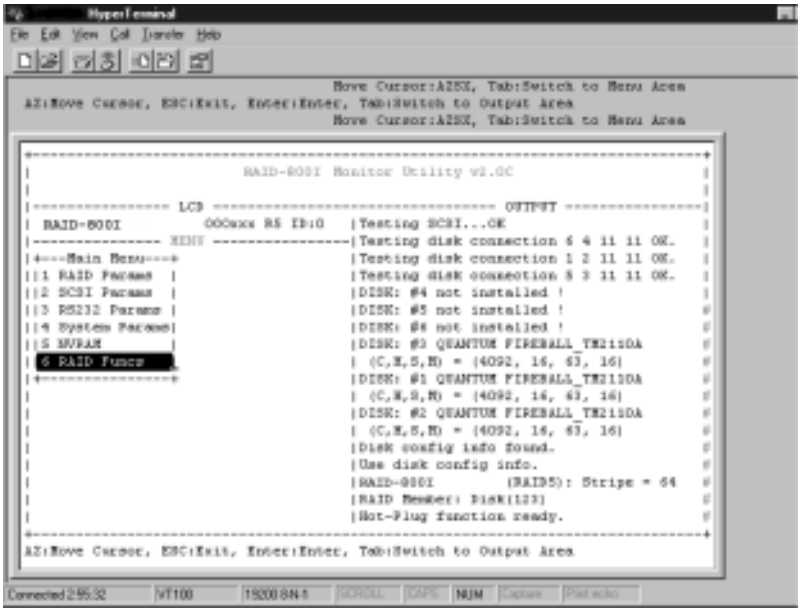


Figure 8-1: Selecting RAID Funcs in Main Menu

2. In the RAID Funcs menu, select Update ROM and press <Enter>.

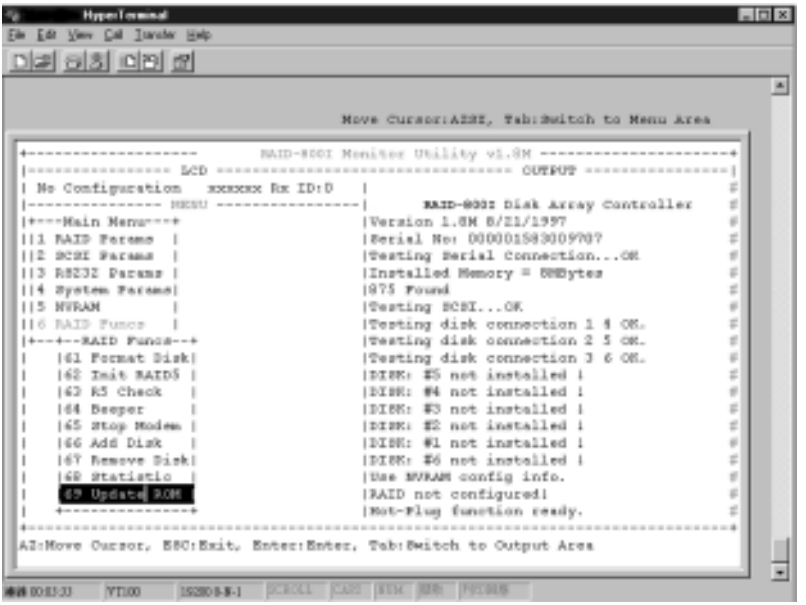


Figure 8-2: Selecting Update ROM in RAID Funcs menu

3. The screen shown below will appear.

Figure 8-3: Display after selecting Update ROM

4. Type <Y>. The following screen will appear.

Figure 8-4: Display after selecting Y for "ready to download"

5. Type <Y>. In the menu bar, select Transfer Menu.

6. The Transfer scroll-down menu will appear. Select Send Text File. The Send Text File dialog box will appear. Select the drive and file where the new firmware is to be located and click Open. If file transferring is taking place, your screen should look like the one shown below:

Figure 8-5: File transfer display

7. After the file has been completely transmitted, type <Go>.

Figure 8-6: Display after file transfer has been completed

8. You will be asked to reconfirm. Type <Go> again.

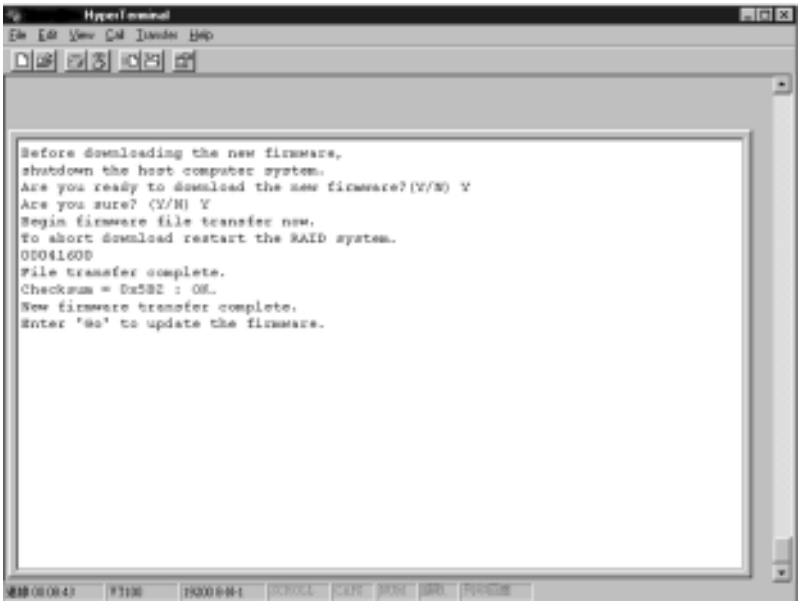


Figure 8-7: Display requesting reconfirmation of file transfer

9. The controller will restart.

CHAPTER 9

Ultra Wide SCSI

- Introduction
- Front and Rear Panels
- RAID Disk Array Controller

9.1 Introduction

Your RAID-800I Ultra Wide SCSI subsystem allows a very fast (40 Mbps) transfer rate using a 16-bit SCSI bus. This provides faster data input and output.

9.2 Front and Rear Panels

The rear panel of an Ultra Wide SCSI subsystem is shown below.

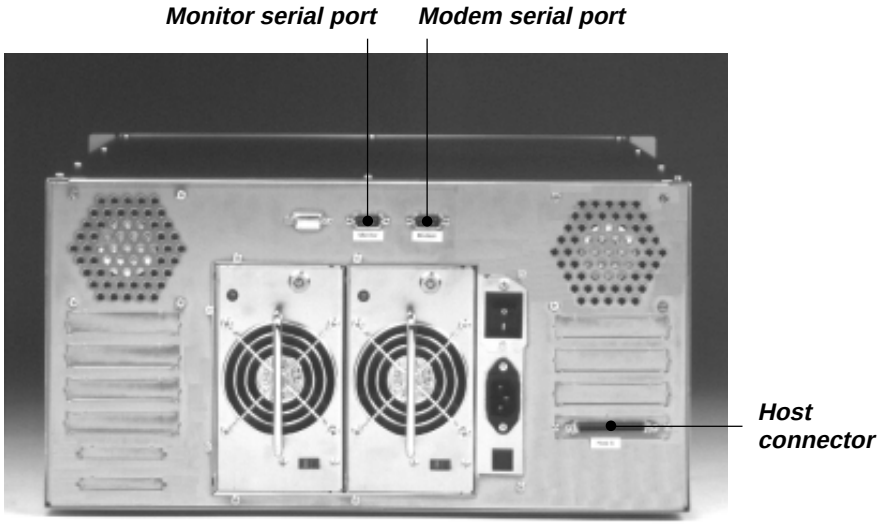


Figure 9-1: Rear panel of an Ultra Wide SCSI subsystem

9.3 RAID Disk Array Controller

The rear panel of the controller is illustrated below:

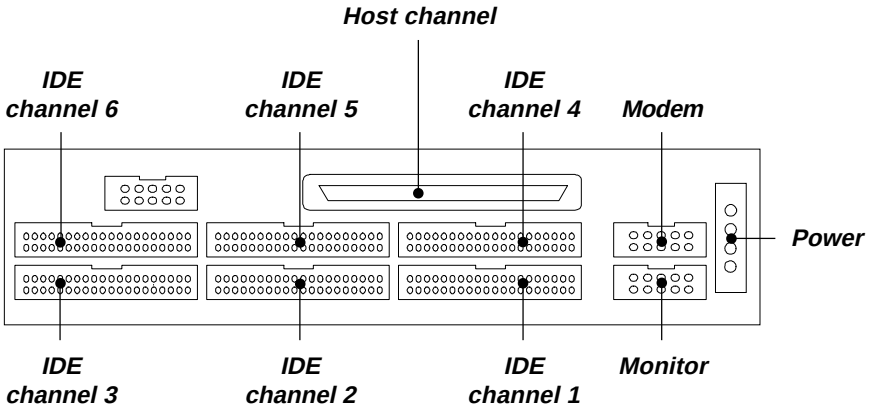


Figure 9-2: Rear panel of RAID disk array controller

APPENDIX A

RAID Levels

The RAID-800I subsystem supports RAID levels 0, 1, 0+1, and 5. This appendix describes each of these levels.

- RAID 0 (Striping)
- RAID 1 (Mirroring)
- RAID 0+1 (Striping and Mirroring)
- RAID 5 (Striping with Parity)

A.1 RAID 0 (Striping)

Striping refers to the storing of a sequential block of incoming data across multiple drives in a drive group. This is the striping technique. If there are three drives in a drive group, the data will be separated into blocks. Block one of the data will be stored on drive one, block two on drive two and block three on drive three. Drive one will again be the location of the next block (block four). Then block five is stored on drive two, block six on drive three, and so on. This method can significantly increase disk system throughput, particularly for transferring large, sequential data blocks.

A.2 RAID 1 (Mirroring)

Mirroring refers to the 100% duplication of data from one disk drive onto another. Each disk contains a mirror image of the data on the other drive.

A.3 RAID 0+1 (Striping and Mirroring)

A.4 RAID 5 (Striping with Parity)

Striping with parity is a method of providing complete data redundancy. For storing redundant information, striping with parity requires only a fraction of the storage capacity which mirroring requires.

In a system configured under RAID 5 (which requires at least three SCSI drives), all data and parity blocks are divided between the drives in such a way that if any single drive is removed (or fails), the data on the missing drive can be reconstructed using the data on the remaining drives.

APPENDIX B

Technical Specifications

Table B-1: Array controller technical specifications	
Form factor	5¼" half-height
RAID processor	486DX
RAID level	0, 1, 0+1, 5
Cache memory	8 ~ 128 MB
No. of channels (host + disk)	1 + 6
No. of disk	6
Maximum storage	30 ~ 100 GB
Host bus interface	Ultra Wide
Disk bus interface	EIDE
Data transfer	Up to 40 MB
MTBF (hrs)	>100,000

Table B-2: Configuration technical specifications	
Hot swap disk bays	6
Hot swap power supply	2
Hot swap cooling fan	2
DB-9 type RS232 port	2 (modem and monitor port)
Security lock	Yes
Audible alarm	Yes
Fax notification	Yes (2 fax numbers)
Pager notification	Yes (2 pager numbers)

APPENDIX C

RAID Controller's Error Messages

This appendix explains four error messages which may appear on the controller's LCD screen.

RAID Controller's Error Messages

Error Message	Description
FAIL Fan	The subsystem's Fan 1 or Fan 2 has failed.
FAIL Power	The subsystem's Power 1 or Power 2 has failed.
HOST CHAN FAIL	The RAID controller's host channel has failed.
DISK CHAN FAIL	The RAID controller's device channel has failed.

APPENDIX D

Mapping Between the LUN of a Host Channel and the Slice of an Array

This appendix explains the relationship between LUNs and slices, and provides a useful example.

Mapping Principles

1. There is one host channel connected to the RAID disk array subsystem. This channel can be connected to an external host computer via the Ultra Wide SCSI interface.
2. The host channel can be assigned eight LUNs (Logical Unit Numbers), LUN0 to LUN7. Each LUN represents a different application program on the same host.
3. All hard drives can include eight slices, Slice0 to Slice7. A "slice" is just the same concept as a "partition" of a group of hard disk drives. Each LUN on the host channel should be mapped to a slice on the group of hard drives.
4. In the example in the following figure, 4 x 4 GB HDDs are installed in a RAID-800I, and are configured as a Level 5 array. The total available disk capacity will be 12 GB ((4-1)*4 GB). If we want to distribute 4 GB to Slice1, and 8 GB to Slice2, then LUN0 (AP1) on the host channel is mapped to Slice2 of the disk array, while LUN1 (AP2) on the host channel is mapped to Slice1 of the disk array. Thus the two APs on the same host use different slices of the same RAID level. This is equivalent to the host owning two completely independent hard disk drives (say, C: and D:).

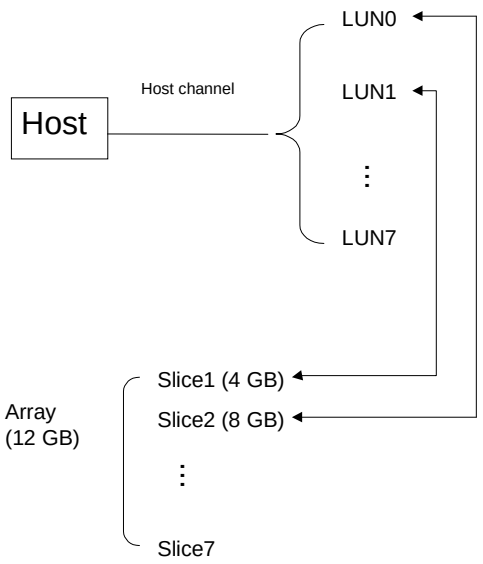


Figure D-1: Example of mapping between the LUN of a host channel and the slice of an array

APPENDIX E

Frequently Asked Questions

This appendix provides answers to a variety of questions commonly asked about the RAID-800I subsystem.

Frequently Asked Questions

Q: Can cache memory be expanded by the end user?

A: Since a post-testing procedure is necessary after expanding cache memory, it is recommended that expansion be performed by AD-VANTECH.

Q: If fan/power failure occurs, will the system page/fax out an alarm message?

A: NO! The system can page/fax out an alarm message only if the hard disk drive fails, and only if such alarm has been enabled during the initial setup procedure.

Q: Is it possible to have different capacities for each hard disk drive?

A: YES! But the total capacity becomes the minimum size of all the hard disk drives multiplied by the number of hard disk drives in the RAID subsystem.

Q: Is it possible to expand a new hard disk drive into an empty slot on-line, or to change the RAID level on-line?

A: On-line insertion of a hard disk drive into an empty slot can only add to the spare HDDs. It cannot expand the total capacity of the RAID subsystem. (Note, however, that on-line expansion of the total capacity of the RAID subsystem will become available in the near future.) It is not possible to change the RAID level on-line.

Q: When dialing a pager through a modem, is it possible to use "," between digits to stop for a second ?

A: YES! Especially when dialing out through a PABX, it is necessary to use "," to wait for the PABX to engage the trunk line. We also suggest you fill the code field of the pager with "#,,,xxxxxxxx#". Then after the pager number has been dialed out, the RAID subsystem will wait for 3 seconds before sending out the eight-digit "xxxxxxxx" number which will be shown on the pager.