

# HP StorageWorks

## e1200-320 4Gb Fibre Channel Interface Card user and service guide



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i n v e n t

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e1200-320 4Gb Fibre Channel Interface Card user and service guide

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# About this guide

This guide provides information about:

- Installing the HP StorageWorks e1200-320 4Gb FC Interface Card
- Configuring the HP StorageWorks e1200-320 4Gb FC Interface Card
- Troubleshooting the HP StorageWorks e1200-320 4Gb FC Interface Card

## Intended audience

This guide is intended for general users who need physical and functional knowledge of the HP StorageWorks e1200-320 4Gb FC Interface Card.

## Related documentation

In addition to this guide, the following document is available for this product:

- *HP StorageWorks e1200-320 4Gb FC Interface Card Installation poster*

This and other HP documents can be found on the HP documents web site:

<http://www.hp.com/support/manuals> .

## Document conventions and symbols

**Table 1** Document conventions

| Convention   | Element  |
|--|--|
| Medium blue text: <a href="#">Figure 1</a>   | Cross-reference links and e-mail addresses   |
| Medium blue, underlined text ( <a href="http://www.hp.com">http://www.hp.com</a> ) | Web site addresses   |
| <b>Bold font</b>   | <ul style="list-style-type: none"><li>• Key names</li><li>• Text typed into a GUI element, such as into a box</li><li>• GUI elements that are clicked or selected, such as menu and list items, buttons, and check boxes</li></ul> |
| <i>Italics font</i>  | Text emphasis  |
| Monospace font   | <ul style="list-style-type: none"><li>• File and directory names</li><li>• System output</li><li>• Code</li><li>• Text typed at the command-line</li></ul>   |
| <i>Monospace, italic font</i>  | <ul style="list-style-type: none"><li>• Code variables</li><li>• Command-line variables</li></ul>  |
| <b>Monospace, bold font</b>  | Emphasis of file and directory names, system output, code, and text typed at the command line  |

⚠ **WARNING!** Indicates that failure to follow directions could result in bodily harm or death.

⚠ **CAUTION:** Indicates that failure to follow directions could result in damage to equipment or data.

---

 **IMPORTANT:** Provides clarifying information or specific instructions.

---

 **NOTE:** Provides additional information.

---

 **TIP:** Provides helpful hints and shortcuts.

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## HP technical support

Telephone numbers for worldwide technical support are listed on the HP support web site:  
<http://www.hp.com/support/>.

Collect the following information before calling:

- Technical support registration number (if applicable)
- Product serial numbers
- Product model names and numbers
- Applicable error messages
- Operating system type and revision level
- Detailed, specific questions

For continuous quality improvement, calls may be recorded or monitored.

HP strongly recommends that customers sign up online using the Subscriber's choice web site:  
<http://www.hp.com/go/e-updates>.

- Subscribing to this service provides you with e-mail updates on the latest product enhancements, newest versions of drivers, and firmware documentation updates as well as instant access to numerous other product resources.
- After signing up, you can quickly locate your products by selecting **Business support** and then **Storage** under Product Category.

## HP-authorized reseller

For the name of your nearest HP-authorized reseller:

- In the United States, call 1-800-282-6672.
- Elsewhere, visit the HP web site: <http://www.hp.com>. Then click **Contact HP** to find locations and telephone numbers.

## Helpful web sites

For other product information, see the following HP web sites:

- <http://www.hp.com>
- <http://www.hp.com/go/storage>
- <http://www.hp.com/support/>
- <http://www.docs.hp.com>

# 1 Introduction

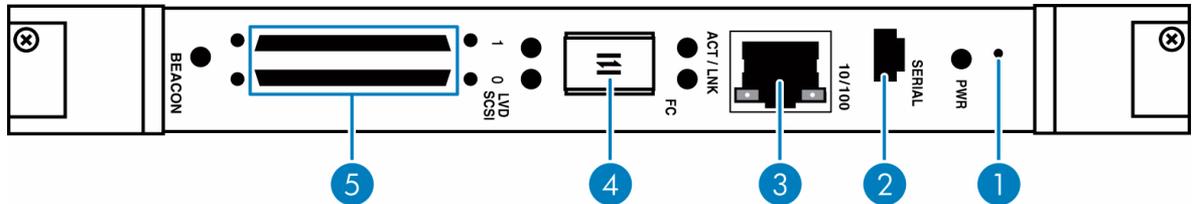
The HP StorageWorks e1200-320 4Gb FC Interface Card provides bi-directional connectivity between one Fibre Channel Switched Fabric (FC-SW) or Fibre Channel Arbitrated Loop (FC-AL), and two Narrow/Wide Fast/Ultra320 LVD/SE SCSI buses.

Supported devices include:

- Initiator Devices – Fibre Channel hosts
- Target Devices – Tape drives

Figure 1 shows the layout of the HP e1200-320 4Gb FC Interface Card.

**Figure 1** HP e1200-320 4Gb Interface Card ports



**Table 2** HP e1200-320 4Gb Interface Card

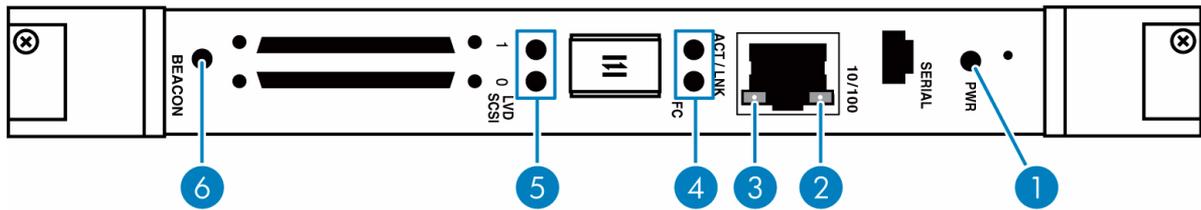
| Number | Description                     |
|--------|---------------------------------|
| 1      | Reset access hole               |
| 2      | Serial management port          |
| 3      | 10/100 Ethernet management port |
| 4      | Fibre Channel network port      |
| 5      | Two SCSI busses                 |

In addition to Fibre Channel and SCSI interfaces, there are Ethernet and serial ports that provide connectivity for configuration and management access. The LEDs (operation indicators) provide basic status information. A reset button is also provided for a manually forced reboot of the interface card.

## Operation indicators

The HP e1200-320 4Gb FC Interface Card has LED indicators for monitoring overall status as shown in Figure 2.

**Figure 2** Operation indicators



**Table 3** Operation indicators

| Number | Description  |
|--------|--|
| 1      | Power LED  |
| 2      | Ethernet link indicator  |
| 3      | Ethernet activity indicator  |
| 4      | ACT (activity) /LNK (link) LED indicators for the Fibre Channel port |
| 5      | Activity indicators for the SCSI busses(1, 0)                        |
| 6      | Beacon indicator   |

The LED functionality of the interface card is detailed below:

- **Power and Fault (Pwr)** – The bi-color LED is green when power is active, and is continuously amber-colored when the interface card detects a fault condition.
- **Fibre Channel Act** – When green, the right ACT indicator signifies a good Fibre Channel link.
- **Fibre Channel LNK** – When green, the left LNK indicator signifies Fibre Channel port activity.
- **SCSI bus (0, 1)** – When lit, these green indicators signify SCSI activity on the bus corresponding to the number of the indicator.
- **Ethernet (10/100)** – When lit, these green indicators signify Ethernet link status and activity.
- **Beacon** – This blue indicator can blink or light continuously for unit identification.

## How the HP e1200-320 4Gb FC Interface Card works

The interface card is a device that translates the Fibre Channel Protocol (FCP) to and from the SCSI Protocol—transparently transferring commands, data, and status information—so that both the Fibre Channel (FC) and SCSI devices and hosts can communicate with each other. Interconnection is provided between two SCSI buses and one Fibre Channel Arbitrated Loop or Switched Fabric, making use of Fibre Channel's ability to encapsulate SCSI protocol packets.

### Processing SCSI information

The following section describes how the interface card processes SCSI information when attached to FC hosts.

1. A FC host issues a command. The FC host encapsulates the command in the FCP protocol and sends the packet to the interface card.
2. The internal FC interface card receives the packet, interprets the FC information, and places the packet in buffer memory.
3. The processor interprets the information and programs an internal SCSI controller to process the transaction.
4. The SCSI controller sends the command to the SCSI device (target).
5. The SCSI target interprets the command and executes it.
6. Data flows between the FC host and SCSI target through payload buffers.
7. Response information flows from the SCSI target back to the FC host.

## HP e1200-320 4Gb FC Interface Card features

### Fibre Channel features

- One FC port (selectable between 4.25, 2.125 and 1.0625 Gbps)
- Fibre Channel Arbitrated Loop (FC-AL) including Point-to-Point configurations in arbitrated loop topology only and Switched Fabric (FC-SW) topologies
- Private Loop Direct Attach (PLDA) profile compliant
- Class 3 operation with SCSI-FCP protocol
- Supports FCP-2 error recovery protocol as specified in FCP-2 rev. 04 and 05 for use with streaming devices (such as tape)
- Optical SFP support (Shortwave)

### SCSI bus features

- Auto-negotiation for Narrow, Wide, Fast, and up to Ultra320
- Concurrent commands, tagged command queuing and disconnect/reconnect
- SCSI-2 and SCSI-3 protocols
- Connection type is VHDCI 68-pin D shell, P type connectors
- LVD/single-ended termination
- Disk, tape, optical, and changer devices

### Management features

- Interface card LUN commands
- Out-of-band Ethernet TCP/IP management access
- DHCP for easier network addressing
- Serial 3-pin connector for terminal access
- Ethernet RJ-45 connector for FTP, Telnet, and Web browser access
- Firmware that can be updated in the field
- SCC (FC only), Indexed, and Auto Assigned addressing modes

## External indicators

- Fibre Channel link status and activity LEDs
- SCSI bus activity LEDs
- Ethernet link status and activity LEDs
- Power/Fault LED
- Beacon LED

## Operating environment

- 0 to 50°C, 32 to 122°F
- 5 to 80% relative humidity (non-condensing)

## Non-operating environment (i.e. for unit storage)

- -40 to +55°C, -40 to 131°F
- 0 to 92% relative humidity (non-condensing)

## HP e1200-320 4Gb Interface Card benefits

The interface card is designed to connect SCSI devices into a Fibre Channel (FC) fabric or loop. The interface card comes with one 4 Gb/s Fibre Channel port and two LVD/SE SCSI buses.

The Fibre Channel ports can be set for 1, 2, or 4 Gb/s speeds and can connect in arbitrated loop (including point-to-point configurations) or switched fabric topologies. SCSI buses automatically negotiate for Fast, Narrow, Wide, and up to Ultra320 SCSI.

---

## 2 Installation, cabling, and setup

This chapter describes installing, cabling, and setup for the HP e1200-320 4Gb Interface Card.

---

 **NOTE:** Read this chapter carefully and completely before working with the interface card.

---

### Installing the HP e1200-320 4Gb Interface Card

Before you begin, clear a work surface near the library to unpack the interface card. Keep the card in the static-sensitive bag until you are ready to install it.

#### Identifying product components

The interface card kit:

- HP e1200-320 4Gb Interface Card
- Documentation bundle
  - Documentation CD
  - Installation poster
  - Safety CD
  - Warranty guide
  - HP product documentation survey
- Serial cable
- Two SCSI cables, 0.5 m VHDCI-VHDCI
- Installation poster

## Removal and installation

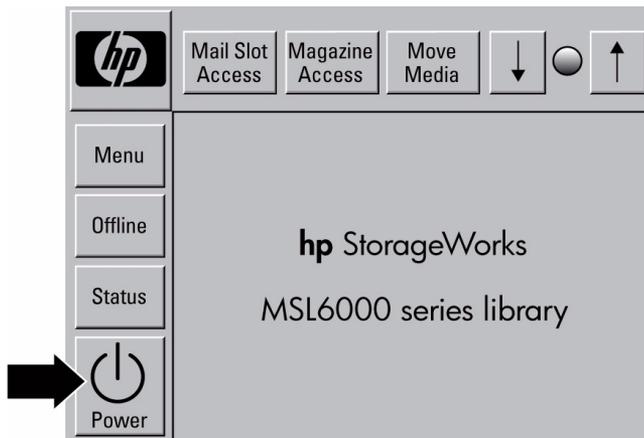
**NOTE:** To avoid damage to the library, ensure cards are installed in the correct option slots. If you are installing one card, place it in the middle slot next to the controller board. If you are installing two cards in a 10U library, place the second card in the center slot on the bottom level of the library.

Before removing an existing card or installing a new card, do the following:

1. Using the library front panel (GUI), turn off power to the library by pressing the **Power** button (see [Figure 3](#)).

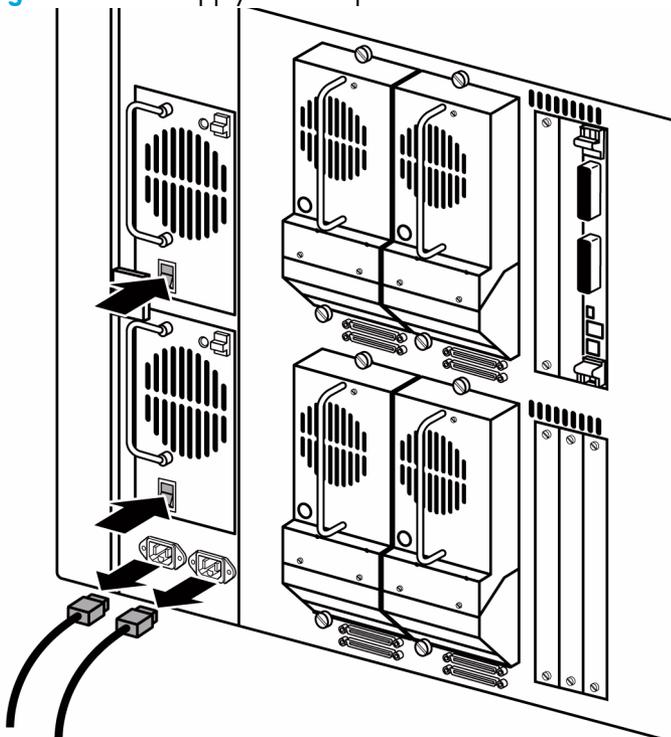
**NOTE:** This process automatically moves the robot to the parked position.

**Figure 3** GUI



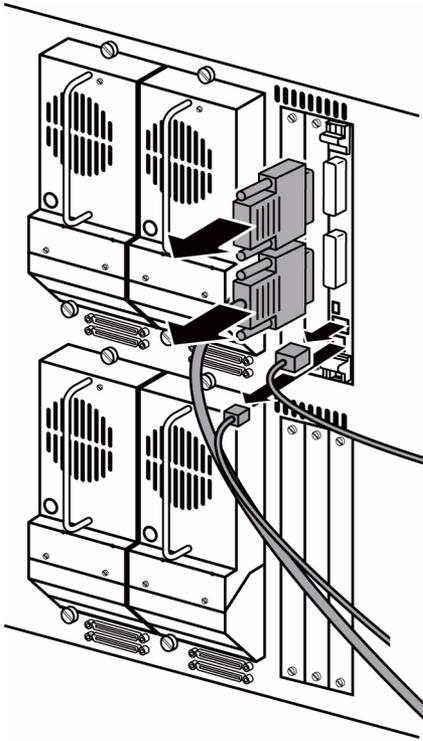
2. From the back of the library, turn off the master power switch for each power supply.
3. Remove the AC power cord(s) (see [Figure 4](#)).

**Figure 4** Power supply and AC power cords



4. Remove the cables from the robotics controller (see [Figure 5](#)).

**Figure 5** Removing cables from the robotics controller



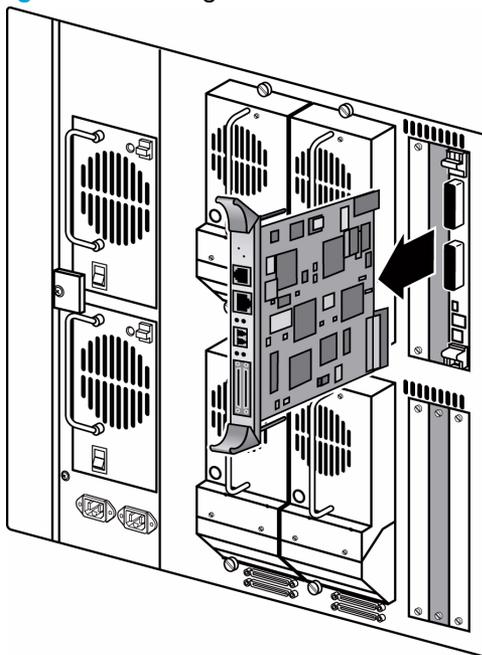
## Removing an existing interface card

If you are replacing a card that is already installed in the library, save the configuration settings using the FTP user interface: `ftp -> login -> bin -> get *.cfg <path><filename>.cfg`. See ["Using the FTP interface"](#) on page 89.

To remove the interface card:

1. From the back of the library, locate the card to be removed (see [Figure 6](#)).
2. Using a #1 Phillips screwdriver, loosen the captive screw in each black ejector handle.
3. Push the ejector handles outward, and pull the card out of the library.

**Figure 6** Removing an interface card from the library

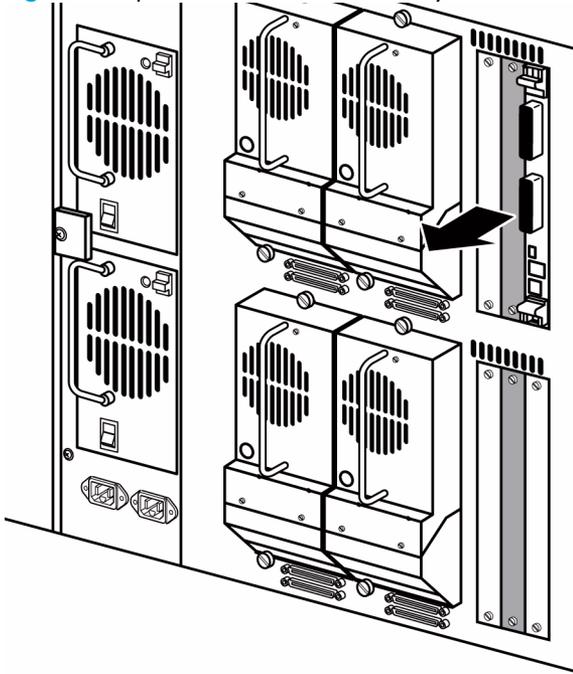


## Installing a new card

**NOTE:** To avoid damage to the library, make sure cards are installed in the correct slots. To install one card, place it in the top level middle slot as shown in [Figure 7](#). To install two cards, place the second card in the bottom level middle slot as also shown in [Figure 7](#).

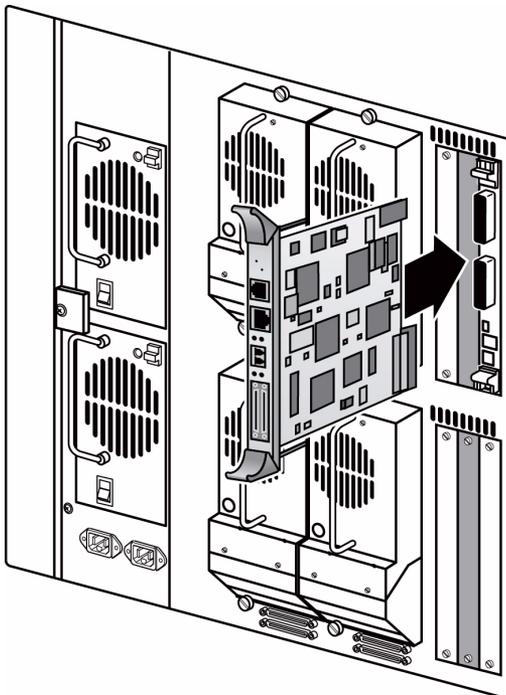
1. Using a #1 Phillips screwdriver, remove the center option slot cover plate (see [Figure 7](#)).

**Figure 7** Option slots in a 10U library



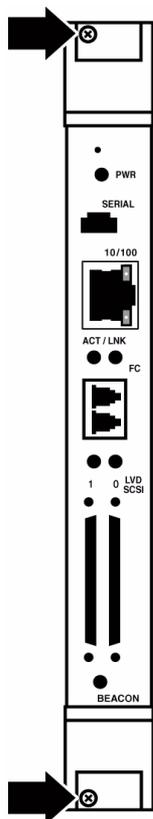
2. Carefully insert the card into the upper and lower guide rails of the option slot as shown in [Figure 8](#). Resistance is felt as the card connects with the library backplane. Apply only enough force to seat the card snugly, then rotate the ejector handles inward.

**Figure 8** Installing the interface card



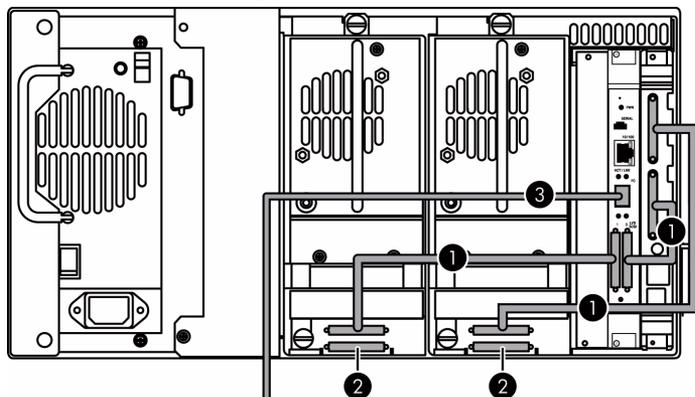
- Using the #1 Phillips screwdriver, tighten the captive screws in both of the black ejector handles as shown in [Figure 9](#).

**Figure 9** Screws in the black ejector handles

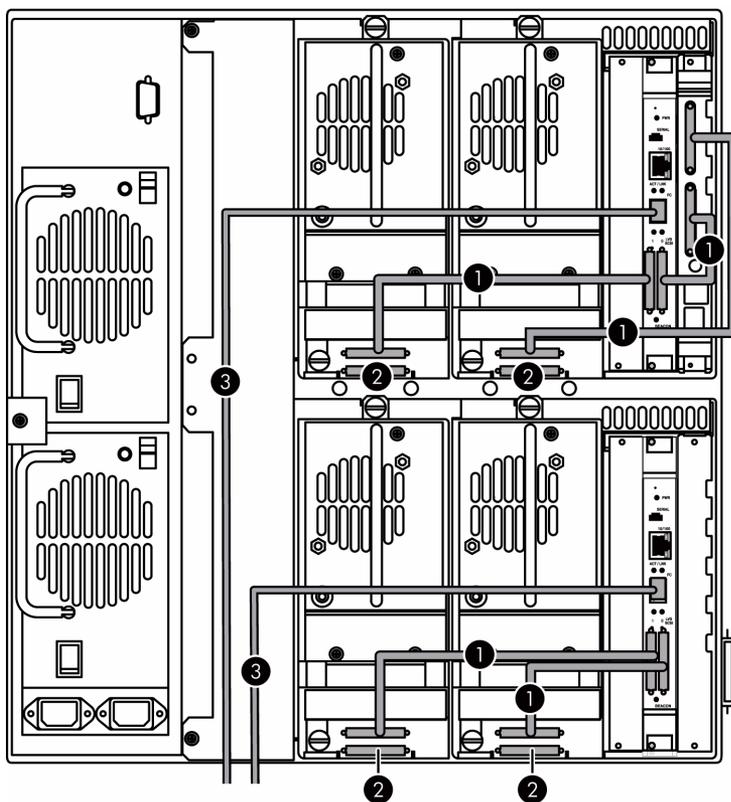


4. Cable the library as shown in [Figure 10](#) for a 5U library, or [Figure 11](#) for a 10U library.

**Figure 10** 5U cable configuration



**Figure 11** 10U cable configuration

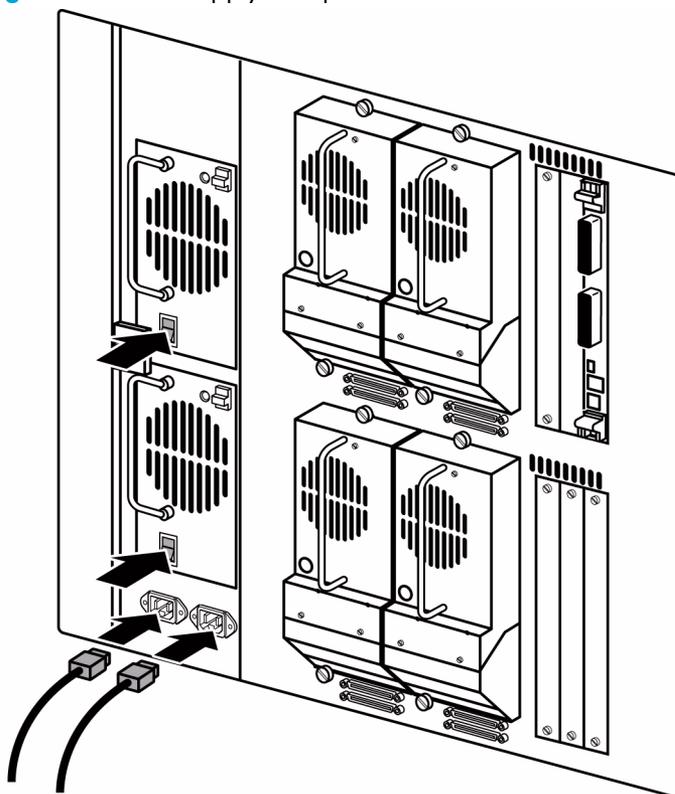


**Table 4** Cable connections

| Number | Description |
|--------|-------------|
| 1      | SCSI cable  |
| 2      | Terminator  |
| 3      | Fibre cable |

5. Connect each power cord. Turn on the master power switch for each power supply (see [Figure 12](#)).

**Figure 12** Power supply and power cord



6. Turn the library on by pressing the **Power** button on the GUI control panel (see [Figure 3](#) on page 14).

## Interfaces and connections

There are four types of interfaces to the interface card:

- Fibre Channel
- SCSI
- 3-pin serial port
- Ethernet

The 3-pin serial and Ethernet ports are used for configuration and management of the interface card.

For convenience in configuring ports, key information is indicated on a label located on the face of the interface card such as WWN name, WWP name, and Ethernet MAC ID (Physical Address).

### Fibre Channel connections

Before connecting the interface card to other devices, it is important to understand the configuration requirements of the environment to which it is connected. Failure to correctly configure a Fibre Channel device may impair the operation of the Storage Area Network (SAN) to which it is attached.

Typical installations have the interface card connected to a Switched Fabric environment. For an Arbitrated Loop, the unit can be directly attached to the Fibre Channel host bus adapter. In Fibre Channel switched environments, the switch is also directly attached to the interface card.

Both FC switches and hubs may allow for individual ports to be configured for different media types. The interface card must be connected to the hub or switch port with the appropriate FC cabling for the media type in use on both the interface card and the port to which it is connected.

The interface card supports various Fibre Channel media types through the use of external Small Form Factor Pluggable Transceivers (SFPs).

Supported media type: **Multi-Mode Fiber** - 4.25 Gbit Dual LC connectors.

To connect the interface card to the Fibre Channel SAN:

1. Locate the Fibre Channel port on the interface card (see [Figure 1](#) on page 9).
2. Remove the rubber protector from the SFP.
3. With the library powered off, connect the interface card into the Fibre Channel environment using the appropriate cabling. The FC optical connector on the interface card is keyed. Be sure to insert the cable connectors in the proper orientation.

### SCSI connection

The interface card can support Fast/Ultra320 Narrow/Wide SCSI, depending on the specific configuration. The interface card is factory configured to support LVD/Single-Ended buses. Two VHDCI 68-pin D-shell, P-type connectors are available, allowing the unit to be attached at the end of up to two SCSI buses. The interface card must always be installed at the end of SCSI buses.

The interface card supplies termination power (TERMPWR) to each SCSI bus. An internal self-resetting fuse in the TERMPWR resets after a fault is cleared.

---

△ **CAUTION:** Do not plug HVD devices to an LVD/SE bus. Failure to follow this caution may result in severe damage to equipment.

---

---

△ **CAUTION:** SCSI ports on the interface card are not hot-pluggable. Power off the library whenever connecting/disconnecting the SCSI cables.

---

To connect the interface card to a SCSI bus:

1. Power off the SCSI devices on this bus.
2. Connect a SCSI cable to one of the SCSI connectors on the unit. The interface card should always be installed at the end of the SCSI bus.
3. Make sure that the bus is terminated correctly. By default, the interface card is automatically terminated. However, the device at the other end of bus must also be terminated.

## Ethernet connection

A 10/100BaseT Ethernet connection provides management and configuration access. The RJ-45 connector on the unit can be directly connected to a standard 10/100BaseT Ethernet network.

---

**NOTE:** You should change the pre-filled in settings if you disable DHCP, because while they are valid settings, a conflict occurs if more than one interface card is on the network with these initial settings.

---

Setting the IP network address is recommended, but not required, in order to configure the interface card from this port. The IP network address can be manually assigned or dynamically assigned (using DHCP). The default network configuration is DHCP, but if DHCP is turned off, the initial value for the IP address is 1.1.1.1, the Subnet is 255.255.255.0, and the Gateway is 0.0.0.0.

Depending on the network environment, you may be able to temporarily use the IP address of 1.1.1.1 to configure the interface card. For more about the IP network address, refer to “[Network configuration](#)” on page 36.

Ethernet capabilities include Telnet support for configuration and management and FTP support for other management capabilities.

## Serial port connection

The 3-pin connector on the interface card provides a serial port that is compatible with RS-232 signaling levels. The interface card is designed to communicate with a terminal or any operating system using a terminal emulator. The baud rate, data bits, stop bits, parity, and flow control of both the interface card and the host system must use the same settings. The Autobaud feature described below provides an effective method to set the baud rate of the interface card and host system.

### Autobaud feature

The Autobaud feature automatically configures the baud rate on the interface card. Once you set the baud rate in the terminal emulator, wait until the interface card completes the Power-On Self Test (POST) and then the firmware initialization process. This can take up to 90 seconds, during which time the POST and initialization information may or may not be visible on the terminal or terminal emulator. After this process has completed, you can press the **Enter** key slowly 7 or 8 times (or just type shift-z) and the interface card automatically detects the baud rate being used by the serial port. The baud rate is then saved in the interface card’s configuration and is retained through future power cycles.

---

 **NOTE:** Pressing the **Enter** key before the POST has completed is of no benefit to the Autobaud feature. Wait at least 90 seconds until both the POST and the Firmware Initialization processes have completed before pressing the **Enter** key.

---

---

 **NOTE:** If there is no response using the Enter key, press the space bar slowly 7 or 8 times, and then press the **Enter** key slowly 7 or 8 times.

---

The baud rate used by the terminal or terminal emulator must be 9600, 19200, 38400, 57600, or 115200 for the Autobaud feature to recognize it. The interface card does not function properly at any other baud rate.

## Setting up serial port communications

Before supplying power to the interface card, HP recommends setting up serial port communications with your host computer, unless serial I/O was previously established and is currently running.

The interface card is designed to communicate with a terminal or any operating system utilizing a terminal emulator. For example, most Windows® operating systems can use a terminal. Be sure the baud rate, data bits, stop bits, parity, and flow control are set correctly.

To set up serial communications with the interface card:

1. Plug the serial cable into one of the host computer's serial ports (COM1 or COM2), and then plug the other end of the serial cable into the interface card's serial port.
2. Start the terminal emulator.
3. Set the terminal emulator to use the appropriate COM port.
4. Specify the following settings for the port:

|               |   |
|---------------|---|
| Baud Rate:    | 9600, 19200, 38400, 57600, or 115200<br>(Autobaud only recognizes these baud rates) |
| Data Bits:    | 8   |
| Stop Bits:    | 1   |
| Parity:       | None  |
| Flow Control: | None or XON/XOFF  |

---

 **NOTE:** Before initially applying power to the library, make sure all the FC devices are powered on first, and that they have finished performing individual self tests. This helps to ensure that device discovery works correctly.

---

5. Apply power to the tape library. The power-up process can take up to 90 seconds. Once complete, the main menu should be accessible.

---

## 3 Device management

To provide connectivity between hosts and devices, it is necessary for the interface card to be recognized with an address on the connected Fibre Channel network.

### SCSI bus configuration

The interface card provides the capability to reset SCSI buses during the interface card boot cycle. This allows the devices on a SCSI bus to be set to a known state. Configuration provides for the SCSI bus reset feature to be enabled or disabled.

The interface card negotiates for the maximum values for transfer rates and bandwidth on a SCSI bus. If an attached SCSI device does not allow the full rates, the interface card uses the best rate it can negotiate for that device. Negotiation is on a device specific basis, so the unit can support a mix of SCSI device types on the same SCSI bus.

### FC port configuration

By default, the configuration of the FC port on the interface card is set to N\_Port mode. For more information, see the Fibre Channel Configuration sections in “[Interface card management](#)” on page 27 and “[Fibre Channel port configuration](#)” on page 42.

### FC arbitrated loop addressing

On a Fibre Channel Arbitrated Loop, each device appears as an Arbitrated Loop Physical Address (AL\_PA). To obtain an AL\_PA, two addressing methods, called **soft** and **hard** addressing, can be used by the interface card. Soft addressing is the default setting. For hard addressing, the user specifies the AL\_PA of the interface card.

#### Soft addressing

When acquiring a soft address, the interface card acquires the first available loop address, starting from address **01** and moving up the list of available AL\_PAs in the chart from **01** to **EF**. In this mode, the interface card obtains an available address automatically and then participates on the FC loop, as long as there is at least one address available on the loop connected to the interface card. Fibre Channel supports up to 126 devices on an Arbitrated Loop.

#### Hard addressing

When acquiring a hard address, the interface card attempts to acquire the AL\_PA value specified by the user in the configuration settings. If the desired address is not available at loop initialization time, the interface card comes up on the FC loop using an available soft address. This allows both the loop and the unit to continue to operate. An example of this scenario would be when another device on the Arbitrated Loop has acquired the same address as that configured on the interface card.

Hard addressing is recommended for FC Arbitrated Loop environments where it is important that the FC device addresses do not change. Device address changes can affect the mapping represented by the host operating system to the application, and have adverse effects. An example of this would be a tape library installation, where the application configuration requires fixed device identification for proper operation. Hard addressing ensures that the device identification to the application remains constant.

### FC switched fabric addressing

When connected to a Fibre Channel switch, the interface card is identified to the switch as a unique device by the factory programmed World Wide Name (WWN) and the World Wide Port Names (WWPN), which are derived from the WWN.

## Discovery

Discovery is a feature that makes it easy to display attached FC and SCSI target devices and have them mapped automatically on the host side for the connected bus/port.

There are two discovery methods available—**Manual Discovery** and **Auto Discovery**. Auto Discovery can be set to occur after either reboot events (when the card reboots) or link-up events (for instance, when cables are attached or a hub is rebooted). Discovery can also be turned off by setting the interface card to **Manual Discovery Only**. The default setting for FC Discovery is Manual Discovery.

For specific information on Discovery settings, see the Fibre Channel configuration and SCSI configuration sections in “[Interface card management](#)” on page 27 and “[Discovery menu](#)” on page 44.

## Host bus adapter configuration

A host system using a Fibre Channel Host Bus Adapter (HBA) typically maps devices into the existing device mapping scheme used by the host operating system. Refer to the HBA manual for the mapping table.

Mapping usually involves pairing FC AL\_PAs to SCSI target addresses. The HBA claims enough SCSI bus entries to allow for 125 FC targets to map to SCSI bus:Target entries. This is usually done by a fixed mapping of AL\_PA to Bus:Target. In such a configuration, the interface card corresponds to a Bus:Target identifier, with the SCSI devices attached to the interface card appearing as logical units (LUNs). Operating systems can extend the available SCSI limit of 15 targets per bus. Although this is not an issue for the operating system or most applications, there are cases where older applications can have expectations about what are valid SCSI IDs, and not correctly handle certain mappings. In particular, applications have been seen to exhibit difficulties addressing target IDs greater than 15 (e.g. 16 and up). This problem can be resolved by configuring the interface card to use hard addressing, and setting the AL\_PA used by the unit to a value that the HBA will map to an ID with a value less than 16.

For example, depending on the FC HBA, if the hard AL\_PA selection is 1, the interface card address is 1. If the selection is 125, the interface card address is 0xEF. Some FC HBAs configure differently, so verify the AL\_PA by reviewing the documentation for the HBA.

## Logical unit management

Because SAN resources can be shared, multiple hosts can have access to the same devices on the SAN. To prevent conflicts, the interface card provides the means to restrict access and only allow hosts to find and access selected devices. Simple LUN masking can restrict access, but many times this leaves gaps in the list of LUNs presented to a host, since devices are always associated with fixed LUNs. The interface card, however, provides controlled access to devices by use of LUN management, which goes beyond simple LUN masking.

LUN Management is the ability to present different hosts with different views of the devices accessed through the interface card. For example, one FC host may see three disk LUNs and a tape LUN at LUNs 0 to 3 when it performs discovery on the interface card. Another FC host may only discover a tape LUN at LUN 0. Not only can the administrator control which devices a host may access, but also which LUNs are used to access these devices.

LUN Management is accomplished by allowing the administrator to configure multiple maps, each of which may present a different view of the devices behind the interface card. Each host accessing the interface card can be associated with a specific map.

For a host connected to an FC port, a map is a table of LUNs where each entry in the table is either empty or contains device address information needed to route commands to the appropriate device.

The FC port on the interface card has a set of maps which include user defined maps and a few special predefined maps.

There are currently four special predefined maps: Indexed, Auto Assigned, SCC, and Port 0 device maps. Until a user configures the interface card otherwise, the default map setting is Indexed.

The Indexed map is initially empty and can be modified by the user, however, this is not recommended.

The Auto Assigned map is built dynamically, and contains all the devices found during discovery. This map changes automatically any time the discovery process finds a change in the devices attached to the interface card. This map can be displayed, but cannot be modified directly by the user.

The SCC map is only available on the FC port and contains a single entry. LUN 0 is an interface card LUN, and access to devices behind the controller is handled by using SCC logical unit addressing.

When a host sends a command to the interface card, the interface card selects which map to use, based on the ID of the host sending the command. For FC ports, the host ID is the World Wide Name. For SCSI buses, the host ID is the initiator ID (0 - 15). When a host is unknown to the interface card, or is not attached to a specific map, the interface card uses the default setting for mapping. The default setting for each port can be set to Auto-assigned, Indexed, or SCC (which applies to the FC port only) by the user.



---

## 4 Interface card management

The HP e1200-320 4Gb FC Interface Card can be managed over the following user interfaces:

- Over the serial port via a terminal or a terminal emulation utility.
- Over Ethernet via a Telnet utility or an HTTP-based interface called Visual Manager. Additionally, FTP support provides additional management functionality.

Before attempting to configure the interface card, a basic understanding of Fibre Channel and SCSI devices is recommended.

---

 **NOTE:** For information on SCSI standards, refer to publications from the X3T10 committee of ANSI (American National Standards Institute). For information on Fibre Channel standards, refer to publications from the X3T11 committee of ANSI. For those who are interested in purchasing approved American National Standards and Technical Reports, you can contact ANSI at (212) 642-4900.

---

### Configuration methods

The interface card can be configured over the serial port via a terminal or terminal emulation utility, over Ethernet via a Telnet utility or Web browser. FTP is also supported on Ethernet, to update firmware revisions.

### Serial port management access

The serial port allows for configuration of device characteristics from an attached terminal or terminal emulator.

---

 **NOTE:** A Serial connection cannot be made if a Telnet session (discussed later) is already open. If a user attempts to open a serial connection while a Telnet session is already open, the following message appears over the serial interface:

```
System in use via Telnet. Shell restarted.
```

The serial interface resumes working when the Telnet session closes.

---

### Out-of-band Ethernet management access

DHCP is enabled by default, and the default network settings that are currently shown are only the values that are pre-loaded if you disable DHCP. The first time you use the interface card, use the serial interface to identify the network settings that were assigned from the DHCP server, or to set a new static setting.

When DHCP is disabled, the pre-filled in values are IP address 1.1.1.1, a subnet mask of 255.255.255.0, and a gateway address of 0.0.0.0. HP recommends that at a minimum, the IP address should be changed.

---

**CAUTION:** HP strongly recommends not having two interface cards using the pre-filled in static IP address on the same network, as this causes a conflict.

---

When setting the IP address for the interface card, there are two options:

- The first option is to enter a fixed, or permanent, IP address for the interface card.
- The second option is to enable DHCP on the interface card, so that a DHCP server (on the Ethernet network used by the interface card) can assign a dynamic IP address to the interface card.

Your DHCP server may also allow you to set up an extended lease reservation for an IP address, by providing the server with the Ethernet MAC address of the interface card. This configures the DHCP server

to always provide the same IP address to the interface card. This setup can be useful for remote management of the interface card via Telnet. Because the method of setting up a lease reservation varies depending on the DHCP server being used, HP recommends that you contact your Network Administrator for assistance.

For more information about enabling DHCP on the interface card, see ["Enabling DHCP on the HP e1200-320 4Gb FC Interface Card"](#) on page 117.

## Command Line Interface

The interface card is capable of holding Telnet sessions for configuration purposes. Access to the configuration menus via the serial port will be disabled when a Telnet session is connected. To open a Telnet session, the IP address of the interface card and a Telnet client utility are required.

---

 **NOTE:** Rebooting the interface card closes the Telnet session. After the interface card reboots and completes POST, the user must restart or re-open the Telnet session.

---

---

 **NOTE:** Resetting to factory defaults from the Telnet interface does not affect Ethernet activity. User configured values for the IP address, gateway, and subnet mask are retained after the interface card reboots. User name and password are not retained.

---

---

 **NOTE:** The interface card supports only one Telnet session at a time.

---

From most Windows systems, users can start a Telnet session from the DOS (or Command) prompt using the following steps:

1. From the Windows Start menu, open the DOS (or Command) prompt window.
2. At the '>' prompt, enter the following command  

```
TELNET <IP address>
```

where *<IP address>* is the IP address of the interface card. This starts a Telnet session window for the interface card.
3. Enter `root` for the default user name and `password` for the default password. HP recommends that you change the user name and password as soon as possible (see ["System menu"](#) on page 34).
4. Access configuration options in the same way used for the serial interface.
5. To exit the Telnet session, select the **Disconnect** option from your Telnet client utility. In most Telnet utilities, this option is available as a menu item. If working from the Command Prompt in Windows, simply close the window to end the session.

## Visual manager

The interface card allows any standard Internet Web browser to view and change the interface card's configuration with the Visual Manager interface. Information is dynamically generated in an HTML format by the interface card, so that Web browsers can access it.

To access Visual Manager, enter the IP address of the interface card into the Address field of a Web browser. Or, you can enter a URL using a host name defined by the user—for instance, <http://HPe1200-3204GbFC> (but the user must define the host name on the DNS server first for this to work).

To make changes to interface card settings, use standard keyboard and mouse controls to input information, and then select the **Submit** button to send the changes to the interface card.

A user name and password are required before any changes can be submitted. The default user name is **root** and the default password is **password**. HP recommends that you change the user name and password as soon as possible (see ["Visual manager access"](#) on page 31).

Other than dynamic mapping changes, any other changes will not take effect until the next time the interface card reboots. You can force the interface card to reboot by selecting the **Reboot** option.

For more information about the Visual Manager interface, refer to "[Visual manager access](#)" on page 31.

---

 **NOTE:** For the VM interface's dynamic display of the interface card configuration to be presented properly, use version 6.2 or later of Netscape's browser on non-Solaris platforms, or Netscape version 6.2.3 for Solaris platforms. If using Internet Explorer, use revision 6.0 or later.

---

## FTP

The interface card includes support of File Transfer Protocol (FTP) for updating firmware, saving trace buffers, and backing up/restoring of configuration settings. FTP functionality is described in more detail in "[Using the Command Line Interface](#)" on page 57. There is also an FTP Utility available within Visual Manager (VM) that is described in "[FTP utility access](#)" on page 50.

## Inband SCSI-3 commands

The interface card supports a set of SCSI-3 commands that can be received as FCP commands over the Fibre Channel ports. When using these commands, they must be sent to a tape LUN or interface card LUN of the interface card. For more information, see "[Inband SCSI-3 commands](#)" on page 109 and "[HP e1200-320 4Gb FC Interface Card features](#)" on page 11.



---

## 5 Visual manager user interface

The HP e1200-320 4Gb FC Interface Card allows any standard Internet Web browser to view and change the interface card's configuration with the Visual Manager interface. Information is dynamically generated in an HTML format by the interface card so that Web browsers can access it.

To access Visual Manager, enter the IP address of the interface card into the address field of a Web browser. Or, enter a URL using a host name defined by the user—for instance, **http://HPe1200-3204GbFCInterfaceCard**. (But the user must define the host name on the DNS server first, for this to work).

To make changes to interface card settings, use standard keyboard and mouse controls to input information, and then select the **Submit** button to send the changes to the interface card.

A user name and password are required before any changes can be submitted. The default user name is **root** and the default password is **password**. HP recommends that you change the user name and password as soon as possible.

Other than dynamic mapping changes, any other changes will not take effect until the next time the interface card reboots. You can force the interface card to reboot by selecting the **Reboot** option.

---

 **NOTE:** For the VM interface's dynamic display of the interface card configuration to be presented properly, use version 6.2 or later of Netscape's browser on non-Solaris platforms, or Netscape version 6.2.3 for Solaris platforms. If using Internet Explorer, use revision 6.0 or later.

---

### Visual manager access

Visual Manager (VM) can be accessed from any standard Web browser:

1. Connect an RJ45 Ethernet cable to the back of the interface card.
2. Obtain the IP address of the interface card.
3. Enter the interface card IP address in the address field of the Web browser of the host computer.

---

**NOTE:** To access VM, the interface card must be assigned a valid IP address. The factory default setting for the IP address is DHCP.

---

**NOTE:** If you don't know the IP address of the interface card, connect to the interface card using the serial connection. You can view and change the current settings from the serial interface's Ethernet menu.

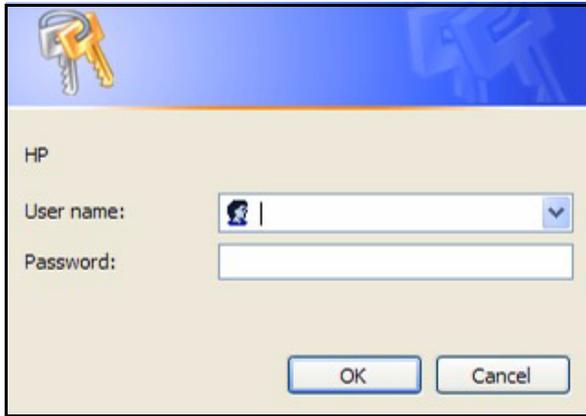
---

The Visual Manager home page is displayed, showing interface card status information. The home page is accessible to anyone who knows the interface card IP address.

4. Select the desired menu option to access menus and screens. The Password dialog box is displayed. See [Figure 13](#) on page 32 for an example of the Password Dialog box.

- Enter the authorized user name and password. The user name and password are case-sensitive. The default user name is `root` and the default password is `password`.

**Figure 13** Password dialog box



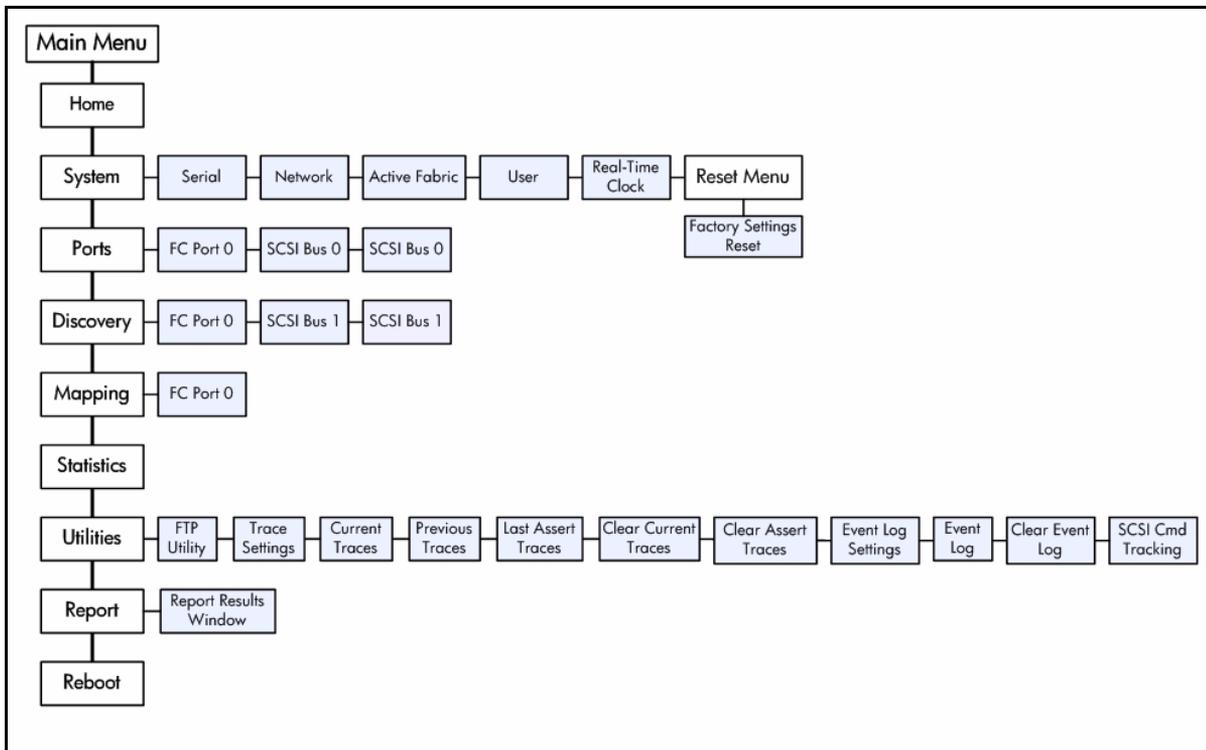
**NOTE:** HP recommends changing the user name and password from the defaults.

**NOTE:** To end the current session of VM, the browser window must be closed. Navigating the browser to another URL does not end the current session.

## Main menu

### Visual Manager menu structure

**Figure 14** Visual Manager menu

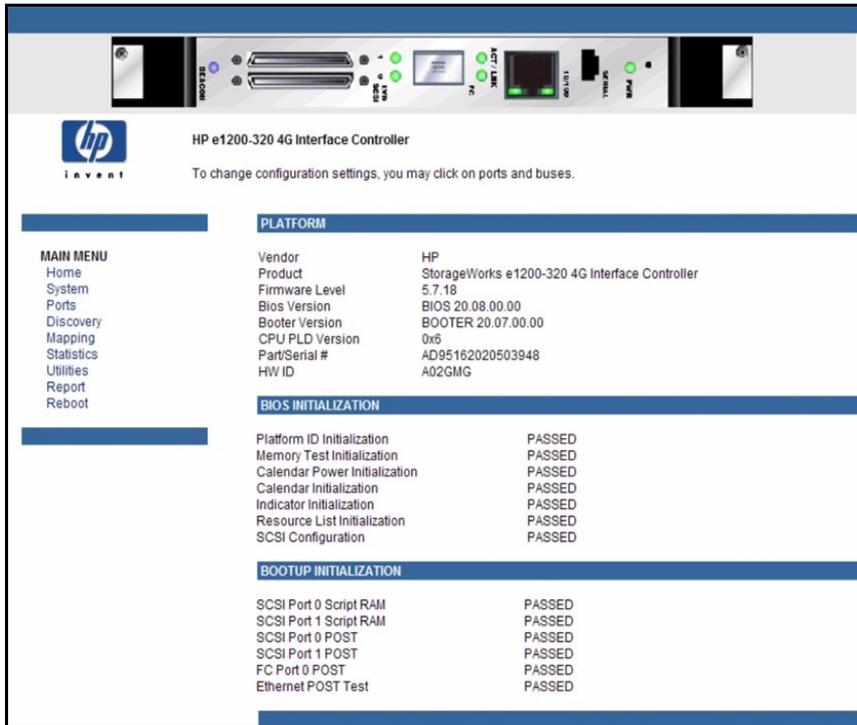


## Home page

The Main menu home page is displayed when Visual Manager (VM) is accessed.

The home page contains status information, including a physical image of the interface card (see [Figure 15](#)).

**Figure 15** Visual Manager Home page



Home page information includes:

- The HP logo is located in the upper left corner of the Home page (see [Figure 15](#)). If the Internet is accessible to the host, click the HP logo to open the web site.
- An illustration of the interface card is located near the top of the home page. [Figure 16](#) is an example of this portion of the home page screen.

**Figure 16** Interface card image



- The interface card image is interactive, allowing quick access to configuration menus:
  - To display current settings and status for a port, click the corresponding port shown in the interface card image.
  - To open a menu for making changes to the configuration for that particular port or bus, click the desired Fibre Channel port or SCSI bus.
  - To open the Network Configuration menu, click the Ethernet port.
- Interface card status information is located in the body of the home page and includes platform information.

- Main menu options:
  - **Home** displays interface card status information.
  - **System** configures standard system components.
  - **Ports** configures the Fibre Channel port and SCSI buses.
  - **Discovery** displays devices and discovers new devices.
  - **Mapping** displays and configures maps.
  - **Statistics** displays interface card statistics.
  - **Utilities** configures utility settings.
  - **Report** displays system information.
  - **Reboot** restarts the interface card.

## System menu

The System menu is accessed from the Main menu and is used to view and configure serial, network, active fabric, user, real-time clock, and factory settings reset (see [Figure 17](#)).

**Figure 17** System page

HP e1200-320 4G Interface Controller  
To change configuration settings, you may click on ports and buses.

| SERIAL    |        | NETWORK       |                      |
|-----------|--------|---------------|----------------------|
| Name      | Status | Name          | Status               |
| Baud Rate | 115200 | MAC Address   | 00:E0:02:E3:17:4B    |
|           |        | IP Address    | 15.27.97.33 (DHCP)   |
|           |        | Subnet Mask   | 255.255.240.0 (DHCP) |
|           |        | IP Gateway    | 15.27.96.1           |
|           |        | Ethernet Mode | 10/100Mbps           |
|           |        | DHCP Client   | Enabled              |
|           |        | Hostname      | Router               |

| ACTIVE FABRIC   |          | REAL-TIME CLOCK |                  |
|-----------------|----------|-----------------|------------------|
| Name            | Status   | Name            | Status           |
| Backup Mode     | DISABLED | Date            | Friday 3/10/2006 |
| Controller LUNS | 1        | Time            | 12:26:09         |

**MAIN MENU**  
Home  
System  
Ports  
Discovery  
Mapping  
Statistics  
Utilities  
Report  
Reboot

**SYSTEM MENU**  
Serial  
Network  
Active Fabric  
User  
Real-Time Clock

**RESET MENU**  
Factory Settings Reset

System menu:

- **Serial** configures the baud rate.
- **Network** configures Ethernet settings.
- **Active Fabric** configures Active Fabric settings.
- **User** configures user security settings.
- **Real-Time Clock** configures system date and time.

Reset menu:

- **Factory Settings Reset** restores factory default settings

## Serial configuration

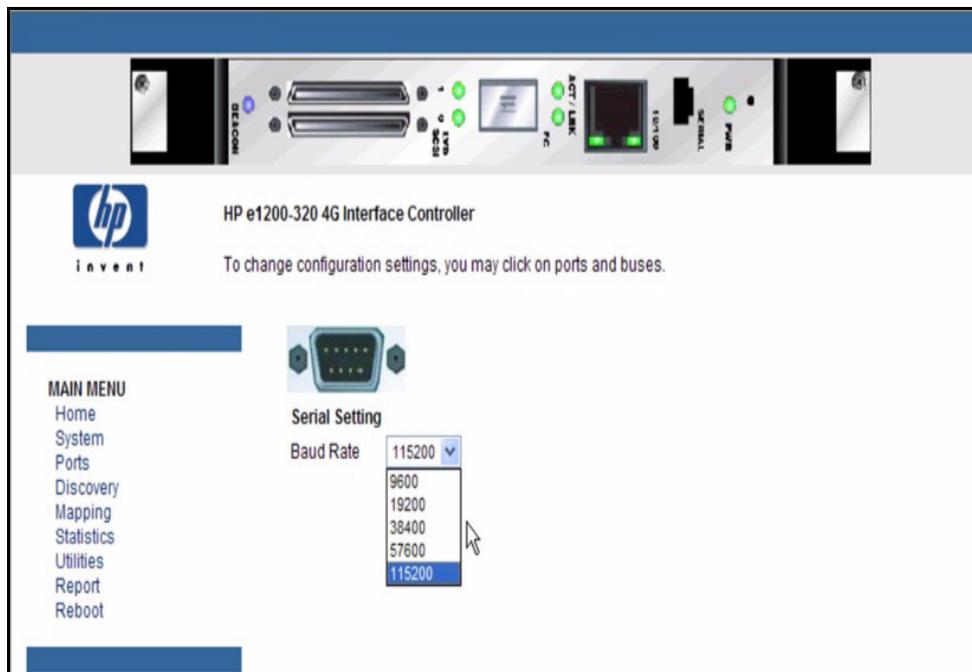
The Serial screen is used to change the baud rate for the serial port (see [Figure 18](#)).

---

**NOTE:** If the Autobaud feature is being used, it may not be necessary to set the baud rate.

---

**Figure 18** Serial screen



The current baud-rate setting is displayed.

Baud rate choices are:

- 9600
- 19200
- 38400
- 57600
- 115200

---

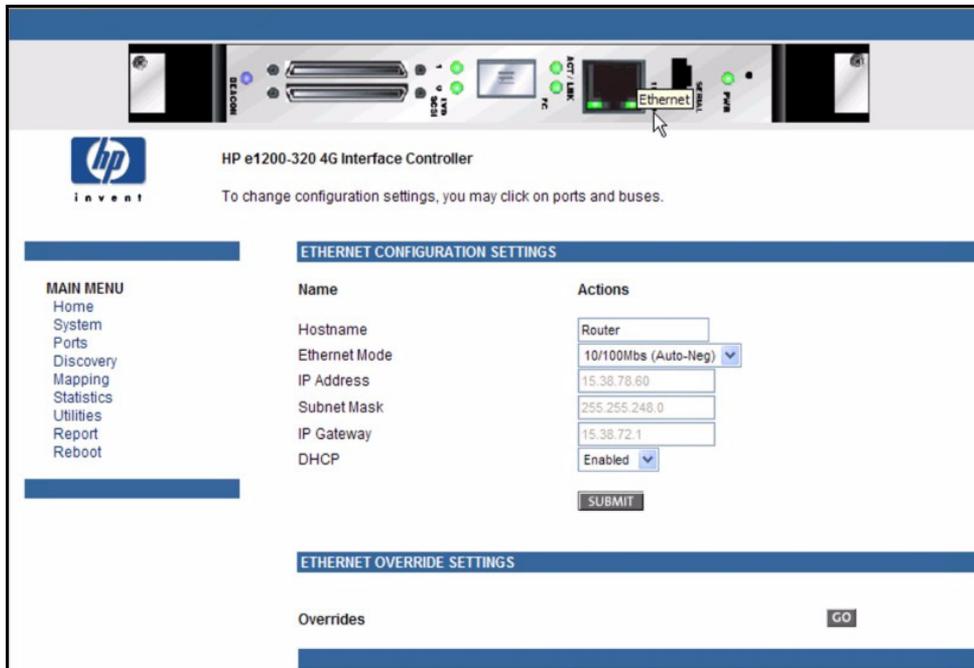
**NOTE:** HP recommends setting the baud rate to 115200.

---

## Network configuration

The Network screen is used to enter Ethernet configuration settings (see [Figure 19](#)).

**Figure 19** Network screen



**CAUTION:** If this configuration is incorrectly set, processing difficulties may occur. Before changing this setting, evaluate the need for the change and verify the desired setting. HP recommends backing up the interface card configuration to an external file before making changes to this setting.

Network menu options:

- **Host name** - to change the host name, enter an alphanumeric entry of one word, up to eight characters in length. Select **Submit**.
- **Ethernet Mode** - the Ethernet Mode can be set to one of the following options, though 10/100Mps (Auto-Neg.) is the default:
  - 10 Mps Only
  - 10/100Mps (Auto-Neg.) **Default**
  - 100Mps (half duplex) Only
  - 100Mps (full duplex) Only

**NOTE:** The Ethernet physical address is assigned by DHCP by default.

- **IP Address** - is the IP address of the interface card.
- **Subnet mask** - is the IP subnet mask for the interface card.
- **IP Gateway** - is the IP address of the gateway for the Ethernet network connected to the interface card.
- **DHCP** - enables or disables support for Dynamic Host Configuration Protocol (DHCP).
  - When DHCP is enabled, the interface card requests a dynamic IP address from a DHCP server on the Ethernet network. The interface card must be rebooted before an IP address is requested from the DHCP server. After the interface card is rebooted, the HTTP session must be restarted. The IP address is different from the former non-DHCP IP address. You can now use the serial interface to obtain the new IP address (see "[Perform configuration](#)" on page 58).

---

**NOTE:** To use the DHCP feature, a DHCP server must be operational on the Ethernet network. If the DHCP feature is used when there is not DHCP server, the standard for DHCP requires the interface card wait three minutes for a response from a DHCP server before timing out.

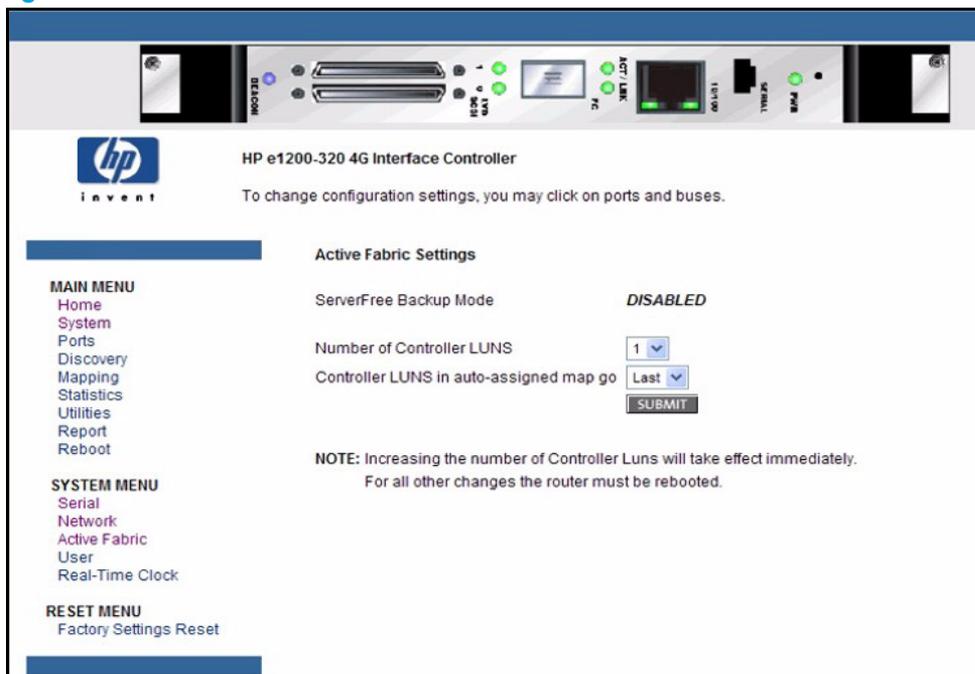
---

Some DHCP servers allow an extended lease reservation to be set up for an IP address by providing the server with the Ethernet MAC address. The DHCP server always provides the same IP address to the interface card. This setup can be useful for remote management of the interface card via Telnet or VM. Because the method of setting up an extended lease reservation varies, depending on the DHCP server being used. Contact the Network Administrator for assistance.

## Active fabric configuration

The Active Fabric (AF) screen allows setup of a fibre target LUN for the interface card (see Figure 20).

**Figure 20** Active Fabric screen



---

**NOTE:** Increasing the number of Controller LUNS takes effect immediately. For all other changes, the interface card must be rebooted.

---

Active Fabric settings:

- **ServerFree Backup Mode: NOT Supported**
- **Number of Controller LUNS:** (default: 1) sets the number of controller LUNs reported by the interface card. The number must be in the range of 0 through 4.
- **Controller LUNS in auto-assigned map go:** settings are **First** or **Last**. Setting the choice to **Last** is recommended. Setting the choice to **First** can cause issues with HP-UX. However, if working with an **OVMS** host, it should be set to **First**.



## Real-Time Clock configuration

The Real-Time Clock screen is used to set the system time and date (see [Figure 22](#)).

**Figure 22** Real-Time Clock screen

HP e1200-320 4G Interface Controller

To change configuration settings, you may click on ports and buses.

**MAIN MENU**

- Home
- System
- Ports
- Discovery
- Mapping
- Statistics
- Utilities
- Report
- Reboot

**SYSTEM MENU**

- Serial
- Network
- Active Fabric
- User
- Real-Time Clock

**RESET MENU**

- Factory Settings Reset

**Time Status**  
Date: Monday 3/13/2006  
Time: 10:35:21

**Date/Time Settings**

**Date Settings**

Month:   
Day:  Day of Week:   
Year:

**Time Settings**

Hours:   
Minutes:   
Seconds:

Date/time settings:

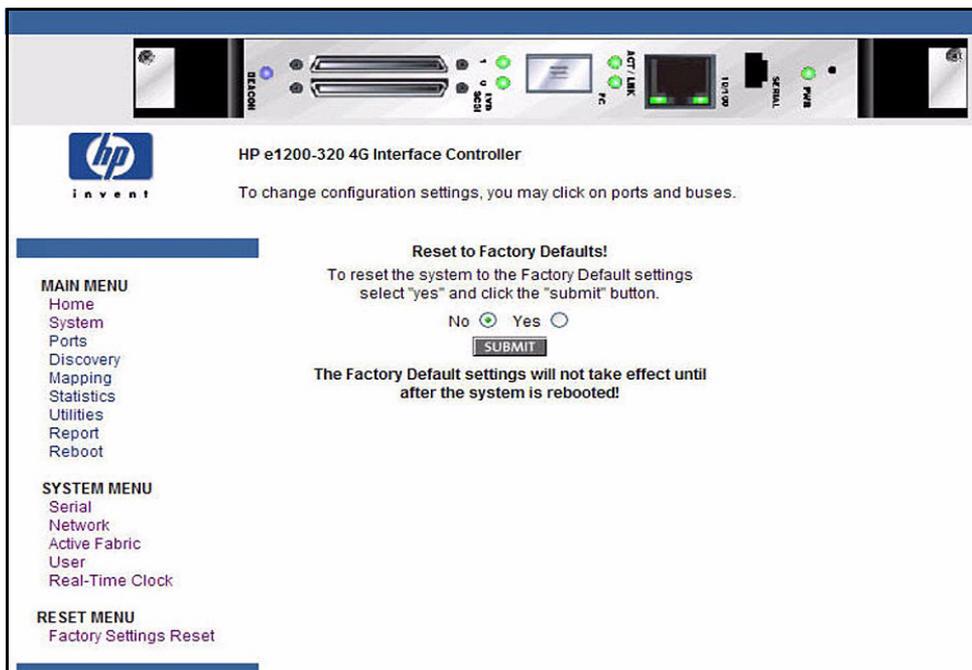
- **Date Settings** sets the month, day, and year (use a four-digit number to represent the year)
  - Day of Week sets the day of the week.
- **Time Settings** sets the hours, minutes, and seconds.

The system clock is a 24-hour clock. There is no a.m. or p.m. designation. Example 1:00 p.m. is 13 hours, 00 minutes.

## Reset menu

The Reset menu is used to reset the interface card to factory default settings (see [Figure 23](#)).

**Figure 23** Reset to Factory Default screen



Current interface card activities are disrupted while the unit resets the configuration to the factory defaults and saves those options to FLASH memory.

---

**CAUTION:** Resetting the interface card configuration to the factory defaults deletes custom maps or map changes.

---

---

**NOTE:** Resetting to factory defaults through VM does not affect Ethernet connectivity. User-configured values for the IP address and gateway are retained.

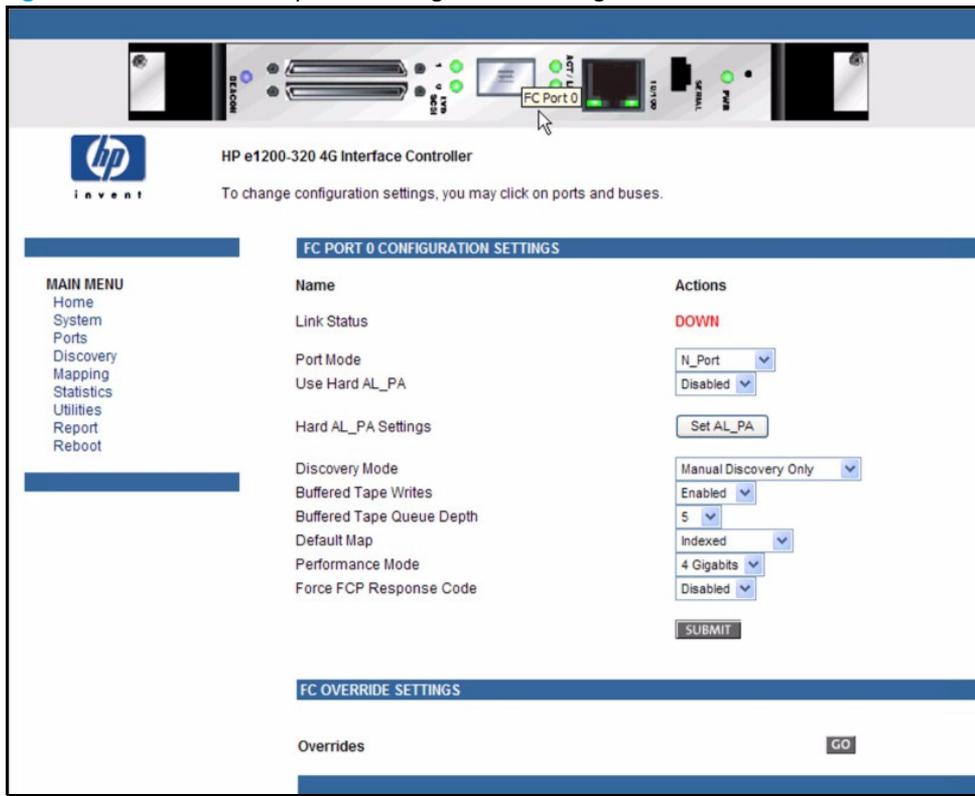
---



## Fibre Channel port configuration

When the Fibre Channel port is selected in Ports menu, the Fibre Channel Configuration screen is displayed (see [Figure 25](#)).

**Figure 25** Fibre Channel port 0 configuration settings screen



Fibre Channel port settings:

- **Link Status** indicates the port link status.
- **Port Mode** (default: N\_Port) sets the port mode.

Port Mode settings:

- **Auto Sense:** In this mode, the Fibre Channel port tries to negotiate as a loop. If it is not successful, then the Fibre Channel port negotiates as a fabric. If the port comes up as a loop, it then determines whether it is on a private or public loop.
- **N\_Port:** (default) This mode allows the interface card to bypass the loop negotiation and come up as a fabric only. If the interface card is on a loop, and N\_Port mode is selected, an error in communication may occur.
- **Use Hard AL\_PA** enables or disables Hard AL\_PA usage.
- **Hard AL\_PA Settings** displays the AL\_PA Lookup Table.

Use the table to find the node number. This unique one-byte valid value (derived from an Arbitrated Loop Topology defined in ANSI specification FC\_AL version 4.5) is used for the Fibre Channel configuration.

- **Discovery Mode** (default: Manual Discovery Only) determines how the interface card discovers new Fibre Channel devices.

Discovery mode settings:

- **Auto Discovery on Reboot** allows the interface card to automatically discover all Fibre Channel devices when rebooted or when link-up events occur, such as connecting cables or rebooting network hubs.
  - Both the ports and the devices behind the ports are discovered on all subsequent link-up events.
- **Discovery on Link Up** allows the interface card to automatically discover all Fibre Channel devices when rebooted or when link-up events occur, such as connecting cables or rebooting network hubs.

- Both the ports and the devices behind the ports are discovered for the first link-up event. Subsequent link-up events only discover the ports and not the devices behind the ports.
- **Manual Discovery Only** (default) sets discovery of new devices to occur only after the user selects the **Discovery** option from the Main menu or when a Registered State Change Notification (RSCN) is received from a fabric.
- **Buffered Tape Writes** (default: enabled) enables or disables the Buffered Tape Write option.

**CAUTION:** If this configuration setting is incorrectly set, processing difficulties may occur. Before changing this setting, evaluate the need for the change and verify the desired setting. HP recommends backing up the interface card configuration to an external file before making changes to this setting.

When enabled, to enhance performance, Buffered Tape Writes return status on consecutive write commands prior to the tape device receiving data.

- **Buffered Tape Queue Depth** sets the Buffered Tape Queue Depth. Select a setting of 0 through 10 from the drop-down list.
- **Default Map** (default: indexed) sets the current mapping mode for the selected port. The current map can be set to:
  - **Indexed** (default) (HP recommends that this map NOT be edited, even though the user is able to edit the Indexed map.)
  - **Auto-assigned** contains all the SCSI devices that are attached to the interface card.
  - **SCC**
- **Performance Mode** (default: 4 Gb/s) toggles between 1 Gb/s, 2 Gb/s, and 4 Gb/s.

**NOTE:** If Performance Mode is set incorrectly and the interface card is plugged into a Loop or Fabric, the unit will not light the LNK LED and may receive Framing errors due to the incorrect Fibre Channel link speed.

- **Force FCP Response Code** toggles between Disabled and Enabled for support of HP-specific HBAs.

## SCSI bus configuration

When a SCSI bus is selected in the Ports menu, the SCSI Bus Configuration screen is displayed (see Figure 26).

**Figure 26** SCSI Bus 0, 1 configuration screens

The screenshot shows the configuration interface for the HP e1200-320 4G Interface Controller. At the top, there is a diagram of the controller with various ports and LEDs labeled. Below this, the HP logo and the text 'HP e1200-320 4G Interface Controller' are displayed, along with the instruction 'To change configuration settings, you may click on ports and buses.'

The main configuration area is titled 'SCSI BUS 1 CONFIGURATION SETTINGS'. It includes a 'MAIN MENU' on the left with options: Home, System, Ports, Discovery, Mapping, Statistics, Utilities, Report, and Reboot. The configuration table is as follows:

| Name                        | Actions |
|-----------------------------|---------|
| Primary Initiator ID        | 7       |
| Discovery                   | Enabled |
| Discovery Delay (seconds) * | 30      |
| Bus Reset on Boot           | Enabled |

Below the table is a 'SUBMIT' button. A note states: '\* To modify the Delay time, both the Discovery and Bus Reset on Boot settings must be enabled. ( Please note that the total Delay time of all buses directly affects the bootup time. )'

At the bottom, there is a section for 'SCSI OVERRIDE SETTINGS' with an 'Overrides' field and a 'GO' button.

SCSI bus configuration settings:

- **Primary Initiator ID** (default: 7) must be a unique ID.
- **Discovery** toggles between Enabled and Disabled, **Enabled** by default.
- **Bus Reset on Boot** toggles between Enabled and Disabled.

When enabled, the interface card automatically resets SCSI buses during a power-up or reboot of the library.

- **Discovery Delay** is the wait time after a power-up or reboot before discovering SCSI devices. HP recommends setting the value to at least 30 seconds to ensure that all SCSI devices complete their individual power-ups.
- **SCSI Override Settings**
  - Overrides

## Discovery menu

Accessed from the Main menu, the Discovery menu is used to view existing, and discover new Target devices (see Figure 27).

**Figure 27** Discovery screen

HP e1200-320 4G Interface Controller

To change configuration settings, you may click on ports and buses.

Perform Discovery on all Ports and Buses:

**MAIN MENU**

- Home
- System
- Ports
- Discovery
- Mapping
- Statistics
- Utilities
- Report
- Reboot

**DISCOVERY MENU**

- FC Port 0
- SCSI Bus 0
- SCSI Bus 1

**FC PORT 0 DEVICES**

There are no devices attached to this port at this time.

**SCSI BUS 0 DEVICES**

| Bus | Tgt | Lun | Type | Status | Xrate | Speed | Offset | Width | Flags | IDP | Maps | Device Description  |
|-----|-----|-----|------|--------|-------|-------|--------|-------|-------|-----|------|---------------------|
| 0   | 0   | 0   | CHGR | UP     | 20    |       | 15     | WIDE  | 0x00  | 0   | 1    | HP MSL6000 Series C |
| 0   | 1   | 0   | TAPE | UP     | 160   | U160  | 120    | WIDE  | 0x02  | 0   | 1    | HP SDLT600 2323     |

**SCSI BUS 1 DEVICES**

| Bus | Tgt | Lun | Type | Status | Xrate | Speed | Offset | Width | Flags | IDP | Maps | Device Description |
|-----|-----|-----|------|--------|-------|-------|--------|-------|-------|-----|------|--------------------|
| 1   | 2   | 0   | TAPE | UP     | 160   | U160  | 120    | WIDE  | 0x02  | 0   | 1    | HP SDLT600 2323    |

**VIRTUAL DEVICES**

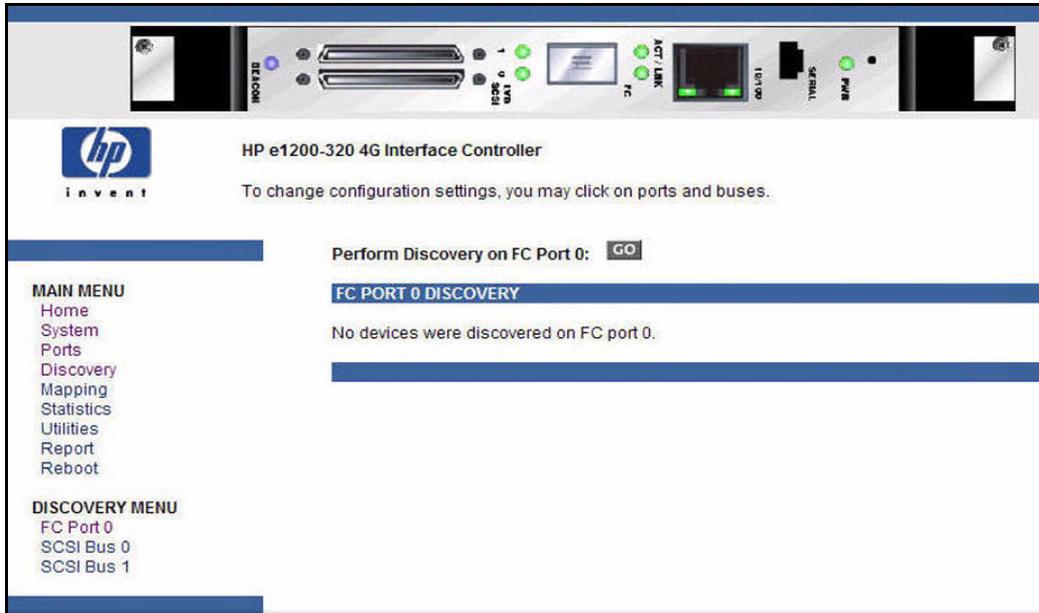
| Type | State | Map Cnt | LUN ID | Device Description | Serial No. |
|------|-------|---------|--------|--------------------|------------|
| CTLR | UP    | 1       | 0      | HP NS E1200-320    |            |

To perform a manual discovery:

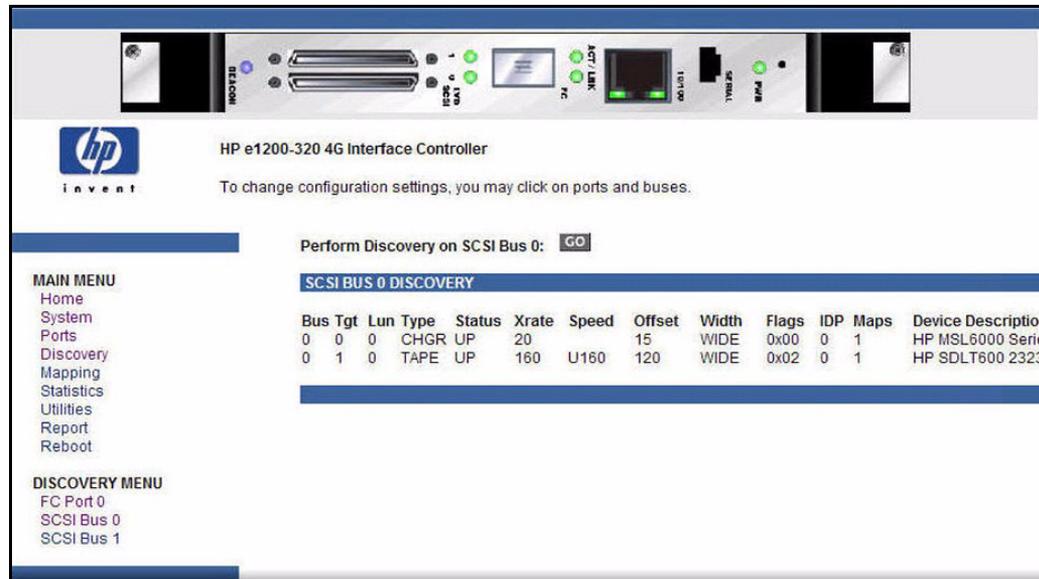
1. Select the Fibre Channel port or SCSI bus from the menu bar or the interface card image.

2. Select **Go**.

**Figure 28** Perform discovery on FC Port 0 screen



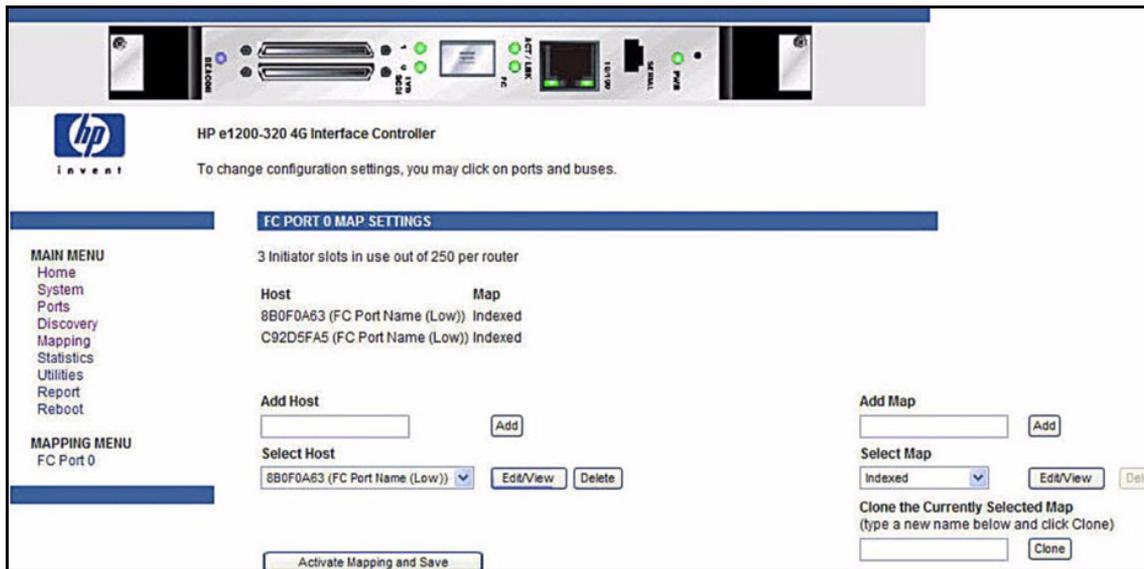
**Figure 29** Perform discovery on SCSI Bus 0 screen



## Mapping menu

Accessed from the Main menu, the Mapping menu is used to create or edit LUN maps and assign them to hosts. (see [Figure 30](#)).

**Figure 30** Fibre Channel port 0 map settings



**NOTE:** Indexed, Auto Assigned, and SCC maps cannot be deleted or renamed.

**NOTE:** SCC and Auto-Assigned maps cannot be cloned.

Each physical port/bus on the interface card can have the following maps:

**Table 5** Device map types

| Map type                   | Generated by                 | Editable |
|----------------------------|------------------------------|----------|
| Auto Assigned              | System                       | No       |
| Indexed ( <b>default</b> ) | System                       | Yes      |
| Port 0 Device Map          | System Generated/User Edited | Yes      |
| SCC                        | System                       | No       |

Each map has a unique name and map ID; one of the maps must be identified as the **current** map.

## Fibre Channel mapping tasks

Configuration tasks for Fibre Channel mapping includes:

- Viewing and changing Fibre Channel map information
- Viewing and changing Fibre Channel host information

Each task is discussed in the following paragraphs.

## Viewing and changing Fibre Channel map information

---

**NOTE:** **Port 0 Device Map** is the HP recommended map to be used for editing and assigning oncoming hosts. The Indexed (default) map should not be used for editing, even though the user is able to edit this map.

---

To view or change current Fibre Channel map information:

1. In the Mapping menu screen, select the desired map.
  2. Select **Edit/View** in the Map section of the screen.  
The Fibre Channel Map dialog box is displayed. Current map information is shown at the top of the dialog box.
  3. Enter the new settings and then select the appropriate action button.
- 

**NOTE:** Bus/Target mapping mode is recommended.

---

**NOTE:** SCSI devices attached to a Fibre Channel must be mapped as sequential Fibre Channel LUNs starting at LUN number 00. Skipping LUN numbers is not recommended when mapping Fibre Channel LUNs because Fibre Channel Discovery stops the discovery process whenever an empty LUN position is found.

---

**NOTE:** Auto-Assigned and SCC maps cannot be modified, cleared, filled, or have entries removed.

---

**NOTE:** Map settings are saved to memory when any button within the page is selected.

---

## Viewing and changing Fibre Channel host information

---

**NOTE:** HP recommends setting the **Index** map as the default and allowing it to remain empty, while filling a custom map (such as **Port 0 Device Map**) with only the hosts that need to communicate with the library or drives.

---

To view or change current host information:

1. In the Mapping menu screen, select the desired map.
2. Click **Edit/View** in the Host section of the screen.  
The Fibre Channel Host Name dialog box is displayed. Current host information is shown at the top of the dialog box.
3. Enter the new map settings and then select **Modify**.

Fibre Channel Host Name settings:

- **Host Name**
- **Host ID** (hexadecimal)
- **Port WWN Hi** (hexadecimal) (service mode-restricted access)
- **Port WWN Lo** (hexadecimal) (service mode-restricted access)
- **Node WWN Hi** (hexadecimal) (service mode-restricted access)
- **Node WWN Lo** (hexadecimal) (service mode-restricted access)
- **Map Name**

## Statistics menu

Accessed from the Main menu, the Statistics menu is used to display Fibre Channel port and SCSI bus information (see Figure 31).

Figure 31 Statistics menu

HP e1200-320 4G Interface Controller

To change configuration settings, you may click on ports and buses.

**MAIN MENU**

- Home
- System
- Ports
- Discovery
- Mapping
- Statistics
- Utilities
- Report
- Reboot

**FC PORT 0 STATISTICS**

|                           |            |
|---------------------------|------------|
| In Device Data Sequences  | 0x0000023E |
| Out Device Data Sequences | 0x00000123 |
| In Link Data Sequences    | 0x0000000B |
| Out Link Data Sequences   | 0x0000000A |
| In PBSY Frames            | 0x00000000 |
| Out PBSY Frames           | 0x00000000 |
| In FBSY Frames            | 0x00000000 |
| In PRJT Frames            | 0x00000000 |
| Out PRJT Frames           | 0x00000000 |
| FC Link Down              | 0x00000000 |
| In Aborts                 | 0x00000000 |
| Out Aborts                | 0x00000000 |
| Laser Faults              | 0x00000000 |
| LOS                       | 0x00000002 |
| Sync                      | 0x00000002 |
| Bad Rx Characters         | 0x000000FF |
| Link Failures             | 0x00000003 |
| Bad CRCs                  | 0x00000000 |
| Protocol Errors           | 0x00000000 |
| Bad SCSI Frames           | 0x00000000 |

Reset FC & SCSI System Statistics:

**SCSI BUS 0 STATISTICS**

|        |     |
|--------|-----|
| Mode   | LVD |
| Resets | 0   |

**SCSI BUS 1 STATISTICS**

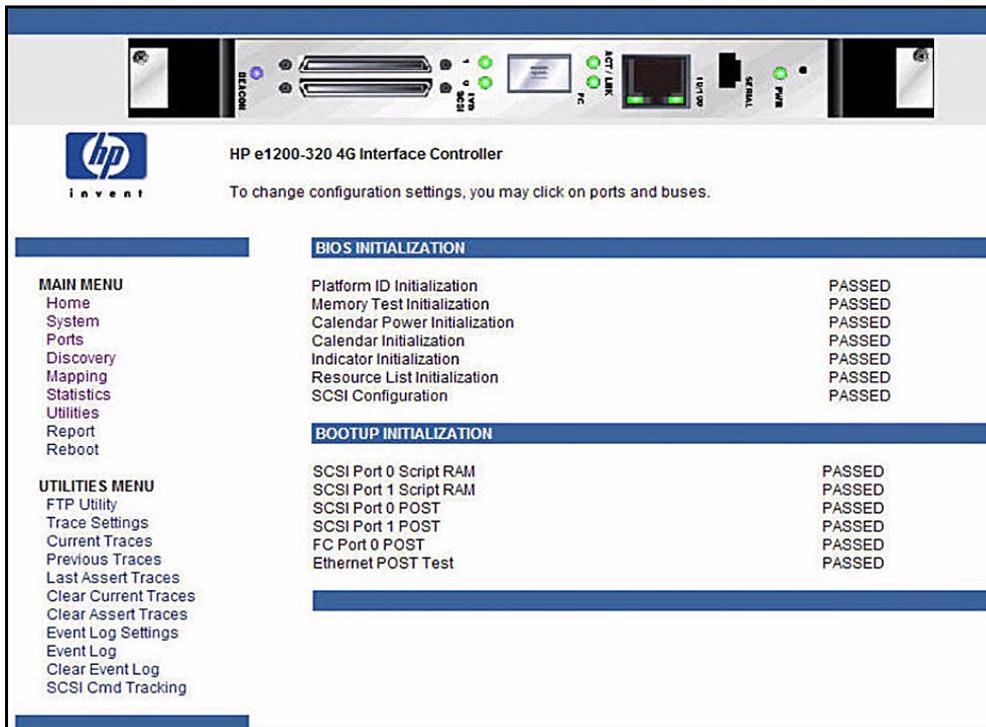
|        |     |
|--------|-----|
| Mode   | LVD |
| Resets | 0   |

To view information for a specific port or bus, click the component on the menu bar or the interface card image. To refresh the display, select **Reset FC & SCSI System Statistics**.

## Utilities menu

Accessed from the Main menu, the Utilities menu is used to view and configure utility options (see Figure 32).

**Figure 32** Utilities menu



Utilities menu tasks:

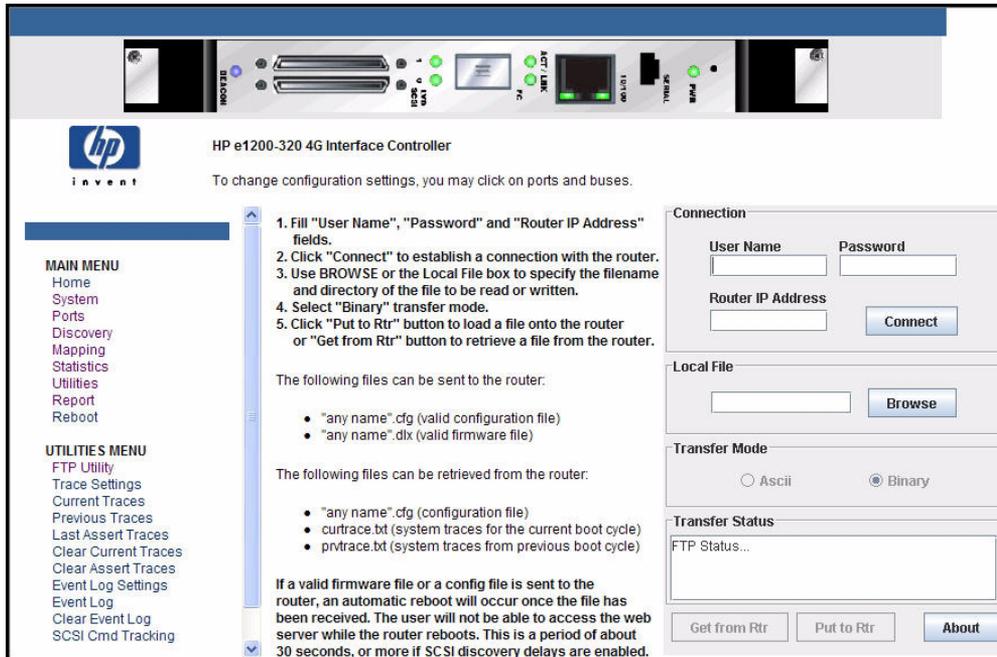
- **FTP Utility** opens an FTP session.
- **Trace Settings** configures trace settings.
- **Current Traces** displays current trace information.
- **Previous Traces** displays previous trace information.
- **Last Assert Traces** displays last assert trace information.
- **Clear Current Traces** clears current trace information.
- **Clear Assert Traces** clear current trace information.
- **Event Log Settings** configures Event Log settings.
- **Event Log** displays the Event Log.
- **Clear Event Log** clears the Event Log.
- **SCSI Command Tracking**

Each Utilities menu option is discussed in the following sections.

## FTP utility access

The FTP utility screen is used to open an FTP session (see [Figure 33](#)).

**Figure 33** FTP Utility screen



The FTP utility requires the use of a JAVA applet and prompts for permission to install the applet, if needed. If the prompt is displayed, follow the on screen instructions to complete the installation. The FTP utility then prompts for permission to run the applet.

**NOTE:** Internet access is required to verify the signature for the HP FTP applet and to download the JAVA applet plug-in for your browser.

If the applet does not load, obtain the latest version of JRE (Java Runtime Environment) from [www.java.com](http://www.java.com).

To open an FTP session:

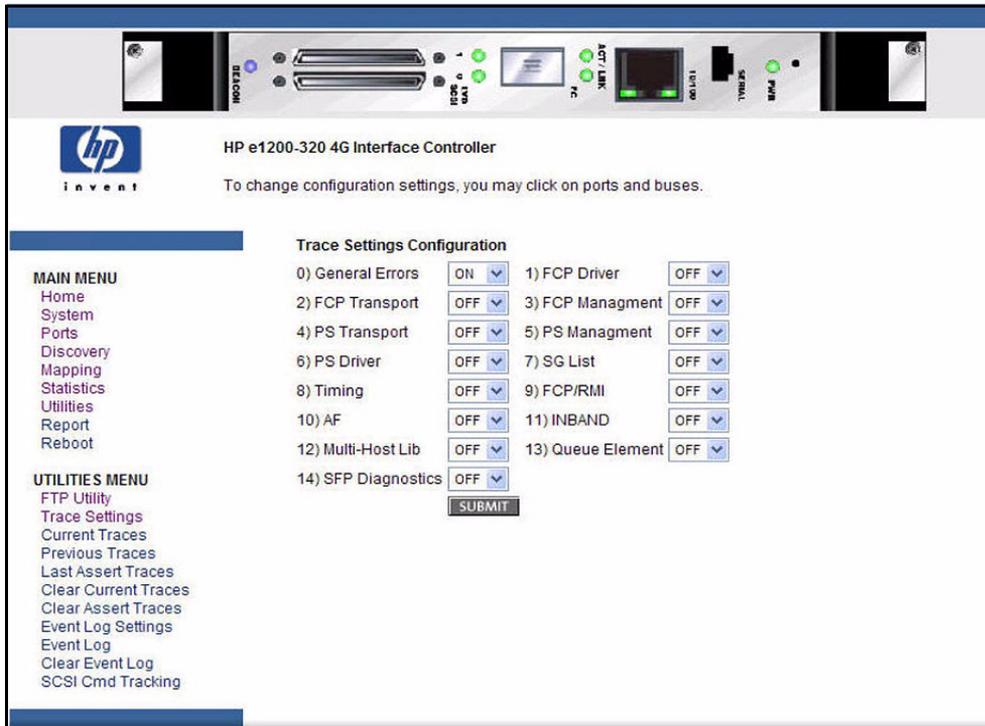
1. Enter the User Name, Password, and the IP address of the interface card.
2. Click **Connect**.
3. Select the local file to upload or download. If necessary, click **Browse** to scroll through a file list.  
The following file types can be uploaded to the interface card:
  - Configuration (*.cfg*)
  - Firmware (*.dlx*)The following file types can be downloaded from the interface card:
  - Configuration (*.cfg*)
  - Traces for the current boot cycle (*curtrace.txt*)
  - Traces from the previous boot cycle (*prvtrace.txt*)
4. Click **Binary** Transfer mode.
5. Choose the desired task:
  - To download a file, click **Get**.
  - To upload a file, click **Put**.

**NOTE:** If a valid firmware or configuration file is uploaded to the interface card, an automatic reboot occurs once the file has been received. The interface card cannot be accessed from the Visual Manager UI during the time that the reboot is in process, which is approximately 30 seconds.

## Trace settings configuration

This menu allows the configuration of Trace Settings (see [Figure 34](#)).

**Figure 34** Trace settings configurations screen



To change the settings, use the drop-down boxes and choose the desired setting. After all changes are completed, select **Submit**. [Table 6](#) is a brief description list of the trace settings.

**Table 6** Trace Settings

| Setting         | Description   |
|-----------------|---|
| General Errors  | Displays the most serious error and exception conditions                  |
| FCP Transport   | Fibre Channel Protocol transport functionality is monitored and recorded  |
| PS Transport    | Parallel SCSI transport functionality is monitored and recorded           |
| PS Driver       | Parallel SCSI driver functionality is monitored and recorded              |
| Timing          | Timer functions are monitored and recorded                                |
| AF              | Active Fabric firmware is monitored and recorded                          |
| Multi-Host Lib  | Debugging capability for Multi-host library features                      |
| SFP Diagnostics | Optical transceiver status is monitored and recorded                      |
| FCP Driver      | Fibre Channel Protocol driver functionality is monitored and recorded     |
| FCP Management  | Fibre Channel Protocol management functionality is monitored and recorded |
| PS Management   | Parallel SCSI functionality is monitored and recorded                     |
| SG List         | Scatter/gather list is monitored and recorded                             |
| FCP/RMI         | Fibre Channel Protocol routing layer is monitored and recorded            |

**Table 6** Trace Settings

| Setting       | Description   |
|---------------|---|
| INBAND        | Controller management functionality is monitored and recorded |
| Queue Element | Debugging capability for specific interface card resources    |

## Current, previous, and last assert trace displays

These three Utilities menu screens show trace information.

- The Current Traces screen shows data since the interface card was last booted.
- The Previous Traces screen shows data from the last boot cycle.
- The Last Assert Traces screen shows data since the last assertion.

Trace buffers can be cleared by selecting either the **Clear Current Traces** option or the **Clear Assert Traces** option.

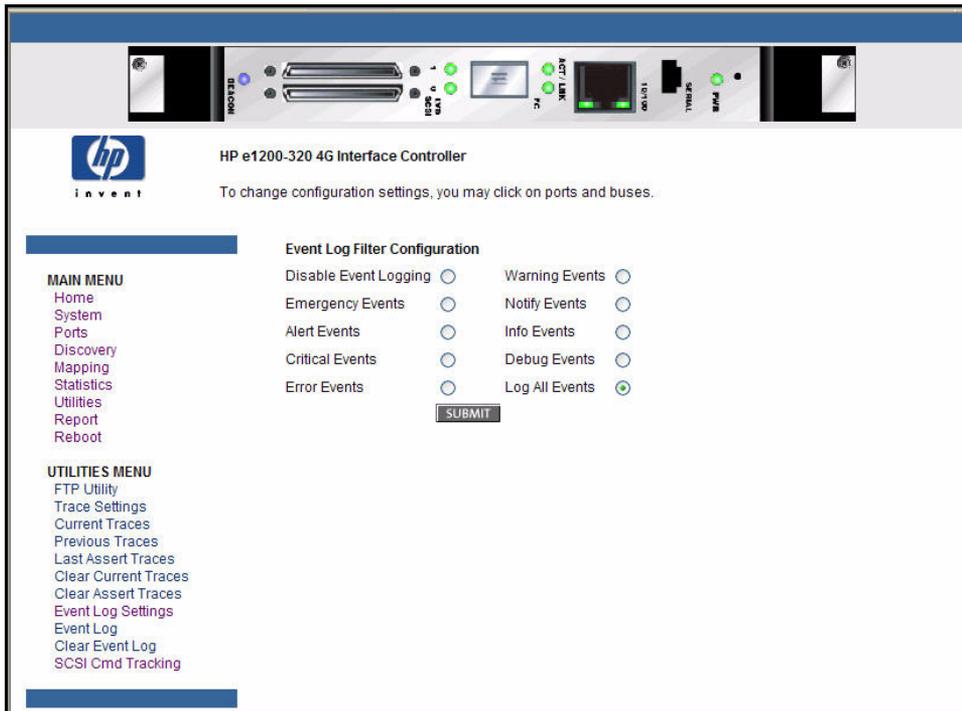
## Clear current trace buffer or assert trace buffer

Trace buffers can be cleared by selecting either the **Clear Current Traces** option or the **Clear Assert Traces** option. When the Clear Current Traces option is selected, a confirmation message appears to verify the selection. If a response of Yes is given, the unit clears the current trace buffer. Current interface card activities are not disrupted while the buffer is cleared. Select the **Submit** button to finalize your choice.

## Event log settings

The Event Log Settings screen is used to configure Event Log filters (see [Figure 35](#)).

**Figure 35** Event Log Settings screen



Event Log settings:

- Disable/Enable Logging
- Emergency Events
- Alert Events
- Critical Events
- Error Events

- Warning Events
- Notify Events
- Info Events
- Debug Events
- Log All Events

Event logging captures the last 215 events and then starts overwriting the log.

**NOTE:** To correlate event logging, correctly set the clock and date in the Real-Time Clock configuration menu.

## Event log display

The Event Log screen is used to view the Event Log (see [Figure 36](#)).

**Figure 36** Event log display

HP e1200-320 4G Interface Controller  
To change configuration settings, you may click on ports and buses.

Event Log Display

MAIN MENU  
Home  
System  
Ports  
Discovery  
Mapping  
Statistics  
Utilities  
Report  
Reboot

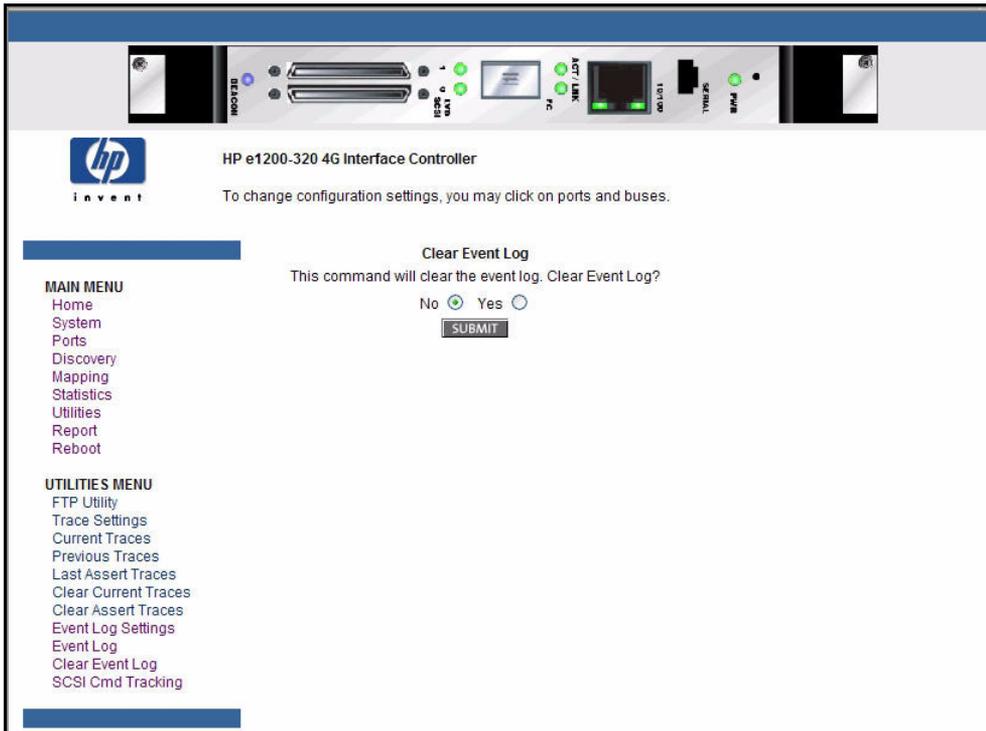
UTILITIES MENU  
FTP Utility  
Trace Settings  
Current Traces  
Previous Traces  
Last Assert Traces  
Clear Current Traces  
Clear Assert Traces  
Event Log Settings  
Event Log  
Clear Event Log  
SCSI Cmd Tracking

| Num | Date/Time           | sysUpTime       | Message   |
|-----|---------------------|-----------------|---|
| 1.  | 03/14/2006 08:54:43 | 0d00h16m13.95s  | Event log erased by Operator  |
| 2.  | 03/22/2006 13:24:28 | 11d11h20m39.95s | Firmware image 5.7.1adw2 Version 5.7 received and stored to flash             |
| 3.  | 03/22/2006 13:27:01 | 0d00h00m00.00s  | New device is added to location 0/0/0   |
| 4.  | 03/22/2006 13:27:01 | 0d00h00m49.20s  | New device is added to location 0/1/0   |
| 5.  | 03/22/2006 13:27:01 | 0d00h00m49.20s  | New device is added to location 1/2/0   |
| 6.  | 03/22/2006 13:27:01 | 0d00h00m49.26s  | Unit restart and initialization, Firmware Version: 5.7 Build Level: 5.7.1adw2 |
| 7.  | 03/22/2006 13:27:02 | 0d00h00m50.48s  | FC Port 0 Link is UP.   |
| 8.  | 03/23/2006 10:45:38 | 1d05h49m42.70s  | Firmware image 5.7.1b Version 5.7 received and stored to flash                |
| 9.  | 03/23/2006 10:48:11 | 0d00h00m00.00s  | New device is added to location 0/0/0   |
| 10. | 03/23/2006 10:48:11 | 0d00h00m49.20s  | New device is added to location 0/1/0   |
| 11. | 03/23/2006 10:48:11 | 0d00h00m49.20s  | New device is added to location 1/2/0   |
| 12. | 03/23/2006 10:48:11 | 0d00h00m49.25s  | Unit restart and initialization, Firmware Version: 5.7 Build Level: 5.7.1b    |
| 13. | 03/23/2006 10:48:12 | 0d00h00m50.50s  | FC Port 0 Link is UP.   |
| 14. | 03/27/2006 10:08:29 | 5d13h29m14.50s  | CHK COND with Sense Key=0x4, ASC=0x8, ASCQ=0x0 from SCSI LUN 0/1/0            |
| 15. | 03/27/2006 10:08:30 | 5d13h29m15.15s  | CHK COND with Sense Key=0x4, ASC=0x8, ASCQ=0x0 from SCSI LUN 1/2/0            |
| 16. | 03/27/2006 10:08:30 | 5d13h29m15.55s  | CHK COND with Sense Key=0x4, ASC=0x8, ASCQ=0x0 from SCSI LUN 0/0/0            |
| 17. | 03/27/2006 10:09:06 | 5d13h30m06.26s  | Reboot requested via main serial menu   |
| 18. | 03/27/2006 10:09:06 | 5d13h30m06.26s  | FC Port 0 Link is DOWN.   |
| 19. | 03/27/2006 10:11:35 | 0d00h00m00.00s  | Unit restart and initialization, Firmware Version: 5.7 Build Level: 5.7.1b    |
| 20. | 03/27/2006 10:11:36 | 0d00h00m50.45s  | FC Port 0 Link is UP.   |
| 21. | 03/29/2006 08:53:34 | 0d00h00m00.00s  | New device is added to location 0/0/0   |

## Clear event log

The Clear Event Log screen is used to clear the Event Log (see [Figure 37](#)). Current interface card activities are not disrupted.

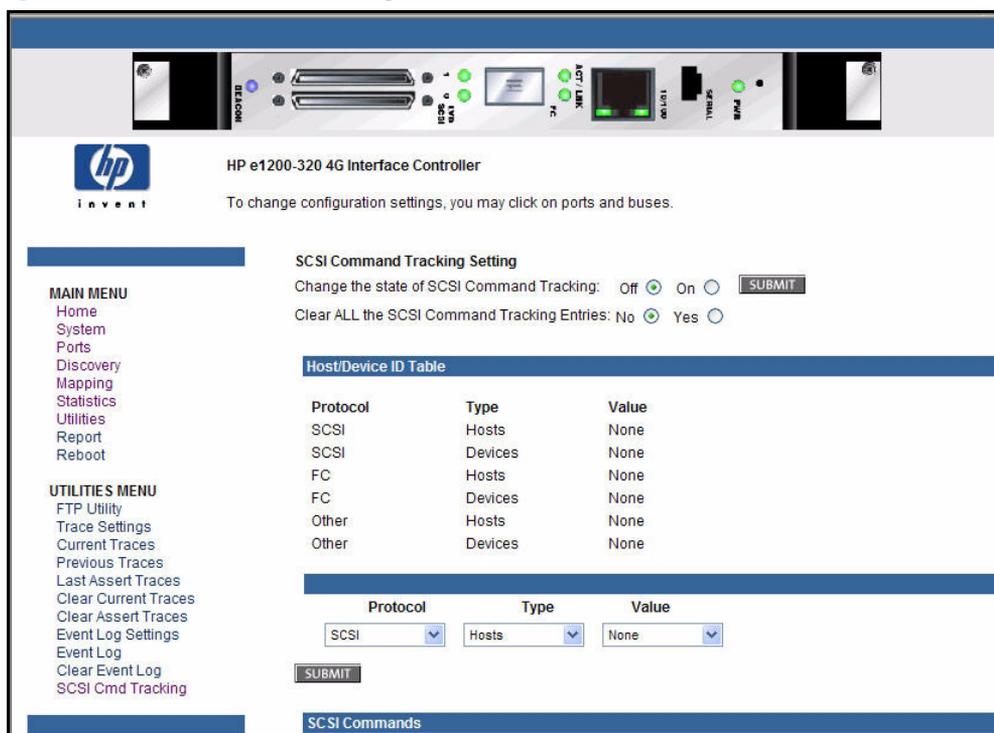
**Figure 37** Clear event log screen



## SCSI command tracking

This menu provides options for setting up and logging SCSI commands that are received or transmitted by the interface card. Results are displayed in the Host/Device ID Table (see [Figure 38](#)).

**Figure 38** SCSI command tracking



While the interface card's current, previous, and last assert trace data does provide a complete summary of events in a chronological fashion, SCSI Command Tracking adds the ability to filter the trace data to show only the information related to the processing of specific SCSI commands.

- SCSI Command Tracking can be toggled to **ON** or **OFF**. When toggled **ON** and submitted, all SCSI commands received or transmitted to or from the interface card are then logged in the SCSI Commands section shown on this screen. When set to **OFF** (and submitted), no SCSI commands are logged.
- Previous entries for SCSI Command Tracking can also be cleared. Toggling the clear option to the **ON** position and selecting the **Submit** button clears all previous entries.
- The settings for the Host/Device ID Table are used to filter the trace data such that a sub-set of the total logged information is displayed under the SCSI Commands section. Logged data can be defined according to the Protocol (FC, Other, or ALL), Type (Device, Host, or ALL), and Value (ID or ALL). For the ID, this can be a specific FC LUN or Switch ID (S\_ID) or some other specific value. Selecting the **Submit** button activates the settings for Protocol, Type, and Value.

## Report menu

Accessed from the Main menu, when Report is selected, a second window pops up and displays a consolidated view of the following:

- Platform
- BIOS Initialization
- Bootup Initialization
- Serial
- Ethernet
- FC Port 0
- SFP Transceiver in FC Port 0
- SCSI Bus 0
- SCSI Bus 1
- Discovery Information
- Device Entries
- Mapping Information
- Active Initiators
- Trace Settings
- Current Traces
- Previous Traces
- Assert Traces
- Event Log Settings
- Event Log

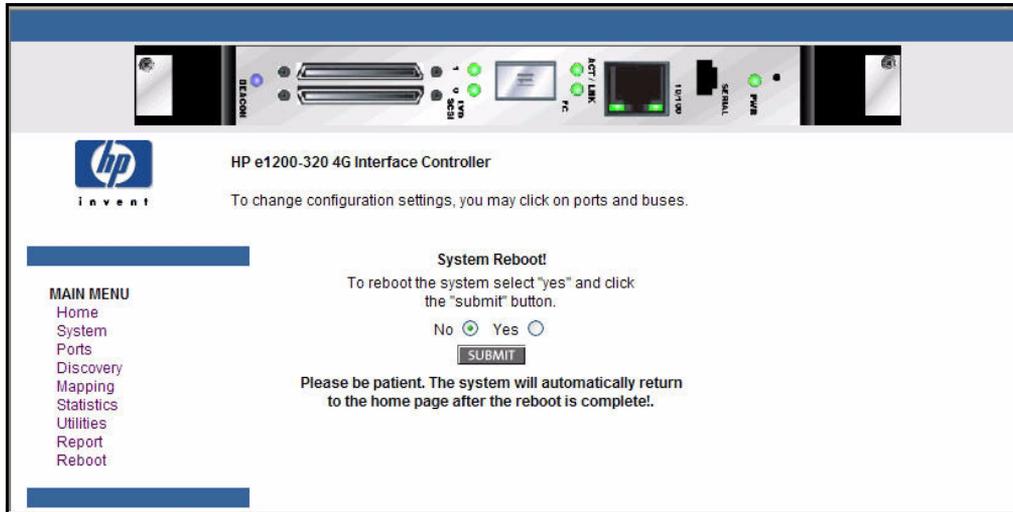
# Reboot option

**CAUTION:** Confirm there is no activity, such as a backup in progress, before initiating a reboot because interface card activities will be disrupted.

Interface card reboots are executed using this Main menu option (see [Figure 39](#)).

When the library is rebooted, current interface card activities are disrupted. All submitted configuration changes are activated during the boot-up process.

**Figure 39** Reboot screen



The system automatically returns to the home page after the reboot has completed.

## 6 Using the Command Line Interface

This chapter describes specific configuration options available from the perspective of the Command Line Interface (CLI). For an overview of using the other configuration methods available, see “[Interface card management](#)” on page 27.

The interface card allows the user to access many configuration settings through the Command Line Interface. Among these settings are:

- Serial, Ethernet, and fibre port configuration
- Fibre LUN mapping
- Assigning LUN maps to Hosts
- Trace level settings

All of the above settings may be changed and saved.

 **NOTE:** Unless otherwise indicated, configuration changes take effect when the system next powers on or reboots.

### Power-up messages

When the HP e1200-320 4Gb Interface Card powers on, a series of power-up messages appear on the terminal or terminal emulation program for the serial port or the Telnet utility for Telnet sessions.

A series of power-up self tests are performed while the library starts (which can take up to 90 seconds), and messages related to these tests are visible from the serial port. If completed successfully, the main menu appears, as shown in [Figure 40](#).

 **NOTE:** The illustrations in this chapter use **Xs** to represent numeric values for certain data fields, such as the product release version and the revision of firmware.

 **NOTE:** For the serial port, if you do not see messages over the Command Line Interface, you may need to re-check your computer’s serial port settings.

The main menu appears as follows:

**Figure 40** Main menu

```
HP StorageWorks e1200-320 4Gb Interface card
X.XX.XX XXXXXX XXXXXXXXXXXXXXXXXXXX
07/7/2005 18:37:08

1) Perform Configuration
2) System Utilities
3) Display Trace and Assertion History
4) Reboot
5) Download a New Revision of The Firmware

Command >
```

The main menu allows for various operations to be performed on the interface card.

- Select **1** to access interface card configuration settings.
- Select **2** to access System Utilities.
- Select **3** to display trace and assertion history.
- Select **4** to reboot the interface card. A confirmation message appears to verify this action.
  - Enter **N** to return to the System Utilities menu.
  - Enter **Y** to restart the interface card.
- Select **5** to download a new revision of the firmware. A confirmation message appears to verify this action. (For additional information see ["Download a new revision of the firmware"](#) on page 88.)
  - Enter **N** to return to the Main menu.
  - Enter **Y** for the interface card to accept firmware data from the serial port.

## Perform configuration

The Perform Configuration menu allows the administrator to configure the various options on the interface card. For most configuration changes to take effect, you must reboot the interface card.

 **NOTE:** Menus are not case sensitive. You can enter uppercase and lowercase characters interchangeably, whenever menus indicate letters as choices.

**Figure 41** Configuration menu

```

                                Configuration Menu
                                X.XX.XX  XXXXXX  XXXXXXXXXXXXXXXXXXXX
                                07/7/2005  08:56:22

1) Baud Rate Configuration
2) Ethernet Configuration
3) Fibre Channel Configuration
4) Parallel SCSI Configuration
5) Device Mapping
6) Trace and Event Settings Configuration
7) Real-Time Clock Configuration
8) Active Fabric Configuration

A) Save Configuration
B) Restore Last Saved Configuration
C) Reset to Factory Defaults

X) Return to main menu

```

## Baud rate configuration

This menu changes the baud rate used on the serial port. Select **1** through **5** for the appropriate baud rate setting. If you are using the Autobaud feature, it may not be necessary to set a baud rate. See "[Autobaud feature](#)" on page 21 for more information on using the Autobaud feature. The default setting for the baud rate is 115200.

**Figure 42** Baud rate configuration menu

```
Baud Rate Configuration Menu
X.XX.XX  XXXXXX  XXXXXXXXXXXXXXXXXXXX
          07/7/2005  08:56:22

1)  9600           2)  19200
3)  38400          4)  57600
5)  * 115200

X) Return to previous menu
```

---

 **NOTE:** The asterisk (\*) symbol indicates the current setting for the baud rate.

---

## Ethernet configuration

This option allows for setting up all Ethernet network settings including IP address, subnet mask, IP gateway, security settings, Ethernet mode, physical address, and host name.

**Figure 43** Ethernet configuration menu

```

                                Ethernet Configuration Menu
                                X.XX.XX XXXXXX XXXXXXXXXXXXXXXXXXXX
                                07/7/2005 08:56:22

IP Address                      : 192.168.60.203 [DHCP]
Subnet Mask                     : 255.255.255.0
IP Gateway                      : 192.168.60.1
Ethernet Physical Address       : 00:E0:02:E3:17:51
Ethernet Mode                   : 10/100Mbps (Auto-Neg)
Hostname                       : interface card
DHCP Configuration             : Enabled

1) Change IP Address
2) Change IP Subnet Mask
3) Change IP Gateway
4) Change Ethernet Physical Address
5) Toggle Ethernet Mode
6) Change Hostname
7) Toggle DHCP Configuration
8) Change Security Settings

X) Return to previous menu
```

- Select **1** to change the IP address of the interface card.
- Select **2** to change the IP subnet mask for the interface card.
- Select **3** to change the IP gateway for the Ethernet network of the interface card.
- Select **4** to change the Ethernet physical address, or MAC address, of the interface card. Since Ethernet physical addresses are always assigned to Ethernet adapters by the manufacturers, HP recommends that this setting not be changed.
- Select **5** to toggle the Ethernet mode among the following options:
  - 10Mps Only
  - 100Mps (half duplex) Only
  - 100Mps (full duplex) Only
  - 10/100Mps (Auto-Neg.) **Default**
- Select **6** to change the host name. This is an alphanumeric entry of one word up to 8 characters long.

---

 **NOTE:** Do not use a capital Z as a part of the host name because this is the autobaud hot key used by the MS Windows terminal utility for serial connections.

---

- Select **7** to toggle the DHCP setting. This setting enables/disables support for Dynamic Configuration Protocol. The default setting is enabled. When enabled, the interface card retrieves a dynamic IP address from a DHCP server located on the Ethernet network that the interface card is connected to. If DHCP is disabled and then enabled, it is necessary to **save** the current configuration and **reboot** the interface card before an IP address can be requested from the DHCP server. Use the following four steps:
  - a. Select **X Return to previous menu**.
  - b. Select **A Save Configuration**.
  - c. Select **X Return to previous menu**.
  - d. Select **4 Reboot**.

After the interface card finishes rebooting, the Main menu appears on the serial interface but, for Telnet, a new session needs to be opened to continue configuring the interface card. DHCP status can be verified from the Ethernet Configuration menu where DHCP Configuration is indicated as Enabled, if DHCP has been successfully activated. Note that the IP address may also appear different than the former non-DHCP IP address.

---

 **NOTE:** To use the DHCP feature, a DHCP server must be operational on the Ethernet network used by the interface card. If the DHCP feature is used when there is no DHCP server, the standard for DHCP requires that the interface card wait three minutes for a response from a DHCP server before timing out.

---

Your DHCP server may allow you to set up an extended lease reservation for an IP address by providing the server with the Ethernet MAC address of the interface card. This sets the DHCP server to always provide the same IP address to the interface card. This setup can be useful for remote management of the interface card via Telnet or Visual Manager. Because the method of setting up a lease reservation varies depending on the DHCP server being used, HP recommends that you contact your Network Administrator for assistance.

- Select **8** to change security settings, including the user name and password. User names and passwords should be unique and kept confidential and HP recommends using a combination of letters and numbers when creating user names and passwords.

## Fibre Channel configuration

This menu allows for setting the Fibre Channel Address method, Hard Address value, discovery mode, WWN overrides, tape backup settings, default map value, and FC port mode.

**Figure 44** Fibre Channel configuration menu

```
Fibre Channel Configuration Menu
X.XX.XX XXXXXX XXXXXXXXXXXXXXXXX
07/7/2005 08:56:22

Current Fibre Channel Configuration - Port 0:

FC Link Status      : DOWN
Node Name           : 0x100000E0 02031751
Port Name           : 0x100000E0 02231751
Port Mode           : N_Port Mode
Discovery Mode      : Manual Discovery Only
Buffered Tape Writes : Enabled, Queue Depth = 5
Current Default Map : 'Indexed'
Port Speed          : 2 GigaBit

1) Change World Wide Name High      2) Change World Wide Name Low
3) Toggle Port Mode                 4) Change ALPA Value
5) Toggle Discovery Mode             6) Toggle Buffered Tape Writes
7) Change Buffered Tape Queue Depth 8) Change Default Map Value
9) Edit FC Override Settings
A) Toggle Port Speed
X) Return to previous menu

Command >
```

 **NOTE:** For In-Band Management to be operational, WWN naming schemes **must** be compliant with IEEE Fibre Channel Format 1, where the left-most hexadecimal character (the NAA field) of the WWN is **1**. Further, the upper nibble of the third byte (the sixth hexadecimal value from the right) must be a value of **0** or **1**.

- Select **1** to enter a new value for the World Wide Name High. Ordinarily, this value should not be changed.

 **NOTE:** Resetting factory defaults overwrites any value a user has previously manually entered for the WWN.

- Select **2** to enter a new value for the World Wide Name Low. Ordinarily, this value should not be changed.

 **NOTE:** Resetting factory defaults overwrites any value a user has previously manually entered for the WWN.

- Select **3** to change the Toggle Port Mode between Auto Sense - Soft AL\_PA, N\_Port, and Auto Sense - Hard AL\_PA. The default setting is N\_Port mode. In this mode, the FC port tries coming up as a fabric port. If the interface card is on a loop and N\_Port mode is selected, an error in communication may occur. In Autosense - Soft AL\_PA mode, the interface card FC port tries to come up as a loop, and if not successful, then tries to come up as a fabric. If the port comes up as a loop, it determines whether it's on a private or public loop. If Auto Sense - Hard AL\_PA is selected, a unique one-byte valid value (derived from an Arbitrated Loop Topology as defined in ANSI specification FC\_AL 4.5) is used for the Fibre Channel configuration. When configuring the Fibre Channel AL\_PA, the interface card presents a list of loop addresses along with the corresponding AL\_PA. From here, the user can select the loop address desired.
- Select **4** to set the Hard AL\_PA Value by entering a node number from the AL\_PA lookup table that appears when this option is selected. For more information, see "[Arbitrated Loop Node number to AL\\_PA lookup table](#)" on page 114 in "[Addressing, structures, and operations](#)" on page 113.
- Select **5** to toggle the Discovery Mode among the following options:
  - Auto Discovery on Reboot Events
  - Auto Discovery on Link Up Events
  - Manual Discovery Only

---

**IMPORTANT:** HP recommends that you only use the **Manual Discovery Only** setting.

---

Discovery Mode determines how the interface card discovers a new FC devices.

**Auto Discovery** allows the interface card to automatically discover all Fibre Channel devices when the interface card reboots.

- **Reboot Events** discovers both the ports and the devices behind the ports.
- **Link-up Events** discovers both the ports and the devices behind the ports for the first link-up event (which is the first reboot of the interface card). Subsequent link-up events only discover the ports and not the devices behind the ports.

**Manual Discovery** is the default selection and sets discovery of new devices to only occur after the user selects the Refresh Device Display option from the Display Attached Fibre Channel Devices menu, located under **Main menu > System Utilities > System Statistics > Display Fibre Channel Protocol Status > Display Attached Fibre Channel Devices > Refresh Device Display**.

- Select **6** to toggle Buffered Tape Writes to enabled or disabled. Buffered Tape Writes is an option designed to enhance system performance. By returning status on consecutive write commands prior to the tape device receiving data, Buffered Tape Writes remove the latency of waiting for responses from the tape device. In the event that data does not transfer correctly for any reason, the interface card returns a check condition on a subsequent command.

---

 **NOTE:** The default setting is enabled. If the application requires confirmation of individual blocks being written to the medium, such as audit trail tapes or log tapes, this option should be disabled.

---

- Select **7** to change the Tape Backup Queue Depth. Select a value from 0 through 10.
- Select **8** to change the Default Map Value for the current port. This can be Indexed, Auto-assigned, or SCC. The default setting is Indexed. The FC Auto-assigned map contains all the SCSI devices that are attached to the interface card.

---

**NOTE:** When a new initiator contacts the interface card through the selected port, it accesses the devices that are in this map by default.

---

- Select **9** to edit the FC override settings. When this option is selected, the following menu appears.

Following are descriptions for each of the override settings:

---

 **NOTE:** Normally, override settings should not be changed except when directed to do so by an authorized HP technician.

---

- Select **1** to toggle the **Hi-Sup Bit** between SET and CLEAR. The default setting is CLEAR. This option should be toggled to SET when the server uses the Hi-Sup bit to scan for FC LUNs greater than eight.

---

 **NOTE:** Hi-Sup Bit is only set in an Active Fabric LUN which needs to be mapped as the first device (FC LUN 00).

---

- Select **2** to toggle the **Force FCP Response Code** between OFF and ON for support of Compaq-specific HBAs #223180-B21 and #120186-001. The default setting is OFF.
- Select **3** to toggle the **Initiator/Target Bit Setting in PRLI** between INITIATOR Bit Set, TARGET Bit Set, INITIATOR & TARGET Bits Set, and INITIATOR & TARGET Bits CLEAR. This should be configured to one of the options for SET on both interface cards/routers when using the interface card in an interface card-to-router configuration (a configuration where at least one interface card/router appears as a target to at least one other interface card/router that appears as an initiator). The default setting is INITIATOR & TARGET Bits SET.
- Select **4** to toggle the **Initiator/Target Bit Setting in PRLI\_ACC** between INITIATOR Bit Set, TARGET Bit Set, INITIATOR & TARGET Bits Set, and INITIATOR & TARGET Bits CLEAR. This should be configured to one of the options for SET on both interface card/routers when using the interface card in an interface card-to-router configuration (a configuration where at least one interface card/router appears as a target to at least one other interface card/router that appears as an initiator). The default setting is TARGET BIT SET.
- Select **5** to toggle **FC Confirm Setting in PRLI\_ACC** between FC CONFIRM SET and FC CONFIRM CLEAR. The default setting is FC CONFIRM SET. This option should be toggled to FC CONFIRM SET when the server is using QLogic HBAs.
- Select **6** to access the **Target Reset Mode** menu. The default setting is setting **ALTERNATE**.

Following are descriptions for each of the settings:

- Select **1** to use a normal SCSI bus reset code to recover from a bus problem.
- Select **2** to use a progressive SCSI bus recovery mechanism that first attempts to recover the bus by attempting a target reset and, if this fails, then trying the bus reset.
- Select **7** to toggle **Force FLOGI in Private Loop** between Disabled and Enabled. The default setting is Disabled. FLOGI Fabric Login is a process by which a node makes a logical connection to a fabric switch. This setting should be used to connect the attached Fibre Channel devices as private loop devices for certain switched fabric environments.
- Select **A** from the Fibre Channel Configuration menu to toggle the port speed between 1, 2, and 4 Gb/s for the selected FC port.

## Parallel SCSI configuration

This menu allows for setting up SCSI attributes.

**Figure 45** Parallel SCSI configuration menu

```
Parallel SCSI Configuration Menu
X.XX.XX  XXXXXX  XXXXXXXXXXXXXXXXXXXX
          07/7/2005  08:56:22

Current SCSI Configuration - Bus 0

Discovery                : Enabled
Bus Reset on Boot       : Enabled
Discovery delay time    : 30 seconds
Internal Termination    : Enabled

1) Edit Initiator Settings
2) Enable/Disable SCSI Discovery
3) Enable/Disable SCSI Reset on Boot
4) Set Discovery Delay Time
5) Set SCSI Termination Mode
6) Set Maximum SCSI Bus Connect Speed

X) Return to previous menu

Command, <enter> for next bus >
```

Press the **Enter** key to toggle the current menu to the next SCSI bus.

- Select **1** to edit the SCSI Initiator menu settings, described later in the chapter.
- Select **2** to enable/disable SCSI Discovery.
- Select **3** to enable/disable SCSI bus Reset on Boot. When enabled, the interface card automatically resets SCSI buses after initial library power-up and after reboots.
- Select **4** to set the discovery delay time for SCSI devices. The default is 30 seconds. This is the time the interface card waits after a power-up or reboot before starting to discover SCSI devices. This value should be set to no less than 250ms, according to the SCSI standard for Reset-to-Selection Time. This value may need to be increased to ensure that all SCSI devices complete their individual power-ups. With Discovery enabled, the Discovery Delay lengthens the time taken by the interface card to reboot.
- Select **5** to toggle the SCSI termination mode between **Enabled** and **Disabled**. This option is automatically set to Enabled for Internal termination. The Internal setting allows the interface card to internally terminate a SCSI connection. Setting this option to Disabled allows the SCSI bus, not the interface card, to handle SCSI terminations.
- Select **6** to access menu settings for the maximum SCSI bus connection speed, described later in this chapter. Note that when this option is selected, the user is prompted to select a Target ID on the currently selected bus. Currently, maximum speed settings are shown.

## SCSI initiator menu

This option allows for setting up the SCSI Initiator.

**Figure 46** SCSI initiator menu

```
SCSI Initiator Menu
X.XX.XX  XXXXXX  XXXXXXXXXXXXXXXXXXXX
07/7/2005  08:56:22

Current Initiator Configuration - Bus 0

Initiator ID      : 07

1) Select primary SCSI Initiator ID
2) Enable/Disable alternate SCSI ID
   (The "alternate" ID is used to enhance the performance
   of status ("agent") commands that are being issued to a
   serial device. To use this feature enable the alternate
   ID and pick an ID that is currently unused on this bus.)
3) Select alternate SCSI Initiator ID

X) Return to previous menu
```

- Select **1** to select the primary SCSI Initiator ID. This is the ID for the SCSI device that requests operations from other SCSI devices known as targets. This should be a unique ID on the bus. This value is initially blank and the user must enter an integer value in the range of 0-15 prior to saving the configuration to the interface card.
- Select **2** to enable/disable an alternate SCSI Initiator ID.
- Select **3** to select an alternate SCSI Initiator ID. This should be a unique ID on the bus. The default value is 6. This option is used to enhance the performance of status (agent) commands issued to a serial device.

## Maximum SCSI bus speed menu

This option allows for setting the maximum SCSI bus speed. When this option is selected, the user must first select the Target ID for the bus before this menu appears.

**Figure 47** SCSI bus speed configuration menu

```
SCSI Bus Speed Configuration Menu
X.XX.XX  XXXXXX  XXXXXXXXXXXXXXXXXXXX
07/7/2005  08:56:22

Bus 0, Target 15 Current Configuration:

Maximum SCSI Bus speed set to Ultra320 (320 MB)

1) Set Maximum Speed to Ultra320: (320 MB)
2) Set Maximum Speed to Fast-160 (160 MB)
3) Set Maximum Speed to Ultra 2 (80 MB)
X) Return to previous menu
```

- Select **1** to set the maximum SCSI bus speed to Ultra320. This setting provides support for transfer rates of up to 320 Megabytes per second. This is the default setting.
- Select **2** to set the maximum SCSI bus speed to Fast-160. This setting provides support for transfer rates of up to 160 Megabytes per second.
- Select **3** to set the maximum SCSI bus speed to Ultra 2. This setting provides support for transfer rates of up to 80 Megabytes per second.
- Select **X** to return to the Target ID selection prompt where a different Target ID can be selected.

## Device mapping

This option allows the user to manipulate maps and associate selected host with a particular map. Each physical port/bus on the system has at least an *Indexed* map and *Auto Assigned* map. In addition, there is a *SCC Map* and a *Port 0 Device Map* on FCP ports. Each map has a unique name and map ID. You can rename all maps, except for **Indexed**, **Auto Assigned**, and **SCC**. The map that is set to be current must always contain valid information, since many of the operations on the map menu are executed against this map.

**Figure 48** Device mapping main menu

```
Device Mapping Main Menu
X.XX.XX  XXXXXX  XXXXXXXXXXXXXXXXXXXX
07/7/2005  08:56:22

Current Default Map for FCP Port 0 - 'Indexed'

1) Select Current Map
2) Display Current Map
3) Create New Map
4) Remove Current Map
5) Edit Current Map
6) Clone Current Map
7) Edit Host List for Current Map
8) Display Device List
9) Activate Mapping and Save

X) Return to previous menu

Command >
```

- Select **1** from the **Device Mapping Main menu** to display all the maps defined by the system for the current protocol/port, and to choose one of the maps from the list to make it a **current** map. The map selected from this list is the one used by the interface card to direct data to the appropriate targets and initiators.

---

 **NOTE:** Because the entire list of maps may not fit on one screen, select **N** or **P** to go back and forth between screens displaying more maps. Select **X** to return to the Device Mapping Main menu.

---

Enter the number from the column on the left side of the table to select a map and make it **Current**. For example, entering **3** from the picture above would select the map named **SCC Map** on Fibre Channel Port 0 and make it a **Current** map.

- Select **2** from the Device Mapping Main menu to display the content of the **current** map. This option displays all the entries in the map. Information in the local part of the address (left) depends on the type of protocol for which the map is defined. The specific device address information depends on the protocol/port where the device resides. Mapping a device to the same port where it resides is not allowed. (that is, you can not map a disk on FCP Port 0 to an address on FCP Port 0.)

---

 **NOTE:** Because the entire list of maps may not fit on one screen, select **N** or **P** to go back and forth between screens displaying more maps. Select **X** to return to the Device Mapping Main menu.

---

- Select **3** from the Device Mapping Main menu to create a new map. This option allows adding a new map for the current protocol/port or bus. Once the map is created, it becomes the current map.
  - Select **4** from the Device Mapping Main Menu to delete current map. The screen asks for confirmation before deleting the map. After the map has been deleted, the default map for the current port becomes the current map. Maps with names Indexed, Auto Assigned or SCC Map may not be removed.
  - Select **5** from the Device Mapping Main menu to edit current map. This option displays the **Map Edit menu** and allows user to edit the name of the map, change content of the map, clear, and fill the map. Editing an Auto Assigned or SCC Map is not allowed.
- 

 **NOTE:** Enter the number of one of the available selections, or enter **X** to exit to the Device Mapping Main menu.

---

- Select **1** from the Map Edit menu to edit the name of the current map. The name of the Indexed map may not be changed. Map name also cannot be left empty.
  - Select **2** from the Map Edit menu to edit entries in the current map. This screen allows the user to navigate up and down the map entries and create or remove entries. Device lists are also available to the user to make it easier to identify the device to be mapped. Mapping device to its native port/bus is not allowed. The information needed to create entries is protocol/port dependent.
- 

 **NOTE:** Control of the editing process is done with simple single letter commands. Select **N** and **P** to scroll up and down the map entries. Select **X** to return to the Map Edit menu. Select **A** to add a new entry to the map or **D** to delete an already existing entry in the map. Select **R** to remove the gaps in the map.

---

 **NOTE:** SCSI devices attached to a Fibre Channel port must be mapped as sequential FC LUNs starting at LUN number 00. Skipping LUN numbers is not recommended when mapping FC LUNs because FC Discovery stops the discovery process whenever an empty LUN position is found.

---

## Adding an entry

To add a new entry, the user must enter the desired Index. If the selected Index is already present in the map, the user is asked to confirm the override or enter different address information. Next, the operator is prompted for the protocol and port at which a device selection list is generated. (Devices may not be mapped to their native port).

The following is an example of adding an entry for an FCP map:

**Figure 49** Adding an FCP port entry

```
Enter desired Index > 0

Select Protocol (0 - SCSI, 1 - AF, X=Cancel) > 0
Select SCSI Port: Port# = ? (0-1,X=Cancel) > 1
```

---

 **NOTE:** If the operator selects a device with LUN '-', all LUNs for this Target are added to the map.

---

---

 **NOTE:** Hi-Sup Bit is only set in an Active Fabric LUN which needs to be mapped as the first device (FC LUN 00).

---

Select a number from the left column **Num** to add a device to the map. Selecting a device where LUN='.' adds all LUNS for this target. If the selected device is already mapped, an error message appears to warn the user about adding a duplicate device. **N** and **P** controls allow scrolling up and down the device list. **X** brings the user back to the **Edit Map Entries** display table.

## Creating an entry

The user can create an empty map, or use an existing map to pre-enter devices that are not yet online. To perform this operation, the user has to know all the essential information about the device. A series of questions are asked to guide the user through the process. The questions vary based on the **current** map protocol.

The user is asked to:

- Select the LUN address for a device,
- The protocol/port on which device it resides,
- The Name for the device (which can be left empty),
- And the type of device

**Figure 50** Creating an entry for FCP port map

```
Enter desired lun address > 1

Select Protocol (0 - SCSI, X=Cancel) > 0
Enter desired Device Name (could be empty) >

DISK_DEVICE           - 0,  TAPE_DEVICE           - 1
PRINTER_DEVICE        - 2,  PROCESSOR_DEVICE        - 3
WORM_DEVICE           - 4,  CDROM_DEVICE           - 5
SCANNER_DEVICE        - 6,  OPTICAL_DEVICE         - 7
MEDIUM_CHGR_DEVICE   - 8,  COMM_DEVICE            - 9
ARRAY_CTLR_DEVICE     - 12, ENCLOSURE_SRV_DEVICE - 13

Enter desired Device Type > 1

Enter device target id > 5

Enter device lun id > 0
```

---

 **NOTE:** If the device being added is a SCSI device, the user is also asked to enter Target ID and LUN ID for the device. Target ID must already be defined in the SCSI Configuration. Otherwise, adding a device is not permitted.

---

**NOTE:** Select MEDIUM\_CHGR\_DEVICE for the library or robot controller.

---

---

 **NOTE:** When creating a device that does not exist, it will be displayed with **Down** status.

---

## Remove gaps

 **NOTE:** SCSI devices attached to a Fibre Channel port must be mapped as sequential FC LUNs starting at LUN number 00. Skipping LUN numbers is not recommended when mapping FC LUNs because FC Discovery stops the discovery process whenever an empty LUN position is found.

This option removes any incremental gaps in the sequence of LUNs listed in the table.

## Deleting an entry

The user selects a LUN ID.

**Figure 51** Deleting an entry

```
Select LUN to delete (X=Cancel, D=DeleteMultiple) > 0

Are you sure you want to delete LUN 0? (Y=Confirm, X=Cancel) > y
```

Select **D** to delete multiple LUNs:

 **NOTE:** When deleting multiple LUNs, the user can list the LUNs to delete in a comma or space delimited format.

- Select **3** from the Map Edit menu to clear (that is, remove all entries from) the current map. The user is prompted for confirmation.
- Select **4** from the Map Edit menu to fill the current map. This selection scans the device list and appends all unmapped devices at the end of the current map. Devices marked as **DOWN** are not mapped. After this operation completes, the Edit Map Entries screen appears.
- Select **6** from the Device Mapping Main menu to clone current map. This option allows the user to make an exact copy of an already existing map complete with all entries. Cloning of **Auto Assigned** or **SCC Map** is not allowed. The new map must have a unique map ID and name. Once cloning is complete, the newly created map becomes current map. The purpose of this option is to create a base for a new map that is similar to an already existing map.
- Select **7** from the Device Mapping Main menu to edit the host list for the current map. The current map can be associated with hosts available in the host list on the same port where the map is defined. Initially all hosts are associated with an Indexed map. These are **built at runtime** hosts. They cannot be edited or deleted; their name cannot be changed.

The following is an example of a host list for FCP hosts:

**Figure 52** Host list for FCP hosts

```
Host List Edit Display
X.XX.XX XXXXXX XXXXXXXXXXXXXXXXXXXX
07/7/2005 08:56:22

Current Map: FCP Port 0 - Name 'Indexed'

FCP Port# 0 Host List:
+-----+-----+-----+-----+-----+
| Num | Port WWN | Node WWN | Host Name | | Active Map Name |
+-----+-----+-----+-----+-----+
| 1 | Hi 0x210000E0 | Hi 0x200000E0 | (built at runtime) | | Indexed |
| | Lo 0x8B02C20E | Lo 0x8B02C20E | PortID = 0x0000EF | | |
+-----+-----+-----+-----+-----+

Page # 1 out of 1 pages.
Total Number of Hosts = 1
Select Host Number(1 - 1) to associate host with the Current Map
Enter (N=Next, P=Prev, A=Add, D=Delete, E=Edit, X=Exit) >
```

 **NOTE:** Because the entire list of hosts may not fit on one screen, select **N** or **P** to see any additional pages showing the list of hosts. Select **X** to return to the Device Mapping Main menu. Select a number from the column on the left to associate a host with the **current** map. At this point the user can edit, delete, or change the name for the host.

## Adding a host

Select **A** to add a host to the list. The user is prompted to enter the desired Host Name, Host ID, Port WWN and Node WWN for FCP host. WWN values are hexadecimal. If the user doesn't know the Host ID, the host won't be added to the host list. Duplicate hosts won't be added to the list.

**Figure 53** Adding a FCP host

```
Enter desired Host Name > Fcp Host
Do you know Port ID of the Host?(y/n) > y

Enter Host ID of the host > 0000ef

Enter the new host's Port WWN High > 210000E0

Enter the new host's Port WWN Low > 8B02C20E

Enter the new host's Node WWN High > 200000E0

Enter the new host's Node WWN Low > 8B02C20E
Host was successfully added to the host list!!!
```

Following the successful addition of the host, the host list is displayed again and the user can make sure that the host information is correct.

## Deleting a host

Select **D** to delete a host from the host list. The operator is asked to enter an index for the host that is displayed in the very left column of the table, and asked for confirmation.

## Editing a host

Select **E** to edit host information. Old information is displayed on the screen, and the user is asked to enter information to replace it, or just hit **Enter** to keep old information. All of the information entered by the user is validated. The following is an example of editing a host list for an FCP Port:

**Figure 54** Editing host list for FCP port

```
Host List Edit Display
X.XX.XX XXXXXX XXXXXXXXXXXXXXXXXXXX
07/7/2005 08:56:22
Current Map: FCP Port 0 - Name 'Indexed'
FCP Port# 0 Host List:
+-----+-----+-----+-----+-----+
| Num | Port WWN | Node WWN | Host Name | Active Map Name |
+-----+-----+-----+-----+-----+
| 1 | Hi 0x210000E0 | Hi 0x200000E0 | | Default |
| | Lo 0x8B02C20E | Lo 0x8B02C20E | PortID = 0x0000EF | |
+-----+-----+-----+-----+-----+
Page # 1 out of 1 pages.
Total Number of Hosts = 1
Select Host Number(1 - 1) to associate host with the Current Map
Enter (N=Next, P=Prev, A=Add, D=Delete, E=Edit, X=Exit) > e

Select Host to edit (X=Cancel) > 1
Old Host Name:
Enter desired new name (<enter> = use old name) > New FCP Host

Old host's Port WWN High: 0x210000E0
Enter desired Port WWN High(<enter> = use old Port WWN High) >

Old host's Port WWN Low: 0x8B02C20E
Enter desired Port WWN Low(<enter> = use old Port WWN Low) >

Old host's Node WWN High: 0x200000E0
Enter desired Node WWN High(<enter> = use old Node WWN High) >

Old host's Node WWN Low: 0x8B02C20E
Enter desired Node WWN Low(<enter> = use old Node WWN Low) >
```

- Select **8** from the Device Mapping Main menu to display the entire device list. Because the entire device list may not fit on one screen, select **N** or **P** to go back and forth between screens displaying more maps. Select **X** to return to the Device Mapping Main menu.

**Figure 55** Entire device list

```

Entire Device List
X.XX.XX XXXXXX XXXXXXXXXXXXXXXXXXXX
07/7/2005 08:56:22

+-----+-----+-----+-----+-----+-----+-----+-----+-----+
+
| # | | Prtl | Port | TYPE | STAT | Protocol Specific Information | Rt | Ct |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+
+
| 1 | | SCSI | 1 | TAPE | UP | Target= 3 Lun= 0 | 2 | 2 |
| 2 | | SCSI | 2 | TAPE | DOWN | Target= 5 Lun= 0 | 1 | 1 |
| 3 | | SCSI | 5 | TAPE | UP | Target= 1 Lun= 0 | 2 | 2 |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+
+
Page # 1 out of 1 pages.

===> Number of entries in the Device Table = 3

Enter (N=Next, P=Prev, X=Exit) >

```

- Select **9** from the Device Mapping menu to activate port mapping changes.

---

**CAUTION:** Before activating any port mapping changes, HP strongly recommends that the user verifies there are not any command or data operations occurring in conjunction with devices affected by the mapping changes. For example, deleting a LUN or device from a map may disrupt I/O transfers with that device. It is the user's responsibility to ensure that no operations are negatively impacted due to the activation of mapping changes.

---



---

**NOTE:** All current mapping settings take effect immediately. If another management interface has made unsaved mapping changes, those changes are lost. Current mapping settings are also not visible in other interfaces until the interface card is rebooted.

---



---

**NOTE:** If the Activate Port Mapping Changes option is not selected, the mapping changes do not take effect until the interface card is rebooted.

---

## Trace and event settings configuration

This option allows set up of trace and events settings.

**Figure 56** Utility settings

```
Utility Settings
X.XX.XX XXXXXX XXXXXXXXXXXXXXXXXXXX
07/7/2005 08:56:22

1) Trace Settings Configuration
2) Event Settings Configuration
3) Special Event Logging Configuration

X) Return to previous menu
```

- Select **1** to edit the trace settings configuration.
- Select **2** to edit the event settings configuration.
- Select **3** to edit the special event logging configuration.

## Trace configuration

This option allows trace levels to be set. These settings should not be modified in normal operation, as performance degradation may result. There are two pages of trace levels.

**Figure 57** Trace settings

```
Trace Settings
X.XX.XX XXXXXX XXXXXXXXXXXXXXXXXXXX
07/7/2005 08:56:22

0) General Errors      : ON
1) FCP Driver          : OFF
2) FCP Transport       : OFF
3) FCP Management      : OFF
4) PS Transport        : OFF
5) PS Management       : OFF
6) PS Driver           : OFF

U) Update Current Operating Trace Levels
X) Return to previous menu

Enter the trace level index, <enter> for next page >
```

If the Enter key is selected, the next page of trace levels appears as follows:

**Figure 58** Trace settings

```
Trace Settings
X.XX.XX XXXXXX XXXXXXXXXXXXXXXXXXXX
07/7/2005 08:56:22

0) SG List           : OFF
1) Timing            : OFF
2) FCP/RMI          : OFF
3) AF                : OFF
4) INBAND            : OFF
5) Multi-Host Lib    : OFF
6) Queue Element     : OFF

U) Update Current Operating Trace Levels
X) Return to previous menu

Enter the trace level index, <enter> for next page >
```

Enter a level number from the Trace Settings that are shown. This toggles the current setting to either **ON** or **OFF**.

Select **U** to update current operating trace levels. This option forces the currently displayed trace settings to become effective immediately, without requiring a reboot or power cycle.

---

 **NOTE:** Be sure to set the clock and date in the Real-Time Clock Configuration menu so event logging is accurate.

---

## Event configuration

This option allows selecting the event threshold for filtering event logging. The asterisk denotes the current setting.

**Figure 59** Event filter settings

```
Event Filter Settings
X.XX.XX XXXXXX XXXXXXXXXXXXXXXXXXXX
07/7/2005 08:56:22

1) Disable Event Logging 6) Warning events
2) Emergency events      7) Notify events
3) Alert events          8) Info events
4) Critical events        9) Debug events
5) Error events          0)* Log all events

U) Update Current Operating Trace Levels
X) Return to Previous menu

Enter event threshold <0-9> >
```

- Enter **1** to disable event logging.
- Enter **2** through **9** to log the specified events or higher.
- Enter **0** to log all events.
- Select **U** to send event configuration changes to the interface card now.

---

**NOTE:** Event logging captures over 2000 events and then starts overwriting the log when full.

---

 **NOTE:** Be sure to correctly set the clock and date in the Real-Time Clock Configuration menu so that event logging is accurate.

---

## Special event logging configuration

This option allows selecting the special event log settings.

**Figure 60** Special event log settings

```

Special Event Log Settings
X.XX.XX  XXXXXX  XXXXXXXXXXXXXXXXXXXX
          07/7/2005  08:56:45

Abort Event Logging           : Disabled
Reservation/Release Events Logging : Disabled
Prevent Media Removal Events Logging : Disabled

1) Toggle Abort Event Logging
2) Toggle Reservation/Release Event Logging
3) Toggle Prevent Media Removal Event Logging

U) Update Current Operating Special Event Logging
X) Return to Previous menu

```

- Enter **1** to toggle Abort Event Logging.
- Enter **2** to toggle Reservation/Release Event Logging.
- Enter **3** to toggle Prevent Media Removal Event Logging.
- Select **U** to send event configuration changes to the interface card now.

## Real-Time clock configuration

When this option is selected from the Perform Configuration menu, the System Clock Setup menu appears.

---

**NOTE:** The time is based on a 24-hour clock. There is no a.m. or p.m. designation. For example: 1:00 p.m. is 13 hours 00 minutes or 13:00.

---

**Figure 61** System clock setup menu

```
System Clock Setup Menu
X.XX.XX XXXXXX XXXXXXXXXXXXXXXXXXXX
07/7/2005 08:56:22

TUESDAY, Date: 07/7/2005, Time: 08:56:22

1) Set clock
X) Return to previous menu
```

Select **1** to set the clock. A series of three prompts appear allowing the set up of 24 hour time (hh:mm:ss), current date (mm/dd/yyyy), and the day of week (SUN, MON, TUE, WED, THU, FRI, SAT). For time, it is not necessary to enter the seconds, that is, hh:mm is an acceptable format. For the date, the month and day can be entered as single digits, for instance **6** instead of **06**.

## Active fabric configuration

When this option is selected from the Perform Configuration menu from the Main menu, the Active Fabric menu appears.

---

**NOTE:** An Active Fabric Controller LUN is needed when using Library & Tape Tools to upgrade the interface card firmware, and to generate support tickets.

---

**Figure 62** Active fabric configuration menu

```
Active Fabric Configuration Menu
X.XX.XX XXXXXX XXXXXXXXXXXXXXXXXXXX
07/7/2005 08:56:22

Current Active Fabric Configuration:

Server Free Backup Mode           : DISABLED
Number of interface card LUNS (0-4) : 1
interface card LUNS in auto-assigned map go: last

1) Change number of interface card LUNS
2) Change location of luns in auto-assigned map

X) Return to previous menu
```

- Select **1** to change the number of interface card LUNs reported by the interface card. This value can be set to a number in the range of 0 to 4.
- Select **2** to change the location of LUNs in an auto-assigned map. LUNs can be positioned starting at the beginning (first location) or at the end (last location) of the map.

For more information on interface card LUNs, see “[Inband SCSI-3 commands](#)” on page 109.

## Save configuration

This option saves the current configuration state in FLASH, which updates the saved previous configuration state. Saved changes are retained across future device resets or power cycles.

## Restore last saved configuration

This option restores the most recently saved configuration. This can be useful when configuration changes are made, but the user wishes to return to the previously saved configured state. The changes take effect after the interface card has rebooted.

## Reset to factory defaults

This option resets all current configuration options to the factory defaults and saves those options to FLASH memory as the current configuration. The changes take effect after the interface card has rebooted.

## System utilities

**Figure 63** System utility menu

```

System Utility Menu
X.XX.XX  XXXXXX  XXXXXXXXXXXXXXXXXXXX
07/7/2005  08:56:22

1) System Statistics Menu
2) Event Log
3) Runtime Report
4) Enter System Diagnostics Mode
5) Special Fibre Channel Link States
6) SCSI Command Tracking

X) Return to main menu

```

- Select **1** to display the System Statistics menu, described later in this chapter.
- Select **2** to display the Event Log menu, described later in this chapter.
- Select **3** to view the Runtime Report, described later in this chapter.
- Select **4** to enter diagnostics mode. A confirmation message appears verifying that you want to do this. If you enter **N** for No, you are returned to the System Utilities menu. If you enter **Y** for Yes, the interface card enters System Diagnostics Mode. This option is described in more detail later in this chapter.
- Select **5** to access a special diagnostic utility. This utility should not be used unless under the guidance of an authorized HP technician.
- Select **6** to display the SCSI Command Tracking menu, described later in this chapter.

## System statistics menu

**Figure 64** System status/statistics menu

```
System Status/Statistics menu
X.XX.XX  XXXXXX  XXXXXXXXXXXXXXXXXXXX
          07/7/2005  08:56:22

1) Display System Status
2) Display Fibre Channel Protocol Status
3) Display Parallel SCSI Protocol Status

X) Return to main menu
```

- Select **1** from the System Status/Statistics menu to display system status.

**Figure 65** System status menu

```
System Status Menu
X.XX.XX  XXXXXX  XXXXXXXXXXXXXXXXXXXX
          07/7/2005  08:56:22

1) Display memory statistics
2) Display active tasks
3) Display stack usage
4) Display SCSI Protocol Resources

X) Return to previous menu
```

- Select **1** to display memory statistics.
- Select **2** to display active tasks.
- Select **3** to display stack usage.
- Select **4** to display SCSI Protocol Resources.
- Select **2** from the System Status/Statistics menu to display Fibre Channel Protocol Status.

- Select **1** from the Fibre Channel Status menu to display Fibre Channel Link Status. [Figure 66](#) below shows the status and statistics for a Fibre Channel loop. Similar data can also be shown for a Fibre Channel fabric.

**Figure 66** Fibre Channel status & statistics

```

Fibre Channel Status & Statistics
X.XX.XX XXXXXX XXXXXXXXXXXXXXXXXXXX
07/7/2005 08:56:22

Current Fibre Channel Status - Port 0

LinkState      DOWN          ALPA          x00000000    InDevDataSeqs x00000000
OutDevDataSeq  x00000000    InLnkDataSeqs x00000000    OutLnkDataSeq  x00000000
InP_BSYFrames  x00000000    OutP_BSYFrms  x00000000    InF_BSYFrames  x00000000
InP_RJTFrames  x00000000    OutP_RJTFrame x00000000    LinkDowns      x00000000
InABTSs        x00000000    OutABTSs      x00000000    LaserFaults    x00000000
SignalLosses   x00000001    SyncLosses    x00000001    BadRxChars     x000000FF
LinkFailures   x00000001    BadCRCFrames  x00000000    ProtocolErrs   x00000000
BadSCSIframes  x00000000    UnderflowErrs x00000000

A) Autorepeat
C) Clear Statistics
X) Return to previous menu

Command >

```

**Table 7** Fibre Channel status

|   |
|---|
| <b>LinkState</b> is the current FC link status.                                       |
| <b>AL_PA</b> is the arbitrated loop physical address.                                 |
| <b>InDevDataSeqs</b> is the number of device data sequences received by this port.    |
| <b>OutDevDataSeq</b> is the number of device data sequences transmitted by this port. |
| <b>InLnkDataSeqs</b> is the number of link data frames received by this port.         |
| <b>OutLnkDataSeq</b> is the number of link data frames transmitted by this port.      |
| <b>InP_BSYFrames</b> is the number of P_BSY frames received by this port.             |
| <b>OutP_BSYFrms</b> is the number of P_BSY frames transmitted by this port.           |
| <b>InF_BSYFrames</b> is the number of F_BSY frames received by this port.             |
| <b>InP_RJTFrames</b> is the number of P_RJT frames received by this port.             |
| <b>OutP_RJTFrame</b> is the number of P_RJT frames transmitted by this port.          |
| <b>LinkDowns</b> is the number of link down conditions detected.                      |
| <b>InABTSs</b> is the number of ABTS frames received.                                 |
| <b>OutABTSs</b> is the number of ABTS frames transmitted.                             |
| <b>LaserFaults</b> is the number of laser faults detected.                            |
| <b>SignalLosses</b> is the number of times loss of signal was detected.               |

**Table 7** Fibre Channel status

|  |
|--|
| <b>SyncLosses</b> is the number of times loss of sync. was detected. |
| <b>BadRxChars</b> is the number of bad characters received.          |
| <b>LinkFailures</b> is the number of link failure conditions.        |
| <b>BadCRCFrames</b> is the number of frames received with a bad CRC. |
| <b>ProtocolErrs</b> is the number of protocol errors detected.       |
| <b>BadSCSIFrames</b> is the number of bad SCSI frames detected.      |
| <b>UnderflowErrs</b> is the number of underflow errors detected.     |

Select **A** to have the status information repeatedly refreshed.

- Select **2** from the Fibre Channel Status menu to display Attached Fibre Channel Devices.

**Figure 67** Fibre Channel device display

```
Fibre Channel Device Display
X.XX.XX  XXXXXX  XXXXXXXXXXXXXXXXXXXX
07/7/2005  08:56:22

FC Port: 0  Port id: 0x000001

R) Refresh Device Display
D) Display Device Details
X) Return to previous menu

Command, <enter> for next FC Port > r
Port 0: Requesting discovery
Doing device discovery on port 0...
Completed discovery on port 0

Fibre Channel Device Display
Version X.X XXXX

FC Port: 0  Port id: 0x000001

Port 0: TARGET DEVICE (UP)  Port id: 0x000010
HP Ultrium 3-SCSI  L22W  Type: Direct Access

R) Refresh Device Display
D) Display Device Details
X) Return to previous menu
```

Select **R** to refresh the device display (as shown in the menu above) with the latest status information and perform manual FC discovery (as set in the Fibre Channel Configuration menu described earlier in this chapter).

Select **D** to display device details.

- Select **3** to display FC Resource Status.
- Select **4** to display FC Driver Resource Status.

- Select **5** to display FC SeqCmd\_Q Resources.
- Select **6** to display FC SFP Data.
- Select **3** from the System Status/Statistics menu to display Parallel SCSI Protocol Status.

**Figure 68** Parallel SCSI protocol status menu

```

Parallel SCSI Protocol Status menu
X.XX.XX XXXXXX XXXXXXXXXXXXXXXXXXXX
          07/7/2005  08:56:22

1) Display SCSI Statistics
2) Display Attached SCSI Devices
3) Display SCSI Resource Status

X) Return to previous menu

```

- Select **1** to display SCSI statistics.
- Select **2** to display attached SCSI devices.

**Figure 69** SCSI device display menu

```

SCSI Device Display Menu
X.XX.XX XXXXXX XXXXXXXXXXXXXXXXXXXX
          07/7/2005  08:56:22

1) Issue discovery for all buses
2) Issue discovery for selected bus
3) Issue boot discovery (includes resets and delays)
4) Display all local devices
5) Display local devices on specified bus

X) Return to previous menu

```

- Select **1** to issue discovery for all SCSI buses.
- Select **2** to issue discovery for selected SCSI bus.
- Select **3** to issue boot discovery (includes resets and delays).
- Select **4** to display all local SCSI devices.
- Select **5** to display local devices on specified SCSI bus.
- Select **3** from the Parallel SCSI Protocol Status menu to display SCSI Resource Status.

## Event Log

When this option is selected from the System Utilities menu, the Event Log menu is displayed.

**Figure 70** Event log menu

```
Event Log Menu
X.XX.XX XXXXXX XXXXXXXXXXXXXXXXXXXX
07/7/2005 08:56:22

1) Display event log
2) Clear event log

X) Return to previous menu
```

- Select **1** to display the event log.
- Select **2** to clear the event log of all old entries and start over with an empty list.

---

 **NOTE:** Event logging captures over 2000 events and then starts overwriting the log when full; therefore, the more types of events logged, the faster the log rolls over and overwrites events.

---

## Runtime report

When this option is selected from the System Utilities menu, the Runtime Report prompt is displayed.

**Figure 71** Runtime Report

```
To save the Report to a file, enable your terminal's 'CAPTURE text' mode.

To start the Report, press 'y' (any other key cancels the Report): y

Runtime Report
X.XX.XX XXXXXX XXXXXXXXXXXXXXXXXXXX
07/7/2005 08:56:22

(... report details appear here ...)

***** END of the Runtime Report *****

The Report has been completed. You may stop the file CAPTURE.

( Press any key to continue... )
```

The Runtime Report presents a consolidated listing of all system information, traces, and the event log.

## Diagnostics mode

When this option is selected from the System Utilities menu, a confirmation message appears to verify the selection. If a response of **Y** (yes) is given to the confirmation message, current interface card activities are interrupted while the unit restarts itself and enters diagnostics mode. The power-up messages appear followed by the diagnostics menu.

**Figure 72** System diagnostics mode

```
System Diagnostics Mode
X.XX.XX  XXXXXX  XXXXXXXXXXXXXXXXXXXX
07/7/2005  08:56:22

1) Perform Ethernet External Loopback Test
2) Perform Fibre Channel Loopback Test
X) Exit diagnostics mode and reboot
```

- Select **1** to perform a loopback test of the Ethernet connection on the interface card unit. For the test to be performed correctly, an Ethernet loopback connector must be attached to the interface card's Ethernet port before selecting this option.
- Select **2** to perform a loopback test of the Fibre Channel connection on the interface card unit. For the test to be performed correctly, a Fibre Channel loopback connector must be attached to the interface card's Fibre Channel port before selecting this option.

Selecting **X** (exit) from System Diagnostics Mode has a confirmation message to verify the selection. If **Y** (yes) is given to the confirmation message, the interface card restarts itself and enters normal operation mode. The power-up messages appear followed by the main menu.

---

 **NOTE:** When exiting System Diagnostics Mode, remove any diagnostics cables before restarting the unit.

---

## Special FC link control

When this option is selected from the System Utilities menu, the Special Fibre Channel Link Control menu is displayed.

**Figure 73** Special FC Link states menu

```
Special FC Link Control
X.XX.XX  XXXXXX  XXXXXXXXXXXXXXXXXXXX
07/7/2005  15:05:45

Current FC Port 0:

Non Participating Mode = Off, LRC Bit in TL
Status Reg = Reset

1) Set FC Link to Non Participating Mode
2) Set FC LRC Mode Active ( bit=1 )
3) Set FC LRC Mode Inactive ( bit=0 )
4) Reset TL
5) Display TL Regs

X) Return to previous menu

Command, <enter> for next Port >
```

The settings provided on the Special FC Link states menu should only be used when directed to do so by an authorized technician for HP Systems.

## SCSI command tracking

When this option is selected from the System Utilities menu, the SCSI Command Tracking menu is displayed.

**Figure 74** SCSI Command Tracking menu

```
SCSI Command Tracking Menu
X.XX.XX  XXXXXX  XXXXXXXXXXXXXXXXXXXX
07/7/2005  15:05:45

1) Turn SCSI Command Tracking OFF
2) Display Available Hosts & Devices
3) Display Command Tracking Info
4) Clear ALL Command Tracking Info
X) Return to previous menu
```

- Select **1** to toggle SCSI Command Tracking ON or OFF. When toggled ON, all SCSI commands received or transmitted to or from the interface card are logged. When OFF, these commands are not logged. When set to ON, menu options **2** through **4** are also available from this menu.
- Select **2** to display all selected hosts and devices.
- Select **3** to set the data to be displayed in terms of Type (Device, Host, ALL), Protocol (FC, SCSI, Other, ALL), and Specific (ID or ALL). If ID is selected for Specific, this ID can be an FC LUN, Switch ID (S\_ID),

or other ID. SCSI commands which have already been tracked, then that information is displayed by selecting this option.

- Select **4** to clear the log of all previously recorded results.

## Display trace and assertion history

When this option is selected from the main menu, the Trace Dump menu is displayed. Trace options are set up in the Trace Settings Configuration menu.

**Figure 75** Trace dump menu

```
Trace Dump Menu
X.XX.XX  XXXXXX  XXXXXXXXXXXXXXXXXXXX
07/7/2005  08:56:22

1) Display trace for current boot cycle
2) Display trace from previous boot cycle
3) Display trace from last assertion failure
4) Clear current trace buffer
5) Clear (flash) assert trace buffer

X) Return to previous menu
```

- Select **1** to display trace history for the current boot cycle.
- Select **2** to display trace history from the previous boot cycle.
- Select **3** to display trace history from the last assertion failure.
- Select **4** to clear the current trace buffer. If cleared, then the **Display trace from current boot cycle** option does not show any data.
- Select **5** to clear the assert trace buffer. If cleared, then the **Display trace from last assertion failure** option does not show any data.

## Get a copy of trace buffer

To save copies of the trace buffers over FTP:

1. Connect the interface card to the Ethernet network used by your computer.
2. Start your FTP program using the interface card's IP address:

```
ftp <IP address>
```

---

**NOTE:** If the IP address of the interface card is not known or needs to be changed, connect to the interface card using a serial connection. The current interface card IP address is displayed and can be changed in the serial Ethernet Configuration menu.

---

The default network setting is DHCP.

---

 **NOTE:** You may also need to specify the directory location on your computer or network where your FTP program stores the trace file.

---

3. Use `root` as the user name and `password` as the password.
4. Specify Bin mode:

```
bin
```
5. Specify the filename (`.txt` file) with the `get` command.
  - For the current trace buffer, use `get curtrace.txt`.

- For the previous trace buffer, use `get prvtrace.txt`.  
The file transfers from the interface card.

## Reboot

When this option is selected, a confirmation message appears to verify the selection. If a response of **Y** (yes) is given to the confirmation message, current interface card activities are disrupted while the unit restarts itself. The last saved configuration changes also take effect after the interface card powers on again.

## Download a new revision of the firmware

When this option is selected, a confirmation message appears to verify the selection. If a response of **Y** (yes) is given to the confirmation message, current interface card activities are interrupted while the unit begins accepting the new firmware from the serial port.

To download firmware using a terminal or terminal emulator connected to the serial port of the interface card:

1. From the Main menu, select the **Download a New Revision of the Firmware** option to start the download procedure.
2. When you confirm you want to download, the interface card starts the download process.
3. Use the **Transfer > Send File** option in the terminal emulator utility.
4. Select the location of the firmware. Use the **Browse** button, if you need help finding it.
5. The download transfer protocol should use 1K XMODEM, if the terminal emulator supports it. Otherwise, use just XMODEM as the transfer protocol.
6. Press the **Send** button. The firmware begins to download to the interface card.

When the download process is complete, the system verifies that the firmware image was successfully written to the FLASH memory and then reboots the interface card. Upon reboot, the interface card detects that there is a newly downloaded firmware image, copies that image to the boot sector of the FLASH, and then boots with that image. At that point, the interface card is using the new firmware.

The following figure shows what you could see on your terminal when you download a new revision of the firmware:

**Figure 76** Trace dump menu

```

Download Firmware Menu
X.XX.XX XXXXXX XXXXXXXXXXXXXXXXXXXX
07/7/2005 08:56:22

This replaces the current revision of the firmware.
A reboot is also performed as part of this process.

Are you sure (y/n)? Y.

Please begin symptom file transfer...
$$$$$$$$$

D O W N L O A D   C O M P L E T E
*****
...* Start System Cold Reboot!
```

---

## 7 Using the FTP interface

This chapter describes specific management options available from the FTP interface. For an overview of using the other management interfaces available, see “[Interface card management](#)” on page 27.

### Backup/restore configuration settings

The interface card supports backup and restore of configuration settings over FTP. This allows users to maintain multiple setting configurations externally from the interface card and to be able to restore any of the configurations as needed. When backing up, configurations are saved from flash to a binary file.

#### Configuration backup procedure

1. Connect the interface card to the Ethernet network used by your computer.
2. Start your FTP program using the interface card’s IP address:

```
ftp <IP address>
```

---

**IMPORTANT:** The network settings set to use DHCP need to be set to default. If the IP address is not known, use the serial interface to obtain the network settings. See “[Setting up serial port communications](#)” on page 22.

---

 **NOTE:** You may also need to specify the directory location on your computer or network where your FTP program will store the backup file.

---

3. Enter the user name and password. The default values for user name and password are **root** for the user name and **password** for the password.
4. Specify binary mode:

```
bin
```

5. Specify the filename (.cfg file) with the `get` command:

```
get filename.cfg
```

(where “*filename.cfg*” can be any name for the configuration file.)

The file will transfer to the current directory specified on your computer’s FTP utility. If running FTP from a DOS or Linux command line, the destination directory can be set using the `lcd` command (ex. `lcd c:\myCfg`).

---

 **NOTE:** World Wide Name (WWN) values and Ethernet physical address (MAC address) values will not be saved. Because user defined values for these settings are not retained in the configuration backup file, they must be re-entered after the configuration is restored. See “[Configuration restore procedure](#)” later in this chapter for more information.

---

#### Configuration restore procedure

1. Connect the interface card to the Ethernet network used by your computer.
2. Start your FTP program using the interface card’s IP address:

```
ftp <IP address>
```

---

**IMPORTANT:** The network settings set to use DHCP need to be set to default. If the IP address is not known, use the serial interface to obtain the network settings. See “[Setting up serial port communications](#)” on page 22.

---

---

 **NOTE:** If the interface card is to use a static IP address, the pre-filled in address when DHCP is disabled is 1.1.1.1 and should be changed to an address that is appropriate for the IP network it will reside on.

---

3. Enter the user name and password. The default values for user name and password are **root** for the user name and **password** for the password.

4. Specify binary mode:

```
bin
```

5. Specify the configuration's path and filename (.cfg file) with the `put` command:

```
put <path:filename.cfg>
```

The file will transfer and the interface card will reboot. The interface card will then be using the configuration.

---

 **NOTE:** World Wide Name (WWN) values and Ethernet physical address (MAC address) values will revert to the factory default settings. Any user defined values for these settings are not retained and must be re-entered after a configuration is restored. See "[Configuration backup procedure](#)" on page 89 for more information.

---

 **NOTE:** Confirm the new configuration by checking that the settings are correct.

---

## Get a copy of trace buffer or event log

Using the following procedure, you can save copies of the trace buffers or event log over FTP.

1. Connect the interface card to the ethernet network used by your computer.

2. Start your FTP program using the interface card's IP address:

```
ftp <IP address>
```

---

**IMPORTANT:** The network settings set to use DHCP need to be set to default. If the IP address is not known, use the serial interface to obtain the network settings. See "[Setting up serial port communications](#)" on page 22.

---

 **NOTE:** You may also need to specify the directory location on your computer or network where your FTP program will store the trace file.

---

 **NOTE:** If the interface card is to use a static IP address, the pre-filled in address when DHCP is disabled is 1.1.1.1 and should be changed to an address that is appropriate for the IP network it will reside on.

---

3. Enter the user name and password. The default values for user name and password are **root** for the user name and **password** for the password.

4. Specify Bin mode:

```
bin
```

5. Specify the filename (.txt file) with the `get` command.

- For the current trace buffer, use `get curtrace.txt`.
- For the previous trace buffer, use `get prvtrace.txt`.
- For the assert trace buffer, use `get assertlog.txt`.
- For the current event log, use `get eventlog.txt`.

The file will transfer to the current directory specified on your computer's FTP utility. If running FTP from a DOS or Linux command line, the destination directory can be set using the `lcd` command (ex. `lcd c:\myCfg`).

## Updating firmware

Using the following procedure, FTP can be used to update the interface card firmware.

1. Connect the interface card to the Ethernet network used by your computer.
2. Start your FTP program using the interface card's IP address:

```
ftp <IP address>
```

---

**IMPORTANT:** The network settings set to use DHCP need to be set to default. If the IP address is not known, use the serial interface to obtain the network settings. See "[Setting up serial port communications](#)" on page 22.

---

 **NOTE:** If the interface card is to use a static IP address, the pre-filled in address when DHCP is disabled is 1.1.1.1 and should be changed to an address that is appropriate for the IP network it will reside on.

---

3. Enter the user name and password. The default values for user name and password are **root** for the user name and **password** for the password.
4. Specify binary mode:

```
bin
```

5. Specify the firmware's path and filename (.dlx file) with the `put` command:

```
put <path:filename.dlx>
```

The file will transfer and the interface card will reboot. The interface card will then be using the new firmware.

---

 **NOTE:** You may want to confirm the new firmware level by checking the reboot messages on the interface card through the serial interface.

---



## 8 Troubleshooting

Various problems can arise when configuring and using the HP e1200-320 4Gb Interface Card. This section is provided to help guide the user through some of the basic methods of identifying faults in the setup and configuration of the unit.

Most problems are found in the initial installation. In general, it is wise to check all connections and review the configuration before proceeding with further trouble analysis. Simplify the installation if possible, reducing it to the most basic configuration, then adding elements one at a time and verifying the operation at each step.

### General troubleshooting

#### What happens if the DHCP server cannot be contacted?

- **Serial Interface:** the following occurs over the serial line: the following text appears above the HP Systems Main Menu within the terminal window, "Attempting to contact DHCP server..." After about 3 minutes, the following message appears, "Can't renew DHCP boot lease."
- **Within Telnet:** the user will see only a blank Telnet window which is not accessible. Instead of an IP address value displaying in upper left heading of Telnet window, "(None)" appears instead. Within half a minute, Telnet will produce a warning message stating "Connect Failed!"
- **Within Visual Manager:** the user will be able to submit a new Web page and reboot (as is typically the case). However, since the DHCP isn't contacted, a new IP address will not be generated after reboot. Therefore, Visual Manager will no longer be useful since no IP address is available. The previous non-DHCP will not work either. Visual Manager will time out and provide a warning message to the user stating that "a connection with server could not be established."

In the above situations, perform the following:

1. Check on the status of the DHCP server with your network administrator,
2. Ensure the Ethernet good link light on the interface card is green (and if not check that the Ethernet cable is securely connected to the interface card).
3. Check the configuration of the interface card, including the gateway address, and assign values manually, if needed.

If the above list all appear to be in order, but DHCP is still not working, attempt to reset the interface card to factory defaults (any current configuration settings will be reset), reboot the interface card, and then reconfigure the interface card as desired. If problems persist, see "[Technical support](#)" on page 97.

### Indicators

The interface card is equipped with LED indicators for monitoring overall unit status. The LED functionality of the interface card is detailed below:

- **Power and Fault (Pwr)**—This indicator is a bi-color LED. When green, this indicator shows that power is currently active. Lack of power indication suggests that the unit is turned off, a problem with the power supplied to the unit, or an internal problem with the unit. When this indicator is amber, this indicator shows that the interface card detects a fault condition. Faults can occur as a result of Power On Self Test (POST) failure or operational failures. It is normal for this indicator to flash on when the unit is powered up or reset. If the fault indicator stays lit, contact your product support representative.
- **Fibre Channel (Act/LNK)**—When lit green, the right indicator signifies a good Fibre Channel link on the port. When lit green, the left indicator signifies Fibre Channel port activity. If the Link indicator fails to light at all, or if the Activity indicator stays continually lit without corresponding activity on a FC device port, there may be a problem with the Fibre Channel configuration. Verify the Fibre Channel configuration.
- **SCSI Bus (0, 1)**—When lit, these green indicators signify SCSI activity on the bus corresponding to the number of the indicator. Activity should only occur briefly during power-up or configuration, and relatively often when the unit is transferring data. If an Activity indicator stays continually lit without corresponding target device activity, there may be a problem with the SCSI bus configuration. Verify the SCSI bus configuration.

- **Ethernet (10/100)**—When lit, these green indicators signify Ethernet link status and activity. If either of these indicators fail to flicker, or stay continuously lit, there may be a problem with the network connection or configuration. Verify the network connection and configuration. The port must be connected to a Ethernet network to function properly.
- **Beacon**—This blue indicator can blink or light continuously for unit identification or other management purposes that are described in more detail in the user documentation for the library management system.

## Basic verification

### Serial port problems

If you experience trouble communicating with the serial port, verify the configuration of the host terminal or terminal emulation program. The interface card requires the baud rate to be set correctly: 8 data bits, 1 stop bit, and no parity. Flow control should be set to none or **XON/XOFF**, and may cause problems if set to **hardware**. Some terminal programs may not support baud rates higher than 19200, so a lower baud rate may be required. If problems persist, you may want to check the cabling or try a different host. Be sure the Scroll Lock key on the keyboard of the host computer is not enabled. If a valid Ethernet IP address is configured, serial configuration settings can also be set via telnet.

### Login problems

In a switched fabric environment, if a login problem is experienced, or if the drives can not be seen, confirm that the port settings of the interface card are set for **auto-sense** or for **N-port**. Using a hard ALPA setting with the N-port setting is not a valid configuration.

### Windows driver

There are no actual device drivers required for the interface card. When Windows prompts for a device driver, this situation occurs because the Active Fabric LUN of the interface card is enabled. Solutions to this request for a driver include the following options:

- Disable Active Fabric (or the target LUN for the interface card, in order to eliminate further Windows driver requests. You can also accept the Windows prompts and disable the device in the device manager.
- Optionally, an HP device driver installation file (called an INF file) is included on the User Documentation CD. The interface card does not really need an actual driver, as the HBA in the host PC manages this. However, the included INF file does allow the Windows Device Manager to register the interface card's interface card LUN as a system device. Thereafter, the Device Manager will no longer consider this interface card LUN to be an unknown or "newly discovered" device every time there is a reboot. By using the included INF file, the user just needs to identify the interface card to the Windows Device Manager only once.

To install (or register) the interface card to a connected host Windows PC, perform the following steps:

1. Copy the INF file to the Windows PC which has the FC HBA to be connected to the interface card. Typically, the appropriate location to copy the file is as follows:

```
C:\WINNT\system32\
```

---

 **NOTE:** There must be an interface card LUN set up on the interface card so that the Windows operating system can discover it.

---

2. When the interface card **FC Link** LED indicates a good connection, the user can either reboot the PC or run the Windows Device Manager **Scan for New Hardware** function. Either action should result in the HBA issuing a SCSI Inquiry command, to which the interface card replies with an ASCII Inquiry string.
- 

 **NOTE:** Initially, the Windows Hardware Wizard uses this string to refer to the interface card. After this discovery interaction occurs, the Hardware Wizard will prompt the user to install a device driver.

---

3. Select the Wizard's **Search for Better Driver** option and specify the folder containing the interface card INF file. The Hardware Wizard will scan the specified folder for all INF files and will select the first INF file it finds with a device entry containing a matching hardware ID string.

---

 **NOTE:** The Hardware Wizard will copy the selected INF file, renaming it to **OEM<#>.inf**, where the # is some integer, and it will place the copied file into the **C:\WINNT\inf** folder. The Hardware Wizard will then compile the INF file to a **.PNF** file with the same root filename and use its interface card model entry information to install, or register, the newly discovered device.

---

4. Reboot the host PC to complete the process, as prompted by the Hardware Wizard.

## Verify SCSI bus configuration

Problems with SCSI bus configuration are common. Basic operation of a SCSI bus can be checked by using the configuration menu to view attached SCSI devices.

Other conditions to look for include:

- **Termination**—Problems with termination can cause intermittent or hard failure. A SCSI bus must be terminated on both ends, and only both ends. Termination issues when both narrow and wide devices are on the same bus are common. Check to make sure that there are no loose terminators. All terminators should be firmly attached.
- **Bus Type**—The SE and LVD devices can be connected to the same SCSI bus; however, on power-up, if at least one SE device is detected, the LVD devices must convert to SE mode, and SE mode will be used. Only the LVD interface is being specified for the Fast/40 and higher rates.
- **Device ID**—Each device on a SCSI bus must have a unique ID. Also check the configured ID's for the interface card to verify these are not in use by other devices on the same SCSI bus.
- **Cabling**—Check SCSI cables to verify that they are functional. SCSI rules for total length, distance between devices, and stub length must be adhered to. Connections should also be checked and reseated if necessary. Ensure that the SCSI cables are Multimode or rated for the SCSI speed of the drive.
- **SCSI Devices**—Verify that the SCSI devices on a particular SCSI bus can be seen in the configuration menu of the interface card. Select **System Utilities > System Statistics > Parallel SCSI Protocol Status > Display Attached SCSI Devices > Display ALL Local Devices**. If the interface card can not see the devices, verify SCSI configuration, cabling, and termination.

Even if the SCSI devices are displayed, they are not accessible unless the mapping mode is auto-assigned or another non-empty map is used.

## Verify Fibre Channel connection

If SCSI devices are recognized on the SCSI buses, but do not appear to the Fibre Channel host, it may be that the Fibre Channel link is not properly established. Most hubs and switches have link indicators, showing link status. When the interface card is connected and the library is powered-on, this link indicator should show a good link (see "[Operation indicators](#)" on page 10). If it does not, check the cabling and connections.

As a means of verifying link integrity when connected to a functional host, disconnecting then reconnecting the Fibre Channel cable should cause momentary activity of this indicator as the link itself reinitializes. Also verify that the media type of the interface card and attached hub, HBA, or switch are of corresponding types. When using optical media, verify that the attached device is using non-OFC type optical devices.

Also, make sure that the interface card is configured with the same speed as the device it is connected to, and that the host is assigned to a LUN map filled with the devices it should be able to communicate with.

## Verify SCSI devices in Windows NT

If running FC-to-SCSI mapping mode, open the NT Control Panel, select **SCSI Adapters**, and double click on the FC HBA. The SCSI devices should be listed.

If no devices are listed, verify the interface card configuration, FC HBA configuration, and cabling.

If devices are listed, verify FC HBA mapping mode or AL\_PA addresses on the interface card.

## Verify configuration

A number of configuration changes may result in an invalid configuration. If you are in doubt about the configuration, restore the interface card to the factory default configuration and proceed to configure the unit a step at a time, verifying the functionality of the configuration as changes are made.

## Verify mapping

Verify that all desired devices have been discovered and mapped. If using Indexed or SCC mapping, try swapping to Auto-assigned to see if this solves the problem.

---

**NOTE:** HP recommends that you **DO NOT** use Auto-Assigned long-term as it exposes the library and drives to the entire SAN. Instead, a custom map should be created with only the hosts that need to communicate with the library and the drives assigned to it.

---

## Verify devices

It may be useful to connect the SCSI target devices you are attempting to use to the native SCSI interface to verify that the devices are functional. SCSI target devices can be connected to a host SCSI bus to verify they are functional.

## Verify host configuration

In some cases, it may be that the FC host bus adapter or host device driver may not be working properly. Check the configuration of these elements. It may be useful to check the release notes for the driver provided to see if there are any specific issues or required configuration. It may also be useful to ensure that you are using a current version of the host bus adapter driver and firmware.

## PRLI data

The interface card supports the discovery mechanism. The interface card returns the PRLI response data as specified in [Table 8](#).

**Table 8** HP e1200-320 4Gb Interface Card PRLI response data

| Item                          | Value |
|-------------------------------|-------|
| PRLI Command Code             | 0x20  |
| Page Length                   | 0x10  |
| Payload Length                | 0x10  |
| Type Code                     | 0x8   |
| Type Code Extension           | 0x0   |
| OPA                           | 0x0   |
| RPA                           | 0x0   |
| IPE                           | 0x1   |
| Response Code                 | 0x1   |
| Originator Process Associator | 0x0   |
| Responder Process Associator  | 0x0   |
| Initiator Function            | 0x1   |
| Target Function               | 0x1   |
| Command/Data Mixed Allowed    | 0x0   |
| Data/Response Mixed Allowed   | 0x0   |

|                         |     |
|-------------------------|-----|
| Read XFER_RDY Disabled  | 0x1 |
| Write XFER_RDY Disabled | 0x0 |

## Verify HBA device driver information

Check the HBA device driver **Readme.txt** file for configuration specifics. An HBA may require a different configuration, depending on whether it is connected to a loop or a switch. HBAs typically come with utility programs to view or change their configurations.

## Running diagnostics

You can run a diagnostics wrap test from Diagnostics Mode in the serial interface.

## Technical support

If you are unable to resolve an issue, contact your authorized service representative and ask for technical support.

## HP technical support

Telephone numbers for worldwide technical support are listed on the HP support web site: <http://www.hp.com/support/>.

Collect the following information before calling:

- Technical support registration number (if applicable)
- Product serial numbers
- Product model names and numbers
- Applicable error messages
- Operating system type and revision level
- Detailed, specific questions

For continuous quality improvement, calls may be recorded or monitored.

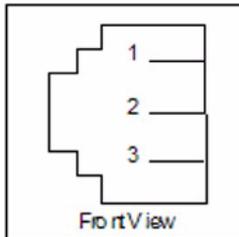


# A Serial and Ethernet pin assignments

## RJ-11 pin assignments

The pin assignments given for the 3-pin serial connection are in reference to the serial receptacle on the rear panel of the HP e1200-320 4Gb FC Interface Card. Use an RS-232 null modem cable to connect the HP e1200-320 4Gb FC Interface Card to the host system.

**Figure 77** RJ-11 pin assignments



**Table 9** RJ-11 pin descriptions

| Number | Description  |
|--------|--|
| 1      | Receive data to HP e1200-320 4Gb Interface Card    |
| 2      | Serial common (Ground)                             |
| 3      | Transmit data from HP e1200-320 4Gb Interface Card |

## DB-9 pin assignments

In conjunction with the pin assignments provided for the 3-pin receptacle on the rear panel of the HP e1200-320 4Gb Interface Card, following are the corresponding pin out assignments for a DB-9 serial connector used to connect the other end of the serial cable to a terminal, or a computer running terminal emulation software.

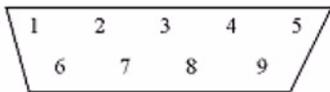
The pin assignments given in [Figure 78](#) for the DB-9 serial connection are in reference to the serial connector at the end of the cable. Use an RS-232 null modem cable to connect the HP e1200-320 4Gb Interface Card to the host system.

---

 **NOTE:** To connect the Interface interface card to a host system, use the RS-232 Serial3-Pin-to-DB-9 cable included in the shipping container for this product.

---

**Figure 78** Corresponding pin outs of the DB-9 connector



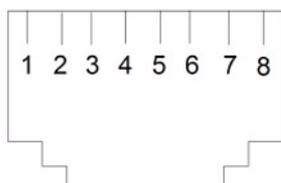
**Table 10** DB-9 connector description

| Number | Description                     |
|--------|---------------------------------|
| 1      | No connection                   |
| 2      | RX data (Receive)               |
| 3      | TX data (Transmit)              |
| 4      | No connection                   |
| 5      | Signal ground                   |
| 6      | No connection                   |
| 7      | RTS (Request to Send), not used |
| 8      | CTS (Clear to Send), not used   |
| 9      | No connection                   |

## RJ-45 Ethernet Pin Assignments

The pin assignments given for the RJ-45 Ethernet connection are in reference to the Ethernet receptacle on the back panel of the HP e1200-320 4Gb Interface Card. The HP e1200-320 4Gb Interface Card Ethernet connection supports the IEEE specifications for 10BASE-T and 100BASE-TX Ethernet standards.

**Figure 79** RJ-45 pin assignments



**Table 11** RJ-45 pin descriptions

| Number | Description    |
|--------|----------------|
| 1      | Transmit out + |
| 2      | Transmit out - |
| 3      | Receive in +   |
| 4      | No connection  |
| 5      | No connection  |
| 6      | Receive in -   |
| 7      | No connection  |
| 8      | No connection  |



---

# B Regulatory compliance and safety

## Regulatory compliance

### Federal Communications Commission notice

Part 15 of the Federal Communications Commission (FCC) Rules and Regulations has established Radio Frequency (RF) emission limits to provide an interference-free radio frequency spectrum. Many electronic devices, including computers, generate RF energy incidental to their intended function and are, therefore, covered by these rules. These rules place computers and related peripheral devices into two classes, A and B, depending upon their intended installation. Class A devices are those that may reasonably be expected to be installed in a business or commercial environment. Class B devices are those that may reasonably be expected to be installed in a residential environment (such as personal computers). The FCC requires devices in both classes to bear a label indicating the interference potential of the device as well as additional operating instructions for the user.

The rating label on the device shows which class (A or B) the equipment falls into. Class B devices have an FCC logo or FCC ID on the label. Class A devices do not have an FCC logo or FCC ID on the label. Once the class of the device is determined, refer to the following corresponding statement.

#### Emissions classification: Class A

#### Class A equipment

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user is required to correct the interference at personal expense.

#### Class B equipment

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

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

## Declaration of conformity for products marked with the FCC logo, United States only

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

For questions regarding your product, visit <http://www.hp.com>.

For questions regarding this FCC declaration, contact us by mail or telephone:

- Hewlett-Packard Company  
P.O. Box 692000, Mailstop 510101  
Houston, Texas 77269-2000
- 1-281-514-3333

To identify this product, refer to the part, Regulatory Model Number, or product number found on the product.

### Modifications

The FCC requires the user to be notified that any changes or modifications made to this device that are not expressly approved by Hewlett-Packard Company may void the user's authority to operate the equipment.

### Cables

Connections to this device must be made with shielded cables with metallic RFI/EMI connector hoods in order to maintain compliance with FCC Rules and Regulations.

### Laser device

All HP systems equipped with a laser device comply with safety standards, including International Electrotechnical Commission (IEC) 825. With specific regard to the laser, the equipment complies with laser product performance standards set by government agencies as a Class 1 laser product. The product does not emit hazardous light.

### Laser safety warning

---

**⚠ WARNING!** To reduce the risk of exposure to hazardous radiation:

- Do not try to open the laser device enclosure. There are no user-serviceable components inside.
  - Do not operate controls, make adjustments, or perform procedures to the laser device other than those specified herein.
  - Allow only HP authorized service technicians to repair the laser device.
-

## International notices and statements

### Canadian notice (avis Canadien)

#### Class A equipment

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

#### Class B equipment

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe B respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

### European Union notice

Products bearing the CE marking comply with the EMC Directive (89/336/EEC) and the Low Voltage Directive (73/23/EEC) issued by the Commission of the European Community and if this product has telecommunication functionality, the R&TTE Directive (1999/5/EC).

Compliance with these directives implies conformity to the following European Norms (in parentheses are the equivalent international standards and regulations):

- EN55022 (CISPR 22) - Electromagnetic Interference
- EN55024 (IEC61000-4-2, IEC61000-4-3, IEC61000-4-4, IEC61000-4-5, IEC61000-4-6, IEC61000-4-8, IEC61000-4-11) - Electromagnetic Immunity
- Power Quality:
  - EN61000-3-2 (IEC61000-3-2) - Power Line Harmonics
  - EN61000-3-3 (IEC61000-3-3) - Power Line Flicker
- EN60950-1 (IEC60950-1) - Product Safety
- Also approved under UL 60950-1/CSA C22.2 No. 60950-1, Safety of Information Technology Equipment.

### BSMI notice

#### 警告使用者:

這是甲類的資訊產品，在居住的環境中使用時，可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當的對策。

## Japanese notice

ご使用になっている装置にVCCIマークが付いていましたら、次の説明文をお読み下さい。

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## Korean notices

### A급 기기 (업무용 정보통신기기)

이 기기는 업무용으로 전자파적합등록을 한 기기이오니 판매자 또는 사용자는 이 점을 주의하시기 바라며, 만약 잘못판매 또는 구입하였을 때에는 가정용으로 교환하시기 바랍니다.

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## Safety

### Battery statement

---

⚠ **WARNING!** This product contains one lithium manganese dioxide battery.

- The e1200-320 4Gb Fibre Channel Interface Card contains one Snaphat® lithium battery.
- The lithium battery is located in the upper left corner of the board, is yellow in color, and can be removed with a flat blade screwdriver.

Lithium may be considered a hazardous material. Dispose of these batteries in accordance with local, state, and federal laws. In addition:

- Do not attempt to recharge the battery if removed from the interface card.
- Do not expose the battery to water or to temperatures higher than 60°C (140°F).
- Do not disassemble, crush, puncture, short external contacts, or dispose of in fire or water.
- Replace batteries only with the designated HP spares.

Batteries, battery packs, and accumulators should not be disposed of together with general household waste. To forward them to recycling or proper disposal, use the public collection system or return them to HP, an authorized HP Partner, or their agents.

For more information about battery replacement or proper disposal, contact an authorized reseller or an authorized service provider.

---

## Taiwan battery recycling notice



廢電池請回收

The Taiwan EPA requires dry battery manufacturing or importing firms in accordance with Article 15 of the Waste Disposal Act to indicate the recovery marks on the batteries used in sales, giveaway or promotion. Contact a qualified Taiwanese recycler for proper battery disposal.



## C Inband SCSI-3 commands

The HP e1200-320 4Gb Interface Card supports a set of SCSI-3 commands that can be received inband over iSCSI/NDMP. When received by the interface card, these commands are then executed by the interface card itself.

When using SCSI-3 commands to access general management features, the commands can be sent to device LUNs that are mapped through the interface card.

The following is a list of the SCSI-3 commands that are supported by the interface card. Complete definitions of SCSI-3 commands can be found in the SCSI-3 standard available from the American National Standards Institute (ANSI).

### General Commands

- REPORT LUNS
- INQUIRY

## General commands

Following is a description of a general-use SCSI-3 command. For more information about the other general-use commands, please contact your service representative.

## Report LUNs command

The interface card supports the Report LUNs command. The Report LUNs command will return a list of Logical Unit Numbers (LUNs) that can receive commands. The format of the report LUNs command is shown in [Table 12](#).

**Table 12** Format of Report LUNs command

| Bit | 7                      | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|-----|------------------------|---|---|---|---|---|---|---|
| 0   | Operation Code ( 0xA0) |   |   |   |   |   |   |   |
| 1   | Reserved               |   |   |   |   |   |   |   |
| 2   | Reserved               |   |   |   |   |   |   |   |
| 3   | Reserved               |   |   |   |   |   |   |   |
| 4   | Reserved               |   |   |   |   |   |   |   |
| 5   | Reserved               |   |   |   |   |   |   |   |
| 6   | (MSB)                  |   |   |   |   |   |   |   |
| 7   | Allocation Length      |   |   |   |   |   |   |   |
| 8   |                        |   |   |   |   |   |   |   |
| 9   |                        |   |   |   |   |   |   |   |
| 10  | Reserved               |   |   |   |   |   |   |   |
| 11  | Control Byte           |   |   |   |   |   |   |   |

The interface card returns the LUN Parameters as defined in [Table 13](#).

**Table 13** Report LUNs Parameter List

| Bit  | 7               | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|------|-----------------|---|---|---|---|---|---|---|
| Byte |                 |   |   |   |   |   |   |   |
| 0    | (MSB)           |   |   |   |   |   |   |   |
| 1    | LUN list length |   |   |   |   |   |   |   |
| 2    |                 |   |   |   |   |   |   |   |
| 3    | (LSB)           |   |   |   |   |   |   |   |
| 4    | Reserved        |   |   |   |   |   |   |   |
| 5    | Reserved        |   |   |   |   |   |   |   |
| 6    | Reserved        |   |   |   |   |   |   |   |
| 7    | Reserved        |   |   |   |   |   |   |   |

| LUN list |           |
|----------|-----------|
| 0-7      | First LUN |
|          | :         |
| 0-7      | Last LUN  |

---

 **NOTE:** The LUN list length is the number of LUNs times 8.

---

All LUNs are reported and will appear in the host's map.

## Inquiry command

The format of the Inquiry command is shown in [Table 14](#).

**Table 14** Format of LUN Inquiry command

| Bit  | 7                           | 6 | 5 | 4 | 3 | 2 | 1 | 0    |
|------|-----------------------------|---|---|---|---|---|---|------|
| Byte |                             |   |   |   |   |   |   |      |
| 0    | Operation Code (12h)        |   |   |   |   |   |   |      |
| 1    | Reserved                    |   |   |   |   |   |   | EVPD |
| 2    | Page Code or Operation Code |   |   |   |   |   |   |      |
| 3    | Reserved                    |   |   |   |   |   |   |      |
| 4    | Allocation Length           |   |   |   |   |   |   |      |
| 5    | Control                     |   |   |   |   |   |   |      |

The interface card returns the LUN Inquiry Data as defined in [Table 16](#).

## EVPD Page 0x80

If the EVPD bit is set and the Page Code is 0x80 the *unit serial number page* is returned. The format of this page is shown in Table 15.

**Table 15** Format of EVPD Page 0x80

| Bit         | 7                 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|-------------|-------------------|---|---|---|---|---|---|---|
| <b>Byte</b> |                   |   |   |   |   |   |   |   |
| 0           | Device Type (0ch) |   |   |   |   |   |   |   |
| 1           | Page Code (80h)   |   |   |   |   |   |   |   |
| 3           | Reserved          |   |   |   |   |   |   |   |
| 4           | Page Length       |   |   |   |   |   |   |   |
| 5...20      | Serial Number     |   |   |   |   |   |   |   |

The serial number field is a 16-byte left-justified ASCII string.

## Device Identification Page 0x83

If the EVPD bit is set and the Page Code is 0x83 the *device identification page* is returned, as described in SPC-2 section 8.4.4.

**Table 16** HP e1200-320 4Gb Interface Card LUN Inquiry Data

| Item                   | Value   |
|------------------------|---|
| Peripheral Qualifier   | 0x00  |
| Peripheral Device Type | 0x0C - Indicates Router/interface card function |
| RMB                    | 0x00  |
| Device Type Qualifier  | 0x00  |
| ISO Version            | 0x00  |
| AENC                   | 0x00  |
| TrmIOP                 | 0x00  |
| Response Data Format   | 0x02 - SCSI-2 Inquiry Data Format               |
| Additional Length      | 0x20  |
| RelAdr                 | 0x00  |
| Wbus32                 | 0x00  |
| Wbus16                 | 0x00  |
| Sync                   | 0x00  |
| Linked                 | 0x00  |
| CmdQue                 | 0x00  |
| SftRe                  | 0x00  |
| Vendor ID              | "CROSSRDS"                                      |
| Product ID             | "interface card interface card"                 |
| Revision Level         | "XXXXX"   |

The interface card will only reply to a SCSI Inquiry when using 8-byte LUN field of 0x00's.

---

 **NOTE:** The Revision Level comes from the last four characters of the build string, which appears in the headings for most menu screens.

---

## D Addressing, structures, and operations

Fibre Channel and SCSI systems employ different methods of addressing devices. The inclusion of a interface card requires that a method of translating device IDs be implemented so that each SCSI device is mapped to the appropriate Fibre Channel LUN. The SCSI buses establish bus connections between devices. Targets on a SCSI bus may internally address logical units. The addressing of a specific SCSI device is represented by the BUS:TARGET:LUN triplet.

When a Fibre Channel initiator initializes on a loop, the host must first determine what devices exist on the loop. Device discovery is performed, and an FCP target device list is built. Each device is queried for FCP logical units. The logical units are the actual devices that the operating system will address. When an initiator addresses a logical unit, the LUN field used is consistent in form with the SCC defined fields. All current Fibre Channel host bus adapter drivers are consistent with these methods. The addressing used is the SCC Logical Unit Addressing and Peripheral Device Addressing methods, shown in [Table 17](#) and [Table 18](#). First level addressing is supported, so only the first 2 bytes of the 8-byte FCP LUN are used.

**Table 17** SCC addressing structure

| Bit         | 7                       | 6 | 5                       | 4 | 3 | 2 | 1 | 0 |
|-------------|-------------------------|---|-------------------------|---|---|---|---|---|
| <b>Byte</b> |                         |   |                         |   |   |   |   |   |
| N           | Address Method          |   | Address Method Specific |   |   |   |   |   |
| N+1         | Address Method Specific |   |                         |   |   |   |   |   |

**Table 18** Address method definitions

| Codes | Description                         |
|-------|-------------------------------------|
| 00    | Peripheral Device Addressing Method |
| 01    | Volume Set Addressing Method        |
| 10    | Logical Unit Addressing Method      |
| 11    | Reserved                            |

**Table 19** SCC logical unit addressing

| Bit         | 7   | 6 | 5      | 4 | 3 | 2 | 1 | 0 |
|-------------|-----|---|--------|---|---|---|---|---|
| <b>Byte</b> |     |   |        |   |   |   |   |   |
| N           | 1   | 0 | Target |   |   |   |   |   |
| N+1         | Bus |   | LUN    |   |   |   |   |   |

**Table 20** Peripheral device addressing

| Bit         | 7          | 6 | 5   | 4 | 3 | 2 | 1 | 0 |
|-------------|------------|---|-----|---|---|---|---|---|
| <b>Byte</b> |            |   |     |   |   |   |   |   |
| N           | 0          | 0 | Bus |   |   |   |   |   |
| N+1         | Target/LUN |   |     |   |   |   |   |   |

The interface card supports the Peripheral Device Addressing Method and the Logical Unit Addressing Method, depending on the configuration.

**Table 21** Arbitrated Loop Node number to AL\_PA lookup table

|         |         |         |         |          |          |
|---------|---------|---------|---------|----------|----------|
| 0:0x01  | 21:0x2E | 42:0x52 | 63:0x74 | 84:0xA6  | 105:0xC9 |
| 1:0x02  | 22:0x31 | 43:0x53 | 64:0x75 | 85:0xA7  | 106:0xCA |
| 2:0x04  | 23:0x32 | 44:0x54 | 65:0x76 | 86:0xA9  | 107:0xCB |
| 3:0x08  | 24:0x33 | 45:0x55 | 66:0x79 | 87:0xAA  | 108:0xCC |
| 4:0x0F  | 25:0x34 | 46:0x56 | 67:0x7A | 88:0xAB  | 109:0xCD |
| 5:0x10  | 26:0x35 | 47:0x59 | 68:0x7C | 89:0xAC  | 110:0xCE |
| 6:0x17  | 27:0x36 | 48:0x5A | 69:0x80 | 90:0xAD  | 111:0xD1 |
| 7:0x18  | 28:0x39 | 49:0x5C | 70:0x81 | 91:0xAE  | 112:0xD2 |
| 8:0x1B  | 29:0x3A | 50:0x63 | 71:0x82 | 92:0xB1  | 113:0xD3 |
| 9:0x1D  | 30:0x3C | 51:0x65 | 72:0x84 | 93:0xB2  | 114:0xD4 |
| 10:0x1E | 31:0x43 | 52:0x66 | 73:0x88 | 94:0xB3  | 115:0xD5 |
| 11:0x1F | 32:0x45 | 53:0x67 | 74:0x8F | 95:0xB4  | 116:0xD6 |
| 12:0x23 | 33:0x46 | 54:0x69 | 75:0x90 | 96:0xB5  | 117:0xD9 |
| 13:0x25 | 34:0x47 | 55:0x6A | 76:0x97 | 97:0xB6  | 118:0xDA |
| 14:0x26 | 35:0x49 | 56:0x6B | 77:0x98 | 98:0xB9  | 119:0xDC |
| 15:0x27 | 36:0x4A | 57:0x6C | 78:0x9B | 99:0xBA  | 120:0xE0 |
| 16:0x29 | 37:0x4B | 58:0x6D | 79:0x9D | 100:0xBC | 121:0xE1 |
| 17:0x2A | 38:0x4C | 59:0x6E | 80:0x9E | 101:0xC3 | 122:0xE2 |
| 18:0x2B | 39:0x4D | 60:0x71 | 81:0x9F | 102:0xC5 | 123:0xE4 |
| 19:0x2C | 40:0x4E | 61:0x72 | 82:0xA3 | 103:0xC6 | 124:0xE8 |
| 20:0x2D | 41:0x51 | 62:0x73 | 83:0xA5 | 104:0xC7 | 125:0xEF |

The data shown in [Table 21](#) comes from the Fibre Channel Configuration Menu (setting the AL\_PA value) on the interface card. The user enters the node number (number to the left of the colon from [Table 21](#)) and the interface card translates the node number into the corresponding AL\_PA value (number to the right of the colon in [Table 21](#)).

## Auto Assigned addressing option

The Auto Assigned option is similar to the Indexed addressing, but with the distinction that the table used is created through SCSI device discovery on power-up or reset, and not otherwise retained. As the unit performs device discovery on the SCSI bus, the Index table FCP LUN values are filled with adjacent FCP LUNs referencing each subsequent SCSI device. The host system will then detect every attached SCSI device without voids, allowing full device discovery to the host. This allows easy configuration in environments where SCSI device ordering is not important, and where hot plugging of SCSI devices will not occur. Configuration options provide for the SCSI discovery to be performed in order of bus, target, or LUN as desired for the specific environment.

## Indexed addressing option

Indexed Addressing allows for host bus adapter (HBA) drivers that only use Peripheral Device addressing to access SCSI devices attached to the interface card. This is done by use of a table, which is indexed by sequential LUN values, indicating selected BUS:TARGET:LUN devices. It is not possible in this mode to address the interface card as an interface card unit directly. The table has the structure as shown in [Table 22](#).

The maximum size of the table is equal to the number of buses times the number of targets per bus, less one initiator ID per bus, times the number of LUNs per target.

The index table can be manually edited. A method is also provided to perform SCSI device discovery, and fill the table in the order that SCSI devices are discovered on the SCSI buses.

**Table 22** Indexed addressing table

| FCP LUN Value | SCSI BUS:TARGET:LUN              |
|---------------|----------------------------------|
| 0             | 0:0:0                            |
| 1             | 0:1:0                            |
| 2             | 0:2:0                            |
| 3             | 0:3:0                            |
| 4             | 0:4:0                            |
| 5             | 0:5:0                            |
| 6             | 0:6:0                            |
|               | (0:7:0 occupied by Initiator ID) |
| 7             | 0:8:0                            |
| (...)         | (...)                            |
| 13            | 0:14:0                           |
| 14            | 0:15:0                           |
| 15            | 1:0:0                            |
| 16            | 1:1:0                            |
| 17            | 1:2:0                            |
| (...)         | (...)                            |

## SCC addressing option

When an interface card device is configured to use SCSI interface card Commands (SCC) addressing, the unit is capable of responding as an interface card device to the FCP Initiator, or routing the FCP request to a specified BUS:TARGET:LUN. When a request using the Peripheral Device addressing method is received (an FCP command with the LUN field with bits 7 and 6 of byte 0 are set to 0), the unit routes the request to the internal processor, which acts on the command directly. When a request using the Logical Unit addressing method is received (bits 7 and 6 set to 10b), the request is routed to the BUS:TARGET:LUN as specified in the defined field.

Host systems using SCC addressing will typically do initial device discovery using the Peripheral Device addressing method. On issuing an INQUIRY command to the interface card, the host will receive the interface card Inquiry data, indicating the device type as a interface card device (Inquiry data indicates device type is 0xC). The host will then know, on this basis, that subsequent commands to interface card attached devices will use the Logical Unit addressing method.

The host can perform discovery by either walking through the BUS:TARGET:LUN values as would a standard SCSI driver, or by issuing a REPORT LUNS command. This command is sent to the interface card (using the Peripheral Device addressing method), and the interface card returns a table indicating

attached devices. The host can then perform actions on these interface card attached devices directly without having to perform discovery by issuing commands through all possible combinations.

---

## E Enabling DHCP on the HP e1200-320 4Gb FC Interface Card

DHCP, or Dynamic Host Configuration Protocol, is an open industry standard that simplifies administering networks based on Transmission Control Protocol/Internet Protocol (TCP/IP). DHCP allows network resources to go farther by enabling a unique IP address to be assigned to a specific device (interface card, client host, etc.) on a non-permanent, dynamic basis.

DHCP makes network administration easier—the larger the network, the greater the benefit. DHCP accommodates larger networks because it can assign temporary IP addresses for a specified time interval. DHCP frees network administrators from having to configure each interface card or host manually.

Other benefits of a DHCP environment include:

- No additional address configuration is required for client hosts.
- IP addresses can be reused or leased for specific time periods.
- IP address assignment is better managed. For example, if the IP address for an interface card in a network changes and 250 client computers have to be updated with the new address, you do not have to manually reconfigure every workstation.

Without DHCP, permanent IP address configuration is the only option. This means a network administrator is required to manually configure a permanent IP address for each individual interface card or client host. Permanent IP addresses require more network resources, but are useful when dealing with smaller LAN environments. Without dynamic address assignment, interface cards and hosts have to be configured manually one by one. IP addresses must be managed to avoid duplicate use, and changes must be applied to clients by hand. Configuration information is not centralized, and it is difficult to get a view of all interface card or host configurations.

The use of TCP/IP and DHCP both contribute to networking and the growth of the Internet. TCP/IP uses open protocol standards that enable the forming of wide area networks (WANS). For each interface card to identify itself on a TCP/IP network, it must be uniquely identified by the following information:

1. An IP address: a 32-bit field composed of four octets (8-bit numbers from 0 through 255). Each address has decimal notation to separate octet numbers, such as 208.24.132.184.  
Your DHCP server may allow you to set up a lease reservation for an IP address by providing the server with the Ethernet MAC address of the interface card. This sets the DHCP server to always provide the same IP address to the interface card. This setup can be useful for remote management of the interface card via Telnet or Visual Manager. Because the method of setting up a lease reservation varies depending on the DHCP server being used, it is recommended you contact your Network Administrator for assistance.
2. A subnet mask: This indicates how the IP address is to be read. It also indicates how to separate the network identifying information from the interface card identifying information so the IP address can be interpreted correctly. For example, if a subnet mask of 255.255.255.0 is applied for an address 10.85.189.24, it indicates that the unique interface card address is 24, located on the 10.85.189 subnetwork.
3. A default gateway: This is used to specify the address for the nearest interface card that is used by the host device to forward addressed packets on to the network.

These previous three options (IP address, subnet mask, and gateway) are necessary for effective DHCP.

## Setting up DHCP over interface card interfaces

Interface cards use three different interfaces which can be used to enable DHCP: Serial, Telnet, and VM. The following will describe how to enable and disable DHCP for each interface.

 **NOTE:** Located on the interface card is a label that displays the unit's Ethernet MAC Address. A network administrator can then use this MAC Address to set up a lease reservation on the DHCP server for the IP address of the interface card. This effectively allows the interface card to have a permanent IP address that is assigned by the DHCP server.

## Serial and Telnet interfaces

When the user turns on the library, and thus the interface card, the system reboots and displays the following Main menu on the terminal window:

**Figure 80** Main menu

```
HP StorageWorks e1200-320 4Gb Interface interface card
X.X.XX XXXXXX XXXXXX-XXX_XXXXXXXXXXXXXXXXX
07/7/2005 08:56:22

1) Perform Configuration
2) System Utilities
3) Display Trace and Assertion History
4) Reboot
5) Download a New Revision of The Firmware
Copyright (C) 1998 - 2004 Crossroads Systems, Inc. All rights reserved.
Command >
```

- Select **1**. The following menu appears:

**Figure 81** Configuration menu

```
Configuration Menu
X.X.XX XXXXXX XXXXXX-XXX_XXXXXXXXXXXXXXXXX
07/7/2005 08:56:22

1) Baud Rate Configuration
2) Ethernet Configuration
3) Fibre Channel Configuration
4) Parallel SCSI Configuration
5) Device Mapping
6) Trace and Event Settings Configuration
7) Real-Time Clock Configuration
8) Active Fabric Configuration

A) Save Configuration
B) Restore Last Saved Configuration
C) Reset to Factory Defaults
X) Return to main menu
```

- Select **2**. The following menu appears:

**Figure 82** Ethernet configuration menu

```

Ethernet Configuration Menu
X.X.XX XXXXXX XXXXXX-XXX_XXXXXXXXXXXXXXXXX
07/7/2005 08:56:22

IP Address                : 1.1.1.1
Subnet Mask               : 255.255.255.0
IP Gateway                : 0.0.0.0
Ethernet Physical Address : 08:06:07:05:03:09
Ethernet Mode             : 10/100Mbps (Auto-Neg)
Hostname                  :
DHCP Configuration       : Disabled

1) Change IP Address
2) Change IP Subnet Mask
3) Change IP Gateway
4) Change Ethernet Physical Address
5) Toggle Ethernet Mode
6) Change Hostname
7) Toggle DHCP Configuration
8) Change Security Settings

X) Return to previous menu

```

Select **7** to toggle the DHCP setting. When DHCP is enabled, this activates Dynamic Host Configuration Protocol and allows the interface card to be assigned a dynamic IP address from a DHCP server located on the Ethernet network used by the interface card.

For descriptions of other menu selections, refer to “[Interface card management](#)”.

Once DHCP is enabled, it is necessary to **save** the current configuration and **reboot** the interface card before DHCP will operate.

---

 **NOTE:** For the IP address, Subnet Mask, and IP Gateway address, it is okay to have null values prior to rebooting the interface card. However, if these settings have null values after a reboot, then this indicates the DHCP Server was unable to acquire the information for that setting. See the note below for more information.

---

Use the following steps to save the current settings and reboot the system:

1. Select **X) Return to previous menu.**
2. Select **A) Save Configuration.**
3. Select **X) Return to previous menu.**
4. Select **4) Reboot.**

After the interface card finishes rebooting, the Main Menu will appear. DHCP status can be verified from the Ethernet Configuration Menu where DHCP Configuration is indicated as “Enabled” if DHCP has been successfully activated. Note that the IP Address may also appear different than the former non-DHCP IP Address.

---

 **NOTE:** To use the DHCP feature, a DHCP server must be operational on the Ethernet network used by the interface card. If the DHCP feature is used when there is no DHCP server, the standard for DHCP requires that the interface card wait three minutes for a response from a DHCP server before timing out. During this period, the interface card menus and functions will not be accessible.

---

## Special note regarding Ethernet IP, subnet mask, and gateway addresses

Once DHCP is enabled, any “null” readings are acceptable for these 3 options *before reboot*. The Ethernet Configuration Menu will also *not* allow these 3 options to be changed while DHCP is enabled (since they are automatically configured by DHCP). Here’s an example of the “DHCP-enabled” menu:

**Figure 83** Ethernet configuration menu

```

                                Ethernet Configuration Menu
                                X.XX.XX  XXXXXX  XXXXXXXXXXXXXXXXXXXX
                                07/7/2005  08:56:22

IP Address                      : 192.168.60.203 [DHCP]
Subnet Mask                     : 255.255.255.0
IP Gateway                      : 192.168.60.1
Ethernet Physical Address       : 00:E0:02:E3:17:51
Ethernet Mode                   : 10/100Mbps (Auto-Neg)
Hostname                       : interface card
DHCP Configuration             : Enabled

1) Change IP Address
2) Change IP Subnet Mask
3) Change IP Gateway
4) Change Ethernet Physical Address
5) Toggle Ethernet Mode
6) Change Hostname
7) Toggle DHCP Configuration
8) Change Security Settings

X) Return to previous menu
```

## Visual Manager

To access the interface card using the Visual Manager interface:

1. Look up the current IP address within the Ethernet Configuration menu using the serial interface.
2. Type the IP address in the Web browser without using “www” or “/” or any other characters or symbols.
3. After entering the IP address, the user should see the Configuration Main menu. **Click** on the **Configuration** link. This will access the Configuration Menu containing CURRENT/NEW readings for DHCP (“Use DHCP”). The following 3 DHCP-relevant options are also listed:
  - Ethernet IP address,
  - Subnet mask, and
  - Gateway IP address.

### Tips for manipulating DHCP within Visual Manager

1. To change the current state of DHCP, change its status to enabled or disabled, **submit** the change and then **reboot**.
2. To **reboot**, click the Reboot link from the main menu, select **Yes** in the confirmation message, and then **submit**.
3. The gateway address should have the same subnetwork (1<sup>st</sup> three bytes) as the IP address. For example, an IP address of 192.168.100.93 may have a gateway of 192.168.100.1. However, an unavailable gateway value appearing under the CURRENT section of the Configuration menu means the DHCP server was unable to get the gateway address. If this happens, contact the network administrator to make sure the DHCP server is providing this information, or manually change the gateway address yourself.

Now you should be able to access the new IP address displayed within the Ethernet Configuration menu using Visual Manager.



---

# Glossary

|                                 |   |
|---------------------------------|---|
| <b>adapter</b>                  | A printed circuit assembly that translates data between the FC host processor's internal bus and a different bus, such as SCSI.   |
| <b>address</b>                  | See SCSI addressing.  |
| <b>addressing mode</b>          | Used to create a mapping table that maps devices on the SCSI bus to Fibre Channel logical units.  |
| <b>AL_PA</b>                    | Arbitrated Loop Physical Address. A unique one-byte valid value, derived and used in an Arbitrated Loop Topology as defined in ANSI specification FC_AL ver 4.5.  |
| <b>arbitrated loop</b>          | See Fibre Channel - Arbitrated Loop. (ANSI specification FC_AL ver 4.5)   |
| <b>area</b>                     | The second byte of the N_Port Identifier.   |
| <b>auto-assigned mapping</b>    | A menu item. The auto-addressing option creates a mapping table using devices discovered upon powering up or resetting the interface card, that is not otherwise retained by the interface card.  |
| <b>baud</b>                     | A unit of signaling speed, expressed as the maximum number of times per second the signal can change the state of the transmission line or other medium (units of baud are $\text{sec}^{-1}$ ). Note: With Fibre Channel scheme, a signal event represents a single transmission bit.                           |
| <b>bus</b>                      | A means of transferring data between modules and adapters or between an adapter and SCSI devices. For a SCSI bus definition, see SCSI bus.  |
| <b>channel</b>                  | A general term for a path on which electronic signals travel.   |
| <b>clusters</b>                 | Two or more computers sharing the same resources on a communication link.   |
| <b>interface card</b>           | An intelligent device within the SAN (storage area network) infrastructure that can handle multiple protocols, such as Fibre Channel and SCSI. The routing decision is based on paths between address mappings among dispersed initiators and targets.  |
| <b>interface card-to-router</b> | Configuration involving at least two interface card/routers where one interface card/router is in Initiator Mode and another in Target Mode.  |
| <b>device</b>                   | See FC Device or SCSI Device.   |
| <b>differential</b>             | An electrical signal configuration using a pair of lines for data transfer. The advantage of differential compared to single-ended configuration is a relative high tolerance for common-mode noise and crosstalk when used with twisted pair cables. In layman's terms, this means longer distance.            |
| <b>domain</b>                   | A FC term describing the most significant byte in the N_Port Identifier for the FC device. It is not used in the FC-SCSI hardware path ID. It is required to be the same for all SCSI targets logically connected to a FC adapter.  |
| <b>exchange</b>                 | A FC term for the basic mechanism used for managing an operation. An exchange identifies information transfers consisting of one or more related non concurrent sequences that may flow in the same or opposite directions, but always in half duplex mode. An exchange is identified by an OX_ID and an RX_ID. |
| <b>fabric</b>                   | An FC term that includes FC Arbitrated Loop, Switched Fabric, and Point-to-Point.   |
| <b>FC</b>                       | See Fibre Channel.  |

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| <b>FC-AL</b>                                   | See Fibre Channel - Arbitrated Loop.   |
| <b>FC adapter</b>                              | A printed circuit assembly that translates data between the FC host processor's internal bus and the FC link. This is also known as an HBA, or Host Bus Adapter.   |
| <b>FC device</b>                               | A device that uses Fibre Channel communications.   |
| <b>FC port</b>                                 | An opening at the back of the interface card that provides a fiber optic connection between the FC adapter and the FC host.  |
| <b>FC-SCSI hardware path ID</b>                | A FC term describing a list of values showing the physical hardware path of the FC host to the target device.<br><br>Format: Bus_Converter/Adapter_Address.Protocol_Type.Area.Port.Bus.Target.LUN<br><br>Example: 8/4.8.0.0.2.4.0  |
| <b>fiber</b>                                   | A fiber optic cable made from thin strands of glass through which data in the form of light pulses is transmitted (LASER, LED). It is often used for high-speed transmission over medium (200m) to long (10km) distances but it can be used for short distances (<200m).   |
| <b>fibre</b>                                   | A generic FC term used to cover all transmission media types specified in the Fibre Channel Physical Layer standard (FC-PH), such as optical fiber, copper twisted pair, and copper coaxial cable.   |
| <b>fibre channel (FC)</b>                      | Logically, the Fibre Channel is a bidirectional, full-duplex, point-to-point, serial data channel structured for high performance data communication. Physically, the Fibre Channel is an interconnection of multiple communication ports, called N_Ports, interconnected by a switching network, called a fabric, a point-to-point link, or an arbitrated loop. Fibre Channel is a generalized transport mechanism that has no protocol of its own or native input/output command set, but can transport any existing Upper Level Protocols (ULPs) such as SCSI and IP. |
| <b>fibre channel - arbitrated loop (FC-AL)</b> | One of three existing Fibre Channel topologies, in which 2 to 126 devices are interconnected serially in a single loop circuit. The arbitrated loop topology supports all classes of service and guarantees in order delivery of frames when the source and destination are on the same loop.  |
| <b>fibre channel protocol for SCSI (FCP)</b>   | FCP defines a Fibre Channel mapping layer (FC-4) that uses FC-PH services to transmit SCSI command, data, and status information between a SCSI initiator and a SCSI target. Using FCP enables transmission and receipt of SCSI commands, data and status, across the Fibre Channel using the standard Fibre Channel frame and sequence formats.   |
| <b>frame</b>                                   | The smallest, indivisible unit of information transfer used by Fibre Channel. Frames are used for transferring data associated with a sequence. Frame size depends on the hardware implementation and is independent of the ULP or the application software.   |
| <b>ftp</b>                                     | File Transfer Protocol   |
| <b>gigabit interface connector (GBIC)</b>      | A physical component that manages the functions of the FC-0 layer, which is the physical characteristic of the media and interface, including drivers, transceivers, connectors, and cables. Mounts on a FC adapter card and connects the interface card to a FC host. Also referred to as a Physical Link Module (PLM).   |
| <b>hardware path</b>                           | See FC-SCSI Hardware Path ID.  |
| <b>host bus adapter (HBA)</b>                  | See FC Adapter.  |
| <b>HVD</b>                                     | High Voltage Differential  |
| <b>ID</b>                                      | Numerical identifier   |

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| <b>indexed addressing</b>  | A menu name. It allows for generic Fibre Channel host bus adapters to access SCSI devices attached to the interface card using a table which is indexed by sequential LUN values.  |
| <b>initiator</b>           | A device (usually a host system) that requests an operation to be performed by another device known as a target (usually a peripheral).  |
| <b>initiator mode</b>      | Configuration mode of the interface card in which a Fibre Channel initiator requests operations to be performed by a SCSI target device.   |
| <b>IP</b>                  | Internet protocol  |
| <b>link</b>                | For Fibre Channel, it is a connection between two nodes, each having at least one N_Port (or the other end could be an F-Port), interconnected by a pair of optical or copper links, one inbound and one outbound.   |
| <b>longwave</b>            | Lasers or LEDs that emit light with wave lengths around 1300 nm. When using single mode (9 nm) fibre, longwave lasers can be used to achieve lengths greater than 2 km.  |
| <b>loop address</b>        | A FC term indicating the unique ID of a node in Fibre Channel loop topology, sometimes referred to as a Loop ID. Also a status type in the FC Status Menu, showing the FC Loop Address of the interface card.  |
| <b>loop port (nl_port)</b> | A FC port that supports loops.   |
| <b>LUN</b>                 | Logical Unit Number or Logical Unit; a subdivision of a SCSI target. For SCSI-2, each SCSI target supports up to sixteen LUNs (LUN-0 to LUN-15). Using LUNs, the FC host can address multiple peripheral devices that may share a common interface card.   |
| <b>LVD/SE</b>              | Low Voltage Differential/Single-Ended  |
| <b>mapping table</b>       | A table which is indexed by sequential LUN values, indicating selected BUS:TARGET:LUN devices. It is used by the interface card to perform Fibre Channel-to-SCSI operations by default.  |
| <b>MB</b>                  | megabyte. (There are 8 bits in a byte.)  |
| <b>motherboard</b>         | The main PCA of the interface card that provides a physical and logical connection between Fibre Channel and SCSI devices.   |
| <b>multiplexer</b>         | A device that allows two or more signals to be transmitted simultaneously on a single channel.   |
| <b>N_port</b>              | A FC term defining a "Node" port. A FC-defined hardware entity that performs data communication over the FC link. It is identifiable by a unique Worldwide Name. It can act as an originator or a responder.   |
| <b>N_port identifier</b>   | A FC term indicating a unique address identifier by which an N_Port is uniquely known. It consists of a Domain (most significant byte), an Area, and a Port, each 1 byte long. The N_Port identifier is used in the Source Identifier (S_ID) and Destination Identifier (D_ID) fields of a FC frame. |
| <b>node name</b>           | A field value under the FC Status Menu. The unique FC identifier, a 64-bit value, the factory assigns to the interface card.   |

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| <b>offline</b>                   | <p>Taking the interface card offline indicates that all SCSI and FC adapters in the interface card are offline.</p> <p>Taking a SCSI adapter offline means ending inputs/outputs and suspending all transactions going from the interface card to the specified SCSI devices. The SCSI adapter is no longer active or available for access.</p> <p>Taking a FC adapter offline means ending inputs/outputs and suspending all transactions going from the interface card to the specified FC device.</p> |
| <b>online</b>                    | <p>For the interface card, online indicates that at least one adapter in the interface card is active and available for access.</p> <p>For a SCSI adapter, online indicates the SCSI adapter is active and available for access and input/output processing.</p> <p>For a FC adapter, online indicates the FC adapter is active and available for access and input/output processing.</p>  |
| <b>originator</b>                | The Fibre Channel N_Port responsible for starting an exchange. A FC originator is comparable to a SCSI initiator.  |
| <b>point-to-point</b>            | One of three existing FC topologies, in which two ports are directly connected by a link with no fabric, loop, or switching elements present. The interface card which uses FC-AL to support Point-to-Point configurations.  |
| <b>port name</b>                 | A field value under the FC Status Menu; the FC port identifier; a 64-bit value the factory assigns to each FC adapter.   |
| <b>post</b>                      | See Power On Self Test.  |
| <b>power on self test (POST)</b> | A group of tests run when the interface card is powered on.  |
| <b>processor</b>                 | Contains the arithmetic and logic, control, and internal memory units that control the interface card.   |
| <b>reset SCSI</b>                | For a specific SCSI bus, the host clears all inputs and outputs and then resets the bus and all the devices connected to it.   |
| <b>responder</b>                 | The logical function in an N_Port responsible for supporting the exchange initiated by the originator in another N_Port. A FC responder is comparable to a SCSI target. The interface card is often the responder.   |
| <b>SAN</b>                       | Storage Area Network   |
| <b>SCC addressing</b>            | A menu item. SCSI-3 interface card Commands (SCC) addressing is used to address SCSI devices attached to the interface card using the SCC logical unit addressing method. In SCC addressing mode, the interface card will respond to FCP commands as a SCC interface card device.  |
| <b>SCSI</b>                      | Small Computer System Interface. An industry standard for connecting peripheral devices and their interface cards to an initiator.   |
| <b>SCSI adapter</b>              | A 16-bit fast/wide SE or Differential or LVD or 8-bit narrow single-ended physical connection between the interface card and the SCSI devices. Each SCSI adapter supports up to sixteen (for fast/wide) or eight (for narrow) SCSI devices, including itself.  |

|   |   |
|---|---|
| <b>SCSI addressing</b>                  | <p>A SCSI adapter supports up to 16 devices, including itself. Each device has its own unique SCSI address. The SCSI address of a device dictates the device's priority when arbitrating for the SCSI bus. SCSI address "7" has the highest priority. The next highest priority address is "6" followed by 5, 4, 3, 2, 1, 0, 15, 14, 13, 12, 11, 10, 9, 8, with "8" being the lowest priority address.</p> <p>The narrow SCSI adapter is factory set to address 7. A narrow SCSI adapter supports up to eight devices, including itself. SCSI address "7" has the highest priority followed by 6, 5, 4, 3, 2, 1, and 0.</p> |
| <b>SCSI bus</b>                         | The means of transferring SCSI data between SCSI devices. It is an 8-bit or 16-bit bus that supports up to eight or sixteen devices (including itself), in any mix of initiators and targets, with the limitation that at least one initiator and one target must be present.   |
| <b>SCSI device</b>                      | A single unit on the SCSI bus, identifiable by a unique SCSI address. A SCSI device can act as an initiator or target. For SCSI-3, each SCSI device supports up to sixteen LUNs.  |
| <b>SCSI port</b>                        | An opening at the back of the interface card providing connection between the SCSI adapter and the SCSI bus.  |
| <b>SCSI status</b>                      | A menu name used to show the number of SCSI devices on the bus.   |
| <b>small formfactor pluggable (SFP)</b> | A physical component that manages the functions of the FC-0 layer, which is the physical characteristic of the media and interface, including drivers, transceivers, connectors, and cables. Mounts on a FC adapter card and connects the interface card to a FC host.  |
| <b>shortwave</b>                        | Lasers or LEDs that emit light with wavelengths around 780 nm or 850 nm. When using multimode fibre (50 nm), shortwave lasers can be used with FC links less than 500m. To achieve longer lengths, single-mode fibre is required. The preferred fibre core size is 50 micron as this fibre has large bandwidth so that the distance is limited by the fibre attenuation. A 62.5 micron core size is also supported for compatibility with existing FDDI installations. Fibre of this type has smaller bandwidth and, in this case, the distance is limited by the fibre bandwidth.  |
| <b>speed</b>                            | A status type in the FC Status Menu showing the speed (1063 Mbps) of the FC adapter.  |
| <b>switched fabric</b>                  | A FC term describing a switched topology, which is one of the three existing FC topologies. Fabric elements interconnect various N_Ports or NL_Ports and are responsible for frame routing.   |
| <b>TCP</b>                              | Transmission Control Protocol   |
| <b>target</b>                           | A device (usually a peripheral) that responds to an operation requested by an initiator (usually a host system). Peripherals are targets, but for some commands (for example, a SCSI COPY command), the peripheral may need to act temporarily as an initiator.   |
| <b>terminator block/termination</b>     | <p>An electrical connection at each end of the SCSI bus composed of a set of resistors (or possibly other components). Its function is to provide a pull-up for open collector drivers on the bus, and also impedance matching to prevent signal reflections at the ends of the cable.</p> <p>The SCSI bus requires termination at both ends of the bus. One end of the SCSI bus is terminated by the SCSI adapter's internal termination. The other end should have a terminator placed on the SCSI connector on the last SCSI peripheral. If this device is not terminated, data errors may occur.</p>                    |
| <b>topology</b>                         | The physical or logical layout of nodes on a network. FC topologies include Point-to-Point, FC-AL, and Fabric.  |
| <b>view node name</b>                   | A status type in the FC Status Menu showing the identification of the node.   |

|                              |   |
|------------------------------|---|
| <b>view port name</b>        | A status type in the FC Status Menu showing the identification of the port.                     |
| <b>world wide name (WWN)</b> | A Name_Identifier which is worldwide unique, and represented by a 64-bit unsigned binary value. |

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