Part No. 315545-B Rev 00
April 2003

4655 Great America Parkway
Santa Clara, CA 950540

Managing Platform Operations and Using Diagnostic Tools

Passport 8000 Series Software Release 3.5

NORTEL NETWORKS™

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Preface

Nortel Networks* Passport* 8000 Series switch is a flexible and multifunctional switch that supports a diverse range of network architectures and protocols. This guide provides procedures for configuring, monitoring, and managing the Passport 8000 Series switch.

Before you begin

This guide is intended for network designers and administrators with the following background:

- Basic knowledge of networks, Ethernet bridging, and IP and IPX routing
- Familiarity with networking concepts and terminology
- Basic knowledge of network topologies
- Experience with windowing systems or graphical user interfaces (GUIs)

Text conventions

This guide uses the following text conventions:

angle brackets (< >)	Indicate that you choose the text to enter based on the description inside the brackets. Do not type the brackets when entering the command. Example: If the command syntax is `ping <ip_address>`, you enter `ping 192.32.10.12`
`bold Courier text`	Indicates command names and options and text that you need to enter. Example: Use the **`dinfo`** command. Example: Enter **`show ip`** {**`alerts`**|**`routes`**}.
braces ({})	Indicate required elements in syntax descriptions where there is more than one option. You must choose only one of the options. Do not type the braces when entering the command. Example: If the command syntax is `show ip {alerts|routes}`, you must enter either `show ip alerts` or `show ip routes`, but not both.
brackets ([ ])	Indicate optional elements in syntax descriptions. Do not type the brackets when entering the command. Example: If the command syntax is `show ip interfaces [-alerts]`, you can enter either `show ip interfaces` or `show ip interfaces -alerts`.
italic text	Indicates new terms, book titles, and variables in command syntax descriptions. Where a variable is two or more words, the words are connected by an underscore. Example: If the command syntax is `show at <valid_route>`, *`valid_route`* is one variable and you substitute one value for it.
`plain Courier text`	Indicates command syntax and system output, for example, prompts and system messages. Example: `Set Trap Monitor Filters`

separator (>)	Shows menu paths. Example: Protocols > IP identifies the IP command on the Protocols menu.
vertical line (|)	Separates choices for command keywords and arguments. Enter only one of the choices. Do not type the vertical line when entering the command. Example: If the command syntax is `show ip {alerts|routes}`, you enter either `show ip alerts` or `show ip routes`, but not both.

Acronyms

This guide uses the following acronyms:

BootP	Bootstrap Protocol
FTP	File Transfer Protocol
IP	Internet Protocol
MAC	media access control
MAU	media access unit
MDI-X	medium dependent interface crossover
NBMA	nonbroadcast multi-access
OSPF	Open Shortest Path First
PPP	Point-to-Point Protocol
SNMP	Simple Network Management Protocol
TCP/IP	Transmission Control Protocol/Internet Protocol
TELNET	Network Virtual Terminal Protocol

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Chapter 1
System platform and diagnostic tools overview

This chapter provides overview information about a variety of system platform operations and diagnostic tools. Specifically, it includes information about the following topics:

Operating modes

A Passport 8000 Series switch can run in the following operating modes:

- Automatic save-to-standby mode — Sets a flag that copies the configuration files from the primary CPU to the backup CPU.
- M mode (128K records mode) — Supports 128K hardware records.
- Enhanced operational mode — Increases the maximum number of VLANs.
- CPU high-availability mode — High availability (HA), or "hot standby," refers to a multiprocessing system that can quickly recover from a failure.

For instructions on configuring these modes, see Chapter , "Configuring chassis operations."

Module types

The Passport 8000 Series switch modules fall into the following types:

- Legacy modules are older modules that manufacturing has discontinued, but are still supported.
  - Legacy modules do **not** support egress port mirroring.
  - Legacy modules support 32K records **only** and cannot operate in M mode.
  - Legacy modules cannot operate in enhanced operational mode.
- E-modules have an "E" suffix and replace the modules that have the same number without the E.
  - E-modules support egress port mirroring.
  - E-modules support 32K records **only** and cannot operate in M mode.
- M-modules did not replace E-modules. They are both available and have different part numbers. The only exception is the 8683POSE module, which was replaced with the 8683POSM.
  - M-modules have an "M" suffix. Two exceptions to this rule are the 10 Gigabit Ethernet modules (8661XLR and 8661XLW).
  - M-modules support 128K records and operate in M mode.

Table 1 lists all the supported 8000 Series modules.

Table 1 8000 Series modules

Legacy	E-modules	M-modules
8608GB	8608GBE (DS1404038)	8608GBM (DS1404059)
8608GT	8608GTE (DS1404044)	8608GTM (DS1404061)
8608SX	8608SXE (DS1404036)	Not supported
8616SX	8616SXE (DS1404011)	Not supported
8624FX	8624FXE (DS1404037)	Not supported
8632TX	8632TXE (DS1404024)	8632TXM (DS1404055)
8648TX	8648TXE (DS1404035)	8648TXM (DS1404056)
8672ATM	8672ATME (DS1304008)	8672ATMM (DS1304009)
8683POS	8683POSE	8683POSM (DS1404060)
	8616GTE (DS1404034)	Not supported
		8661XLR (DS1404053)
		8661XLW (DS1404052)
		8661 SSL Acceleration Module (DS1404070
		Web Switching Module (WSM) (DS1404045)

Microsoft* Network Load Balancing Support

Passport 8000 Series switch software allows you to choose whether ARP entries for multicast MAC addresses are associated with the VLAN or the port on which it was learned.

This enhancement is useful if multiple endstations/servers are sharing a multicast MAC address as is the case with certain Microsoft network load balancing applications, wherein the traffic is flooded to the VLAN to ensure that every end station using this virtual multicast MAC address is receiving a copy of the stream.

This feature is disabled by default.

To enable or disable NLBS support, enter the CLI command:

```
config ip arp multicast-mac-flooding <enable|disable>
```

Note: This option is not dynamic. That is, if the setting of this feature is changed, it will not dynamically reprogram all previously learned ARP entries from multicast MAC addresses.

Port mirroring

Passport 8000 Series switches have a port mirroring feature that helps you to monitor and analyze network traffic. The port mirroring feature supports both *ingress* (incoming traffic) and *egress* (outgoing traffic) port mirroring. When this feature is enabled, the *mirrored* (source) port's ingress or egress packets are forwarded normally and a copy of the packets is sent out the mirrored port to the *mirroring* (destination) port. Although you can configure Passport 8000 Series switches to monitor both ingress and egress traffic, some restrictions apply:

- Passport 8100 switches
  - — Ingress port mirroring is always supported
  - — Egress port mirroring is supported only in half-duplex mode of operation
- Passport 8600 switches
  - — Ingress port mirroring is always supported
  - — Egress port mirroring is currently supported only on Passport 8600 E-modules

You can configure up to 100 entries in the port mirroring table for mirroring, and you can have up to 25 entries active at any given time.

Egress port mirroring can be enabled separately, allowing you to monitor packets as they leave specified ports. In addition, you can monitor traffic for MAC addresses, where traffic with a given MAC source address (SA) or MAC destination address (DA) is copied to the specified mirroring port.

To avoid seeing unintended traffic, you should remove mirroring (destination) ports from all virtual local area networks (VLANs) and spanning tree groups (STGs).

You can observe and analyze packet traffic at the mirroring port using a network analyzer — a copy of the packet can be captured and analyzed. Unlike other methods that are used to analyze packet traffic, the packet traffic is uninterrupted and packets flow normally through the mirrored port.

Configuration considerations

Note: Nortel Networks recommends that you disable port mirroring when not in use to reduce the load on the switch.

In release 3.2 and prior, you could configure only 25 mirrored ports to 1 mirroring port. With release 3.2.0.1 and up:

Passport 8100 switch

- You can configure 25 mirrored ports to 1 mirroring port
- Ethernet MDAs can also be a part of these 25 ports
- Ingress and Egress mirroring is supported
- Half duplex ONLY for Egress mirroring

Passport 8600 switch

In release 3.2.2 and later:

- The number of port mirroring entries can now be configured between 1 and 383, and ALL entries can be active simultaneously
- The number of mirroring ports plus the number of mirrored ports cannot exceed 384.
- Hardware limitations:
  - Ports supported by the same OCTAPID (group of 8 10/100 ports or 1 Gig port) can only be mirrored to the same destination.
  - One port cannot be mirrored to multiple destinations.
  - A maximum of 64 destination ports can be configured at one time without violating hardware limitations.

Note: Egress mirroring is supported only on E-modules.

Note: If a port mirroring rule is disregarded, the following error message is displayed: `error: invalid diag-logue operation`.

For more information about the port mirroring feature, see "Configuring and monitoring port mirroring" on page 191.

Packet Capture Tool (PCAP)

PCAP is an onboard data packet capture tool capturing packets ingressing and egressing on selected I/O ports. This feature allows customer support personnel to capture, save, and download one or more traffic flows through the Passport 8600 switch and analyze the captured traffic offline. All captured packets are stored on the secondary CPU in the PCAP engine. The primary CPU maintains its protocol handling and will not be affected by any PCAP capture activity. For more information about PCAP, refer to *Using the Packet Capture Tool*.

Syslog

On any UNIX*-based management platform, you can use the syslog messaging feature of the Passport 8000 Series 8000 Series switch to manage event messages. The Passport 8000 Series syslog software communicates with a server software component named *syslogd* on your management workstation. The UNIX daemon syslogd is a software component that receives and locally logs, displays, prints, and/or forwards messages that originate from sources internal and external to the workstation. For example, syslogd on a UNIX workstation concurrently handles messages received from applications running on the workstation, as well as messages received from a Passport 8000 Series switch running in a network accessible to the workstation.

Note: Syslog and Trap Log may not capture all log session messages for the Web Switching Module.

Network Time Protocol (NTP)

The Network Time Protocol (NTP) synchronizes the internal clocks of various network devices across large, diverse networks to universal standard time. NTP runs over UDP, which in turn runs over IP. The NTP protocol specification is documented in RFC 1305.

Every network device relies on an internal system clock to maintain accurate time. On local devices, the internal system clock is usually set by eye or by wristwatch to within a minute or two of the actual time and is rarely reset at regular intervals. Many local clocks are battery-backed devices that use room temperature clock oscillators that can drift as much as several seconds each day. NTP solves this problem by automatically adjusting the time of the devices so that they are synchronized within a millisecond (ms) on LANs and up to a few tens of milliseconds on WANs relative to Coordinated Universal Time (UTC).

The current implementation of NTP supports only unicast client mode. In this mode, the NTP client, which is tailored to the limitations of the Real Time Clock (RTC) on the CPU board (Dallas Semiconductors DS1307 series), sends NTP time requests to other remote time servers in an asynchronous fashion. The NTP client collects four samples of time from each remote time server. A clock selection algorithm determines the best server among the selected samples based on stratum, delay, dispersion and the last updated time of the remote server. The RTC is adjusted to the selected sample from the chosen server.

NTP terms

A *peer* can be any device that runs NTP software. However, this implementation of NTP refers to peers as remote time servers that provide time information to other time servers on the network and to the local *NTP client*. An NTP client refers to the local network device — in this case, a Passport 8000 Series switch — that accepts time information from other remote time servers.

NTP system implementation model

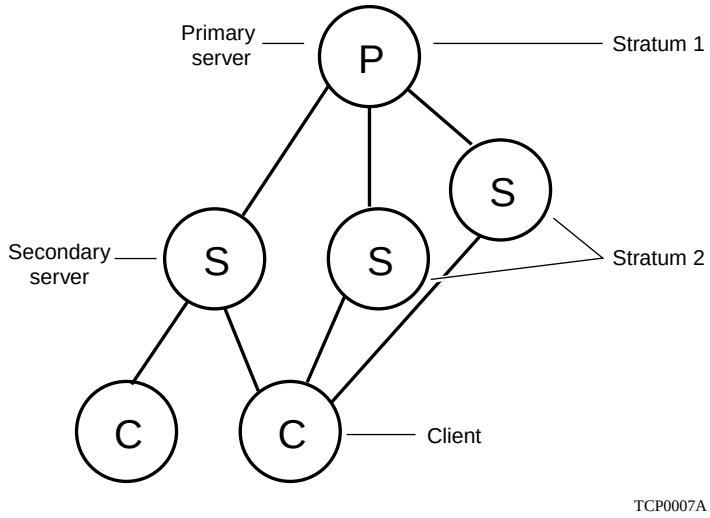
NTP is based on a hierarchical model that consists of a local NTP client that runs on the Passport 8000 Series switch and on remote time servers. The NTP client requests and receives time information from one or more remote time servers. The local NTP client reviews the time information from all available time servers and synchronizes its internal clock to the time server whose time is most accurate. The NTP client does not forward time information to other devices running NTP.

There are two types of time servers in the NTP model: primary time servers and secondary time servers. A *primary time server* is directly synchronized to a primary reference source, usually a wire or radio clock that is synchronized to a radio station providing a standard time service. The primary time server is the authoritative time source in the hierarchy, meaning that it is the one true time source to which the other NTP devices in the subnet synchronize their internal clocks.

A *secondary time server* uses a primary time server or one or more secondary time servers to synchronize its time, forming a synchronization subnet (Figure 1). A *synchronization subnet* is a self-organizing, hierarchical master-slave configuration with the primary servers at the root and secondary servers of decreasing accuracy at successive levels.

Figure 1 shows NTP time servers forming a synchronization subnet.

Figure 1 NTP time servers forming a synchronization subnet



In the NTP model, the synchronization subnet automatically reconfigures in a hierarchical primary-secondary (master-slave) configuration to produce accurate and reliable time, even if one or more primary time servers or the path between them fails. This feature applies in a case in which all the primary servers on a partitioned subnet fail, but one or more backup primary servers continue to operate. If all of the primary time servers in the subnet fail, the remaining secondary servers synchronize among themselves.

How NTP distributes time within a subnet

NTP distributes time through a hierarchy of primary and secondary servers, with each server adopting a stratum (see Figure 1 on page 31). A *stratum* defines how many NTP *hops* away a particular secondary time server is from an authoritative time source (primary time server) in the synchronization subnet. A “stratum 1” time server is located at the top of the hierarchy and is directly attached to an external time source, typically a wire or radio clock; a “stratum 2” time server receives its time via NTP from a “stratum 1” time server; a “stratum 3” time server receives its time via NTP from a “stratum 2” time server, and so forth.

Each NTP client in the synchronization subnet chooses as its time source the server with the lowest stratum number with which it is configured to communicate via NTP. This strategy effectively builds a self-organizing tree of NTP speakers. The number of strata is limited to 15 to avoid long synchronization loops.

NTP tries not to synchronize to a remote time server whose time might not be accurate. It avoids doing this in two ways. First, NTP never synchronizes to a remote time server that is not itself synchronized. Second, NTP compares the times reported by several remote time servers.

Synchronizing with the best available time server

Unlike other time synchronization protocols, NTP does not attempt to synchronize the remote time servers' internal clocks to each other. Rather, NTP synchronizes the servers' clocks to universal standard time, using the "best" available time source and transmission paths to that time source.

NTP uses the following criteria to determine the time server whose time is best:

- The time server with the lowest stratum
- The time server closest in proximity to the primary time server (reduces network delays)
- The time server offering the highest claimed precision

NTP prefers to have access to several (at least three) servers at the lower stratum level, since it can apply an agreement algorithm to detect a problem on any part of the time source.

NTP modes of operation

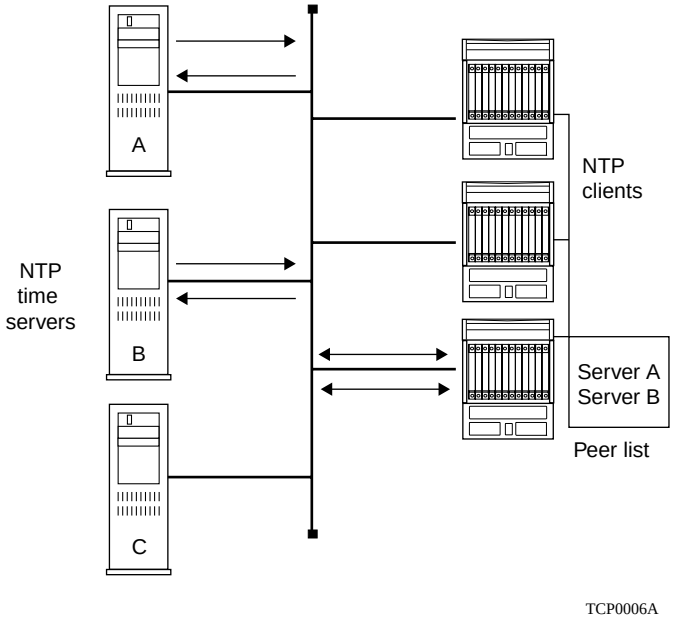
NTP uses unicast client mode to enable time servers and NTP clients to communicate in the synchronization subnet. The Passport 8000 Series switch supports only unicast client mode.

When you configure a set of remote time servers (peers), NTP creates a list that includes each time server's IP address. The NTP client uses this list to determine which remote time servers to query for time information.

When the NTP client queries the remote time servers, they respond with various timestamps, along with information about their clocks, such as stratum, precision, and time reference (Figure 2). The NTP client reviews the list of responses from all available servers and chooses one as the “best” available time source from which to synchronize its internal clock.

Figure 2 shows how NTP time servers operate in unicast mode.

Figure 2 NTP time servers operating in unicast client mode



NTP authentication

You can authenticate time synchronization to ensure that the local time server obtains its time services only from known sources. NTP authentication adds a level of security to your NTP configuration. By default, network time synchronization is not authenticated.

When you select authentication, the Passport 8000 Series switch uses the Message Digest 5 (MD5) algorithm to produce a *message digest* of the key. The message digest is created using the key and the message, but the key itself is not sent. The MD5 algorithm verifies the integrity of the communication, authenticates the origin, and checks for timeliness.

To authenticate the message, the client authentication key must match that of the time server. Therefore, the authentication key must be securely distributed in advance (the client administrator must get the key from the server administrator and configure it on the client).

While a server may know many keys (identified by many key IDs) it is possible to declare only a subset of these as trusted. This feature allows the time server to share keys with a client that requires authenticated time and that trusts the server, but that is not trusted by the time server.

BootP/DHCP relay

The Dynamic Host Configuration Protocol (DHCP) is an extension of the Bootstrap Protocol (BootP) and provides host configuration information to the workstations on a dynamic basis. To lower administrative overhead, network managers prefer to configure a small number of DHCP servers in a central location. It is necessary for routers to support the BootP/DHCP relay function so that hosts can access configuration information from servers several router hops away. IP subnet-based VLANs do not support DHCP relay functions because the DHCP request does not specify to which subnet the inquiry should be related.

Differences between DHCP and BootP

The following differences between DHCP and BootP are specified in RFC 2131 and include functions that BootP does not address:

- DHCP defines mechanisms through which clients can be assigned a network address for a finite lease (allowing for reuse of IP addresses).
- DHCP provides the mechanism for clients to acquire all of the IP configuration parameters needed to operate.

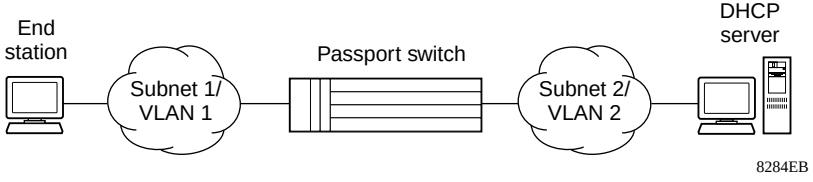
DHCP uses the BootP message format defined in RFC 951. A packet is classified as DHCP if the first four octets in the options field are 99, 130, 83, 99, and the fifth octet is 53. The first four octets are referred to as the “Magic Cookie,” while the fifth is the DHCP message type code. The remainder of the options field consists of a list of tagged parameters that are called “options” (RFC 2131).

Summary of DHCP relay operation

BootP/DHCP clients (workstations) generally use UDP/IP broadcasts to determine their IP addresses and configuration information. If such a host is on a network or a subnet segment (or VLAN) that does not include a DHCP server, the UDP broadcasts are by default not forwarded to the server located on a different network segment or VLAN. The Passport 8000 Series can be configured to overcome this issue by forwarding the broadcasts to the server through virtual router interfaces. The router interfaces can be configured to forward DHCP broadcasts to other locally connected network segments or directly to the server’s IP address. DHCP must be enabled on a per-routable-interface basis.

Figure 3 shows an end station connected to subnet 1, corresponding to VLAN 1. The Passport 8000 Series connects two subnets by means of the virtual routing function. When the end station generates a DHCP request as a limited UDP broadcast to the IP address of all 1s (that is, 255.255.255.255) with the DHCP relay function configured, the Passport 8000 Series forwards DHCP requests to subnet 2 or to the host address of the DHCP server, depending on the configuration.

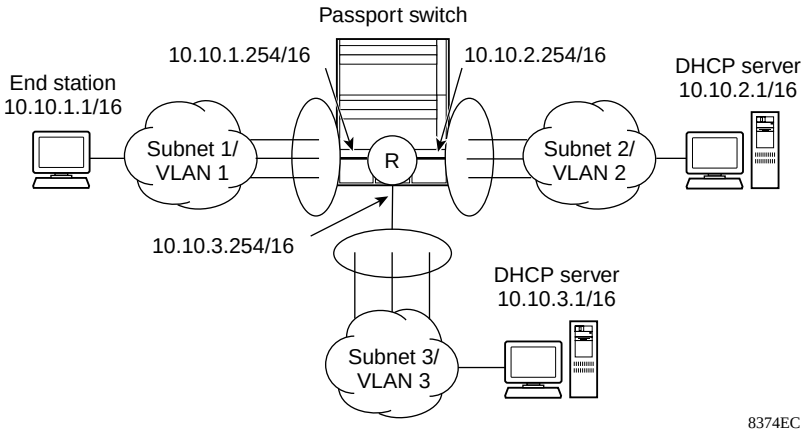
Figure 3 DHCP operation



Forwarding DHCP packets

In the example shown in Figure 4, the *agent address* is 10.10.1.2. To configure the Passport 8000 Series to forward DHCP packets from the end station to the server, use 10.10.2.1 as the *server address*.

Figure 4 Forwarding DHCP packets



All BootP broadcast packets, including DHCP packets that appear on the VLAN 1 router interface (10.10.1.2), will be forwarded to the DHCP server. In this case, the DHCP packets will be forwarded as unicast to the DHCP server's IP address.

To forward BootP/DHCP packets as broadcast packets to VLAN 2, specify the IP address of the switch VLAN 2 router interface (10.10.2.2) as the server address.

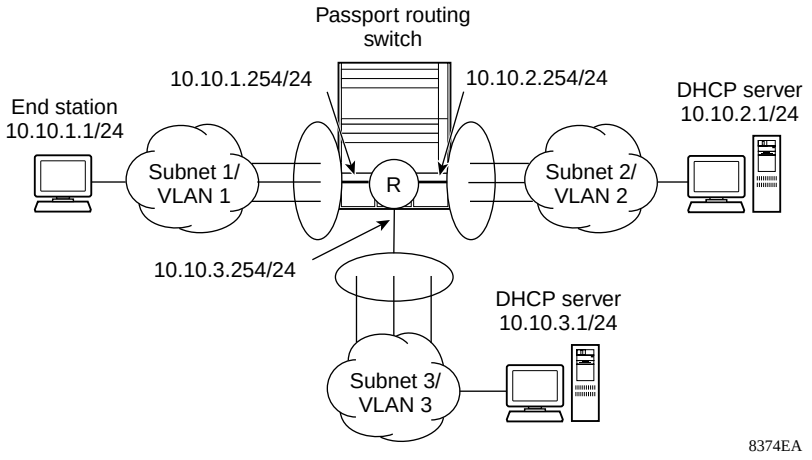
Multiple BootP/DHCP servers

Most enterprise networks use multiple BootP/DHCP servers for fault tolerance. The Passport 8000 Series allows you to configure the switch to forward BootP/DHCP requests to multiple servers. You can configure up to 10 servers to receive copies of the forwarded BootP/DHCP messages.

If a DHCP client is connected to a routable interface, to configure DHCP requests to be sent to 10 different routable interfaces or 10 different server IP addresses, enable DHCP on the client (agent address) and then enable DHCP from the client to each of the interfaces or IP addresses (server addresses).

In the example shown in Figure 5, two DHCP servers are located on two different subnets. To configure the Passport 8000 Series to forward the copies of the BootP/DHCP packets from the end station to both servers, specify the switch (10.10.1.254) as the agent address. Then enable DHCP to each of the DHCP servers by entering 10.10.2.1 and 10.10.3.1 as the server addresses.

Figure 5 Configuring multiple BootP/DHCP servers



UDP broadcast forwarding

Some network applications such as the NetBIOS name service rely on a User Datagram Protocol (UDP) broadcast to request a service or locate a server for an application. If a host is on a network, subnet segment, or VLAN that does not include a server for the service, UDP broadcasts are by default not forwarded to the server located on a different network segment or VLAN. Resolve this problem by forwarding the broadcasts to the server through physical or virtual router interfaces.

UDP broadcast forwarding is a general mechanism for selectively forwarding limited UDP broadcasts received on an IP interface out to other router IP interfaces as a rebroadcast or to a configured IP address.

- If the address is that of a server, the packet is sent as a unicast packet to this address.
- If the address is that of an interface on the router, the frame is rebroadcast.

To follow the basic steps for setting up UDP broadcast forwarding:

1. Enter protocols into a table.
2. Create policies (protocol/server pairs).
3. Assemble these policies into lists or profiles.
4. Apply the list to the appropriate interfaces.

When a UDP broadcast is received on a router interface, it must meet the following criteria if it is to be considered for forwarding:

- Be a MAC-level broadcast
- Be an IP limited broadcast
- Be for the specified UDP protocol
- Have a TTL value of at least 2

For each ingress interface and protocol, the policy specifies how the UDP broadcast is retransmitted: to a unicast host address or to a broadcast address.

Chapter 2
Booting and accessing the switch

This chapter describes the four-stage boot sequence, instructions for accessing the Boot Monitor and Run-Time CLI, and instructions for navigating the CLI. The chapter includes the following topics:

Booting the switch

Passport 8000 Series switches go through a four-stage boot sequence before they become fully operational. When you turn on power to the switch, the 8690/8691SF or 8190SM module starts its built-in boot loader. In a Passport 8000 Series switch with redundant switch fabric or switch management modules, the module in slot 5 provides the active CPU functions when the switch powers up or resets. (Options in the Boot Monitor CLI allow you to specify which module is the active CPU.) The switch fabric subsystems of both modules are active and share the switching functions for the switch.

The boot sequence consists of the following four file loads:

- Stage 1: Boot monitor image load
- Stage 2: Boot configuration load
- Stage 3: Run-time image load

- Stage 4: Switch configuration load

The following sections describe what happens at each stage in the boot process.

Stage 1: Loading the boot monitor image

At power-up or reset, the CPU subsystem on the 8691SF module loads the boot monitor image.

When the boot monitor image is loaded, the CPU and basic system devices such as the console port, modem port, PCMCIA card slot, and management port are initialized. (At this stage, the I/O ports are not available; they are not initialized until later in the boot process.)

Stage 2: Loading the boot configuration

After the boot monitor image loads, the boot configuration is loaded from a file called /flash/boot.cfg on the onboard flash memory (Nortel Networks recommends having a copy of the boot.cfg file in the /flash directory). If the /flash/boot.cfg file is not present, and if there is a PCMCIA card present, the 8000 Series switch will search for the file /pcmcia/boot.cfg.

Note: If the boot.cfg file on the flash becomes corrupted, the switch may start a loop process since the switch always loads the file from the flash before the PCMCIA.

If a PCMCIA card is not present, or if the file /pcmcia/boot.cfg is not present, the 8000 Series switch will boot using the default boot-configuration settings.

Note: If using a PCMCIA card manufactured by Sandisk, the 8000 Series switch may not be able to access the /pcmcia/boot.cfg file during boot-up. This limitation has only been observed during boot-up. No limitation has been observed when accessing the Sandisk(*) device after boot-up.

If the Autoboot flag is set to disabled or if the boot process is interrupted at the console, the boot process stops. At this stage, you have access to the Boot Monitor CLI at the console. In the Boot Monitor CLI, you can set the boot configuration and perform upgrades to the boot monitor image and run-time image (loaded in stage 3). Any changes made and saved at the Boot Monitor CLI change the boot configuration.

After you save changes, you can reinitiate the boot process from the Boot Monitor CLI using the **`boot`** command.

Stage 3: Loading the run-time image

The run-time image loads after the boot configuration. This software image initializes the I/O modules and provides full routing switch functionality. The run-time image can be loaded from the flash memory, from a PCMCIA card, or from a TFTP server using the management port.

The default load order is defined in the boot configuration file (/pcmcia/boot.cfg or /flash/boot.cfg). You can redefine the source and order from which to load the run-time image if you interrupt the Autoboot process. You can also specify the order using the CLI or Device Manager.

Stage 4: Loading the switch configuration file

The final step before the boot process is complete is to load the switch configuration file (/flash/config.cfg). The switch configuration consists of any higher-level functionality, including:

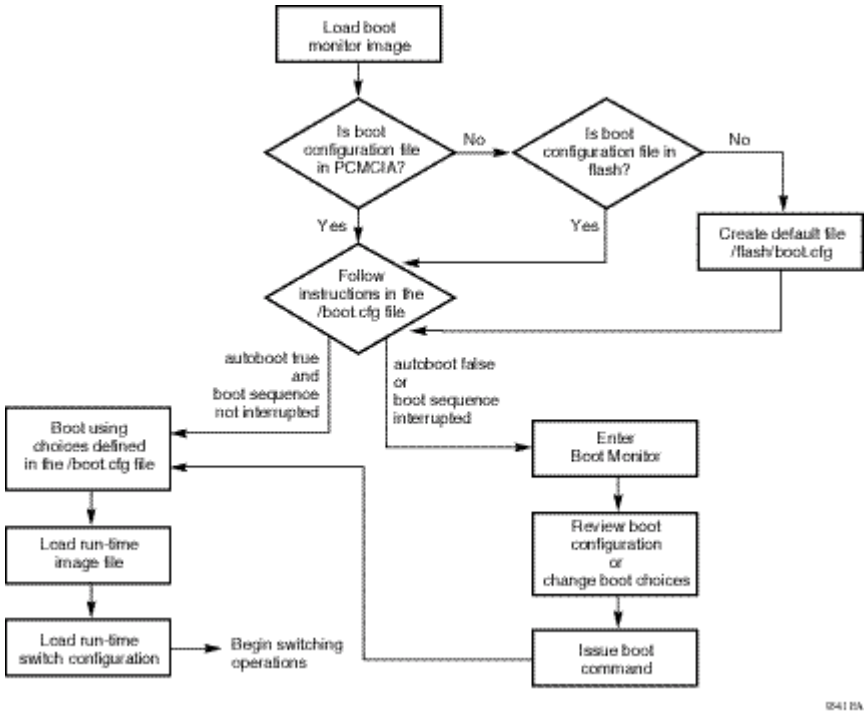
- Chassis configuration
- Port configuration
- Spanning tree group configuration
- VLAN configuration
- Routing configuration
- IP address assignments
- RMON configuration

The default switch configuration includes:

- All ports in a single spanning tree group, STG number 1 (The default spanning tree group is 802.1D compliant, and its BPDUs are never tagged.)
- A single, port-based default VLAN with a VLAN identification number of 1, bound to the default spanning tree group
- Spanning Tree FastStart disabled on all ports
- No interfaces assigned IP addresses
- Traffic priority for all ports set to normal priority
- All ports as nontagged ports
- Default communication protocol settings for the Console port (see *Getting Started* for information about these protocol settings.)

Figure 6 shows a summary of the boot sequence.

Figure 6 Switch boot sequence



Verifying the boot image source after the boot process

After a switch boot, the system notes the boot source and logs a message in the system log file that informs you about the selected boot source. For more information about the different boot sources, see Chapter 3.

Figure 7 displays the boot source messages observed on the console port:

Figure 7 Console port boot source messages

```
[04/24/2002 10:07:48] ERROR: Code=0x1ff0105 Task=rcStart:
unrecognized record type 60 in alsRead

[04/24/2002 10:07:50] INFO: Code=0x0 Task=rcStart: System
is ready

[04/24/2002 10:07:51] INFO: Code=0x0 Task=rcStart: BOOTED
WITH TERTIARY BOOT SOURCE - pcmcia:p10ab

**********************************
* Nortel Networks, Inc.           *
* Copyright (c) 1996-2002
* All Rights Reserved             *
**********************************

Login:
```

Accessing the Boot Monitor CLI

The Boot Monitor CLI allows you to configure and manage the boot process. To access the Boot Monitor CLI, do one of the following tasks:

- Reboot and interrupt the boot sequence by pressing the Enter key when the following prompt is displayed:

  ```
  Press Enter to stop autoboot.
  ```

- From the Run-Time CLI, enter the following commands, and then reboot:

  ```
  8610-# config bootconfig flags autoboot false
  8610-# save bootconfig
  8610-# boot -y
  ```

Note: You must be using a terminal connected directly to the Console port on the switch. If you reboot the switch from a remote terminal, the connection is terminated.

When you enter the Boot Monitor CLI, the following prompt is displayed:

```
monitor#
```

Accessing the Run-Time CLI

When the Passport 8000 Series switch is up and running, the Run-time CLI commands enable you to perform most of the configuration and management functions necessary to manage the switch. These functions include:

- Resetting or rebooting the Passport 8000 Series switch.
- Adding, deleting, and displaying address resolution protocol (ARP) table entries.
- Pinging another network device.
- Displaying and setting configuration parameters for the entire switch and for individual ports.
- Configuring and displaying spanning tree group (STG) parameters and enable or disable Spanning Tree Protocol on an STG.
- Configuring and displaying MultiLink Trunking (MLT) parameters.
- Testing the switching fabric and perform internal and external loopback tests on individual ports.
- Creating and managing port-based VLANs or policy-based VLANs.

To access the Run-Time CLI, wait until the boot process is complete. At the login prompt, enter your user name and password.

Navigating the CLI

Each CLI is organized into a tree data structure. When you type a command, you see the command's context (the current level or branch) and subcontext. Context indicates commands at that level, and subcontext indicates one or more command layers available. Figure 8 shows the screen output, including context and subcontext, for the **`config vlan 1 info`** command.

Figure 8 Context and subcontext in the CLI

```
8610:6/config/vlan/1# info

Sub-Context: create fdb-entry fdb-filter fdb-static ip ipx ports srcmac
Current Context:

                      action : N/A
                     add-mlt :
                     agetime : N/A
                      delete : N/A
                    qoslevel : 1
                        name : Default
```

When you are in a given branch of the tree, you need to type only the subcommand for that level. For example, to view the configuration information of VLAN 1 from the top or prompt level, type **`config vlan 1 info`**. When you are already in the "config vlan" branch (as in Figure 8), you need only type **`info`**. In addition, when you are at a certain level, you will remain at that level until you type **`box`** or **`top`**. (These two commands return the CLI context to the system-level prompt.) This feature enables you to create, delete, or change all relevant parameters for a port without reentering information.

Figure 9 and Figure 10 show sample command hierarchies for the Run-Time and Boot Monitor CLI, respectively. These samples do not include all commands.

Figure 9 Run-Time CLI—partial command hierarchy

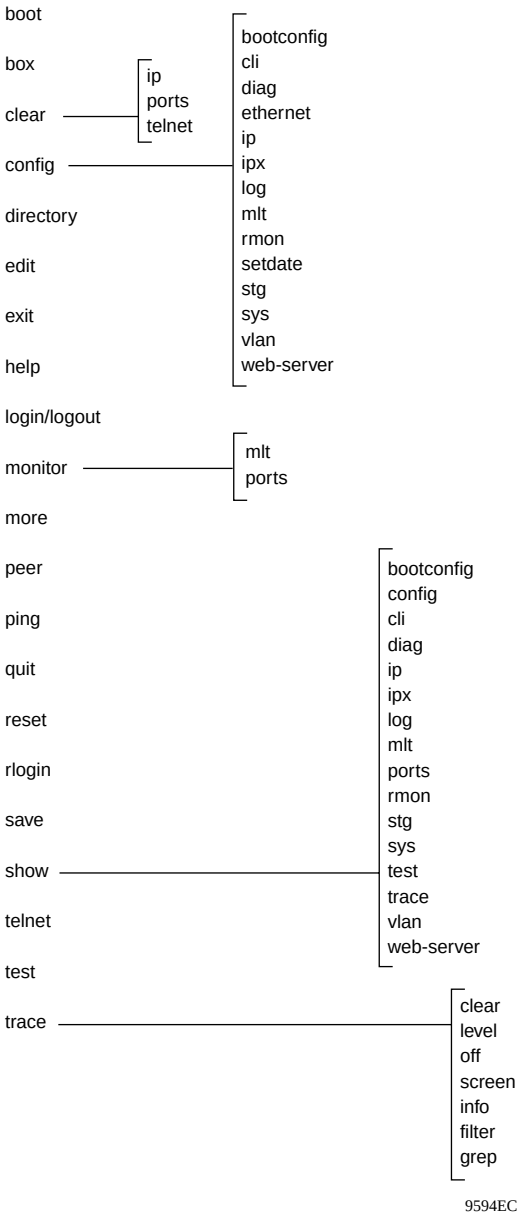
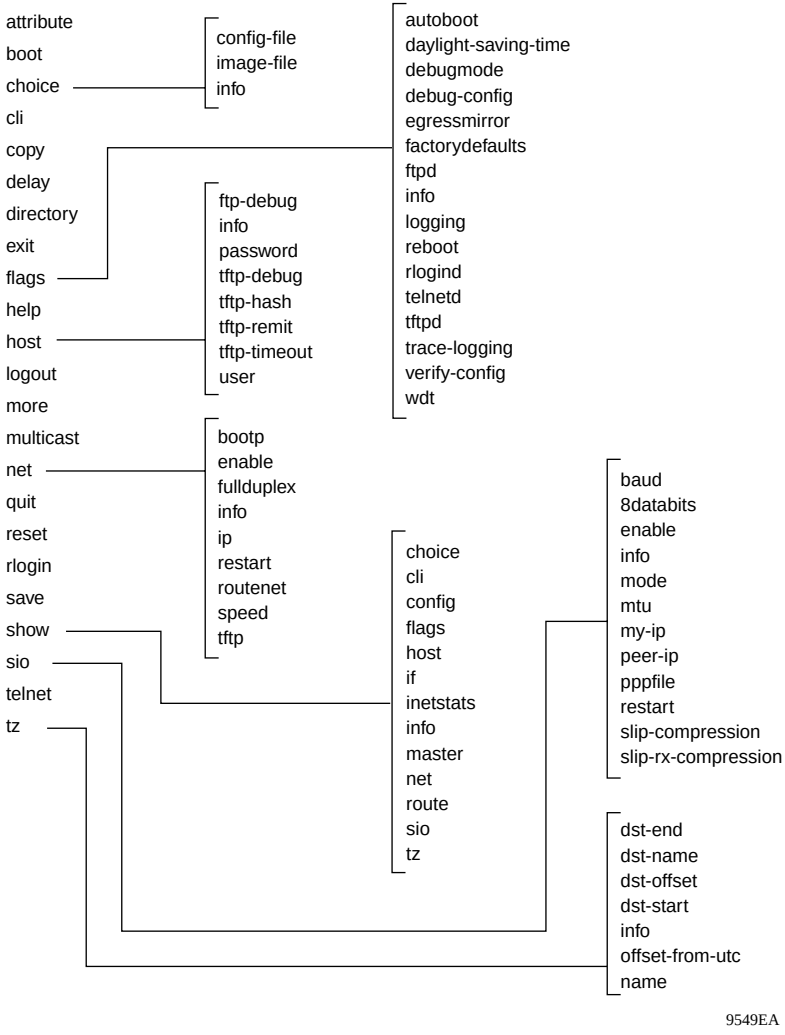


Figure 10 Boot Monitor CLI—partial command hierarchy



Command syntax

Commands are generally in the form <*top-level command*> <*command option*> <*argument*>. For example, to enable access to the switch through the Web management interface, you use the following command:

```
config web-server enable
```

where:

`config` is the top-level command.
`web-server` is one of the possible options for the **`config`** command.
`enable` is the argument.

The system prompt on the screen indicates the level or branch of the command structure at which you are operating. When the system prompt is `8600#`, you are at the top level. If you type only the top-level command and press Enter, you move into that branch of the command tree and the system prompt changes to indicate the new context. For example, if you type **`config`** and press Enter, the system prompt changes to `8600/config#`. When you are in a given branch of the tree, you need to type only the subcommand for that level. For example, to set the system contact from the top level, type **`config sys set contact`** <*`contact`*>. When you are already in the "config sys" branch, you need only type **`set contact`** <*`contact`*>.

In addition, after you have entered information to put you at a certain level, you remain at that level until you type `back` or reenter the original command. For example, when you use a command that begins with `config ethernet` <*`ports`*>, after you enter a port number, you do not have to reenter this information unless you go back up a level. This feature enables you to create, delete, or change all relevant parameters for this port without reentering information.

To avoid having to type complete commands, you can enter a shortened version of the command, such as **`dis`** for disable or **`en`** for enable, or type part of a command and then press the Tab key to complete the command. If the letters you typed are unique to a command, the command is completed automatically. If not, a bell sounds to indicate that more information is necessary.

Navigation commands

The following navigation commands are available in the Boot Monitor and Run-Time CLIs:

- **`back`**—takes you back up one level.
- **`box`**—goes to the top or the box level.
- **`cwc`**—changes the current working context.
- **`pwc`**—displays the current working context.
- **`pwd`**—prints the current working directory in the file system.
- **`top`**—goes to the box or top level (same as the **`box`** command).
- **`..`**—goes back up one level (same as the **`back`** command).

Throughout the CLI, you can use the following keystrokes:

- The up arrow key or Control-P: to view and scroll through the previous history commands.
- The down arrow key or Control-N: to view and scroll through the next history commands.
- Control-U: to delete a line; clears the line and allows you to enter a new command.
- Control-C: to abort a line entry; aborts the command entry and puts you at a new prompt. Note that this command does not abort the current command level that is running, only the new entry.
- Control-D: logs you off the system.
- Control-S/Control-Q: software flow control XON/XOFF.
- The Tab key or Control-I: command completion; completes the command when you have entered part of a word (`sh` for show).
- The Backspace key or Control-H: backspace.

For a complete list of the keystrokes available in the CLI, see Appendix C.

Parameter values in the CLI are indicated by angle brackets < >. Parameters can be optional or required. Required parameters must be in the specified order, followed by optional parameters. Optional parameters are displayed in brackets [ ].

When you enter multiple CLI commands, you can terminate a command within a single line of input by using the semicolon (;) as the separator. A semicolon is treated like a carriage return by the CLI.

Specifying ports

Each port identifier in the CLI has two components: a slot number and a port number. The slot number identifies the chassis slot containing the switch module that the port is on. The port number identifies the position of the port on the switch module. Port numbers begin with port 1 on top at the far left of the module. For more details about the port numbering in the modules, see Appendix A.

In an Passport 8000 Series switch, chassis slots are numbered from the top slot down, beginning with 1 for the top slot.

To specify a single port, type the slot number, a forward slash, and then the port number. For example, to specify port 20 on the switch management module in slot 3 of the switch, express the port number as follows:

```
3/20
```

To specify a list of port numbers, separate individual port numbers with commas. There is no space between the port numbers and the commas. Some examples of port lists are:

```
3/4,3/10,3/30,7/2,8/16
```

```
2/7,1/3,4/4
```

To specify a range of ports, type the low port number in the range, a dash, and then the high port number in the range. There is no space between the port numbers and the dashes. Some examples of port ranges are:

```
3/1-3/6
```

```
2/2-2/9
```

```
2/5-3/5
```

When you specify ports, you can specify any combination of port lists and port ranges. For example, the following port arguments are valid:

```
2/7,3/1-3/6

3/2-3/5,1/1-1/7,7/1

7/6,2/5,3/1-3/7,2/1
```

Specifying IP addresses and subnet masks

All IP addresses in the CLI are specified in dotted-decimal notation as follows:

```
<xxx>.<xxx>.<xxx>.<xxx>
```

An IP address with a subnet mask can be specified in two forms:

```
<xxx>.<xxx>.<xxx>.<xxx>/<yyy>.<yyy>.<yyy>.<yyy>
```

or

```
<xxx>.<xxx>.<xxx>.<xxx>/<n>
```

where:

`<xxx>.<xxx>.<xxx>.<xxx>` is the IP address in dotted-decimal notation.

`<yyy>.<yyy>.<yyy>.<yyy>` is the subnet mask in dotted-decimal notation.

`<n>` is the number of subnet mask bits.

The following examples both refer to the same IP address and subnet mask pair:

```
10.10.10.1/255.255.255.0

10.10.10.1/24
```

Chapter 3
Managing the boot process

This chapter describes how to configure and manage the boot process using the Boot Monitor CLI. You access the Boot Monitor CLI by either interrupting the boot process or from the Run-Time CLI. See “Accessing the Boot Monitor CLI” on page 44 for instructions.

This chapter includes information about the following topics:

Roadmap of Boot Monitor CLI commands

The following roadmap lists the commands and their parameters that you use to configure the Boot Monitor CLI. Use this list as a quick reference or click on any entry for more information:

Command	Parameter
`config cli`	`info`
	`more <true|false>`
	`prompt <value>`
	`rlogin-sessions <value>`

Command	Parameter
	screenlines <value>
	telnet-sessions <value>
	timeout <seconds>
config bootconfig	info
	delay <seconds>
	master <cpu-slot>
	multicast <value>
	logfile minsize maxsize maxoccupyPercentage
config bootconfig cli	info
	more <true|false>
	prompt <value>
	rlogin-sessions <value>
	screenlines <value>
	telnet-sessions <value>
	timeout <seconds>
config bootconfig choice <boot-choice>	info
	config-file <filename>
	image-file <filename>
config bootconfig delay <seconds>	
config bootconfig flags	info
	8100-mode <true|false>
	autoboot <true|false>
	daylight-saving- time <true|false>
	debugmode <true|false>
	debug-config <true|false>
	egress-mirror <true|false>

Command	Parameter
	factorydefaults <true|false>
	ftpd <true|false>
	logging <true|false>
	reboot <true|false>
	rlogind <true|false>
	savetostandby <true|false>
	block-snmp <true|false>
	sshd <true|false>
	telnetd <true|false>
	tftpd <true|false>
	trace-logging <true|false>
	verify-config <true|false>
	wdt <true|false>
config bootconfig host	info
	ftp-debug <true|false>
	password <value>
	tftp-debug <true|false>
	tftp-hash <true|false>
	tftp-rexmit <seconds>
	tftp-timeout <seconds>
	user <value>
config bootconfig master <cpu-slot>	
show bootconfig master	
config bootconfig net <cpu-net-port>	info
	autonegotiate <true|false>
	bootp <true|false>
	enable <true|false>

Command	Parameter
	fullduplex <true|false>
	ip <addr/mask> [cpu-slot <value>]
	restart
	route <net|add|del> <netaddr> <gateway>
	speed <10|100>
	tftp <ipaddr>
show bootconfig	info
	choice
	cli
	config [verbose]
	flags
	host
	master
	net
	show-all [file <value>]
	sio
	tz
	wlan
config bootconfig sio <cpu-sio-port>	info
	baud <rate>
	8databits <true|false>
	enable <true|false>
	mode <ascii|slip|ppp>
	mtu <bytes>
	my-ip <ipaddr>
	peer-ip <ipaddr>
	pppfile <file>

Command	Parameter
	restart
	slip-compression <true|false>
	slip-rx-compression <true|false>
config bootconfig tz	info
	dst-end <Mm.n.d/hhmm| MMddhhmm>
	dst-name <dstname>
	dst-offset <minutes>
	dst-start <Mm.n.d/hhmm| MMddhhmm>
	offset-from-utc <minutes>
	name <tz>
config bootconfig show	info
	choice
	cli
	config [verbose]
	flags
	host
	master
	net
	show-all [file <value>]
	sio
	tz
	wlan

Note: You can initiate a Boot Monitor CLI session only through a direct serial-port connection to the switch. After the Boot Monitor CLI is active, you can access it through a Telnet or rlogin session. (The flags for Telnet and rlogin must be set to allow remote access.) Within the Boot Monitor CLI, you can change the boot configuration, including boot choices and boot flags.

Configuring the Boot Monitor CLI

If you accessed the Boot Monitor CLI by interrupting the boot process (see Chapter 2 for instructions), you can configure and manage the Boot Monitor CLI using the following command:

```
config cli
```

Note: For the changes made to the Boot Monitor CLI to take effect, you must use the **`save`** command to save the changed configuration file and then reboot the switch. See “Saving the boot configuration to a file” on page 79 for more information.

This command includes the following options:

`config cli` followed by	
`info`	Displays information about the current settings of CLI display options.
`more <true|false>`	Enables scrolling of display output. The default is true. • `true` sets output display scrolling to one page at a time. • `false` sets the output display to continuous scrolling.
`prompt <value>`	Sets the root-level prompt. The default is monitor. • *`value`* is a string (1 to 1024 characters).

config cli followed by	
`rlogin-sessions <value>`	Sets the allowable number of allowed inbound rlogin/rsh sessions. The default is 8. • *value* is the number of sessions (0 to 8).
`screenlines <value>`	Sets the number of lines displayed on the terminal screen. The default is 23. • *value* is the number of lines (8 to 64).
`telnet-sessions <value>`	Sets the allowable number of inbound Telnet sessions. The default is 8. • *value* is the number of sessions (0 to 8).
`timeout <seconds>`	Sets the idle timeout period before automatic logout for CLI sessions; the default is 0. • *seconds* is the timeout period in seconds (30 to 65536).

Figure 11 shows sample output from the **`cli info`** command.

Figure 11 cli info command output

```
monitor# cli info
cli more true
cli prompt "monitor"
cli rlogin-sessions 8
cli screenlines 23
cli telnet-sessions 8
cli timeout 0
```

The Boot Monitor **`config cli`** command contains several sub-commands, which are similar to the Run-Time **`config cli`** commands described in Chapter 4 of this manual.

Configuring the Boot Monitor CLI from the Run-Time CLI

When you are in the Run-Time CLI, you can make changes to the Boot Monitor CLI using the following command:

```
config bootconfig
```

Note: You can also execute the commands in this section from the `monitor` prompt. This prompt appears if you accessed the Boot Monitor CLI by interrupting the boot process.

Note: If you make changes to the Boot Monitor CLI using the **`config bootconfig`** command, you must use the **`save bootconfig`** command to save the changed configuration file. For the changes to take effect, you must then reboot the switch. See "Saving the boot configuration to a file" on page 79 for more information.

The **`config bootconfig`** command includes the following options:

`config bootconfig` followed by:	
`info`	Displays the configured values for `delay`, `master`, and `multicast`.
`delay <seconds>`	Sets the number of seconds a standby CPU should wait (delay) before trying to become the master CPU. This command applies only during a cold start and does not apply to a failover start. The default is 2 seconds delay.
`master <cpu-slot>`	Indicates which CPU should become master when the switch is turned on. The master CPU performs a loopback test to test the switch fabric. The default master is set for slot 5. • *`cpu-slot`* specifies the module position, either slot 5 or slot 6.

config bootconfig followed by:	
`multicast <value>`	Sets the system multicast scaling parameter. Valid values are 0 to 2147483647.
`logfile minsize maxsize maxoccupyPercentage`	Sets the parameters for the log file. • `minsize` specifies the minimum size of the log file. The valid values are 64 to 500 KB. • `maxsize` specifies the maximum size of the log file. The valid values are 500 to 16384 KB. • `maxoccupyPercentage` is the percentage of free PCMCIA that can be used for a log file. The valid values are 10 to 90.

The **`config bootconfig`** command contains several sub-commands. The following topics describe some of the tasks that you can perform using these commands:

Modifying Boot Monitor CLI operation

To change the operation of the Boot Monitor CLI, use the following command:

```
config bootconfig cli
```

The **config bootconfig cli** command includes the following options:

config bootconfig cli followed by:	
info	Displays the current settings for the Boot Monitor CLI (Figure 12).
more <true|false>	Sets scrolling for the output display. The default is true. • true sets output display scrolling to one page at a time. • false sets the output display to continuous scrolling.
prompt <*value*>	Changes the Boot Monitor prompt to the defined string. • *value* is a string from 1 to 32 characters.
rlogin-sessions <*value*>	Sets the allowable number of inbound remote Boot Monitor CLI login sessions; the default is 8. • *value* is the number of sessions (0 to 8).
screenlines <*value*>	Sets the number of lines in the output display; the default is 23. • *value* is the number of lines (8 to 64).
telnet-sessions <*value*>	Sets the allowable number of inbound Telnet sessions; the default is 8. • *value* is the number of sessions (0 to 8).
timeout <*seconds*>	Sets the idle timeout period before automatic logout for CLI sessions; the default is 0. • *seconds* is the timeout period in seconds (0 to 65536).

Figure 12 shows output from the **config bootconfig cli info** command.

Figure 12 config bootconfig cli info command output

```
8610# config bootconfig cli info
cli more true
cli prompt "monitor"
cli rlogin-sessions 8
cli screenlines 23
cli telnet-sessions 8
cli timeout 0
```

Modifying the boot sequence

The default boot sequence directs the switch to look for its image and configuration files first on the PCMCIA card, then in the onboard flash memory, and then from a server on the network. That is, the PCMCIA card is the *primary* source for the files, the onboard flash memory is the *secondary* source, and the network server is the *tertiary* source. These source and file name definitions are in the boot configuration file.

Note: If a Passport 8000 Series switch loads its secondary software image file because it cannot find its primary software image, during this process, it also loads the secondary configuration file.

You can change the boot sequence in the following ways:

- Change the primary, secondary, and tertiary designations for file sources. For example, you can specify the network as the primary file source and update the configuration file or image file using a single copy of the file on the server. In the CLI, use the **`config bootconfig choice`** command. For instructions on using this command, see "Changing the boot source order" on page 65. In Device Manager, select the switch fabric module on the device view, and choose Edit > Card > Boot Config.

Note: Each choice of a file source (primary, secondary, or tertiary) specifies an image file and a matching configuration file. When you specify a source, you specify the associated pair of files.

- Change the file names from the default values. You can store several versions of the image or configuration file and specify a particular one by file name when you reboot the switch. In the CLI, use the **`config bootconfig choice`** command. In Device Manager, select the switch fabric module on the device view, and choose Edit > Card > Boot Config.
- Boot the switch without loading a configuration file, so that the switch uses its factory default configuration settings. Bypassing the switch configuration does not affect any saved switch configuration; the configuration is simply not loaded.

Whether the switch configuration is loaded or not is controlled by the boot configuration. You can bypass loading of the switch configuration in the following ways:

- Use the Boot Monitor CLI and the following **`flags`** command:

  `flags factorydefault true`

- Use the Run-Time CLI and issue this command:

  `config bootconfig flags factorydefault true`

- In Device Manager, select the switch fabric module on the device view. Then choose Edit > Card > Boot Config and set the EnableFactoryDefaults parameter to true.

When the configuration is bypassed, the switch boots with the default switch configuration settings and the boot flag settings that were loaded as the boot configuration file in stage 2.

Figure 13 describes the boot source text added to the system log file:

Figure 13 Boot source text added to the system log file

```
157: [04/24/2002 10:07:50] INFO: Code=0x0 Task=rcStart:
System is ready

158: [04/24/2002 10:07:51] INFO: Code=0x0 Task=rcStart:
BOOTED WITH TERTIARY BOOT SOURCE - pcmcia:p10ab

159: [04/24/2002 10:07:51] WARNING: Code=0x0
Task=rcStart: CANNOT ACCESS SECONDARY BOOT SOURCE

160: [04/24/2002 10:07:51] WARNING: Code=0x0
Task=rcStart: PRIMARY BOOT SOURCE IS NON-EXECUTABLE

161: [04/24/2002 10:07:52] INFO: Code=0x0 Task=tTrapd:
Link Up(1/1)
```

Changing the boot source order

To display or change the order in which the boot sources (flash and PCMCIA card) are accessed, use the following command:

`config bootconfig choice <boot-choice>`

where:
`boot-choice` is the order in which the specified boot devices are accessed when you reboot the switch. The options for *`boot-choice`* are `primary, secondary, or tertiary`. The default order is to access the PCMCIA card first, and then the onboard flash.

This command includes the following options:

`config bootconfig choice <boot-choice>` followed by:	
`info`	Displays the current boot choices and associated files (Figure 14).
`config-file <filename>`	Identifies the boot configuration file. • *`filename`* is the device and file name, up to 256 characters including the path.
`image-file <filename>`	Identifies the image file. • *`filename`* is the device and file name, up to 256 characters including the path.

For example, to specify the configuration file in flash memory as the primary boot source, use the following command:

`config bootconfig choice primary config-file /flash/config.cfg`

Figure 14 shows the output from the **`config bootconfig choice primary info`** command.

Figure 14 choice primary info command output

```
8610# choice primary info
choice primary config-file "/flash/config.cfg"
choice primary image-file "11.22.33.44:/rel3.1/current/main/
acc.gz"
```

In this example, the switch is set to use the onboard flash as the primary source for the configuration file and a TFTP server as the primary source for the image file.

Setting the standby-to-master delay

To set the number of seconds a standby CPU should wait (delay) before trying to become the master CPU (refer to the **`config bootconfig master`** command on page -71), use the following command:

`config bootconfig delay <seconds>`

This command applies only during a cold start and does not apply to a failover start. The default is 2 seconds delay.

Setting system flags

To enable or disable flags for configuration settings, use the following command:

`config bootconfig flags`

Note: When you change the configuration parameters using the **`config bootconfig flags`** command, you must save the changes to the configuration file and reboot the switch before the changes take effect. See “Saving the boot configuration to a file” on page 79 for more information.

This command includes the following options:

config bootconfig flags followed by:	
info	Displays information about the current flag settings.
8100-mode <true|false>	Enables the 8000 Series switch to act as a switch only. In a switch with Passport 8100 modules, this flag defaults to true. For Passport 8600 modules, the default is false.
autoboot <true|false>	Controls whether the switch automatically runs the run-time image after being reset or stops at the monitor prompt. Setting autoboot to false is useful for some debugging tasks. The default is true.
daylight-saving-time <true|false>	Enables or disables daylight saving time for the switch. The default is false.
debugmode <true|false>	Controls whether the switch stops in debug mode following a fatal error. Debug mode provides information equivalent to the **trace** commands. • true means the switch is not rebooted following a fatal error. • false means the switch is automatically rebooted following a fatal error. The default is false.
debug-config <true|false>	Enables or disables run-time debugging of the configuration file. The default is false.
egress-mirror <true|false>	Enables the ability to mirror egress traffic. The default is true.
factorydefaults <true|false>	Specifies whether or not the switch boots with the factory defaults. The default is true.
ftpd <true|false>	Enables or disables FTP server on the switch. The default is false. To enable FTP, make sure the **config bootconfig flags tftpd** command is set to false.
ha-cpu <true|false>	Enables or disables High Availability (HA) mode. HA mode enables switches with two CPUs to recover quickly from a failure of one of the CPUs. See Chapter 8 for more information about HA mode.
logging <true|false>	Enables or disables system logging to a PCMCIA file. The default is true.
reboot <true|false>	Enables or disables automatic reboot on a fatal error. The default is true. This command is equivalent to the **debugmode** command.

config bootconfig flags followed by:	
`rlogind <true|false>`	Enables or disables the rlogin/rsh server. The default is false.
`savetostandby <true|false>`	Enables or disables the ability to save the configuration or boot configuration file automatically to the standby CPU. The default is false.
`block-snmp <true|false>`	Enables or disables SNMP access. The default is false.
`sshd <true|false>`	Enables or disables the SSH daemon. The default is false.
`telnetd <true|false>`	Enables or disables the Telnet server. The default is false.
`tftpd <true|false>`	Enables or disables TFTP. The default is false.
`trace-logging <true|false>`	Enables or disables the creation of trace logs. The default is false.
`verify-config <true|false>`	Enables syntax checking of the configuration file and does not execute the file if an error is found. The factory default configuration file is loaded if a syntax error is found. The default is true.
`wdt <true|false>`	Enables or disables the hardware watchdog timer, which monitors a hardware circuit. The watchdog timer reboots the switch based on software errors. The default for this command is true.

Figure 15 shows output from the **`config bootconfig flags info`** command.

Figure 15 config bootconfig flags info command output

```
8610# config bootconfig flags info
flags 8100-mode false
flags autoboot true
flags daylight-saving-time false
flags debugmode false
flags debug-config false
flags egress-mirror true
flags factorydefaults true
flags ftpd false
flags ha-cpu false
flags logging true
flags reboot true
flags rlogind false
flags savetostandby false
flags block-snmp false
flags sshd false
flags telnetd false
flags tftpd false
flags trace-logging false
flags verify-config true
flags wdt true
```

Troubleshooting switch's failure to read configuration file

The switch may fail to read and load a saved configuration file when it boots. This situation occurs if the `factorydefaults` boot configuration flag is set to true.

To make sure the switch boots using a saved configuration file, set the `factorydefaults` flag to false, using one of the following commands:

- From the Run-Time CLI, the command is:

  `config bootconfig flags factorydefaults false`
- From the Boot Monitor CLI, the command is:

  `flags factorydefaults false`

Configuring the remote host login

To define conditions for remote host login, use the following command:

```
config bootconfig host
```

This command includes the following options:

config bootconfig host followed by:	
`info`	Displays the current remote host login settings (Figure 16).
`ftp-debug <true|false>`	Enables or disables debug mode on FTP. If you enable debug mode, debug messages are displayed on the management console screen. The default is false.
`password <value>`	Sets the password to enable FTP transfers. • *value* is the password, up to 16 characters long. When this password is set, only FTP is used for remote host login. **Note:** This password must match the password set for the FTP server, or the FTP operation fails.
`tftp-debug <true|false>`	Enables or disables debug mode on TFTP/TFTPD. If you enable debug mode, debug messages are displayed on the management console screen. The default is false.
`tftp-hash <true|false>`	Enables or disables the TFTP hash bucket display. The default is false.
`tftp-rexmit <seconds>`	Sets the TFTP retransmission timeout. The default value is 2 seconds. • *seconds* is the number of seconds (1 to 2147483647).
`tftp-timeout <seconds>`	Sets the TFTP timeout. The default value is 10 seconds. • *seconds* is the number of seconds (1 to 120).
`user <value>`	Sets the remote user login. • *value* is the user login name, up to 16 characters long.

Figure 16 shows output for the **`host info`** command.

Figure 16 host info command output

```
8610# host info
host password ""
host tftp-hash false
host tftp-rexmit 2
host tftp-timeout 10
host user "target"
host ftp-debug false
host tftp-debug false
```

Specifying the master CPU

The master CPU performs a loopback test to test the switch fabric. To indicate which CPU should become master when the switch is turned on, use the following command:

`config bootconfig master <cpu-slot>`

where *cpu-slot* can be 5 or 6. The default master is set for slot 5.

To display the current setting for the master CPU, use the following command:

`show bootconfig master`

Configuring CPU network port devices

The three network ports are the management port (mgmt), the CPU port (cpu2cpu), and the PCMCIA card (pccard), if it is acting as a network port. To configure the CPU network port devices, use the following command:

`config bootconfig net <cpu-net-port>`

where:
cpu-net-port is `mgmt`, `cpu2cpu`, or `pccard`.

Note: Use the **`net mgmt ip <addr/mask>`** command to assign an IP address to the switch.

This command includes the following options:

config bootconfig net <*cpu-net-port*> followed by:	
`info`	Displays information about the current configuration of the specified port (Figure 17).
`autonegotiate <true|false>`	Enables or disables autonegotiation for the port. The default is false.
`bootp <true|false>`	Enables or disables the Bootstrap Protocol (BootP) for the port. The default is true.
`enable <true|false>`	Enables or disables the specified port. The default is true.
`fullduplex <true|false>`	Enables or disables full-duplex mode on the specified port. The default is true.
`ip <addr/mask> [cpu-slot <value>]`	Assigns an IP address/mask for the management port, CPU, or PCMCIA card. **Optional parameter:** • `cpu-slot` *`value`* allows you to specify the slot number to which the IP address applies. The valid options are 3 to 6. If you do not specify a slot, the IP address is assigned to the port in the currently active CPU. **Note:** In an 8003 chassis, the only available CPU slot is 3.
`restart`	Restarts the port.
`route <net|add|del> <netaddr> <gateway>`	Sets a route for the port. • `net|add|del` adds a route (`add` or `net`) or deletes a route (`del`). • *`netaddr`* is the IP address of the network to be reached. • *`gateway`* is the gateway IP address.
`speed <10|100>`	Sets the connection speed for ports to 10 Mb/s or 100 Mb/s. The default is 10.
`tftp <ipaddr>`	Specifies a TFTP server for the port. • *`ipaddr`* is the IP address of the TFTP server.

Figure 17 shows output for the **`net mgmt info`** command, that is, the settings for the management port.

Figure 17 net mgmt info command output

```
8610:5/config/bootconfig/net/mgmt# info
net mgmt autonegotiate true
net mgmt bootp true
net mgmt enable true
net mgmt fullduplex true
net mgmt speed 10
net mgmt tftp 192.32.96.82
net mgmt ip 192.32.96.82/255.255.255.0 cpu-slot 5
net mgmt ip 0.0.0.0/0.0.0.0 cpu-slot 6
net mgmt route add 192.32.95.0 192.32.96.65
net mgmt route add 192.32.235.137 192.32.96.65
net mgmt route add 192.32.104.0 192.32.96.65
net mgmt route add 47.17.182.75 192.32.96.65
current status: link: true speed: 100 duplex: full
8610:5/config/bootconfig/net/mgmt#
```

Displaying the Boot Monitor configuration

To display the current Boot Monitor configuration, using the following command:

```
show bootconfig
```

This command includes the following options:

show bootconfig followed by:	
info	Displays the current settings for the boot monitor.
choice	Displays the current boot configuration choices.
cli	Displays the current cli configuration.
config [verbose]	Displays the current boot configuration. verbose includes all possible information. If you omit verbose, only the values that have been changed from their default settings are displayed.
flags	Displays the current flag settings.
host	Displays the current host configuration.
master	Displays the current CPU slot set as master and the settings for the **delay** and **multicast** commands.

show bootconfig followed by:	
net	Displays the current configuration of the CPU network ports.
show-all [file <*value*>]	Displays all relevant information about boot configuration on the switch. • *value* is the filename to which the output will be redirected.
sio	Displays the current configuration of the CPU serial ports.
tz	Displays the current configuration of the switch time zone.
wlan	Displays wireless LAN information.

Figure 18 shows output from the **show bootconfig choice** command.

Figure 18 show bootconfig choice command output

```
8610:5# show bootconfig choice
choice primary config-file "/flash/config.cfg"
choice primary image-file "/flash/p80a3100_b29.img"
choice secondary config-file "/flash/config.cfg"
choice secondary image-file "/flash/ac86a300.img"
choice tertiary config-file "/flash/config.cfg"
choice tertiary image-file "0.0.0.0:"
```

Warning: Do not edit the boot.cfg file manually, because the switch reads this file during the boot process. Errors generated while editing the file could render the switch inoperable.

Figure 19 shows output from the **show bootconfig info** command.

Figure 19 show bootconfig info command

```
8610:5# show bootconfig info
CPU Slot 5:    PPC 740 Map B
Version:       2.0.0.0/10
Memory Size:   0x04000000
```

Configuring the CPU serial port devices

To configure the CPU serial port devices, use the following command:

`config bootconfig sio <cpu-sio-port>`

where *cpu-sio-port* can be `console`, `modem`, or `pccard`.

This command includes the following options:

config bootconfig sio <cpu-sio-port> followed by:	
`info`	Displays information about the specified port (Figure 20).
`baud <rate>`	Sets the baud rate for the port. The default is 9600.
`8databits <true|false>`	Specifies either 8 (`true`) or 7 (`false`) data bits per byte for software to interpret. The default is false.
`enable <true|false>`	Enables or disables the port. The default is true.
`mode <ascii|slip|ppp>`	Sets the communication mode for the serial port. The default is ascii. If you are configuring the Modem port, you can set the port to use the same SLIP or PPP communication mode as the modem. For instructions to connect a modem to the Modem port, refer to *Getting Started*.
`mtu <bytes>`	Sets the size of the maximum transmission unit for a point-to-point link (0 to 2048). The default is 0.
`my-ip <ipaddr>`	Sets the near-end IP address on the point-to-point link. The default is 0.0.0.0.
`peer-ip <ipaddr>`	Sets the peer IP address on the point-to-point link. The default is 0.0.0.0.
`pppfile <file>`	Identifies which file to use for PPP initialization parameters.
`restart`	Shuts down and reinitializes the port.
`slip-compression <true|false>`	Enables or disables TCP/IP header compression. The default is false.
`slip-rx-compression <true|false>`	Enables or disables TCP/IP header compression on the receive packet. The default is false.

In PPP mode, you can configure additional parameters. Those configuration options are listed in *Configuring PPP and SLIP for Remote Access.*

Warning: Nortel Networks does not recommend setting the Console port mode to SLIP or PPP, because the log, trace, and error messages may be displayed on this port and will interfere with the SLIP or PPP operation.

Figure 20 shows output from the **`sio console info`** command.

Figure 20 sio console info command output

```
8610# sio console info
sio console baud 9600
sio console 8databits false
sio console enable true
sio console mode ascii
sio console mtu 0
sio console my-ip 0.0.0.0
sio console peer-ip 0.0.0.0
sio console pppfile ""
sio console slip-compression false
sio console slip-rx-compression false
current status: active: true mode: ascii baud: 9600 options: 7
bit data 1 stop no parity cts dsr ri
```

Setting the time zone

To set the switch's relation to time zones, use the following command:

```
config bootconfig tz
```

This command includes the following options:

config bootconfig tz followed by:	
info	Displays time zone information (Figure 21).
dst-end <*Mm.n.d/hhmm*| *MMddhhmm*>	Sets the ending date of daylight saving time. You can specify the time in one of two ways: • Specify an hour on the nth occurrence of a weekday in a month. For example, M10.5.0/0200 means the 5th occurrence of Sunday in the 10th month (October) at 2:00 a.m. • Specify a month, day, hour, and minute. For example, 10310200 means October 31 at 2:00 a.m.
dst-name <*dstname*>	Sets an abbreviated name for the local daylight saving time zone. • *dstname* is the name (for example, “pdt” is Pacific Daylight Time).
dst-offset <*minutes*>	Sets the daylight saving adjustment in minutes. The default is 60.
dst-start <*Mm.n.d/hhmm*| *MMddhhmm*>	Sets the starting date of daylight saving time. The format is the same as for setting the ending date.
offset-from-utc <*minutes*>	Sets the time zone offset, in minutes to subtract from Universal Coordinated Time (UTC), where positive numbers mean west of Greenwich and negative numbers mean east of Greenwich.
name <*tz*>	Sets an abbreviated name for the local time zone name. • *tz* is the name (for example “pst” is Pacific Standard Time).

Figure 21 shows output from the **tz info** command.

Figure 21 tz info command output

```
8610# tz info
tz dst-end M10.5.0/0200
tz dst-name "PDT"
tz dst-offset 60
tz dst-start M4.1.0/0200
tz offset-from-utc 480
tz name "PST"
TIMEZONE=PST:PDT:480:M4.1.0/0200:M10.5.0/0200:60
```

Displaying the Boot Monitor configuration

To display the current configuration of the Boot Monitor and the Boot Monitor CLI, use the following command:

```
config bootconfig show
```

This command includes the following options:

config bootconfig show followed by:	
info	Displays the current boot monitor settings (Figure 22).
choice	Displays the boot configuration choices.
cli	Displays the CLI configuration.
config [verbose]	Displays the current boot configuration. verbose displays all possible information.
flags	Displays the flags settings.
host	Displays the host configuration.
master	Displays the current CPU slot set as master.
net	Displays the current configuration of the CPU network ports.
show-all [file <*value*>]	Displays all relevant information about boot configuration on the switch. • *value* is the filename to which the output will be redirected.
sio	Displays the current configuration of CPU serial ports.
tz	Displays the switch's time zone setting.
wlan	Displays wireless LAN information.

Figure 22 shows output for the **config bootconfig show info** command:

Figure 22 config bootconfig show info command output

```
8610:5# config bootconfig show info
CPU Slot 5:    PPC 740 Map B
Version:       1.0.0.2/5
Memory Size:   0x04000000
```

Saving the boot configuration to a file

To save the boot configuration to a file, or to save a log or trace file, enter the following command:

```
save <savetype> [file <value>] [verbose] [standby <value>]
[backup <value>]
```

where:

- *savetype* specifies what to save. Possible values for this parameter are `config`, `bootconfig`, `log`, and `trace`.
- `file <value>` is a file name in one of the following formats:
  - `[a.b.c.d]:<file>`
  - `/pcmcia/<file>`
  - `/flash/<file>`
- `verbose` saves default and current configuration. If you omit this parameter, only parameters you have changed are saved.
- `standby <value>` saves the specified file name to the standby CPU.
- `backup <value>` saves the specified file name and identifies the file as a backup file.

Note: If a PCMCIA card is removed before a write operation (e.g., upload), is complete, the file that is being written to may have a corrupted EOF marker. Before removing the PCMCIA card, execute the CLI command **`stop-pcmcia`**.

Also, some PCMCIA cards do not contain a file attribute table (FAT). Therefore, you may need to use the **`dos-chkdsk /pcmcia`** CLI command to check the card. If you receive error messages, use the **`dos-chkdsk /pcmcia/ repair`** command or the **`dos-format`** command.

For example, to save a boot configuration file as a backup file, you might use the following command:

```
save bootconfig file boot.cfg backup2
```

Note: The boot configuration file must be named boot.cfg for the system to boot using it.

Note: To save a file to the standby CPU, you must enable TFTP on the standby CPU. To enable TFTP, enter **`flags tftpd true`** in the Boot Monitor CLI or **`config bootconfig flags tftpd true`** in the Run-Time CLI.

Chapter 4
Managing the Run-Time process

This chapter describes how to configure and manage the runtime process using the Run-Time CLI. To access the Run-Time CLI, wait until the boot process is complete. At the login prompt, enter your user name and password.

This chapter includes information about the following topics:

Roadmap of Run-Time CLI commands

The following roadmap lists some of the commands and their parameters that you use to configure and manage the Run-Time CLI. Use this list as a quick reference or click on any entry for more information:

Command	Parameter
`config cli`	`info`
	`banner add <string>`
	`banner defaultbanner <true|false>`
	`banner delete`
	`banner info`
	`defaultlogin <true|false>`
	`defaultpassword <true|false>`
	`loginprompt <string>`
	`monitor duration <integer>`
	`monitor info`
	`monitor interval <integer>`
	`more <true|false>`
	`motd add <string>`
	`motd displaymotd <true|false>`
	`motd delete`
	`motd info`
	`passwordprompt <string>`
	`prompt <prompt>`
	`rlogin-sessions <nsessions>`
	`screenlines <nlines>`
	`v1v2-community <true|false>`
	`telnet-sessions <nsessions>`

Command	Parameter
	timeout <seconds>
show cli info	
show cli who	
show cli password	
show cli show-all [file <value>]	
show config [verbose] [module <value>]	
show tech	
show sys info [card] [asic] [mda]	
config sys set action	info
	cpuswitchover
	resetconsole
	resetcounters
	resetmodem
config sys set clock-sync-time <minutes>	
config sys set snmp	info
	community <ro|rw|l1|l2|l3|rwa> <commstr>
	del-trap-recv <ipaddr>
	trap-recv <ipaddr> <v1|v2c> <commstr>
config sys set mgmt-virtual-ip <ipaddr/mask>	
config sys set	info
	clock-sync-time <minutes>
	contact <contact>
	ecn-compatibility <enable|disable>
	global-filter <enable|disable>

Command	Parameter
	location <location>
	mgmt-virtual-ip <ipaddr/mask>
	msg-control <enable|disable>
	mtu <bytes>
	name <prompt>
	portlock <on|off>
	sendAuthenticationTrap <true|false>
	topology <on|off>
	udpsrc-by-vip <enable|disable>
	vlan-bysrcmac <enable|disable>
show sys	info [card] [asic] [mda]
	community
	mcast-mlt-distribution
	mcast-software-forwarding
	msg-control
	perf
	record-reservation
	sw
	topology
config sys link-flap-detect	info
	auto-port-down <enable|disable>
	frequency <frequency>
	interval <interval>
	send-trap <enable|disable>
config slot <slots> state <enable|disable>	
config slot <slots> info	

Configuring the Run-Time CLI

You can configure and manage the Run-Time CLI using the following command:

`config cli`

This command includes the following options:

`config cli` followed by:	
`info`	Displays the current CLI parameter settings (Figure 23).
`banner add <string>`	Adds lines of text to the CLI login banner. • *`string`* is an ASCII string from 1 to 1024 characters.
`banner defaultbanner <true|false>`	Enables or disables using the default CLI login banner.
`banner delete`	Deletes an existing customized login banner.
`banner info`	Displays the text that was added to the login banner using the **`banner add`** command.
`defaultlogin <true|false>`	Enables or disables using the default login string. • `false` disables the default login banner and displays the new banner.
`defaultpassword <true|false>`	Enables or disables using the default password string.
`loginprompt <string>`	Changes the CLI login prompt. • *`string`* is an ASCII string from 1 to 1024 characters.
`monitor duration <integer>`	Changes the monitoring time duration (refresh rate) for the **`monitor`** commands. • *`integer`* is the time duration in seconds (1 to 1800). The default is 300.
`monitor info`	Displays the current setting for the monitor duration and interval used by the **`monitor`** commands.

config cli followed by:	
`monitor interval <integer>`	Changes the monitoring time interval between screen updates set by the **`monitor`** commands. *`integer`* is the time duration in seconds (1 to 600). The default is 5.
`more <true|false>`	Sets scrolling for the output display. The default is true. • `true` sets output display scrolling to one page at a time. • `false` sets the output display to continuous scrolling.
`motd add <string>`	Creates a “message of the day” that can be displayed with the login banner. • *`string`* is an ASCII string from 1 to 1024 characters.
`motd displaymotd <true|false>`	Displays (`true`) or does not display (`false`) the message of the day.
`motd delete`	Deletes the message of the day.
`motd info`	Displays information about the message of the day.
`passwordprompt <string>`	Changes the CLI password prompt. • *`string`* is an ASCII string from 1 to 1024 characters.
`prompt <prompt>`	Sets the root level prompt and sysName to a defined string. • *`prompt`* is a string from 1 to 32 characters.
`rlogin-sessions <nsessions>`	Sets the allowable number of inbound remote CLI login sessions; the default is 8. • *`nsessions`* is the number of sessions (0 to 8).
`screenlines <nlines>`	Sets the number of lines in the output display; the default is 23. • *`nlines`* is the number of lines (8 to 64).
`v1v2-community <true|false>`	Checks the v1/v2 community string against the SNMP community table instead of the login access level.

config cli followed by:	
`telnet-sessions <nsessions>`	Sets the allowable number of inbound Telnet sessions; the default is 8. • *nsessions* is the number of sessions (0 to 8).
`timeout <seconds>`	Sets the idle timeout period before automatic logout for CLI sessions; the default is 0. • *seconds* is the timeout period in seconds (0 to 65536).

Note: In any display area that you can alter by specifying a character string, you must enclose the string in quotation marks if it contains more than one word. For example, if you change the cli prompt to a multiword prompt, enclose the phrase in quotes. If you do not do so, only the first word will become the prompt. That is, **`config cli prompt 8000 Series`** displays 8000 as the prompt, whereas **`config cli prompt "8000 Series"`** displays 8000 Series as the prompt.

Figure 23 shows output from the **`config cli info`** command.

Figure 23 config cli info command output

```
8610:5# config cli info

Sub-Context: clear config dump monitor show test trace wsm sam
Current Context:

               defaultlogin : true
            defaultpassword : true
                loginprompt : Login:
                       more : true
             passwordprompt : Password:
                     prompt : Hollywood
            rlogin-sessions : 8
               screen-lines : 23
            telnet-sessions : 8
                    timeout : 900
             v1v2-community : false

8610:5#
```

Displaying CLI configuration information

To display information about the CLI configuration, use the following command:

```
show cli info
```

Figure 24 shows sample output from the **`show cli info`** command.

Figure 24 show cli info command output

```
8100:5# show cli info

cli configuration

more            : true
screen-lines    : 23
telnet-sessions : 8
rlogin-sessions : 8
timeout         : 900 seconds
monitor duration: 300 seconds
monitor interval: 5 seconds

use default login prompt    : true
default login prompt        : Login:
custom login prompt         : Login:
use default password prompt : true
default password prompt     : Password:
custom password prompt      : Password:
```

To displays a list of users who are logged in to the switch, use the following command:

```
show cli who
```

Figure 25 shows output from the **`show cli who`** command.

Figure 25 show cli who command output

```
8100:5# show cli who
SESSION   USER                ACCESS    IP ADDRESS
Telnet0   rwa                 rwa       10.177.25.205
Console                       none
Modem                         none
```

To display the CLI access, login, and password combinations, use the following command:

```
show cli password
```

Figure 26 shows output from the **`show cli password`** command.

Figure 26 show cli password command output

```
8100:5# show cli password
ACCESS    LOGIN
rwa       rwa
rw        rw
l3        l3
l2        l2
l1        l1
ro        ro

         l4admin   l4admin
         slbadmin  slbadmin
         oper      oper
         l4oper    l4oper
         slboper   slboper
         ssladmin  ssladmin
8100:5#
```

For definitions of the different access levels of the switch and instructions on changing the login or password for these levels, see *Configuring and Managing Security.*

To display all relevant CLI information, use the following command:

```
show cli show-all [file <value>]
```

where `<value>` is the filename to which the output will be redirected.

See Figure 27 on page 90 for sample output.

Figure 27 show cli show-all command output

```
Passport-8610:5#      show cli show-all

# show cli info

cli configuration

more            : true
screen-lines    : 23
telnet-sessions : 8
rlogin-sessions : 8
timeout         : 3600 seconds
monitor duration: 300 seconds
monitor interval: 5 seconds

use default login prompt    : true
default login prompt        : Login:
custom login prompt         : Login:
use default password prompt : true
default password prompt     : Password:
custom password prompt      : Password:

# show cli password

ACCESS    LOGIN
rwa       rwa
rw        rw
l3        l3
l2        l2
l1        l1
ro        ro

        l4admin   l4admin
        slbadmin  slbadmin
        oper      oper
        l4oper    l4oper
        slboper   slboper
```

Displaying the current switch configuration

To display the current switch configuration, use the following command:

```
show config [verbose] [module <value>]
```

where:

- `verbose` specifies a complete list of all configuration information about the switch.
- `module <value>` specifies the command group for which you are requesting configuration settings. The *`value`* option can be `cli`, `sys`, `web`, `rmon`, `vlan`, `port`, `qos`, `traffic-filter`, `mlt`, `stg`, `ip`, `ipx`, `diag`, `dvmrp`, `radius`, `atm`, `ntp`, `or svlan`.

If you make a change to the switch, it is displayed under that configuration heading. A complete display is too long to include here; Figure 28 shows representative information.

Figure 28 show config command (partial output)

```
8100:5# show config
#
# WED SEP 13 10:41:47 2000 UTC
# box type             : 8010
# software version     : REL3.1.0.0
# monitor version      : 1.0.0.2/5
#
# Asic Info :
# SlotNum|Name  |CardType|MdaType |Parts Description
#
# Slot  1 8108GB 30325108 00000000
# Slot  2 8132TX 30211120 00000000
# Slot  3 8116FX 30311110 00000000
# Slot  4 8148TX 30210130 00000000
# Slot  5 8190SM 200e0100 00000000 CPU: CPLD=14
# .
# .
# .
#
# CLI CONFIGURATION
#
cli prompt "8100"

#
# SYSTEM CONFIGURATION
#
sys set snmp trap-recv 10.10.25.47 v1 public
sys set snmp trap-recv 10.10.25.48 v1 public
```

When you add `verbose` to the **`show config`** command, the output contains current switch configuration including software (versions), performance, VLANs (such as numbers, port members), ports (such as type, status), routes, OSPF (such as area, interface, neighbors), memory, interface, and log and trace files. With this command (Figure 29), you can see current configuration and default values. Without `verbose`, not all of the default values are displayed.

Figure 29 show config verbose command (partial output)

```
8100:5# show config verbose
#
# WED SEP 13 10:47:43 2000 UTC
# box type              : 8010
# software version      : REL3.1.0.0
# monitor version       : 1.0.0.2/5
#
# Asic Info :
# SlotNum|Name  |CardType|MdaType |Parts Description
#
# Slot  1 8108GB 30325108 00000000
# Slot  2 8132TX 30211120 00000000
# Slot  3 8116FX 30311110 00000000
# . . .
# Slot 10   --   00000001 00000000
config

#
# CLI CONFIGURATION
#
cli monitor duration 300
cli monitor interval 5
cli more true
cli password ro "ro" "ro"
cli password l1 "l1" "l1"
. . .
cli password rwa "rwa" "rwa"
cli prompt "8100"
cli rlogin-sessions 8
cli screenlines 23
cli telnet-sessions 8
cli timeout 900
cli defaultlogin true
cli defaultpassword true
cli banner defaultbanner true
cli motd displaymotd false
```

Displaying system status

To display technical information about system status and information about the hardware, software, and operation of the switch, use the following command:

```
show tech
```

The information available from the **`show tech`** command includes general information about the system (such as location), hardware (chassis, power supplies, fans, and modules), system errors, boot configuration, software versions, memory, port information (locking status, configurations, names, interface status), VLANs and STGs (numbers, port members), OSPF (area, interface, neighbors), and log and trace files. This command displays more information than the similar **`show sys info`** command, which is described in the following section.

Figure 30 shows representative output from the **`show tech`** command.

Figure 30 show tech command (partial output)

```
8610:5# show tech

Sys Info:
---------------

General Info :

        SysDescr     : Passport-8610 (3.5.0.0)
        SysName      : Passport-8610
        SysUpTime    : 2 day(s), 05:17:39
        SysContact   : support@nortelnetworks.com
       SysLocation  : 4401 Great America Parkway, Santa Clara,
CA 95054

Chassis Info :

        Chassis     : 8010
        Serial#     : ssnm000016
        HwRev       : 1
        NumSlots    : 10
        NumPorts    : 143
        GlobalFilter: enable
        VlanBySrcMac: disable
        Ecn-Compatib: enable

        BaseMacAddr : 00:80:2d:39:d0:00
    MacAddrCapacity : 1024
        Temperature : 33 C
        MgmtMacAddr : 00:80:2d:39:d3:f4
        System MTU  : 1950
        clock_sync_time : 60

Power Supply Info :

        Ps#1 Status       : empty

        Ps#2 Status       : up
        Ps#2 Type         : ac
        Ps#2 Description  : 8001 690W 110/220V AC Power Supply
        Ps#2 Serial Number: ARTS007329
        Ps#2 Version      : A
        Ps#2 Part Number  : 202067
```

Displaying hardware information

To display system status and technical information about the switch hardware components. (Compare this command with the **`show tech`** command on page -94.) The command displays several pages of information, including general information about the system (such as location), chassis (type, serial number, and base MAC address), temperature, power supplies, fans, cards, system errors, port locks, topology status, and message control information.

The command syntax is:

```
show sys info [card] [asic] [mda]
```

where:

`card` displays information about all the installed modules.

`asic` displays information about the ASIC installed on each module.

`mda` displays information about installed MDAs.

Figure 31 shows partial output from the **`show sys info`** command.

Figure 31 show sys info command (partial output)

```
8100:5# show sys info

General Info :

        SysDescr     : Passport-8610 (3.5.0.0)
        SysName      : Passport-8610
        SysUpTime    : 2 day(s), 05:23:19
        SysContact   : support@nortelnetworks.com
       SysLocation  : 4401 Great America Parkway, Santa Clara,
CA 95054

Chassis Info :

        Chassis     : 8010
        Serial#     : ssnm000016
        HwRev       : 1
        NumSlots    : 10
        NumPorts    : 143
        GlobalFilter: enable
        VlanBySrcMac: disable
        Ecn-Compatib: enable
        BaseMacAddr : 00:80:2d:39:d0:00
    MacAddrCapacity : 1024
        Temperature : 33 C
        MgmtMacAddr : 00:80:2d:39:d3:f4
        System MTU  : 1950
        clock_sync_time : 60
```

Resetting system functions

The Run-Time CLI allows you to reset all statistics counters, the modem port, the console port, and the operation of the switchover function.

To reset these system functions, use the following command:

```
config sys set action
```

This command includes the following options:

config sys set action followed by:	
`info`	Displays the current settings for system actions.
`cpuswitchover`	Resets the switch to change over to the backup CPU.
`resetconsole`	Reinitializes the hardware UART drivers. Use this command only if the console or modem connection is hung.
`resetcounters`	Resets all the statistics counters in the switch to zero.
`resetmodem`	Resets the modem port.

Configuration example

This configuration example uses the above commands to reset the switch to change over to the backup CPU and to reset the statistics counters to zero. The example also uses the **`config sys set action info`** command to display information about the system functions.

```
Passport-8610:5# config sys set action cpuswitchover
Passport-8610:5# config sys set action resetcounters
Are you sure you want to reset system counters (y/n)? y
Passport-8610:5# config sys set action info

Sub-Context: clear config dump monitor show test trace wsm
Current Context:

rcCliSettingSysSetAction: before set
               cpuswitchover : (N/A)
                resetconsole : (N/A)
               resetcounters : (N/A)
                  resetmodem : (N/A)

rcCliSettingSysSetAction: after set
Passport-8610:5#
```

Note: N/A displayed in a command output indicates that the information is Not Available or Not Applicable.

Synchronizing clocks

The 8000 Series switch automatically synchronizes the real-time clocks (hardware) on the master and standby CPUs, and synchronizes the real-time and system (software) clocks.

Synchronizing the real-time clocks

When you configure the real-time clock on the master CPU, the standby CPU real-time clock is immediately updated, and both clocks are set to the same time. A log message is then added in the log file stating that clock synchronization is complete. Note the following conditions regarding CPU clock synchronization:

- When the switch is operating normally with a redundant CPU, clock synchronization is done at 24 hour intervals. When the switch is operating normally with no redundant CPU, if a standby CPU card is inserted, the real-time clocks on the master CPU and the standby CPU are immediately synchronized. A log message is added in the log file, stating that clock synchronization is complete. If the synchronization process continues successfully, no more log messages are generated and clock synchronization continues at 24 hour intervals.

  At boot time, after the switch is initialized, the clocks on the master CPU and the standby CPU are immediately synchronized and clock synchronization continues at 24 hour intervals. In the event the standby CPU is removed, the CPU clock synchronization process is stopped. Also, if the clock synchronization process fails, a log message is generated in the log file. Once the real-time clock synchronization begins to fail, a log message is generated for each failed attempt.

- If the Inter CPU Communication (ICC) channel is in use by another process at the time of clock synchronization, the synchronization process is not performed, but attempted again after the scheduled 24 hour interval. A log message is added in the log file stating that synchronization was not successful.

Synchronizing the real-time and system clocks

Synchronizing the real-time and system clocks occurs at regular intervals that you define. To configure the synchronization time, use the following command:

```
config sys set clock-sync-time <minutes>
```

where:
minutes is the number of minutes between synchronizations. The range is 15 to 3600 minutes; the default is 60 minutes.

Log messages are generated when the drift between the real-time clock and the system clock is more than 5 seconds.

Configuring SNMP settings

To configure SNMP settings, use the following command:

`config sys set snmp`

This command include the following options:

`config sys set snmp` followed by:	
`info`	Displays the current SNMP settings.
`community <ro|rw|l1|l2|l3|rwa> <commstr>`	Sets the SNMP community string for the selected community: • `ro` is read-only. • `rw` is read/write. • `l1` is layer 1 read/write. • `l2` is layer 2 read/write. • `l3` is layer 3 (and layer 2) read/write. • `rwa` is read/write/all. • *`commstr`* is the input community string.
`del-trap-recv <ipaddr>`	Deletes the SNMP trap receiver. *`ipaddr`* is the IP address of the trap receiver.
`trap-recv <ipaddr> <v1|v2c> <commstr>`	Sets an SNMP trap receiver. • *`ipaddr`* is the IP address of the trap receiver. • `v1|v2c` is the SNMP version; select version 1 or version 2c. • *`commstr`* is the input community string from 1 to 1024 characters.

Configuration example

This configuration example uses the above commands to set the SNMP community and set an SNMP trap receiver. The example also uses the **`config sys set snmp info`** command to display information about the SNMP setup.

```
Passport-8610:5# config sys set snmp
Passport-8610:5/config/sys/set/snmp# community rw community1
Passport-8610:5/config/sys/set/snmp# trap-recv 47.140.54.40 v1
community1
Passport-8610:5/config/sys/set/snmp# info

Sub-Context:
Current Context:

       community :
              ro - public
              rw - community1
              l1 - private
              l2 - private
              l3 - private
              rwa - secret
del-trap-recv : N/A
    trap-recv :
47.140.54.40 - v1 community1
47.153.248.81 - v1 public
192.32.229.150 - v1 public
192.32.229.172 - v1 public
Passport-8610:5/config/sys/set/snmp#
```

Creating a virtual management port

To create a virtual management port in addition to the physical management ports on the switch management modules, use the following command:

```
config sys set mgmt-virtual-ip <ipaddr/mask>
```

Note: When you assign an IP address to the virtual management port, that IP address provides access to both switch management modules. The master management module replies to all management requests sent to the virtual IP address, as well as to requests sent to its management port IP address. If the master management module fails and the standby management module takes over, the virtual management port IP address continues to provide management access to the switch.

Note: This feature is not supported in a switch with mixed Passport 8000 Series 8190SM modules and Passport 8000 Series 8691SF modules.

Configuration example

This configuration example uses the above commands to set an IP address for the virtual management port, save the configuration file to the standby management module, assign an IP addresses to the physical management ports (see *Getting Started*).

```
Passport-8610:5# config sys set mgmt-virtual-ip 47.140.54.40/
255.255.255.0
Physical and Virtual IP must be in the same subnet
Passport-8610:5# save config file config1 standby standby1
Save config to file config1 successful.
Passport-8610:5# config bootconfig net mgmt ip 47.140.54.40/
255.255.255.0
Passport-8610:5#
```

Setting individual system level switch parameters

To set individual system-level switch parameters, use the following command:

```
config sys set
```

This command includes the following options:

config sys set followed by:	
info	Displays current system settings.
clock-sync-time <*minutes*>	Configures the RTC-to-system clock synchronization time. • *minutes* is 15 to 3600 minutes.
contact <*contact*>	Sets the contact information for the switch. • *contact* is an ASCII string from 1 to 1024 characters (for example a phone extension or email address).
ecn-compatibility <enable|disable>	Enables or disables explicit congestion notification, as defined in Experimental RFC 2780. This feature is not currently supported on the Passport 8000 Series switch.
global-filter <enable|disable>	Enables or disables global filtering on the switch. When this command is enabled, you must disable source MAC VLANs (**config sys set vlan-bysrcmac disable**). The system will not allow you to enable global filtering and source MAC-based VLANs at the same time. This command is available only on Passport 8600 switches.
location <*location*>	Sets the location information for the switch. • *location* is an ASCII string from 1 to 1024 characters (for example, Finance).
mgmt-virtual-ip <ipaddr/mask>	Configures the virtual management port. • ipaddr/mask is the ip address and mask of the virtual management port.
msg-control <enable|disable>	Enables or disables the system message control. Enable this command to suppress duplicate error messages.
mtu <*bytes*>	Enables Jumbo frame support. • *bytes* is the Ethernet frame size, either 1950 (default) or 9600 bytes.
name <*prompt*>	Sets the box or root level prompt name for the switch. • *prompt* is an ASCII string from 1 to 1024 characters (for example, LabSC7 or Closet4).

config sys set followed by:	
portlock <on|off>	Turns port locking on or off. To specify the ports to be locked, use the **config ethernet <*ports*> lock** command (refer to *Configuring Routing Operations for the Passport 8000 Series Switch Using the Command Line Interface Release 3.1.2*).
sendAuthenticationTrap <true|false>	Sets whether or not to send authentication failure traps.
smlt-on-single-cp <enable|disable> [timer <*value*>]	Enables or disables SMLT on the single CP feature. **Optional parameter:** • timer *value* is the timer value for SMLT on the single CP feature timer. Valid options are 1 to 3.
topology <on|off>	Turns the topology feature on or off. The topology feature generates topology packets used by Optivity* network management software. When this feature is off, the topology table is not generated. The default is on.
udpsrc-by-vip <enable|disable>	Enables or disables virtual IP as the UDP source.
vlan-bysrcmac <enable|disable>	Enables or disables the ability to configure source MAC VLANs on the switch. The default is disable. If you enable this command, you must disable the global filter command (**config sys set global-filter disable**). The system will not allow you to enable global filtering and source MAC-based VLANs at the same time. This command is available only on Passport 8600 switches.

Configuration example

This configuration example uses the above commands to set the following system-level switch parameter: contact, location, message control, and authentication trap. The example also uses the **`info`** command to display information about the switch parameters.

```
Passport-8610:5# config sys set
Passport-8610:5/config/sys/set# contact cbfw
Passport-8610:5/config/sys/set# location Marketing
Passport-8610:5/config/sys/set# msg-control enable
Passport-8610:5/config/sys/set# sendAuthenticationTrap true
Passport-8610:5/config/sys/set# info
Sub-Context: action flags record-reservation snmp ssh
Current Context:
   mgmt-virtual-ip : 0.0.0.0/0.0.0.0
   contact : cbfw
   location : Marketing
   name : Passport-8610
   msg-control : enable
   portlock : off
   sendAuthenticationTrap : true
   topology : on
   globalFilter : enable
   vlanBySrcMac : disable
   ecn-compatibility : enable
   System MTU : 1950
Passport-8610:5/config/sys/set#
```

Showing system status and parameter configuration

To show system status and parameter configuration, use the following command:

```
show sys
```

This command includes the following options:

show sys followed by:	
info [card] [asic] [mda]	Displays system status and technical information about the switch hardware components. • card displays information about all the installed modules. • asic displays information about the ASICS installed on each module. • mda displays information about installed MDAs.
community	Displays the configured community strings in the system.
mcast-mlt-distribution	Displays the settings for multicast over MLT.
mcast-software-forwarding	Displays the settings for multicast software forwarding.
msg-control	Displays the system message control function status (enabled or disabled).
perf	Displays system performance information, such as CPU utilization, switch fabric utilization, NVRAM size, and NVRAM used. The information is updated once per second, so it is no more than one second from real time.
record-reservation	Displays the number of reserved records and usage information for each record type. Record types include filter, IPMC, MAC, and static route.
sw	Displays the version of software running on the switch, the last update of that software, and the Boot Config Table. The Boot Config Table lists the current system settings and flags.
topology	Displays the topology table. This table shows the information that is being sent to Optivity network management software for creating network displays.

Configuration example

This configuration example uses the above commands to display information about the following parameters: message control, system performance, system software, and system topography.

```
Passport-8610:5# show sys msg-control

                msg-control : enable

Passport-8610:5# show sys perf

                      CpuUtil: 0%
             SwitchFabricUtil: 0%
        OtherSwitchFabricUtil: 0%
                   BufferUtil: 0%
                    DramSize: 64 M
                    DramUsed: 67%
                    DramFree: 21155 K
Passport-8610:5# show sys sw

System Software Info :

Default Runtime Config File : /flash/config
Default Boot Config File : /flash/boot.cfg
Config File :
Last Runtime Config Save : THU APR 15 19:50:19 1999
Last Runtime Config Save to Slave : 0
Last Boot Config Save : SAT MAR 06 21:07:10 1999
Last Boot Config Save on Slave : 0

Boot Config Table
Slot# : 5
Version : Build REL3.3.0.0_B069 on Build REL3.3.0.0_B069 on Fri Mar
29 14:05:52 EST 2002
LastBootConfigSource : /flash/boot.cfg
LastRuntimeImageSource : /flash/p80a3300b069.img
LastRuntimeConfigSource : /flash/config
PrimaryImageSource : /flash/p80a3300b069.img
PrimaryConfigSource : /flash/config
SecondaryImageSource : /flash/p80a3000.img
SecondaryConfigSource : /flash/config.cfg
TertiaryImageSource : 0.0.0.0:
TertiaryConfigSource : /flash/config.cfg
```

```
              EnableAutoBoot : true

              EnableFactoryDefaults : false
              EnableDebugMode : false
              EnableHwWatchDogTimer : false
              EnableRebootOnError : true
              EnableTelnetServer : true
              EnableRloginServer : false
              EnableFtpServer: true
              EnableTftpServer : true
Passport-8610:5# show sys topology
=========================================================
              Topology Table
=========================================================
SLOT  IP_ADDR          SEG MAC_ADDR       CHASSIS        BKPL    LOCAL CURSTATE
PORT                   D                  TYPE           TYPE    SEG
---------------------------------------------------------------------
0 /0  47.140.54.40  0   00:04:dc:6c:00:00 Passport8610 enetFastGigEnet true  heartbeat
Passport-8610:5#
```

Controlling link state changes

Link flap detection allows you to control link state changes on a physical port. You can set thresholds for the number and frequency of changes allowed and take action if the thresholds are exceeded. If the link state change thresholds are exceeded, a log entry is generated. The possible configuration actions are to send a trap and to bring down the port.

This feature allows you to detect when the link is going up and down rapidly (that is, flapping) on a port. This action can be detrimental to network stability because it could trigger spanning tree and routing table recalculation.

To control link state changes, use the following command:

```
config sys link-flap-detect
```

The **`config sys link-flap-detect`** command includes the following options:

`config sys link-flap-detect` followed by:	
`info`	Shows the link-flap-detect settings.
`auto-port-down <enable|disable>`	Enables or disables automatic disabling of the port if the link-flap threshold is exceeded; the default is `enable`.
`frequency <`*`frequency`*`>`	Sets the number of changes that are allowed during the time specified by the **`interval`** command. The default is 10. *`frequency`* is from 1 to 9999.
`interval <`*`interval`*`>`	Sets the link-flap-detect interval in seconds. The default is 60. *`interval`* is from 2 to 600.
`send-trap <enable|disable>`	Enables or disables sending traps. The default is `enable`.

Configuration example

This configuration example uses the above commands to enable automatic disabling of the port, set the link-flap-detect interval, and enable sending traps. The example also uses the **`info`** command to display the link-flap settings.

```
Passport-8610:5# config sys link-flap-detect
Passport-8610:5/config/sys/link-flap-detect# auto-port-down enable
Passport-8610:5/config/sys/link-flap-detect# interval 20
Passport-8610:5/config/sys/link-flap-detect# send-trap enable
Passport-8610:5/config/sys/link-flap-detect# info

 Auto Port Down : enable
 Send Trap      : enable
 Interval       : 20
 Frequency      : 10

Passport-8610:5/config/sys/link-flap-detect#
```

Note: The **`show sys link-flap-detect general-info`** command displays the same information as the **`config sys link-flap-detect info`** command

Enabling the administrative status of a module

To enable or disable the administrative status of the module, use the following command:

```
config slot <slots> state <enable|disable>
```

To display the administrative status of the module, enter the following command:

```
config slot <slots> info
```

Figure 32 shows output from the `config slot info` command.

Figure 32 config slot info command

```
Passport-8610:6 config slot 1 info
Sub-Context"
Current Context:

              state : enable
Passport-8610:6/config/slot/1#
```

Chapter 5
Configuring NTP

This chapter describes how to configure the Network Time Protocol (NTP) using Device Manager and the CLI. It includes the following topics:

Configuration prerequisites

Before you can configure NTP, you must do the following:

- Configure an IP interface on the Passport 8000 Series switch and ensure that the NTP server is reachable through this interface. For instructions, see *Configuring IP Routing Operations*.
- Make sure that the Real Time Clock is present on the CPU board.

Note: NTP server MD5 authentication does not support passwords (keys) that start with a special character or that contain a space between characters.

Configuring NTP using Device Manager

This section describes how to use Device Manager to perform the following tasks:

- "Enabling NTP globally" on page 114

- "Adding an NTP server" on page 115
- "Assigning a NTP key" on page 118

Enabling NTP globally

When you enable NTP globally on the Passport 8000 Series switch, default values are in effect for most NTP parameters.

To enable NTP globally:

1 From the Device Manager menu bar, select Edit > NTP.

The NTP dialog box opens with the Global tabs displayed (Figure 33).

Figure 33 NTP dialog box—Globals tab

2 Select the Enable check box.

3 Click Apply.

Table 2 describes the NTP Globals tab fields.

Table 2 Global tab fields

Field	Description
Enable	Enables (true) or disables (false) NTP. You cannot enable NTP if RTC has not been installed on the CPU boards. By default, NTP is disabled.
Interval	Specifies the time interval (10 to 1440 minutes) between successive NTP updates. The default interval is 15 minutes. NOTE: If NTP is already enabled, this setting will not take effect until you disable NTP and then reenable it.

Adding an NTP server

After you enable NTP globally on the Passport 8000 Series switch, you can add a remote NTP server by specify its IP address. NTP adds this IP address to a list of servers, which the local NTP client uses when querying remote time servers for time information. The list of qualified servers is referred to as a peer list.

You can configure a maximum of 10 time servers.

To specify an IP address for an NTP server:

1. From the Device Manager menu bar, select Edit > NTP.

   The NTP dialog box opens with the Globals tab displayed (Figure 33).

2. Click the Server tab.

   The Server tab opens (Figure 34).

Figure 34 Server tab

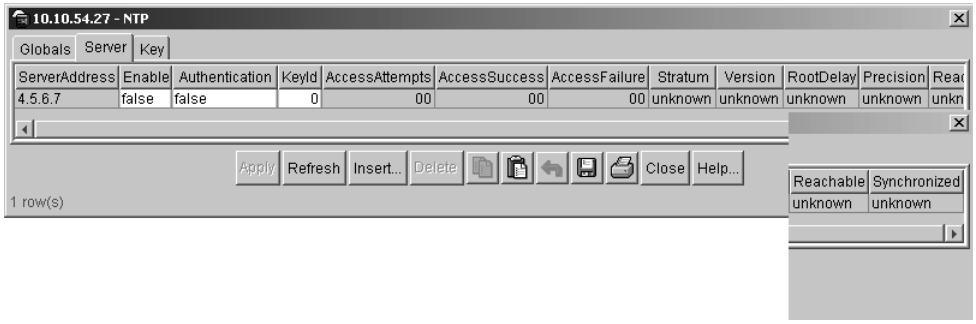


Table 3 describes the Server tab fields.

Table 3 Server tab fields

Field	Description
ServerAddress	Specifies the IP address of the remote NTP server.
Enable	Enables or disables the remote NTP server.
Authentication	Enables or disable MD5 authentication on this NTP server. MD5 produces a message digest of the key. MD5 verifies the integrity of the communication, authenticates the origin, and checks for timeliness. The default is no MD5 authentication.
KeyId	Displays the key id used to generate the MD5 digest for this NTP server. You must specify a number between 1 and 214743647. The default is 0, which indicates that authentication is disabled.
AccessAttempts	Displays the number of NTP requests sent to this NTP server.
AccessSuccess	Displays the number of times this NTP server was selected to update the time.
AccessFailure	Displays the number of times this NTP server was rejected from updating the time.
Stratum	This is the Stratum of the server.
Version	This field is the NTP version of the server.
RootDelay	This is the Root Delay of the server.
Precision	This is the NTP precision of the server in seconds.

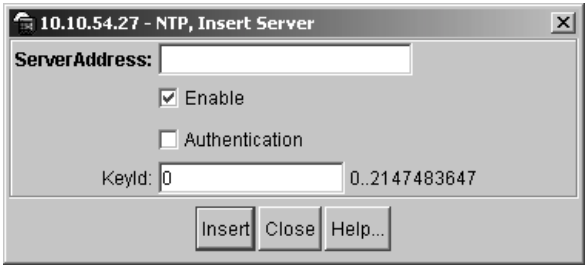
Table 3 Server tab fields (continued)

Field	Description
Reachable	This is the NTP reach ability of the server.
Synchronized	This is the status of synchronization with the server.

3 Click Insert.

The NTP, Insert Server dialog box opens (Figure 35).

Figure 35 NTP, Insert Server dialog box



4 Specify the IP address of the NTP server.

5 Click Insert.

The IP address of the NTP server that you configured is displayed in the Server tab of the NTP dialog box.

Table 4 describes the NTP, Insert Server dialog box dialog box fields.

Table 4 NTP, Insert Server dialog box fields

Field	Description
ServerAddress	The IP address of the remote NTP server.
Enable	Enables or disables the remote NTP server.

Table 4 NTP, Insert Server dialog box fields

Field	Description
Authentication	Enables or disables MD5 authentication on this server. If you enable authentication on a server but do not specify a value for the public key, the server is assumed disabled. The default is no MD5 authentication.
KeyId	Specifies the key id used to generate the MD5 digest for this server. By default, the key ID is 0, which indicates that MD5 authentication is disabled.

Assigning a NTP key

If you enable MD5 authentication on the server, you must assign an NTP key.

To assign an NTP key:

1. From the Device Manager menu bar, select Edit > NTP.

   The NTP dialog box opens with the Global tab displayed (Figure 33).

2. Click the Key tab.

   The Key tab opens (Figure 36).

Figure 36 NTP dialog box—Key tab

Table 5 describes Key tab fields.

Table 5 Key tab fields

Field	Description
KeyId	This field is the key id used to generate the MD5 digest. You must specify a value between 1 and 214743647. The default value is 0, which indicates that authentication is disabled.
KeySecret	This field is the MD5 key used to generate the MD5 Digest. You must specify an alphanumeric string between 0 and 8. NOTE: You cannot specify an "#" as a value in the KeySecret field. The NTP server interprets the "#" as the beginning of a comment and truncates all text entered after the "#". This is a limitation of xntpd version 3 or lower.

3 Click Insert.

The NTP, Insert Key dialog box opens (Figure 37).

Figure 37 NTP, Insert Key dialog box

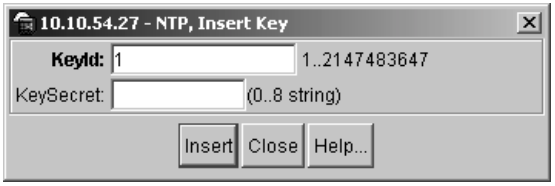


Table 6 describes the fields in the NTP, Insert Key dialog box.

Table 6 NTP, Insert Key dialog box fields

Field	Description
KeyId	The key id used to generate the MD5 digest for this NTP server. You must specify a value between 1and 214743647. The default value is 0, which indicates that authentication is disabled.
KeySecret	The MD5 key ID used to generate the MD5 digest for this NTP server. NOTE: You cannot specify an “#” as a value in the KeySecret field. The NTP server interprets the “#” as the beginning of a comment and truncates all text entered after the “#”. This is a limitation of xntpd version 3 or lower.

4 Click Insert.

The values that you specified for the key id and the MD5 key id are displayed in the Key tab of the NTP dialog box.

Configuring NTP using the CLI

This section includes the following topics:

Enabling NTP globally

When you enable NTP, default values are in effect for most parameters. You can customize NTP by modifying parameters. To enable or disable NTP globally on the Passport 8000 Series switch, use the following command.

```
config ntp
```

The **`config ntp`** commands include the following options:

`config ntp` followed by:	
`info`	Displays current NTP settings on this NTP server.
`enable <true|false>`	Globally enables or disables NTP. The default is false. You cannot enable NTP unless RTC has been installed on the CPU boards.
`interval <value>`	Specifies the time interval (10 to 1440 minutes) between successive NTP updates. The default is 15 minutes. • *value* is the time interval in minutes. **Note:** If NTP is already enabled, this setting will not take effect until you disable NTP and then reenable it.

Configuration example

This configuration example uses the above commands to enable NTP. The example also uses the **`show ntp info`** command to display the NTP global status.

```
8610:5# config ntp
8610:5/config/ntp# enable true
8610:5/config/ntp# show ntp info

Sub-Context: key server
Current Context:

                     enable : true
                   interval : 15
last ntp update:


8610:5/config/ntp#
```

Figure 38 show ntp info command output

```
8610# show ntp info

Sub-Context: clear config dump monitor show test trace
Current Context:

                      enable : true
                    interval : 12
last ntp update:

          Latest update time : THU AUG 23 18:09:38 2001 UTC
             synchronized to : 10:10.2.13 (Stratum: 5)
```

As shown in the example above, the *latest update time* field indicates the most recent update to the NTP server. The *synchronized to* field displays the NTP server address from which the Passport 8000 Series switch received time. The *stratum* field indicates the current stratum value of the Passport 8000 Series switch.

Creating an NTP server

To create an NTP server or modify existing NTP server parameter, use the following command.

```
config ntp server
```

Note: You can configure a maximum of 10 time servers.

The **`config ntp server`** command includes the following options:

`config ntp server` followed by:	
`info`	Displays NTP server configuration settings on the switch.
`create <ipaddr> [enable <value>] [auth <value>] [key <value>]`	Adds an NTP server. • *`ipaddr`* is the IP address of the NTP server. NTP adds this address to a list of servers. The local NTP server consults this list of servers for time information. • `enable` *`value`* enables (true) or disables (false) the NTP server. The default is enable. • `auth` *`value`* enables (true) or disables (false) MD5 authentication on this NTP server. The default is no MD5 authentication. • `key` *`value`* specifies the key id value used to generate the MD5 digest for this NTP server. The value range is an integer from 1 to 214743647. The default value is 0, which indicates that authentication is disabled.

config ntp server followed by:	
delete <*ipaddr*>	Deletes the NTP server. • *ipaddr* is the IP address of the NTP server you want to delete.
set <*ipaddr*> [enable <*value*>] [auth <*value*>] [key <*value*>]	Allows you to modify NTP server parameters. • *ipaddr* is the IP address of the NTP server. • enable *value* enables (true) or disables (false) the NTP server. The default is enable. • auth *value* enables (true) or disables (false) MD5 authentication on this NTP server. The default is no MD5 authentication. • key *value* specifies the key id value used to generate the MD5 digest for this NTP server. The value range is an integer from 1 to 214743647. The default value is 0, which indicates that authentication is disabled.

Configuration example

This configuration example uses the above commands to create an NTP server, enable the server, assign authentication, and assign a key. The example also uses the **info** command to display information about the NTP server.

```
8610:5# config ntp server create 47.140.53.187 enable true
8610:5# config ntp server
8610:5/config/ntp/server# info

Sub-Context:
Current Context:

        create :

Server Ip         Enabled Auth    Key Id
47.140.53.187     true    false   0

        delete : N/A
           set : N/A

8610:5/config/ntp/server# set 47.140.53.187 auth true
```

```
8610:5/config/ntp/server# set 47.140.53.187 key 15
8610:5/config/ntp/server# info

Sub-Context:
Current Context:

        create :

Server Ip         Enabled Auth    Key Id
47.140.53.187     true    true    15

        delete : N/A
           set : N/A

8610:5/config/ntp/server#
```

Note: The **`show ntp server config`** command displays the same information as the **`config ntp server info`** command.

Configuring authentication keys

To configure NTP authentication keys, use the following command:

```
config ntp key
```

The **`config ntp key`** command includes the following options:

`config ntp key` followed by:	
`info`	Display NTP authentication key configuration settings.
`create <authentication key value> <secret key value>`	Adds a MD5 authentication key entry to the list where: • *`authentication key value`* is the key id used to generate the MD5 digest. Specify a value between 1 and 214743647. The default is 0. • *`secret key value`* is the MD5 key ID used to generate the MD5 digest. Specify an alphanumeric string between 0 and 8.

config ntp key followed by:	
delete <*authentication key value*>	Delete a MD5 authentication key entry from the list. • *authentication key value* is the key id used to generate the MD5 digest.
set <*authentication key value*> <*secret key value*>	Modifies a MD5 authentication key value where: • *authentication key value* is the key id used to generate the MD5 digest. Specify a value between 1 and 214743647. The default is 0. • *secret key value* is the MD5 key ID used to generate the MD5 digest. Specify an alphanumeric string between 0 and 8.

Configuration example

This configuration example uses the above commands to configure and NTP authentication key. The example also uses the **show ntp key config** command to display information about the NTP key configuration setup.

```
8610:5# config ntp key
8610:5/config/ntp/key# create 5 18
8610:5/config/ntp/key#
8610:5/config/ntp/server# show ntp key
8610:5/config/ntp/key# info

Sub-Context:
Current Context:

                     create :

MD5_Key_Id  MD5 Key
5           18

                     delete : N/A
                        set : N/A

8610:5/config/ntp/key#
```

Showing NTP server status

The **`show ntp server stat`** command displays the NTP server status. This information includes:

- Number of NTP requests sent to this NTP server,
- Number of times this NTP server was selected to update the time
- Number of times this NTP server was rejected from updating the time
- Stratum
- Version
- Sync Status
- Reachability
- Root Delay
- Precision

To display the NTP server status, use the following command:

```
show ntp server stat
```

Figure 39 shows sample command output.

Figure 39 show ntp server stat command sample output

```
8610:5/config/ntp# show ntp server stat
P3/config/ntp# show ntp server stat

              NTP Server : 134.177.216.230
----------------------------------------
                 Stratum : 5
                 Version : 3
             Sync Status : synchronized
             Reachability: reachable
              Root Delay : 0.19053647
               Precision : 0.00003051
         Access Attempts : 1
            Server Synch : 1
             Server Fail : 0
P3/config/ntp#
```

Chapter 6
Configuring BootP/DHCP and UDP forwarding using Device Manager

This chapter describes using Device Manager for configuration and router management of BootP/DHCP relay and UDP forwarding and includes IP features that the Passport 8000 Series switch supports.

For more information about DHCP and UDP management, see Chapter 1.

Supporting BootP/DHCP relay

Dynamic Host Configuration Protocol (DHCP), an extension of the Bootstrap Protocol (BootP), is used to dynamically provide host configuration information to the workstations. To lower administrative overhead, network managers prefer to configure a small number of DHCP servers in a central location. Using few DHCP servers requires the routers connecting to the subnets or bridge (or VLANs) domains to support the BootP/DHCP relay function so that hosts can get the configuration information from servers several router hops away.

Note: BootP/DHCP relays are supported on only IP routed port-based VLANs and protocol-based VLANs. BootP/DHCP relays are not supported on IP subnet-based VLANs.

Configuring DHCP on a brouter port

Use the DHCP tab when setting the DHCP behavior on a brouter port. The DHCP tab is not applicable unless the port (or VLAN) is routed; that is, it is assigned an IP address.

BootP/DHCP relay must be enabled first on a port (or VLAN), then enabled globally.

To enable BootP/DHCP on a port:

1. Select a port.
2. From the Device Manager menu bar, choose Edit > Port.

   The Port dialog box opens with the Interface tab displayed.
3. Click the DHCP tab.

   The DHCP tab opens (Figure 40).

Figure 40 Port dialog box—DHCP tab

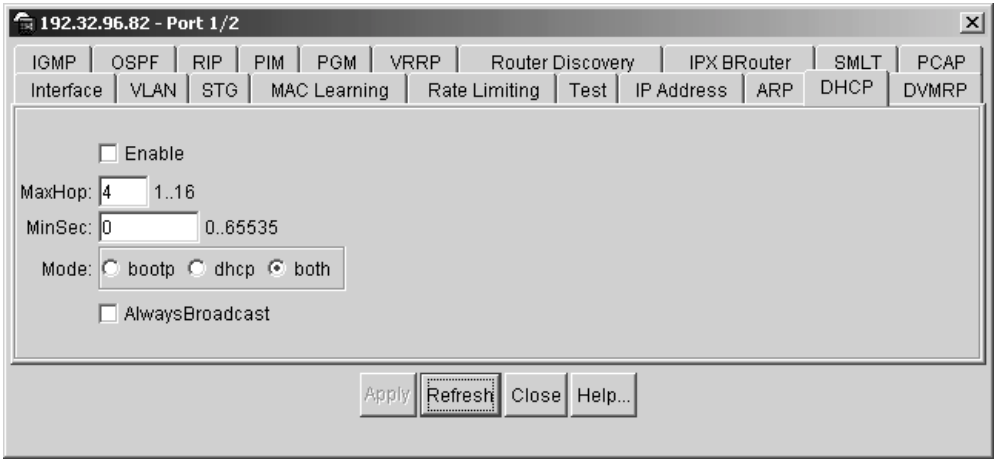


Table 7 describes the DHCP tab fields.

Table 7 DHCP tab fields

Field	Description
Enable	Enables or disables BootP/DHCP on the port. The default is disable.
MaxHop	Sets the maximum number of hops before a BootP/DHCP packet is discarded (1 to 16). The default is 4.
MinSec	The “secs” field in the BootP/DHCP packet header represents the elapsed time since the client first sent the message. If the “secs” field in the packet header is greater than this value, the switch relays or forwards the packet; otherwise, the packet is dropped. The default is 0 seconds.
Mode	Sets the interface to process only BootP, only DHCP, or both types of packets. The default is both.
AlwaysBroadcast	When enabled, the server reply is sent as a broadcast back to the end station. The default is disable.

4 Click Enable to select the DHCP option.

The default is disable.

5 Enter the appropriate values.

6 Click Apply.

Configuring BootP/DHCP on VLANs

The procedure for configuring BootP/DHCP relay on a routed VLAN is the same as configuring DHCP relay for a brouter port.

To configure the DHCP behavior for a routed VLAN:

1 From the Device Manager menu bar, select VLAN > VLANs > Basic.

The VLAN dialog box opens, with the Basic tab displayed.

2 Select a VLAN.

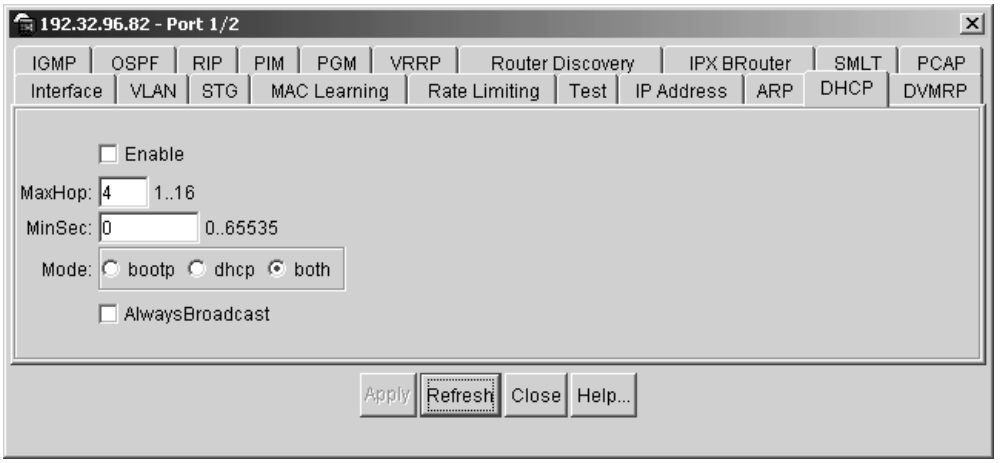
3 Click IP.

The IP, VLAN dialog box opens with the IP Address tab displayed.

4 Select the DHCP tab.

The DHCP tab opens (Figure 41).

Figure 41 IP, VLAN dialog box—DHCP tab



5 Select Enable and enter the appropriate values.

6 Click Apply.

Configuring forwarding policies

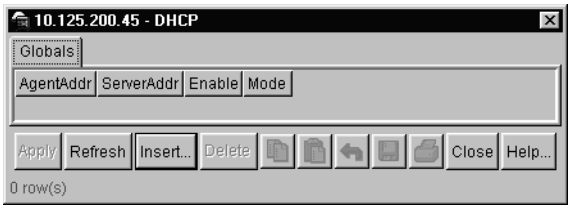
After configuring the BootP/DHCP relay on an IP interface, you can configure forwarding policies to indicate where packets are to be forwarded. The forwarding policies are based on the type of packet and where the packet is received.

To set up a forwarding policy for BootP/DHCP packets received on a virtual interface (brouter or VLAN) enabled for DHCP relaying:

1 From the Device Manager menu bar, choose IP Routing > DHCP.

The DHCP dialog box opens (Figure 42).

Figure 42 DHCP dialog box



2 Click Insert.

The DHCP, Insert Globals dialog box opens (Figure 43).

Figure 43 DHCP, Insert Globals dialog box

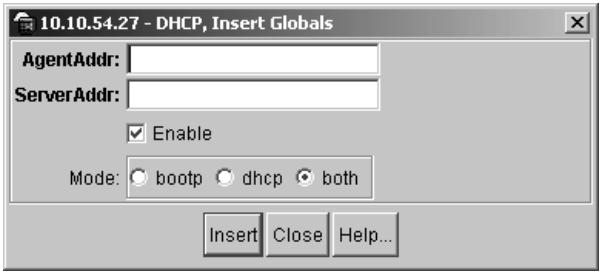


Table 8 describes the fields in the DHCP, Insert Globals dialog box.

Table 8 DHCP, Insert Globals dialog box fields

Field	Description
AgentAddr	IP address of the input interface (agent) on which the relaying of received BootP/DHCP packets must be enabled.
ServerAddr	This parameter is either the IP address of the BootP/DHCP server or the address of another local interface of the switch. • If it is the address of the BootP/DHCP server, then the request is unicast to the server's address. • If the address is one of the IP addresses of an interface on the switch, then the BootP/DHCP requests will be broadcast out of that local interface.

Table 8 DHCP, Insert Globals dialog box fields (continued)

Field	Description
Enable	Enables BootP/DHCP relay on the routing switch.
Mode	Specifies the type of messages relayed: • None • Only BootP • Only DHCP • Both types of packets

3 In the AgentAddr box, type in the agent address.

This parameter specifies the IP address of the IP interface on which the BootP/DHCP request packets are received for forwarding. This address is the IP address of either a brouter port (or a VLAN) for which forwarding is enabled.

4 In the ServerAddr list, type in the server address.

This parameter is either the IP address of the BootP/DHCP server or the address of another local IP interface of the switch. If it is the address of the BootP/DHCP server, then the request is unicast to the server's address. If the address is one of the IP addresses of an interface on the switch, then the BootP/DHCP requests will be broadcast out of that local interface.

5 Click Enable to turn on BootP/DHCP relay, or click Enable to clear the option.

Each agent server forwarding policy can be enabled or disabled. The default is enabled.

6 In the Mode field, select the type of messages to be relayed.

What determines which packets get forwarded is both the mode setting for the DHCP interface and the mode setting for the agent interface. The default is to forward both BootP and DHCP messages.

7 Click Insert.

Configuring UDP broadcast forwarding

Some network applications, such as the NetBIOS name service, rely on a User Data Protocol (UDP) broadcast to request a service or to locate a server. By default, broadcasts are not forwarded by a router. UDP broadcast forwarding is a generalized mechanism for the router to selectively forward UDP broadcasts.

The basic steps for setting up UDP broadcast forwarding are:

1. Enter protocols into a table.
2. Create policies (protocol/server pairs).
3. Assemble these policies into lists or profiles.
4. Apply the list to the appropriate interfaces.
5. Enter a name for the protocol.
6. Click Insert.

   The protocol is added to the Protocol table. Once created, a protocol name or number cannot be changed. The protocol must be deleted first and then added with a new name and number.

The following sections describe using Device Manager to manage UDP forwarding protocols:

- "Managing UDP forwarding protocols," next
- "Managing UDP forwarding" on page 138
- "Creating the forwarding profile" on page 140
- "Managing the broadcast interface" on page 141

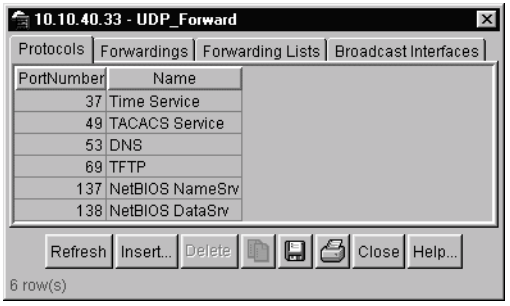
Managing UDP forwarding protocols

To enter protocols into the UDP Forwarding Protocols table:

1. From the Device Manager menu bar, choose IP Routing > UDP Forwarding.

   The UDP_Forward dialog box opens with the Protocols tab (Figure 44) open, listing the UDP protocols with broadcasts that can be forwarded.

Figure 44 UDP_Forward dialog box—Protocols tab



The Passport 8000 Series is configured with the following well-known protocols:

- Time Service
- TACACS Service
- DNS
- TFTP
- NetBIOS NameSrv
- NetBIOS DataSrv

Note: These protocols cannot be deleted. You may add to the list of protocols.

2 Click Insert.

The UDP_Forward, Insert Protocols dialog box opens (Figure 45).

Figure 45 IUDP_Forward, Insert Protocols dialog box

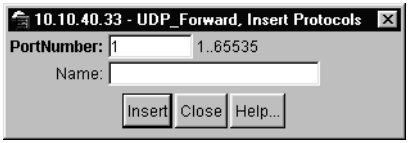


Table 9 describes the f Protocols tab and the UDP_Forward, Insert Protocols dialog box fields.

Table 9 Protocols tab and UDP_Forward, Insert Forwarding dialog box fields

Field	Description
Id	Value that uniquely identifies this list of entries (1 to 1000).
Name	An administratively assigned name for this list (0 to 15 characters).
FwdIdList	The zero or more port forwarding entries associated with this list. Each list identifier is stored as 2 bytes in this array, starting from 0 bytes (size=64). Clicking on the ellipses (...) in this field displays the ID list.

3 In the PortNumber text box, type a port number (UDP port).

This number defines the port (UDP port) used by the server process as its contact port.The range is from 1 to 65535 and cannot be one of the well-known UDP port numbers or a number previously assigned.

4 In the Name text box, type a name for the protocol.

5 Click Insert.

The protocol is added to the Protocol table.

Note: Once created, a protocol name or number cannot be changed.

Managing UDP forwarding

You can define the destination addresses for the UDP protocol.

To define the destination address:

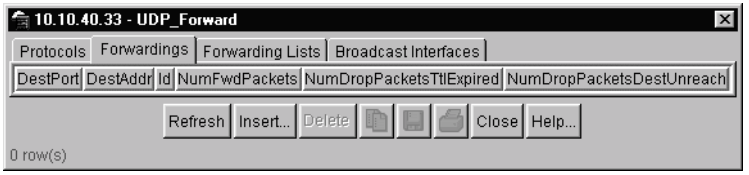
1 From the Device Manager menu bar, choose IP Routing > UDP Forwarding

The UDP_Forward dialog box opens (Figure 44).

2 Click the Forwardings tab.

The Forwardings tab opens (Figure 46).

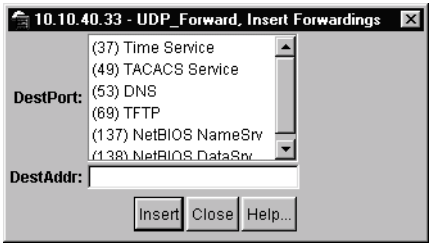
Figure 46 UDP_Forward dialog box—Forwardings tab



3 Click Insert.

The UDP_Forward, Insert Forwardings dialog box opens (Figure 47).

Figure 47 UDP_Forward, Insert Forwardings dialog box



4 Select a destination UDP port from the defined protocols.

5 Enter a destination IP address.

The destination address can be any IP server address for the given protocol application or the IP address of an interface on the router.

- If the address is that of a server, the packet will be sent as a unicast packet to this address.
- If the address is that of an interface on the router, the frame will be rebroadcast.

6 Click Insert.

The information is added to the Forwarding tab.

Table 10 describes UDP_Forward, Insert Forwardings dialog box and Forwarding tab fields.

Table 10 UDP_Forward, Insert Forwardings dialog box tab fields

Field	Description
DestPort	The well-known port number defined for UDP, depending upon the protocol type.
DestAddr	The destination address can be any IP server address for the given protocol application or the IP address of an interface on the router. • If the address is that of a server, the packet will be sent as a unicast packet to this address. • If the address is that of an interface on the router, the frame will be rebroadcast.
Id (Forwarding tab only)	Integer used to identify this entry internally.

Table 10 UDP_Forward, Insert Forwardings dialog box tab fields (continued)

Field	Description (continued)
NumFwdPackets (Forwarding tab only)	The total number of UDP broadcast packets forwarded using this policy.
NumDropPacketsTtlExpired (Forwarding tab only)	The total number of UDP broadcast packets dropped because the time to live (TTL) has expired.
NumDropPacketsDestUnreach (Forwarding tab only)	The total number of UDP broadcast packets dropped because the specified destination address was unreachable.

Creating the forwarding profile

You can create a forwarding profile, a collection of port and destination pairs.

To create a forwarding profile:

1. From the Device Manager menu bar, choose IP Routing > UDP Forwarding.

   The UDP_Forward dialog box opens (Figure 44).

2. Click the Forwarding Lists tab.

   The Forwarding Lists tab opens (Figure 48).

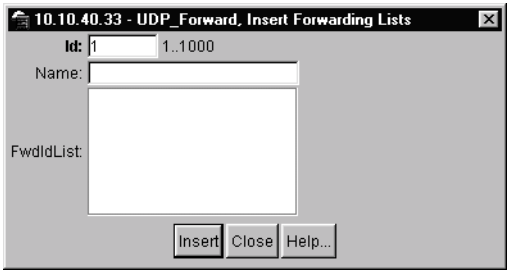
Figure 48 UDP_Forward dialog box—Forwarding Lists tab

3. To add a new list, click Insert.

   When configuring UDP forwarding list entries, be sure to first configure the UDP forwarding list. Then, configure your UDP forwarding list entries and assign them to a UDP forwarding list. If you do not assign a UDP forwarding list entry to at least one UDP forwarding list, the UDP forwarding list will be lost after a reboot.

   The UDP_Forward, Insert Forwarding Lists dialog box opens (Figure 49).

Figure 49 UDP_Forward, Insert Forwarding Lists dialog box



4 In the Id text box, type the forwarding list Id.

5 In the Name text box, type the name of the forwarding list (optional).

6 The forwarding list is displayed in the FwdIdList text box.

Table 11 describes the Forwarding Lists tab and UDP_Forwarding Forwarding Lists dialog box fields.

Table 11 Forwarding Lists tab and UDP_Forward, Insert Forwarding Lists dialog box fields

Field	Description
Id	Value that uniquely identifies this list of entries (1 to 1000).
Name	An administratively assigned name for this list (0 to 15 characters).
FwdIdList	The zero or more port forwarding entries associated with this list. Each list identifier is stored as 2 bytes in this array, starting from 0 bytes (size=64). Clicking on the ellipses (...) in this field displays the ID list.

Managing the broadcast interface

You can specify and display which router interfaces will receive UDP broadcasts to be forwarded.

To add a UDP broadcast interface:

1 From the Device Manager menu bar, choose IP Routing > UDP Forwarding.

The UDP_Forward dialog box opens (Figure 44).

2 Click the Broadcast Interface tab.

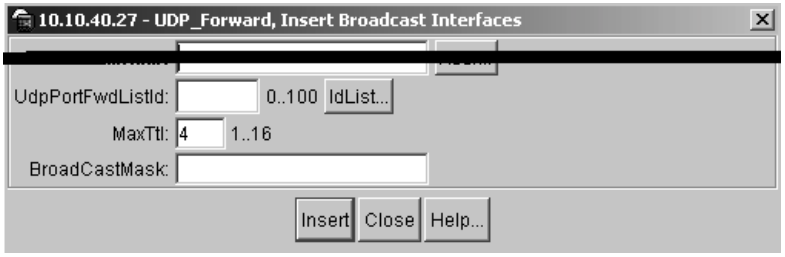
The Broadcast Interfaces tab opens (Figure 50).

Figure 50 UDP_Forward dialog box—Broadcast Interfaces tab

3 Click Insert.

The UDP_Forward, Insert Broadcast Interfaces dialog box opens (Figure 51).

Figure 51 UDP_Forward, Insert Broadcast Interfaces dialog box



4 In the LocalIfAddr text box, type a local interface IP address; or click the Addr button to select an address from the list.

5 In the UdpPortFwdListId text box, type the forwarding list ID; or choose an ID from the list.

6 In the MaxTtl field, type the maximum number of hops an IP broadcast can take from the source device to the destination device (the default is 4; the range is 1 to 16).

7 In the BroadCastMask text box, enter the subnet mask of the local interface that is used for broadcasting the UDP broadcast packets.

When configuring the UDP forwarding broadcast mask, the broadcast mask should be less specific (shorter in length) or equally specific (equal in length) to the subnet mask of the IP interface it is configured upon. If the UDP forwarding broadcast mask is configured to be more specific than the subnet mask of the corresponding IP interface, then UDP forwarding will not function properly.

Table 12 describes the Broadcast Interface tab and UDP_Forward, Insert Broadcast Interface dialog box fields.

Table 12 UDP_Forward, Insert Broadcast Interface dialog box fields

Field	Description
LocalIfAddr	The IP address of the local router interface that will receive UDP broadcast packets that are forwarded.
UdpPortFwdListId	The number of the UDP lists/profiles that this interface is configured to forward (0 to100). A value of 0 indicates that the interface will not forward any UDP broadcast packets.
MaxTtl	The maximum number of hops an IP broadcast packet can take from the source device to the destination device (the default is 4; the range is 1 to 16).
BroadCastMask	The subnet mask of the local interface that is used for broadcasting the UDP broadcast packets.
NumRxPkts	The total number of UDP broadcast packets received by this local interface.
NumFwdPkts	The total number of UDP broadcast packets forwarded by this local interface.
NumDropPacketsTtlExpired	The total number of UDP broadcast packets dropped because the time to live (TTL) has expired.
NumDropPacketsDestUnreach	The total number of UDP broadcast packets dropped because the destination was unreachable.
NumDropPacketsUnknownPort	The total number of UDP broadcast packets dropped because the destination port/protocol specified has no matching forwarding policy.

Chapter 7
Configuring DHCP and UDP using the CLI

This chapter describes the Run-Time CLI commands that are used to configure DHCP and UDP functions in your Passport 8000 Series switch. The chapter includes sections about the following command groups used to configure routing characteristics:

Roadmap of IP commands

The following roadmap lists some of the IP commands and their parameters. Use this list as a quick reference or click on any command or parameter entry for more information.

Command	Parameter
config ip dhcp-relay	info
	create-fwd-path agent <value> server <value> [mode <value>] [state <value>]
	enable-fwd-path agent <value> server <value>
	delete-fwd-path agent <value> server <value>
	disable-fwd-path agent <value> server <value>
	mode <mode> agent <value> server <value>
config ethernet <ports> ip dhcp-relay	info
	broadcast <enable|disable>
	disable
	enable
	max-hop <max-hop>
	min-sec <min-sec>
	mode <mode>
config vlan <vid> ip dhcp-relay	info
	broadcast <enable|disable>
	disable
	enable
	max-hop <max-hop>

Command	Parameter
	min-sec <min-sec>
	mode <mode>
config ip udpfwd protocol <udpport>	info
	create <protoname>
	delete
config ip udpfwd portfwd	info
	add-portfwd <udpport> <ipaddr>
	remove-portfwd <udpport> <ipaddr>
config ip udpfwd portfwdlist <fwdlistid>	info
	add-portfwd <udpport> <ipaddr>
	create
	delete
	name <name>
	remove-portfwd <udpport> <ipaddr>
config ip udpfwd interface <ipaddr>	info
	broadcastmask <ipaddr>
	create <fwdlistid>
	delete
	maxttl <maxttl>
	udpportfwdlist <fwdlistid>
show ip dhcp-relay fwd-path	

Command	Parameter
`show ip dhcp-relay counters`	
`show ports info dhcp-relay [<ports>]`	
`show ports stats dhcp-relay [<ports>]`	
`show vlan info dhcp-relay [<vid>]`	
`show ip udpfwd interface info [<ipaddr>]`	
`show ip udpfwd portfwd info`	
`show ip udpfwd portfwdlist info [<fwdlistid>]`	
`show ip udpfwd protocol info`	

DHCP relay commands

Dynamic Host Configuration Protocol (DHCP), an extension of the Bootstrap Protocol (BootP), is used to dynamically provide host configuration information to the workstations. Use the port DHCP relay commands to set DHCP relay behavior on a port and the VLAN DHCP commands to set DHCP relay behavior on a VLAN.

DHCP relay must be enabled on the path for port or VLAN configuration to take effect.

Configuring DHCP relay

To view and configure DHCP parameters globally, use the following command:

```
config ip dhcp-relay
```

This command includes the following options:

config ip dhcp-relay followed by:	
`info`	Displays current DHCP global configuration on the switch.
`create-fwd-path agent <value> server <value> [mode <value>] [state <value>]`	Configures the forwarding path from the client to the server. • `agent value` is the IP address configured on an interface (a locally configured IP address). • `server value` is the IP address of the DHCP server in the network. If this IP address corresponds to the locally configured IP network, the DHCP packet is broadcast out the interface. • `mode value` is to forward BootP messages only, DHCP messages only, or both {bootp | dhcp | bootp_dhcp}. • `state value` enables or disables the forwarding path.
`enable-fwd-path agent <value> server <value>`	Enables DHCP relaying on the path from the IP address to the server. • `agent value` is the IP address configured on an interface (a locally configured IP address). • `server value` is the IP address of the DHCP server in the network. If this IP address corresponds to the locally configured IP network, the DHCP packet is broadcast out the interface.
`delete-fwd-path agent <value> server <value>`	Deletes the forwarding path from the client to the server. • `agent value` is the IP address configured on an interface (a locally configured IP address). • `server value` is the IP address of the DHCP server in the network.

config ip dhcp-relay followed by:	
`disable-fwd-path agent <value> server <value>`	Disables DHCP relaying on the path from the IP address to the server. This is the default. • `agent value` is the IP address configured on an interface (a locally configured IP address). • `server value` is the IP address of the DHCP server in the network.
`mode <mode> agent <value> server <value>`	Modifies DHCP mode to forward BootP messages only, DHCP messages only, or both. The default is both. • *mode* is [bootp | dhcp | bootp_dhcp]. • `agent value` is the IP address configured on an interface (a locally configured IP address). • `server value` is the IP address of the DHCP server in the network.

Showing DHCP relay information

To display information about DHCP routes and counters, use the following commands:

```
show ip dhcp-relay fwd-path
show ip dhcp-relay counters
```

The **`show ip dhcp-relay fwd-path`** command displays DHCP routing information, including interface, server, enabled or disabled, and mode (forward BootP messages only, DHCP messages only, or both).

The **`show ip dhcp-relay counters`** command displays DHCP counter information, including the number of requests and the number of replies for each interface.

Figure 52 shows sample output for the **`show ip dhcp-relay counters`** command.

Figure 52 show ip dhcp-relay counters command output

```
Passport-8610/show/ip/dhcp-relay# counters

================================================================
                         Dchp
================================================================
INTERFACE       REQUESTS  REPLIES
----------------------------------------------------------------
10.10.40.1      0         0
```

Configuring DHCP relay on a port

To view and configure DHCP parameters on the specified port(s), use the following command:

`config ethernet <ports> ip dhcp-relay`

where:
ports is the port or list of ports on which you are running the command {slot/port[-slot/port][, ...]}.

This command includes the following options:

config ethernet <*ports*> ip dhcp-relay followed by:	
`info`	Displays current DHCP configuration on the port (Figure 53).
`broadcast <enable|disable>`	Sets whether or not the server reply is sent as a broadcast or unicast back to the end station.
`disable`	Disables DHCP relaying on the port.This is the default state.
`enable`	Enables DHCP relaying on the port.
`max-hop <max-hop>`	Sets the maximum number of hops before a BootP/DHCP packet is discarded (1 to 16). The default is 4.

config ethernet <*ports*> ip dhcp-relay followed by:	
min-sec <*min-sec*>	Sets the minimum seconds count set for DHCP. If the "secs" field in the BootP/DHCP packet header is greater than this value, the switch relays or forwards the packet; otherwise, the packet is dropped (0 to 65535). The default is 0 seconds.
mode <*mode*>	Sets DHCP mode to forward BootP messages only, DHCP messages only, or both. The default is both.

Figure 53 shows a sample of the **config ethernet ip dhcp-relay info** command.

Figure 53 config ethernet ip dhcp-relay info command output

```
Passport-8610# config ethernet 1/2 ip dhcp-relay info

Sub-Context: clear config dump monitor show test trace
Current Context:

Port 1/2 :
                  dhcp-relay : disable
                   broadcast : disable
                     max-hop : 4
                     min-sec : 0
                        mode : both
```

Showing DHCP relay information for a port

To display information about DHCP on one or more ports, use the following two commands:

```
show ports info dhcp-relay [<ports>]
show ports stats dhcp-relay [<ports>]
```

The **show ports info dhcp-relay** command displays the DHCP parameters for a specified port or all ports.

The **show ports stats dhcp-relay** command displays DHCP statistics for a specified port or for all ports.

Figure 54 shows an example of the **show ports info dhcp-relay** command.

Figure 54 show ports info dhcp-relay command (partial output)

```
Passport-8610# show ports info dhcp-relay

================================================================
                            Port Dhcp
================================================================
PORT_NUM ENABLE   MAX_HOP  MIN_SEC  MODE  ALWAYS_BROADCAST
----------------------------------------------------------------
9/1      false    4        0        both  false
9/2      true     4        0        both  false
9/3      false    4        0        both  false
9/4      false    4        0        both  false
9/5      false    4        0        both  false
9/6      false    4        0        both  false
9/7      false    4        0        both  false
```

Figure 55 shows sample output for the **show ports stats dhcp-relay** command.

Figure 55 show ports stats dhcp-relay command (partial output)

```
Passport-8610# show ports stats dhcp-relay

================================================================
                        Port Stats Dhcp
================================================================
PORT_NUM NUMREQUEST NUMREPLY
----------------------------------------------------------------
1/1      0          0
3/1      0          0
3/2      0          0
3/3      0          0
3/4      0          0
3/5      0          0
```

Configuring DHCP relay on a VLAN

To configure DHCP routing on a VLAN, use the following command:

```
config vlan <vid> ip dhcp-relay
```

where:
vid refers the VLAN ID, which is a value from 1 to 4094.

This command includes the following options:

config vlan <*vid*> ip dhcp-relay followed by:	
`info`	Displays DHCP characteristics on the VLAN.
`broadcast <enable|disable>`	Sets whether or not the server reply is sent as a broadcast back to the end station.
`disable`	Disables DHCP relaying on the VLAN. This state is the default state.
`enable`	Enables DHCP relaying on the VLAN.
`max-hop <max-hop>`	Sets the maximum number of hops before the BootP/DHCP packet is dropped (1 to 16).
`min-sec <min-sec>`	Sets the minimum seconds count for DHCP. If the secs field in the packet header is greater than this value, the switch forwards the packet; otherwise it is dropped (0 to 65535).
`mode <mode>`	Sets DHCP mode to forward BootP messages only, DHCP messages only, or both. The default is both.

Figure 56 shows sample output for the **`config vlan ip dhcp-relay info`** command.

Figure 56 config vlan ip dhcp-relay info command output

```
Passport-8606:6# config vlan 1 ip dhcp-relay info

Sub-Context: clear config dump monitor show test trace wsm
Current Context:

                  dhcp-relay : disable
                   broadcast : disable
                     max-hop : 4
                     min-sec : 0
                        mode : both
```

Showing DHCP relay information for a VLAN

To display the DHCP parameters for all VLANs or for the specified VLAN, use the following command:

`show vlan info dhcp-relay [<vid>]`

where:
vid refers the VLAN ID, which is a value from 1 to 4094.

The interface index (IF Index) is assigned as the VLAN is created. Numbers 1 to 256 are ports; numbers above 257 are VLANs.

Figure 57 shows sample output for the **`show vlan info dhcp-relay` command**.

Figure 57 show vlan info dhcp-relay command output

```
Passport-8610# show vlan info dhcp-relay

================================================================
                                          Vlan Dhcp
================================================================
VLAN IF            MAX    MIN            ALWAYS
ID   INDEX  ENABLE HOP    SEC    MODE    BCAST
----------------------------------------------------------------
1    2049   false  4      0      both    false
2    2050   false  4      0      both    false
```

UDP commands

Some network applications, such as the NetBIOS name service, rely on a User Data Protocol (UDP) broadcast to request a service or to locate a service. By default, broadcasts are not forwarded by a router. UDP broadcast forwarding is a generalized mechanism for the router to selectively forward UDP broadcasts.

The basic procedure for setting up UDP broadcast forwarding is:

- To enter protocols in a protocol table, use the **`config ip udpfwd protocol`** command, next.
- To add or remove a port forward entry, use the **`config ip udpfwd portfwd`** command (page 157).
- To create and name the port forward list and assign protocols and servers to the port forward list, use the **`config ip udpfwd portfwdlist`** command (page 158).
- To apply the port forward list to the appropriate interfaces, use the **`config ip udpfwd interface`** command (page 159).
- To display the current UDP forwarding configuration, use the **`show ip udpfwd`** command (page 160)

Configuring UDP protocols

To configure a UDP protocol, use the following command:

`config ip udpfwd protocol <udpport>`

where:
udpport refers to the UDP protocol port number {1..65535}.

This `command` includes the following options:

config ip udpfwd protocol <udpport> followed by:	
`info`	Displays created and/or deleted UDP protocols.
`create <protoname>`	Creates a new UDP protocol. • *protoname* is the UDP protocol name {string}.
`delete`	Deletes a UDP port protocol.

Configuring a UDP port forward entry

To add or remove a port forward entry, use the following command:

`config ip udpfwd portfwd`

The **`config ip udpfwd portfwd`** command includes the following options:

config ip udpfwd portfwd followed by:	
`info`	Displays the current configuration for the port forward list ID.

config ip udpfwd portfwd followed by:	
add-portfwd <*udpport*> <*ipaddr*>	Adds a UDP protocol port to the specified port forwarding list. • *udpport* is a UDP protocol port {1..65535}. • *ipaddr* is an IP address in dotted decimal format.
remove-portfwd <*udpport*> <*ipaddr*>	Removes a protocol port forwarding entry and IP address from the list. • *udpport* is a UDP protocol port {1..65535}. • *ipaddr* is an IP address in dotted decimal format.

Configuring the UDP port forward list

To create and name the port forward list and assign protocols and servers to the port forward list, use the following command:

`config ip udpfwd portfwdlist <fwdlistid>`

where:
fwdlistid refers to the port forwarding list number {1..1000}.

This command includes the following options:

config ip udpfwd portfwdlist <fwdlistid> followed by:	
info	Displays the current configuration for the port forward list ID.
add-portfwd <*udpport*> <*ipaddr*>	Adds a UDP protocol port to the specified port forwarding list. • *udpport* is a UDP protocol port {1..65535}. • *ipaddr* is an IP address in dotted decimal format.
create	Creates a UDP port forwarding list.
delete	Deletes a port forwarding list ID.

config ip udpfwd portfwdlist <fwdlistid> followed by:	
name <*name*>	Assigns a name to the UDP port forwarding list. • *name* is an alphabetical string.
remove-portfwd <*udpport*> <*ipaddr*>	Removes a protocol port forwarding entry and IP address from the list. • *udpport* is a UDP protocol port {1..65535}. • *ipaddr* is an IP address in dotted decimal format.

Configuring UDP forward interfaces

To apply the port forward list to the appropriate interfaces, use the following command:

config ip udpfwd interface <*ipaddr*>

where:
ipaddr indicates the IP address of the selected interface.

This command includes the following options:

config ip udpfwd interface <*ipaddr*> followed by:	
info	Displays the current configuration of the UDP interface.
broadcastmask <*ipaddr*>	Sets the interface broadcast mask (the *interface broadcast* mask may be different than the interface mask). • *ipaddr* is an IP address.
create <*fwdlistid*>	Assigns a forwarding list ID {1..1000} to an interface IP address.
delete	Removes the forwarding list from the IP address.
maxttl <*maxttl*>	Sets maximum time-to-live for the UDP broadcast forwarded by the interface.
udpportfwdlist <*fwdlistid*>	Changes the port forwarding list {1..1000}.

Showing UDP forward information

The **show ip udpfwd** command displays information about the UDP forwarding characteristics of the switch. The command has four options: interface info, portfwd info, portfwdlist info, and protocol info.

Showing UDF forward interface information

To display information about the UDP interface for all IP addresses or a specified IP address, use the following command:

```
show ip udpfwd interface info [<ipaddr>]
```

Figure 58 shows sample output for this command.

Figure 58 show ip udpfwd interface info command output

```
Passport-8610# show ip udpfwd interface info x.x.x.x


================================================================================
                                  Udp Broadcast Interface Forwarding Tbl
================================================================================
INTF_ADDR       FWD    MAXTTL RXPKTS  FWDPKTS DRPTTLEX DRPDEST  DRP_UNKNOWN BDCASTMASK
                LISTID                                UNREACH  PROTOCOL

--------------------------------------------------------------------------------
161.69.150.1    1      4      9       7       0        0        0       0
```

Showing the UDF port forwarding table information

To display the UDP port forwarding table, use the following command:

```
show ip udpfwd portfwd info
```

Figure 59 shows sample output for this command.

Figure 59 show ip udpfwd portfwd info command output

```
Passport-8610/show/ip/udpfwd/portfwd# info

================================================================
                       Udp Prot Fwd Tbl
================================================================
UDP_PORT FORWARDING_ADDR FWDPKTS  DRPTTLEX DRPDEST_UNKNOWN
----------------------------------------------------------------
1        1.1.1.1         7        0        0
1        2.2.2.2         0        0        0
```

Showing the UDP port forwarding list table information

To display the UDP port forwarding list table for the specified list or all lists on the switch, use the following command:

```
show ip udpfwd portfwdlist info [<fwdlistid>]
```

where:
fwdlistid is a list id number with a range of 1 to 1000.

Showing the UDP protocol table information

To display the UDP protocol table with the UDP port numbers for each supported or designated protocol, use the following command:

```
show ip udpfwd protocol info
```

Figure 60 shows sample output for this command.

Figure 60 show ip udpfwd protocol info command output

```
Passport-8610/show/ip/udpfwd/protocol# info

================================================================
                        Udp Protocol Tbl
================================================================
UDP_PORT PROTOCOL_NAME
----------------------------------------------------------------
1        NewPIOne
37       Time Service
49       TACACS Service
53       DNS
69       TFTP
137      NetBIOS NameSrv
138      NetBIOS DataSrv
1024     UserDefinedLab Prot
```

Chapter 8
Using Device Manager diagnostic tools

This chapter describes the Device Manager diagnostic tools that you can run on a Passport 8000 Series switch. It includes the following topics:

Testing the switch fabric and address resolution table

The Test tab in Device Manager allows you to perform two tests. You can test the switch fabric and check the address resolution (AR) table for consistency.

The Fabric test causes the CPU to generate traffic and send it through the switch fabric. Given the forwarding rate of Passport 8000 Series switches, the CPU does not generate much traffic, but it performs a simple test of the switch fabric memory.

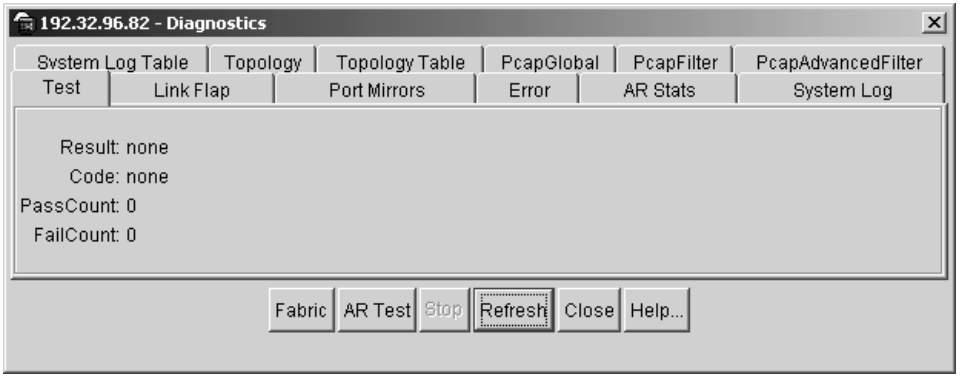
The AR table test performs a consistency check on address resolution table entries.

To test the fabric or address resolution table:

1 From the Device Manager menu bar, choose Edit > Diagnostics.

The Diagnostics dialog box opens with the Test tab displayed (Figure 61).

Figure 61 Diagnostics dialog box—Test tab



The following test options are available:

- Test the Address Resolution Table (AR Test)
- Test the switch fabric (Fabric)
- Stop a test in progress

Table 13 describes the Test tab fields on the Diagnostics dialog box.

Table 13 Test tab fields

Field	Description
Result	The result of the most recently run (or current) test: • none • success • inProgress • notSupported • unAbleToRun • aborted • failed
Code	The code contains more specific information about the test result (for example, an error code after a failed test): • none • NoReceive (timeout on a send) • BadSeq (packets received out of sequence) • BadLen (packet length mismatch) • BadData (packet data mismatch)
PassCount	The number of iterations of the test case that completed successfully.
FailCount	The number of iterations of the test case that failed.

Monitoring how often a port goes down

You can monitor the number of times a link is going up or down rapidly (that is, flapping) on a port. This action can be detrimental to network stability because it could trigger spanning tree and routing table recalculation. If the number exceeds a given boundary during a specified interval, the port is forced out of service.

To monitor a port:

1. From the Device Manager menu bar, choose Edit > Diagnostics.

   The Diagnostics dialog box opens with the Test tab displayed.

2. Click the Link Flap tab.

The Link Flap tab opens (Figure 62).

Figure 62 Diagnostics dialog box—Link Flap tab

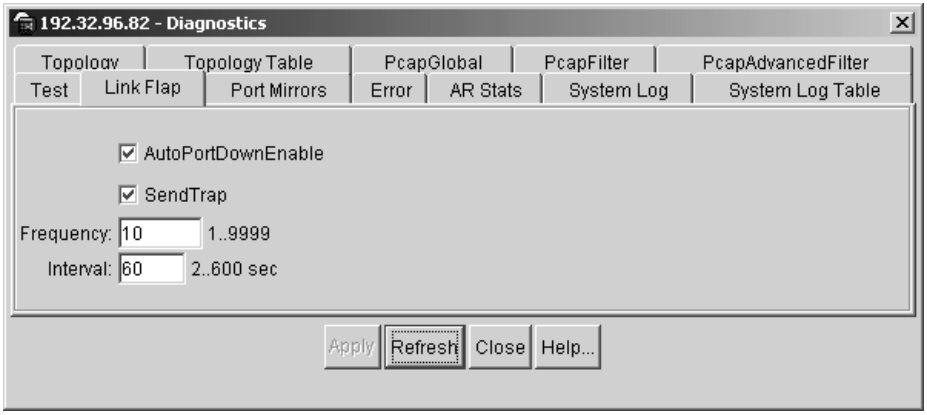


Table 14 describes the Link Flap tab fields on the Diagnostics dialog box.

Table 14 Link Flap tab fields

Field	Description
AutoPortDownEnable	Enables or disables the Link Flap Detect feature.
SendTrap	Specifies whether or not a trap should be sent if the port is forced out of service.
Frequency	Specifies the number of times the port can go down. The default is 10.
Interval	Specifies the interval (in minutes). The default is 60.

Configuring and monitoring port mirroring

You can use port mirroring to specify a destination port on which you want to see mirrored traffic and specify the source ports from which traffic is mirrored. Any packets entering or leaving the specified ports are forwarded normally and a *copy* of the packets is sent out the mirror port. You can configure up to 100 entries in the MirroredPort field for mirroring, and you can have up to 25 entries active

(enabled) at any given time. When the port mirroring feature is active, all packets received on the port(s) specified by the MirroredPort field are copied to MirroringPort. The mirroring operation is nonintrusive; mirrored traffic is always treated in the lowest priority queue.

You can also use the port mirroring feature to monitor traffic from MAC addresses where traffic with a given MAC source address (SA) or MAC destination address (DA) is copied to the mirror port. This feature is enabled by setting the Monitor field to true for a MAC address in the Forwarding dialog box.

Note: Monitoring of MAC address traffic must be within the context of a VLAN.

Configuring port mirroring ports

To configure ports for port mirroring:

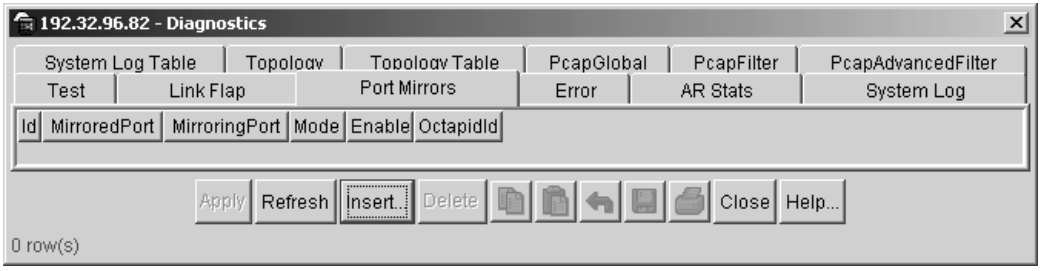
1. From the Device Manager menu bar, choose Edit > Diagnostics.

   The Diagnostics dialog box opens with the Test tab displayed (Figure 61).

2. Click the Port Mirrors tab.

   The Port Mirrors tab opens (Figure 63).

Figure 63 Diagnostics dialog box—Port Mirrors tab



3 Click Insert.

The Diagnostics, Insert Port Mirrors dialog box opens (Figure 64).

Figure 64 Diagnostics, Insert Port Mirrors dialog box

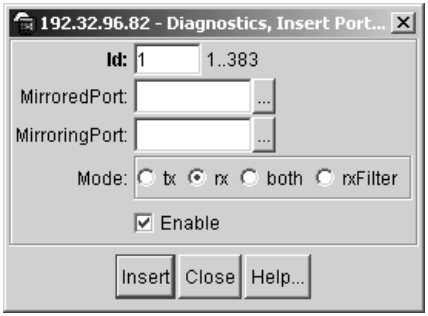


Table 15 describes the Diagnostics, Insert Port Mirrors dialog box fields.

Table 15 Diagnostics, Insert Port Mirrors dialog box fields

Field	Description
Id	An assigned identifier for the configured port mirroring instance.
MirroredPort	Allows you to specify a port to be mirrored (source port). You can select ports from any module in your configuration by clicking the ellipses button to the right of the field (Figure 64).
MirroringPort	Allows you to specify a destination port (the port to which the mirrored packets are forwarded). You can select ports from any module in your configuration by clicking the ellipses button to the right of the field (see "Selecting ports for mirroring," next).
Mode	Allows you to specify the traffic direction of the packet being mirrored—Rx, Tx, or both. The default configuration is Rx.
Enable	Allows you to enable or disable this port mirroring instance. The default value is Enable.
OctapidId	This field is the Octapid Id for a port.

Selecting ports for mirroring

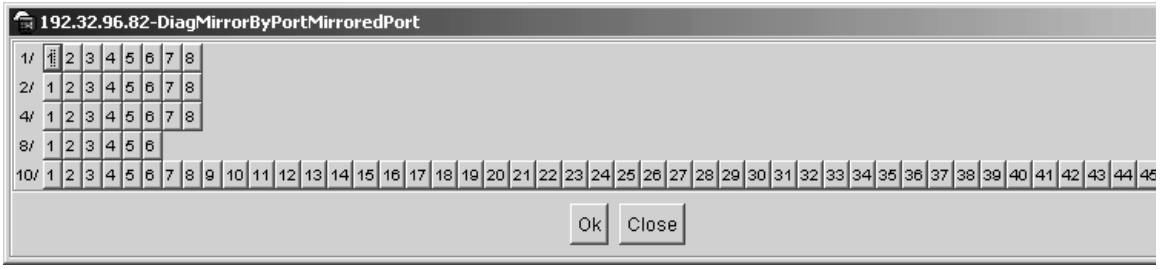
To select ports for port mirroring:

1 On the device view, select a mirrored (source) port:

a Click the ellipses button in the MirroredPort field.

The DiagMirrorByPortMirroredPort dialog box opens (Figure 65).

Figure 65 DiagMirrorByPortMirroredPort dialog box



b Select a source port.

c Click Ok.

The Diagnostics, Insert Port Mirrors dialog box displays the new entry in the MirroredPort field.

2 Select a destination port.

a Click the ellipses button in the MirroringPort field.

The DiagMirrorByPortMirroringPort dialog box opens.

b Select a destination port.

c Click Ok.

The Diagnostics, Insert Port Mirrors dialog box displays the new entry in the MirroringPort field.

3 In the Diagnostics, Insert Port Mirrors dialog box, select the appropriate mode value (tx, rx, or both) to specify the traffic direction of the mirrored packet. The default configuration is rx.

4 Select the appropriate value (Enable or Disable) to enable or disable this instance of mirroring. The default value is Enable.

5 Click Insert to accept your configuration choices.

Editing existing port mirroring values

This section describes how to edit existing port mirroring values. The following topics are covered:

Sorting entries

You can click on the column heading of any entry listed in the Port Mirrors tab to sort the entries in ascending or descending numerical order, or you can sort to group entry values.

Displaying configured port mirroring entries

To display existing port mirroring entries:

1 From the Device Manager menu bar, choose Edit > Diagnostics.

The Diagnostics dialog box opens with the Test tab displayed (Figure 61).

2 Click the Port Mirrors tab.

The Port Mirrors tab opens, displaying the configured port mirroring entries (Figure 66).

Figure 66 Diagnostics dialog box—Port Mirrors tab

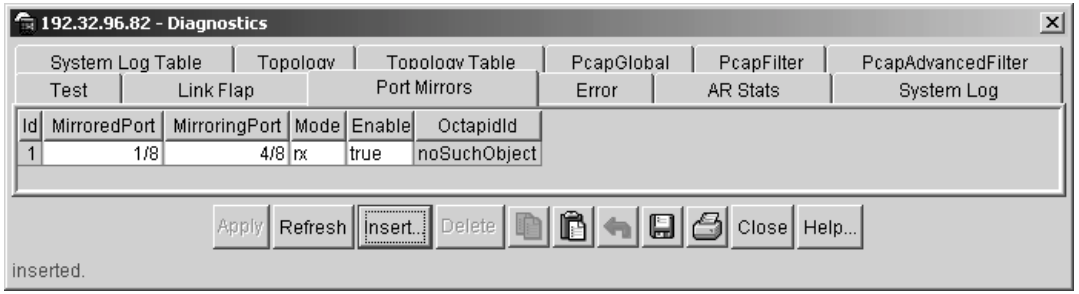


Table 16 describes the Port Mirrors tab fields on the Diagnostics dialog box.

Table 16 Port Mirrors tab fields

Field	Description
Id	Read-only field—displays the assigned identifier for the existing port mirroring instances.
MirroredPort	Displays existing port(s) from which packets are being copied (also referred to as *source* ports).
MirroringPort	Displays the existing port(s) that are performing the mirroring, that is, the port(s) to which the mirrored packets are forwarded (also referred to as *destination* ports).
Mode	Specifies the traffic direction of the packets being mirrored for each existing entry—Rx, Tx, or Both.
Enable	Specifies the status of existing entries—true (enabled) or false (disabled).
OctapidId	Read-only field—displays the OctaPID ID assignment for existing entries. The interface automatically assigns an OctaPID ID according to the switch fabric in specific Passport 8000 modules and a fixed set of configuration rules (see Appendix D, “Tap and OctaPID assignment”). Each OctaPID ID supports up to 8 port members. Source ports that are members of the same OctaPID ID can only be mirrored to the same destination port.

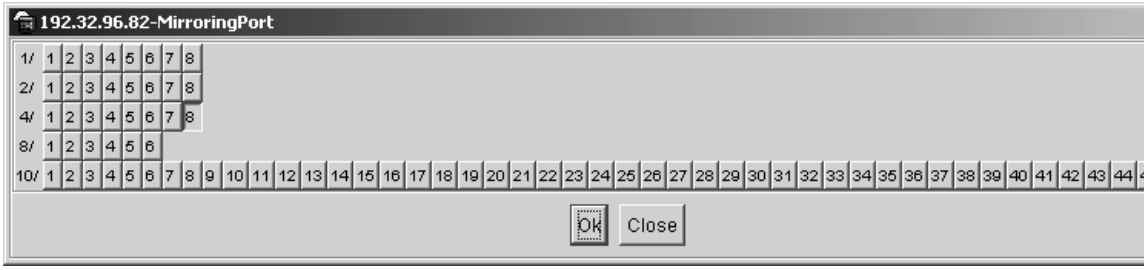
Editing existing mirrored or mirroring ports

To modify an existing mirrored or mirroring port:

1. From the Port Mirrors dialog box, double click on an entry you want to modify in the MirroredPort or MirroringPort column heading.

   The appropriate dialog box opens with the port you clicked to modify shown selected (Figure 65).

Figure 67 MirroringPort dialog box



2. Click on the port you want as a replacement.
3. Click Ok.

   The entry in the Port Mirrors tab is replaced with the new port.

Editing the Mode field values

To modify an existing entry in the Mode field:

1. Click on the entry to display the pop up menu.

   A pop up widow displays the following options: Rx, Tx, or Both.
2. Click on the option you want for replacement.

   The Apply button becomes highlighted.
3. Click Apply to accept the option.

Editing the Enable field values

To modify an existing entry in the Enable field:

1. Click on the entry to display the pop up menu.

   A pop up widow displays the following options: true or false.

2. Click on the option you want for replacement.

   The Apply button is highlighted.

3. Click Apply to accept the option.

Trapping errors

You can specify that errors generate an SNMP trap. All errors detected are then sent to a log that you can view in Device Manager.

To trap errors:

1. From the Device Manager menu bar, choose Edit > Diagnostics.

   The Diagnostics dialog box opens with the Test tab displayed.

2. Click the Error tab.

   The Error tab opens (Figure 68).

Figure 68 Diagnostics dialog box—Error tab

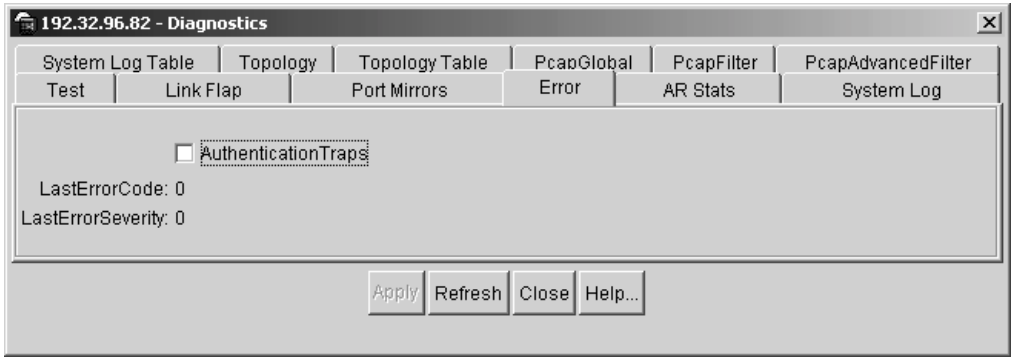


Table 17 describes the Error tab fields on the Diagnostics dialog box.

Table 17 Error tab fields

Field	Description
AuthenticationTrap	When enabled, sends a trap upon receiving an error in the system.
LastErrorCode	The last error reported in the system. This value is intended to help customer support personnel isolate system problems.
LastErrorSeverity	The last error reported in the system. The meanings of this value are: 0= Informative Information 1= Warning Condition 2= Error Condition 3= Manufacturing Information 4= Fatal Condition

Viewing address resolution statistics

The AR Stats tab shows statistics for the internal state of the address translation table. These statistics are debugging aids, and you should use them only when consulting with Nortel Networks support personnel.

The statistic of most interest is the NoSpace counter, which indicates the number of entries the address resolution (AR) table could not add because of lack of space.

To access the AR Stats tab:

1. From the Device Manager menu bar, choose Edit > Diagnostics.

   The Diagnostics dialog box opens with the Test tab displayed.

2. Click the AR Stats tab.

   The AR Stats tab opens (Figure 69).

Figure 69 Diagnostics dialog box—AR Stats tab

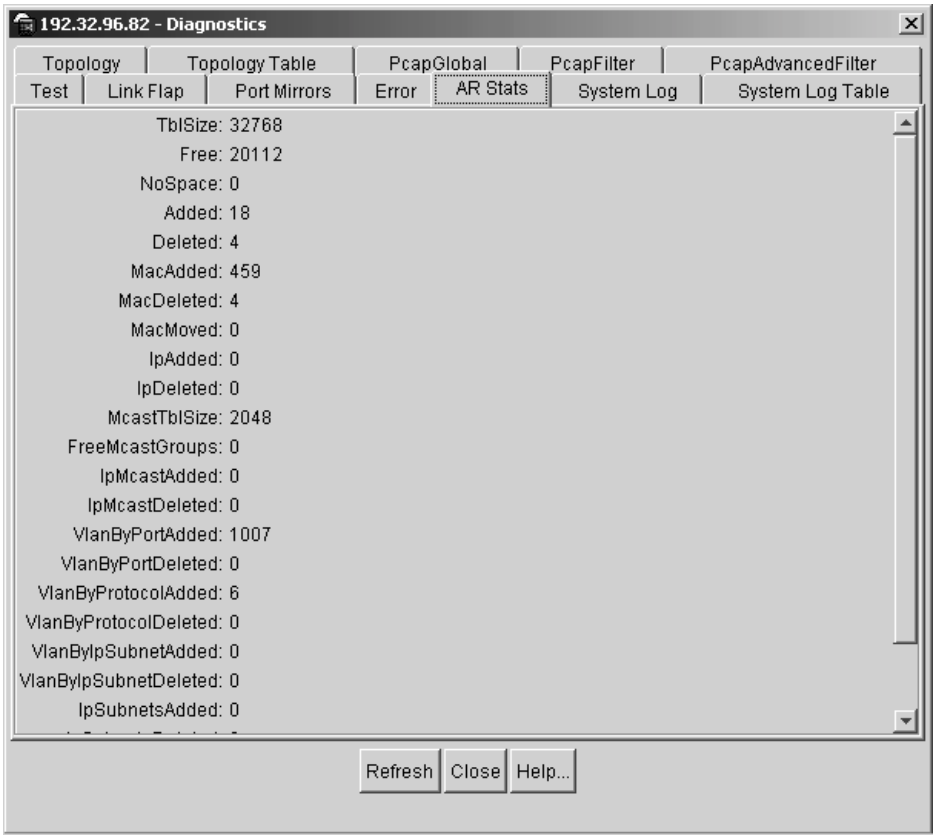


Table 18 describes the AR Stats tab fields on the Diagnostics dialog box.

Table 18 AR Stats tab fields

Field	Descriptions
TblSize	The size of the address resolution (AR) translation table.
Free	The number of free entries that are available in the AR translation table.
NoSpace	The number of entries that were not added to the AR translation table because of lack of space.
Added	The number of entries added to the AR translation table.

Table 18 AR Stats tab fields (continued)

Field	Descriptions
Deleted	The number of entries deleted from the AR translation table.
MacAdded	The number of MAC entries added to the AR translation table.
MacDeleted	The number of MAC entries deleted from the AR translation table.
MacMoved	The number of MAC entries moved in the AR translation table.
IpAdded	The number of IP entries added to the AR translation table.
IpDeleted	The number of IP entries deleted from the AR translation table.
McastTblSize	The size of the Multicast AR translation table.
FreeMcastGroups	The number of free multicast groups available in the AR table.
IpMcastAdded	The number of IP multicast entries added to the AR table.
IpMcastDeleted	The number of IP multicast entries deleted from the AR table.
VlanByPortAdded	The number of VLAN by Port entries added to the AR table.
VlanByPortDeleted	The number of VLAN by Port entries deleted from the AR table.
VlanByProtocolAdded	The number of VLAN by Protocol Type entries added to the AR table.
VlanByProtocolDeleted	The number of VLAN by Protocol Type entries deleted from the AR table.
VlanByIpSubnetAdded	The number of VLAN by IP Subnet entries added to the AR table.
VlanByIpSubnetDeleted	The number of VLAN by IP Subnet entries deleted from the AR table.
IpSubnetsAdded	The number of IP Subnet entries added to the AR table.
IpSubnetsDeleted	The number of IP Subnet entries deleted from the AR table.
RsvpsAdded	The number of RSVP entries added to the AR table.
RsvpsDeleted	The number of RSVP entries deleted from the AR table.

Enabling the system log

You can enable the system log feature globally to send messages to up to 10 syslog hosts. By default, five hosts are supported.

To enable the system log feature globally:

1. From the Device Manager menu bar, choose Edit > Diagnostics.

   The Diagnostics dialog box opens with the Test tab displayed.

2. Click the System Log tab.

   The System Log tab opens (Figure 70).

3. Set Enable to true.

4. Set the maximum number of hosts (1 to 10).

Figure 70 Diagnostics dialog box—System Log tab

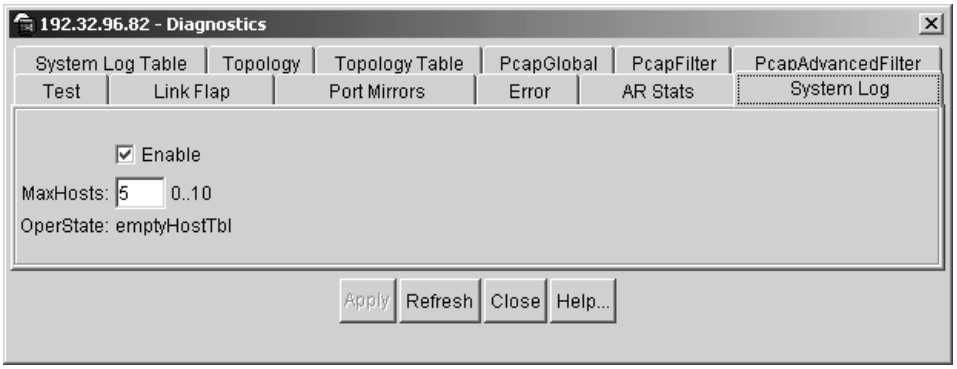


Table 19 describes the System Log tab fields on the Diagnostics dialog box.

Table 19 System Log tab fields

Field	Descriptions
Enable	Used to enable/disable the syslog feature. When enabled, this feature sends a message to a server on a network that is configured to receive and store diagnostic messages from this device. The type of messages sent is user configurable.
MaxHost	The maximum number of remote hosts considered active and able to receive messages from the syslog service.
OperState	The operational state of the syslog service.

Receiving system log messages

You can use the system log messaging feature of the Passport 8000 Series switch to manage switch event messages on any UNIX-based management platform. The Passport 8000 Series switch syslog software supports this functionality by communicating with a counterpart software component named *syslog* on your management workstation. The UNIX daemon syslogd is a software component that receives and locally logs, displays, prints, and/or forwards messages that originate from sources internal and external to the workstation. For example, syslogd on a UNIX workstation concurrently handles messages received from applications running on the workstation, as well as messages received from Passport 8000 Series switch running in a network accessible to the workstation.

At a remote UNIX management workstation, the system log messaging feature does the following:

- Receives system log messages from the Passport 8000 Series switch
- Examines the severity code in each message
- Uses the severity code to determine appropriate system handling for each message

- Based on the severity code in each message, dispatches each message to any or all of the following destinations:
  - — Workstation display
  - — Local log file
  - — Designated printer
  - — One or more remote hosts

Internally the Passport 8000 Series switch has four severity levels for log messages:

- Info
- Warning
- Error
- Fatal

The system log feature supports eight different severity levels:

- Debug
- Info
- Notice
- Warning
- Error
- Critical
- Alert
- Emergency

Table 20 shows the default mapping of internal severity levels to syslog severity levels.

Table 20 Default severity levels and system log severity levels

UNIX system error codes	System log severity level	Internal Passport 8000 Series severity level
0	Emergency	Fatal
1	Alert	-
2	Critical	-
3	Error	Error
4	Warning	Warning
5	Notice	-
6	Info	Info
7	Debug	-

Changing the severity level mapping

To change the severity level mapping:

1. From the Device Manager menu bar, choose Edit > Diagnostics.

   The Diagnostics dialog box opens with the Test tab displayed.

2. Click the System Log Table tab.

   The System Log Table tab opens (Figure 71).

3. For each severity type, use the MapWarningSeverity list to change the severity level.

Figure 71 Diagnostics dialog box—System Log Table tab

To insert a system log table member:

1. From the Device Manager menu bar, choose Edit > Diagnostics.

   The Diagnostics dialog box opens with the Test tab displayed.

2. Click the System Log Table tab.

   The System Log Table tab opens.

3. In the Diagnostics dialog box, click Insert.

   The Diagnostics, Insert System Log Table dialog box opens (Figure 72).

4. Select the appropriate items.

5. Click Insert.

Figure 72 Diagnostics, Insert System Log Table dialog box

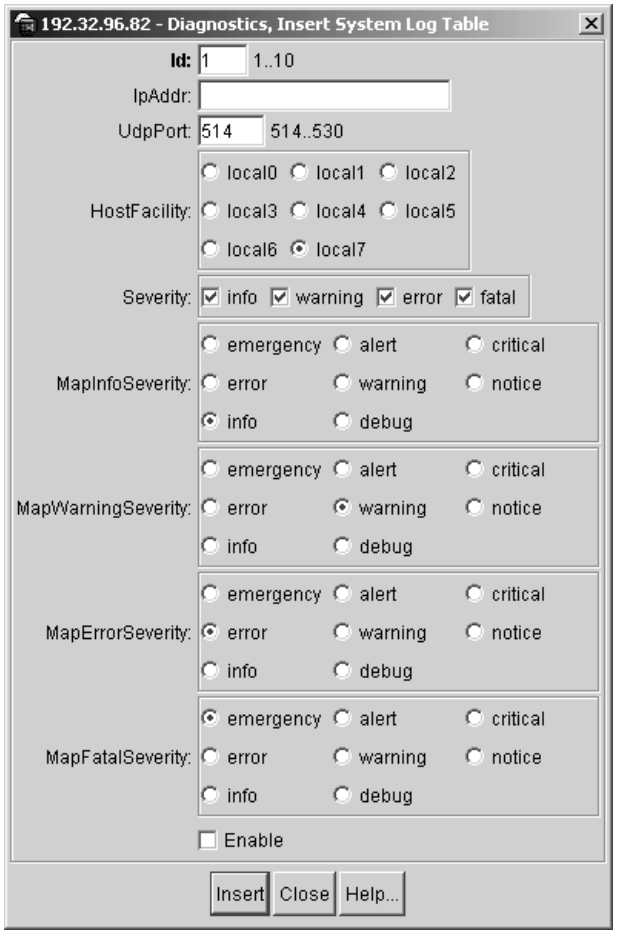


Table 21 describes the System Log Table tab fields and Diagnostics, Insert System Log Table dialog box.

Table 21 Diagnostics, Insert System Log Table dialog box fields

Field	Description
Id	ID for the syslog host being created.
IpAddr	IP address of the syslog host.
UdpPort	The UDP port to use to send messages to the syslog host (514 to 530).
HostFacility	The syslog host facility used to identify messages (LOCAL0 to LOCAL7)
Severity	The Passport 8000 Series message severity for which syslog messages will be sent.
MapInfoSeverity	The fields that map Passport 8000 Series severity levels to syslog severity.
MapWarningSeverity	The fields that map Passport 8000 Series warning severity levels to syslog severity.
MapErrorSeverity	The fields that map Passport 8000 Series error severity levels to syslog severity.
MapFatalSeverity	The fields that map Passport 8000 Series fatal severity levels to syslog severity.
Enable	Enables or disables sending messages to the syslog host.

Checking the MIB status

Use the Topology tab to view Nortel Management MIB (NMM) status information.

To view topology status information:

1. From the Device Manager menu bar, choose Edit > Diagnostics.

   The Diagnostics dialog box opens with the Test tab displayed.

2. Click the Topology tab.

   The Topology tab opens (Figure 73).

Figure 73 Diagnostics dialog box—Topology tab

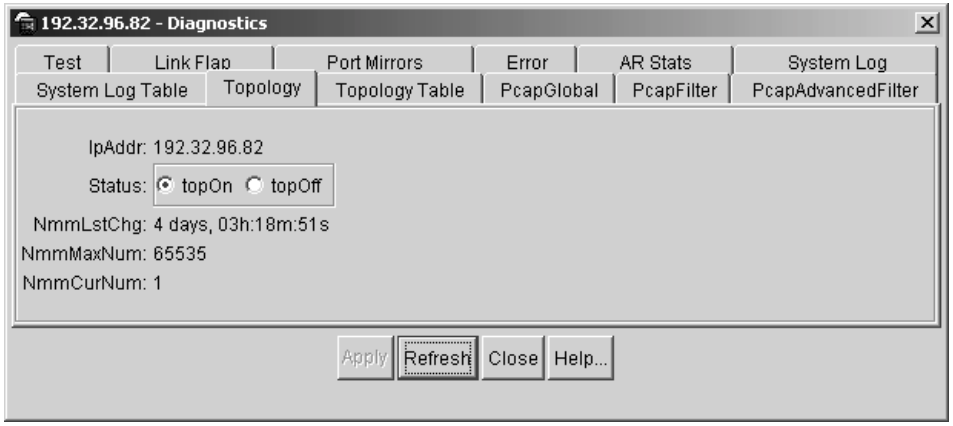


Table 22 describes the Topology tab fields on the Diagnostics dialog box.

Table 22 Topology tab fields

Field	Description
IpAddr	The IP address of the device.
Status	Whether Nortel Networks topology is on or off for the device.
NmmLstChg	The value of sysUpTime the last time an entry in the network management MIB (NMM) topology table was added, deleted, or modified. If the table has not changed since the last cold or warm start of the agent.
NmmMaxNum	The maximum number of entries in the NMM topology table.
NmmCurNum	The current number of entries in the NMM topology table.

Checking the details of the MIB status

Use the Topology Table tab to view details of Nortel Management MIB (NMM) status information.

To view topology table information:

1. From the Device Manager menu bar, choose Edit > Diagnostics.

   The Diagnostics dialog box opens with the Test tab displayed.

2. Click the Topology Table tab.

   The Topology Table tab opens (Figure 74).

Figure 74 Diagnostics dialog box—Topology Table tab

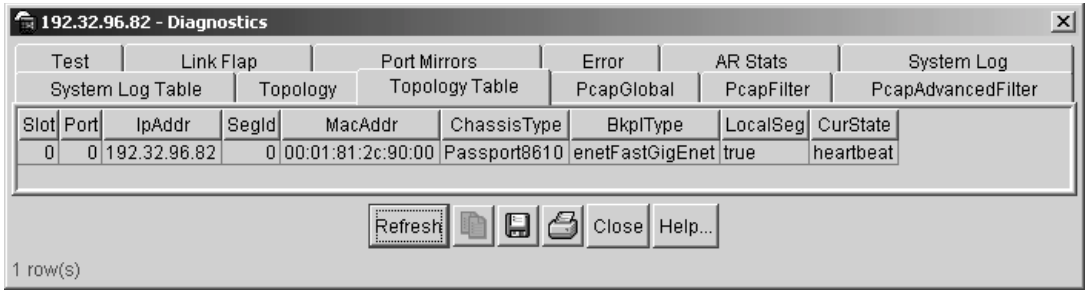


Table 23 describes the Topology Table tab fields.

Table 23 Topology Table tab fields

Field	Description
Slot	The slot number in the chassis in which the topology message was received.
Port	The port on which the topology message was received.
IpAddr	The IP address of the sender of the topology message.
SegId	The segment identifier of the segment from which the remote agent sent the topology message. This value is extracted from the message.
MacAddr	The MAC address of the sender of the topology message.
ChassisType	The chassis type of the device that sent the topology message.
BkplType	The backplane type of the device that sent the topology message.

Table 23 Topology Table tab fields (continued)

Field	Description
LocalSeg	Indicates if the sender of the topology message is on the same Ethernet segment as the reporting agent.
CurState	The current state of the sender of the topology message. The choices are: • topChanged—Topology information has recently changed. • heartbeat—Topology information is unchanged. • new—The sending agent is in a new state.

Chapter 9
Using CLI diagnostic tools

This chapter describes the CLI diagnostic tools that you can run on a Passport 8000 Series switch. It includes the following topics:

Roadmap of CLI diagnostic commands

The following roadmap lists some of the commands and their parameters that you use to perform diagnostics using the Run-Time CLI. Use this list as a quick reference or click on any entry for more information:

Command	Parameter
config diag	info
config diag mirror-by-port <id>	info
	create in-port <value> out-port <value> [mode <value>] [enable <value>
	enable <true|false>
	delete
	mirrored-port <port>
	mirroring-port <port>
	mode <tx|rx|both|rxFilter>
show diag mirror-by-port	
show port stats routing	
show port stats dhcp-relay	
show port stats rmon	
config cli monitor	info
	duration <integer>
	interval <integer>
clear	atm elan-stats <vlan id>
	atm f5-stats [<ports>]
	atm port-stats [<ports>]
	ip arp ports <port>
	ip arp vlan <vid>
	ip route ports <port>

Command	Parameter
	ip route vlan <vid>
	ip vrrp ports <ports> vrid <value>
	ip vrrp vlan <vid> vrid <value>
	mlt ist stats
	ports stats [<ports>]
	telnet <session id>
config sys syslog	info
	host <id> address <ipaddr>
	host <id> create
	host <id> delete
	host <id> facility <facility>
	host <id> <enable|disable>
	host <id> info
	host <id> mapinfo <level>
	host <id> mapwarning <level>
	host <id> maperror <level>
	host <id> mapfatal <level>
	host <id> severity <info| warning| error|fatal> [<info|warning| error|fatal>]
	host <id> udp-port <port>
	max-hosts <maxhost>
	state <enable|disable>
show sys syslog	general-info
	host <id> info
dump ar <opid> <vlan|ip_subnet|mac_vlan|mac|arp|ip|ipx| ipmc|ip_filter|protocol|all> <verbosity>	

Command	Parameter
traceroute <ipaddr> [<datasize>] [-m <value>] [-p <value>] [-q <value>] [-w <value>] [-v]	
trace auto-enable	info
	add-module <modid> <level>
	auto-trace <enable|disable>
	high-percentage <percent>
	high-track-duration <seconds>
	low-percentage <percent>
	low-track-duration <seconds>
	remove-module <modid>
test loopback <ports> [<int|ext>]	
config diag ping-snoop	info
	add-ports <ports>
	create src-ip <value> dst-ip <value>
	delete
	enable <true|false>
	remove-ports <ports>

Configuring and monitoring port mirroring

You use port mirroring for troubleshooting and analyzing network traffic. When using port mirroring, you specify a destination port to see mirrored traffic and specify the source ports from which traffic is mirrored. Any packet ingressing or egressing the specified ports is forwarded normally, and a copy of the packet is sent out the mirror port. When this feature is active, all packets received on the specified ports are copied to the port specified as out-port. The mirroring operation is nonintrusive.

Note: Ingress mirroring mirrors only packets with valid CRCs.

The Passport 8100 switch supports ingress and egress port mirroring; however egress mirroring is supported only in half-duplex mode.

On a Passport 8600 switch, ingress mirroring is supported by all modules; however, egress mirroring is supported only on Passport E-modules. Refer to the release notes for a list of E-modules.

You set up port mirroring using the **`config diag`** commands. For example, to monitor port 9/2 with output on port 9/3, use the following commands:

Note: Nortel Networks recommends that you disable port mirroring when not in use to reduce the load on the switch.

```
config diag mirror-by-port enable true

config diag mirror-by-port 1 create in-port 9/2 out-port 9/3
```

If you are using a network sniffer, connect the sniffer to port 9/3.

In addition, you can use the VLAN forwarding database feature to monitor traffic for MAC addresses where traffic with a given source or destination MAC address is copied to the mirror port. To avoid seeing unintended traffic, remove the mirroring (destination) port from all VLANs and spanning tree groups (STGs).

This chapter includes the following port mirroring commands:

Displaying port mirroring settings

To display information about the current port mirroring settings, use the following command:

```
config diag
```

The **`config diag`** command includes the following options:

`config diag` followed by:	
`info`	Displays information about the current port mirroring setting.

Configuring mirror-by-port entries

To diagnose the system by monitoring/mirroring a port, use the following command:

```
config diag mirror-by-port <id>
```

Note: The required parameter *`id`* is the mirror-by-port entry ID (1 to 383). You can configure one mirroring port and up to 10 mirrored ports.

This command includes the following options:

config diag mirror-by-port <*id*> followed by:	
`info`	Displays current port mirroring settings.
`create in-port <value> out-port <value> [mode <value>] [enable <value>`	Creates a new mirror-by-port table entry. • `in-port <value>` is the mirrored port. • `out-port <value>` is the mirroring port. **Optional parameters:** • `mode value` sets the mirror mode (see description for `mode`). • `enable value` enables the mirroring port (see description for `enable`).
`enable <true|false>`	Enables or disables a mirroring port already created in the mirror-by-port table.
`delete`	Deletes an entry from the mirror-by-port table.
`mirrored-port <port>`	Specifies the mirrored port.
`mirroring-port <port>`	Specifies the mirroring port. See "Mirroring ports/ destination ports" for more information.
`mode <tx|rx|both|rxFilter>`	Sets the mirroring mode. • `tx` mirrors transmit packets. • `rx` mirrors receive packets. • `both` mirrors both transmit and receive packets. • `rxFilter` mirrors and filters receive packets.

Configuration example

This configuration example uses the above commands to monitor/mirror a port. The example also uses the **`info`** command to display information about the current port mirroring settings.

```
8610:5# config diag
8610:5/config/diag# mirror-by-port 2
8610:5/config/diag/mirror-by-port/2# info

Sub-Context:
Current Context:

8610:5/config/diag/mirror-by-port/2# enable
```

Mirroring ports/destination ports

The number of mirroring ports (also called “destination ports”) that you can configure depends on the type and quantity of modules you have in your system configuration.

The module’s switch fabric determines the quantity of mirrored (source) ports that can be supported by a single mirroring (destination) port, based on the OctaPID ID assignment for that module. For example, a 48-port 10/100TX module is assigned 6 OctaPID IDs, and each OctaPID ID supports up to 8 ports (6 x 8 = 48 ports). You can assign one destination port per OctaPID ID.

When you configure destination ports, the CLI interface automatically assigns the actual OctaPID ID assignment according to the switch fabric in specific Passport 8000 modules. The assignment of the OctaPID ID by the interface follows a fixed set of configuration rules based on the module type.

Source ports that are members of the same OctaPID ID can only be mirrored to the same destination port. If you try to assign source ports that are members of the same OctaPID ID to different destination ports, the CLI will prompt you with an error message. For more information on how the OctaPID ID is used for assigning destination ports, see Appendix D.

Displaying mirrored port information

To display information about mirrored ports on the switch, use the following command:

```
show diag mirror-by-port
```

Configuration example

This configuration example uses the **show** command to monitor/mirror a port.

```
8610# show diag mirror-by-port

=================================================================
                    Diag Mirror-By-Port
=================================================================
ID   MIRRORED_PORT   MIRRORING_PORT  ENABLE     MODE
1    9/2             9/3             true       rx
```

Showing port statistics

You can display port statistics using the CLI.

Showing port routing statistics

To display routing statistics about ports on the switch, use the following command:

```
show port stats routing
```

Configuration example

This configuration example uses the **show** command to display routing statistics.

```
8610:5# show port stats routing
=========================================================
                      Port Stats Routing
=========================================================
PORT     IN_FRAME   IN_FRAME   IN         OUT_FRAME  OUT_FRAME
NUM      UNICAST    MULTICAST  DISCARD    UNICAST    MULTICAST
---------------------------------------------------------------------------------
8/1      0          0          0          0          0
8/2      0          0          0          0          0
8/3      0          0          0          0          0
8/4      0          0          0          0          0
8/5      0          0          0          0          0
8/6      0          0          0          0          0
8/7      0          0          0          0          0
8/8      0          0          0          0          0
9/1      0          0          0          0          0
9/2      0          0          0          0          0
9/3      0          0          0          0          0
9/4      0          0          0          0          0
9/5      0          0          0          0          0
9/6      0          0          0          0          0
9/7      0          0          0          0          0
9/8      0          0          0          0          0
9/9      0          0          0          0          0
9/10     0          0          0          0          0

8610:5#
```

Showing port DHCP relay statistics

To display DHCP relay statistics about ports on the switch, use the following command:

```
show port stats dhcp-relay
```

Configuration example

This configuration example uses the **show** command to display DHCP relay statistics.

```
8610:5# show port stats dhcp-relay

=========================================================================
                    Port Stats Dhcp
=========================================================================
PORT_NUM NUMREQUEST NUMREPLY
-------------------------------------------------------------------------
8610:5#
```

Showing port RMON statistics

To display RMON statistics about ports on the switch, use the following command:

```
show port stats rmon
```

Configuration example

This configuration example uses the **show** command to display RMON statistics.

```
Passport-8610:5# show port stats rmon

================================================================================
                           Port Stats Rmon
================================================================================
PORT  OCTETS     PKTS    MULTI   BROAD   CRC     UNDER   OVER    FRAG    COLLI
NUM                      CAST    CAST    ALLIGN  SIZE    SIZE    MENT    SION
--------------------------------------------------------------------------------
9/3   0          0       0       0       0       0       0       0       0

             8610:5#
```

Showing port STG statistics

To show port STG statistics:

```
8610:5# show port stats stg

================================================================================
                            Port Stats Stg
================================================================================
PORT     IN_CONFIG  IN_TCN     IN_BAD     OUT_CONFIG OUT_TCN
NUM      BPDU       BPDU       BPDU       BPDU       BPDU
--------------------------------------------------------------------------------
8/1      0          0          0          0          0
8/2      0          0          0          0          0
8/3      0          0          0          0          0
8/4      0          0          0          0          0
8/5      0          0          0          0          0
8/6      0          0          0          0          0
8/7      0          0          0          0          0
8/8      0          0          0          0          0
9/1      0          0          0          0          0
9/2      0          0          0          0          0
9/3      0          0          0          0          0
9/4      0          0          0          0          0
9/5      0          0          0          0          0
9/6      0          0          0          0          0
9/7      0          0          0          0          0
9/8      0          0          0          0          0

8610:5#
```

Monitoring port statistics

The **`monitor`** commands are self-updating **`show`** commands. To set the monitor duration and interval, use the following command:

```
config cli monitor
```

The **`config cli monitor`** command include the following options:

`config cli monitor` followed by:	
`info`	Displays current level parameter settings and next level directories.
`duration <integer>`	Sets the monitor time duration. To clear the display, type Ctrl/L. • `<integer>` is an integer value with a range of 1 to 1800 seconds.
`interval <integer>`	Sets the monitor time interval. To clear the display, type Ctrl/L. • `<integer>` is an integer value with a range of 1 to 600 seconds

Configuration example

This configuration example uses the above commands to set the monitor duration and set the monitor interval. The example also uses the **`info`** command to display the current level parameter settings and next level directories.

```
8610:5# config cli monitor
8610:5/config/cli/monitor# info

Sub-Context:
Current Context:

                    duration : 300
                    interval : 5

8610:5/config/cli/monitor# duration 500
8610:5/config/cli/monitor# interval 10
8610:5/config/cli/monitor# info

Sub-Context:
Current Context:

                    duration : 500
                    interval : 10

8610:5/config/cli/monitor#
```

Table 24 lists the **monitor** commands.

Table 24 Monitor and show commands

monitor command
monitor mlt error collision [<*mid*>]
monitor mlt error main [<*mid*>]
monitor mlt stats interface main [<*mid*>]
monitor mlt stats interface utilization [<*mid*>]
monitor ports error collision [<*ports*>] [from <*value*>]
monitor ports error extended [<ports>] [from <*value*>]
monitor ports error main [<*ports*>] [from <*value*>]
monitor ports stats bridging [<*ports*>] [from <*value*>]
monitor ports stats interface extended [<*ports*>] [from <*value*>]
monitor ports stats interface main [<*ports*>] [from <*value*>]
monitor ports stats interface utilization [<*ports*>] [from <*value*>]
monitor ports stats stg [<*ports*>] [from <*value*>]

The **monitor ports stats rmon [<*ports*>] [from <*value*>]** command is similar to the **config rmon etherstats info** command, which is described in *Managing the Passport 8000 Series Switch Using the Command Line Interface Release 3.2*.

Table 25 lists the monitor commands for routing functions.

Table 25 Routing monitor commands

monitor ports error ospf [<*ports*>] [from <*value*>]
monitor ports stats dhcp-relay [<*ports*>] [from <*value*>]
monitor ports stats ospf extended [<*ports*>] [from <*value*>]
monitor ports stats ospf main [<*ports*>] [from <*value*>]
monitor ports stats routing [<*ports*>] [from <*value*>]
monitor ports stats vrrp extended [<*ports*>] [from <*value*>]
monitor ports stats vrrp main [<*ports*>] [from <*value*>]

Configuration example

This configuration example uses the above commands to monitor error collisions and to set the monitor port statistics.

```
8610:5/config/cli/monitor# monitor ports error collision

                        PORT COLLISION STATISTIC
Monitor Interval: 5sec | Monitor Duration: 300sec TUE NOV 02
17:23:12 1999

PORT  -----------------COLLISIONS------------
NUM   SINGLE   MULTIPLE LATE     EXCESSIVE
-----------------------------------------------------------------
1/1   0        0        0        0
1/2   0        0        0        0
1/3   0        0        0        0
1/4   1        1        0        0
1/5   0        0        0        0
1/6   0        0        0        0
1/7   0        0        0        0
1/8   0        0        0        0
1/9   0        0        0        0
1/10  0        0        0        0
1/11  0        0        0        0
1/12  0        0        0        0
1/13  1        2        0        0
1/14  0        1        0        0
1/15  0        0        0        0
```

```
8610:5/config/cli/monitor# monitor ports stats interface utilization


PORT INTERFACE UTILIZATION
Monitor Interval: 5sec | Monitor Duration: 300sec TUE NOV 02 17:32:22 1999


PORT_NUM IN_OCTETS  OUT_OCTETS IN_UTIL(%) OUT_UTIL(%)
-----------------------------------------------------------------
9/1      0          0          0          0
9/2      0          0          0          0
9/3      0          0          0          0
9/4      0          0          0          0
9/5      0          0          0          0
9/6      0          0          0          0
9/7      0          0          0          0
8610:5/config/cli/monitor#
```

Clearing statistics

To clear statistics from counters, flush entries from a table, or end a Telnet session, use the following command:

```
clear
```

This command includes the following options:

clear followed by:	
`atm elan-stats <vlan id>`	Clears ATM ELAN statistics • *`vlan id`* is a value from 1 to 4095.
`atm f5-stats [<ports>]`	Clears ATM F5 statistics. • *`ports`* specifies the ports for which you are entering the command in the form portlist {slot/port[-slot/port][, ...]}.
`atm port-stats [<ports>]`	Clears ATM port statistics. • *`ports`* specifies the ports for which you are entering the command in the form portlist {slot/port[-slot/port][, ...]}.
`ip arp ports <port>`	Clears ARP port entries from the ARP table. • *`port`* specifies the ports for which you are entering the command in the form portlist {slot/port[-slot/port][, ...]}.
`ip arp vlan <vid>`	Clears ARP VLAN entries from the ARP table. • *`vid`* is the VLAN ID.
`ip route ports <port>`	Clears route entries associated with the specified port. • *`port`* specifies the ports for which you are entering the command in the form portlist {slot/port[-slot/port][, ...]}.
`ip route vlan <vid>`	Clears route entries associated with the specified VLAN. • *`vid`* is the VLAN ID. The valid values are 0 to 255.

clear followed by:	
`ip vrrp ports <ports> vrid <value>`	Clears IP VRRP statistics for the specifed ports and virtual router. • *ports* specifies the ports for which you are entering the command in the form portlist {slot/port[-slot/port][, ...]}. • *vrid* specifies the virtual router. The valid values are 0 to 255.
`ip vrrp vlan <vid> vrid <value>`	Clears IP VRRP statistics for the specified VLAN and virtual router. • *vid* is the VLAN ID. The valid values are 1 to 4095. • *vrid* is the virtual router ID. The valid values are 0 to 255.
`mlt ist stats`	Clears MLT IST statistics.
`ports stats [<ports>]`	Clears port statistics from the switch counters. • *ports* specifies the ports for which you are entering the command in the form portlist {slot/port[-slot/port][, ...]}.
`telnet <session id>`	Ends the specified Telnet session. • *session id* is a number between 0 and 7.

Configuring the syslog facility

The syslog facility in UNIX machines logs messages and assigns each message a severity level based on importance.

To configure the syslog facility, use the following command:

```
config sys syslog
```

The **`config sys syslog`** command includes the following options:

Note: For the syslog host ID, the range is from 1 to 10.

`config sys syslog` followed by:	
`info`	Displays the current syslog settings.
`host <id> address <ipaddr>`	Configures a host location for the syslog host. • *`address`* is the IP address of the UNIX system syslog host.
`host <id> create`	Creates a syslog host.
`host <id> delete`	Deletes a syslog host.
`host <id> facility <facility>`	Specifies the UNIX facility used in messages to the syslog host. • *`facility`* is the UNIX system syslog host facility (LOCAL0 to LOCAL7).
`host <id> <enable|disable>`	Enables or disables the syslog host.
`host <id> info`	Displays system log information for the specified host. This command results in the same output as the **`show sys syslog host <id> info`** command. The ID ranges from 1 to 10.
`host <id> mapinfo <level>`	Specifies the syslog severity level to use for Passport Information messages. *`level`* is {`emergency|alert|critical|error|warning|notice|info|debug`}.

config sys syslog followed by:	
host <*id*> mapwarning <*level*>	Specifies the syslog severity to use for Passport Warning messages. • *level* is {emergency|alert| critical|error|warning| notice|info|debug}.
host <*id*> maperror <*level*>	Specifies the syslog severity to use for Passport Error messages. • *level* is {emergency|alert| critical|error|warning| notice|info|debug}.
host <*id*> mapfatal <*level*>	Specifies the syslog severity to use for Passport Fatal messages. • level is {emergency|alert| critical|error|warning| notice|info|debug}.
host <*id*> severity <info| warning| error|fatal> [<info|warning| error|fatal>]	Specifies the severity levels for which syslog messages should be sent for the specified modules. • severity is the severity for which syslog messages are sent.
host <*id*> udp-port <*port*>	Specifies the UDP port number on which to send syslog messages to the syslog host. • udp-port <*port*> is the UNIX system syslog host port number (514 to 530).
max-hosts <*maxhost*>	Specifies the maximum number of syslog hosts supported. • *maxhost* is the maximum number of enabled hosts allowed (1 to 10).
state <enable|disable>	Enables or disables sending syslog messages on the switch.

Configuration example

This configuration example uses the above commands to create a host, specify a facility to log on syslog host, specify a syslog severity to use for Passport Warning messages, specify a syslog severity to use for Passport Fatal messages, and enable the sending of syslog messages. The example also uses the **`info`** command to display system log information for the specified host.

```
Passport-8610:5# config sys syslog
Passport-8610:5/config/sys/syslog# host 1 create
Passport-8610:5/config/sys/syslog# host 1 facility local0
Passport-8610:5/config/sys/syslog# host 1 mapwarning alert
Passport-8610:5/config/sys/syslog# host 1 mapfatal alert
Passport-8610:5/config/sys/syslog# state enable
Passport-8610:5/config/sys/syslog# host 1 info

Sub-Context: host
Current Context:

                     address : 0.0.0.0
                      create : 1
                      delete : N/A
                    facility : local0
                        host : disable
                     mapinfo : info
                  mapwarning : alert
                    maperror : error
                    mapfatal : alert
                    severity : info|warning|error|fatal
                    udp-port : 514

Passport-8610:5/config/sys/syslog#
```

Displaying information about syslog features

To display information about the syslog features enabled on the switch, use the following command:

```
show sys syslog
```

The **show sys syslog** command includes the following options.

show sys syslog followed by:	
general-info	Displays general information about the system log
host <*id*> info	Displays system log information for a specified host.

Configuration example

This configuration example uses the above commands to display general information about the system log, and to display information about a specified host.

```
Passport-8610:5# show sys syslog general-info

 Enable    : true
 Max Hosts : 5
 OperState : active
 Total number of configured hosts : 1
 Total number of enabled hosts : 0
 Configured host : 1
 Enabled host :

Passport-8610:5#
Passport-8610:5# show sys syslog host 1 info

                Id : 1
            IpAddr : 0.0.0.0
           UdpPort : 514
          Facility : local0
          Severity : info|warning|error|fatal
    MapInfoSeverity : info
 MapWarningSeverity : alert
   MapErrorSeverity : error
     MapMfgSeverity : notice
   MapFatalSeverity : alert
             Enable : false

Passport-8610:5#
```

Displaying hardware registers

The **`dump ar`** command allows you to display the hardware registers of the RaptARU attached to OctaPID. To display the hardware registers, use the following command:

```
dump ar <opid> <vlan|ip_subnet|mac_vlan|mac|arp|ip|ipx|
ipmc|ip_filter|protocol|all> <verbosity>
```

where:

- *`opid`* specifies the octaPID assignment, from 1 to 64. See *Configuring Network Management* for more information.
- `vlan|ip_subnet|mac_vlan|mac|arp|ip|ipx|ipmc|ip_filter|protocol|all` specifies a record type in the AR table.
- *`verbosity`* specifies the verbosity level, from 0 to 3. Higher numbers specify more verbosity.

Configuration example

This configuration example uses the above commands to specify an octaPID and specify a record type in the AR table.

```
Passport-8610:5# dump ar 4 all 3
Passport-8610:5#
```

Tracing the route to a remote host

To trace the route to a remote host, use the following command:

```
traceroute <ipaddr> [<datasize>] [-m <value>] [-p <value>]
[-q <value>] [-w <value>] [-v]
```

where:

- *`ipaddr`* is the IP address of the remote host.
- *`datasize`* is the size of the probe packet (1 to 1464).
- `-m <value>` is maximum time-to-live (TTL) value (1 to 255).

- `-p <value>` is the base UDP port number (0 to 4294967295).
- `-q <value>` is the number of probes per TTL (1 to 255).
- `-w <value>` is the wait time per probe (1 to 255).
- `-v` is the verbose mode (showing all).

This command is valuable for troubleshooting because it shows all the routes that are used or indicates that the remote network is not reachable.

Figure 75 shows output from the **`traceroute`** command.

Figure 75 traceroute command output

```
8610# traceroute 10.10.81.18
traceroute to 10.10.81.18, 30 hops max, 40 byte packets
 1  10.10.221.1  12 ms 1 ms 1 ms
 2  10.10.175.1  0 ms 0 ms 0 ms
 3  10.10.180.1  2 ms 1 ms 2 ms
 4  10.10.184.2  1 ms 1 ms 3 ms
 5  10.10.103.2  3 ms 2 ms 2 ms
 6   10.10.13.8   7 ms 4 ms 6 ms
 7  10.10.81.18  19 ms 17 ms 17 ms
```

Configuring an automatic trace

You can configure the switch to automatically enable a trace in the event CPU utilization reaches a pre-defined value.

To enable the trace auto-enable feature, use the following command:

```
trace auto-enable
```

This command includes the following parameters:

`trace auto-enable` followed by:	
`info`	Displays trace auto-enable information.
`add-module <modid> <level>`	Adds a module to be traced by the trace auto-enable feature. • *`modid`* identifies the module that you want to add. For example, 3 = Port Manager, 20 = Topology Discovery. For a complete list of module IDs, enter **`trace auto-enable add-module ?`**. • *`level`* identifies the level of detail you want in the trace. For example, 0 = Disabled, 1 = Very Terse. For a complete list of module IDs, enter **`trace auto-enable add-module ?`**.
`auto-trace <enable|disable>`	Enables or disables auto-trace. The default is disable.
`high-percentage <percent>`	Specifies the CPU utilization percentage above which auto trace should be enabled. • *`percent`* is a value from 60 to 100. The default is 90.
`high-track-duration <seconds>`	Specifies the time in seconds to monitor CPU utilization before triggering a trace. • *`seconds`* is a value from 3 to 10. The default is 5.
`low-percentage <percent>`	Specifies the CPU utilization percentage below which auto-trace should be disabled. • *`percent`* is a value from 50 to 90. The default is 75.
`low-track-duration <seconds>`	Specifies the time, in seconds, to monitor CPU utilization before disabling the trace. • *`seconds`* is a value from 3to 10. The default is 5.
`remove-module <modid>`	Removes a module from automatic tracing. • *`modid`* identifies the module for which you want to disable auto-trace. For example, 3 = Port Manager, 20 = Topology Discovery. For a complete list of module IDs, enter **`trace auto-enable add-module ?`**.

Note: The enabling or disabling of auto-trace is not saved to the configuration file. When a Passport 8000 Series switch re-boots, auto-trace functionality will be disabled.

Figure 76 shows sample output for the **`trace auto-enable info`** command.

Figure 76 trace auto-enable info command

```
Passport-8606:5#/trace/auto-enable# info

Sub-Context:
Current Context:

        Auto-Trace Enable    : Enable
        High CPU Utilization : 90%
        High Track Duration  : 3 seconds
        Low CPU Utilization  : 75%
        Low Track Duration   : 5 seconds
        Modules Selected     : Module     ModId    Level
                               SNMP       1          4
                               OSPF       6          4
                               PORT_MGR   3          3
                               P2IP       14         4
```

Performing a loopback test

To perform a loopback test, use the following command:

`test loopback <ports> [<int|ext>]`

where:
`ports` specifies the ports for which you are entering the command in the form portlist {slot/port[-slot/port][, ...]}. `int/ext` is a string length between 1 and 1536.

The following warning message appears when you perform a loopback test using the `test loopback` command:

Figure 77 test loopback warning message output

```
8610:5# test loopback 1

CPU utilization will dramatically increase with this diagnostic.
This could affect the performance of box.
Do you really want to loopback (y/n)?
```

Configuring and displaying log files

The **log** commands allow you to configure and display the log files for the switch. When the **config bootconfig flags logging true** command is saved in the configuration file, the log entries are written to the `/pcmcia/syslog.txt` file. If the logging flag is not set to true, the entries are stored in memory.

Writing log files

To write a log file, use the following command:

```
config log
```

The **config log** commands include the following options:

config log followed by:	
`info`	Displays the current log settings.
`clear`	Clears the log file.
`level [<level>]`	Shows and sets the logging level. *level* is one of these values: • 0 = Information; all messages are recorded. • 1 = Warning; only warning and more serious messages are recorded. • 2 = Error; only error and more serious messages are recorded. • 3 = Manufacturing; this parameter is not available for customer use. • 4 = Fatal; only fatal messages are recorded.
`screen [<setting>]`	Sets the log display on the screen to on or off. • *setting* is `off` or `on`.
`write <str>`	Writes the log file with the designated string. • *str* is the string or command that you append to the log file. If the string contains spaces, you must enclose the string in quotation marks.
`logToPCMCIA`	Enables or disables logging to the PCMCIA.

Configuration example

This configuration example uses the above commands to write a log file, set the logging level, and turn on the screen display. The example also uses the **`info`** command to display log information.

```
8610:5# config log
8610:5/config/log# write test
8610:5/config/log# level 0
8610:5/config/log# screen on
Screen logging is on
8610:5/config/log# info

Sub-Context:
Current Context:

                      clear : N/A
                      level : 0
                     screen : on
                      write : N/A
            LoggingToPcmcia : True


8610:5/config/log#
```

Displaying log information

To display log information for the switch, use the following command:

```
show log file [tail]
```

where:
`tail` displays the log file in reverse order, with the most recent information first.

Note: Issuing the `show log file tail` command shows only the log messages reported after the system comes up. This will avoid system problems when displaying a large (larger than 10MB) /pcmcia/syslog.txt file.

Configuration example

This configuration example uses the above command to write a log file, where the `tail` option was entered to display the most recent information first.

Note: If the Passport 8000 Series switch has a real-time clock, the log file shows real time.

```
8610:5/config/log# show log file tail
[04/17/99 01:02:28] test
[04/16/99 23:09:54] WARNING Code=0x1ff0009 Task=tShell Blocked unauthorized cli
access
[04/15/99 19:50:19] Save config to file config1 successful.
[04/09/99 12:37:04] State 172.16.2.5: OPENCONFIRM --> ESTABLISHED

[04/09/99 12:37:04] State 172.16.2.5: OPENSENT --> OPENCONFIRM

[04/09/99 12:37:03] State 172.16.2.5: CONNECT --> OPENSENT

[04/09/99 12:37:03] State 172.16.2.5: IDLE --> CONNECT

[04/09/99 12:36:53] State 172.16.2.5: ESTABLISHED --> IDLE

[04/09/99 12:36:53] GLOBAL_ERROR PKT: receiving data: Conn is gone: nbr
172.16.2.5, conn 2

[04/09/99 12:36:27] PEER_ERROR EVENT:(172.16.2.5): svr conn: collision in
ESTABLISHED state

[04/09/99 12:35:49] State 172.16.2.5: OPENCONFIRM --> ESTABLISHED

[04/09/99 12:35:49] State 172.16.2.5: OPENSENT --> OPENCONFIRM

[04/09/99 12:35:49] State 172.16.2.5: CONNECT --> OPENSENT
```

Displaying level information

The **`show log level`** command displays the level of information being entered in the log. The level ranges from information (INFO), where all messages are entered, to FATAL, where only fatal errors are recorded. The manufacturing (MFG) level is for manufacturing purposes only and not available for customer use. To display the level information, use the following command:

`show log level command`

Configuration example

This configuration example uses the above command to display level of information being entered in the log.

```
8610:5/config/log# show log level
Log Levels are:
 0 = INFO
 1 = WARNING
 2 = ERROR
 3 = MFG
 4 = FATAL
The Log Level is INFO
8610:5/config/log#
```

Configuring ping snoop

You can use the ping snoop feature to troubleshoot Multilink-trunking (MLT) and Split Multilink-trunking (SMLT) networks. This feature displays the path that IP traffic takes over an MLT or SMLT path. Ping snoop works by enabling a filter that copies ICMP messages to the CPU. The CPU then monitors the ICMP stream. The console displays the port that is used for each IP traffic flow, from source to destination station. There is no mechanism to prevent line rate ICMP traffic from going to the CPU as a result of enabling ping snoop.

You create a ping snoop filter by specifying a source and destination IP address. Then, you specify the ports on which you want to enable ping snoop. Only one ping snoop filter is supported on a port. If an ICMP request is received on any of the added ports, the source and destination IP address and the port on which the packet was received will be displayed on the management console.

Ping snoop uses one of the available global filters (0-7). If eight global filters are configured on a port prior to enabling ping snoop, then ping snoop cannot be enabled for a port. You must remove at least one of the global filters to enable ping snoop.

By design, ping snoop configurations are not saved to the config file and are deleted by resetting the switch. In addition, your ping snoop configuration will be erased if you log out and login under a different security level.

To configure and enable ping snoop, use the following command:

`config diag ping-snoop`

This command includes the following options.

`config diag ping-snoop` followed by:	
`info`	Displays the ping snoop filter and the ports on which it is applied (Figure 78).
`add-ports <ports>`	This is used to add ports to the ping snoop filter after the filter has been created. After adding a port, if an ICMP request is received on that port, the source and destination IP address, and the port on which the packet was received will be displayed on the management console. • *`ports`* specifies the port or range of ports when you apply the ping snoop filter.
`create src-ip <value> dst-ip <value>`	This command is used to create the ping snoop filter. It takes two arguments, the source IP address, and the destination IP address. To enable ping snoop, after you create the filter, you add ports using the `add-ports` option. • `src-ip` *`value`* the source IP address. • `dst-ip` *`value`* the destination IP address.
`delete`	This command removes the ping snoop filter from any ports that were added and deletes the filter.
`enable <true|false>`	Enables or disables the ping snoop filter.
`remove-ports <ports>`	Used to delete the ping snoop filter on a particular port. • *`ports`* used to remove a port or range of ports from a ping snoop filter.

Figure 78 shows sample output for the **`config diag ping-snoop info`** command.

Figure 78 config diag ping-snoop info command

```
Passport-8600:5/config/diag/ping-snoop# info

                      src-ip : 1.1.1.0/255.255.255.0
                      dst-ip : 2.2.2.0/255.255.255.0
                   add_ports : 1/1
                      enable : true
```

Chapter 10
Configuring chassis operations

This chapter includes the following topics:

Enabling Jumbo frames

The standard 1518 bytes Ethernet frame size was designed to protect against the high bit error rates of older physical-layer Ethernet components. But computer processing power has increased by an order of magnitude, and the use of switched Ethernet over unshielded twisted pair or fiber media has significantly lowered Ethernet errors.

In addition, the speed and capacity of the Ethernet are pushing the processor limits of many installed servers, and more data is being transferred between servers. For these reasons, increasing Ethernet's frame size has become a logical option. The 8000 series switch now supports Ethernet frames as large as 9600 bytes, compared to the standard 1518 bytes, in order to transmit large amounts of data efficiently and minimize the task load on a server CPU.

Tagged VLAN support

A port with VLAN tagging enabled can send tagged frames. If you plan to use Jumbo frames in a VLAN, make sure that the ports in the VLAN are configured to accept Jumbo frames and that the server or hosts in the VLAN do not send frames that exceed 9600 bytes. For more information about configuring VLANs, refer to *Configuring Layer 2 Operations: VLANs, Spanning Tree, Multilink Trunking*.

Modules and Interfaces that support Jumbo frames

The following 8000 series modules and interfaces support Jumbo frames:

- Gig Fiber and Gig Copper ports in 8608SX, 8608SX-E, 8608GBIC, 8608GBIC-E, 8632TX, 8632TX-E, 8608GT, and 8608GT-E
- 10GB interfaces

Note: The Web Switching Module (WSM) supports Jumbo frames of up to 9018 octets. For instructions on configuring Jumbo frames for this module, see *Configuring the Web Switching Module Using Device Manager.*

When you enable Jumbo frame support on the chassis, the port interfaces that support the Jumbo frames feature are set to an MTU size of 9600 bytes. The port interfaces that do not support the Jumbo frames feature will retain the default MTU of 1950 bytes. Any changes that you make to the MTU size are dynamic; that is, they take place immediately.

Enabling Jumbo frames using the CLI

When you enable Jumbo frame support on the chassis, the port interfaces that support the Jumbo frames feature are set to an MTU size of 9600 bytes. The port interfaces that do not support the Jumbo frames feature will retain the default MTU of 1950 bytes.

To enable Jumbo frame support on the chassis, use the following command:

```
config sys set mtu <bytes>
```

where *bytes* is the Ethernet frame size, either 9600 bytes or 1950 bytes (default).

Showing the MTU for the system

To display the MTU value for the system, use the following command:

```
show sys info
```

Figure 79 shows sample output for this command.

Figure 79 show sys info command output

```
8000:5# show sys info

General Info :

        SysDescr     : Passport-8610 (3.3.0.0)
        SysName      : Passport-8610
        SysUpTime    : 1 day(s), 16:08:25
        SysContact   : support@nortelnetworks.com
        SysLocation  : 4401 Great America Parkway, Santa
Clara, CA 95054

Chassis Info :

        Chassis     : 8010
        Serial#     : SSNM00137R
        HwRev       : A
        NumSlots    : 10
        NumPorts    : 36
        GlobalFilter: enable
        VlanBySrcMac: disable
        Ecn-Compatib: enable
        BaseMacAddr : 00:01:81:2c:90:00
        MacAddrCapacity : 1024
        Temperature : 30 C
        MgmtMacAddr : 00:01:81:2c:93:f4

        System MTU  : 9600
```

Showing the MTU for all ports

To display the MTU values for all ports on the chassis, use the following command:

```
show port info all
```

Figure 80 shows sample output for this command.

Figure 80 show sys info command output

```
8000:5# show port info all

================================================================
                                          Port Interface
================================================================

PORT                      LINK  PORT          PHYSICAL
STATUS
NUM   INDEX DESCRIPTION    TRAP  LOCK     MTU   ADDRESS
ADMIN  OPERATE
----------------------------------------------------------------
.
.
.
1/48  111   100BaseTX      true  false    1950
00:80:2d:ae:a4:3f up     down
2/1   128   1000BaseF      true  false    9600
00:80:2d:ae:a4:40 up     down
2/2   129   1000BaseF      true  false    9600
00:80:2d:ae:a4:48 up     down
2/3   130   1000BaseF      true  false    9600
00:80:2d:ae:a4:50 up     down
2/4   131   1000BaseF      true  false    9600
00:80:2d:ae:a4:58 up     down
2/5   132   1000BaseF      true  false    9600
00:80:2d:ae:a4:60 up     down
2/6   133   1000BaseF      true  false    9600
00:80:2d:ae:a4:68 up     down
2/7   134   1000BaseF      true  false    9600
00:80:2d:ae:a4:70 up     down
2/8   135   1000BaseF      true  false    9600
00:80:2d:ae:a4:78 up     down
3/1   192   100BaseF       true  false    1950
00:80:2d:ae:a4:80 up     down
3/2   193   100BaseF       true  false    1950
00:80:2d:ae:a4:81 up     down
.
.
.
8000:5#
```

Enabling Jumbo frames using Device Manager

When you enable Jumbo frame support on the chassis, the port interfaces that support the Jumbo frames are set to an MTU size of 9600 bytes. The port interfaces that do not support the Jumbo frames feature retain the default MTU of 1950 bytes.

To enable Jumbo frame support on the chassis:

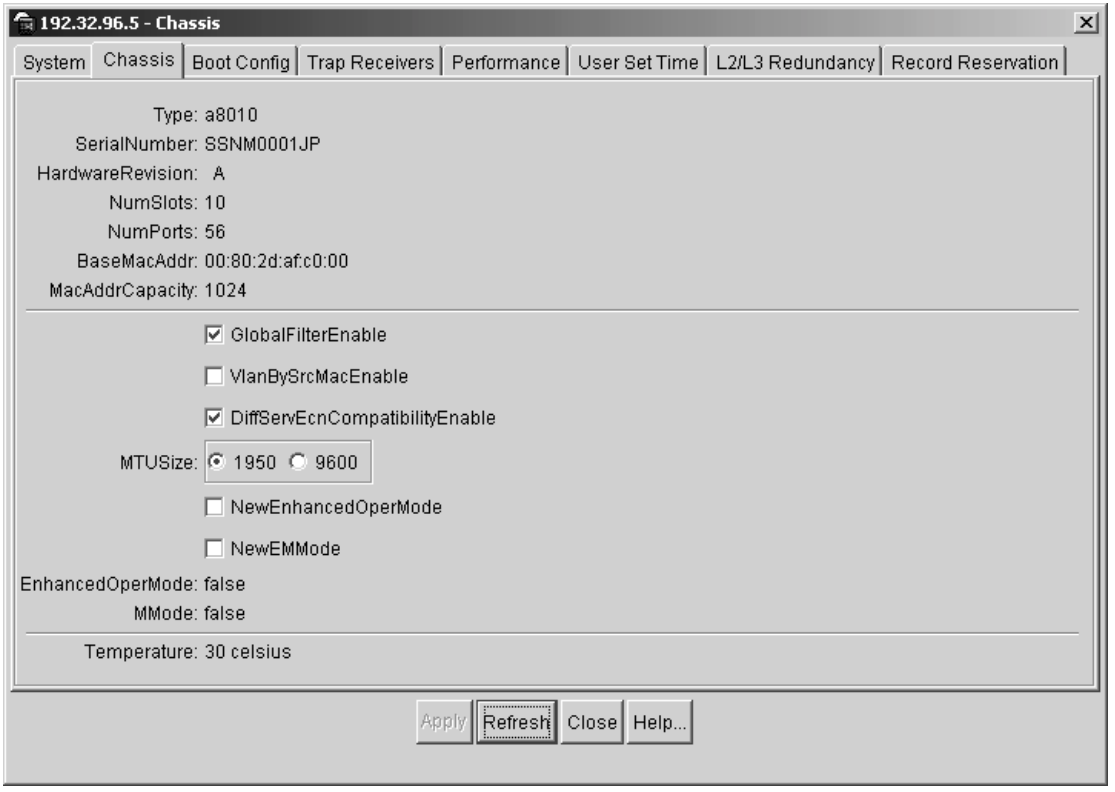
1. From the Device Manager menu bar, choose Edit > Chassis.

   The System dialog box opens with the System tab displayed.

2. Click on the Chassis tab.

   The Chassis dialog box opens with the Chassis tab displayed (Figure 81).

Figure 81 Chassis tab



3 Click MTU size: 9600.

4 Click Apply.

5 Click Close.

Showing the MTU for the system

To show the MTU configured for the entire system:

1 From the Device Manager menu bar, choose Edit > Chassis.

The System dialog box opens with the System tab displayed.

2 Click on the Chassis tab.

The Chassis dialog box opens with the Chassis tab displayed (Figure 81).

3 Check that 9600 is selected for MTU size.

Showing the MTU for each port

To show the MTU for each port:

1 From the Device View, click on the port for which you want to display information.

To select more than one port, click on the first port. Then, while holding down the Ctrl key, click on the ports for which you want to display information.

2 From the Device Manager menu bar, choose Edit > Port.

The Port dialog box opens with the Interface tab displayed.

3 Check the MTU field to verify the MTU size for each port.

Enabling M mode (128K mode)

The 8600 modules support 128K hardware records, which is the maximum allowed with the existing ASIC. This means that the hardware capacity has increased to handle as many as 100K routes in hardware. For information on reserving records, see *Configuring Network Management.*

Keep the following points in mind when configuring your switch:

- If your CPU module is a single 8690, it does **not** support the 128K M Mode. The operation mode is always 32K.
- If your CPU module is 8691 or higher, you can configure the chassis to operate either in 32K (default) or 128K M mode.
- I/O (Legacy I/O and E-Modules) modules support 32K mode only (non-MMode).
- If your system has both 128K and 32K modules, refer to Table 26 for configuration information so that the switch reboots in the desired mode.

Note: If all modules are currently in non-Mmode, with module 1 as the master and module 2 as the standby, and you enable MMode on module 1, save the configuration, and reboot, module 2 comes up as the master and module 1 as the standby. If you then enable MMode on the new master (module 2), the standby (module 1) goes offline and remains offline.

The boot mode is determined by the modules in the chassis and whether 128K mode status is enabled.

To see how to configure your switch, refer to Table 26.

Table 26 Boot mode at startup

If the configuration is:	And 128K mode status at startup is:	Then:
All M-modules	Enabled	System starts in 128K mode.
Mixed configuration: • M-modules, • E-modules and • Legacy modules	Enabled	System starts in 128K mode. • M-modules enabled. • E-modules disabled. • Legacy modules disabled.

Table 26 Boot mode at startup

If the configuration is:	And 128K mode status at startup is:	Then:
All E-modules and/or Legacy modules	Enabled	All modules are disabled.
All 128K modules	Disabled	System starts in 32K mode. All modules are enabled.
Mixed (32K and 128K) modules	Disabled	System starts in 32K mode. All modules are enabled.
All E-modules and/or Legacy modules	Disabled	System starts in 32K mode. All modules are enabled.

When you insert a module into a running chassis, the 128K mode status determines the module's initialization mode (Table 27).

Table 27 Inserting 32K and 128K modules into a running chassis

If you insert this module into a running chassis:	And 128K mode status is:	Then:
M-module (128K)	Enabled	The module is initialized in M mode (128K).
E-module or Legacy module (32K)	Enabled	The module is **not** initialized. A trap is sent and an error is logged to the console.
M-module (128K)	Disabled	The module is initialized as a 32K module.
E-module or Legacy module (32K)	Disabled	The module is initialized as a 32K module.

The following sections describe how to enable M mode using the CLI and Device Manager. Once you have configured your switch for M mode, to synchronize the operating mode of the master and slave CPUs, reset the switch.

Enabling M mode with the CLI

If you decide to change the configuration while you are operating the switch, you can use the following CLI command to modify boot.cfg:

To enable M mode, enter:

```
config sys set flags m-mode true
```

To disable M mode, enter:

```
config sys set flags m-mode false
```

Note: If you have 8690 SF/CPU modules in your switch, and you attempt to activate any 128K features using the CLI, the following error message appears: `This feature will not be enabled with 8690 SF/CPU cards.`

Enabling M mode with Device Manager

To enable the M mode, use the following steps:

1. From the Device Manager menu bar, choose Edit > Chassis.

   The Chassis dialog box opens with the System tab displayed.
2. Click the Chassis tab.
3. Check the NewMMode box.
4. Click Apply.

   A warning message appears, advising you to reboot.
5. Click OK.

Note: If you've enabled M mode and you're using Device Manager, you cannot edit or apply changes on the Boot tab on the standby CPU. Configuration is possible if you are in non-M mode.

Enabling enhanced operational mode

The enhanced operational mode increases the maximum number of VLANs when using MLT (1980) and SMLT (989). This mode requires 8600 E modules. For a list of E-modules, see Table 1 on page 25.

The scaling numbers are reduced by multicast MAC filters. Scaling figures remain unaffected for VLANs not using MLT. Scaling numbers are also reduced if you use IST and SMLT. With IST and SMLT, you can create maximum 989 VLANs.

Table 28 shows new VLAN scaling limitations, with and without enhanced operational mode enabled.

Table 28 Maximum numbers of port/protocol based VLANs

VLAN type	Enhanced Operational Mode enabled	Enhanced Operational Mode disabled
MLT	1980	240
IST/SMLT	989	120

When enhanced operational mode is enabled, only E-modules and M-modules are initialized (legacy modules are taken offline). Either replace any legacy module or move the network connections to an E- or M-module to avoid losing modules and network connectivity.

The boot mode is determined by the modules in the chassis and whether the enhanced operational mode is enabled. To see how to configure your switch, refer to Table 29.

Table 29 Boot mode at startup

If the configuration is:	And enhanced operational mode is:	Then:
All M-modules and/or E-modules	Enabled	System starts in enhanced operational mode. All modules are initialized and can be configured with up to 1980 VLANs with MLT.
Mixed configuration: • M-modules, • E-modules and • Legacy modules	Enabled	System starts in enhanced operational mode. • M-modules enabled. • E-modules enabled. • Legacy modules disabled.
All Legacy modules	Enabled	System starts in NON-enhanced operational mode. All modules are disabled.
All M-modules and/or E-modules	Disabled	System starts in NON-enhanced operational mode. All modules are enabled.
Mixed configuration: • M-modules, • E-modules and • Legacy modules	Disabled	System starts in NON-enhanced operational mode. All modules are enabled.
All Legacy modules	Disabled	System starts in NON-enhanced operational mode. All modules are enabled.

When you insert a module into a running chassis, the enhanced operational mode status determines the module's initialization mode (Table 30).

Table 30 Inserting modules into a running chassis

If you insert this module into a running chassis:	And enhanced operational mode status is:	Then:
M-module or E-module	Enabled	The module is initialized in enhanced operational mode.
Legacy module	Enabled	The module is not initialized. A trap is sent and an error is logged to the console.
M-module or E-module	Disabled	The module is initialized in NON-enhanced operational mode.
Legacy module	Disabled	The module is initialized in NON-enhanced operational mode.

Enabling enhanced operational mode with the CLI

If you decide to change the configuration while you are operating the switch, you can use the following CLI command to modify boot.cfg:

To enable the enhanced operational mode, enter:

```
config sys set flags enhanced-operational-mode true
```

To disable the enhanced operational mode, enter:

```
config sys set flags enhanced-operational-mode false
```

Enabling enhanced operational mode with Device Manager

To enable the enhanced operational mode, use the following steps:

1. From the Device Manager menu bar, choose Edit > Chassis.

   The Chassis dialog box opens with the System tab displayed.

2 Click the Chassis tab.

3 Check the NewEnhancedOperMode button.

Note: For the changes to take effect, you must save the configuration and reboot the chassis.

For more information on the parameter settings, see *Configuring Layer 2 Operations: VLANs, Spanning Tree, Multilink Trunking.*

Enabling CPU high-availability mode

CPU high-availability (HA) mode enables switches with two CPUs to recover quickly from a failure of one of the CPUs.

- In HA mode, also called “hot standby,” the two CPUs are synchronized. This means the CPUs are compatible and configured in the same mode.
- In non-HA mode, also called “warm standby,” the two CPUs are **not** synchronized. Either the CPUs are incompatible or one of them is configured in a mode that it cannot support.

Synchronization also applies to software parameters. Table 31 shows what features are supported in Release 3.2 and 3.3 or later.

Table 31 Release 3.2 and 3.3 or later synchronization capabilities in HA mode

Synchronization of:	in Release 3.2	in Release 3.3 or later
Layer 1		
Port configuration parameters	Yes	Yes
Layer 2		
VLAN parameters	Yes	Yes
QoS parameters	Yes	Yes
Layer 3		Yes
VLAN virtual interface	Yes	Yes
ARP entries	No	Yes
Static and default routes	No	Yes

HA mode support for 8690SF and 8691SF CPUs

Table 32 shows the hardware and software dependencies that are required to support HA mode with 8690SF and 8691SF CPUs. The boot mode is determined by the types of CPU in the chassis and whether M Mode is enabled.

In the following configurations, assume that CPU high-availability mode is enabled. However, you can see in some cases that HA mode is impossible because one of the CPUs was taken off-line due to a hardware or software incompatibility.

Table 32 M Mode and switch fabric dependencies in HA mode

	Master CPU			
Slave CPU	**8690 in 32K (non M Mode)**	**8690 in 128K (M Mode)**	**8691 in 32K (non M Mode)**	**8691 in 128K (M Mode)**
8690 in 32K (non M Mode)	32K	32K W1, n/a[1]	32K	128K 8690 off-line E1, E2
8690 in 128K (M Mode)	32K n/a, W1	32K W1,W1	32K n/a, W1	128K 8690 off-line E1, W1&E2
8691 in 32K (non M Mode)	32K	32K W1&W2, I1	32K	Mismatch W4, W4
8691 in 128K (M Mode)	Mismatch W5, W3	32K W1&W3, W3	Mismatch	128K

1 The following list shows the error and warning messages for each configuration. Messages for the master CPU are shown first and then the slave separated by a comma.

Information message:

I1: Configuration mismatch of M mode on master and slave. Rectify master's configuration.

Error messages (caused by hardware incompatibility):

E1: Peer CPU is 8690 which cannot support M mode (128K mode), ->offline

E2: 8690 slave cannot support master's M mode (128K mode), ->offline

Warning messages (caused by configuration incompatibility):

W1: 8690 cannot support M mode (128K mode), operating in 32K mode

W2: Slave (8691) can support configured M mode. For 128K mode of operation, check slave's configuration as reset/switch-over.

W3: Master (8690) cannot support configured M mode. For 128K mode of operation, reset Master.

W4: Master and Slave have mismatching M mode configuration.

W5: Configuration and HW mismatch: master does not have configuration or capability to support M mode. Slave has both. Switch over if M mode is needed.

HA mode support for Dual CPUs

If your switch supports Dual CPU modules, refer to Table 33 to use the CPU high-availability mode. The boot mode is determined by the types of CPUs in the chassis and whether the CPU high-availability mode is enabled.

Table 33 Boot mode at startup for Dual CPU configurations

If the configuration is:	And CPU high-availability mode is:	Then:
Two Dual CPU modules	Enabled	System starts in CPU high-availability mode.
One Dual CPU module and One Single CPU module	Enabled	If the Single CPU boots first, the CPU reboots so the Dual CPU can be Master and the Single CPU goes offline. If the Dual CPU boots first, the system starts in CPU high-availability mode and the Single CPU goes offline.
Two Single CPU modules	Enabled	System does not boot and stays in monitor mode.
Two Dual CPU modules	Disabled	System starts in single CPU mode.

Table 33 Boot mode at startup for Dual CPU configurations

If the configuration is:	And CPU high-availability mode is:	Then:
One Dual CPU module and One Single CPU module	Disabled	System starts in single CPU mode.
Two Single CPU modules	Disabled	System starts in single CPU mode.

When you insert a module into a running chassis, the CPU high-availability mode status determines the module's initialization mode (Table 34).

Table 34 Inserting single and dual CPU modules into running chassis

If you insert this module into a running chassis:	And CPU high-availability mode status is:	Then:
Dual CPU module	Enabled	The module is activated as a backup.
Single CPU module	Enabled	The module is not activated. A trap is sent and an error is logged to the console.
Dual CPU module	Disabled	The module is activated in single CPU mode.
Single CPU module	Disabled	The module is activated in single CPU mode.

Removing a master CPU with CPU-HA mode enabled

To remove the master CPU without loss of traffic when CPU-HA is enabled:

1. Software reset the master CPU, when then becomes the standby.
2. Remove what is now the standby CPU.

   The master is removed. Because CPU-HA is enabled, no traffic data is lost during reset.

Note: Reinserting a CPU module before the HA-enabled CPU becomes the master CPU, may cause the master CPU to remain in a booting state.

Enabling CPU high-availability mode with the CLI

To configure CPU high-availability mode with the CLI:

1. Enter the following:

   ```
   config bootconfig flags ha-cpu <true|false>
   save boot
   ```

2. Reset the switch.

Enabling CPU high-availability mode with Device Manager

For instructions on enabling CPU high-availability mode with Device Manager, see Chapter 5 in *Configuring Network Management*.

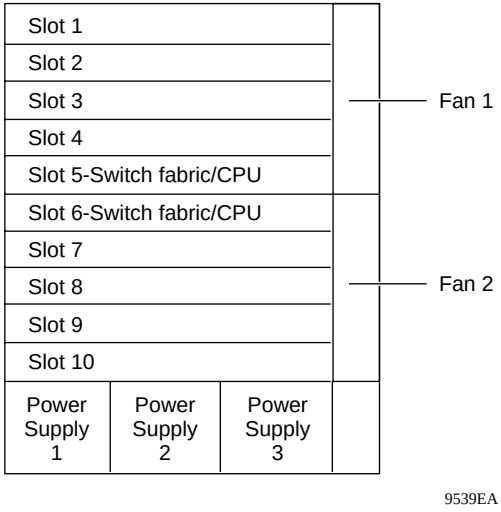
Appendix A
Port numbering and MAC address assignment

This appendix includes information about the following topics:

Port numbering

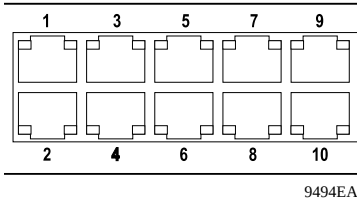
A port number includes the slot location of the module in the chassis, as well as the port's position in the I/O module. In the Passport 8000 Series switches, slots are numbered from top to bottom. Figure 82 shows slot numbering for an 8010 chassis.

Figure 82 8010 chassis slots



Ports are numbered generally from left to right beginning with 1 for the far left port. On high-density modules with two rows of ports, such as the 8648TX module, ports in the top row are assigned sequential odd numbers, and ports in the bottom row are assigned sequential even numbers (Figure 83).

Figure 83 Port numbers on high-density modules



Interface indexes

Interface indexes are used in SNMP to identify ports, VLANs, and Multi-Link Trunks.

The interface index of a port is computed using the following formula:

inIndex = (64 x slot number) + (port number – 1)

where:

Slot number is a value between 1 and 10, inclusive.

Port number is a value between 1 and 48, inclusive.

For example, the interface index of port 1/1 is 64, and the interface index of port 10/48 is 687.

The interface index of a VLAN is computed using the following formula:

ifIndex = 2048 + VLAN's MGID

where:

MGID is the multicast group ID number.

Because the default VLAN always has an MGID value of 1, its interface index is always 2049.

The interface index of a Multi-Link Trunk (MLT) is computed using the following formula:

ifIndex = 4096 + MLT ID number

MAC address assignment

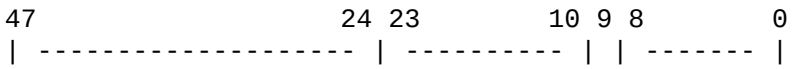
Understanding how MAC addresses are assigned is important when you define static ARP entries for IP addresses in the switch and when you use a network analyzer to decode network traffic.

Each [Model #] module is assigned a base of 1024 MAC addresses. Within the switch, these MAC addresses are assigned as follows:

- 512 addresses for ports in the switch (physical MAC addresses)
- 500 addresses for VLANs in the switch (virtual MAC addresses)
- 8 addresses for CPU interfaces
- 4 addresses for use by other Passport 8000 Series modules

A MAC address has the format shown in Figure 84.

Figure 84 Parts of a MAC address



The MAC address is divided into the following parts:

- Bits 47–24: IEEE OUI (for example, 00-80-2d)
- Bits 23–10: Chassis ID
- Bit 9: Type of MAC address in the switch:
  - 0 = Port address (physical MAC address)
  - 1 = VLAN address (virtual MAC address)
- Bits 8–0: Unique port or VLAN address

Physical MAC addresses

Physical MAC addresses are addresses assigned to the physical interfaces or ports visible on the device. The physical MAC addresses are used in the following types of frames:

- Spanning Tree Protocol BPDUs sent by the switch
- Frames to or from an isolated routing port's physical interface

BPDUs are sent using the physical MAC address as the source because identifying which physical port sent the BPDU is critical to how the Spanning Tree Protocol works.

The ports on the switch fabric/CPU module have the following last bytes:

- Management port in slot 5: 0xf4
- CPU port (an internal port) in slot 5: 0xf5
- Management port in slot 6: 0xf6
- CPU port in slot 6: 0xf7

Virtual MAC addresses

Virtual MAC addresses are the addresses assigned to VLANs. A virtual MAC address is assigned to a VLAN when it is created. The MAC address for a VLAN IP address is the virtual MAC address assigned to the VLAN.

Appendix B
Edit commands

To edit a file, type ESC to enter edit mode and use the commands listed in Table 35. The ESC key switches the shell to edit mode. The RETURN key always moves to the next line.

When you enter the editor, you are in edit mode.

Table 35 is a summary of the commands available in edit mode.

Table 35 Commands available in edit mode

Key Combination	Description
:q	Ends the editing mode without saving the changes made to a file.
:w	Quits and saves the file.
ZZ	Quits and saves the file.
	Movement and Search Commands
^L	Redraw screen.
^F	Display next screen.
^B	Display previous screen.
^D	Display next 1/2 screen.
^U	Display previous 1/2 screen.
<*n*>G	Go to command number *n*.
G	Go to last command line.
/<*s*>	Search for string *s* forward in file.
?<*s*>	Search for string *s* backward in file.
n	Repeat last search.
N	Repeat last search in opposite direction.

Table 35 Commands available in edit mode (continued)

Key Combination	Description
<*n*>k	Get *nth* previous line in file.
<*n*>-	Same as “k.”
<*n*>j	Get *nth* next line in file.
<*n*>+	Same as “j.”
RETURN	Same as “j.”
<*n*>h	Move left *n* characters.
^H	Same as “h.”
<*n*>l	Move right *n* characters.
SPACE	Same as “l.”
<*n*>w	Move *n* words forward.
<*n*>W	Move *n* blank-separated words forward.
<*n*>e	Move to end of the *nth* next word.
<*n*>E	Move to end of the *nth* next blank-separated word.
<*n*>b	Move back *n* words.
<*n*>B	Move back *n* blank-separated words.
f<*c*>	Find character *c*, searching forward.
F<*c*>	Find character *c*, searching backward.
^	Move cursor to first nonblank character in line.
$	Go to end of line.
0	Go to beginning of line.
	Insert Commands (Input is expected until an ESC is typed)
a	Append.
A	Append at end of line.
c SPACE	Change character.
cl	Change character.
cw	Change word.
cc	Change entire line.
c$	Change everything from the cursor to the end of the line.

Table 35 Commands available in edit mode (continued)

Key Combination	Description
C	Same as “c$.”
S	Same as “cc.”
i	Insert.
I	Insert at the beginning of the line.
R	Type over characters.
o	Open a line below current line.
O	Open a line above current line.
	Editing Commands
<*n*>r<*c*>	Replace the following *n* characters with *c*.
<*n*>x	Delete *n* characters starting at the cursor.
<*n*>X	Delete *n* characters to the left of the cursor.
d SPACE	Delete character.
dl	Delete character.

Note: The default value for <*n*> is 1.

Appendix C
Special terminal characters

Table 36 lists the special terminal characters.

Table 36 Special terminal characters

Key Combination	Command
^H	Backspace.
^D	Logout of cli.
^C	Abort line entry.
^P	Previous history command.
^N	Next history command.
^S	Output suspend.
^Q	Output resume.
^I	Command completion.
^B	Move cursor back one character.
^F	Move cursor forward one character.
^A	Move cursor to beginning of line.
^E	Move cursor to end of line.
ESC B	Move cursor back one word.
ESC F	Move cursor forward one word.
DEL	Erase character at cursor.
^K	Erase all characters from cursor to end of line.
^X	Erase all characters before the cursor to beginning of line.
^U	Erase or clear entire line.
^W	Erase word to left of cursor.
ESC D	Erase from cursor to end of word.
^L	Redisplay line.
^R	Redisplay line.

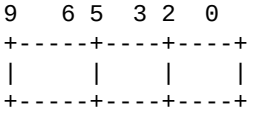
Table 36 Special terminal characters (continued)

Key Combination	Command
^T	Transpose the character to left of cursor with character at cursor.
ESC L	Change character at cursor to lowercase.
ESC U	Change character at cursor to uppercase.
;	Multiple command terminator.
"..."	Preserve white space in strings.

Appendix D
Tap and OctaPID assignment

The switch fabric in the Passport 8600 modules has nine switching taps, one for each of the eight I/O slots (1 to 4 and 7 to 10) and one for the CPU slots (5 and 6). Taps 0-7 map to the eight I/O slots and can support up to eight OctaPIDs. Each OctaPID can support up to eight ports.

In the Passport 8000 Series switch, a physical port number is 10 bits long and has the following format:



bits 9–6: Tap number (0–15)

bits 5–3: OctaPID number (0–7)

bits 2-0: MAC port number (0-7)

The Tap number bits and the OctaPID number bits combined (bits 9–3) are usually referred to as the OctaPID ID.

Table 1 lists the module types that are currently available, along with the associated OctaPID ID assignments for each module.

Table 1 Available module types and OctapPID ID assignments

Module type	Port type	OctaPID ID assignment
8608GBE and 8608GBM Modules	1000BASE-SX (GBIC)	Table 2 next
	1000BASE-LX (GBIC)	
	1000BASE-ZX (GBIC)	
	1000BASE-XD (GBIC)	
	1000BASE-TX (GBIC)	
8608GTE and 8608GTM Modules	1000BASE-T	Table 2 next
8608SXE Module	1000BASE-SX	Table 2 next
8616SXE Module	1000BASE-SX	Table 3 on page 253
8624FXE Module	100BASE-FX	Table 4 on page 253
8632TXE and 8632TXM Modules	10BASE-T/100BASE-TX	Table 5 on page 254
	1000BASE-SX (GBIC)	
	1000BASE-LX (GBIC)	
	1000BASE-ZX (GBIC)	
	1000BASE-XD (GBIC)	
	1000BASE- TX (GBIC)	
8648TXE and 8648TXM Modules	10/100 Mb/s	Table 6 on page 254
8672ATME and 8672ATMM Modules	OC-3c MDA	Table 7 on page 255
	OC-12c MDA	
	DS3	
8681XLR Module	10GBASE-LR	Table 8 on page 255
8681XLW Module	10GBASE-LW	Table 9 on page 255
8683POSM Module	OC-3c MDA	Table 10 on page 256
	OC-12c MDA	

Table 2 describes the OctaPID ID and port assignments for the 8608GBE, Passport 8608GBM, 8608GTE, 8608GTM, and 8608SXE modules.

Table 2 8608GBE/8608GBM/8608GTE/8608GTM, and 8608SXE modules

OctaPID ID assignment	Port assignment
OctaPID ID: 0	Port 1
OctaPID ID: 1	Port 2
OctaPID ID: 2	Port 3
OctaPID ID: 3	Port 4
OctaPID ID: 4	Port 5
OctaPID ID: 5	Port 6
OctaPID ID: 6	Port 7
OctaPID ID: 7	Port 8

Table 3 describes the OctaPID ID and port assignments for the 8616SXE Module.

Table 3 8616SXE module

OctaPID ID assignment	Port assignment
OctaPID ID: 0	Ports 1 and 2
OctaPID ID: 1	Ports 3 and 4
OctaPID ID: 2	Ports 5 and 6
OctaPID ID: 3	Ports 7 and 8
OctaPID ID: 4	Ports 9 and 10
OctaPID ID: 5	Ports 11 and 12
OctaPID ID: 6	Ports 13 and 14
OctaPID ID: 7	Ports 15 and 16

Table 4 describes the OctaPID ID and port assignments for the 8624FXE Module.

Table 4 8624FXE module

OctaPID ID assignment	Port assignment
OctaPID ID: 0	Ports 1 through 8

Table 4 8624FXE module (continued)

OctaPID ID assignment	Port assignment
OctaPID ID: 1	Ports 9 through 16
OctaPID ID: 2	Ports 17 through 24

Table 5 describes the OctaPID ID and port assignments for the 8632TXE and 8632TXM Modules.

Table 5 8632TXE and 8632TZM modules

OctaPID ID assignment	Port assignment
OctaPID ID: 0	Ports 1 through 8
OctaPID ID: 1	Ports 9 through 16
OctaPID ID: 2	Ports 17 through 24
-	-
-	-
OctaPID ID: 5	Ports 25 through 32
OctaPID ID: 6	Port 33 (GBIC port)
OctaPID ID: 7	Port 34 (GBIC port)

Table 6 describes the OctaPID ID and port assignments for the 8648TXE and 8648TXM Modules.

Table 6 8648TXE and 8648TXM modules

OctaPID ID assignment	Port assignment
OctaPID ID: 0	Ports 1 through 8
OctaPID ID: 1	Ports 9 through 16
OctaPID ID: 2	Ports 17 through 24
-	-
-	-
OctaPID ID: 5	Ports 25 through 32
OctaPID ID: 6	Port 33 through 40
OctaPID ID: 7	Port 41 through 48

Table 7 describes the OctaPID ID and port assignments for the 8672ATME and 8672ATMM Modules.

Table 7 8672ATME and 8672ATMM modules

OctaPID ID assignment	Port assignment
OctaPID ID: 0	• Ports 1 through 4 (with OC-3c MDA) • Port 1 (with OC-12c MDA) • Ports 1 through 2 (with DS-3 MDA)
OctaPID ID: 1	• Ports 5 through 8 (with OC-3c MDA) • Port 5 (with OC-12c MDA) • Ports 5 through 6 (with DS-3 MDA)
OctaPID ID: 2	Not used

Table 8 describes the OctaPID ID and port assignments for the 8681XLR Module.

Table 8 8681XLR module

OctaPID ID assignment	Port assignment
OctaPID ID: 0	Port 1
OctaPID ID: 1	
OctaPID ID: 2	
OctaPID ID: 3	
OctaPID ID: 4	
OctaPID ID: 5	
OctaPID ID: 6	
OctaPID ID: 7	

Table 9 describes the OctaPID ID and port assignments for the 8681XLW Module.

Table 9 8681XLW module

OctaPID ID assignment	Port assignment
OctaPID ID: 0	Port 1
OctaPID ID: 1	

Table 9 8681XLW module

OctaPID ID assignment	Port assignment
OctaPID ID: 2	
OctaPID ID: 3	
OctaPID ID: 4	
OctaPID ID: 5	
OctaPID ID: 6	
OctaPID ID: 7	

Table 10 describes the OctaPID ID and port assignments for the 8683POSM Module.

Table 10 8683POSM module

OctaPID ID assignment	Port assignment
OctaPID ID: 0	• Ports 1 and 2 (with OC-3c MDA) • Port 1 (with OC-12c MDA)
OctaPID ID: 1	• Ports 3 and 4 (with OC-3c MDA) • Port 3 (with OC-12c MDA)
OctaPID ID: 2	• Ports 5 and 6 (with OC-3c MDA) • Port 5 (with OC-12c MDA)

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