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Using the Passport 8100 Modules

NORTEL
NETWORKS™

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Passport™ 8100 modules installed in an Passport 8000 Series chassis create an edge switch entity within the chassis. These high-performance, low-cost Ethernet switches from Nortel Networks™ provide a high-density layer 2 switching system that is ideal for wiring closet applications.

This guide provides information about the features and capabilities of the Passport 8100 modules, including module specifications and switch startup procedures.

This guide discusses the Passport 8190SM, Passport 8132TX, Passport 8148TX, and Passport 8108GBIC modules. They are referred to collectively as the Passport 8100 modules. Each module is referred to specifically when features and functions are unique to that particular model.

Before You Begin

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

- Working knowledge of various Ethernet types, including 10BASE-T, 100BASE-TX, 100BASE-FX, and 1000BASE-SX
- Working knowledge of cable types, including Category 5 unshielded twisted pair (UTP) and multimode and single-mode optical fiber

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
```

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 file and directory names, 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> then valid_route  
is one variable and you substitute one value for it.
```

screen text Indicates command names and options, text that you need to enter, and system output such as prompts and system messages.

Example: Set Trap Monitor Filters

- separator (>) Shows menu paths.
Example: Protocols > IP identifies the IP option 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.

Related Publications

For more information about using the Passport management software or other Passport 8000 series equipment, refer to the following publications:

- *Getting Started with the Passport 8100 Management Software* (part number 207311-C)
Provides instructions to install management software and describes general use of the management software.
- *Reference for the Passport 8000 Series Management Software Switching Operations* (part number 207414-C)
Describes how to use Device Manager software to configure and manage layer 2 (switching) functions, including procedures and illustrations of the software user interface.
- *Reference for the Passport 8000 Series Command Line Interface Switching Operations* (part number 207308-C)
Describes the command line interface (CLI) commands and parameters. Most configuration tasks that can be performed using the management software can also be done using the command line interface.
- *Networking Concepts for the Passport 8000 Series Switch* (part number 207307-C)
Provides general information and description of how a Passport routing switch handles various networking features, such as VLANs and Multi-Link Trunking.

- *Installing the Passport 8010 Chassis* (part number 204518-B)
Describes installation procedures for the Passport 8010 chassis.
- *Installing the Passport 8006 Chassis* (part number 207313-B)
Describes installation procedures for the Passport 8006 chassis.
- *Installing the Passport 8001PS AC Power Supply* (part number 204519-B)
Describes installation and connection procedures for the Passport 8001PS AC power supply.
- *Installing the Passport 8002PS DC Power Supply* (part number 207314-B)
Describes installation and connection procedures for the Passport 8002PS DC power supply.

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Sydney, Australia	61-2-9927-8800
Tokyo, Japan	81-3-5740-1700

Chapter 1

About the Passport 8100 Modules

The Passport 8100 modules provide a full complement of switching capabilities in a Passport 8000 Series chassis. The Passport 8100 modules provide 10/100 megabit per second (Mb/s) autonegotiating twisted pair Ethernet ports, 100 Mb/s fiber Ethernet ports, and fiber Gigabit Ethernet ports. A Passport 8000 Series chassis with installed Passport 8100 modules constitutes a single switching entity with distributed management and full redundancy.

The Passport 8100 modules include a switch management module and input/output (I/O) modules. For CPU system redundancy, you can install two management modules. The I/O modules support different types of Ethernet interfaces with different speeds, port counts, and media types.

The following Passport 8100 modules are available:

- Passport 8190SM Switch Management Module—management module for the chassis ([page 1-4](#))
- Passport 8132TX Edge Switch Module—32-port 10/100 Mb/s Ethernet I/O module, with expansion slot for optional MDA ([page 1-8](#))
- Passport 8148TX Edge Switch Module—48-port 10/100 Mb/s Ethernet I/O module ([page 1-11](#))
- Passport 8108GBIC Edge Switch Module—1000 Mb/s Ethernet I/O module with eight bays for installing gigabit interface converters (GBICs) ([page 1-12](#))

An expansion slot on the Passport 8132TX module allows installation of a media dependent adapter (MDA) to provide other port types. The MDAs support high-speed connections to servers, shared Fast Ethernet hubs, or backbone devices.

This chapter includes the following information:

- Summary of features
- Detailed descriptions of each module

Features

The Passport 8100 modules have the following features:

- One active and one optional standby CPU subsystem with fast fail-over in the event of loss of one CPU
- Hardware redundancy features, including power supplies, chassis fans, and switch management modules
- High-speed forwarding rate, up to 3 million packets per second (peak)
- Store-and-forward switching, providing full-performance forwarding at full line speed
- Learning rate of 3 million addresses per second (peak)
- Address database capacity of up to 16,000 entries at line rate (32,000 entries without flooding)
- Connection to a high-speed backplane for forwarding of packets between modules
- Front-panel LEDs for monitoring port activity and module operation
- Expansion slot for installation of an optional media dependent adapter to provide 100BASE-FX fiber connections, Gigabit Ethernet connections, or additional 10/100BASE-TX connections (Passport 8132TX module only)
- Support for Spanning Tree Protocol with one spanning tree group in two modes:
 - IEEE 802.1D-compliant mode
 - FastStart mode, which allows the port to reach forwarding state fasterSpanning tree can be disabled on individual ports or the entire switch.

- IEEE 802.1Q port-based virtual LANs (VLANs)
- IEEE 802.1p prioritization
- IEEE 802.3u-compliant autonegotiating ports, with four modes:
 - 10BASE-T half-duplex
 - 10BASE-T full-duplex
 - 100BASE-TX half-duplex
 - 100BASE-TX full-duplex
- Two hardware-based priority queues per port
- Multi-Link Trunking (MLT) with up to 4 ports in a trunk and up to 6 MLT groups in a switch with a single trunk able to span multiple I/O modules, supporting switch-to-switch trunks and switch-to-server trunks
- Ability to remove and install a module (hot swap) without powering down the switch chassis
- Port mirroring by port, by source, and by destination MAC address
- IP Multicast optimization using Internet Group Management Protocol (IGMP) snooping
- RMON port support for the following four groups:
 - Alarms
 - Events
 - Statistics
 - History
- Port for configuring and managing the switch locally or remotely:
 - Console port on the Passport 8190SM module
 - Ethernet Management port on the Passport 8190SM module
 - Comm port on the Passport 8132TX module (if a Passport 8190SM module is not installed)

- A command line interface (CLI) for managing the Passport 8100 switch, accessible through the Passport 8190SM module or through a Telnet connection
- If a Passport 8190SM module is not installed, the CLI is accessible through the Comm port on the Passport 8132TX module.
- Support for up to eight simultaneous Telnet sessions with optional password protection
 - Device Manager support
 - Web-based monitoring support
 - SNMPv1 and SNMPv2 agent support
 - Upgradable device firmware in nonvolatile flash memory using the Trivial File Transfer Protocol (TFTP)
 - Optional PCMCIA card for file management
 - Up to 2,000 VLANs defined by port or network protocol

Passport 8190SM Management Module

The Passport 8190SM Switch Management Module ([Figure 1-1](#)) provides centralized management capabilities for the Passport 8010 and 8006 chassis. Use this module to configure and manage all 8100 Series modules in the chassis.

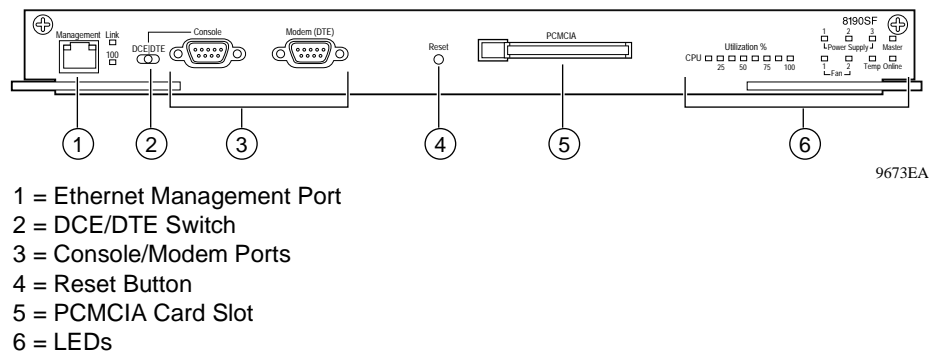


Figure 1-1. Passport 8190SM Switch Management Module

The Passport 8190SM module fits into either slot 5 or slot 6 in the Passport chassis. Image, configuration, and log files are maintained on the flash memory (onboard and PCMCIA) of this module. The module also provides out-of-band management by using the Ethernet port on the module.



Note: Nortel Networks recommends using the Ethernet port on the Passport 8190SM module for management rather than a switched port.

You achieve redundancy by putting a Passport 8190SM module into *both* slots 5 and 6 of the chassis. When running normally, the second module is in standby mode. Should the primary Passport 8190SM module fail, the secondary module initializes while the switch continues to pass traffic. When the secondary Passport 8190SM module completes initialization, it resets the switch with a convergence time similar to the convergence timing for spanning tree.

The Passport 8190SM module can also be in the chassis with the Passport 8690SF Switch Fabric Module. The Passport 8690SF module provides layer 3 functionality for 8600 Series modules (routing switch modules). For more information about the Passport 8690SF module, refer to *Using the Passport 8600 Modules*.



Note: Although you can mix 8100 Series and 8600 Series modules in the same chassis, Nortel Networks does not recommend this configuration.

Physical features on the front panel of the Passport 8190SM module include a management port, DCE/DTE switch for the console port, console port, modem port, reset button, PCMCIA card slot, and status LEDs.

Ethernet Management Port

The Ethernet Management port on the Passport 8190SM module is an MDI 10/100BASE-T port that allows out-of-band management using a Web browser, Device Manager and VLAN Manager, or a Telnet session to access the command line interface (CLI). You can use this port to connect the switch to a network management station. The port has its own IP address but does not switch traffic to other ports in the chassis.



Note: This port should be used only as a management port. It does not provide network connectivity.

DTE/DCE Switch

The DTE/DCE switch changes the pin assignments on the Console port and allows you to designate the connector as either DTE or DCE. For information about pin assignments for this port, refer to [Appendix A, “Technical Specifications.”](#)

Serial Ports

The Passport 8190SM module provides two serial ports for attachment of modem or console devices. The Console port provides terminal access to the Passport 8190SM module using the CLI. The Modem port allows you to connect a standard modem for out-of-band, dial-up management.

For communications specifications used by the serial ports, refer to [Appendix A, “Technical Specifications.”](#)

Reset Button

The recessed reset button on the module allows you to perform a hard reset or reboot of the system.

PCMCIA Card Slot

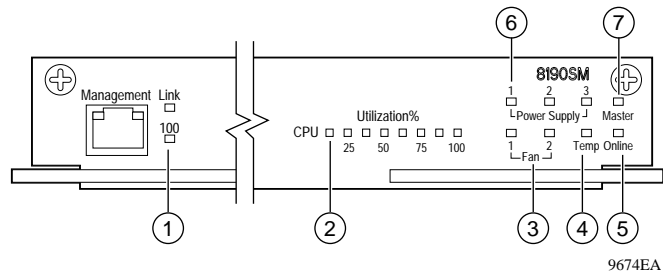
The Passport 8190SM module provides a PCMCIA card slot for use with an ATA-type Sandisk-compatible flash memory card. The flash memory card provides a convenient way to store switch configurations and boot images. Using the memory card, you can quickly transfer configurations and images between multiple switches or store multiple configurations for a single switch.



Note: You cannot use the Passport 1200 PCMCIA card in Passport 8000 Series equipment.

LEDs

LEDs on the Passport 8190SM module indicate the status of the module subsystems, chassis power supplies, and chassis fans ([Figure 1-2](#)).



- | | |
|--------------------------|-----------------------|
| 1 = Management port LEDs | 5 = Online LED |
| 2 = CPU utilization LEDs | 6 = Power Supply LEDs |
| 3 = Fan LEDs | 7 = Master LED |
| 4 = Temp LED | |

Figure 1-2. LEDs on the Passport 8190SM Module

The CPU LEDs serve as a bar graph to indicate module activity. The CPU bar graph increases when the CPU is actively performing tasks, such as learning media access control (MAC) addresses or interacting with the device management station.

For detailed information about the LED meanings, refer to [Appendix B, “LEDs.”](#)

Passport 8132TX 32-Port I/O Module

The Passport 8132TX module ([Figure 1-3](#)) is a single-slot I/O module for the Passport 8000 Series chassis. It has 32 autosensing 10BASE-T/100BASE-TX switched ports with RJ-45 connectors. The ports have integrated LEDs to indicate port operation, and the module has three additional LEDs to indicate system operation. An expansion slot allows you to install an MDA to provide additional port types. You can add 10/100BASE-T, 100BASE-FX, or Gigabit Ethernet ports by installing an optional MDA in the Passport 8132TX module. Inserter/extractor levers and captive retaining screws are at each end of the module.

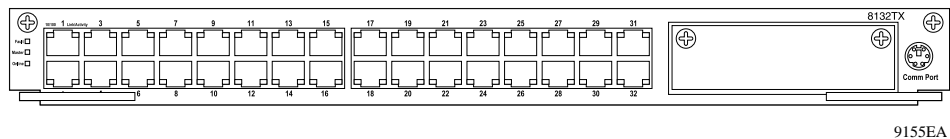


Figure 1-3. Passport 8132TX Edge Switch Module

10BASE-T/100BASE-TX Port Connectors

The Passport 8132TX module provides 32 10/100 Mb/s autosensing ports that support the IEEE 802.3u autonegotiation standard. Each port can operate in full- or half-duplex mode. When a port is connected to another device that also supports the IEEE 802.3u standard, the two devices negotiate the best speed and duplex mode of operation.

The port connectors are 8-pin modular RJ-45 connectors configured as MDI-X (media-dependent interface-crossover) connections. You can connect these ports to an MDI port (for example, a workstation or server) using a straight-through cable. If you are connecting to a device that does not have an MDI port, use a crossover cable (see [“MDI and MDI-X Connections” on page A-12](#)).



Note: For 10 Mb/s connections, you can use Category 3, 4, or 5 copper unshielded twisted pair (UTP) cable. Use only Category 5 UTP cable to connect ports that will operate at 100 Mb/s.

Refer to [Appendix A, “Technical Specifications,”](#) for more information about the RJ-45 port connectors.

MDA Slot

The MDA slot allows you to install optional media dependent adapters (MDAs) that support a range of media types. The following MDA versions are available for the Passport 8132TX module:

- 450-1SR MDA—1000BASE-SX MDA (1-port shortwave gigabit fiber, with 1 redundant port)
- 450-1SX MDA—1000BASE-SX MDA (1-port shortwave gigabit fiber)
- 450-1LR MDA—1000BASE-LX MDA (1-port longwave gigabit fiber, with 1 redundant port)
- 450-1LX MDA—100BASE-LX MDA (1-port longwave gigabit fiber)
- 8100-4TX MDA—10BASE-T/100BASE-TX MDA (4-port copper)
- 8100-2FX MDA—100BASE-FX MDA (2-port multimode fiber with SC connectors)
- 8100-4FX MDA—100BASE-FX MDA (4-port multimode fiber with MT-RJ connectors)

For information about installing MDAs and specifications for each MDA, refer to [Appendix C, “Media Dependent Adapters.”](#)



Note: The MDAs are hot-swappable in an operating Passport 8132TX module; however, the module resets when an MDA is inserted or removed.

Comm Port

The Comm port (also called a Console port) allows you to access the CLI if a Passport 8190SM module is not installed in the chassis. The Comm port is a mini-DIN serial port connector.



Note: Nortel Networks recommends using the Passport 8190SM module to configure and manage your switch. The Comm port on the Passport 8132TX module is active only when no Passport 8190SM module is present and when the Passport 8132TX module is operating as the master module.

The Comm port on the Passport 8132TX module is configured as a data communications equipment (DCE) connector. Be sure that your RS-232 cable pinouts are configured for DCE connections.

LEDs

The Passport 8132TX module has LEDs ([Figure 1-4](#)) to indicate operational status of the ports and the module. Each port has two integrated LEDs to indicate link speed and activity for that port. In addition, the module has three LEDs to indicate system operating conditions.

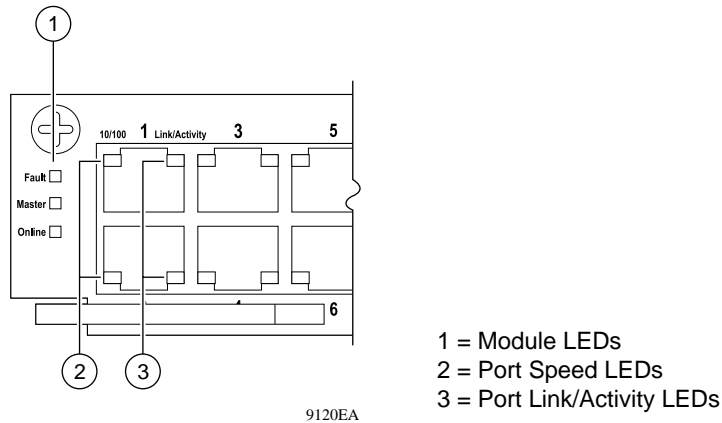
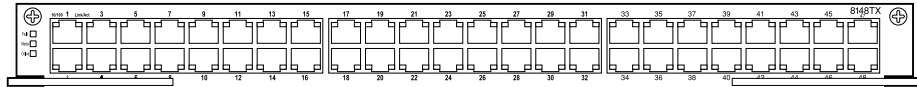


Figure 1-4. LEDs on the Passport 8132TX Module

For more information about LED operation, refer to [Appendix B, “LEDs.”](#)

Passport 8148TX 48-Port I/O Module

The Passport 8148TX module provides 48 autonegotiating 10/100 Mb/s ports ([Figure 1-5](#)). Each port can operate in full- or half-duplex mode. Autonegotiation circuitry automatically negotiates the highest possible data rate and the duplex operation possible with the attached device, if the attached device supports IEEE 802.3u autonegotiation.



9672EA

Figure 1-5. Passport 8148TX Edge Switch Module

The port connectors are modular RJ-45 connectors with MDI-X wiring. This port can be connected to an MDI port (for example, a workstation or server) using a straight-through cable.

The Passport 8108TX module uses 10BASE-T/100BASE-TX RJ-45 port connectors to connect to 10 Mb/s or 100 Mb/s Ethernet segments or nodes.



Note: For 10 Mb/s connections, you can use Category 3, 4, or 5 copper unshielded twisted pair (UTP) cable. Use only Category 5 UTP cable to connect ports that will operate at 100 Mb/s.

Refer to [Appendix A, “Technical Specifications,”](#) for more information about the RJ-45 port connectors.

LEDs

Each port on the Passport 8148TX module has two LEDs that indicate data speed and activity for the port (Figure 1-6). In addition, the module has three LEDs to indicate system operating conditions. For details of LED operation, refer to [Appendix B, “LEDs.”](#)

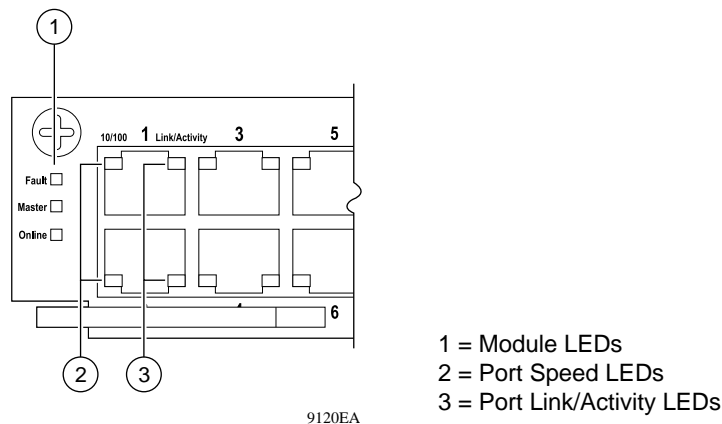


Figure 1-6. LEDs on the Passport 8148TX Module

Passport 8108GBIC 8-Port I/O Module

The Passport 8108GBIC I/O module (Figure 1-7) provides eight bays for installing any of four types of gigabit interface converters (GBICs). These fiber ports allow you to make riser connection, server attachments, or interswitch links. The following four types of GBICs are available:

- 1000BASE-SX
- 1000BASE-LX
- 1000BASE-XD
- 1000BASE-ZX



Note: Only Nortel Networks-qualified GBICs are supported for use in the Passport 8108GBIC module. For specific model numbers, refer to the Nortel Networks price list.

For more information about the GBICs and instructions to install them, refer to [Appendix D, “Installing GBICs.”](#)

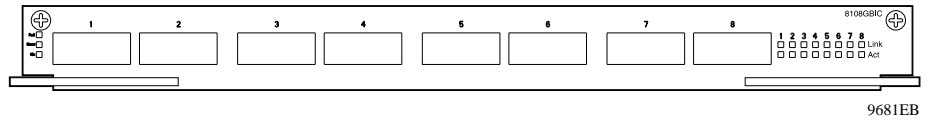


Figure 1-7. Passport 8108GBIC Module

LEDs

Each port has an associated Link LED and Act (activity) LED to indicate link and TX/RX activity ([Figure 1-8](#)). In addition, the module has three LEDs to indicate system operating conditions. For details of LED operation, refer to [Appendix B, “LEDs.”](#)

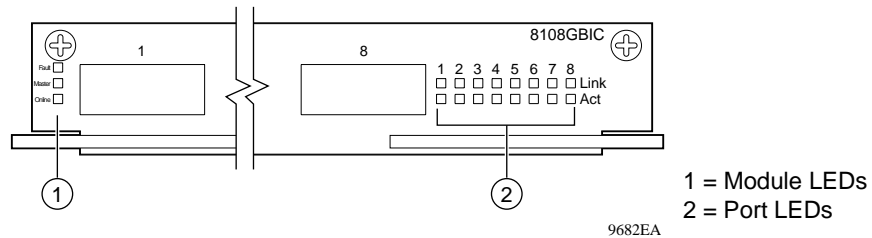


Figure 1-8. LEDs on the Passport 8108GB Module

Redundancy Features

A Passport 8000 Series chassis with one or more Passport 8190SM modules and two or more power supplies provides features that support redundant operation in case of certain failures. These redundancy features allow you to use this switch in high-availability environments where system uptime is critical to application performance.

Redundant Passport 8190SM Modules

When you install two Passport 8190SM modules in a Passport 8000 Series chassis, one provides the active CPU functions for the switch; the CPU subsystem on the other module is in standby mode. If the active CPU fails, the standby CPU assumes the CPU functions for the switch within 1 second. Then the module relearns the routing databases for the switch.

If two Passport 8190SM modules are installed in the chassis when you turn on switch power, the module in slot 5 becomes the active CPU; the module in slot 6 is in standby mode.

Redundant Power Supplies

A Passport 8000 Series chassis supports redundant power supplies. Both AC and DC power supplies are available, and they may be combined in the same chassis.

The Passport 8010 Chassis with more than six installed modules requires a minimum of two power supplies for a nonredundant configuration. A redundant configuration for such a chassis requires three power supplies.

In a chassis with a nonredundant power supply configuration, if one power supply fails, the system loses power and network connectivity.

In a chassis with two installed power supplies, you can add a third power supply without removing power to the chassis. In a chassis with a redundant power configuration, you can hot-swap any one power supply while the chassis continues to operate with no interruption of service ([Table 1-1](#)).

Table 1-1. Power Supply Hot-Swapping

Chassis	Number of Modules	Number of Power Supplies	Hot-Swap One?
8010	Up to 6	1	No
		2	Yes
	7 to 10	2	No
3		Yes	
8006	Up to 6	1	No
		2	Yes
		3	Yes

The Passport 8000 Series redundant power supplies provide protection from the following types of failures:

- Failure of the power supply module
- Disconnection or cutting of the AC or DC line cord

When you plug the power cords for each power supply into separate AC circuits or separate DC power sources, the Passport 8000 Series redundant power supplies also provide protection against the failure of an individual circuit or power source.



Note: Redundant power supplies are an optional feature, not a requirement.

A single Passport 8000 Series power supply provides adequate operating power for up to 6 installed modules in the chassis. Two power supplies constitute a nonredundant power configuration for a Passport 8010 Chassis with 7 to 10 installed modules.

Combining Passport 8100 and Passport 8600 Modules

Although the Passport system software allows you to install both Passport 8100 Series and Passport 8600 Series modules in the same switch chassis, Nortel Networks *does not* recommend such a configuration for the following reasons:

- Each type of modules functions as a separate switching entity in the chassis, with no switched connection between the two. To provide connectivity between the two switch entities, you must make external cable connections.
- Each CPU module must have its own IP address to allow separate management of the separate switch entities. When you use Device Manager, you can manage either the Passport 8100 Series switch or the Passport 8600 Series switch at a given time. The other modules in the chassis are grayed out.
- The Passport 8190SM module provides management only for Passport 8100 Series edge switch modules. Similarly, the Passport 8690SF module provides management only for Passport 8600 Series routing switch modules. With two types of switch modules installed, you cannot install redundant CPUs, because you must have one each of the Passport 8690SF module and the Passport 8190SM module.

Chapter 2

Installing a Passport 8100 Module

This chapter provides instructions for installing and connecting the Passport 8100 modules in a Passport 8000 Series chassis. For more information about your chassis, refer to the documentation that was shipped with the chassis.

The initial switch setup tasks are described in [Chapter 3, “Basic Switch Configuration.”](#) For details about configuring a Passport 8100 module, refer to *Getting Started with the Passport 8100 Management Software*, *Reference for the Passport 8000 Series Management Software Switching Operations*, and *Reference for the Passport 8000 Series Command Line Interface Switching Operations*.

This chapter discusses the following topics:

- Chassis configuration requirements ([page 2-2](#))
- Safety and environmental precautions ([page 2-2](#))
- Installing a module ([page 2-3](#))
- Turning on the power ([page 2-5](#))
- Connecting cables ([page 2-6](#))
- Replacing modules ([page 2-7](#))

Chassis Configuration Requirements

Slots in the Passport 8000 Series chassis are numbered from the top down, starting with 1. In either the Passport 8010 or the Passport 8006 chassis, slots 5 and 6 are reserved for the Passport 8190SM Switch Management Module. Any of the Passport 8100 Series I/O modules can be installed in the remaining chassis slots.



Note: You must install an I/O module in slot 1 or slot 2 to provide bus master functions in the switch.

Safety and Environmental Precautions

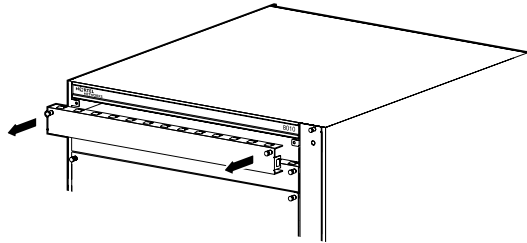
Before you perform any installation or replacement procedure on the switch, please note the following safe-handling guidelines:

- To prevent damage caused by electrostatic discharge (ESD), handle the switch chassis and modules only when you, the chassis, and the chassis modules are properly grounded. Nortel Networks recommends using a grounding wrist strap.
- When handling modules, do not touch components on the circuit boards; always handle modules by their edges. Store unused modules in their protective packaging.
- To maintain proper airflow and cooling, always cover unused module slots and power supply bays with filler panels.

Installing a Module

To install a module in a Passport 8000 Series chassis:

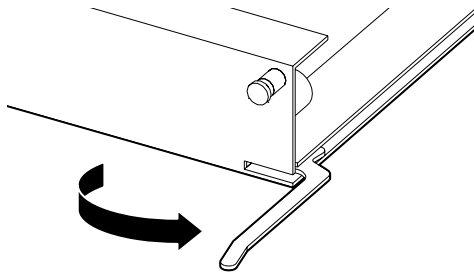
1. Remove the filler panel from the slot where you will install the module ([Figure 2-1](#)).



9058FA

Figure 2-1. Removing a Filler Panel

2. Make sure the inserter/extractor levers are extended away from the front of the module ([Figure 2-2](#)).



9397FA

Figure 2-2. Inserter/Extractor Levers in Extended Position

3. Slide the module into the slot ([Figure 2-3](#)).

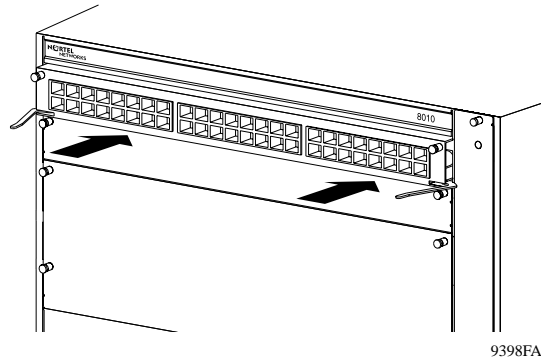


Figure 2-3. Inserting a Module

4. Rotate the inserter/extractor levers to seat the module backplane connectors ([Figure 2-4](#)).

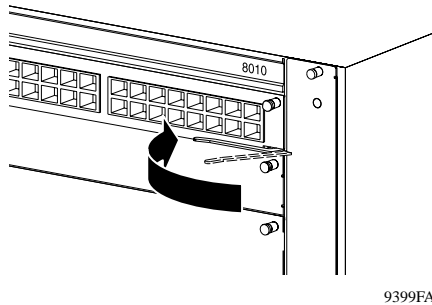


Figure 2-4. Seating the Backplane Connectors

5. Tighten the retaining screws to secure the module in the chassis ([Figure 2-5](#)).

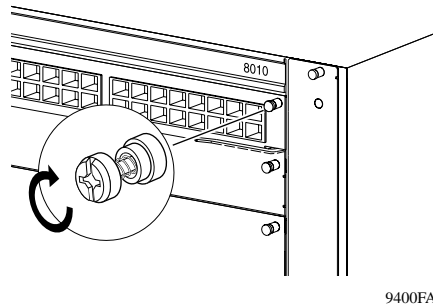


Figure 2-5. Securing the Module in the Chassis

Turning On the Chassis Power

Although you can install or replace modules in an operating chassis, in a new installation you may prefer to install all the modules before turning on the chassis power.

To turn on the chassis power:

1. Verify that all power cords are connected properly, as described in the installation instructions for the power supplies.
2. Turn all the power switches to the On position.



Note: In a chassis with two power supplies in a nonredundant power configuration, you must turn on both power supply units within 2 seconds of each other. If you wait longer to turn on the second power supply, both power supplies will shut down. To correct this condition, turn off both power supplies, wait at least 30 seconds, and then turn on both power supplies again within 2 seconds.

Connecting Cables

After the modules are installed and the chassis is powered on, connect network cables. [Table 2-1](#) shows the connector types and recommended cables for each module.

Table 2-1. Connectors and Cables for Passport 8000 Series Edge Switch Modules

Module	Port	Connector	Recommended Cable Type	Maximum Cable Length
Passport 8190SM	Ethernet Management Port	RJ-45	EIA Category 3, 4, or 5 unshielded twisted pair for 10 Mb/s operation; EIA Category 5 required for 100 Mb/s operation	328 ft (100 m)
	Serial Ports	DB-9	RS-232	
Passport 8132TX	10/100 Mb/s Ethernet Ports	RJ-45 wired as MDI-X	EIA Category 3, 4, or 5 unshielded twisted pair for 10 Mb/s operation; EIA Category 5 required for 100 Mb/s operation	328 ft (100 m)
	Serial Port	Mini DIN-8	RS-232 (Not required if Passport 8109SM module is present)	
Passport 8148TX	10/100 Mb/s Ethernet Ports	RJ-45 wired as MDI-X	EIA Category 3, 4, or 5 unshielded twisted pair for 10 Mb/s operation; EIA Category 5 required for 100 Mb/s operation	328 ft (100 m)
Passport 8108GBIC	1000 Mb/s Ethernet port	Duplex SC	Depends on installed GBIC model; for specifications, refer to Appendix A, "Technical Specifications."	



Note: Ports on the Passport 8132TX and 8148TX modules are wired as MDI-X. Use straight-through cables to connect these ports to MDI connections such as workstations or servers. Use crossover cables to connect these ports to other MDI-X connections such as hubs or other switches.

Nortel Networks recommends that you route all network cables through the supplied cable management brackets ([Figure 2-6](#)).

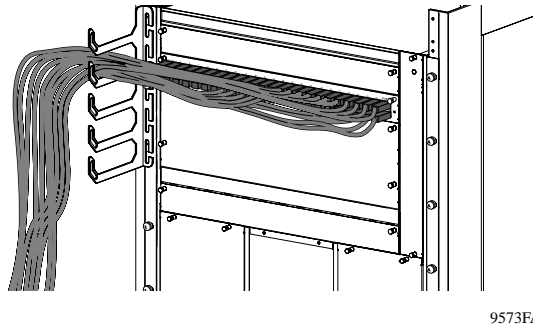


Figure 2-6. Routing Network Cables

Replacing Modules

Any of the Passport 8100 modules can be removed from an operating switch chassis without turning off the chassis power.

If you insert a module into the same slot and chassis where the same type of module was previously installed, the previous configuration is maintained for that module in that slot. In all other cases, a module inserted into a Passport 8000 series chassis is reset to factory defaults.

If you remove the switch management module (for example, to replace it), the switch continues switching for up to 2 minutes. Then it reboots using the configuration settings on the backup switch management module, if one is present. If no backup switch management is present, after 2 minutes all ports go to blocking mode.

To replace a module:

- 1. Disconnect all network cables from the module to be removed.**
- 2. Loosen the module retaining screws.**
- 3. Rotate the inserter/extractor levers to disconnect the module from the backplane connectors.**
- 4. Remove the module from the chassis.**
- 5. Insert the new module in the chassis and tighten the retaining screws.**
- 6. Reconfigure the ports of the new module as necessary.**
- 7. Reconnect the cables.**

Chapter 3

Basic Switch Configuration

This chapter describes how to use the command line interface (CLI) for basic switch configuration. The chapter includes the following information:

- Port numbering ([page 3-2](#))
- Booting the switch ([page 3-3](#))
- Logging on to the system ([page 3-4](#))
- Assigning an IP address to the Management port ([page 3-5](#))
- Setting system identification ([page 3-5](#))
- Setting system security ([page 3-6](#))
- Sample configuration ([page 3-8](#))

For information about more advanced configuration topics, refer to the following publications:

- *Networking Concepts for the Passport 8000 Series Switch*
- *Reference for the Passport 8000 Series Management Software Switching Operations*
- *Reference for the Passport 8000 Series Command Line Interface Switching Operations*



Note: To perform configuration procedures, you must log on to the switch with Read-Write privileges.

Specifying Port Numbers

Each port number on the Passport switch consists of a slot number and a position number in the format `<slot>/<position>`. The slot number identifies the chassis slot containing the I/O module with that port. The position number identifies the position of the port on the I/O module. Chassis slots are numbered from the top down, and 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 Passport 8148TX module, ports in the top row are assigned sequential odd numbers, and ports in the bottom row are assigned sequential even numbers ([Figure 3-1](#)).

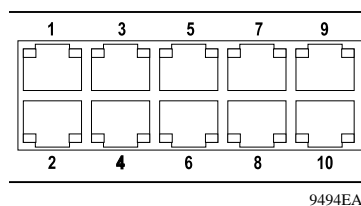


Figure 3-1. Port Numbers on High-Density Modules

MDA ports are numbered as a continuation of the ports on the module, and port numbers on an MDA are in ascending order from left to right. For example, the far left MDA port in a Passport 8132TX module is port 33. Gigabit MDAs with redundant PHYs are regarded as a single port.

To specify a list of port numbers, separate individual port numbers with commas. For example:

```
3/4,7/22,10/47
```

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. For example:

```
3/4-3/16
```



Note: Spaces are not allowed in port lists or ranges.

For more information about port numbering as well as MAC addressing, refer to *Getting Started with the Passport 8100 Management Software*.

Booting the Switch

When you turn on the switch power supplies, the switch begins its automatic boot process. The default boot order is to try to boot the switch first from the PCMCIA card, then from the internal flash memory, and finally over the network. If a terminal is connected to the Console port, you can watch the system messages that record the boot sequence. You can modify this boot order using the boot monitor command line interface (CLI).

While the Passport 8190SM module is booting, the I/O modules boot using their local image files, which check for the presence of a Passport 8190SM module in the chassis. When the Passport 8190SM module has completed its boot process, the I/O modules transmit a load request. Messages on the console screen indicate the request and the completion of the image load. Then the I/O modules reboot using the newly loaded image. The entire boot sequence for the switch can take up to one minute.

When the switch starts booting, you can access the boot monitor by pressing any key during the first 4 seconds of the boot sequence. For details about the boot monitor and using the command line interface to modify the boot process, refer to *Getting Started with the Passport 8100 Management Software* and *Reference for the Passport 8000 Series Command Line Interface Switching Operations*.

Logging On to the System

The Passport 8100 switches have four levels of security access for device management. [Table 3-1](#) describes the access levels and lists their default login names and passwords.

Table 3-1. Access Levels and Default Login Values

Access Level	Description	Default Login	Default Password
Read-Only	Allows only viewing of configuration and status information. Is equivalent to SNMP read-only community access.	ro	ro
Layer 2 (read-write)	Allows viewing and changing configuration and status information for layer 2 (bridging/switching) functions.	l2	l2
Read-Write	Allows viewing and changing configuration and status information across the switch; does not allow changing security and password settings. Is equivalent to SNMP read-write community access.	rw	rw
Read-Write-All	Allows all the rights of Read-Write access <i>and</i> the ability to change security settings, including the CLI and Web-based management user names and passwords and the SNMP community strings.	rwa	rwa

For example, if you want to log on with Read-Write-All access through the Console port, log on as rwa with password rwa at the login prompt.

Assigning an IP Address to the Management Port

You must assign an IP address to the Management port before you can use it for out-of-band management.

To assign an IP address:

- **Use the following command:**

```
config bootconfig net mgmt ip <addr/mask>
```

where:

<addr/mask> specifies the IP address and mask of the Console Management port.



Note: The preferred route for managing the switch is to use the Management port.

Setting System Identification

System identification parameters specify the system name, contact person, and location.

To set the system identification:

1. **Specify the system name using the command:**

```
config sys set name <prompt>
```

where <prompt> is an ASCII string specifying the system name and box or root level prompt.

2. **Specify the name of the contact person for the switch using the command:**

```
config sys set contact <contact>
```

where <contact> is an ASCII string specifying the name of the person.

3. **Define the location for the system with the command:**

```
config sys set location <location>
```

where <location> is an ASCII string specifying the system location.

Setting System Security

System security parameters allow you to define login names and passwords for access to the switch management functions and to specify the access methods, such as through a Telnet session or through a Web browser.

To set system security:

1. Change CLI users and passwords using the following commands:

- `config cli password ro <username>[<password>]`—changes the Read-Only login and/or password.
- `config cli password l2 <username>[<password>]`—changes the Layer 2 Read-Write login and/or password.
- `config cli password rw <username>[<password>]`—changes the Read-Write login and/or password.
- `config cli password rwa <username>[<password>]`—changes the Read-Write-All login and/or password.

where:

`username` is the login name.

`password` is the password associated with the login name.

2. Change SNMP community strings using the command:

```
config sys set snmp community <ro|rw|l2|rwa> <commstr>
```

where:

`<ro|rw|l2|rwa>` is the choice of community—`ro` is Read-Only, `rw` is Read-Write, `l2` is Layer 2 Read-Write, and `rwa` is Read-Write-All.

`<commstr>` is the input community string {string}.

3. Enable or disable Web access using the commands:

- `config web-server disable` to turn off Web access
- `config web-server enable` to turn on Web access

4. Change Web passwords using the command:

```
config web-server set password ro <username> <passwd>
```

where:

<username> is the user's login name, up to 20 characters long.

<passwd> is the password associated with the login name, up to 20 characters long.

To enable or disable Telnet access, you set flags from the boot monitor CLI. You can access the boot monitor CLI while the switch is booting.

To set up Telnet access:

- 1. While the switch is booting, press any key to interrupt the autoboot process.**
- 2. Enable or disable Telnet access using the command:**

```
flags telnetd <true|false>
```

where:

true enables Telnet access.

false disables Telnet access.

Switch Configuration

The Passport 8100 Series modules provide layer 2 switching as soon as you install them and turn on the switch power. The default configuration includes a single VLAN with a VLAN ID of 1 that contains all the ports in the switch.

The only configuration you need to do for the Passport 8100 Series switch is to assign an IP address and a gateway address (default route) for remote management.

Configuring the Passport switch as a layer 2 switch consists of the following tasks:

- Confirm that all ports are in the default VLAN.
- Assign an IP address for management.
- Specify a default gateway address or default route.
- Test connectivity.

To configure the switch as a layer 2 (bridging/switching) device:

1. Confirm that all ports are in the default VLAN using the command:

```
show vlan info ports
```

The display shows the VlanId (1) and lists the port members.

2. To assign an IP address for management, use the command:

```
config bootconfig net mgmt ip <ipaddr/mask>
```

where:

<ipaddr/mask> is the IP address/subnet mask you are assigning (for example, 10.10.10.1/24).

Alternatively, you can assign an IP address to the default VLAN (VLAN ID 1) using the command `config vlan 1 ip create <addr/mask>`.



Note: Nortel Networks does not recommend assigning an IP address to the default VLAN. Management response is significantly degraded by managing the switch through the default VLAN.

3. Specify a default gateway address/default route.

When configuring IP on most layer 2 switches, you need to specify the IP address of the device and the IP address of the default gateway.

Use the following Boot Monitor CLI command to specify the default route:

```
net mgmt route net 0.0.0.0 <ipaddr>
```

Use the following Run-Time CLI command to specify the default route:

```
config bootconfig net mgmt route net 0.0.0.0 <ipaddr>
```

In each of these commands, `ipaddr` specifies the IP address of the default gateway.

4. To save the configuration, enter:

```
save config
```

Your Passport 8100 switch now has an IP address and can be used as a layer 2 switch.

Chapter 4

Troubleshooting

This chapter describes troubleshooting techniques for the Passport 8100 modules.

This chapter includes information about the following topics:

- Normal power-up sequence (this page)
- Failure to get a login prompt ([page 4-2](#))
- Failure of the management software to recognize I/O modules ([page 4-2](#))
- LED indications of problems ([page 4-2](#))
- Port connection problems ([page 4-4](#))
- Installation issues ([page 4-7](#))

Normal Power-Up Sequence

In a normal power-up sequence, the LEDs display as follows:

1. When power is applied to the switch, the green LED on each power supply and fan tray turns on within 5 seconds.
2. Each module initiates a self-test, during which the port and module LEDs display various patterns to indicate the progress of the self-test.
3. Upon successful completion of the self-test (within 10 seconds after power is applied), the Online LED lights.

For information about the other LEDs on the Passport 8132TX, 8148TX, 8108GBIC, and 8190SM modules, refer to [Appendix B, “LEDs.”](#)

Failure to Get a Login Prompt from the Console Port

If you have connected a terminal to the Console port on the Passport 8190SM module and fail to get a login prompt, the port may have an incorrect DCE/DTE setting. Try moving the DCE/DTE switch from its current setting to the other position ([Figure 4-1](#)).

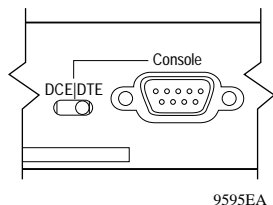


Figure 4-1. DCE/DTE Switch on the Passport 8190SM Module

Failure of Management Software to Recognize I/O Modules

If management software does not recognize the presence of any I/O modules in the switch, the device view in Device Manager, for example, shows a switch with only a management module installed. This situation can occur when no I/O module is installed in slot 1 or slot 2 of the chassis. A Passport 8000 Series chassis must have an I/O module installed in slot 1 or slot 2 of the chassis to provide bus master functions for the switch.

LED Indications of Problems

If the switch is not operating properly, LEDs may provide information about the probable cause. [Table 4-1](#) lists possible problems as indicated by LEDs on the switch modules and suggests corrective action.

Table 4-1. LED Indications of Problems

Symptom	Probable Cause	Corrective Action
Green power supply LEDs are off.	The switch is not receiving AC power.	Verify that each AC power cord is fastened securely at both ends and that power is available at each AC power outlet. Verify that each power supply is turned on.
The Link/Activity LED for a connected port is off or does not blink (and you have reason to believe that traffic is present).	The switch is experiencing a port connection problem. The switch's link partner is not autonegotiating properly.	See "Port Connection Problems" next.
The Link/Activity LED blinks continuously.	There may be a port configuration error.	
The Online LED on an I/O module is yellow.	Software incompatibility exists, or the module cannot communicate with the master module over the backplane.	Use the <code>show log</code> command to check the system log for indications of communication problems. Use the <code>boot</code> command to download a new software image.
The Master LED on a module in slot 1 or slot 2 is yellow.	This module has detected system clock generation failure on its own circuitry.	Replace the module; make sure it is in the correct slot. Note: This LED refers only to the module in slot 1 or slot 2 that provides the clock function for the switch.
The Fault LED is blinking yellow.	A chassis failure has been detected.	From the console management station, use the <code>show log</code> command to check the system log for information about hardware failures Check the fans in the Passport 8100 module chassis to make sure both are running. Check the switch power supplies; one may have stopped functioning. The module may have failed to read the MAC address from the chassis backplane. If this is the case, arrange to replace the chassis.
The Fault LED is steadily yellow.	A diagnostics failure or hardware failure has been detected.	The module failed its power-on self-test. Replace the module.
No LEDs are lit.	A hardware failure has been detected.	Power cycle the switch.

Port Connection Problems

Port connection problems can usually be traced to a poor cable connection or to an improper connection of the port cables at either end of the link. These types of problems can be remedied by making sure that the cable connections are secure and that the cables are connected to the correct ports at both ends of the link. For more information about cabling, see [“Cabling,”](#) next in this chapter.

Port connection problems can also be traced to the autonegotiation mode (refer to [“Autonegotiation Modes”](#) on [page 4-5](#)) or the port interface.

Cabling

Cabling for 10BASE-T networks can consist of 2-pair Category 3, 4, or 5 unshielded twisted pair (UTP) wiring. However, to cover future upgrades to Fast Ethernet, Nortel Networks strongly recommends that you use all Category 5 cable in your network.

Ethernet 10BASE-T network installations use cables consisting of two pairs of twisted pair wires—one pair to send data and one to receive data. These wires must connect to another 10BASE-T station that has the sending pair attached to its receiving pair and vice versa. In this way, the two nodes can exchange data. If the two nodes are wired alike, they both attempt to send data out on the same RJ-45 pins. In such a case, a straight-through cable would not work. However, a crossover cable would operate normally.

The Passport 8100 Series modules are designed to have Ethernet NICs connect directly to their RJ-45 ports using straight-through (MDI) cables. However, if a Passport 8100 module must connect to a hub or another switch that follows usual conventions, a crossover cable (MDI-X) is required.

The 100 Mb/s ports are designed to operate using Category 5 UTP cabling only. Category 5 UTP cable is a 2-pair cable certified to handle up to 100 Mb/s bandwidth. To minimize crosstalk noise, maintain the twist ratio of the cable up to the point of termination; untwist at any termination should not exceed 0.5 inch (1.27 cm).

For best performance with respect to noise immunity and emissions, the unused pairs in the 2-pair cable should be terminated at their characteristic impedance (that is, 100 ohms) in the equipment at each end of the cable. All Nortel Networks 100BASE-TX equipment includes such a Common Mode Termination (CMT).

The fiber MDAs use only multimode 62.5/125 μm fiber cable. The Nortel Networks 100BASE-FX MDA is not supported on single-mode fiber. SC connectors are used on 2-port 100BASE-FX MDAs, and MT-RJ connectors are used on 4-port 100BASE-FX MDAs.

Cables for the GBICs vary depending on the specific GBIC type. For details of the cable requirements for GBICs, refer to [Appendix A, “Technical Specifications.”](#)

Autonegotiation Modes

Port connection problems can occur when a port (or station) is connected to another port (or station) that is not operating in a compatible mode (for example, connecting a full-duplex port on one station to a half-duplex port on another station).

The Passport 8100 modules negotiate port speeds according to the IEEE 802.3u autonegotiating standard. The switch adjusts (autonegotiates) its port speed and duplex mode to match the best service provided by the connected station, up to 100 Mb/s in full-duplex mode.

The following autonegotiation problems can occur:

- If the connected station uses a form of autonegotiation that is not compatible with the IEEE 802.3u autonegotiating standard, the Passport 8100 module cannot negotiate a compatible mode for correct operation.
- If the autonegotiation feature is not present or is not enabled at the connected station, the Passport 8100 module may not be able to determine the correct duplex mode.

In both situations, the Passport 8100 module autosenses the speed of the connected station and, by default, reverts to half-duplex mode. If the connected station is operating in full-duplex mode, it cannot communicate with the switch.

To correct this mode mismatch problem:

1. Use the CLI to disable autonegotiation for the suspect port.

Refer to *Reference for the Passport 8000 Command Line Interface Switching Operations* for the appropriate CLI commands.

2. Use the CLI to set the speed and duplex mode of the port to match the speed/duplex mode of the connected station.

You may have to try several settings before you find the correct speed/duplex mode of the connected station.

If the problem persists, follow these additional steps:

1. Using the CLI, disable the autonegotiation feature at the connected station.

2. Manually set the speed/duplex mode of the connected station to the same speed/duplex mode you have manually set for the Passport 8100 module port.



Note: Nortel Networks recommends that you manually set the Passport 8100 module port to the desired speed/duplex mode when connecting to any of the following Nortel Networks products:

- Nortel Networks 28000 product family
 - Nortel Networks 58000 product family
 - BayStack™ 302T switch (100 Mb/s port)
-

Port Interface

Verify that the devices are connected using the appropriate crossover or straight-through cable. (For information about appropriate cables, refer to [Appendix A, “Technical Specifications.”](#))

Installation-Related Issues

Ethernet networks tend to be fairly simple, but they can still have problems that take time to resolve. The most common problems are associated with the actual network wiring.

If you have problems with a newly established network (initial setup), the trouble is most likely related to cabling or addressing. If the network has been operational for an extended period and is now beginning to have problems, the trouble is probably related to recent additions or changes.

Addresses

Remember that each Passport 8100 module or Passport 8000 Series switch has a media access control (MAC) station address and an IP address. The MAC station addresses are unique because each address contains the Nortel Networks manufacturer ID and node ID codes.

A valid IP address is not required for normal switching operation or if you are managing the switch from a console. However, for management over the network (SNMP or Telnet session), a valid IP address is required.

You can change the IP address of the unit to match your own network addressing structures. Make sure that the IP address of the Passport 8100 module or Passport 8000 Series switch is unique in your network. You can change the IP address using the `config ip address` command (refer to [“Assigning an IP Address to the Management Port” on page 3-5](#)). You will need to set a valid IP address if you intend to use network management with SNMP or Telnet.

Appendix A

Technical Specifications

This appendix lists technical specifications for the Passport 8100 modules. The appendix includes the following information:

- General specifications
- Specifications for individual modules, including:
 - Physical specifications
 - Connector types and, where appropriate, pin assignments
 - Required cables
- MDI and MDI-X connections
- Declaration of Conformity

General Specifications

Standards Supported

IEEE 802.3 CSMA/CD (ISO/IEC 8802-3)

IEEE 802.3i 10BASE-T (ISO/IEC 8802-3)

IEEE 802.3u 100BASE-TX (ISO/IEC 8802-3)

IEEE 802.1D MAC Bridges (ISO/IEC 10038)

IEEE 802.1p (Prioritization)

IEEE 802.1Q (VLAN Tagging)

IEEE 802.1z (Gigabit)

IEEE 802.3z 1000BASE-SX and 1000BASE-LX (Draft Standard ver. 3.1)

IEEE 802.3x on Gigabit ports

Data Rate and Encoding

10 Mb/s Manchester encoding

100 Mb/s 4B/5B encoding

1000 Mb/s 8B/10B encoding

Environmental Specifications

Operating Temperature: 5° to 40° C (41° to 104° F)

Storage Temperature: -25° to 70° C (-13° to 158° F)

Operating Humidity: 85% maximum relative humidity, noncondensing

Storage Humidity: 95% maximum relative humidity, noncondensing

Operating Altitude: 3000 m (10,000 ft) maximum

Free Fall/Drop: ISO 4180-s, NSTA 1A

Vibration: IEC 68-2-6/34

Shock/Bump: IEC 68-2-27/29

Performance Specifications (64-byte packets)

Aggregate Throughput: 3,000,000 pps maximum

Switched Forwarding Rates: For 10 Mb/s: 14,880 pps maximum

For 100 Mb/s: 148,810 pps maximum

For 1000 Mb/s: 1,488,100 pps maximum

Latency: 9 ms

Address Database Size

Addressing: 48-bit MAC address

Frame Length: 64 to 1518 bytes (IEEE 802.1Q Untagged)

64 to 1522 bytes (IEEE 802.1Q Tagged)

Safety Agency Approvals

UL Listed (UL 1950)

CUL CSA 22.2 No. 950

CB with all national deviations

NOM NOM-019-SCFI 1994

Electromagnetic Emissions

Meets requirements of:	US: FCC CFR 47, Part 15, Subpart B, Class A Canada: ICES-003, Issue-2, Class A Australia/New Zealand: AS/NZS 3548:1995, Class A Japan: VCCI V-3/97.04, Class A Taiwan: CNS 13438, Class A EN 55 022 (CISPR 22:1985), Class A CE Mark
Electromagnetic Immunity:	EN50082-1:1997

Passport 8190SM Switch Management Module

Physical Specifications

Height:	1.5 in. (3.8 cm)
Width:	15.4 in. (39.1 cm)
Depth:	18.5 in. (47.0 cm)
Weight:	7 lb (3.15 kg)

Electrical Specifications

Input Current:	75 W
Thermal Rating:	250 BTU/hr maximum

MTBF Rating

229,623 hr

Connector Types

Ethernet Management port:	RJ-45 connector wired as MDI-X (Table A-1)
Console port:	DB-9 connector (Table A-2)
Modem port:	DB-9 connector (Table A-3)

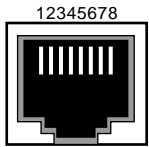
Required Cables

Ethernet Management port:	Category 3, 4, or 5 UTP cable (10 Mb/s operation) Category 5 UTP cable (100 Mb/s operation)
Console port:	RS-232 cable
Modem port:	DTE-to-DCE cable (straight or transmit cable)

Management Port

The Management port is a 10/100 Mb/s Ethernet port implemented on an RJ-45 connector wired as an MDI connection. [Table A-1](#) shows the pin assignments for this connector.

Table A-1. Pin Assignments in the Passport 8190SM Management Port

Connector	Pin Number	Signal
 12345678 8020EA	1	Output transmit data + (TX+)
	2	Output transmit data - (TX-)
	3	Input receive data + (RX+)
	6	Input receive data - (RX-)
	4, 5, 7, 8	Not used

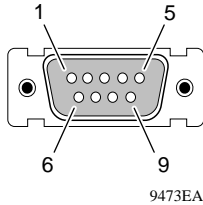
Console Serial Port

The Console serial port is implemented as a DB-9 connector. This port can operate as a data terminal equipment (DTE) or data communication equipment (DCE) device. Use the switch to the left of the port to set the port to DTE (left) or DCE (right). Default settings for this port are 9600 bps, 8 data bits, no parity, and one stop bit.

Because the Console port expects to receive Data Set Ready (DSR) and Clear To Send (CTS) signals before transmitting, these control lines are required in the cabling. The Console port does not support any inbound flow control; that is, the port does not toggle control lines to indicate an input buffer full condition.

[Table A-2](#) lists the pin assignments for the Console port for both the DTE and DCE settings.

Table A-2. Pin Assignments in the Passport 8190SM Console Port

Connector	Pin Number	DCE Signal	DTE Signal
	2	RXD	TXD
	3	TXD	RXD
	4	DTR	DSR
	5	GND	GND
	6	DSR	DTR
	7	RTS	CTS
	9	CTS	RTS

Modem Serial Port

The Modem serial port is implemented on a DB-9 connector wired as a DTE connection.

To set up modem access, you need a DTE-to-DCE cable (straight or transmit cable) between the Modem port and a modem or terminal server. The cable should have the pin assignments listed in [Table A-3](#).

Table A-3. DTE-to-DCE Pin Assignments

Signal	Switch	Modem	
	Pin Number	DCE DB-9 Pin Number	DCE DB-25 Pin Number
RXD	2	2	3
TXD	3	3	2
DTR	4	4	20
GND	5	5	7
DSR	6	6	6
RTS	7	7	4
CTS	9	9	5

Passport 8132TX Module

Physical Specifications

Height:	1.5 in. (3.8 cm)
Width:	15.4 in. (39.1 cm)
Depth:	18.5 in. (47.0 cm)
Weight:	8.06 lb (4 kg approximate)

Electrical Specifications

Input Current:	75 W maximum
Thermal Rating:	250 BTU/hr maximum

MTBF Rating

122,000 hr

Connector Type

10/100 Ethernet Ports:	RJ-45 connector wired as MDI-X (Table A-4)
Comm Port:	Mini-DIN

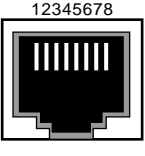
Cable Specifications

Type:	Category 3, 4, or 5 UTP cable (10 Mb/s operation) Category 5 UTP cable (100 Mb/s operation)
Maximum Distance:	328 ft (100 m)

Data Port Connectors

The data ports on the Passport 8132TX module are RJ-45 ports wired as MDI-X connectors ([Table A-4](#)).

Table A-4. Passport 8132TX Port Pinouts

Connector	Pin Number	Signal
	1	Input receive data + (RX+)
	2	Input receive data - (RX-)
	3	Output transmit data + (TX+)
	6	Output transmit data - (TX-)
	4, 5, 7, 8	Not used

Comm Port Connector

The cable used to connect the comm port is a serial cable with a mini-DIN connector on one end to connect to the Passport 8132TX comm port and a DB-25 connector on the other to connect to a terminal or computer. This cable and a DB-25 to DB-9 adapter are shipped with the Passport 8000 Series chassis.



Note: The Comm port on the Passport 8132TX module is active only when the chassis has no installed Passport 8190SM module. You should not use this port for managing the switch if you are using software version 2.0 or later.

MDAs

450-1SR MDA, 450-1SX MDA

Required Cable:	Multimode fiber optic
Maximum distance:	1804 ft (550 m)
Wavelength:	850 nm
Average Transmit Output Power:	-9.5 to -4 dBm
Average Receiver Sensitivity:	-17 dBm (minimum)

450-1LR MDA, 450-1LX MDA

Required Cable:	Multimode fiber optic
Maximum distance:	1804 ft (550 m)
Wavelength:	1300 nm
Average Transmit Output Power:	-5.2 to 0 dBm
Average Receiver Sensitivity:	-22 dBm (minimum)

Passport 8148TX Module

Physical Specifications

Height:	1.5 in. (3.8 cm)
Width:	15.4 in. (39.1 cm)
Depth:	18.5 in. (47.0 cm)
Weight:	9 lb (4 kg)

Electrical Specifications

Input Current:	75 W maximum
Thermal Rating:	250 BTU/hr maximum

MTBF Rating

72,213

Connector Type

RJ-45 connector wired as MDI-X ([Table A-5](#))

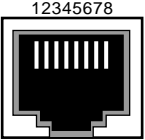
Cable Specifications

Type:	Category 3, 4, or 5 UTP cable (10 Mb/s operation) Category 5 UTP cable (100 Mb/s operation)
Maximum Distance:	328 ft (100 m)

Port Connectors

The ports on the Passport 8148TX module are RJ-45 ports wired as MDI-X connectors ([Table A-5](#)).

Table A-5. Passport 8148TX Port Pinouts

Connector	Pin Number	Signal
	1	Input receive data + (RX+)
	2	Input receive data - (RX-)
	3	Output transmit data + (TX+)
	6	Output transmit data - (TX-)
	4, 5, 7, 8	Not used

Passport 8108GBIC Module

Physical Specifications

Height:	1.5 in. (3.8 cm)
Width:	15.4 in. (39.1 cm)
Depth:	18.5 in. (47.0 cm)
Weight:	8 lb (4 kg)

Electrical Specifications

Input Current:	65 W maximum
Thermal Rating:	224 BTU/hr maximum

MTBF Rating

93,284 hr

Connector Type

Duplex SC

GBICs

Physical Specifications

Height:	12 mm
Width:	30 mm
Depth:	65 mm
Weight:	Varies with GBIC type

Connector Type

Duplex SC

1000BASE-SX GBIC

Cable Specifications

Type: 62.5 μm or 50 μm multimode fiber
Maximum Distance: 1804 ft (550 m)

Optical Specifications

Wavelength: 850 nm (VCSEL)
Average Transmit Output Power: -9.5 to -4 dBm
Average Receiver Sensitivity: -17 dBm (minimum)

1000BASE-LX GBIC

Cable Specifications

Type 62.5 μm multimode fiber or
9 μm single-mode fiber
Note: Multimode fiber may require a DMD patch cord.
Maximum Distance: Single-mode fiber: 32,810 ft (10 km)
Multimode fiber: 1804 ft (550 m)

Optical Specifications

Wavelength: 1300 nm (FP laser diode)
Average Transmit Output Power: -5.2 to 0 dBm
Average Receiver Sensitivity: -22 dBm (minimum)

1000BASE-XD GBIC

Cable Specifications

Type:	9 μ m single-mode fiber
Maximum Distance:	31 mi (50 km) Note: For a shorter link distance, you may need an in-line attenuator to prevent overloading the receiver.

Optical Specifications

Wavelength:	1550 nm (DFB laser diode)
Average Transmit Output Power:	-5.2 to 0 dBm
Average Receiver Sensitivity:	-24 dBm

1000BASE-ZX GBIC

Cable Specifications

Type:	9 μ m single-mode fiber
Maximum Distance:	43 mi (70 km) Note: For a shorter link distance, you may need an in-line attenuator to prevent overloading the receiver.

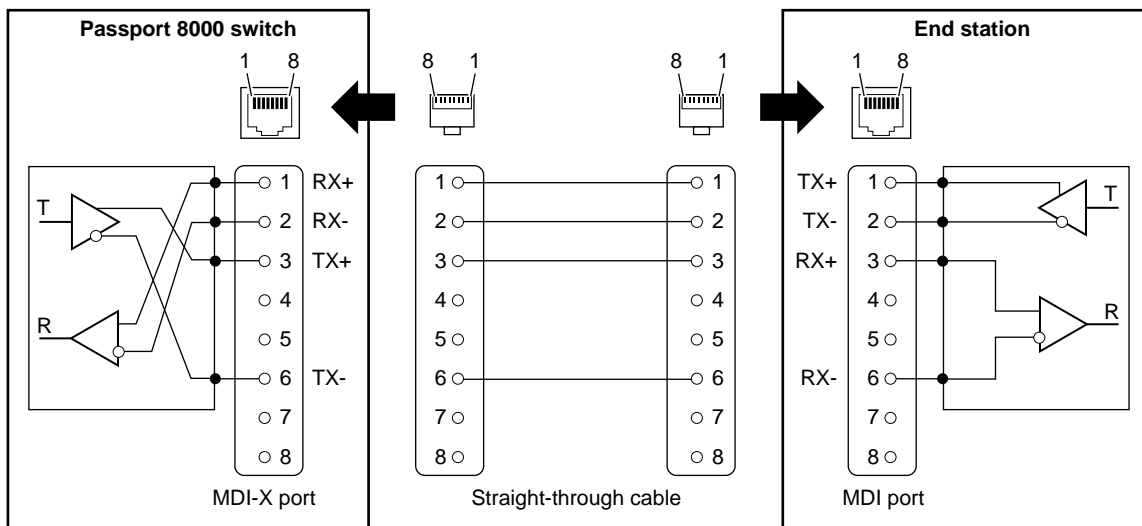
Optical Specifications

Wavelength:	1550 nm (DFB laser diode)
Average Transmit Output Power:	0 to 5.2 dBm
Average Receiver Sensitivity:	-22 dBm (minimum)

MDI and MDI-X Connections

For communication to take place between two devices, the transmitter of one device must connect to the receiver of the other device. The connection must be achieved through a crossover function, which could be a crossover cable or a port that implements the crossover function internally.

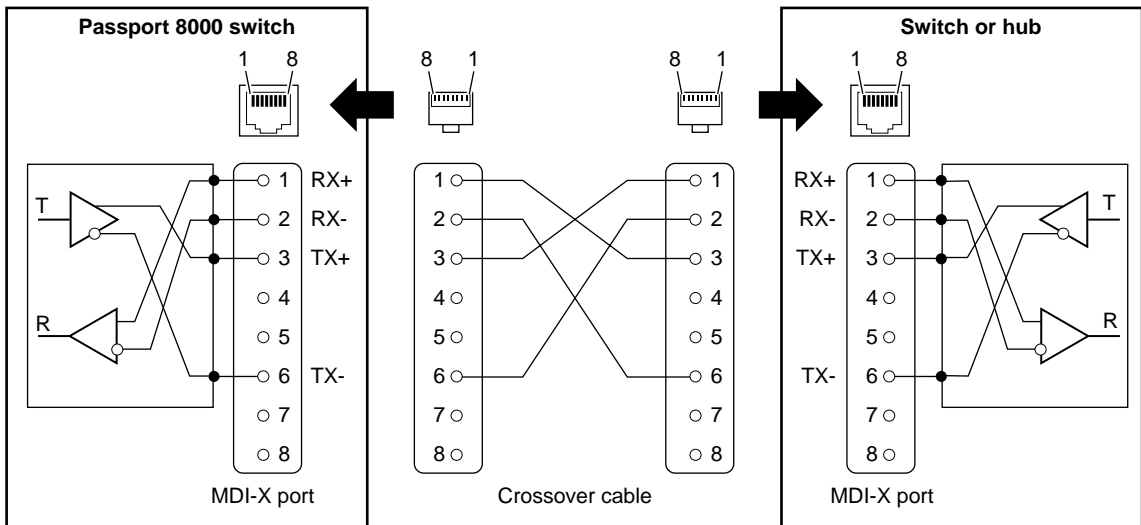
The Passport 8100 modules use MDI-X ports that allow you to connect directly to end stations without using crossover cables ([Figure A-1](#)). Ports that implement the crossover function internally are known as MDI-X ports (where “X” refers to the crossover function).



617EF

Figure A-1. MDI-X to MDI Cable Connections

If you are connecting a device to the Passport 8100 module that also implements MDI-X ports ([Figure A-2](#)), use a crossover cable.



618EF

Figure A-2. MDI-X to MDI-X Cable Connections

Declaration of Conformity

The Declaration of Conformity for the Passport 8100 modules complies with ISO/IEC Guide 22 and EN45014. The declaration identifies the product models, the Nortel Networks name and address, and the specifications recognized by the European community.

As stated in the Declaration of Conformity, the Passport 8100 modules comply with the provisions of Council Directives 89/336/EEC and 73/23/EEC.

Appendix B

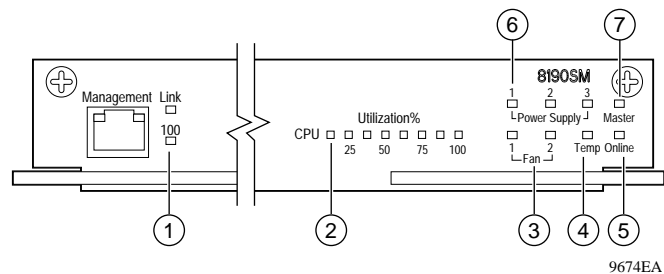
LEDs

This appendix describes the LED locations and meanings for the following Passport 8000 Series modules:

- [Passport 8190SM Switch Management Module](#) (this page)
- [Passport 8132TX and 8148TX I/O Modules](#) (page B-3)
- [Passport 8108GBIC Module](#) (page B-4)

Passport 8190SM Switch Management Module

[Figure B-1](#) shows the LEDs on the Passport 8190SM module. [Table B-1](#) describes the operation of these LEDs.



- 1 = Management port LEDs
- 2 = CPU utilization LEDs
- 3 = Fan LEDs
- 4 = Temp LED
- 5 = Online LED
- 6 = Power Supply LEDs
- 7 = Master LED

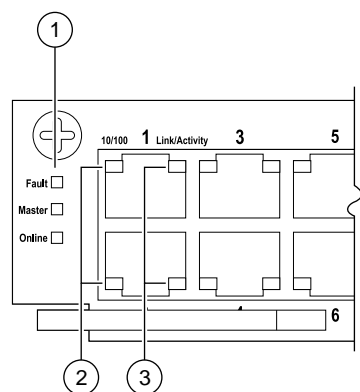
Figure B-1. LEDs on the Passport 8190SM Module

Table B-1. LED Operation on the Passport 8190SM Module

Label	Color/State	Meaning
Link	Green/Steady	The management port is connected, and the link is good.
	Off	There is no link to the management port.
100	Green/Steady	The management port is operating at 100 Mb/s.
	Off	The management port is operating at 10 Mb/s.
Utilization % (8 LEDs)	Green	The number of lit LEDs indicates the level of CPU activity.
Power Supply 1, 2, 3	Off	A power supply is not present in the specified position, or the power supply in the specified position is not turned on.
	Green/Steady	The specified power supply is operating normally.
	Amber/Steady	The specified power supply has a fault.
Fan 1, 2	Green/Steady	The specified fan is operating normally.
	Amber/Steady	The specified fan has failed.
Temp	Green/Steady	The temperature is normal for switch operation.
	Amber/Steady	The maximum operating temperature has been exceeded.
Master	Off	The CPU subsystem on the module is performing diagnostics.
	Amber/Steady	The CPU subsystem is in a fault state.
	Green/Blinking	This module is providing active CPU functions for the switch.
	Green/Steady	The CPU subsystem on this module is up and in standby mode.
Online	Off	This LED is always off during operation of the Passport 8190SM module.

Passport 8132TX and 8148TX I/O Modules

The Passport 8132TX and 8148TX modules have three LEDs to indicate module and system operating conditions ([Table B-2](#)). In addition, each port has two LEDs to indicate data speed and link status ([Table B-3](#)). [Figure B-2](#) shows the locations of the LEDs.



- 1 = Module LEDs
- 2 = Port LEDs: Speed
- 3 = Port LEDs: Link/Activity

Figure B-2. LEDs on the Passport 8132TX and 8148TX Modules

[Table B-2](#) describes the module LEDs, and [Table B-3](#) describes the port LEDs.

Table B-2. Module LEDs on the Passport 8132TX and 8148TX Modules

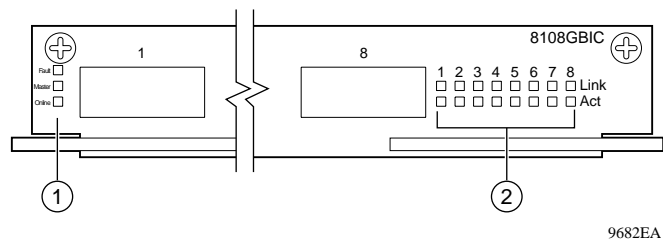
Label	Color/State	Meaning
Fault	Yellow/Steady	A diagnostics failure or hardware failure has been detected.
	Yellow/Blinking	A chassis failure has been detected.
	Off	The system is functioning normally.
Master	Green/Steady	This module is properly generating the system clock for the switch.
	Yellow/Steady	This module has detected system clock generation failure on its own circuitry.
	Off	This module is not providing the system clock for the switch. You can pull this module out of the chassis without resetting the switch.
Online	Green/Steady	The module is functioning normally and is in switching mode.
	Green/Blinking	The module is running diagnostic tests.
	Yellow/Steady	The module is not in switching mode. Software incompatibility exists, or the module cannot communicate with the master module over the backplane.
	Off	The module is not receiving power or is administratively disabled.

Table B-3. Port LEDs on the Passport 8132TX and 8148TX Modules

LED	Color/State	Meaning
10/100 (Speed)	Green/Steady	The port is set to operate at 100 Mb/s.
	Off	The port is set to operate at 10 Mb/s.
Link/Activity	Off	No link exists, or the port is disabled.
	Green/Steady	The link is good.
	Green/Blinking	The link is good, and the port is transmitting or receiving traffic.

Passport 8108GBIC Module

The Passport 8108GBIC module has three LEDs to indicate module and system operating conditions ([Table B-4](#)). In addition, each port has two LEDs to indicate the presence of link and data activity ([Table B-5](#)). [Figure B-3](#) shows the locations of the LEDs.



1 = Module LEDs
2 = Port Link and Activity LEDs

Figure B-3. LEDs on the Passport 8108GBIC Module

Table B-4. Module LEDs on the Passport 8108GBIC Module

Label	Color/State	Meaning
Fault	Yellow/Steady	A diagnostics failure or hardware failure has been detected.
	Yellow/Blinking	A chassis failure has been detected.
	Off	The system is functioning normally.
Master	Green/Steady	This module is properly generating the system clock for the switch.
	Yellow/Steady	This module has detected system clock generation failure on its own circuitry.
	Off	This module is not providing the system clock for the switch. You can pull this module out of the chassis without resetting the switch.
Online	Off	The switch power is off. Or The power has been turned on, and the module is going through its power-on self-test and software initialization. A module in this state is not yet functional.
	Amber/Steady	The module failed its power-on self-test.
	Green/Steady	The module has completed its power-on self-test and software initialization and is operating normally.

Table B-5. Port LEDs on the Passport 8108GBIC Module

Label	Color/State	Meaning
Activity	Green	The port is transmitting data.
	Off	No data activity is occurring.
Link	Off	The port has no link.
	Green	The port has link and is enabled.

Appendix C

Media Dependent Adapters

This appendix describes the media dependent adapters (MDAs) that are available from Nortel Networks. The MDAs can support high-speed connections to servers, shared Fast Ethernet hubs, or backbone devices.

The following MDA versions are available for the Passport 8132TX Edge Switch Module:

- 450-1SR MDA—1000BASE-SX MDA (1-port shortwave gigabit fiber, with 1 redundant port)
- 450-1SX MDA—1000BASE-SX MDA (1-port shortwave gigabit fiber)
- 450-1LR MDA—1000BASE-LX MDA (1-port longwave gigabit fiber, with 1 redundant port)
- 450-1LX MDA—100BASE-LX MDA (1-port longwave gigabit fiber)
- 8100-4TX MDA—10BASE-T/100BASE-TX MDA (4-port copper)
- 8100-2FX MDA—100BASE-FX MDA (2-port multimode fiber with SC connectors)
- 8100-4FX MDA—100BASE-FX MDA (4-port multimode fiber with MT-RJ connectors)

Nortel Networks continually adds new models and features to existing product lines; see your Nortel Networks sales representative for a full range of available MDAs that may have been added after the release of this guide. Each MDA shipment comes with installation instructions.

450 Series MDAs

Four versions of gigabit Ethernet MDAs are available:

- Two shortwave gigabit MDAs ([Figure C-1](#)):
 - The 450-1SR MDA is a single-MAC MDA with a separate redundant Phy (backup Phy port).
 - The 450-1SX MDA is a single-Phy MDA.

These MDAs use shortwave 850 nm fiber optic connectors to connect devices over multimode (550 meter) fiber optic cable.

- Two longwave gigabit MDAs ([Figure C-2](#)):
 - The 450-1LR MDA is a single-MAC MDA with a separate redundant Phy (backup Phy port).
 - The 450-1LX MDA is a single-Phy MDA.

These MDAs use longwave 1300 nm fiber optic connectors to connect devices over single-mode (3 kilometer) or multimode (550 meters) fiber optic cable.

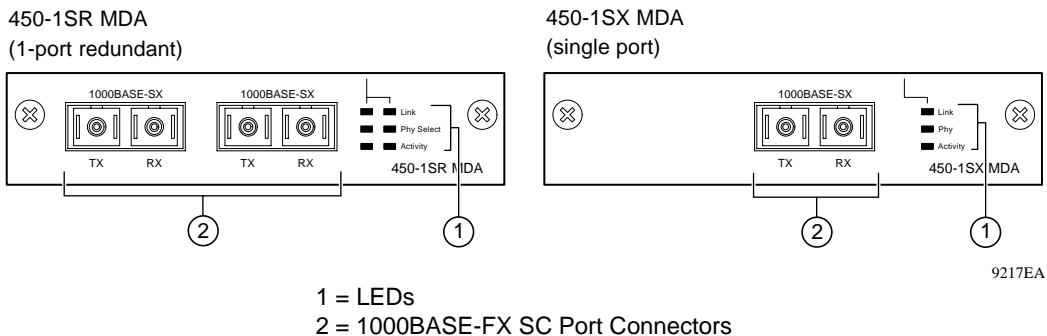


Figure C-1. 1000BASE-SX (Shortwave Gigabit) MDA Front Panels

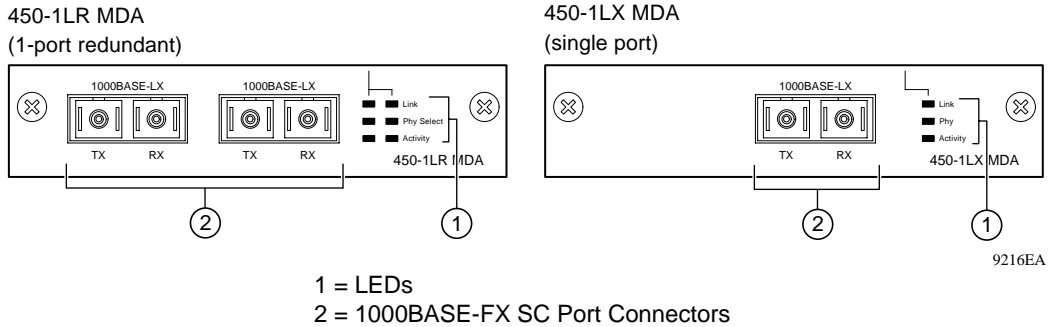


Figure C-2. 1000BASE-LX (Longwave Gigabit) MDA Front Panels

[Table C-1](#) describes the 1000BASE-SX MDA LEDs.

Table C-1. 1000BASE-SX MDA LEDs

Label	Type	Color/State	Meaning
Link	Communication link LEDs	Green/On	A valid communication link is established.
		Green/Blinking	The corresponding port is management disabled.
		Off	The communication link connection is bad, or there is no connection to this port.
Phy Select	Phy selection LEDs	Green/On	The corresponding Phy port is selected.
		Off	The corresponding Phy port is in backup mode.
Activity	Port activity LEDs	Green/Blinking	Indicates network activity level for the corresponding port. A high level of network activity can cause LEDs to appear to be on continuously.

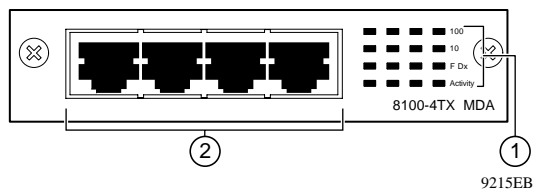
[Table C-2](#) describes the 1000BASE-LX MDA LEDs.

Table C-2. 1000BASE-LX MDA LEDs

Label	Type	Color/State	Meaning
Link	Communication link LEDs	Green/On	A valid communication link is established.
		Green/Blinking	The corresponding port is management disabled.
		Off	The communication link connection is bad, or there is no connection to this port.
Phy Select	Phy selection LEDs	Green/On	The corresponding Phy port is selected.
		Off	The corresponding Phy port is in backup mode.
Activity	Port activity LEDs	Green/Blinking	Indicates network activity level for the corresponding port. A high level of network activity can cause LEDs to appear to be on continuously.

8100-4TX MDA

The 8100-4TX MDA ([Figure C-3](#)) uses standard RJ-45 connectors to attach Ethernet devices. This MDA can operate at either 10 Mb/s or 100 Mb/s speed. The speed is determined through autonegotiation with the connected device.



1 = LEDs

2 = 10BASE-T/100BASE-TX Port Connectors

Figure C-3. 8100-4TX MDA Front Panel

[Table C-3](#) shows the 8100-4TX MDA LEDs.

Table C-3. 8100-4TX MDA LEDs

Label	Type	Color/State	Meaning
100	100BASE-TX port status LEDs	Green/On	The corresponding port is set to operate at 100 Mb/s.
		Green/Blinking	The corresponding port is management disabled.
		Off	The link connection is bad, or there is no connection to this port.
10	10BASE-T port status LEDs	Green/On	The corresponding port is set to operate at 10 Mb/s.
		Green/Blinking	The corresponding port is management disabled.
		Off	The link connection is bad, or there is no connection to this port.
F Dx	Full-duplex port status LEDs	Green/On	The corresponding port is in full-duplex mode.
		Off	The corresponding port is in half-duplex mode.
Activity	Port activity LEDs	Green/Blinking	Indicates the network activity level for the corresponding port. A high level of network activity can cause LEDs to appear to be on continuously.

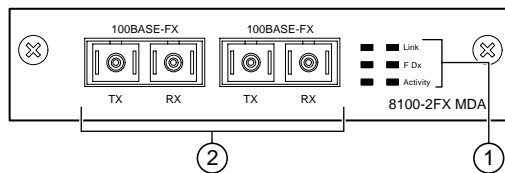
8100 Series Fiber MDAs

The 8100 Series fiber MDAs are used to make fiber-based 100 Mb/s connections to the switch. Two versions of these MDAs are available ([Figure C-4](#)):

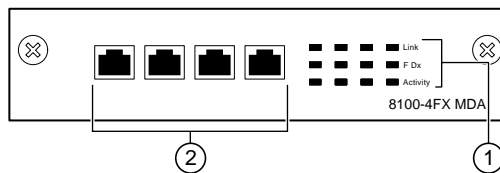
- The 8100-2FX MDA uses two longwave 1300 nm SC connectors to connect devices over 62.5/125 μm multimode fiber optic cable.
- The 8100-4FX MDA uses four longwave 1300 nm MT-RJ connectors to connect devices over 62.5/125 μm multimode fiber optic cable.

The 8100 Series fiber MDAs are not supported on single-mode fiber cable.

8100-2FX MDA
(2-port SC connectors)



8100-4FX MDA
(4-port MT-RJ connectors)



9214EB

1 = LEDs
2 = 100BASE-FX SC Port Connectors

Figure C-4. 8100 Series MDA Front Panels

[Table C-4](#) describes the 8100 Series MDA LEDs.

Table C-4. 8100 Series MDA LEDs

Label	Type	Color/State	Meaning
Link	Communication Link LEDs	Green/On	A valid communication link is established.
		Green/Blinking	The corresponding port is management disabled.
		Off	The communication link connection is bad, or there is no connection to this port.
F Dx	Full-duplex port status LEDs	Green/On	The corresponding port is in full-duplex mode.
		Green/Off	The corresponding port is in half-duplex mode.
Activity	Port activity LEDs	Green/Blinking	Indicates the network activity level for the corresponding port. A high level of network activity can cause LEDs to appear to be on continuously.

Installing an MDA

The MDA slot on the Passport 8132TX module accommodates a single MDA. The connection can be either an RJ-45 10/100BASE-TX MDA or a fiber (100BASE-FX or 1000BASE-SX/LX) MDA with an SC or MT-RJ connector.



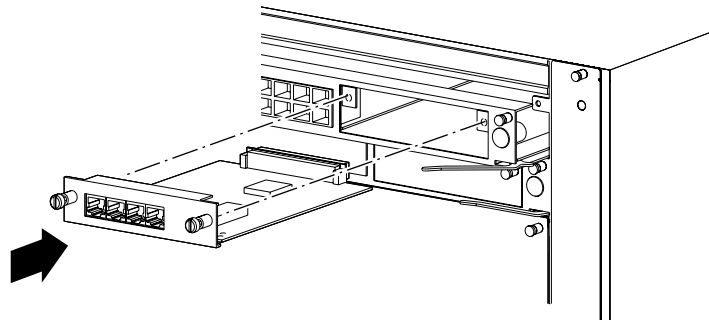
Note: The MDAs are hot-swappable in an operating Passport 8132TX module; however, the module resets when an MDA is inserted or removed.

To install an MDA:

1. Loosen the retaining screw at each end of the module.
2. Use the inserter/extractor levers to disconnect the module from the chassis backplane connector.
3. Loosen the thumbscrews and remove the filler panel (or previously installed MDA) from the MDA slot.
4. Insert the MDA into the slot ([Figure C-5](#)), taking care to slide the MDA onto the guides provided on the module backing.



Caution: Make sure the MDA slides in on the guides provided. Failure to align the guides could result in bent and broken pins.



9169FA

Figure C-5. Installing an MDA

5. **Press the MDA *firmly* into the slot. Be sure that the MDA is fully seated into the mating connector.**
6. **Secure the MDA in the module by tightening the thumbscrews on the MDA front panel.**
7. **Use the inserter/extractor levers to reseat the module backplane connector.**
8. **Tighten the module retaining screws.**
9. **Attach devices to the MDA ports.**



Note: The IEEE 802.3u specification requires that all ports operating at 100 Mb/s use only Category 5 unshielded twisted pair (UTP) cabling.

Appendix D

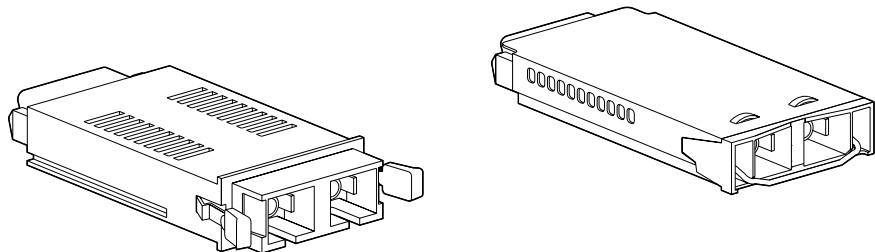
Installing GBICs

This appendix describes how to install the gigabit interface converters (GBICs) in the Passport 8108GBIC module.

The following GBIC versions are available for the Passport 8108GBIC switch module:

- 100BASE-SX—uses multimode fiber over distances up to 550 meters
- 100BASE-LX—uses multimode fiber over distances up to 550 meters or single-mode fiber over distances up to 10 kilometers (km)
- 100BASE-XD—uses single-mode fiber over distances up to 50 km
- 100BASE-ZX—uses single-mode fiber over distances up to 70 km

GBICs are available in two styles ([Figure D-1](#)). One type has two spring tabs at the front of the GBIC; the other type has an extractor handle on the front.



9702FA

Figure D-1. Types of GBICs

GBICs are shipped with a protective rubber plug in the connectors. Leave the plug in place when no cables are connected to the GBIC.

Installing a GBIC

The Passport 8108GB module has eight bays for installing GBICs. The GBIC bays are covered by spring-loaded filler panels that rotate out of the way as you push the GBIC into place. You can install or replace a GBIC in an operating switch module without powering down the switch.

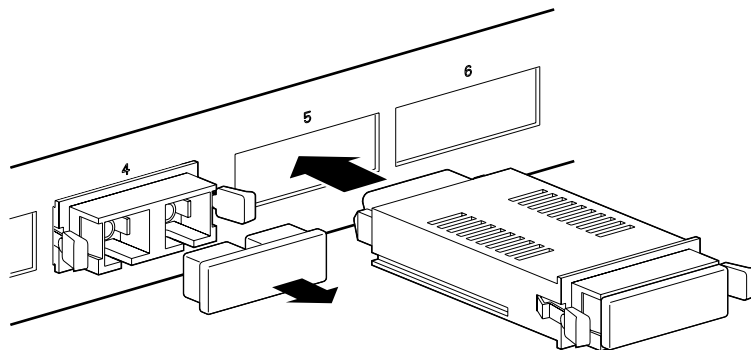


Warning: Fiber optic equipment can emit laser or infrared light that can injure your eyes. Never look into an optical fiber or connector port. Always assume that fiber optic cables are connected to a light source.

To install a GBIC:

1. **Remove the GBIC from its protective packaging.**
2. **Insert the GBIC into the slot on the module ([Figure D-2](#)).**

GBICs are keyed to prevent improper insertion. If the GBIC resists pressure, do not force it. Remove it, turn it over, and reinsert it.



9703FA

Figure D-2. Installing a GBIC

3. **Press on the front of the GBIC until it snaps into place.**
4. **Remove the rubber plug to connect cables.**

To remove an installed GBIC:

1. If the GBIC has spring tabs, press in on the tabs on each side of the GBIC as you pull the GBIC out of the bay ([Figure D-3](#)).

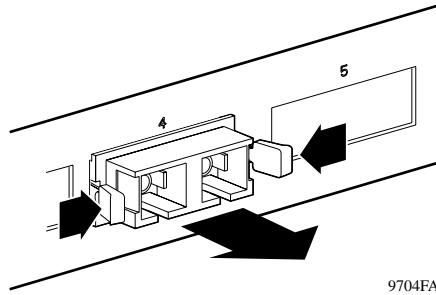


Figure D-3. Removing a GBIC

2. If the GBIC has an extractor handle, grasp the handle and pull firmly to remove the GBIC from the bay.

Appendix E

RFCs and Standards

For more information about networking concepts, protocols, and topologies, you may want to consult the following sources:

- RFC 951 (BootP)
- RFC 1112 (IGMP version 1)
- RFC 1213 (Network Management of TCP/IP MIB II)
- RFCs 1271 and 1757 (RMON)
- RFC 1493 (Bridge MIB)
- RFC 1573 (IANA If Type)
- RFC 1643 (Ether-like MIB)
- RFC 1723 (RIP version 2)
- RFC 1850 (OSPF MIB)
- RFC 2131 (DHCP)
- RFC 2233 (IANA If Type)
- RFC 2236 (IGMP version 2)
- IEEE 802.1D (Standard for Spanning Tree Protocol)
- IEEE 802.3 Ethernet
- IEEE 802.1Q (VLAN Tagging)
- Enterprise MIB (located on the *Passport 8000 Series Software CD*)

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