Chapter 7
Hardware Overview

This chapter provides a hardware overview of the HP 9308M, HP 9304M, and HP 6308M-SX routing switches and the HP 6208M-SX switch.

- For information about specific hardware standards and specifications, see the “Software Specifications” appendix in the *Advanced Configuration and Management Guide*.
- For a detailed summary and description of software features, see “Software Overview” on page 6-1.

The HP 6208M-SX switch provides support for Layer 2 switching within one platform. The HP 6308M-SX routing switch provides both Layer 2 switching and Layer 3 routing in a single device.

The HP 9308M and HP 9308M also provide Layer 2 switching and Layer 3 routing in a single device and support hardware-based Layer 2/3/4 switching and multi-protocol routing on a single, chassis-based platform.

Chassis Devices

The HP 9308M and HP 9304M routing switches provide second generation, hardware-based Layer 2/3/4 switching and multi-protocol routing on a single, chassis-based platform, as shown in Figure 7.1 and Figure 7.14, respectively.

Enterprises and Internet service providers (ISPs) can use these routing switches to build very high-performance, end-to-end packet networks that provide the Quality of Service (QoS) needed to support delay-sensitive traffic. Designed for use in collapsed backbone data centers, server farms, and wiring closets, the HP 9308M and HP 9304M deliver high-density Gigabit Ethernet ports and 10/100 Mbps ports and provides performance of up to 100,000,000 packets per second.

Chassis Modules

Each slot of the HP 9308M and HP 9304M can be populated by either a switch module or a management module. All non-management modules (those without a serial management port), are referred to as ***switch*** modules.

Each system requires at least one ***management module***. Management modules are available with 10/100 Mbps, 100 Mbps fiber ports or Gigabit Ethernet ports and provide a serial port for console access. Management modules also provide additional port density to the system. The management module can be installed within any slot.

For added redundancy and reliability, you can install two Redundant Management modules in a Chassis device. One of the Redundant Management modules is the active module while the other waits in standby mode to assume operation if the active module becomes unavailable. See “Redundant Management Module” on page 7-11 and “Using Redundant Management Modules” on page 4-1 for more information.

The HP 9308M and HP 9304M can be populated with any of the following modules:

- Redundant Management modules
  - J4845A HP ProCurve 9300 GigLX Redundant Management Module (8-port) (Figure 7.8)
  - J4846A HP ProCurve 9300 GigSX Redundant Management Module (8-port) (Figure 7.3)
  - J4847A HP ProCurve 9300 Redundant Management Module (0-port) (Figure 7.4)
- Management modules
  - J4141A HP ProCurve 9300 10/100 Management Module (16-port) (Figure 7.5)
  - J4144A HP ProCurve 9300 Gigabit SX Management Module (8-port) (Figure 7.6)
  - J4146A HP ProCurve 9300 Gigabit 4LX/4SX Management Module (8-port) (Figure 7.7)
- Non-Management modules
  - J4842A HP ProCurve 9300 1000Base-T Module (8-port) (Figure 7.8)
  - J4140A HP ProCurve 9300 10/100 Module (24-port) (Figure 7.9)
  - J4142A HP ProCurve 9300 100Base FX Module (24-port MT-RJ) (Figure 7.10)
  - J4143A HP ProCurve 9300 Gigabit SX Module (8-port) (Figure 7.11)
  - J4145A HP ProCurve 9300 Gigabit 4LX/4SX Module (8-port) (Figure 7.12)
  - J4844A HP ProCurve 9300 GigLX Module (8-port) (Figure 7.13)

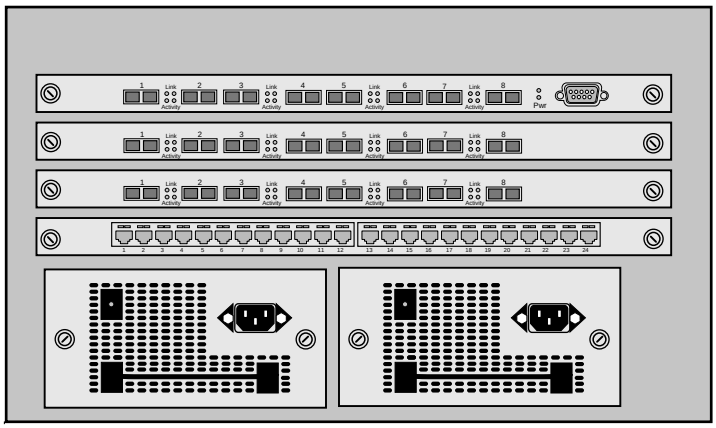

Figure 7.1 Example of an HP 9304M routing switch (4-slot)

Figure 7.2 J4845A HP ProCurve 9300 GigLX Redundant Management Module (8-port)

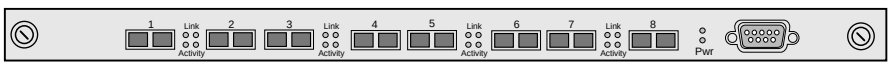

Figure 7.3 J4846A HP ProCurve 9300 GigSX Redundant Management Module (8-port)

Figure 7.4 J4847A HP ProCurve 9300 Redundant Management Module (0-port)

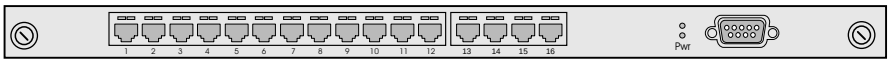

Figure 7.5 J4141A HP ProCurve 9300 10/100 Management Module (16-port)

Figure 7.6 J4144A HP ProCurve 1000BaseSX Management Module (8-port)

Figure 7.7 J4146A HP ProCurve 1000Base 4LX/4SX Management Module (8-port)

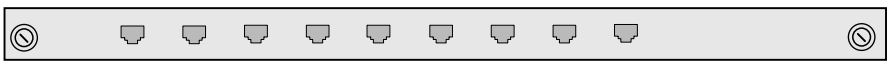

Figure 7.8 J4842A HP ProCurve 9300 1000Base-T Module (8-port)

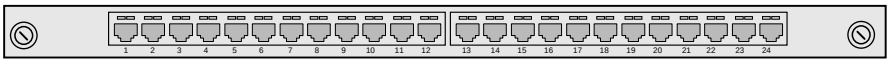

Figure 7.9 J4140A HP ProCurve 9300 10/100 Module (24-port)

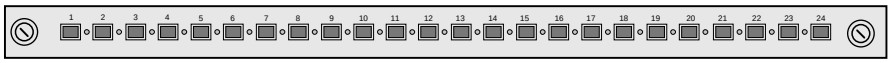

Figure 7.10 J4142A HP ProCurve 9300 100Base FX Module (24-port MT-RJ)

Figure 7.11 J4143A HP ProCurve 9300 Gigabit SX Module (8-port)

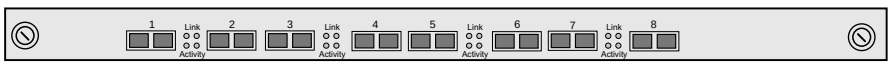

Figure 7.12 J4145A HP ProCurve 9300 Gigabit 4LX/4SX Module (8-port)

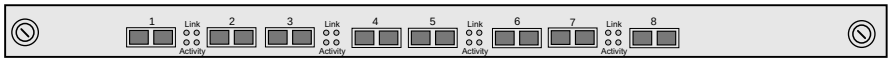

Figure 7.13 J4844A HP ProCurve 9300 GigLX Module (8-port)

NOTE: All 10/100 ports are auto-sensing and auto-negotiating for easy deployment into existing network topologies. Gigabit Ethernet interfaces are available in multi-mode 1000BaseSX, single-mode/multi-mode 1000BaseLX, and copper.

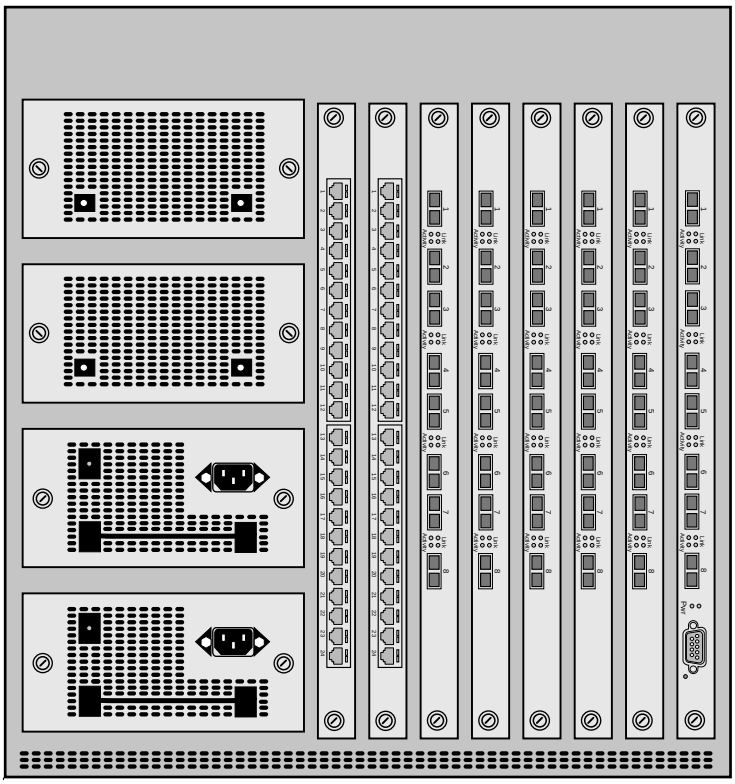

Figure 7.14 Example of an HP 9308M routing switch (8-slot)

Fixed-Port Switch HP 6208M-SX and Routing Switch HP 6308M-SX

Figure 7.15 shows the HP 6308M-SX. Figure 7.16 shows the HP 6208M-SX. Each device provides a serial port for CLI management and eight 100Mbps SX fiber ports for connection to Gigabit Ethernet links.

The HP 6308M-SX routing switch provides both Layer 2 switching and Layer 3 routing in a single device and supports all of the most popular standards-based protocols—IP, IP/RIP, IPX, OSPF, BGP4, and AppleTalk. HP routing switches also support two IP multicasting protocols—Distance Vector Multicast Routing Protocol (DVMRP) and Protocol Independent Management (PIM). The routing switches also support path redundancy for hosts within a network provided by the Standby Router Protocol (SRP).

HP 6308M-SX routing switches can be concentrated in a data center to provide additional port density for very high-performance, centralized routing. A stack of HP 6308M-SX routing switches can provide connections to routers, switches, and servers.

The HP 6208M-SX switch provides support for Layer 2 and Layer 3 switching within one platform.

The HP 6208M-SX switch can be used to interconnect a stack of backbone switches for faster switching and access over Gigabit links. This switch also can be stacked with other HP 6208M-SX switches in a network center to provide Gigabit link connections to switches and server farms through the riser.

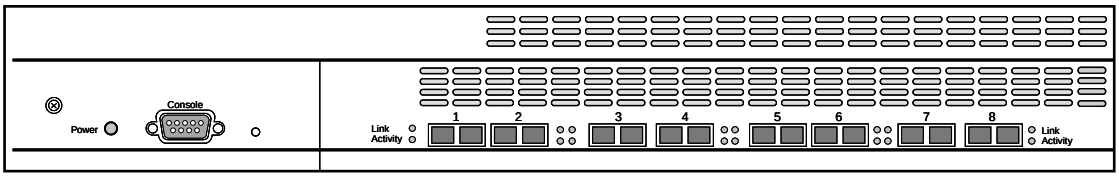

Figure 7.15 HP ProCurve 6308M-SX routing switch

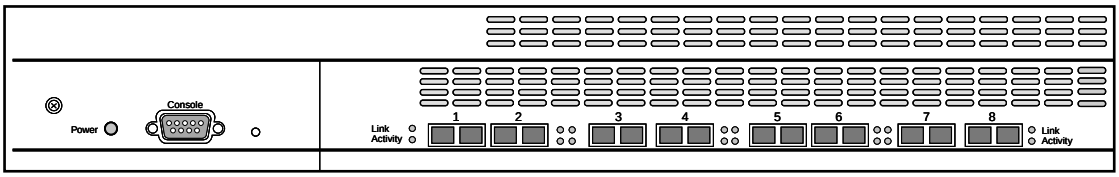

Figure 7.16 HP ProCurve 6208M-SX switch

System Architecture

Chassis Architecture

Built on a fully non-blocking architecture, the chassis platform provides switching capacity in the core and on each interface module of up to 128 Gbps for the HP 9304M and 256 Gbps for the HP 9308M.

The chassis core consists of a backplane and crosspoint switching fabric that supports four interfaces modules on the HP 9304M. The HP 9308M supports eight interface modules.

Each interface module utilizes a high bandwidth, shared memory switching fabric that switches up to 32 Gbps of bandwidth. This local switching fabric houses the forwarding engines and includes Application Specific Integrated Circuits (ASICs) that provide packet switching functions such as priority handling. Each interface module also contains ASICs that perform high speed Layer 2, Layer 3, and Layer 4 lookups and forwarding, including IP sub-net look ups and packet modifications of IP and IPX packets. Additionally, each interface module has an 8 Gbps full-duplex data path to the backplane that provides separate priority queues for each module destination.

Fixed-Port Architecture

Layer 2 Architecture

When a packet arrives at an HP 6208M-SX switch, a search for the MAC destination address is initiated. If the MAC destination address is found, the packet's priority is determined. The packet is then forwarded to the appropriate output port.

Packets that are not located in the address table are forwarded to all other switch ports unless VLANs are operating on the switch. If the switch is operating with VLANs, then the packet is forwarded only to other ports within its VLAN.

If the source address of the packet received at the switch is not resident in its address table, or if the source port of the packet has changed, both the source address and its source port will be programmed into the address table.

Layer 3 Architecture

When a packet arrives at an HP 9304M, HP 9308M, or HP 6308M-SX routing switch, an address lookup is initiated.

IP Version 4 Packets

If the IP address is located, then the device performs the following Layer 3 IP operations on the IP packet:

- Decrements the TTL value.
- Checks to see if TTL value is greater than zero. If so, the packet will be forwarded.
- Performs destination MAC address substitution of the next hop router or end station. The source MAC address will be replaced by the MAC address of the interface.
- Updates the header checksum.

Once Layer 3 operations are completed, the packet's priority is determined, and it is placed in the appropriate buffer for forwarding to the target output port.

IPX Packets

When an IPX packet is received, the frame type is determined. When the incoming and outgoing frame types are Ethernet 802.2 or 802.3, the device will perform hardware forwarding:

- If the destination network number is an internal or remote network number.
- If the destination network number is an internal or remote network number, the system will provide network assistance.
- If the frame type is Ethernet II or Ethernet SNAP, the packet is sent directly to the CPU. The CPU will increment the transport control count and forward it to its target output port.

Other Protocol Packets

Protocols not supported by the routing switches will be switched at Layer 2.

Physical View

This section describes the external features of the HP 9304M, HP 9308M, HP 6308M-SX, and HP 6208M-SX.

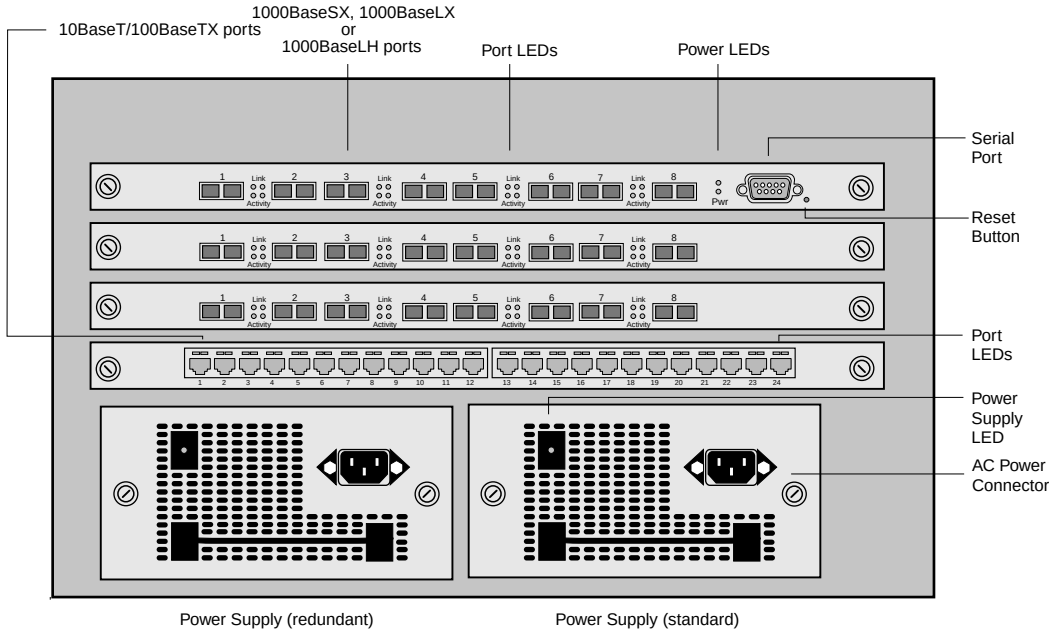

Figure 7.17 Example front panel of an HP 9304M routing switch

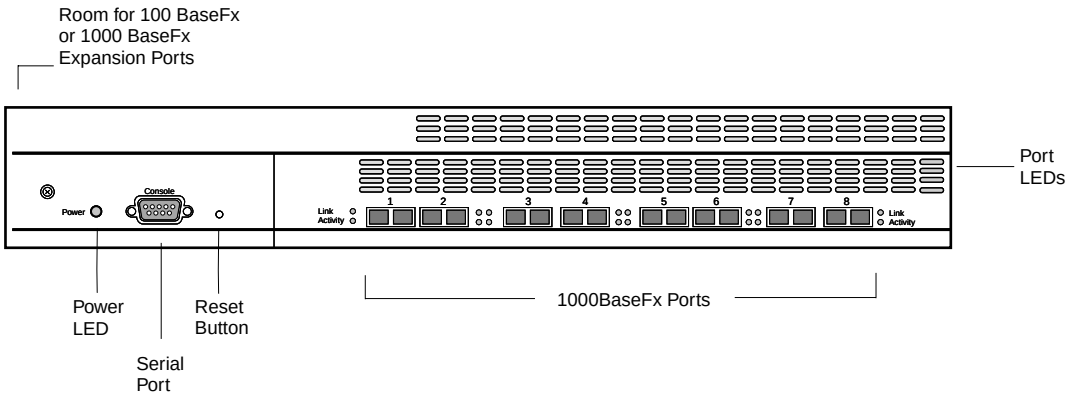

Figure 7.18 Front panel of an HP ProCurve 6308M-SX routing switch

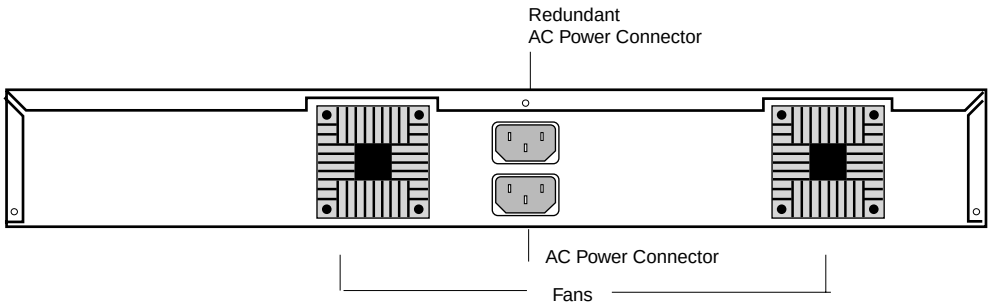

Figure 7.19 Rear panel of an HP 6208M-SX switch or HP 6308M-SX routing switch

NOTE: The rear panel of the HP 9308M and HP 9304M Chassis devices provide no network or power connections and therefore are not shown.

Slot and Port Numbers

The port numbers on all Fixed-port devices and Chassis devices are labeled on the hardware. However, the method you use to enter or select a port number differs depending on whether you are managing a Fixed-port device or a Chassis device.

Fixed-Port Devices

To specify a port number in the software, enter or select the number associated with the port on the device's front panel. For example, to assign a name to port 8 on a Fixed-port device, enter the following CLI commands:

```
HP6208(config)# interface e 8
HP6208(config-if-8)# port-name pdtmarketing
```

Syntax: interface ethernet <portnum>

Syntax: port-name <string>

Chassis Devices

The port numbers on the modules in Chassis devices are labeled, but the slot numbers are not labeled.

- Slots on the HP 9304M are numbered 1 – 4, from top to bottom.
- Slots on the HP 9308M are numbered 1 – 8, from left to right.

You can place the management module in any slot. The slot numbers are absolute and do not change based on the position of the management module.

To specify a port on a Chassis device, enter the slot number, a forward slash (/), and the number associated with the port on the device's front panel. For example, to assign a name to port 8 on the module installed in chassis slot 2, enter the following commands:

```
HP9300(config)# interface e 2/8
HP9300(config-if-2/8)# port-name pdtmarketing
```

Syntax: interface ethernet <portnum>

Syntax: port-name <string>

NOTE: The Fixed-port devices do not contain separate slots and thus do not use slot numbers.

AC Power Connector

The AC power connectors are located at the rear of the Fixed-port devices. Because a redundant supply is installed, the rear panel contains two AC connectors.

On Chassis devices, the power supplies are accessible from the front of the chassis, and the power supply connector is embedded within the power supply.

Buffering

Fixed-port devices provide a pool of 2 Megabytes (MB) of buffering memory for their ports. Buffering memory for each chassis module is also 2 MB.

Fans

The HP 6308M-SX routing switch and HP 6208M-SX switch come standard with two fans to provide additional cooling for the internal components of the device.

The Chassis devices, the HP 9304M and HP 9308M, come standard with four fans. The HP 9304M also comes standard with four fans. The HP 9308M comes standard with six fans.

LEDs

Each device is equipped with LEDs that denote port and power supply status. The tables below reflect the different port and expansion module port states.

Fixed-Port Devices

The HP 9304M and HP 9308M devices come equipped with three LEDs per Ethernet port, as highlighted in Table 7.7.1 below. Gigabit Ethernet ports have two LED indicators, as defined in Table 7.7.2.

Chassis Devices

Chassis devices support two different modules with two different LED indicator types, Ethernet/Fast Ethernet and Gigabit Ethernet. Ethernet modules have two port LED indicators, as defined in Table 7.7.2. LEDs for Gigabit Ethernet ports are defined in Table 7.7.3.

Table 7.1: Port LED indicators for a fixed-port 10BaseT/100BaseTX system

LED	Position	State	Meaning
FDX/HDX	Top	On	The port is operating at full-duplex.
		Off	The port is operating at half-duplex.
100	Middle	On	The port is operating at 100 Mbps.
		Off	The port is not operating at 100 Mbps.
Link/Act	Bottom	On	Port is connected.
		Off	No port connection exists.
		Blinking	Traffic is being transmitted or received on that port.

Table 7.2: Port LED indicators for 100BaseFX or 1000BaseSX/LX ports

LED	Position	State	Meaning
Link	Top	On	Port is connected.
		Off	No port connection exists.
Activity	Bottom	On	Traffic is being transmitted and received on that port.
		Off	No traffic is being transmitted.
		Blinking	Traffic is being transmitted and received on that port.

Table 7.3: Port LED indicators for 10BaseT/100BaseTX chassis modules

LED	Position	State	Meaning
Link/Activity	Left	On	Port is connected.
		Off	No port connection exists.
		Blinking	Traffic is being transmitted and received on that port.
FDX	Right	On	The port is operating at full-duplex.
		Off	The port is operating at half-duplex.

Ports

The following port types are supported on the HP 9304M and HP 9308M devices.

1000BaseT Gigabit Copper (GC) Ports

The 1000Base-T Gigabit Copper ports can provide Gigabit throughput over standard Cat-5 copper wiring. The port connectors are RJ-45s, the same as the connectors on HP's 10/100 modules. Thus, you can immediately deploy the GC ports without recabling.

10BaseT/100BaseTX Ports

The 10BaseT/100BaseTX ports are auto-sensing, auto-negotiating ports with RJ-45 UTP connectors. These ports accept Category 5 Unshielded Twisted Pair (UTP) cables.

See "Connecting Network Devices" on page 2-18 for cabling pinouts and signalling specifics. If you prefer to avoid assembling cables by hand, you can order the proper cables from HP.

100BaseFX Ports

The 100BaseFX ports are equipped with SC connectors and operate at 100 Mbps in full-duplex mode.

1000BaseSX Ports

The 1000BaseSX ports operate in full-duplex mode and are equipped with SC connectors. Multi-mode fiber cabling is supported.

1000BaseLX

The 1000BaseLX ports operate in full-duplex mode and are equipped with SC connectors. Both single-mode fiber (SMF) and multi-mode fiber (MMF) cabling is supported. The 1000BaseLX ports must be connected to another 1000BaseLX port. Connection to a 1000BaseSX port is not supported.

NOTE: 1000BaseSX and 1000BaseLX ports also support auto-negotiation when the auto-gig option is enabled on the system.

NOTE: 1000BaseSX and 1000BaseLX ports operate only at full-duplex.

Port Connectors

100BaseFX, 1000BaseSX, and 1000BaseLX ports come with dual SC connectors.

10/100BaseTX ports come with RJ-45 connectors.

Processors

The HP 9304M, HP 9308M, HP 6208M-SX, and HP 6308M-SX devices come standard with a 240 MHz processor.

Modules

This section describes the modules designed for the HP 9304M and HP 9308M routing switches.

Chassis Modules

Chassis modules are available with either 10/100BaseTX ports or Gigabit Ethernet ports:

- 8-port management module
- 8-port Gigabit Ethernet management module
- 8-port Gigabit Ethernet switch module
- 16-port fiber 100BaseFX switch module
- 16-port 10/100 BaseT/BaseTX Ethernet management module
- 24-port 10/100 BaseT/BaseTX Ethernet switch module
- 24-port 10/100 BaseFx switch module

NOTE: The Chassis devices support 1000BaseSX and 1000BaseLX ports.

Redundant Management Module

The Redundant Management modules provide increased route capacity for routing switches running Border Gateway Protocol Version 4 (BGP4). In addition, the Redundant Management modules contain a configurable temperature sensor that sends a Syslog message and SNMP trap if the temperature on the module exceeds a specified warning level. The temperature sensor also can shut the module down automatically to prevent damage.

You can use one or two Redundant Management modules in a Chassis device. Using two Redundant Management modules adds fault protection against system outage. The two modules work together as active and standby management modules. If the active module becomes unavailable, the standby module automatically takes over system operation.

For more information and complete configuration and management information, see “Using Redundant Management Modules” on page 4-1.

AC Power Supply

The fixed-port HP 6208M-SX switch and HP 6308M-SX routing switch are equipped with an autoranging 100-250 VAC power supply rated at 5 – 2.5A and 50 – 60 Hz.

The HP 9304M and HP 9308M routing switches are equipped with an autoranging 100 – 120/200 – 240 VAC power supply rated at 8A/4A and 50 – 60 Hz.

Standard and Redundant Power Options

The Fixed-port devices come standard with two power supplies. Redundant power is an option for the Chassis device. Each power supply can be connected to a separate AC power source for additional power redundancy.

Fixed-Port Devices

These systems come standard with two power supplies.

Chassis Devices

The HP 9304M comes standard with one power supply, which is enough to provide adequate power for any combination of modules. You can order an additional power supply for redundancy.

The HP 9308M can contain from one to four power supplies and comes standard with one power supply.

- One supply is adequate for devices with one, two, or three modules (including the management module).
- If the chassis contains four or more modules, you need at least two power supplies. Two power supplies is sufficient if the chassis contains fewer than four 24-port 10/100 FX modules.
- If the chassis contains four or more 24-port 10/100 FX modules, you need at least three power supplies.

You can order additional power supplies over your systems' minimum requirement for redundancy. If fewer than four power supplies are installed, the empty slots will be covered by safety covers.

NOTE: When you power on a Chassis device that requires multiple power supplies, make sure you apply power to all the supplies (or at least the minimum number of supplies required for your configuration) at the same time. Otherwise, the device either will not boot at all, or will boot and then repeatedly display a warning message stating that you need to add more power supplies.

Temperature Sensor

The Redundant Management modules for the HP 9304M and HP 9308M routing switches contain an on-board temperature sensor. The software reads the sensor based on the chassis poll-time, a configurable parameter that determines how often the software polls the chassis for hardware status information.

The software is configured with a warning temperature (default 45 degrees Celsius) and a shutdown temperature (default 55 degrees Celsius). When the software reads the temperature sensor, if the temperature equals or exceeds the warning or shutdown temperature, the software does the following:

- Warning message – If the temperature of the module reaches the warning value, the software sends a Syslog message to the Syslog buffer and also to the SyslogD server, if configured. In addition, the software sends an SNMP trap to the SNMP trap receiver, if you have configured the device to use one.
- Shutdown – If the temperature matches or exceeds the shutdown temperature, the software sends a Syslog message to the Syslog buffer and also to the SyslogD server if configured. The software also sends an SNMP trap to the SNMP trap receiver, if you have configured the device to use one.

If the temperature equals or exceeds the shutdown temperature for five consecutive polls of the temperature by the software, the software shuts down the module to prevent damage.

For more information and configuration information, see “Temperature Sensor” on page 4-15.

Reset Button

The reset button allows you to restart the system. The reset button is recessed to prevent it from being pushed accidentally.

- For Chassis devices, the reset button is located to the right of the serial port on the management module as labeled in Figure 7.17.
- For Fixed-port devices, the reset button is located to the right of the serial port as labeled in Figure 7.18.