



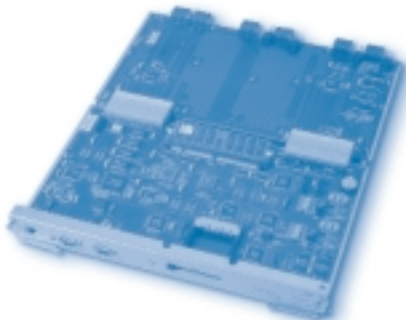
Passport 8000

8100 Series Edge Switch Modules

Passport 8100 Series Features and Benefits

- High Availability
- Operational Simplicity
- Low Cost of Ownership
- Open IP Environment

Figure 1: *Passport 8190SM
Switch Management
Module.*



The Passport* 8100 series Edge Switch modules deliver high-density, high-performance Layer 2 switching for Nortel Networks' flexible Passport 8000 enterprise switch platform. The 8100 series Edge Switch modules provide the high availability, operational simplicity and low cost of ownership required by today's high-density enterprise wiring closets, delivering cost-effective 10/100 or 100BASE-FX desktop connections and integrated Fast Ethernet, Gigabit Ethernet or ATM risers for connectivity to the network core.

The Passport 8100 series Edge Switch modules support a high-performance Layer 2 switching architecture that delivers up to 50 Gbps of switching capacity today (scaling to 256 Gbps in the future) and 24 Mpps performance with less than 10 microseconds of latency to support business applications. One software license is required per 8100 switching chassis, regardless of the application demands.

Switch Management

The 6-slot and 10-slot chassis require one 8190 SM Switch Management module (see Figure 1) for the 8100 switching system.

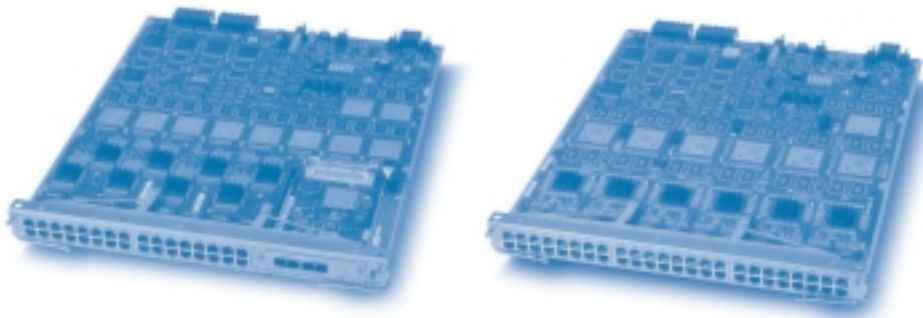
The 8190SM Switch Management module delivers an on-board CPU for management and administration of the 8100 series Edge Switch modules. A full file management system provides important administrative capabilities such as software image and configuration file storage, file upload/download, ASCII file editing and management access lists for SNMP and Telnet.

Two 8190SM modules can be installed for maximum switch resilience. In the event of a CPU failure, control is automatically passed to the secondary 8190SM modules in less than one second.

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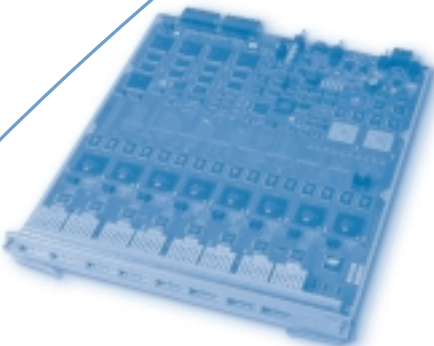
Figure 2: Passport 8100 Series Fast Ethernet Edge Switch Modules.



The 8190SM offers a standard console and modem port using DB-9 serial connectors, a PCMCIA slot for ATA type cards and a 10/100 Ethernet port for out-of-band Ethernet management — easing switch administration.

The 8190SM Switch Management module also provides LEDs to indicate temperature, power supply and fan tray status, master/secondary status, CPU utilization and management port link and speed.

Figure 3: Passport 8108GBIC Gigabit Ethernet Edge Switch Module.



Fast Ethernet

Providing solutions for copper and fiber media, the Fast Ethernet Edge Switch modules provide the high availability, maximum port density and operational simplicity required by enterprise wiring closets.

The 8132TX module has 32 autosensing 10BASE-T/100BASE-TX ports for desktop connections and one MDA slot for riser connections or additional desktop ports. Plug-in MDAs are available with 10/100, 100BASE-FX, or Gigabit Ethernet (SX and LX) to support all variants of riser connections.

The 8116FX module provides 16 100BASE-FX ports and can be used for fiber desktop connections for network center aggregation of risers from multiple workgroups. This module also has one MDA slot for riser connections, additional desktop ports or server attachment. The same plug-in MDAs are available with 10/100, 100BASE-FX, and Gigabit Ethernet (SX and LX).

The 8148TX module is optimal for the highest density wiring closets, providing 48 10/100 autosensing ports for user desktop connectivity via standard RJ-45 interfaces.

Each module has LEDs to indicate port speed and activity for each port and further LEDs to indicate power and diagnostic status.

Up to eight Edge Switch modules can be installed in the 10-slot chassis, providing support for up to 384 10/100 ports or 160 100BASE-FX ports. Up to four Edge Switch modules can be installed in the 6-slot chassis, providing support for up to 192 10/100 ports or 80 100BASE-FX ports.

Gigabit Ethernet

The 8108GBIC module (see Figure 3) provides 8 Gigabit Interface Connector (GBIC) ports for riser and server connectivity using plug-in GBIC modules with SC connectors. Plug-in GBIC modules are available in shortwave (SX), longwave (LX) and extended distance (XD and DX).

The 8108GBIC module is optimized for high density server farms and aggregation points in enterprise campus networks and for backbone/core applications in medium size campus networks.

Each module has LEDs to indicate link and activity for each port and additional LEDs to indicate power, fault and master clock status.

Table 1 shows the maximum port densities supported by each chassis using the Edge Switch modules and plug-in MDAs.

Table 1: Maximum port densities for the Passport 8010 and 8006 chassis.

Features and Benefits

High Availability

- Hot-swap for all modules and chassis components.
- Redundant MultiLink Trunking (MLT) delivers fail-safe riser and server connectivity.
- BaySecure* Media Access Control (MAC) address authentication prevents unauthorized network access.
- Broadcast and Multicast Rate Limiting prevents network storms.
- Spanning Tree Protocol (STP) and enhanced STP FastStart provides efficient Layer 2 resilience.

Operational Simplicity

- Switch capacity of 50 Gbps, scaling to 256 Gbps in the future.
- MultiLink Trunking (MLT) increases riser and server scalability by aggregating two to four ports to form a single high-performance link of up to 8 Gbps capacity.
- Internet Group Management Protocol (IGMP) snooping and pruning provides efficient control of Multicast traffic.
- Port- and protocol-based VLANs provide broadcast containment and separation of network traffic.

| Module and Interface Type | No. of Interfaces Per Module | Maximum No. of Interfaces Per Chassis | |
|---|------------------------------|---------------------------------------|-------------------------------|
| | | Passport 8006 6-slot chassis | Passport 8010 10-slot chassis |
| 8132TX edge switch module with MDA 10/100 BASE-TX (RJ45) | 32 (plus one MDA slot) | 128 (plus 4 MDAs) | 256 (plus 8 MDAs) |
| 8116FX edge switch module with MDA 100BASE-FX (MT-RJ) | 16 (plus one MDA slot) | 64 (plus 4 MDAs) | 128 (plus 8 MDAs) |
| 8148TX Edge Switch module 10/100 BASE-TX (RJ45) | 48 | 192 | 384 |
| 8108GBIC Edge Switch module 100BASE-X (SC) | 8 | 32 | 64 |

- 802.1Q VLAN tagging enables multiple VLANs to be carried over a single riser trunk.
- 802.1p prioritization, with dual hardware queues, enables Class of Service (CoS) support for critical business applications.
- Four groups of Remote Network Monitoring (RMON) per port.
- Port mirroring for local monitoring and troubleshooting.
- Configuration using Nortel Networks' common Command Line Interface (CLI) and Passport Device Manager/VLAN Manager graphical user interface (GUI).

Low Cost of Ownership

- Future-proof chassis with built-in support for future technologies.
- Web-based Optivity* device and network management.
- Support for Optivity end-to-end policy management.

Technical Specifications

Table 2: Technical Specifications for the Passport 8190SM Switch Management module.

| | |
|--|--|
| MTBF | 229,623 hours |
| Module Performance Specifications (64 byte packets) | |
| Aggregate Throughput | 3.0 million packets per second (pps) |
| Switched 10 Mbps Port Forwarding Rate | 14,880 pps |
| Switched 100 Mbps Port Forwarding Rate | 148,810 pps |
| Switched 1000 Mbps Port Forwarding Rate | 1,488,100 pps |
| Latency | 9 microseconds for minimum packet length at 100 Mbps |
| Network Protocol and Standards Compatibility | |
| IEEE 802.3 | CSMA/CD (ISO/IEC 8802-3) |
| IEEE 802.3i | 10BASE-T (ISO/IEC 8802-3) |
| IEEE 802.3u | 100BASE-T (ISO/IEC 8802-3) |
| IEEE 802.1D | MAC Bridges (ISO/IEC 10038) |
| IEEE 802.3z | 1000BASE-SX and 1000BASE-LX (Draft Standard v3.1) |
| Data Rate and Encoding | |
| 10 Mbps | Manchester encoding |
| 100 Mbps | 4B/5B encoding |
| 1000 Mbps | 8B/10B encoding |
| Gigabit Link Power Budget | |
| 1000BASE-SX | 7.5 dB |
| 1000BASE-LX MultiMode Fiber | 7.5 dB |
| 1000BASE-LX SingleMode Fiber | 8.0 dB |
| Gigabit Cabling Distance Specification | |
| 1000BASE-SX on MultiMode Fiber (50 um) | 550 m |
| 1000BASE-SX on MultiMode Fiber (62.5 um) | 260 m |
| 1000BASE-LX on MultiMode Fiber (50um) | 550 m |
| 1000BASE-LX on MultiMode Fiber (62.5um) | 550 m |
| 1000BASE-LX on SingleMode Fiber (10um) | 5 km |

Table 2: Technical Specifications for the Passport 8190SM Switch Management module.

| | |
|---|---|
| Module Microprocessor | Motorola MC68340 |
| Module Memory | |
| Processor DRAM | 4 MB |
| Flash Memory | 2 MB |
| Module Electrical Specifications | |
| Input Power | 75 W maximum |
| Thermal Rating | 250 BTU/hr |
| Module Physical Dimensions | (H) 1.5 in. x (W) 15.4 in. x (D) 18.5 in. [(H) 3.8 cm x (W) 39.1 cm x (D) 47.0 cm] |
| Module Weight | 8 lb (4 kg) |
| Environmental Specifications | |
| Operating Temperature | 5° to 40° C |
| Storage Temperature | -25° to 70° C |
| Operating Humidity | 85% maximum relative humidity, non-condensing |
| Storage Humidity | 95% maximum relative humidity, non-condensing |
| Operating Altitude | 10,000 ft (3,000 m) maximum |
| Storage Altitude | 10,000 ft (3,000 m) maximum |
| Free Fall/Drop | ISO 4180-s, NISTA 1A |
| Vibration | IEC 68-2-6/34 |
| Shock/Bump | IEC 68-2-27-29 |
| Electromagnetic Emissions | |
| Meets requirements of: | |
| US | FCC CFR47 Part 15, Subpart B, Class A |
| Canada | ICES-003, Issue-2, Class A |
| Australia/New Zealand | AS/NZS 3548:1995, Class A |
| Japan | VCCI-V3/97.04, Class A |
| Taiwan | CNS13438, Class A |
| | EN 55 022 (CISPR 22:1985), Class A |
| | CE Mark |
| Electromagnetic Susceptibility | EN 50082-1,1992 |
| Safety Agency Approvals | UL Listed (UL 1950) CUL CSA 22.2 #950 CB with all national deviations NOM NOM –019-SCFI 1994 |

Technical Specifications

Table 3: Technical Specifications for the Passport 8100 series Fast Ethernet modules.

| MTBF | |
|--|--|
| 8132TX | 122,000 hours |
| 8116FX | 102,814 hours |
| 8148TX | 72,213 hours |
| Module Performance Specifications (64 byte packets) | |
| Aggregate Throughput | 3.0 million packets per second (pps) |
| Switched 10 Mbps Port Forwarding Rate | 14,880 pps |
| Switched 100 Mbps Port Forwarding Rate | 148,810 pps |
| Switched 1000 Mbps Port Forwarding Rate | 1,488,100 pps |
| Latency | 9 microseconds for minimum packet length at 100 Mbps |
| Network Protocol and Standards Compatibility | |
| IEEE 802.3 | CSMA/CD (ISO/IEC 8802-3) |
| IEEE 802.3i | 10BASE-T (ISO/IEC 8802-3) |
| IEEE 802.3u | 100BASE-T (ISO/IEC 8802-3) |
| IEEE 802.1D | MAC Bridges (ISO/IEC 10038) |
| IEEE 802.3z | 1000BASE-SX and 1000BASE-LX (Draft Standard v3.1) |
| Data Rate and Encoding | |
| 10 Mbps | Manchester encoding |
| 100 Mbps | 4B/5B encoding |
| 1000 Mbps | 8B/10B encoding |
| Gigabit Link Power Budget | |
| 1000BASE-SX | 7.5dB |
| 1000BASE-LX MultiMode Fiber | 7.5 dB |
| 1000BASE-LX SingleMode Fiber | 8.0dB |

Table 3: Technical Specifications for the Passport 8100 series Fast Ethernet modules (continued).

| | |
|---|--|
| Gigabit Cabling Distance Specification | |
| 1000BASE-SX on MultiMode Fiber (50 um) | 550 m |
| 1000BASE-SX on MultiMode Fiber (62.5 um) | 260 m |
| 1000BASE-LX on MultiMode Fiber (50um) | 550 m |
| 1000BASE-LX on MultiMode Fiber (62.5um) | 550 m |
| 1000BASE-LX on SingleMode Fiber (10um) | 5 km |
| Module Memory | |
| Processor DRAM | 4 MB |
| Flash Memory | 2 MB |
| Module Electrical Specifications | |
| Input Power | 75 W maximum |
| Thermal Rating | 250 BTU/hr |
| Module Physical Dimensions | (H) 1.5 in. x (W) 15.4 in. x (D) 18.5 in. [(H) 3.8 cm x (W) 39.1 cm x (D) 47.0 cm] |
| Module Weight | 8lb (4kg) |
| Environmental Specifications | |
| Operating Temperature | 5° to 40° C |
| Storage Temperature | -25° to 70° C |
| Operating Humidity | 85% maximum relative humidity, non-condensing |
| Storage Humidity | 95% maximum relative humidity, non-condensing |
| Operating Altitude | 10,000 ft (3,000 m) maximum |
| Storage Altitude | 10,000 ft (3,000 m) maximum |
| Free Fall/Drop | ISO 4180-s, NISTA 1A |
| Vibration | IEC 68-2-6/34 |
| Shock/Bump | IEC 68-2-27-29 |

Table 3: Technical Specifications for the Passport 8100 series Fast Ethernet modules (continued).

| | |
|---------------------------------------|---------------------------------------|
| Electromagnetic Emissions | |
| Meets requirements of: | |
| US | FCC CFR47 Part 15, Subpart B, Class A |
| Canada | ICES-003, Issue-2, Class A |
| Australia/New Zealand | AS/NZS 3548:1995, Class A |
| Japan | VCCI-V3/97.04, Class A |
| Taiwan | CNS13438, Class A |
| | EN 55 022 (CISPR 22:1985), Class A |
| | CE Mark |
| Electromagnetic Susceptibility | EN 50082-1,1992 |
| Safety Agency Approvals | |
| | UL Listed (UL 1950) |
| | CUL CSA 22.2 #950 |
| | CB with all national deviations |
| | NOM NOM –019-SCFI 1994 |

Technical Specifications

Table 4: Technical specifications for the Passport 8108GBIC module.

| | |
|--|--|
| MTBF | 93,284 hours |
| Module Performance Specifications (64 byte packets) | |
| Aggregate Throughput | 3.0 million packets per second (pps) |
| Switched 10 Mbps Port Forwarding Rate | 14,880 pps |
| Switched 100 Mbps Port Forwarding Rate | 148,810 pps |
| Switched 1000 Mbps Port Forwarding Rate | 1,488,100 pps |
| Latency | 9 microseconds for minimum packet length at 100 Mbps |

Table 4: Technical specifications for the Passport 8108GBIC module (continued).

| | |
|---|--|
| Network Protocol and Standards Compatibility | |
| IEEE 802.3 | CSMA/CD (ISO/IEC 8802-3) |
| IEEE 802.1D | MAC Bridges (ISO/IEC 10038) |
| IEEE 802.3x | flow control |
| IEEE 802.3z | 1000BASE-SX (Draft standard version 3.1) |
| Data Rate and Encoding | 1000 Mbps 8B/10B encoding |
| Gigabit Link Power Budget | |
| 1000BASE-SX | 7.5dB |
| Gigabit Cabling Distance Specification | |
| 1000BASE-SX on MultiMode Fiber (50 um) | 550 m |
| 1000BASE-SX on MultiMode Fiber (62.5 um) | 260 m |
| Module Memory | |
| Processor DRAM | 4 MB |
| Flash Memory | 2 MB |
| Module Electrical Specifications | |
| Input Power | 75 W maximum |
| Thermal Rating | 250 BTU/hr |
| Module Physical Dimensions | (H) 1.5 in. x (W) 15.4 in. x (D) 18.5 in. [(H) 3.8 cm x (W) 39.1 cm x (D) 47.0 cm] |
| Module Weight | 8 lb (4 kg) |

Table 4: Technical specifications for the Passport 8108GBIC module (continued).

| | |
|-------------------------------------|---|
| Environmental Specifications | |
| Operating Temperature | 5° to 40° C |
| Storage Temperature | -25° to 70° C |
| Operating Humidity | 85% maximum relative humidity, non-condensing |
| Storage Humidity | 95% maximum relative humidity, non-condensing |
| Operating Altitude | 10,000 ft (3,000 m) maximum |
| Storage Altitude | 10,000 ft (3,000 m) maximum |
| Free Fall/Drop | ISO 4180-s, NISTA 1A |
| Vibration | IEC 68-2-6/34 |
| Shock/Bump | IEC 68-2-27-29 |
| Electromagnetic Emissions | |
| Meets requirements of: | |
| US | FCC CFR47 Part 15, Subpart B, Class A |
| Canada | ICES-003, Issue-2, Class A |
| Australia/New Zealand | AS/NZS 3548:1995, Class A |
| Japan | VCCI-V3/97.04, Class A |
| Taiwan | CNS13438, Class A |
| | EN 55 022 (CISPR 22:1985), Class A |
| | CE Mark |
| | Electromagnetic Susceptibility |
| | EN 50082-1,1992 |
| Safety Agency Approvals | |
| | UL Listed (UL 1950) |
| | CUL CSA 22.2 #950 |
| | CB with all national deviations |
| | NOM NOM –019-SCFI 1994 |

Ordering Information

Table 5: Ordering information for the Passport 8000 enterprise switch.

| Order Number | Product Name | Description |
|--------------|-------------------|---|
| DS1402002 | Passport 8006 | 6-Slot Chassis incl. 1 fan tray and backplane |
| DS1402001 | Passport 8010 | 10-Slot Chassis incl. 2 fan trays and backplane |
| DS1405?01 | Passport 8001PS | Power Supply: 110/220 V AC |
| DS1405002 | Passport 8002PS | Power Supply: 48 V DC |
| DS1404014 | Passport 8190SM | Edge Switch Management Module/CPU |
| DS1404009 | Passport 8108GBIC | 8-port GBIC Edge Switch module (requires one or more GBICs) |
| DS1404008 | Passport 8116FX | 16-port 100BASE-FX edge switch module with MDA |
| DS1404006 | Passport 8132TX | 32-port 10/100 edge switch module with MDA |
| DS1404007 | Passport 8148TX | 48-port 10/100 Edge Switch module |
| DS2033001 | 8100-2FX | 2-port 100BASE-FX MDA |
| DS2033002 | 8100-4FX | 4-port 100BASE-FX MDA |
| DS2033003 | 8100-4TX | 4-port 10BASE-T/100BASE-TX MDA |
| AA1419001 | 1000BASE-SX GBIC | 1-port 1000BASE-SX GBIC (SC) for MultiMode fiber |
| AA1419002 | 1000BASE-LX GBIC | 1-port 1000BASE-LX GBIC (SC) for MultiMode and SingleMode fiber |
| AA1419003 | 1000BASE-XD GBIC | 1-port 1000BASE-XD GBIC (SC) for SingleMode fiber up to 50 km |
| AA1419004 | 1000BASE-ZX GBIC | 1-port 1000BASE-ZX GBIC (SC) for SingleMode fiber up to 70 km |
| AL2033005 | 450-1SX MDA | 1-port 1000BASE-SX MDA |
| AL2033006 | 450-1SR MDA | 1-port 1000BASE-SX MDA (LinkSafe redundant PHY) |
| AL2033007 | 450-1LX MDA | 1-port 1000BASE-LX MDA |
| AL2033008 | 450-1LR MDA | 1-port 1000BASE-LX MDA (LinkSafe redundant PHY) |
| DS1410003 | | Software for the Passport 8600 series Routing Switch modules |

The seventh character (?) of the AC Power Supply order number MUST be replaced with the proper code to indicate desired product nationalization:
 "A" — No power cord included. "B" — European "Schuko" power cord common in Austria, Belgium, Finland, France, Germany, The Netherlands, Norway and Sweden.
 "C" — Power cord commonly used in the United Kingdom and Ireland. "D" — Power cord commonly used in Japan. "E" — North American power cord.
 "F" — Australian power cord, also commonly used in New Zealand and the People's Republic of China.

Acronym Glossary

| | | | | | |
|--------------|---|-------------|---|-------------|---|
| CLI | Command Line Interface | IEEE | Institute of Electrical and Electronic Engineers | VLAN | Virtual LAN |
| CoS | Class of Service | IGMP | Internet Group Management Protocol | VRRP | Virtual Router Redundancy Protocol |
| CPU | Central Processor Unit | LAN | Local Area Network | WRR | Weighted Round Robin queuing |
| DVMRP | Distance Vector Multicast Routing Protocol | LED | Light-Emitting Diode | XC | eXpress Classification |
| ECMP | Equal Cost Multi-Path routing | MAC | Media Access Control | | |
| GBIC | Gigabit Interface Converter | MLT | Multi-Link Trunking | | |
| | | RMON | Remote Network Monitoring | | |
| | | SF | Switch Fabric | | |
| | | STP | Spanning Tree Protocol | | |



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