System 5000 Ethernet Switching Module

Increases Network Bandwidth

Provides High-Speed Riser Links

Supports Diverse Network Environments

The Ethernet Switching Module adds performance-enhancing segment switching capabilities to Bay Networks leading System 5000™ networking platform, increasing available bandwidth without requiring any changes to existing hardware or software.

The module delivers integrated, high-speed 10 megabit-per-second (Mbps) frame switching between the System 5000's 12 Ethernet backplane segments, plus dedicated 10 or 100 Mbps links to high-utilization servers, power users, workgroups, or other hubs in the network. By providing dedicated bandwidth to attached users, segments, or devices, the module eliminates the data bottlenecks that often hamper network performance, improving network response times for a modest one-time investment.

Installed in a Model 5000 or Model 5005 chassis, the switch module, which occupies two hub slots, offers a simple, reliable, and flexible solution for enhancing network performance while eliminating the need for external devices. The module base unit features 2 gigabits per second (Gbps) of internal switching capacity and 16 10BASE-T switched ports, 12 of which can be assigned to backplane segments to keep network traffic moving at full-line speeds. A media-dependent adapter (MDA) slot holds a two-port 100BASE-T module, which supports "big pipe" connections to centralized high-utilization devices and backbone connections to distributed power workgroups or individual power users. A front-panel expansion slot can hold up to four more 100BASE-T adapters, providing a total of 10 high-speed 100BASE-T ports for particularly demanding applications. The expansion slot is also designed to support an optional 100 Mbps FDDI module, providing a high-speed backbone connection that eases the transition to future applications while protecting existing investments.

The Ethernet Switching Module coexists in any System 5000 hub alongside Ethernet, Token Ring, and FDDI host, cluster, and network management modules, providing a new level of integration for supporting today's enterprise networks. The module includes a redundant Simple Network Management Protocol (SNMP) agent, providing a critical backup for collecting and reporting management data should the primary Ethernet network management module fail.

Fully compatible with all of Bay Networks standards-based Ethernet, Fast Ethernet, and FDDI hub and router products, the module contributes to the industry's most complete enterprise networking solution.

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Benefits

Increases Network Bandwidth

Segmentation reduces the number of network collisions and increases available bandwidth, resulting in dramatically improved network response times. The Ethernet Switching Module provides 10 and 100 Mbps switching between Ethernet segments, plus 100 Mbps big pipe connections to centralized servers, data centers, or power workgroups. The module enhances network reliability by reducing the number of network risers while providing a 50-fold increase in total available bandwidth.

Provides High-Speed Riser Links

The Ethernet Switching Module is a high-density platform that offers multiple configuration options that address a wide variety of applications and environments. Switched 10BASE-T host ports provide high-performance switching between network segments. Optional 100BASE-T MDA modules can be added to provide high-speed riser connections or links to other 100 Mbps switches. And a 100 Mbps FDDI expansion module can be installed to support high-speed backbone connections.

Supports Diverse Network Environments

The Ethernet Switching Module supports a variety of media and technologies, delivering a flexible solution for supporting particularly diverse networks. The module supports standard 10 Mbps Ethernet over unshielded twisted pair cabling (10BASE-T); 100 Mbps Fast Ethernet over Category 5 unshielded twisted pair (100BASE-TX) and fiber optic (100BASE-FX) cabling; and 100 Mbps FDDI over fiber optic cabling.

Features

The System 5000 Ethernet Switching Module integrates high-speed, performance-enhancing segment switching capabilities into the Bay Networks System 5000 enterprise networking platform. Providing 10 and 100 Mbps switching between distributed segments and high-speed 100 Mbps big pipe connections to centralized resources such as servers, the switch increases network throughput without requiring any changes to existing network hardware or software.

Installed in a System 5000 chassis, the double-wide module provides clean, internal nonblocking switching between multiple segments supported over the hub's Ethernet backplane. Featuring a 2 Gbps internal switching fabric, the Ethernet Switching Module delivers full wire-speed performance on all ports simultaneously, regardless of configuration, to maintain throughput while minimizing network congestion and data bottlenecks. The switch also offers a variety of media and technology options, providing a flexible solution for supporting a number of highly segmented, high-utilization environments and virtual LANs (VLANs).

Complementing the System 5000's configuration switching capabilities, the Ethernet Switching Module contributes a key feature to the industry's most complete, high-performance networking solution.

Ethernet Switching Module Performance

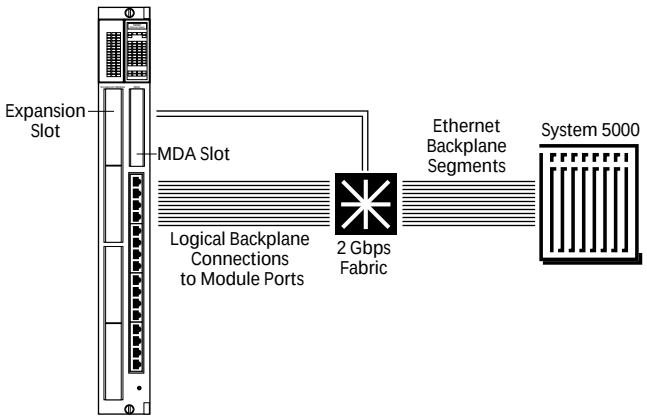
The System 5000 Ethernet Switching Module can be installed in either a Model 5000 or Model 5005 chassis, where it attaches to the hub's multisegment Ethernet backplane. Through the backplane connection, the module provides high-performance 10 Mbps switching between all of the Model 5000's and the Model 5005's 12 internal Ethernet segments, delivering a clean, fast, reliable method for linking multiple independent workgroups supported by the hub.

Front panel 10 Mbps and 100 Mbps ports provide external switched connections to devices such as centralized servers, routers, or other switches. Each port supports up to 1,024 addresses, providing adequate switching capacity for large-scale networks. In virtual networking environments, the module supports up to 32 VLANs per switch and 1,024 addresses per VLAN, meeting the needs of even the largest enterprise networks.

Configuration Options

The Ethernet Switching Module base unit features 16 switched Ethernet ports, 12 of which can be logically connected to the hub's Ethernet backplane segments (see Figure 1). The remaining ports provide dedicated 10 Mbps connections to local external resources, such as centralized servers or printers. The Ethernet ports utilize RJ-45 modular receptacles to support 10 Mbps transmissions over readily available Category 3 and high-performance Category 5 unshielded twisted pair (UTP) cabling.

Figure 1 **Switching Between System 5000 Ethernet Backplane Segments**



The Ethernet Switching Module base unit also includes one optional MDA slot and an expansion slot to support a variety of 100BASE-T and FDDI interfaces for additional configuration flexibility. A host of MDA and expansion modules are available to satisfy most connectivity requirements.

MDA Modules The Ethernet Switching Module's MDA slot supports a two-port 100BASE-T Fast Ethernet module to provide 100 Mbps switched connections to high-utilization servers, Fast Ethernet hubs, or other Fast Ethernet switches. Three 100BASE-T MDA modules are available:

- The 100BASE-TX MDA module offers two RJ-45 modular receptacles for supporting Fast Ethernet connections over Category 3 and Category 5 unshielded twisted pair cabling.
- The 100BASE-FX MDA module offers two media interface connectors (MICs) for supporting Fast Ethernet connections over 50/125 and 62.5/125 µm multimode fiber optic cabling at distances up to 2 kilometers.
- The 100BASE-TX/FX MDA module combines one unshielded twisted pair and one MIC fiber connector on a single card for added media flexibility.

Expansion Slot The Ethernet Switching Module's expansion slot is designed to provide high-speed connections to the network backbone via a 100 Mbps FDDI expansion module. In applications where FDDI backbone connectivity is not required, the expansion slot can be used to hold up to four additional 100BASE-T MDA modules, enabling a single Ethernet Switching Module to support a maximum of 10 Fast Ethernet connections.

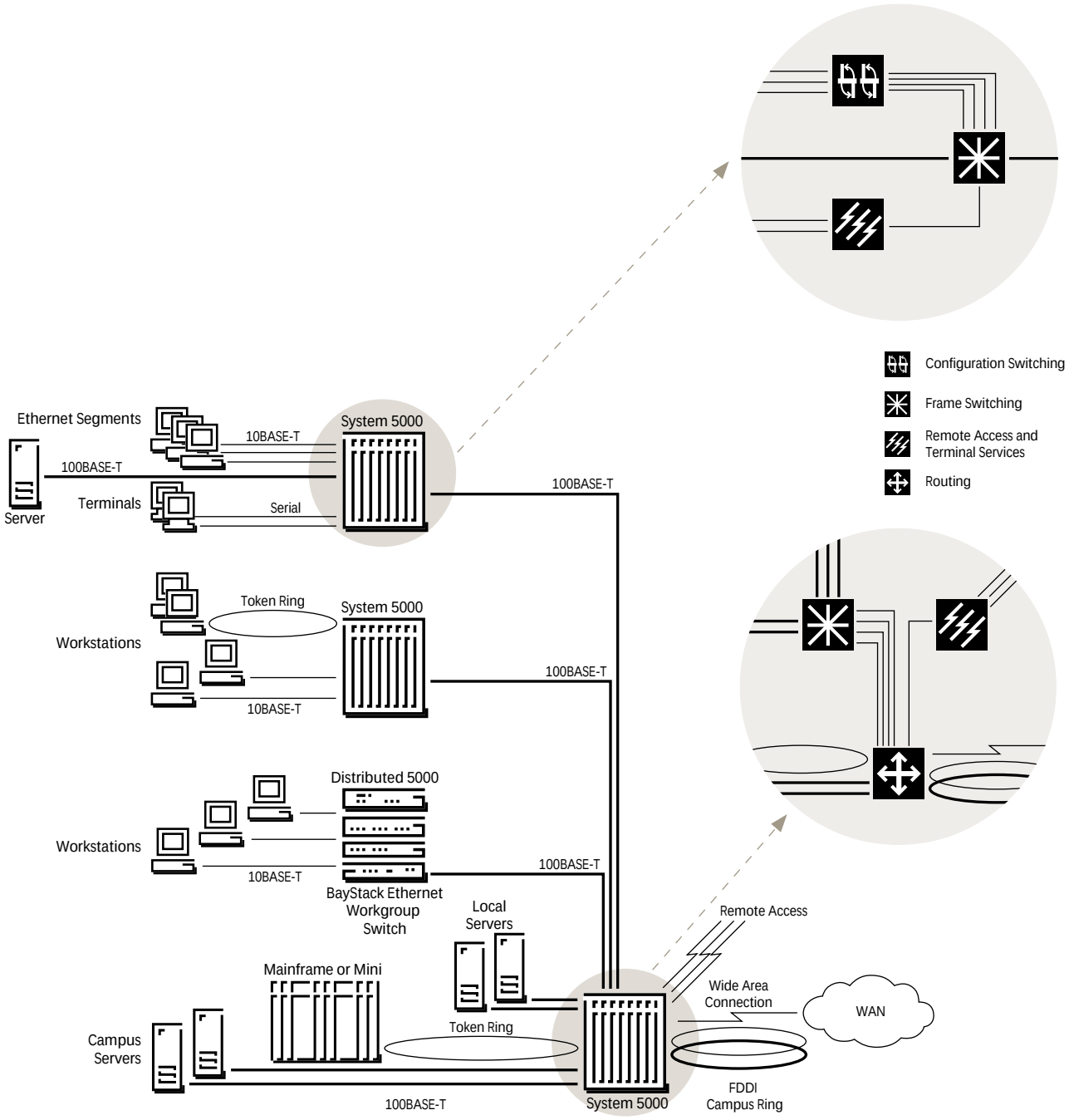
Ethernet Switching Module Applications

The System 5000 Ethernet Switching Module is designed for applications where multiple users or segments require access to a common group of resources. By handling multiple transmissions simultaneously, the switch reduces the data bottlenecks found in such high-utilization shared-media environments.

In a structured network, where distributed workgroups or segments are terminated at a System 5000 hub located in the network center, the Ethernet Switching Module provides users with uncontested access to centralized resources such as departmental servers. The switch can handle multiple requests simultaneously across the multi-segment backplane, while the front-panel Ethernet ports provide individual servers with dedicated 10 Mbps links to maintain maximum throughput. Where extra bandwidth is required, an MDA module provides 100 Mbps big pipe connections to departmental "super servers" or high-speed switches supporting server clusters (see Figure 2).

For more bandwidth-hungry environments, the Ethernet Switching Module's expansion slot can be filled with 100BASE-T MDA modules to provide an added performance boost. Fully configured, the Ethernet Switching Module supports up to 10 Fast Ethernet connections for high-speed links to centralized super servers or distributed 100 Mbps switches supporting highly segmented workgroups.

Figure 2 | **System 5000 Switched Wiring Closet and Fast Ethernet Backbone Applications**



Unmatched Reliability

As a member of the Bay Networks System 5000 product family, the Ethernet Switching Module enjoys market-leading fault-tolerance and redundancy capabilities for maximum reliability.

The System 5000 employs a number of backup systems to maximize network availability. These include:

- Redundant cooling: Dual fan units evenly distribute airflow to all components installed in the hub, even if only one fan is operating.
- Redundant power supplies: Dual power supplies can be installed to support full load-sharing capabilities or provide a backup power source should the primary supply fail.
- Redundant clocks: A backup unit is automatically activated following a primary clock failure to monitor and distribute module clock rates to all slots.
- Redundant configuration storage: Each module automatically retains and stores backup copies of the hub's configuration data, protecting against a Supervisory Module failure.

The Ethernet Switching Module also supports a redundant link capability, which supports fault-tolerant connections to other switches or shared-media segments to protect against a primary link failure. If the primary link fails, the backup path is automatically activated to maintain network connectivity and throughput.

Feature Specifications

Feature specifications for the System 5000 Ethernet Switching Module appear in Table 1.

Table 1 **System 5000 Ethernet Switching Module Feature Specifications**

Supports 16 10BASE-T segments in standard (base) configuration over both UTP and STP wiring
Supports up to ten 100BASE-TX/FX segments in increments of two
Twelve 10BASE-T segments are configurable for front panel or backplane connections
Features 2 Gbps internal switch fabric architecture
Delivers "wire-speed" filtering and forwarding on all ports simultaneously in half and full duplex
Supports up to 1,024 MAC addresses per port or virtual LAN
Supports up to 8,192 MAC addresses per switch community
Supports up to 64 virtual LANs per switch community
Up to 32 switches may be interconnected within a single "switch community," with a maximum of seven switches between any two end stations
Fully SNMP manageable
Supports latest DOS- and UNIX-based Optivity applications
Features MIB I, MIB II, and Bridge support
Hot-swappable
Future support for FDDI

Technical Specifications

Technical specifications for the System 5000 Ethernet Switching Module appear in Table 2.

Table 2 **System 5000 Ethernet Switching Module Technical Specifications**

Standards Compatibility	IEEE 802.3i 10BASE-T IEEE 802.3u 100BASE-T
Hardware Interface Specifications	
Built-in Ports	RJ-45 connectors for 10BASE-T ports
MDA Ports	RJ-45 connectors for 100BASE-TX MDA ports SC fiber optic connectors for 100BASE-FX MDA ports
Electrical Specifications	
Power Consumption	60W @ -48VDC without MDA 78W @ -48VDC with MDA
Thermal Rating	205 Btu/hr without MDA 266 Btu/hr with MDA

Table 2 | **System 5000 Ethernet Switching Module Technical Specifications (continued)**

Environmental Specifications	
Operating Temperature	5°C to 40°C
Operating Humidity	85% max. relative humidity, noncondensing
Operating Altitude	10,000 ft (3,048 m) max.
Storage Temperature	-25°C to 70°C
Storage Humidity	95% max. relative humidity, noncondensing
Free Fall/Drop	ISO 4180-s, NSTA 1A
Vibration	IEC 68-2-6/34
Shock/Bump	IEC 68-2-27/29
Electromagnetic Emissions	Meets FCC Class A digital devices
	Meets EN 55022 (CISPR 22), Class B (shielded cables required)
	Meets VCCI Class 1 ITE (shielded AC power cables required)
	European CE mark
Electromagnetic Susceptibility	
Electrostatic discharge (ESD)	IEC 801-2, Level 3
Electrical fast transient/burst	IEC 801-4, Level 2
Electrical surge	IEC 801-5, Level 1/2
RF susceptibility	IEC 801-3, Level 2
European CE mark	
Safety Agency Approvals	UL 1950 with D-3 deviations
	CSA 22.2 #950 with D-3 deviations
	IEC 950/EN 60 950 (TUV)
	Designed to meet UL94-V1 flammability requirements for all PC boards
Physical Dimensions	(H) 19.0 in. x (W) 2.44 in. x (D) 11.0 in.
	(H) 48.26 cm x (W) 6.20 cm x (D) 27.94 cm
Weight	
Without MDA	5.1 lb (2.3 kg)
With MDA	5.5 lb (2.5 kg)

Ordering Information

Ordering information for the System 5000 Ethernet Switching Module, subsystem, MDA modules, and expansion modules appears in Table 3.

Table 3 | **System 5000 Ethernet Switching Module Ordering Information**

Order Number	Description
Base Unit	
CH2004001	Model 58000 Ethernet Switching Module Subsystem
MDA Modules	
CH3133001	Model 58000-104 Two-port 100BASE-FX MDA with SC Connectors
CH3133002	Model 58000-105 Two-port 100BASE-TX MDA with RJ-45 Connectors
CH3133003	Model 58000-106 Two-port 100BASE-TX/FX MDA with One RJ-45 Connector and One SC Connector
Expansion Modules	
CH2011002	100BASE-T MDA Expansion Module for Model 58000 Switch Module Subsystem

Bay Networks

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