System 5000 EtherSpeed Switching Modules

Support Scalable Port Density and Capacity

System 5000™ EtherSpeed™ Ethernet switching modules extend the capabilities of existing networks by providing high-performance, low-cost switched Ethernet and Fast Ethernet to the System 5000 enterprise networking platform.

Protect Network Investments

Utilizing powerful internal switching technology integrated with the System 5000 chassis, the EtherSpeed host modules can be used in applications ranging from backbone networks to high-density workgroups and desktops. Working with the System 5000's asynchronous transfer mode (ATM) core architecture — the same used in the Centillion 100™ switching system — the EtherSpeed modules contribute to the industry's most flexible, integrated high-performance LAN and ATM switching solution.

Futureproof Network Infrastructure

The System 5000, featuring two 3.2 gigabit-per-second (Gbps) ATM backplanes and distributed frame LAN and ATM switching, increases overall network traffic handling capacity and provides dedicated bandwidth to servers and desktops to improve network performance.

Allow Flexible Switching Solutions

Combining simultaneous support for Ethernet, Fast Ethernet, Token Ring, and FDDI shared media with ATM switching, routing, remote access services, and Layer 3 switching capabilities, the System 5000 delivers a powerful solution that meets the evolving needs of today's enterprise networking environments.

Integrated with System 5000

The System 5000 EtherSpeed modules are members of the Bay Networks family of high-performance Ethernet solutions. Working with the BayStack™ 10 and 100 megabit-per-second (Mbps) stackable hubs and switches, System 3000™ Ethernet and Fast Ethernet solutions, the Centillion 100™ multi-LAN/ATM switch, and 100 Mbps interfaces on the Access Stack Node (ASN™) and Backbone Node (BN®) routers, the EtherSpeed modules contribute to one of the industry's most complete Ethernet solutions.

Bay Networks

Benefits

Support Scalable Port Density and Capacity

The System 5000 easily and cost-effectively supports up to 176 switched 10 Mbps EtherSpeed ports per hub. Delivering a combined 6.4 Gbps of throughput, the System 5000 backplanes offer nonblocking switching performance to all ports, providing more than 2 million packets per second (pps) throughput.

System 5000 hubs also provide a scalable solution for building large switched Ethernet and ATM backbone networks supporting upwards of 2,000 users (see Figure 1). The System 5000 switches can connect to each other or to wiring closet switches such as the Centillion 100™ via one or more 155 Mbps ATM ports configured in a high-speed GIGArray.™ GIGArray simplifies ATM links, enabling them to act as an extension of the backplane to provide scalable backbone bandwidth based on individual user needs, while file server and router connections can be implemented with either 100 Mbps Fast Ethernet or ATM using LAN emulation (LANE).

Protect Network Investments

Compatible with existing Ethernet solutions and transparent to today's applications, System 5000 EtherSpeed modules can be seamlessly integrated into the network to alleviate bandwidth constraints, improving network performance. The EtherSpeed modules are fully interoperable with existing System 5000 Ethernet and Fast Ethernet modules, Centillion 100 switches, and other standards-based Ethernet solutions, delivering powerful switched Ethernet capabilities to any network.

Futureproof Network Infrastructure

The System 5000 provides a powerful, futureproof shared media and multi-LAN/ATM switching solution that addresses the majority of user needs, both for today and for the future. The EtherSpeed modules, working with the System 5000's built-in ATM backplane, allow existing Ethernet networks to move to ATM incrementally, without expensive forklift upgrades. For networks not ready for ATM, the System 5000 and EtherSpeed modules deliver powerful Ethernet and Fast Ethernet switching that offers immediate relief from bandwidth bottlenecks. Integrated Layer 3 capabilities enable the System 5000 to support enterprise intranet applications, paving the way for future network expansion.

For networks supporting multiple distributed switches, the System 5000's integrated ATM capabilities provide high-speed switched connections to other hubs and switches, significantly increasing backbone bandwidth and reducing network response times. When ATM servers and desktops are required, ATM ports can be added where and when they are needed.

Allow Flexible Switching Solutions

Designed to combine multi-LAN switching and ATM on a single platform, the System 5000 supports any combination of Ethernet, Fast Ethernet, Token Ring, FDDI, and ATM modules to fit the needs of both current and future networks. The System 5000's flexible architecture easily supports a variety of LAN types, as well as Ethernet and Token Ring routing and remote access services. As requirements change, new modules supporting different technologies and capabilities can be easily added to provide a long-term switched internetworking solution.

Integrated with System 5000

EtherSpeed modules are fully integrated with the System 5000 platform, delivering high-speed Ethernet and Fast Ethernet switching capabilities to the industry's most comprehensive, full-featured networking platform. Installed alongside existing shared media, ATM, routing, and remote access modules, the EtherSpeed modules provide crucial performance enhancements while preparing the network for the future.

Features

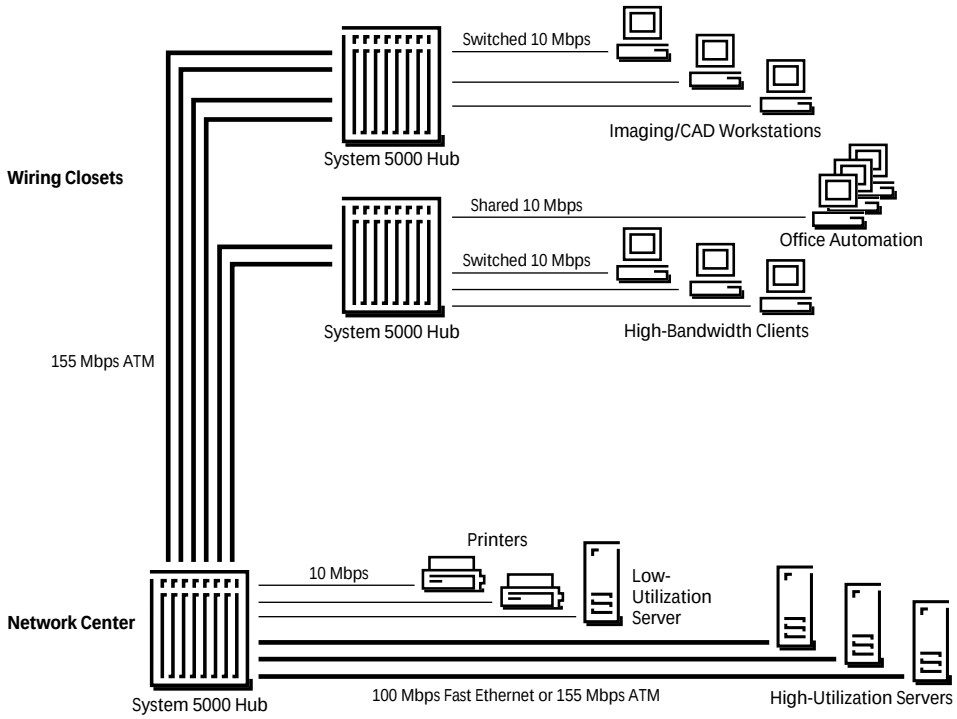
System 5000 EtherSpeed Switching Modules Description

System 5000 EtherSpeed switching modules are designed to optimize the performance of existing Ethernet networks. Working with the System 5000's ATM-core backplane, the EtherSpeed modules deliver a high-speed switched Ethernet and Fast Ethernet solution that extends the life of today's shared media networks while preparing for an eventual migration to ATM.

Four System 5000 EtherSpeed switching modules are available, each designed for a specific application: the Model 5328M EtherSpeed Master Control Processor Module, the Model 5328 EtherSpeed Switching Module, the Model 5328-TX EtherSpeed 10/100 Switching Module, and the Model 5328-FX EtherSpeed 10/100 Switching Module.

Model 5328M EtherSpeed Master Control Processor (MCP) Module The Model 5328M EtherSpeed MCP Module offers eight RJ-45 ports for supporting switched 10BASE-T connections, as well as Flash

Figure 1 | **System 5000 EtherSpeed Modules Provide Switched Wiring Closet and Network Center Connectivity**



memory and 4 MB of processor memory (expandable to 10 MB). The System 5000 must include at least one MCP module to support switched operations.

Model 5328 EtherSpeed Switching Module The Model 5328 EtherSpeed Switching Module offers 16 RJ-45 ports for supporting switched 10BASE-T connections to desktops, servers, and other end devices.

Model 5328-TX EtherSpeed 10/100 Switching Module The Model 5328-TX EtherSpeed 10/100 Switching Module offers 14 RJ-45 ports for supporting switched 10BASE-T connections, plus two RJ-45 10BASE-T/100BASE-TX ports for supporting high-speed 100 Mbps switched file server and router connections over unshielded twisted pair cabling.

Model 5328-FX EtherSpeed 10/100 Switching Module The Model 5328-FX EtherSpeed 10/100 Switching Module offers 14 RJ-45 ports for supporting switched 10BASE-T connections, plus two SC-type 100BASE-FX fiber ports for supporting high-speed 100 Mbps switched backbone connections over 62.5/125 µm and 50/125 µm multimode fiber optic cabling.

All four EtherSpeed modules include a 133 MIPS RISC-based packet engine to provide transparent Ethernet switching, as well as high-speed ATM segmentation and reassembly (SAR) hardware. Local packets are switched locally by the packet engine. Packets destined for another switch module are converted to ATM cells by the onboard ATM SAR and are switched across the hub's ATM backplane to the destination module.

High-capacity switching between the System 5000's ATM-core backplane and each EtherSpeed module's packet engine, coupled with the high-speed SAR hardware, enables the System 5000 to provide aggregate throughput of more than 2 million Ethernet pps.

Network-Wide Virtual LANs Simplify Network Topology

System 5000 EtherSpeed modules, coupled with the hub's ATM core backplane, support a network-wide port-level virtual LAN (VLAN) capability. The VLAN capability allows network microsegmentation without changing the logical network topology.

Any number of System 5000 EtherSpeed ports can be grouped into a VLAN. Up to 31 Ethernet VLANs are supported on each switch. A per-VLAN Spanning Tree capability ensures VLAN compatibility with external bridges and routers, while external routers provide VLAN routing.

VLANs enable centralized servers to be logically assigned to the same VLAN as their distributed client segments, minimizing the need for time- and bandwidth-consuming router hops. VLANs can also be distributed across multiple hubs, grouping users and resources regardless of their physical location.

Robust Filtering Controls Network Traffic

EtherSpeed has an advanced set of filtering capabilities that simplify network management. Up to 64 user-defined filters are supported, which can be configured per port. Any pattern up to 12 bytes in width within the first 255 bytes of a packet can be easily compared, enabling packets to be forwarded, dropped, mirrored, or redirected based on the information.

System 5000 EtherSpeed Applications

High-Density Switch for Ethernet Workgroups and Desktops A fully configured System 5000 can support up to 176 EtherSpeed ports, making it an ideal high-density wiring closet solution for workgroups where desktops are running out of bandwidth. Each EtherSpeed port delivers a full 10 Mbps of bandwidth to each desktop, alleviating bandwidth constraints and maximizing the productivity of the existing network. Flexible VLAN support simplifies management and enables workgroups to be partitioned based on communications patterns.

High-Performance Backbone Options The ATM-core architecture of the System 5000 allows ATM to be transparently deployed when and where it is needed without requiring investments in new equipment. In large networks, ATM can be used as a high-speed riser or interbuilding link to build a nonblocking backbone. Multiple ATM links between the System 5000 and distributed switches such as the Centillion 100 can load share and provide aggregate interswitch bandwidth in excess of 155 Mbps. The System 5000's integral ATM capabilities ensure predictable, reliable performance, reducing latency and improving network response times.

Backbone Switch for Large Networks Delivering more than 20 Gbps of switching capacity, a System 5000 hub configured with EtherSpeed modules is ideally suited for use as a backbone switch in network centers. A System 5000 in the network can support direct ATM connections to wiring closet switches such as the Centillion 100, while EtherSpeed modules provide distributed users with direct, high-speed switched access to centralized resources such as shared printers, servers, and routers.

Technical Specifications

Technical specifications for the System 5000 EtherSpeed switching modules appear in Table 1.

Table 1 **System 5000 EtherSpeed Switching Modules Technical Specifications**

Number of Ports	
Model 5328P EtherSpeed MCP Module	8 switched 10BASE-T ports
Model 5328 EtherSpeed Switching Module	16 switched 10BASE-T ports
Model 5328-TX EtherSpeed 10/100 Switching Module	14 switched 10BASE-T ports and 2 switched 10BASE-T/100BASE-TX ports
Model 5328-FX EtherSpeed 10/100 Switching Module	14 switched 10BASE-T ports and 2 switched 100BASE-FX ports
Data Rate	10 Mbps 100 Mbps (Model 5328-TX and Model 5328-FX only)
Performance	
10BASE-T Ports	14,800 pps forwarding per port
System 5000	Aggregate throughput of over 2 million pps per switch
Processor	133 MHz, 64-bit MIPS RISC
Interfaces	RJ-45 10BASE-T RJ-45 100BASE-TX SC-type 100BASE-FX
Processor Memory	
Model 5328M	4 MB, expandable to 10 MB
Buffer Memory	
Model 5328M and Model 5328	1.25 MB
Model 5328-TX and Model 5328-FX	4.25 MB
Bridging Mode	Transparent
Spanning Tree per VLAN	802.1d
Address Storage	10,240 MAC addresses per System 5000
Physical Dimensions	(H) 19.0 in. x (W) 1.2 in. x (D) 11.0 in. [(H) 48.3 cm x (W) 3.0 cm x (D) 28.0 cm]
Environmental Specifications	
Operating Temperature	5˚ to 40˚C
Operating Humidity	85% max relative humidity, noncondensing
Operating Altitude	10,000 ft (3,048 m) max
Storage Temperature	-25˚ to 70˚C
Storage Humidity	95% max relative humidity
Free Fall/Drop	ISO 4180-2, NSTA 1A
Vibration	IEC 68-2-6/34
Stock/Bump	IEC 68-2-27/29

Table 1 | **System 5000 EtherSpeed Switching Modules Technical Specifications (continued)**

Weight	3.87 lb (1.74 kg)
Safety Agency Approvals	UL 1950 with D3 deviations CSA 22.2 #950 with D3 deviations IEC 950 / EN 60 950 (TUV) PCB designed to meet UL94-V1 flammability requirements
Electromagnetic Emissions	
Meet Requirements of	FCC Part 15, Subparts A and B, Class A EN 55 022 (CISPR 22:1985), Class B General License VDE 0871, Class B (AmtsblVfg No. 243/1991 and Vfg 46/1992) VCCI Class 1 ITE

Ordering Information

Ordering information for the System 5000 EtherSpeed switching modules appears in Table 2.

Table 2 | **System 5000 EtherSpeed Switching Modules Ordering Information**

Order Number	Description
CL1904001	Model 5328 16-port EtherSpeed Switching Module for 10BASE-T (1.25 MB buffer memory)
CL1904002	Model 5328M 8-port EtherSpeed MCP Switching Module with Master Control Processor for 10BASE-T (1.25 buffer memory, 4 MB processor memory)
CL2004001	Model 5328-FX EtherSpeed Switching Module with 14 10BASE-T ports and two 100BASE-FX ports (4.25 MB buffer memory)
CL2004002	Model 5328-TX EtherSpeed Switching Module with 14 10BASE-T ports and two 10BASE-T/100BASE-TX ports (4.25 MB buffer memory)

Bay Networks
People connect with us

For more sales and product information, please call **1-800-8-BAYNET**.

United States

Bay Networks, Inc.
4401 Great America Parkway
Santa Clara, CA 95054
1-800-8-BAYNET

Bay Networks, Inc.
8 Federal Street
Billerica, MA 01821-5501
1-800-8-BAYNET

Europe, Middle East, and Africa

Bay Networks EMEA, S.A.
Les Cyclades – Immeuble Naxos
25 Allée Pierre Ziller
06560 Valbonne, France
+33-92-966-996 Fax
+33-92-966-966 Phone

Pacific Rim, Canada, and Latin America

Australia +61-2-9927-8888
Brazil +55-11-247-1244
Canada 416-733-8348
Hong Kong +852-2-539-1388
India +91-11-301-0404
Japan +81-3-5402-7001
Mexico +52-5-202-7599
China +8610-238-5177
Singapore +65-323-3522

World Wide Web: **http://www.baynetworks.com**

09/96 DA510-2546WC-A

Printed on recycled paper.