



Improve Network Flexibility

System 5000™ Fiber Distributed Data Interface (FDDI) modules deliver complete connectivity and management solutions for Bay Networks System 5000 structured networking applications. Fully supported in both the 14-slot Model 5000 and the eight-slot Model 5005 intelligent hub chassis, the FDDI modules support high-bandwidth, fault-tolerant applications for mission-critical FDDI networks.

delivering a structured networking solution for today's legacy networks. The System 5000 also includes a built-in migration path to switched LAN technologies, allowing shared-media LANs to incrementally evolve to switched-backbone networks without sacrificing existing investments.

Maximize Network Performance

The System 5000 FDDI modules work together to support a variety of high-speed network configurations. Operating over the FDDI backplane on the Model 5000 or Model 5005 hub, the single-slot modules can access one or more of five available 100 megabit-per-second (Mbps) data paths for maximum configuration flexibility. The modules can also be isolated from the hub backplane to establish independent, standalone FDDI networks.

The System 5000 supports highly segmented enterprise networks by providing a central point of integration and administration for distributed environments. Residing in the network center, the System 5000 unites distributed Bay Networks System 2000™, System 3000™, Distributed 5000™, Ethernet, Token Ring, and FDDI networks as a single, cohesive system, optimizing the use of centralized network resources, such as servers, bridges, and routers.

Enhance Network Connectivity

The FDDI modules contribute to a complete enterprise networking solution, working alongside Ethernet, Token Ring, and Asynchronous Transfer Mode (ATM) modules in the System 5000 hub to satisfy complex, multiprotocol requirements. The System 5000 represents the industry's most sophisticated intelligent hub platform,

The System 5000 FDDI modules also work with FDDI interfaces on Bay Networks Access Stack Node (ASN™), Backbone Link Node (BLN™), and Backbone Concentrator Node (BCN™) routers, providing access to high-speed, wide area links for large internetwork applications.

Benefits

Improve Network Flexibility

System 5000 FDDI modules can operate over any of five FDDI data paths on the Model 5000 or Model 5005 backplane, delivering tremendous configuration flexibility. A maximum of two full FDDI rings can be supported, each with dedicated primary and secondary paths and a shared local path. Any other combination can also be supported to meet specific application requirements. The modules can also be completely isolated from the hub backplane to establish independent, standalone FDDI networks.

Maximize Network Performance

System 5000 FDDI modules support full standards-based 100 Mbps operations, delivering the performance required for highly demanding network environments. Connected to 100 Mbps FDDI interfaces on Bay Networks ASN, BLN, and BCN routers, the modules provide high-speed access to wide area backbones in distributed enterprise network environments.

Enhance Network Connectivity

System 5000 FDDI modules reside in System 5000 hubs alongside standards-based Ethernet and Token Ring modules, delivering additional flexibility for complex multiprotocol network environments. Additional support for frame- and cell-switched technologies contributes to a single-platform solution that satisfies existing and future network applications.

Features

System 5000 FDDI Modules

The System 5000 family of FDDI modules includes both host modules and network management modules. System 5000 FDDI host modules provide high-speed network connectivity for routers, end stations, and other resources, such as printers and servers. The System 5000 FDDI network management modules collect, process, and evaluate FDDI network performance data, forwarding only critical information to the central management station for further action.

All System 5000 FDDI modules are fully compatible with Bay Networks UNIX-based Optivity® network management system, the industry's leading enterprise management solution. Optivity delivers integrated management of all Bay Networks switches, hubs, and routers, enabling the enterprise internetwork to be monitored and controlled from a single management station.

System 5000 FDDI Host Modules

Bay Networks offers three different System 5000 FDDI host modules: the Model 5904 Multimode Fiber Host Module, the Model 5904-2SM Single-mode Fiber FDDI Host Module, and the Model 5905 Unshielded Twisted Pair (UTP) FDDI Host Module.

The Model 5904 offers six multimode fiber media interface connector (MIC) Master (M) ports to support host connections up to two kilometers over 62.5/125 μm and 50/125 μm fiber optic cabling.

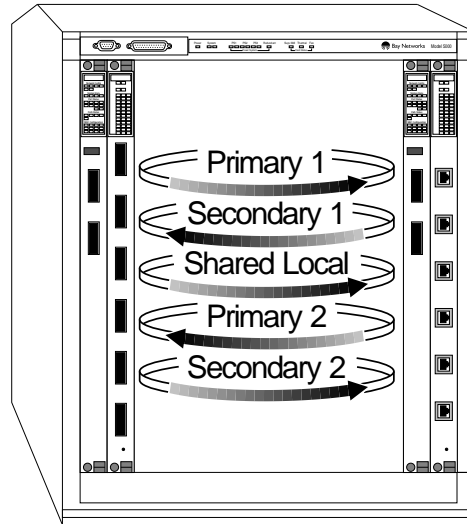
The Model 5904-2SM includes four multimode fiber and two single-mode fiber MIC M ports. The single-mode ports support connectivity up to 20 kilometers over 8.5/125 μm single-mode fiber optic cabling.

The Model 5905 offers six RJ-45 modular receptacles to support high-speed host connections up to 100 meters over high-performance Category 5 UTP cabling. The module also operates over Type 1 and Type 2 shielded twisted pair (STP) cabling.

The modules are fully compatible with industry standards, including the International Standards Organization's (ISO) 9314-1 Physical Protocol (PHY) and Physical Medium Dependent (PMD) standards, as well as the American National Standards Institute's (ANSI) X3T9.5 Station Management (SMT) Version 7.3 specification.

The Model 5904, Model 5904-2SM, and Model 5905 also include 512 KB of DRAM to run connection management in standalone mode when the modules are isolated from the backplane. An additional 512 KB of EPROM contains boot and system code, while 8 KB of non-volatile RAM is available for configuration storage and restoration.

Figure 1 | System 5000 FDDI Architecture



Model 5910S FDDI Network Management Module

Two System 5000 FDDI network management modules are offered: the Model 5910S Multimode FDDI Network Management Module and the Model 5910S-SM Single-mode FDDI Network Management Module.

The Model 5910S offers two multimode fiber A and B MIC ports to support primary and secondary links up to two kilometers over 62.5/125 μm and 50/125 μm fiber optic cabling. The Model 5910S-SM is identical to the Model 5910S, with the exception of two single-mode fiber A and B MIC ports to support primary and secondary connections up to 20 kilometers over 8.5/125 μm single-mode fiber optic cabling.

The A and B fiber ports can be configured to support a variety of applications, including peer, tree, null-attached, and fail-safe dual-homed configurations. Both modules feature full compatibility with FDDI SMT, PMD, and PHY standards, as well as a resident Simple Network Management Protocol (SNMP)

agent. In addition, an onboard SNMP-to-SMT proxy agent allows SNMP-based management stations to access SMT-specific data.

System 5000 FDDI network management modules use the Common Management Bus (CMB) on the Model 5000/Model 5005 chassis backplane to communicate with FDDI host modules installed in the hub. The network management modules collect, process, and condense specific performance and activity data at the network, hub, module, and port levels. The SNMP-to-SMT proxy agent translates the information and forwards it in-band to a Bay Networks Optivity or other SNMP-compatible network management station for further review. A front-panel RS-232 serial communications port is also available for transmitting SNMP management information out-of-band at speeds up to 19.2 kilobits per second (Kbps).

The modules include 2 MB of Flash memory, with an additional 2 MB of EPROM available for local loading of the base image code should the Flash image be invalid. A full 4 MB of DRAM simultaneously supports execution of SMT, SNMP, and image downloads to Flash memory.

Module Configuration

The System 5000 FDDI architecture incorporates software-controlled backplane assignment logic on all host and network management modules, enabling each board to access one or more of five FDDI backplane paths. The hub's default mode of operation supports two FDDI networks, each with a primary path, a secondary path, and a shared local path, which supports intelligent insertion of FDDI devices on the network (see Figure 1). Modules can be selectively assigned to either network through the network management system or via a front-panel service port on the Model 5000/Model 5005 hub.

The FDDI modules also support a variety of other configurations, depending on how the backplane paths are utilized. Isolating each module from the backplane creates up to 14 unmanaged FDDI segments in a single Model 5000 hub, or eight unmanaged FDDI segments in a single Model 5005 hub. By switching host module M ports between two sets of path traces, users can establish up to 28 100 Mbps FDDI segments in a single Model 5000 hub (16 segments in a Model 5005) for supporting user data.

FDDI Management

Each System 5000 FDDI network management module contains three MAC elements, which can be assigned to any of the five backplane paths through software control. The System 5000 architecture supports multiple NMMs to manage all FDDI paths running on both networks within the hub.

If only one network management module is installed in the hub, users can selectively use software to swap it among networks to perform management operations on all FDDI paths. When two network management modules are present, all paths on both networks can be managed simultaneously.

FDDI management agents reside on FDDI NMMs, where they interoperate with the Optivity network management system to support full management at the network, hub, module, and port levels. From a central management console, network managers can obtain a host of performance statistics to determine specific ring utilization levels. A network-level, fault-correlation feature identifies those links and MACs with the worst error rates, helping network managers locate potential trouble spots in the network. Physical topology mapping of the FDDI network is also supported, as well as a logical ring topology feature with trunk-ring wrap detection capabilities.

Displays and Indicators

The System 5000 FDDI modules include a series of front-panel LED indicators to report module and port status at a glance. The Model 5910S and Model 5910S-SM

include a module-level annunciator LED to indicate overall module status, as well as individual LEDs to report network configuration and station, port, and path status. In addition, a four-character, front-panel alphanumeric display reports self-test and general board operational status.

The Model 5904 and Model 5904-2SM also offer a module-level annunciator LED to report overall module status. A series of network configuration LEDs indicate which FDDI network the modules are attached to or whether they are isolated from the backplane paths. A set of port-level indicators report whether individual ports are active, if a fault has been isolated to the port, or if the port is on the primary or secondary network path.

Technical specifications for the System 5000 FDDI host and network management modules are shown in Table 1.

Ordering information for the System 5000 FDDI host and network management modules is shown in Table 2.

Table 1 | System 5000 FDDI Modules Technical Specifications

Network Protocol and Standards Compatibility	<p>ISO 9314-1 FDDI Physical Protocol (PHY) Standard</p> <p>ISO 9314-3 FDDI Physical Medium Dependent (PMD) Standard</p> <p>ISO 9314-2 FDDI Media Access Control (MAC) Standard</p> <p>ANSI FDDI X3T9.5 Single-Mode Fiber Physical Medium Dependent (SMF-PMD) Standard</p> <p>ANSI FDDI X3T9.5 Twisted-Pair Physical Medium Dependent (TP-PMD) Draft Standard</p> <p>ANSI FDDI X3T9.5 Station Management (SMT) Specification Version 7.3</p>
Data Rate	Three 100 Mbps onboard paths
Microprocessor and Memory	
Model 5904/5904-2SM/5905	<p>25 MHz Motorola 68340 main processor</p> <p>512 KB of DRAM</p> <p>512 KB of EPROM</p> <p>8 KB of NVRAM</p>
Model 5910S/5910S-SM	<p>25 MHz Motorola 68EC030</p> <p>4 MB of DRAM (SIMMs)</p> <p>2 MB of EPROM</p> <p>2 MB Flash EPROM (SIMMs)</p> <p>32 KB of NVRAM</p>
Electrical Specifications	
Power Consumption	
5904/5904-2SM/5905	40W max
5910S/5910S-SM	60W max
Thermal Rating	
Model 5904/5904-2SM/5905	100 Btu/hr max
Model 5910S/5910S-SM	200 Btu/hr max
Physical Dimensions	<p>(H) 19.0 in. x (W) 1.2 in. x (D) 11.0 in.</p> <p>(H) 48.3 cm x (W) 3.0 cm x (D) 28.0 cm</p>
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
Free fall/drop	ISO 4180-2, NISTA 1A
Vibration	IEC 68-2-6/34
Shock/bump	IEC 68-2-27/29
Weight	4.4 lbs (2.0 kg)

Table 1 | System 5000 FDDI Modules Technical Specifications (continued)

Electromagnetic Susceptibility	Electrostatic discharge (ESD)	IEC 801-2, Level 2/4
	Radiated electromagnetic field	IEC 801-2, Level 2
	Electrical fast transient/burst	IEC 801-4, Level 2/3
	Electrical surge	IEC 801-5, Level 1/3
Safety Agency Approvals	UL Listed (UL 1950)	
	CSA certified (CSA 22.2 #950)	
	TUV licensed (EN 60 950)	
Electromagnetic Emissions	Meet FCC Part 15, Subpart B, Class A	
	Meet VCCI Class 1 ITE	
	Meet EN 55 022 9 (CISPR 22:1985), Class A	

Table 2 | System 5000 FDDI Module Ordering Information

Order Number	Description
5904	Model 5904 6-port FDDI Multimode Fiber Host Module
5904-2SM	Model 5904-2SM FDDI Fiber Host Module with 4 Multimode Fiber and 2 Single-mode Fiber Ports
5905	Model 5905 6-port FDDI UTP Host Module
5910S	Model 5910S FDDI Network Management Module with A/B Multimode Fiber Ports
5910S-SM	Model 5910S-SM FDDI Network Management Module with A/B Single-mode Fiber Ports



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
 Phone: 1-800-8-BAYNET

Bay Networks, Inc.
 8 Federal Street
 Billerica, MA 01821-5501
 Phone: 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
 Fax: +33-92-966-996
 Phone: +33-92-966-966

Intercontinental

Bay Networks, Inc.
 8 Federal Street
 Billerica, MA 01821-5501
 Fax: 508-670-9323
 Phone: 1-800-8-BAYNET

World Wide Web: <http://www.baynetworks.com>

Copyright © 1996 Bay Networks, Inc. All rights reserved. Bay Networks and the Bay Networks logo, ASN, Distributed 5000, System 2000, System 3000, and System 5000 are trademarks, and BCN, BLN, and Optivity are registered trademarks of Bay Networks, Inc. All other brand and product names are trademarks or registered trademarks of their respective holders. Information in this document is subject to change without notice. Bay Networks, Inc. assumes no responsibility for any errors that may appear in this document. Printed in USA.