System 3000 Ethernet/Fast Ethernet NMMs

Simplify Network Monitoring

Provide Flexible Management Options

Improve Network Visibility

System 3000™ Ethernet and Fast Ethernet network management modules (NMMs) work with Bay Networks management systems to deliver a complete, multilayer management solution for System 3000-based 10 megabit-per-second (Mbps) Ethernet and 100 Mbps Fast Ethernet networks.

Occupying a single slot in a Model 3000 or Model 3030 intelligent hub, the modules gather and evaluate a variety of network fault, performance, and configuration data from Ethernet and Fast Ethernet host modules installed in the hub. A summary of that data is forwarded to a central management console, providing a detailed window into overall network performance.

The modules support three different levels of functionality, each offering increasingly powerful capabilities for managing the network. These capabilities, determined by software agents installed on the modules themselves, offer everything from simple statistics to sophisticated RMON-based troubleshooting tools, allowing the management system to be tailored to the needs of the network.

The Ethernet and Fast Ethernet NMMs work with Bay Networks Optivity® network management system, as well as other Simple Network Management Protocol (SNMP)-based applications, contributing to an integrated, standards-based management solution. With Optivity, all data provided by the modules is presented as part of an intuitive graphical user interface, available through simple pop-up windows or pull-down menus and displayed in clear, concise tables and lists. The information is updated continuously, providing a real-time picture of network performance.

The System 3000 Ethernet and Fast Ethernet NMMs support a variety of cabling, offering flexibility for mixed-media environments. The modules can also reside in a System 3000 hub alongside System 3000 Token Ring and FDDI modules, contributing to a highly flexible solution for diverse network configurations.

Bay Networks

Benefits

Simplify Network Monitoring

System 3000 Ethernet and Fast Ethernet NMMs automatically gather and process network fault, performance, and configuration data, providing the management system with a simple, easy-to-understand summary of network activity. Network managers can access the information through simple pop-up windows or pull-down menus, where the data is displayed in real time for rapid fault identification and resolution.

Provide Flexible Management Options

Three levels of management software agents are currently available, delivering increasingly powerful capabilities for managing the network. The Standard agent provides basic statistics, offering a window into network performance. The Advanced agent supports a number of powerful Optivity tools such as Sphere Autotopology™ dynamic mapping, thresholds, and Nodal and OmniViews, enabling more precise network monitoring and control. The Advanced Analyzer™ agent provides full RMON and SuperRMON™ functionality for detailed packet capture and analysis.

Improve Network Visibility

The Advanced Analyzer agent's RMON and SuperRMON capabilities, working with NodalView™ and OmniView,™ provide unprecedented visibility into the network. Correlating analyzer information with hub management data, the agent provides port-to-network address association that identifies network problems by their physical location and network address. In addition, protocol distribution data allows managers to see how much each protocol is being utilized as a percentage of overall network activity, providing tremendous insight into network operations.

Features

System 3000 Ethernet and Fast Ethernet NMMs reside in System 3000 intelligent hubs, where they coordinate the collection of detailed network performance data throughout the Ethernet or Fast Ethernet network. The Ethernet NMMs connect to either Channel A or Channel B of the hub's multisegment Ethernet backplane, providing complete management for up to five independent segments. The Fast Ethernet NMMs can attach to one of three independent segments on the hub's Fast Ethernet backplane.

Utilizing onboard circuitry and sophisticated agent software, the modules, which also connect to a dedicated network management bus on the hub backplane, gather specific activity, configuration, and diagnostic information at the segment, hub, module, and port levels. The data is assembled into SNMP packets and forwarded to a central management station, where the Optivity network management software displays it as part of an intuitive, easy-to-use graphical user interface.

Ethernet/Fast Ethernet Network Management Module Similarities

The System 3000 Ethernet and Fast Ethernet NMMs share a number of features, including full SNMP compatibility, dual IP and IPX protocol stacks, MIB II and IETF Repeater MIB support, and out-of-band signaling capabilities.

The modules also support Bay Networks unique Expanded View™ and OmniView user interfaces. Expanded View provides a real-time image of any selected hub, complete with installed modules, allowing managers to perform precise, port-level management operations from a central console. OmniView offers a user-customized display of statistics and status information for diagnosing and isolating hub-based faults.

All System 3000 Ethernet and Fast Ethernet NMMs include a series of front panel status and activity LEDs to indicate microprocessor faults, partitioning conditions, online status, collisions, and data activity. Working with System 3000 Ethernet and Fast Ethernet host modules, the NMMs also satisfy the IEEE 802.3 repeater specification required in each level of a System 3000 network.

System 3000 Ethernet Network Management Modules

Two types of System 3000 Ethernet NMMs are available, each offering a choice of physical interfaces. The Model 3313 offers an Attachment Unit Interface (AUI) port for connecting to standard Ethernet drop cables, coaxial cable, or external transceivers, while the Model 3314 features a 10BASE-FL-compatible duplex fiber optic port for dual ST-type connections to other hubs.

The Model 3313 AUI and Model 3314 10BASE-FL Ethernet NMMs deliver extensive fault isolation, performance analysis, configuration control, and security features for System 3000 Ethernet networks. The modules can connect to either the A or B channel on the hub's Ethernet backplane, delivering additional flexibility for managing multiple Ethernet segments.

Three versions of the Model 3313 and Model 3314 are available: The Model 331xA-03, the Model 331xA-04, and the Model 331xSA. Each model supports increasingly powerful management agents that deliver additional processing capabilities for the network.

Model 3313A-03/Model 3314A-03 The Model 3313A-03 and Model 3314A-03 Ethernet NMMs include Bay Networks Standard agent, which supports industry-standard MIB-II, Repeater, and MAU MIBs to provide real-time hub- and port-level management.

The Standard agent also offers fault and diagnostic tools for monitoring and controlling hubs. Through Fault, Performance, and Configuration pull-down menus on the Expanded View image, the modules provide hub- and port-level diagnostic, status, and activity data. With Expanded View, managers can partition and enable ports and obtain port-level performance statistics such as good packets, errors, and incoming and outgoing data.

The Model 3313A-03 and Model 3314A-03 feature 1 MB of dynamic RAM (expandable to 3 MB), plus an additional 32K of nonvolatile RAM to retain important security, configuration, and threshold data in the event of a power loss. The modules also include a local load feature, enabling hubs to boot from onboard memory (512K, expandable to 1 MB) without requiring a BootP/TFTP server.

Model 3313A-04/Model 3314A-04 The Model 3313A-04 and Model 3314A-04 Ethernet NMMs are identical to the Model 3313A-03 and Model 3314A-03, with the exception of Bay Networks Advanced agent software. The Advanced agent offers all the functionality of the Standard agent plus a number of additional features, such as:

- The Sphere Autotopology dynamic mapping feature, which automatically discovers all hubs, routers, bridges, switches, and endstations on the network. Interconnections between hubs are automatically identified by their specific slot and port location. The information is displayed by Optivity as part of a real-time map of the enterprise.
- Nodal View, a powerful tool for monitoring all devices connected to any Ethernet segment, which provides invaluable fault and performance analysis capabilities. All endstations appear within a concise, color-coded, user-definable window, allowing managers to quickly determine network status and identify potential trouble spots at a glance.
- Events logging, which provides a historical record of network errors and activity.
- Full support for RMON Alarms, Events, Ethernet Statistics, and History groups.
- Allowed Nodes, which enforces network security by denying access to unauthorized users.
- Find Nodes and Show Nodes features, which rapidly locate and display the specific hub, slot, and port location of up to 512 network devices, identified by MAC address or alias name.
- A rate thresholds feature, which enables proactive control of network hubs by alerting the manager to major deviations in performance. By comparing error levels to network traffic, rather than just measuring absolute values, the modules can intelligently discern the severity of specific problems in relation to overall network performance. Up to 48 thresholds can be set to track network events such as backoff failures and short events that identify problems such as improper configurations, failing NICs, or electromagnetic interference.
- Out-of-band signaling, which allows management operations to continue over the telephone network should inband communications fail.

Model 3313SA/Model 3314SA The Model 3313SA and Model 3314SA Ethernet NMMs include Bay Networks Advanced Analyzer agent, which supports full RMON capabilities (RFC 1271 — all nine groups) to provide detailed packet capture and analysis capabilities. Utilizing Bay Networks-developed ASIC technology for dedicated packet processing, the Model 3313SA and Model 3314SA provide the optimum platform for gathering and computing RMON and Bay Networks SuperRMON statistics.

The Advanced Analyzer agent provides all the functionality available with the Advanced agent, plus an integrated probe that delivers highly sophisticated RMON network troubleshooting and problem resolution capabilities. Advanced Analyzer data is leveraged by DecodeMan,™ included with the Optivity Campus™ and Optivity LAN™ applications, as well as a suite of RMON tools integrated with the Optivity Analysis™ package. Working with these applications and tools, the Advanced Analyzer agent provides remote monitoring and analysis for RMON-compliant agents, packet capture and filtering capabilities, and decodes of protocols such as IP, IPX, and DECnet.

Advanced Analyzer's SuperRMON capabilities go beyond traditional RMON, working with Optivity applications such as NodalView and OmniView to provide unprecedented visibility into the network. By correlating analyzer information with hub management data, the agent provides port-to-network address association, allowing managers to identify network problems by their physical location and network address. Advanced Analyzer also provides network protocol distribution data, which, through simple, easy-to-read Optivity charts and graphs, allows managers to see at a glance how much each protocol is being utilized as a percentage of overall network activity. System 3000 Ethernet NMM RMON support is shown in Table 1.

To support the Advanced Analyzer agent, the Model 3313SA and Model 3314SA utilize LANIP ASIC technology to provide continuous monitoring of segments to collect network performance, topology, fault, usage, and protocol information.

Table 1 | **System 3000 Ethernet Network Management Module RMON Support**

	Model 331xA-03	Model 331xA-04	Model 331xSA
RFC 1271 Remote Network Monitoring Management Information Base (RMON)		√	√
Statistics Group		√	√
History Group		√	√
Alarm Group		√	√
Host Group			√
HostTopN Group			√
Matrix Group			√
Filter Group			√
Packet Capture Group			√
Event Group		√	√

The Model 3313SA and Model 3314SA feature 512 KB of Flash EPROM (expandable to 1 MB) and 2 MB of dynamic RAM (upgradable to 8 MB). A full 32 KB of nonvolatile memory (upgradable to 128 KB) is also available, and a series of port- and module-level LEDs and a four-character LED display report module status at a glance.

Model 3410 Fast Ethernet Network Management Module

The Model 3410 Fast Ethernet NMM delivers port-level SNMP management functions for one of three Fast Ethernet segments in a System 3000 intelligent hub. The module collects detailed fault, performance, and configuration data for each 100 Mbps Fast Ethernet port on its segment, which it forwards to the Optivity management console for display.

The Model 3410, which offers a front panel DB-9 console port and an RS-232 communications port, supports a Fast Ethernet version of the Advanced agent. The Fast Ethernet Advanced agent is similar to the Advanced agent supported by the Model 3313A-04 and Model 3314A-04 Ethernet NMMs, with the addition of a software segment steering capability and support for multiple NMMs in a single segment.

When multiple management modules are assigned to a single Fast Ethernet segment, one module is designated as the primary module while the others assume a standby role. Should the primary NMM fail, a standby automatically takes over management operations.

With software segment steering, network managers can selectively reassign, or steer, a primary or standby NMM to another segment via the Optivity management console. The segment steering feature allows a single module to manage all three Fast Ethernet segments, one at a time, to maximize management investments.

Technical Specifications

Technical specifications for the System 3000 Ethernet and Fast Ethernet NMMs appear in Table 2.

Table 2 | **System 3000 Ethernet/Fast Ethernet Network Management Modules Technical Specifications**

Data Rate	10 Mbps Manchester encoded IEEE 802.3, CSMA/CD
	100 Mbps Fast Ethernet
Microprocessors	
Model 3313A/Model 3314A	16.78 MHz Motorola 68332 with National Semiconductor DP 8390 Network Controller
Model 3313SA/Model 3314SA	32-bit Motorola 68EC040 20 MHz CPU
Model 3410	16.78 MHz Motorola 68332 with National Semiconductor DP 8390 Network Controller
Memory	
Model 3313A/Model 3314A	1 MB dynamic RAM (expandable to 3 MB); 512K Flash EEPROM (upgradable to 1 MB); 64 KB EPROM; 32 KB nonvolatile RAM
Model 3313SA/Model 3314SA	2 MB dynamic RAM (expandable to 8 MB); 512K Flash EEPROM (upgradable to 1 MB); 32 KB nonvolatile RAM (upgradable to 128 KB)
Model 3410	1 MB dynamic RAM (expandable to 3 MB); 512K Flash EEPROM (upgradable to 1 MB); 64 KB EPROM; 32 KB nonvolatile RAM
Standards Compatibility	IEEE 802.3, ISO 8802/3
	IEEE 802.3u 100BASE-T
	IEEE 802.3 Attachment Unit Interface (Model 3313A and Model 3313SA only)
	IEEE 802.3 10BASE-FL Signaling (Model 3314A and Model 3314SA only)
	IEEE 802.3 Layer Management for 10 Mbps repeater, clause 19
	IEEE 802.3 Layer Management for 10 Mbps Medium Attachment Units (MAUs), clause 20
	RFC 791 Internet Protocol (IP)
	RFC 792 Internet Control Message Protocol (ICMP)
	RFC 768 User Datagram Protocol (UDP)
	RFC 826 Ethernet Address Resolution Protocol (ARP)
	RFC 783 Trivial File Transfer Protocol (TFTP Revision 2)
	RFC 951/1048 Bootstrap Protocol (BootP)
	RFC 1155 Structure and Identification or Management Information for TCP/IP-based Internets
	RFC 1157 Simple Network Management Protocol (SNMP)
	RFC 1212 Concise MIB Definitions
	RFC 1213 MIB for Network Management of TCP/IP-based Internets (MIB II)
	RFC 1215 Convention for Defining Traps for Use with the SNMP
	RFC 1515 Definitions of Managed Objects for IEEE 802.3 Medium Attachment Units (MAUs)
	RFC 1516 Definitions of Managed Objects for IEEE 802.3 Repeater Devices
	RFC 1271 Remote Network Monitoring Management Information Base (RMON)

Table 2 | **System 3000 Ethernet/Fast Ethernet Network Management Modules Technical Specifications (continued)**

Serial Port Interface	RS-232 (DB-25)
Physical Dimensions	(H) 15 in. x (W) 1.2 in. x (D) 10.5 in. [(H) 38.1 cm x (W) 3.1 cm x (D) 26.7 cm]
Environmental Specifications	
Operating Temperature	5° to 40°C
Operating Humidity	85% max relative humidity, noncondensing
Operating Altitude	10,000 ft (3,048 m), 40°C max
Storage Temperature	-25° to 70°C
Storage Humidity	95% max relative humidity, noncondensing
Free Fall/Drop	ISO 4180-2, NSTA 1A
Vibration	IEC 68-2-6/34
Stock/Bump	IEC 68-2-27/29
Weight	
Model 3313/3314A/SA	2.70 lb (1.2 kg)
Model 3410	2.35 lb (1.06 kg)
Electromagnetic Emissions	
Meets Requirements of	FCC Part 15, Subpart J, Class A and B
	EN 55 022 (CISPR 22: 1985), Class B
	General License VDE 0871, Class B (AmtsblVfg 243/1991, 46/1992)
	VCCI Class 1 ITE
Electromagnetic Susceptibility	
Electrostatic Discharge (ESD)	IEC 801-2, Level 3/2
Radiated Electromagnetic Field	IEC 801-3, Level 2
Electrical Fast Transient/Burst	IEC 801-4, Level 2/2
Electrical Surge	IEC 801-5, Level 2/1
Safety Agency Approvals	UL listed (UL 1950)
	CSA certified (CSA 22.2 #950)
	TUV licensed (EN 60 950)
	CE

Ordering Information

Ordering information for the System 3000 Ethernet and Fast Ethernet NMMs appears in Table 3.

Table 3 | **System 3000 Ethernet/Fast Ethernet Network Management Modules Ordering Information**

Order Number	Description
3313A-03	Model 3313A-03 Ethernet Network Management Module with connections to Channels A and B of System 3000 Multisegment Ethernet backplanes; includes AUI port, RS-232 port, IP/IPX firmware, and license for Standard IP/IPX network management agent
3313A-04	Model 3313A-04 Ethernet Network Management Module with connections to Channels A and B of System 3000 Multisegment Ethernet backplanes; includes AUI port, RS-232 port, IP/IPX firmware, and license for Advanced IP/IPX network management agent
3313SA	Model 3313SA Ethernet Network Management Module with connections to Channels A and B of System 3000 Multisegment Ethernet backplanes; includes AUI port and Advanced Analyzer network management agent
3314A-03	Model 3314A-03 Ethernet Network Management Module with connections to Channels A and B of System 3000 Multisegment Ethernet backplanes; includes 10BASE-FL port, RS-232 port, IP/IPX firmware, and license for Standard IP/IPX network management agent
3314A-04	Model 3314A-03 Ethernet Network Management Module with connections to Channels A and B of System 3000 Multisegment Ethernet backplanes; includes 10BASE-FL port and license for Advanced IP/IPX network management agent
3314SA	Model 3314SA Ethernet Network Management Module with connections to Channels A and B of System 3000 Multisegment Ethernet backplanes; includes 10BASE-FL port, RS-232 port, IP/IPX firmware, and Advanced Analyzer network management agent
AC2207001	Model 3410 Fast Ethernet Network Management Module with connections to three segments on System 3000 Fast Ethernet backplane; includes DB-9 console port and RS-232 communications port, and license for Advanced IP/IPX network management agent

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

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