

Hubs

Modules

System 5000 Token Ring Host Modules



Enhance Configuration Flexibility

System 5000™ Token Ring host modules deliver state-of-the-art connectivity, configuration and management capabilities for Bay Networks System 5000-based network center and wiring closet applications. Occupying a single slot in a Model 5000 or Model 5005 chassis and featuring complete IEEE 802.5 Token Ring compatibility, the System 5000 Token Ring modules deliver advanced solutions for building structured Token Ring networks.

removed from and inserted into powered System 5000 hubs without disrupting network operations.

Provide Superior Connectivity

The modules can connect to any of nine Token Ring data paths on the Model 5000 hub or five Token Ring paths on the Model 5005, offering tremendous configuration flexibility for segmenting networks in high-utilization wiring closets. Both 4 megabit per second (Mbps) and 16 Mbps operations are supported, enabling the modules to be seamlessly integrated into any existing Token Ring environment. Ring speeds are user-selectable through a manual jumper selection or via network management.

The modules are integrated into the Optivity® family of network management solutions, enabling complete Simple Network Management Protocol (SNMP) monitoring and control. With Optivity, network administrators can manage their entire network, including all hubs, switches and routers, from a single management station.

Improve Network Reliability

All System 5000 Token Ring host modules include onboard automatic frequency detection circuitry, which reduces network beaconing errors by detecting faulty cables and preventing wrong-speed stations from entering the ring. The modules are also fully hot-swappable, enabling them to be

The System 5000 Token Ring host modules can reside alongside System 5000 Ethernet and FDDI modules in the same chassis, contributing to an integrated solution for supporting multiple access methods within a single network. The modules are also fully compatible with Bay Networks System 2000™ and System 3000™ Token Ring products, as well as Token Ring interfaces on the Bay Networks family of routers and switches. Working together, the Bay Networks hub, router and switching products deliver a complete enterprise networking solution.

Benefits

Enhance Configuration Flexibility

The System 5000 Token Ring host modules support Bay Networks' configuration switching capabilities, which greatly simplify network moves, additions and changes while providing a low entry point for adopting future frame and cell switching solutions. Individual modules or ports can be software-assigned to specific network segments through the Optivity network management system, allowing managers to tailor the network's configuration to meet their specific needs.

Provide Superior Connectivity

System 5000 Token Ring host modules support industry-standard IEEE 802.5 Token Ring at both 4 and 16 Mbps over a variety of twisted pair and fiber optic cabling. Single networks supporting up to 250 Token Ring stations can be built using System 5000 Token Ring host modules.

Improve Network Reliability

System 5000 Token Ring host modules contribute to one of the industry's most reliable product families. Combined with Bay Networks System 3000 and System 2000 Token Ring products, Token Ring interfaces on Bay Networks Access Node (AN[®]), Access Stack Node (ASN[™]) and Backbone Node (BN[®]) routers, and the Centillion SpeedSwitch 100[™] product family, System 5000 Token Ring host modules deliver a critical piece of a total enterprise Token Ring solution.

Features

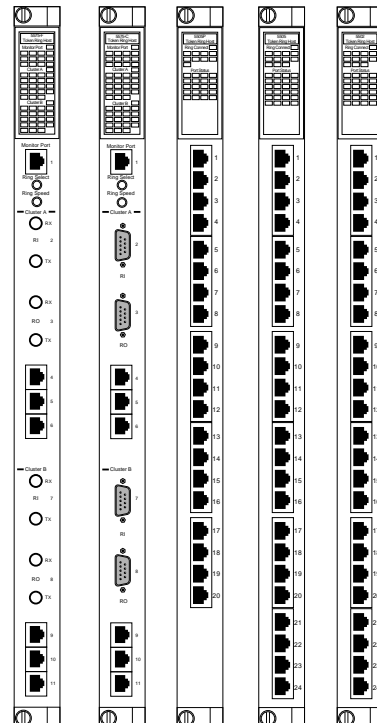
The System 5000 Token Ring host modules deliver complete connectivity solutions across a wide range of unshielded twisted pair and shielded twisted pair media. Occupying a single slot in a System 5000 switching hub, the modules can operate at either 4 Mbps or 16 Mbps over one of nine Token Ring data paths on the Model 5000 backplane or one of five paths on the Model 5005 backplane, delivering unprecedented flexibility for dynamic applications.

All System 5000 Token Ring host modules include built-in automatic frequency-detection hardware, which prevents a

Token Ring device from entering the network at the wrong speed. If a data-rate mismatch is attempted — such as a 4 Mbps device connecting to a 16 Mbps ring — the frequency detection circuitry automatically wraps the port, avoiding potential beaconing conditions on the network.

Five System 5000 Token Ring host modules are available: two versions of the Model 5575 Token Ring Intelligent Dual Cluster Repeater Host Module, the Model 5505P Token Ring Active Retiming Host Module with per-port configuration switching, the Model 5505 Token Ring Active Retiming Host Module, and the Model 5502 Token Ring Passive Host Module.

Figure 1 | Model 5575-F, Model 5575-C, Model 5505P, Model 5505 and Model 5502 Token Ring Host Modules



Model 5575 Token Ring Intelligent Dual Cluster Repeater Host Module

The Model 5575 Token Ring Intelligent Dual Cluster Repeater Host Module provides distributed workgroups with full access to centralized resources located in the network center.

Two versions of the Model 5575 are available. The Model 5575-F features two sets of duplex ST fiber connectors to support Ring-In/Ring-Out trunk connections to System 3000 and System 2000 Token Ring workgroups distributed throughout the enterprise. The ports provide connectivity for users located up to 2 kilometers away over 62.5/125 μm and 50/125 μm fiber optic cable. Full repeating functions are implemented on receive and transmit pairs for both primary and secondary ring paths.

The Model 5575-C offers two sets of dual DB-9 connectors to support Ring-In/Ring-Out trunk connections over both shielded and unshielded twisted pair cabling to distributed workgroups. Full repeating functions are implemented on receive and transmit pairs for both primary and secondary paths. Supported media and maximum cabling distances are shown in Table 1.

Each Model 5575 Ring-In/Ring-Out trunk connection is associated with a “cluster” consisting of three RJ-45 copper lobe ports, providing efficient access to centrally located file servers, bridges and routers over readily available shielded and unshielded twisted pair cabling. Each cluster can be assigned to any of the System 5000 hub’s Token Ring backplane paths through software control, providing considerable flexibility for configuring the network.

Table 1 | **Model 5575 Cabling Support**

Supported Media	4 Mbps	16 Mbps
UTP Category 5	300 m	180 m
UTP Category 4	300 m	160 m
UTP Category 3 (DIW)	200 m	100 m
STP Type 1, 1A, 2	600 m	300 m
STP Type 6, 9	400 m	200 m
STP Type 8	300 m	150 m

The clusters can alternatively attach to a local module-level ring, which is not connected to the backplane, or they can be removed entirely from both the module-level and backplane rings to establish independent, isolated clusters in the network center.

A Monitor port on the Model 5575 offers a single front-panel RJ-45 modular receptacle for attaching network diagnostic equipment in the network center. The equipment can be used to evaluate individual ring performance, using either front-panel push-button controls or via the network management system to select the desired ring number and speed.

The modules include core management capabilities that allow network managers to monitor hub hardware status and control hub configuration. Each Ring-In/Ring-Out trunk port also includes a built-in Frame Processing Unit (FPU) to provide the network management system with sophisticated ring statistics and diagnostic information (see Table 2).

Model 5505P Token Ring Active Retiming Host Module with Per-port Configuration Switching

The Model 5505P Token Ring Active Retiming Host Module offers 20 RJ-45 modular receptacles for supporting 4 Mbps and 16 Mbps Token Ring host stations over both shielded and unshielded twisted pair cabling on the same ring. Model 5505P host ports can also support Ring-In connections from other dumb media access units (MAUs), expanding module density to eight nodes per port.

The Model 5505P includes a per-port configuration switching feature that enables individual ports to be selectively assigned to any of the System 5000 hub’s Token Ring backplane paths or to the module-level local ring. Backbone rings can also be isolated from the backplane, enabling the module to support up to six independent local rings. Per-port configuration switching allows network managers to fine-tune the network’s performance through microsegmentation without physically rewiring the hub, reducing network downtime, errors and operations overhead.

Table 2 | FPU Statistics

Core Statistics	
Total MAC Octets	Total Octets
Total Frames	Total Good Frames
Total Bad Frames	Total MAC Frames
Total LLC Frames	Total Nonunicast Frames
Total Unicast Frames	Total Beacon Frames
Total Ring Purges	Total Claim Token Frames
Total Soft Error Frames	
Ring Segment Soft Errors	
Internal Errors	Line Errors
AC Errors	Burst Errors
Lost Frame Errors	Abort Errors
Frame Copied Errors	Congestion Errors
Token Errors	Frequency Errors

The Model 5505P also incorporates data signal active retiming and regeneration on each lobe port, thereby reducing system jitter and signal loss to maintain highly reliable performance over all twisted pair cabling types.

The Model 5505P can be used to create rings supporting up to 132 devices over a variety of shielded and unshielded twisted pair cabling. See Table 3 for a complete summary of Model 5505P media and lobe length support.

Model 5505 Token Ring Active Retiming Host Module

The Model 5505 Token Ring Active Retiming Host Module includes 24 RJ-45 modular receptacles for supporting 4 and 16 Mbps Token Ring host stations over shielded twisted pair cabling and high-grade, low-crosstalk Category 4 and

Category 5 unshielded twisted pair cabling. Like the Model 5505P, the Model 5505 incorporates data signal active retiming and regeneration on each lobe port, reducing system jitter and signal loss to maintain highly reliable performance over all cabling.

The Model 5505 also includes a per-module configuration switching feature that allows all 24 ports to be software-assigned, as a group, to any of the System 5000 hub's Token Ring backplane data paths, or to a local board-level segment. Per-module configuration switching provides cost-effective configuration flexibility for stable network environments.

The Model 5505 can be used to build individual Token Ring networks supporting a maximum of 132 devices over a variety of twisted pair cabling. See Table 3 for a complete summary of Model 5505 media support.

Model 5502 Token Ring Passive Host Module

The Model 5502 Token Ring Passive Host Module offers 24 RJ-45 modular receptacles to support Token Ring host stations operating at 4 or 16 Mbps over shielded twisted pair cabling and high-grade, low-crosstalk Category 4 and Category 5 unshielded twisted pair cabling.

The Model 5502 provides a compact solution for high-density network environments. The Model 5502 includes the per-module configuration feature, in which all 24 ports can be assigned, as a group, to one of the System 5000 hub's Token Ring backplane paths, or to the local module-level ring.

Table 3 | Model 5505P/5505 Cabling Support

Supported Media	4 Mbps	16 Mbps
UTP Category 5	300 m	180 m
UTP Category 4	300 m	160 m
UTP Category 3 (DIW)	200 m	100 m
STP Type 1, 1A, 2	600 m	300 m
STP Type 6, 9	400 m	200 m
STP Type 8	300 m	150 m

Table 4 | **Model 5502 Cabling Support**

Supported Media	4 Mbps	16 Mbps
UTP Category 5	200 m	100 m
UTP Category 4	200 m	100 m
UTP Category 3 (DIW)	100 m	–
STP Type 1, 1A, 2	350 m	180 m
STP Type 6, 9	200 m	120 m
STP Type 8	150 m	90 m

The Model 5502 can be used to build individual Token Ring networks supporting a maximum of 250 devices over shielded twisted pair cabling or 132 devices on unshielded twisted pair. See Table 4 for a summary of Model 5502 cabling options and distances.

Adapter Card Compatibility

The Model 5575-F, Model 5575-C, Model 5505P, Model 5505 and Model 5502 have all been successfully tested for compatibility with IBM 16/4 Token Ring adapter cards, allowing for seamless integration of existing IBM networks into System 5000 environments. The modules have also demonstrated interoperability with adapters from a variety of other vendors through joint testing at the Token Ring Interoperability Lab (TRIL).

Token Ring Module Management

System 5000 Token Ring modules are fully integrated into the Optivity network management system, enabling network managers to monitor and control network activity from a central management station. Management data is forwarded to the network management system over a high-speed, out-of-band 32 MB Common Management Bus (CMB) on the Model 5000 or Model 5005 backplane, ensuring rapid and timely reporting of network performance information.

The Token Ring modules appear in the Expanded View™ graphical user interface, providing unprecedented visibility into the network topology. Software-based configuration switching is accomplished through Optivity’s LANarchitect™ tool, which enables network managers to create logical network segments unrestricted by physical location.

LED Indicators

Each System 5000 Token Ring module includes a comprehensive front-panel LED display matrix to indicate module performance and configuration at a glance.

The Model 5575-F and Model 5575-C include module-level LEDs to indicate overall module status, as well as separate LED fields for the various cluster ports. The LEDs report which backplane rings the clusters are assigned to, the various ring speeds and whether the clusters are local or isolated from the backplane. Other conditions, such as beaconing, wrapping or the presence of a phantom signal, are also reflected on a per-port and per-cluster basis on the LED matrix display.

The Model 5505P, Model 5505 and Model 5502 include an overall module-status LED, as well as a series of indicators to report individual ring and port status. One field indicates which ring or rings on the backplane are being utilized by the module or by individual ports, and the status of those rings. A second field offers a series of port-level indicators to report the presence of a valid phantom signal or whether the port is wrapped. Optivity can then determine the origin of the phantom signals (hardware or software) and the cause of the port wraps (speed mismatch, beacon wrap, permanent wrap, time wrap).

Technical Specifications

Technical specifications for the System 5000 Token Ring host modules are shown in Table 5.

Table 5 | System 5000 Token Ring Host Module Technical Specifications

Network Protocol and Standards Compatibility	IEEE 802.5 Token Ring Access Method and Physical Layer Specifications
Data Rate	4 Mbps or 16 Mbps
Electrical Specifications	
Power Consumption	Model 5575-F: 60W @ -48VDC Model 5575-C: 35W @ -48VDC Model 5505P: 50W @ -48VDC Model 5505: 40W @ -48VDC Model 5502: 30W @ -48VDC
Thermal Rating	Model 5575-F: 205 Btu/hr max Model 5575-C: 120 Btu/hr max Model 5505P: 170 Btu/hr max Model 5505: 134 Btu/hr max Model 5502: 100 Btu/hr max
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°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, NSTA 1A Vibration: IEC 68-2-6/34 Shock/bump: IEC 68-2-27/29
Weight	Model 5575-F: 4.2 lb (1.9 kg) Model 5575-C: 3.95 lb (1.79 kg) Model 5505P: 4.2 lb (1.9 kg) Model 5505: 4.0 lb (1.9 kg) Model 5502: 4.2 lb (1.9 kg <None>)
Flammability	PCB designed to meet UL94-V1
Electromagnetic Emissions	Meet FCC Part 15, Subpart B, Class A Meet VCCI Class 1 ITG (CISPR 22 A limits) Meet EN 55 022, Class B and Vfg 243 Class B with shielded cable

Order Information

Order information for the System 5000 Token Ring host modules appears in Table 6.

Table 6 | **System 5000 Token Ring Host Module Ordering Information**

Order Number	Description
5502	Model 5502 24-port Passive STP/UTP Token Ring Host Module
5505	Model 5505 24-port Active Retiming STP/UTP Token Ring Host Module
5505P	Model 5505 20-port Active Retiming STP/UTP Token Ring Host Module with Per-port Configuration Switching
5575-C	Model 5575-C Intelligent Dual Repeater Cluster Token Ring Host Module with 2 STP/UTP RI/RO Trunks and 6 Active Retiming STP/UTP Ports
5575-F	Model 5575-F Intelligent Dual Repeater Cluster Token Ring Host Module with 2 Fiber RI/RO Trunks and 6 Active Retiming STP/UTP Ports



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