

Hubs

Modules

## System 3000 Token Ring Host Modules



### Optimize Network Performance

### Broaden Network Management

### Improve Network Flexibility

System 3000™ Token Ring host modules from Bay Networks™ provide Token Ring connectivity for the System 3000 intelligent hub platform. Occupying a single slot in a Model 3000 or Model 3030 concentrator, Token Ring host modules provide host connections to IBM and other IEEE 802.5 Token Ring-compatible devices. In conjunction with the Model 354-ST Fiber Optic Extender, the Token Ring host modules can support lobe and trunk connections up to two kilometers in length.

The modules operate over one of two buses on the System 3000 Token Ring backplane. The buses represent separate rings, each of which can operate at either 4 megabits per second (Mbps) or 16 Mbps. The modules can operate at either speed, offering a flexible Token Ring connectivity solution for any networking environment. Flexible media options take advantage of most existing structured cabling environments, including unshielded twisted pair (UTP), shielded twisted pair (STP) and fiber optic cabling.

The System 3000 Token Ring host modules are fully manageable by the Optivity® network management system. On-board circuitry provides the management software with board- and port-level status, configuration, diagnostic and performance data, enabling port-level control from a central management station.

The modules are fully compatible with the IEEE 802.5 Token Ring standard, enabling them to fit seamlessly into any standards-based Token Ring or IBM environment. Working with other Bay Networks Token Ring-based products, including hubs, routers and switches, the modules contribute to a comprehensive Token Ring enterprise networking solution.

## Benefits

### Optimize Network Performance

System 3000 Token Ring host modules provide complete, standards-based Token Ring connectivity. Working with other Bay Networks products, including the System 2000™ Token Ring hubs, System 5000™ Token Ring hubs, the Centillion 100™ switches, and Token Ring interfaces on the Access Node (AN™), Access Stack Node (ASN™) and Backbone Node (BN®) families of routers, the modules contribute to one of the industry's most complete Token Ring solutions.

### Broaden Network Management

The System 3000 Token Ring host modules provide the Optivity network management system with detailed fault and configuration data for precise port-level control. Working with System 3000 Token Ring network management modules, the host modules enable full network monitoring and control from a single, central location.

### Improve Network Flexibility

System 3000 Token Ring host modules operate at both 4 and 16 Mbps (ring speed determined by jumper setting prior to installation), offering flexible solutions for any Token Ring environment. The modules can also reside in a System 3000 hub alongside System 3000 Ethernet and FDDI modules, contributing to a single-platform solution for complex networks employing multiple access methods.

## Features

System 3000 Token Ring host modules provide standards-based connectivity solutions for the System 3000 intelligent hub platform. Operating at either 4 or 16 Mbps, the modules deliver flexible IEEE 802.5-based performance options for any existing Token Ring or IBM environment.

Three different System 3000 Token Ring host modules are available, each offering various performance and media options. For widely-distributed networks, a fiber optic extender is also available to provide a long-distance link between Token Ring networks separated by up to two kilometers.

### Model 3505B STP/UTP Active Retiming Token Ring Host Module

The Model 3505B STP/UTP Active Retiming Token Ring Host Module delivers a plug-and-play solution for supporting 16 Mbps and 4 Mbps Token Ring over both shielded and unshielded twisted pair cabling plants.

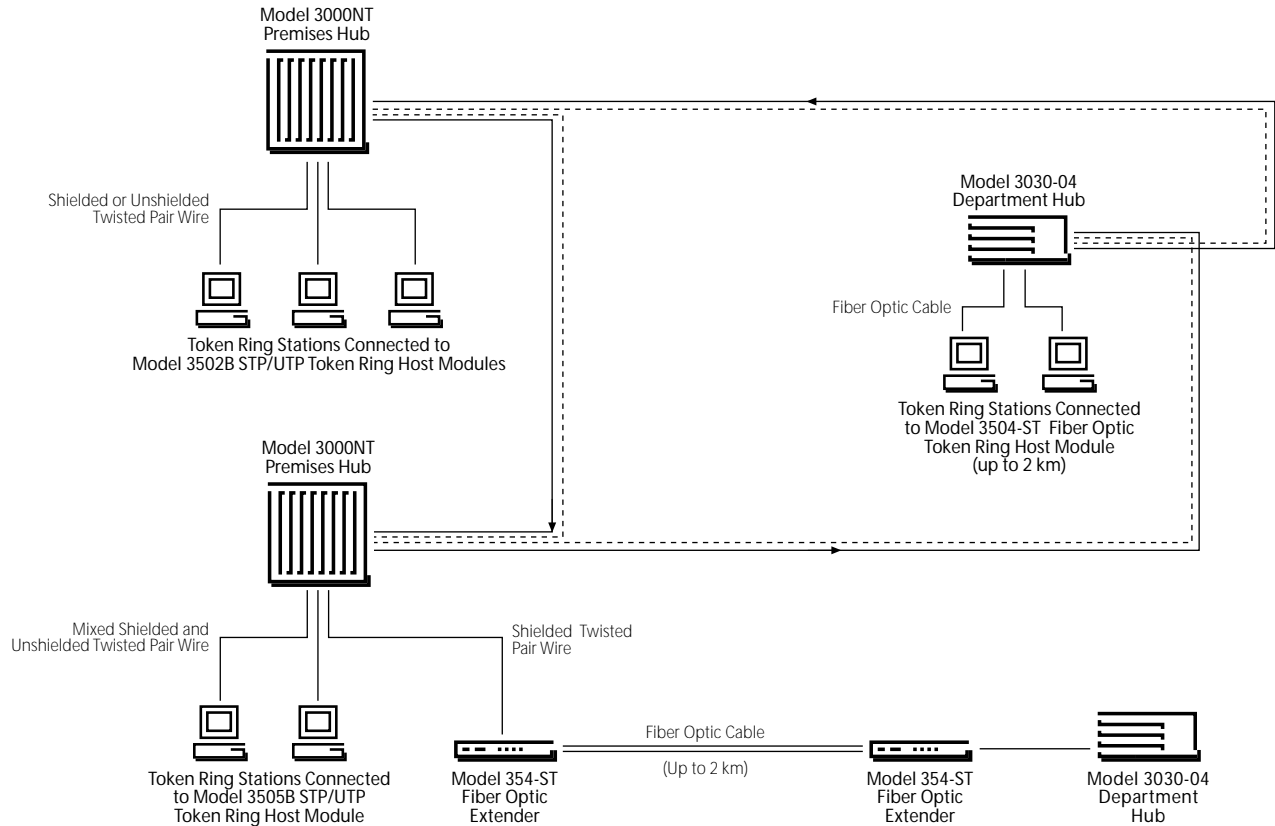
Front-panel shielded RJ-45 modular receptacles support up to 12 host connections on a single module. Working with System 3000 Token Ring repeater or network management modules, the Model 3505B can be used to create single networks supporting up to 132 stations.

Per-port active retiming circuitry performs signal regeneration and retiming on each lobe at the hub, enabling the Model 3505B to support any installed combination of shielded and unshielded twisted pair wire connections in a mixed cabling environment. The Model 3505B can support unshielded twisted pair lobe lengths up to 200 meters at 4 Mbps and 100 meters at 16 Mbps over standard D-Inside Wire (DIW) — also known as Type 3, Level 3, Category 3 or voice grade cable. Lobe lengths of 300 meters (at 4 Mbps) and 160 meters and 180 meters (at 16 Mbps) are also supported over high-grade, low-crosstalk Category 4 and Category 5 unshielded twisted pair cable, respectively.

Table 1 | Model 3505B Cabling Distance Support

Cabling	4 Mbps	16 Mbps
Category 4 Unshielded Twisted Pair	300 meters	160 meters
Category 5 Unshielded Twisted Pair	300 meters	180 meters
Category 3 Unshielded Twisted Pair	200 meters	100 meters
Type 1, Type 1A and Type 2 Shielded Twisted Pair	600 meters	300 meters
Type 6 and Type 9 Shielded Twisted Pair	400 meters	200 meters
Type 8 Shielded Twisted Pair	300 meters	150 meters

Figure 1 | System 3000 Token Ring Network



With shielded twisted pair cabling, the Model 3505B supports lobe lengths of 600 meters (at 4 Mbps) and 300 meters (at 16 Mbps) over Type 1, Type 1A and Type 2 shielded twisted pair cabling; 400 meters (at 4 Mbps) and 200 meters (at 16 Mbps) over Type 6 and Type 9 STP; and 300 meters (at 4 Mbps) and 150 meters (at 16 Mbps) over Type 8 shielded twisted pair cabling. See Table 1 for a summary of cabling distance support.

A Bay Networks Model 955 or Model 550B Token Ring Lobe Media Filter is required for Token Ring host stations to communicate over unshielded twisted pair wire. These passive low-pass filters, which attach directly to Token Ring adapter cards, reduce electromagnetic radiation on unshielded twisted pair lobe cables in accordance with FCC restrictions.

The filters attach to Token Ring adapter cards via a standard DB-9 male connector. The Model 955 features a 15-foot patch cable terminated with an RJ-45 male connector to provide direct access to the unshielded twisted pair cabling system. The Model 550B offers a female RJ-45 modular receptacle, giving customers the freedom to choose a patch cable length that best suits their needs.

**Model 3502B STP/UTP Token Ring Host Module**

For homogeneous cabling environments, the Model 3502B STP/UTP Token Ring Host Module provides 12 shielded RJ-45 modular receptacles for supporting 4 and

16 Mbps Token Ring over shielded twisted pair cabling as well as unshielded twisted pair cabling systems such as AT&T's PDS and Northern Telecom's IBDN.

On shielded twisted pair cabling, Model 3502B host modules work with System 3000 Token Ring repeater or network management modules to create networks supporting up to 250 stations. With unshielded twisted pair cabling, Model 3502B host modules can be used to create single rings supporting up to 144 stations. The module supports 100 meter lobe lengths at 4 Mbps over Category 3 DIW, as well as at 16 Mbps and 4 Mbps over high-grade Category 4 or Category 5 unshielded twisted pair. Host stations must employ a Model 955 or Model 550B Token Ring media filter in unshielded twisted pair environments.

### Model 3504-ST Fiber Optic

#### Token Ring Host Module

The Model 3504-ST Fiber Optic Token Ring Host Module offers six dual ST-type bayonet connectors for supporting Token Ring host stations over standard 62.5/125  $\mu\text{m}$  multimode duplex fiber optic cabling. The module, which incorporates standards-based signaling compatible with the IEEE 802.5j Trial Use Standard for Token Ring Fiber Optic Station Attachment, supports host connections up to two kilometers, providing an efficient hub-based solution for Token Ring networks requiring longer lobe distances than copper cabling can provide.

Because fiber optic cabling is resistant to electronic eavesdropping and external noise, the Model 3504-ST also represents an effective, reliable solution for high-security networks and heavy manufacturing environments.

#### Automatic Frequency Detection Feature

Each System 3000 Token Ring host module includes sophisticated frequency detection circuitry that automatically discerns the frequency of a connecting device and prevents it from operating at the wrong speed. Data-rate mismatches — such as a 4 Mbps device connecting to a 16 Mbps ring — are the most common cause of beaconing or alarm conditions

on a ring. The detection circuitry on the modules automatically wraps a port if a device strays from the established ring speed, maintaining a reliable and virtually beacon-free network.

#### Model 354-ST Fiber Optic Extender

In widely-dispersed Token Ring network environments, the Model 354-ST Fiber Optic Extender provides connectivity between remote network devices to extend up to two kilometers the distance over which fiber optic media may operate.

The Model 354-ST, a stand-alone device with two ST-type fiber connectors and an IBM data connector, can be used as both a lobe extender or as a trunk extender between concentrators. As a lobe extender, the Model 354-ST is used in pairs to extend host connections out to remote stations, bridges or routers. As a trunk extender, the Model 354-ST can be used in pairs or a single unit can be connected to a Model 3534-ST Token Ring Fiber Repeater or a Model 3514-ST Fiber Optic Token Ring Network Management Module to provide an extended ring trunk connection between concentrators. The Model 354-ST can operate at either 16 Mbps or 4 Mbps; data rate is switch-selectable.

#### Token Ring Host Module Management

System 3000 Token Ring host modules support Bay Networks' Optivity<sup>®</sup> network management systems, including Optivity Workgroup<sup>™</sup>, Optivity Campus<sup>™</sup> and Optivity Enterprise<sup>™</sup>. On-board circuitry allows the modules to provide a System 3000 Token Ring network management module with dynamic board- and port-level status and configuration data, which is forwarded to an Optivity network management station.

Automatic wrap of individual ports maintains ring integrity while satisfying IBM and IEEE 802.5 Token Ring specifications. Module or port wrap occurs if a module detects a loss of phantom signal due to a broken lobe cable or a disabled station.

The network management solutions also support a unique multi-ring architecture within the System 3000 platform. From an Optivity network management station, host modules can be individually wrapped from the concentrator backplane to create an independent 12- or 6-port ring. A fully-configured Model 3000 concentrator can support up to 11 separate, manageable rings in this manner.

#### LED Indicators

Two sets of LED indicators on the System 3000 Token Ring host modules provide module status information at a glance. Board-level LEDs indicate power, module bypass under network management, module network management control, the assigned backplane ring, and the ring's speed. Two LEDs are also provided for each port. One LED indicates ring wrap forced by network management. The other LED indicates the presence of phantom from an IBM or IEEE 802.5-compatible Token Ring adapter card connected to that host port.

The Model 354-ST includes a series of LEDs to indicate status, ring speed, and the presence of a phantom signal on the shielded twisted pair or the fiber optic cable connections to the attached devices.

## Technical Specifications

Technical specifications for the System 3000 Token Ring host modules appear in Table 2.

Table 2 | **System 3000 Token Ring Host Module Technical Specifications**

<b>Data Rates</b>	16 Mbps or 4 Mbps differential Manchester encoding, IEEE 802.5
<b>Physical Dimensions</b>	
Model 3502B, Model 3504-ST and Model 3505B	(H) 15 in x (W) 1.2 in x (D) 10.9 in [(H) 38.1 cm x (W) 3.1 cm x (D) 27.7 cm]
Model 354-ST Fiber Optic Extender:	(H) 1.31 in x (W) 4.0 in x (D) 9.75 in [(H) 3.3 cm x (W) 10.1 cm x (D) 24.7 cm]
Model 550B Token Ring Lobe Media Filter:	(H) 0.78 in x (W) 1.75 in x (D) 3.7 in [(H) 2 cm x (W) 4.4 cm x (D) 9.4 cm]
Model 955 Token Ring Lobe Media Filters:	(H) 0.7 in x (W) 1.3 in x (D) 2.4 in [(H) 1.7 cm x (W) 3.3 cm x (D) 5.9 cm]
	Cable length: 15 ft (4.6 m)
<b>Compatibility</b>	IEEE 802.5 Token Ring access method and physical layer specifications IBM-compatible
<b>Environmental Specifications</b>	Operating temperature: 5°C to 40°C Vibration: IEC 68-2-6/34 Operating altitude: 10,000 ft (3,048 m), 40°C max Storage temperature: -29°C to 70°C Operating humidity: 85% max relative humidity Free fall/drop: ISO 4180-2, NSTA 1A Storage humidity: 95% max relative humidity Stock/bump: IEC 68-2-27/29
<b>Electrical Specifications</b>	
Power consumption:	
Model 3502B:	11 watts @ +5V; 1.5 watts @ +12V; 12.5 watts total
Model 3504-ST:	12 watts @ +5VDC
Model 3505B:	18.8 watts @ +5V; 1.2 watts @ +12V; 20 watts total
Thermal rating (max):	
Model 3502B:	42.8 BTU/hr max
Model 3504-ST:	41 BTU/hr max
Model 3505B:	68 BTU/hr max
<b>Weight</b>	
Model 3502B:	2.2 lbs (1 kg)
Model 3504-ST:	2.6 lbs (1.2 kg)
Model 3505B:	2.8 lbs (1.1 kg)
Model 354-ST:	1.6 lbs (0.6 kg)
Model 550B:	5.6 oz (0.13 kg)
Model 955:	7.3 oz (0.2 kg)
<b>Flammability</b>	PCB designed to meet UL 94-V1
<b>Electromagnetic Emissions</b>	Meets FCC Part 15, Subpart J, Class A and B Meets EN 55 022 (CISPR 22: 1985), Class B Meets General License VDE 0871, Class B (AmtsbIVfg 243/1991, 46/1992) Meets VCCI Class 1 ITE

**Table 2 | System 3000 Token Ring Host Module Technical Specifications (continued)**

<b>Electromagnetic Susceptibility</b>	Electrostatic discharge (ESD): IEC 801-2, Level 2/4 Radiated electromagnetic field: IEC 801-3, Level 2 Electrical fast transient/burst: IEC 801-4, Level 2/3 Electrical surge: IEC 801-5, Level 1/3
<b>Safety Agency Approvals</b>	UL listed (UL 1950) CSA certified (CSA 22.2 #950) TUV licensed (EN 60 950)

## Ordering Information

Ordering information for the System 3000 Token Ring host modules, the Model 354-ST Fiber Optic Extender, and the Model 955 and Model 550B Token Ring media filters appears in Table 3.

**Table 3 | System 3000 Token Ring Host Module Ordering Information**

Order Number	Description
3502B	Model 3502B Shielded/Unshielded Twisted Pair Token Ring Host Module
3504-ST	Model 3504-ST Token Ring Fiber Host Module
3505B	Model 3505B Shielded/Unshielded Twisted Pair Token Ring Host Module with Per-port Active Retiming
354-ST	Model 354-ST Token Ring Fiber Optic Extender
550B	Model 550B Token Ring Unshielded Twisted Pair Media Filter
955	Model 955 Token Ring Integrated Media Filter



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