Network Adapters
Sales Guide

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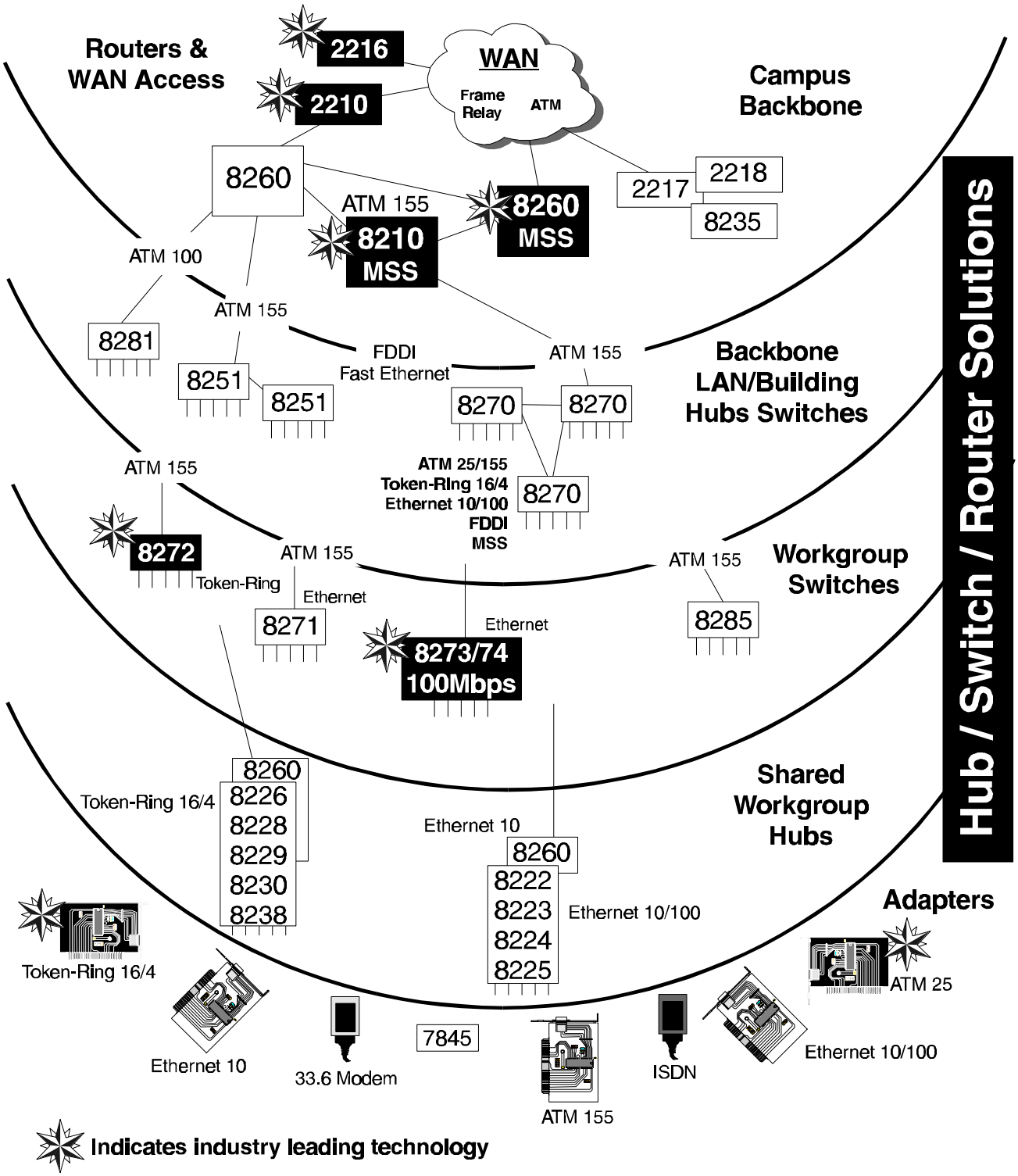
IBM Networking Portfolio Highlights



PLUS: End-to-end integrated Network Management, extensive education, service and support

IBM Adapter Highlights

This Sales Guide contains the information you need to be successful selling IBM network adapters. This easy-to-use reference tool guides you through the selling process for adapters and equips you to even handle your customer's most challenging questions.

Products

IBM offers a **total networking solution** including network adapters, workstations, servers and campus infrastructure products (see figure Page 3). No other vendor can match the breadth of products IBM offers. IBM has products for all major LAN and WAN environments. IBM offers adapters to meet all of your networking needs, including:

- Ethernet
- Token-Ring
- Asynchronous Transfer Mode (ATM)
- Wide Area Networking (WAN)/Integrated Services Digital Network (ISDN)

Why Sell IBM Adapters?

There are numerous reasons why selling IBM adapters is important to you.

Total Solution — IBM's network adapters are only part of its total networking product line. You will be able to meet all of your customer's networking needs with a cohesive and industry-leading family of products.

Technology — IBM's adapters offer the technological advances you would expect from the computer industry's leading vendor.

Support — IBM is an industry leader in the support it offers you in your sales efforts and the support it provides to your technicians and customers after the sale.

Price — IBM has priced its adapters to be extremely competitive in the market place.

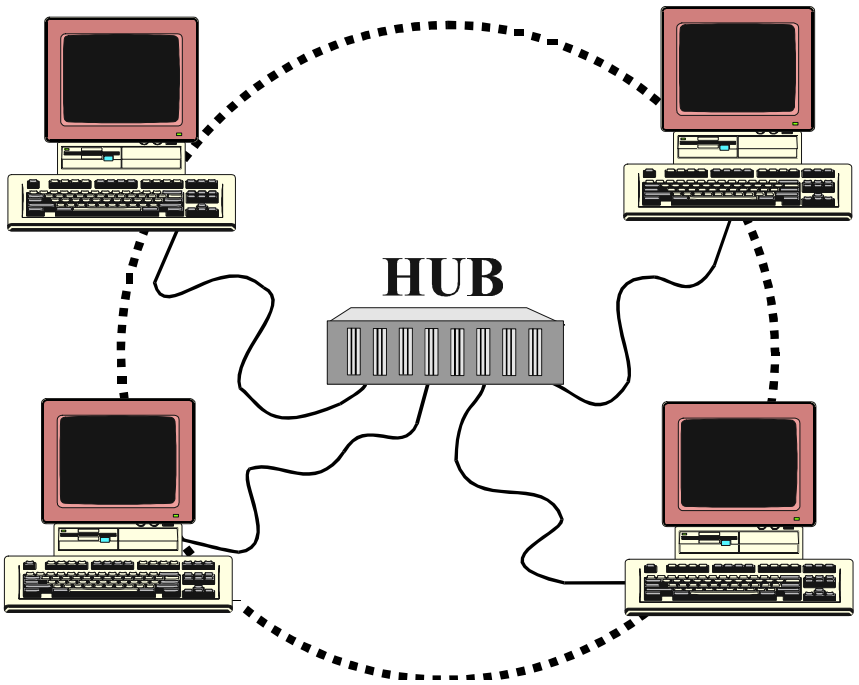
Sales — IBM adapters are sold in conjunction with other hardware and software (PCs, concentrators, hubs, switches, etc.) or as a standalone with other vendors' equipment. Adapter sales often lead to substantial pull-through sales of additional networking products.

Compatibility — With IBM's adapters, you have the peace of mind that their compatibility and state-of-the-art design match up well with the industry's leading personal computers.

TOKEN-RING ADAPTERS
Market Information

Background

In 1985, IBM introduced the industry's first Token-Ring products, as defined by the IEEE 802.5 standard. Token-Ring is so named because the network is logically a ring, on which a high-speed token is passed sequentially from station to station along the ring. The token provides the access control so that only the station currently owning the token can transmit. Token-Ring physically uses a star wiring topology in which up to 260 stations connect to a central wiring hub (or concentrator). This star wiring topology enables excellent fault tolerance and management capabilities to be integrated into the basic network.



Star-Wired Token-Ring Network

Market Trends

Demand for Token-Ring and Token-Ring products is stronger than ever. Smart customers continue to recognize the cost-of-ownership benefits of IBM Token-Ring and wisely invest more today than ever before. And even though IBM Token-Ring performance keeps improving and new features keep being added, the price of IBM Token-Ring keeps falling. Today, you can acquire IBM's latest and most advanced Token-Ring adapters at a competitive price.

Currently, very few IBM Token-Ring customers see the need for greater bandwidth at the client connection. Some foresee the need for greater

bandwidth in the backbone. For those customers, IBM has Token-Ring switching solutions and Token-Ring to ATM products to increase bandwidth significantly yet protect their investment in Token-Ring.

IBM Products

IBM offers a complete product line of Token-Ring network adapters complementing its campus networking products. IBM's product line offers solutions for all major bus structures (ISA, Micro Channel™, PCI and PCMCIA). IBM and third parties offer support for IBM's Token-Ring adapters for all major LAN environments. Many of IBM's Token-Ring adapters have been named "Best of Breed" by independent agencies.

IBM Token-Ring Adapter Features

IBM is the originator of Token-Ring. Its adapter product line contains the most advanced features and capabilities available on the market today.

- **Software Configuration**. Micro Channel and EISA adapters have always been software configurable. The IBM Turbo 16/4 ISA adapter is also software configurable via the LANAID program (see next page). In addition, the Turbo 16/4 ISA, the Triple LANStreamer PCI, and the PCI Token-Ring adapters are all Plug and Play (P&P) enabled, which allows automatic configuration in P&P-ready PCs. This means that simply turning on the system will automatically configure the adapter. With the addition of P&P operating systems, the drivers will also be automatically installed. IBM is a leader in offering P&P capability for Token-Ring adapters.

- **System Interface**. IBM's Token-Ring adapters offer a choice of system interfaces (Shared RAM and Busmaster). Adapters with **Shared RAM** use the system CPU to handle data transfer. IBM's Shared RAM adapters can all use the same drivers, and are even driver compatible with IBM's earlier 8-bit Token-Ring adapters.

  Busmaster is a performance-boosting technique in which a device borrows control of the system bus to handle data transfer without involving the PC's processor. Because of this, busmaster adapters offer higher throughput (especially LANStreamer) and lower CPU utilization.

- **Data Width**. Data width is the number of bits the adapter can transfer across the system bus for each data cycle. All of IBM's current ISA adapters are 16 bit and all current PCI adapters are 32 bit.

- **LEDs**. Adapters are equipped with two external LED status indicators that allow the user to easily determine adapter and ring status at a glance. Most competitors do not offer this feature.

- **Auto Ring Speed Adjust.** IBM's Auto Ring Speed adapters automatically determine and set the correct ring speed. This is an IBM **exclusive** feature.

- **Auto Media Select**. Most IBM adapters support automatic media sensing, which eliminates the need for users to specify the media type being used.

- **LANAID.** A new Graphical User Interface (GUI) adapter installation/customizing program that automates the installation of NETBIOS, 802.2, TCP/IP, IPX/SPX, Novell Client, and DLS. It also automates the installation of LAN Client memory reduction support for DOS and Windows users. For example, with just two clicks of the mouse, you can install Novell Client and 802.2. Other benefits include command line interface for batch installations, display of the MAC drivers selected for the operating system you have chosen, and printing to a file or printer the installation steps that LANAID will perform according to the options you have selected. LANAID is an IBM exclusive.

- **IBM LAN Client.** This code reduces the amount of conventional and upper memory required with IBM Token-Ring adapters in DOS/Windows environments. The IBM LAN Client supports NetWare, NetBIOS, 802.2 and TCP/IP protocols. With IBM LAN Client, device drivers in a NetWare environment also running 802.2 shrink from more than 100KB of conventional memory to a tiny 4KB. In an OS/2 LAN Server client with 802.2, what used to require more than 100KB of DOS memory shrinks to 2KB. LAN Client is free from IBM and works only with IBM Token-Ring adapters.

- **Ring Speed Listen.** All current IBM adapters "listen" to the ring before inserting to verify correct ring speed selection. This eliminates beaconing conditions and ring down time from accidental wrong speed insertions.

- **Full-Duplex.** Full-duplex enabled adapters allow stations to transmit and receive at the same time. With these adapters and a full-duplex switch (instead of a hub), servers or workstations have up to 32 Mbps of available bandwidth.

- **DTR (Dedicated Token-Ring).** Designation established by the Token-Ring Standards Committee indicating that a Token-Ring adapter has the ability to operate in full-duplex mode (FDX) when attached to a Token-Ring switch (like the IBM 8271 Token-Ring Switch), plus the ability to respond to special signals from the switch that instruct the adapter to change from half-duplex mode (HDX) to FDX mode. All of IBM's current ISA and PCI adapters support DTR.

- **UTP/STP**. All of IBM's adapters support both unshielded twisted pair (UTP) cable and shielded twisted pair (STP), simplifying installation.

- **LAN Support Program (LSP) Included.** IBM's LSP provides support for the 802.2 and NetBIOS protocols. It is included at no extra charge with many IBM adapters.

- **Remote Program Load (RPL) Included**. RPL makes it easy to update, control and maintain consistent Initial Program Load (IPL) levels across the LAN. RPL is usable on both medialess workstations and systems with local hard drives. Most competitors offer RPL only as an add-on option, but IBM provides it at no additional cost with all of its adapters.

- **Symmetric Multiprocessing System (SMP)**. Many of today's high performance servers use multiple processors to achieve their high performance. To fully capitalize on this extra performance, the server adapter should support SMP. Many of IBM's adapters support SMP.

- **IEEE Universal Address Label.** This is affixed to the bracket and is visible from the outside for ease of use.

- **Microcode Stored in Flash Memory.** This permits easy field upgrades.

- **Lifetime Warranty**. IBM offers a lifetime warranty on all Token-Ring network adapters purchased on or after September 13, 1994. This lifetime warranty is in effect as long as the original customer owns the adapter. In addition, IBM offers a 30-day, money-back guarantee, no questions asked, on all of its adapters.

- **Wake On LAN.** This IBM exclusive feature enables a powered-off, LAN enabled PC that is connected to the Token-Ring network to be remotely powered-on. The power-on sequence can be initiated from any network management workstation running IBM's PC SystemView (formerly IBM NetFinity) or from any network management package that has the capability to send the special wake-up frame. The advantages of this feature include:
  - energy cost savings
  - ability to perform network upgrades at any time
  - ability to stagger network PC startups to prevent server overloading

- **Low Cost.** IBM's Token-Ring adapters are competitively priced.

- **DMI (Desktop Management Interface).** DMI is a standards framework for managing information provided by the components within any PC. Created by the Desktop Management Task Force (DMTF), it is a cooperative, industry-wide effort formed to bring management, ease of use, and control to PC systems. IBM offers more DMI compliant Token-Ring adapters than any company. For IBM Token-Ring customers, IBM provides a free copy of the System View Agent that enables any standard SNMP manager to access the adapter management information.

PCI Token-Ring Adapter

Product Description

The PCI Token-Ring Adapter is a 32-bit, Plug and Play enabled card that offers industry leading performance, low CPU utilization and LAN Client memory reduction.

Positioning

This adapter is ideal for DOS, Windows or OS/2 clients and servers, and for bridges and gateway PCs.

Features

Features of the PCI Token-Ring Adapter include the following:

Feature	PCI Token-Ring Adapter
Bus	PCI
Software Configuration	Yes (Plug and Play)
System Interface	Busmaster
Data Width	32
LEDs	Yes
Auto Ring Speed Adjust	Yes
Auto Media Select	Yes
LANAID	Yes
IBM LAN Client	Yes
FDX and DTR Enabled	Yes
UTP/STP	Yes
LSP included	No
Remote Program Load included	Yes
SMP	Yes
Network Interface	RJ-45/9-pin
FCC Class	A[1]
Wake On LAN	No
Promiscuous Mode Enabled	Yes
Lifetime Warranty	Yes

1) FCC A with UTP cable

Part Options

Adapter	Part Options
PCI Token-Ring	Single CDROM Card Pack[1] 36-Pack

1) Adapter card only, without accompanying literature

Drivers for PCI Token-Ring Adapter

LAN Environment	Driver	LAN Environment	Driver
Artisoft LANtastic Banyan NDIS Client 5.5+ DEC Pathworks IBM LAN Station Manager Microsoft WFW v3.1 NDIS 2.0 NetManage Chameleon IBM DOS LAN Requester IBM LSP 1.33 or higher IBM LSP NDIS 1.01+ IBM PC/3270 3.11+ IBM TCP/IP-DOS v2.1 Banyan Native Client	IBMTRP.DOS	Novell NetWare 3.x Server Novell NetWare 4.x Server Novell NetWare 4.x client NT Novell NetWare for OS/2 Novell LANalyzer Novell NetWare 3.X client Novell NetWare 4.X client Novell Personal 1.0 NetWare Novell NetWare Lite IBM PC/3270 v3.11+ IBM TCP/IP-DOS v2.1 IBM LAN Client	IBMTRPO.LAN N/A IBMTRPO.LAN N/A IBMTRPO.LAN
Min. memory,802.2 option: IBM DOS LAN Requester IBM LSP 1.33 or higher IBM LAN Station Manager IBM PC/3270 v3.11+ IBM PC Support 400	N/A	Novell 3.x client OS/2 Novell 4.x client OS/2 Novell UnixWare 2.0 SCO LAN Manager on UNIX	IBMTRPO.SYS Novell N/A
IBM COMM Manager/2 v1.0 IBM LAN Network Manager 1.1 IBM LAN Station Manager 1.0 IBM MPTS IBM OS/2 v2.1 IBM OS/2 Extended SVC IBM TCP/IP v2.1 Microsoft LAN Manager 2.1+ IBM LAN Server v2.0+	IBMTRP.OS2	SCO TCP/IP on UNIX SCO NSF, Open Desktop Santa Cruz Operation Banyan VINES Server WFW v3.11 NDIS 3.0 Microsoft Windows NT (NDIS 3.0) Microsoft Windows 95 (NDIS 3.0)	N/A IBMTRP.386 IBMTRP.SYS IBMTRP.VXD

Target Market The PCI Token-Ring Adapter should be directed to customers with high performance needs in a client/server environment.

Key Selling Points The following points should be emphasized when selling the PCI Token-Ring Adapter:

- **LANAID** installation program
- **LAN Client** memory reduction software for DOS and Windows
- **Performance** Unsurpassed performance in all environments, with the highest throughput and lowest CPU utilization. Supports 32-bit data streaming and 32-bit addressing, making it well-suited for server and bridge applications.
- **FDX and DTR Capable** Software upgradable to full-duplex Token-Ring. In conjunction with a full-duplex switch, this adapter can provide 32 Mbps of bandwidth per port for high-end applications.
- **Multimedia Support** LANStreamer technology provides prioritized hardware transmit channels and priority token support to guarantee bandwidth for multimedia and other high priority traffic.
- **Ease of Use** Provide automatic ring speed adjust, automatic media sensing, upgradable flash memory, and adapter/ring status LEDs.
- **Lifetime Warranty with 30-day money-back guarantee**
- **Competitively priced**

PCI Token-Ring Wake On LAN Adapter

Product Description

This new PCI Token-Ring adapter is a 32-bit Plug and Play enabled card that offers the same industry leading performance, low CPU utilization, and IBM LAN Client memory reduction as the IBM PCI Token-Ring Adapter. In addition, it also provides the Wake On LAN function. With Wake On LAN you can power-up a powered-off client or server PC from a remote location.

Positioning

This adapter is ideal for DOS, Windows or OS/2 clients and servers, and for bridges and gateway PCs.

Features

Features of the PCI Token-Ring Adapter include the following:

Feature	PCI Token-Ring Adapter
Bus	PCI
Software Configuration	Yes (Plug and Play)
System Interface	Busmaster
Data Width	32
LEDs	Yes
Auto Ring Speed Adjust	Yes
Auto Media Select	Yes
LANAID	Yes
IBM LAN Client	Yes
FDX and DTR Enabled	Yes
UTP/STP	Yes
LSP included	No
Remote Program Load included	Yes
SMP	Yes
Network Interface	RJ-45/9-pin
FCC Class	A[1]
Wake On LAN	Yes
Promiscuous Mode Enabled	Yes
Lifetime Warranty	Yes

1) FCC A with UTP cable

Part Options

Adapter	Part Options
PCI Token-Ring Wake On LAN	Single Card Pack[1] 36-Pack

1) Adapter card only, without accompanying literature

Target Market

The PCI Token-Ring Wake On LAN Adapter should be directed at customers needing the ability to power-on PCs that have been powered-off and to do so

from a remote network management workstation, and capitalize on the superior performance of the PCI bus.

Key Selling Points

The following points should be emphasized when selling the PCI Token-Ring Wake On LAN Adapter:

- **LANAID** installation program
- **LAN Client** memory reduction software for DOS and Windows
- **Performance** Unsurpassed performance in all environments, with the highest throughput and lowest CPU utilization. Supports 32-bit data streaming and 32-bit addressing, making it well-suited for server and bridge applications.
- **FDX and DTR Capable** Software upgradable to full-duplex Token-Ring. In conjunction with a full-duplex switch, this adapter can provide 32 Mbps of bandwidth per port for high-end applications.
- **Multimedia Support** LANStreamer technology provides prioritized hardware transmit channels and priority token support to guarantee bandwidth for multimedia and other high priority traffic.
- **Ease of Use** Provides automatic ring speed adjust, automatic media sensing, upgradable flash memory, and adapter/ring status LEDs.
- **Lifetime Warranty with 30-day money-back guarantee**
- **Competitively priced**

Triple LANStreamer PCI Adapter

Product Description

The Triple LANStreamer PCI Adapter, with Plug and Play capability and a Busmaster interface, offers ease of use and guaranteed bandwidth for high-end devices and high performance needs.

Positioning

This adapter is best suited for servers, bridges and high-end workstations where there is a requirement for multiple adapters/systems and there are limited available PCI slots.

Features

The Triple LANStreamer PCI Adapter has the following features:

Feature	Triple LANStreamer PCI
Bus	PCI
Software Configuration	Yes (Plug and Play)
System Interface	Busmaster
Data Width	32
LEDs	Yes
Auto Ring Speed Adjust	Yes
Auto Media Select	Yes
LANAID	No
IBM LAN Client	No
FDX and DTR Enabled	Yes
UTP/STP	Yes
LSP Included	No
Remote Program Load Included	Yes
SMP	Yes
Network Interface	RJ-45 (three)
FCC Class	A[1]
Wake On LAN	No
Promiscuous Mode Enabled	Yes
Lifetime Warranty	Yes

1) FCC A with UTP cable

Part Options

Adapter	Part Options
Triple LANStreamer PCI	Single 5-Pack 30-Pack

Drivers for Triple LANStreamer PCI Adapter

LAN Environment	Driver	LAN Environment	Driver
Artisoft LANtastic	N/A	Novell NetWare 3.x Server	IBMMPCO.LAN
Banyan NDIS Client 5.5+		Novell NetWare 4.x Server	
DEC Pathworks		Novell NetWare 4.x client NT	N/A
IBM LAN Station Manager		Novell NetWare for OS/2	IBMMPCO.LAN
Microsoft WFW v3.1 NDIS 2.0		Novell LANalyzer	
NetManage Chameleon		IBM LAN Client	
IBM DOS LAN Requester		Novell NetWare 3.X client	N/A
IBM LSP 1.33 or higher		Novell NetWare 4.X client	
IBM LSP NDIS 1.01+		Novell Personal 1.0 NetWare	
IBM PC/3270 3.11+		Novell NetWare Lite	
IBM TCP/IP-DOS v2.1		IBM PC/3270 v3.11+	
Banyan Native Client		IBM TCP/IP-DOS v2.1	
Min. memory,802.2 option:	N/A	Novell 3.x client OS/2	N/A
IBM DOS LAN Requester		Novell 4.x client OS/2	
IBM LSP 1.33 or higher		Novell UnixWare 2.0	
IBM LAN Station Manager		SCO LAN Manager on UNIX	
IBM PC/3270 v3.11+			
IBM PC Support 400			
IBM COMM Manager/2 v1.0	N/A	SCO TCP/IP on UNIX	N/A
IBM LAN Network Manager 1.1		SCO NSF, Open Desktop	
IBM LAN Station Manager 1.0		Santa Cruz Operation	
IBM MPTS		Banyan VINES Server	
IBM OS/2 v2.1		WFW v3.11 NDIS 3.0	N/A
IBM OS/2 Extended SVC		Microsoft Windows NT	STREAMER.SYS
IBM TCP/IP v2.1		Microsoft Windows 95	STREAMER.VXD
Microsoft LAN Manager 2.1+			
IBM LAN Server v2.0+	IBMMPC.OS2		

Target Market This adapter card is of optimal use for customers having multimedia applications and other high bandwidth traffic.

Key Selling Points The following points should be emphasized when selling the Triple LANStreamer PCI Adapter:

- **Performance** Unsurpassed performance in all environments, with the highest throughput and lowest CPU utilization. Supports 32-bit data streaming and 32-bit addressing, making it well-suited for server and bridge applications.
- **FDX and DTR Capable** Software upgradable to full-duplex Token-Ring. In conjunction with a full-duplex switch, this adapter can provide 32 Mbps of bandwidth per port for high-end applications.
- **Multimedia Support** LANStreamer technology provides prioritized hardware transmit channels and priority token support to guarantee bandwidth for multimedia and other high priority traffic.
- **Allows three Token-Ring LAN** attachments but uses only one PCI bus slot.
- **Ease of Use** Provides automatic ring speed adjust, automatic media sensing, upgradable flash memory, and adapter/ring status LEDs.
- **Lifetime Warranty with 30-day money-back guarantee**
- **Competitively priced**

Turbo 16/4 Token-Ring ISA Adapter

Product Description

The Turbo 16/4 Token-Ring ISA Adapter is a 16-bit, Plug and Play enabled card that features extremely high throughput, memory reduction capabilities, and easy installation.

Positioning

This adapter is well suited for DOS, Windows or OS/2 clients, servers, gateways, and bridges.

Features

Features of the Turbo 16/4 Token-Ring ISA Adapter are given below:

Feature	Turbo 16/4 Token-Ring ISA
Bus	ISA
Software Configuration	Yes (Plug and Play)
System Interface	SRAM
Data Width	16
LEDs	Yes
Auto Ring Speed Adjust	Yes
Auto Media Select	Yes
LANAID	Yes
IBM LAN Client	Yes
FDX and DTR Enabled	Yes
UTP/STP	Yes
LSP included	No
Remote Program Load included	Yes
SMP	No
Network Interface	RJ-45/9-pin
FCC Class	A[1]
Wake On LAN	No
Promiscuous Mode Enabled	N/A
Lifetime Warranty	Yes

1) FCC A with UTP cable

Part Options

Adapter	Part Options
Turbo 16/4 Token-Ring ISA	Single Card Pack[1] 36-Pack

1) Adapter card only, without accompanying literature

Drivers for Turbo 16/4 Token-Ring ISA Adapter

LAN Environment	Driver	LAN Environment	Driver
Artisoft LANtastic	IBMTOK.DOS	Novell NetWare 3.x Server	TOKEN.LAN
Banyan NDIS Client 5.5+		Novell NetWare 4.x Server	
DEC Pathworks		Novell NetWare 4.x client NT	
IBM LAN Station Manager		Novell NetWare for OS/2	
Microsoft WFW v3.1 NDIS 2.0		IBM LAN Client	
NetManage Chameleon		Novell LANalyzer	N/A
IBM DOS LAN Requester		Novell NetWare 3.X client	TOKEN.COM
IBM LSP 1.33 or higher		Novell NetWare 4.X client	
IBM LSP NDIS 1.01+		Novell Personal 1.0 NetWare	
IBM PC/3270 3.11+		Novell NetWare Lite	
IBM TCP/IP-DOS v2.1		IBM PC/3270 v3.11+	
Banyan Native Client		IBM TCP/IP-DOS v2.1	
Min. memory,802.2 option:	N/A	Novell 3.x client OS/2	TOKEN.SYS
IBM DOS LAN Requester		Novell 4.x client OS/2	
IBM LSP 1.33 or higher		Novell UnixWare 2.0	Novell
IBM LAN Station Manager		SCO LAN Manager on UNIX	N/A
IBM PC/3270 v3.11+			
IBM PC Support 400			
IBM COMM Manager/2 v1.0	IBMTOK.OS2	SCO TCP/IP on UNIX	N/A
IBM LAN Network Manager 1.1		SCO NSF, Open Desktop	
IBM LAN Station Manager 1.0		Santa Cruz Operation	
IBM MPTS		Banyan VINES Server	
IBM OS/2 v2.1		WFW v3.11 NDIS 3.0	IBMTOK5.386
IBM OS/2 Extended SVC		Microsoft Windows NT	IBMTOK5.SYS
IBM TCP/IP v2.1		Microsoft Windows 95	IBMTOK5.VXD
Microsoft LAN Manager 2.1+			
IBM LAN Server v2.0+			

Target Market The Turbo 16/4 Token-Ring ISA Adapter should be offered to customers wanting extremely high performance levels from their ISA-bus system.

Key Selling Points The following points should be emphasized when selling the Turbo 16/4 Token-Ring ISA Adapter:

- **Performance** Provides 90% higher throughput over previous ISA Adapters in a Novell/DOS client environment
- **LANAID**
- **LAN Client** memory reduction software for DOS and Windows
- **Easy Configuration** LANAID and more I/O and Interrupt Choices
- **Lifetime Warranty with 30-day money-back guarantee**
- **Competitively priced**

Auto Wake Token-Ring ISA Adapter

Product Description

The Auto Wake Token-Ring ISA Adapter is a 16-bit card with Auto Wake capability, memory reduction code, and the LANAID easy installation program.

Positioning

This adapter is suited for DOS, Windows or OS/2 clients.

Features

Features of the Auto Wake Token-Ring ISA Adapter are as follows:

Feature	Auto Wake Token-Ring ISA
Bus	ISA
Software Configuration	Yes
System Interface	SRAM
Data Width	16
LEDs	Yes
Auto Ring Speed Adjust	Yes
Auto Media Select	Yes
LANAID	Yes
IBM LAN Client	Yes
FDX & DTR Capable	Yes
UTP/STP	Yes
LSP included	No
Remote Program Load included	Yes
SMP	No
Network Interface	RJ-45
FCC Class	A[1]
Wake On LAN	Yes
Promiscuous Mode Enabled	N/A
Lifetime Warranty	Yes

1) FCC A with UTP cable

Part Options

Adapter	Part Options
Auto Wake Token-Ring ISA	Single Card Pack[1] 36-Pack

1) Adapter card only, without accompanying literature

Drivers for Auto Wake Token-Ring ISA Adapter

LAN Environment	Driver	LAN Environment	Driver
Artisoft LANtastic	IBMTOK.DOS	Novell NetWare 3.x Server	TOKEN.LAN
Banyan NDIS Client 5.5+		Novell NetWare 4.x Server	
DEC Pathworks		Novell NetWare 4.x client NT	
IBM LAN Station Manager		Novell NetWare for OS/2	
Microsoft WFW v3.1 NDIS 2.0		IBM LAN Client	
NetManage Chameleon		Novell LANalyzer	N/A
IBM DOS LAN Requester		Novell NetWare 3.X client	TOKEN.COM
IBM LSP 1.33 or higher		Novell NetWare 4.X client	
IBM LSP NDIS 1.01+		Novell Personal 1.0 NetWare	
IBM PC/3270 3.11+		Novell NetWare Lite	
IBM TCP/IP-DOS v2.1		IBM PC/3270 v3.11+	
Banyan Native Client	N/A	IBM TCP/IP-DOS v2.1	
Min. memory,802.2 option:		Novell 3.x client OS/2	TOKEN.SYS
IBM DOS LAN Requester	DXMC0MOD.SYS	Novell 4.x client OS/2	
IBM LSP 1.33 or higher		Novell UnixWare 2.0	Novell
IBM LAN Station Manager		SCO LAN Manager on UNIX	N/A
IBM PC/3270 v3.11+			
IBM PC Support 400			
IBM COMM Manager/2 v1.0	IBMTOK.OS2	SCO TCP/IP on UNIX	N/A
IBM LAN Network Manager 1.1		SCO NSF, Open Desktop	
IBM LAN Station Manager 1.0		Santa Cruz Operation	
IBM MPTS		Banyan VINES Server	
IBM OS/2 v2.1		WFW v3.11 NDIS 3.0	IBMTOK5.386
IBM OS/2 Extended SVC		Microsoft Windows NT	IBMTOK5.SYS
IBM TCP/IP v2.1		(NDIS 3.0)	
Microsoft LAN Manager 2.1+		Microsoft Windows 95	IBMTOK5.VXD
IBM LAN Server v2.0+		(NDIS 3.0)	

Target Market The Auto Wake Token-Ring ISA Adapter should be directed at customers needing the ability to power-on PCs that have been powered-off, and to do so from a remote network management workstation.

Key Selling Points The following points should be emphasized when selling the Auto Wake Token-Ring ISA Adapter:

- **LANAID**
- **LAN Client** memory reduction software for DOS and for Windows
- **Auto Wake capability** wake up a powered-off PC that is connected to the Token-Ring LAN, enabling network upgrades at any time, staggering of network startups to prevent server overloading, and cost savings from energy conservation.
- **Easy configuration** LANAID and more I/O & Interrupt choices
- **Lifetime Warranty with 30-day money-back guarantee**
- **Competitively priced**

Turbo 16/4 Token-Ring PC Card

Product Description

This new product is 100 percent compatible with the Auto16/4 Token-Ring Credit Card Adapter plus uses less memory, performs significantly faster, supports dedicated Token-Ring (full-duplex operations), has greater I/O port addressability to enable easier installation, and comes with a new and easy to use installation aid.

Positioning

This adapter provides Token-Ring access for the most popular network operating systems, applications and transport services. It is targeted for the mobile PC user, and is compatible with all IBM and non-IBM machines with PCMCIA Type II or III slots.

Features

Following are the features of the Turbo 16/4 Token-Ring PC Card:

Feature	Turbo 16/4 Token-Ring PC Card
Bus	PCMCIA Type II or III
Software Configuration	Yes
System Interface	SRAM[1]
Data Width	16
LEDs	No
Auto Ring Speed Adjust	Yes
Auto Media Select	Yes
LANAID	Yes
IBM LAN Client	Yes
FDX and DTR Enabled	Yes
UTP/STP	Yes
LSP included	Yes
Remote Program Load included	Yes
SMP	N/A
Network Interface	RJ-45
FCC Class	B
Wake On LAN	N/A
Promiscuous Mode Enabled	N/A
Lifetime Warranty	Yes

1) SRAM = Shared RAM

Part Options

Adapter	Part Options
Turbo 16/4 Token-Ring PC Card 9 pin and RJ-45 connectors	Single 5-Pack
Turbo 16/4 Token-Ring PC Card RJ-45 connector	Single 5-Pack

Drivers for Turbo 16/4 Token-Ring PC Card Adapter

LAN Environment	Driver	LAN Environment	Driver
Artisoft LANtastic 5.0+ Banyan NDIS Client 5.5+ DEC Pathworks IBM LAN Station Manager Microsoft WFW v3.1+ NDIS 2.0 NetManage Chameleon IBM DOS LAN Requester IBM LSP 1.33 or higher IBM LSP NDIS 1.01+ IBM PC/3270 3.11+ IBM TCP/IP-DOS v3.3+ Banyan Native Client	IBMTOKCS.DOS	Novell NetWare 3.x Server Novell NetWare 4.x Server Novell NetWare 4.x client NT Novell NetWare for OS/2 Novell LANalyzer Novell NetWare 3.X client Novell NetWare 4.X client Novell Personal 1.0 NetWare Novell NetWare Lite IBM PC/3270 v3.11+ IBM TCP/IP-DOS v3.3+	N/A TOKENCS.COM
Min. memory,802.2 option: IBM DOS LAN Requester IBM LSP 1.33 or higher IBM LAN Station Manager IBM PC/3270 v3.11+ IBM PC Support 400	DXMCSMOD.SYS	Novell 3.x client OS/2 Novell 4.x client OS/2 Novell UnixWare 2.0 SCO LAN Manager on UNIX	TOKENCS.SYS N/A
IBM COMM Manager/2 v1.0 IBM LAN Network Manager 1.1 IBM LAN Station Manager 1.0 IBM MPTS IBM OS/2 v2.1 IBM OS/2 Extended SVC IBM TCP/IP v2.1 Microsoft LAN Manager 2.2+ IBM LAN Server v2.0+	IBMTOKCS.OS2	SCO TCP/IP on UNIX SCO NSF, Open Desktop Santa Cruz Operation Banyan VINES Server WFW v3.11 NDIS 3.0 Microsoft WindowsNT 3.5+ (NDIS 3.0) Microsoft Windows 95 (NDIS 3.0)	N/A IBMTKPCM.SYS IBMTOK.VXD

Target Market Customers using notebook computers and workstations with PCMCIA Type II slots should consider the Turbo 16/4 Token-Ring PC Card Adapter.

Key Selling Points

The following points should be emphasized when selling the Turbo 16/4 Token-Ring PC Card adapter:

- **LANAID** plus expanded IRQ and I/O addressing to make installation easier
- **Price** – IBM is committed to being competitive on pricing and offers special bid pricing
- **First Token-Ring PC Card** to provide Full Duplex (FDX) operations when attached to a Token-Ring switch
- **LAN Client** memory reduction software for DOS and Windows
- **Performance** – 90% higher through-put over previous Token-Ring PC Cards
- **Compatibility** – Fully compatible with IBM Token-Ring Auto 16/4 Credit Card Adapter but with enhanced features and superior performance
- **Lower Power Consumption** – A new power saving feature that means the card will not consume power when the card cable is removed even though the card remains in the portable. Helps prevent losing or misplacing the card.
- **Lifetime Warranty for investment protection**

Auto LANStreamer MC32 Adapter

Product Description

The Auto LANStreamer MC32 Adapter is a 32-bit card with a Busmaster interface, offering high throughput, low CPU utilization, and full-duplex upgrade capability.

Positioning

This adapter is ideal for use with servers, gateways, and bridges.

Features

The following are features of the Auto LANStreamer MC32:

Feature	Auto LANStreamer MC32
Bus	MC
Software Configuration	Yes
System Interface	Busmaster
Data Width	32
LEDs	Yes
Auto Ring Speed Adjust	Yes
Auto Media Select	Yes
LANAID	No
IBM LAN Client	No
FDX and DTR Capable	Yes
UTP/STP	Yes
LSP included	Yes
Remote Program Load included	Yes
SMP	Yes[1]
Network Interface	RJ-45
FCC Class	A[2]
Wake On LAN	No
Promiscuous Mode Enabled	Yes
Lifetime Warranty	Yes

1) OS/2, NetWare and Windows NT
2) FCC A with UTP cable

Part Options

Adapter	Part Options
Auto LANStreamer MC32	Single 5-Pack 30-Pack

Drivers for Auto LANStreamer MC32 Adapter

LAN Environment	Driver	LAN Environment	Driver
Artisoft LANtastic	N/A	Novell NetWare 3.x Server	IBMMPCO.LAN
Banyan NDIS Client 5.5+		Novell NetWare 4.x Server	
DEC Pathworks		Novell NetWare 4.x client NT	N/A
IBM LAN Station Manager		Novell NetWare for OS/2	IBMMPCO.LAN
Microsoft WFW v3.1 NDIS 2.0		Novell LANalyzer	
NetManage Chameleon		Novell NetWare 3.X client	N/A
IBM DOS LAN Requester		Novell NetWare 4.X client	
IBM LSP 1.33 or higher		Novell Personal 1.0 NetWare	
IBM LSP NDIS 1.01+		Novell NetWare Lite	
IBM PC/3270 3.11+		IBM PC/3270 v3.11+	
IBM TCP/IP-DOS v2.1		IBM TCP/IP-DOS v2.1	
Banyan Native Client			
Min. memory,802.2 option:		Novell 3.x client OS/2	N/A
IBM DOS LAN Requester	N/A	Novell 4.x client OS/2	
IBM LSP 1.33 or higher		Novell UnixWare 2.0	
IBM LAN Station Manager		SCO LAN Manager on UNIX	
IBM PC/3270 v3.11+			
IBM PC Support 400			
IBM COMM Manager/2 v1.0	N/A	SCO TCP/IP on UNIX	N/A
IBM LAN Network Manager 1.1		SCO NSF, Open Desktop	
IBM LAN Station Manager 1.0		Santa Cruz Operation	
IBM MPTS		Banyan VINES Server	
IBM OS/2 v2.1		WFW v3.11 NDIS 3.0	
IBM OS/2 Extended SVC		Microsoft Windows NT	STREAMER.SYS
IBM TCP/IP v2.1		(NDIS 3.0)	
Microsoft LAN Manager 2.1+		Microsoft Windows 95	STREAMER.VXD
IBM LAN Server v2.0+	IBMMPC.OS2	(NDIS 3.0)	

Target Market This adapter is for customers needing high levels of performance for server and bridge connections within a Micro Channel environment.

Key Selling Points The following points should be emphasized when selling the Auto LANStreamer MC32 adapter:

- **Performance** — Unsurpassed performance in all environments with the highest throughput and lowest CPU utilization. The Auto LANStreamer supports 32-bit data streaming and 32-bit addressing, making it well-suited for server and bridge applications.
- **Full-Duplex Capable** — Software upgradable to full-duplex Token-Ring. In conjunction with a full-duplex switch, this adapter can provide 32 Mbps of bandwidth per port for high-end applications.
- **Multimedia Support** — LANStreamer technology provides prioritized hardware transmit channels and priority token support to guarantee bandwidth for multimedia and other high priority traffic.
- **Ease of Use** — The Auto LANStreamer provides automatic ring speed adjust, automatic media sensing, and upgradable flash memory. Auto LANStreamer also provides two LED status indicators.
- **Lifetime Warranty with 30-day money-back guarantee**
- **Competitively priced**

Migration Strategies

Bandwidth has been less of an issue for Token-Ring customers than for Ethernet customers because of Token-Ring's greater speed and because Token-Ring's deterministic architecture allows maximum available bandwidth 100% of the time. However, when new applications begin to require more bandwidth, IBM offers several migration strategies to increase network bandwidth:

- **Segmented LANs.** By splitting LANs into smaller segments, greater total network bandwidth can be created. IBM's LANStreamer adapters offer very low CPU utilization, so several LANStreamers can be put into a single server without bottlenecking the server's CPU. By attaching each LANStreamer adapter to a different Token-Ring segment, the total network capacity available to the server is significantly increased.

- **Token-Ring Switch.** IBM announced the 8272 Nways Token-Ring switch in March 1995. Switches allow the customer to isolate the nodes (such as servers) that generate the most traffic and provide a full 16 Mbps per port of dedicated bandwidth to these nodes.

- **Full-Duplex Token-Ring**. IBM pioneered full-duplex Token-Ring technology. The IBM 8272 Nways Switch, as well as several recently introduced IBM adapters, support full-duplex Token-Ring. Full-duplex means being able to transmit and receive simultaneously, thereby doubling the available bandwidth. Connecting a full-duplex Token-Ring adapter to a dedicated full-duplex switch can provide 32 Mbps of dedicated bandwidth per port.

- **ATM** (Asynchronous Transfer Mode). ATM offers high bandwidth and advanced switching and bandwidth management. IBM is committed to providing a full range of ATM products to connect shared Token-Ring to switched ATM. The 8272 Nways Switch offers an optional ATM "fat pipe", allowing users to connect their Token-Ring network to an ATM backbone through the switch. ATM products for interoperating with shared LANs, such as LAN emulation servers, will also be provided by IBM. **Customers will be able to migrate to ATM without disrupting their existing Token-Ring networks.**

Sales Strategies

Usually network adapters will be purchased at the same time workstations or servers are purchased. Network adapters are often purchased in conjunction with the purchase of campus networking products such as hubs or switches. That is why it is important to emphasize the following points (in addition to those listed in the *Selling Points* for each adapter).

- In conjunction with IBM PCs, IBM LAN adapters offer a single vendor network station solution (resulting in a single support organization).
- IBM performs extensive testing of its LAN adapters with major PC vendors' equipment and guarantees the interoperability of its adapters.
- IBM offers all of the pieces needed for a complete networking solution — workstations, LAN adapters, hubs, switches, bridges, routers, network management, and network operating systems, along with customer service and support.

Target Customer

In a Token-Ring adapter sale, the network administrator or the network planner is likely to be very instrumental in the evaluation process.

Target Environments

Token-Ring technology is well-suited for the following environments:

- **Environments with high traffic loads**. Because of deterministic token-passing architecture, Token-Ring networks do not experience the collision problems of Ethernet networks under heavy loads. Token-Ring provides maximum available bandwidth 100% of the time.
- **Environments with a large number of nodes or the potential for growth**. Ethernet needs more segments to support equivalent traffic, which means more bridges or routers plus additional units to manage. With the recent price reductions on Token-Ring, the initial cost per node (considering all the network costs) is very competitive for Token-Ring compared to Ethernet for larger networks. Token-Ring also provides easier management, better performance and better fault tolerance for these environments.
- **Environments where investment protection is key**. Token-Ring supports emerging applications such as imaging and video because it is designed for higher bandwidth than Ethernet and better bandwidth management capability (such as priority tokens).

Sales Tools

IBM provides a broad range of selling tools to assist you in your sales efforts with network adapters. These tools include marketing deliverables, collateral materials, special bid programs, loaner programs and presale hotline support. Please refer to the *Sales Tools* unit later in this guide for complete information on the sales support available for Token-Ring adapters.

Handling Sales Objections

In your sales activities with IBM Token-Ring adapters, you may encounter customers who raise a few common sales objections. These can be easily handled with the following responses.

Whenever I have a problem with an adapter, IBM always tells me that there is a new device driver to fix it!

IBM is implementing a new procedure to fix this problem. It will ship a diskette with the device driver rev. number clearly indicated on the label. Instructions will be included which ask the customer to first call our 800 number to determine the drivers and revision level required. Instructions will also be provided for downloading the device drivers from our bulletin board and our Internet site. The networking Web page can be accessed at http:\\www.networking.ibm.com. The Token-Ring driver diskette images can be accessed at: http:\\www.networking.ibm.com\nes\nestoken.htm.

Competitors claim to have better performance than IBM's Token-Ring adapters.

IBM offers the highest performance Token-Ring adapters available. The LANStreamer adapter offers the fastest throughput for all frame sizes as well as low CPU utilization because of a Busmaster interface. For high-end applications such as servers, bridges or high-end workstations where performance is key, IBM's LANStreamer adapters are the best solution. IBM's Shared RAM adapters provide very competitive performance for client applications at an attractive price, and IBM's PCI Token-Ring adapters have the industry's best performance and lowest CPU utilization. See the *Sales Tools* section for additional information on performance.

IBM s adapters are more expensive.

IBM's adapters are aggressively priced. See *Sales Tools* later in this Guide for more information about the special bid process.

Q s and A s

To facilitate your sales efforts, IBM has provided answers to some commonly asked customer questions regarding Token-Ring adapters.

Q) Has Token-Ring run its course?
A) Absolutely not. Token-Ring was engineered to correct Ethernet's performance inefficiencies, management limitations, and its lack of quality of service. Simply making Ethernet faster does not solve any of its problems. Network managers who understand these vital issues were the early investors in IBM Token-Ring and continue to invest in IBM Token-Ring today. In 1996 more Token-Ring adapters and hubs were sold than 1995. Today there are more than 14 million Token-Ring adapters installed. There has even been a significant increase (more than 25%) worldwide in Token-Ring shipments since 1994. More than 50% of the US Fortune 1000 headquarter sites have Token-Ring installed (CII, March 1997) and Token-Ring is the LAN of choice for mission critical applications because of its superior performance, availability, and automatic self-management. As further proof of Token-Ring's vitality, Dell'Ore Group is forecasting the switched Token-Ring segment of the Token-Ring market to be $2 billion in the United States by the year 2000.

IBM has more than 50% of the Token-Ring world marketshare and is committed to continuing development of Token-Ring technology.

Q) What has IBM done for Token-Ring over the past 4 years?
A) Over the past 4 years, IBM has introduced:

- Its 8th generation Token-Ring chip. No other Token-Ring vendor has more Token-Ring knowledge, experience, and product leadership
- Token-Ring for PCMCIA
- Token-Ring for PCI
- Token-Ring with Wake On LAN technology
- Switched Token-Ring
- Dedicated Token-Ring (Token-Ring that runs in full-duplex mode)
- Token-Ring low memory solutions for our DOS and Windows customers
- DMI and SNMP for IBM Token-Ring adapters (IBM has more Token-Ring adapters certified by DMTF than any other Token-Ring adapter vendor.)
- Numerous performance and ease of use/installation improvements.

Q) Occasionally other Token-Ring vendors claim their adapters have superior performance. How do IBM Token-Ring adapters compare?

A) Performance is a measurement that can be both true and misleading at the same time. To understand the true performance of any Token-Ring adapter, you need to look at two areas of measurement. One is "frames per second." This is the measurement behind most superior performance claims and to be meaningful it should be measured and reported when using many different frame sizes. Many times a superior performance claim highlights the results of only one frame size that just happens to correspond to a size for which the adapter driver is particularly efficient. A truly superior performing adapter is an excellent performer across many different frame sizes up to and larger than 8K. Most Token-Ring LANs can achieve optimum performance by running with 8K or larger frames. The other component of performance is the PC's "CPU utilization." This is a measurement of how much work the PC has to do to help the adapter perform well. The lower the PC's CPU utilization the better since you want the CPU available for running your applications. Many times the CPU utilization is unreferenced by superior performance claims.

The Tolley Group compared the IBM Token-Ring PCI Adapter and the IBM Turbo 16/4 Token-Ring ISA Adapter to Madge and Olicom Token-Ring adapters and documented IBM's superior CPU utilization and frames per second using a wide range of frame sizes. You can read both complete Tolley reports at: http://www.networking.ibm.com/tra/trahome.html.

Q) Why are IBM's adapters often back ordered?

A) Occasionally, IBM has experienced supply constraints with Token-Ring adapters. We have taken appropriate steps to reduce or eliminate these problems from happening in the future.

Q) How does the ring speed adjust work?

A) When the adapter is inserted into the ring, it listens for certain frequencies associated with 4 Mbps and 16 Mbps rings, and adjusts its speed accordingly. This provides key benefits for environments with mixed 4 and 16 Mbps rings, simplifying upgrades, moves and new installs.

Q) IBM's adapter uses too much memory in a DOS environment.

A) IBM has introduced a new LAN Client code that dramatically reduces the amount of conventional DOS memory required in even the most memory-constrained client workstations. IBM LAN Client supports NetWare, NetBIOS and TCP/IP protocols. With IBM LAN Client, device drivers in a NetWare environment also running 802.2 shrink from more than 100KB of conventional memory to a tiny 4 KB. In an OS/2 LAN Server client with 802.2, what used to require more than 100KB of DOS memory, shrinks to 2KB. IBM LAN Client supports IBM ISA, PCI, Micro Channel and PCMCIA adapters.

Q) What is Plug and Play?

A) Plug and Play is an industry standard developed to provide automatic configuration of option adapters for ISA-bus systems. Many key vendors including IBM, Compaq, Intel, Microsoft and others offer products that support this standard. Installing a P&P adapter in a P&P system means no user intervention is needed to set hardware configuration parameters. If the operating system supports P&P, adapter drivers will also be installed automatically.

Token-Ring Adapter Competition

Market Share

IBM has always been and remains the market leader in Token-Ring adapter sales. Worldwide shipments of Token-Ring adapters in 1996 were the largest ever recorded. IBM's share of this market grew to 50%. (Source: DataQuest, 1997). Madge and Olicom are considered IBM's closest competitors. The newest noteworthy competitor in this market is 3Com.

Madge

A major competitor in the Token-Ring market is Madge, who offers adapters for all major bus architectures. Madge has a new Blue+ product that is based on Madge-designed silicon. The company touts these adapters as being fully compatible with IBM and even faster. However, they do not use IBM technology (which could result in incompatibility issues), use more DOS memory than IBM adapters, and lack many of the features found on IBM adapters (such as Plug and Play, automatic ring speed adjust, and status LEDs).

Olicom

Another major competitor of IBM's in the Token-Ring adapter market is Olicom (a company based in Denmark). It offers adapters for the following bus structures: ISA, PCI, EISA, Micro Channel and PCMCIA. Olicom competes with IBM on the basis of price and performance, and recently refreshed its PCI adapter to become more competitive with IBM.

ISA Adapters

The IBM Turbo 16/4 Token-Ring ISA Adapter is a superior performer when compared to Madge's ISA client adapters. The IBM Turbo 16/4 Token-Ring ISA Adapter also offers more features than the Olicom ISA 16/4 Plug and Play. The following tables (beginning on page 32) demonstrate the superiority of the IBM Turbo 16/4 Token-Ring ISA Adapter.

3Com

3Com is the leading Ethernet adapter vendor and recently has been making inroads in the Token-Ring adapter market. Previously, their line of Token-Ring III adapters were based on IBM TROPIC technology. In November, 1995, they announced a new ISA bus adapter (TokenLink III, part suffix "C") based on 3Com-designed silicon and a new PCI bus adapter (TokenLink Velocity) also based on 3Com-designed silicon.

These adapters are 3Com's first Token-Ring adapter products based on their own chip design. IBM currently uses 8th generation chip technology with

tuned software drivers and is the industry benchmark. The new 3Com adapters do not use IBM technology (which could result in incompatibility issues).

Proteon and SMC

Proteon is fifth in market share in the Token-Ring adapter market and SMC is also another competitor. For ISA adapters, Proteon and SMC claim their adapters have higher performance and are easier to install and upgrade because they are switchless (Proteon's adapter also has flash memory).

IBM's response to these claims by Proteon and/or SMC are:

- In most typical user environments, IBM's adapters are as fast or faster.
- IBM's adapters offer much better value than Proteon's or SMC's, with more features and competitive performance.
- The Turbo 16/4 Token-Ring ISA Adapter is easier to install, easier to use and is easily upgraded.
- SMC has unacceptable DOS memory use for most typical user environments.

IBM's advantages over Proteon and/or SMC for ISA adapters include:

- De facto standard Token-Ring interface.
- IBM LAN Client code for reduced memory usage.
- The Turbo 16/4 Token-Ring ISA Adapter is easier to install and use. It is Plug and Play, has auto ring speed adjust, auto media select, and diagnostic LEDs.
- The Turbo 16/4 Token-Ring ISA Adapter provides full-duplex capability.
- RPL is standard on all IBM adapters.

IBM Turbo 16/4 Token-Ring ISA versus Madge ISA adapters

	IBM Turbo Auto 16/4 ISA	IBM Auto Wake TR ISA	Madge Blue Plus 16/4 ISA PnP	Madge Smart Client PnP	Madge Smart AT+ Ringnode
Mfg. Part No.			62-04	22-04	52-03
US List Price[1]			$250	$250	$595
Technology					
Bus Access	Shared Ram	Shared Ram	Shared Ram	BusMaster	BusMaster Prog. I/O
Full-Duplex Enabled	Yes	Yes	Yes	Yes	Yes
Silicon	IBM Sixth-Generation	IBM	Madge-New RingRunner	TI	TI
Software	LSP **LAN Client**	LSP	FastBlue	Fastmac Plus	Fastmac Plus
Ease of Use					
Plug & Play	Yes	Yes	Yes	Yes	No
Auto Speed Detect/Set	Yes	Yes	Optional	No	No
Auto Media Select	Yes	Yes	Yes	Yes	Yes
Auto I/O Addr. Res.	Yes	Yes	No	No	No
Hardware Switches	None	None	No	None	I/O Address
Flash EPROM	**Yes**	**Yes**	No	No	No
Remote IPL	Standard	Standard	Standard	Additional cost	Standard
Diagnostic LEDs	**2 (7 states)**	**2 (7 states)**	No	No	No
MAC Address Label	**Yes**	Yes	No	No	No
Memory[2]					
LAN Client Driver	**Yes**	**Yes**	No	No	No
640K DOS Memory	**2-5K**	**2-5K**	60K	16K	16K
Download Protocols	Yes (802.2)	Yes		Yes (=<2)	Yes (=<7)
On-Board RAM	128K	128K	256K	128K	512K
Warranty	Life	Life	Life	Life	Life
Strengths/Weaknesses	• Equiv. or better per-formance in most real networks • Lowest DOS/ Windows memory use	• Equiv. or better per-formance in most real networks • Lowest DOS/ Windows memory use • Wake On LAN	• Madge's first TR chip	•	• High price for claim of high perform-ance

1) Prices subject to change.
2) DOS Memory Use numbers reflect 0 – 640k Conventional Memory use. IBM Turbo ISA also uses 16k Shared RAM page and 8k ROM page in Upper Memory.

IBM Turbo 16/4 Token-Ring ISA versus Olicom ISA 16/4

	IBM Turbo Auto 16/4 ISA	IBM Auto Wake TR ISA	Olicom 16/4 PnP	3Com TokenLink Velocity
Mfg. Part No.			OC3118	3C319C
US List Price[1]			$227	$265
Technology				
Bus Access	Shared Ram	Shared Ram	BusMaster	BusMaster
Full-Duplex Enabled	Yes	Yes	Yes	Yes
Silicon	IBM Sixth-Generation	IBM	TI	3Com – New
Software	LSP **LAN Client**	LSP	PowerMACH	3Com
Ease of Use				
Plug & Play	Yes	Yes	Yes	Yes
Auto Speed Detect/Set	Yes	Yes	No	No
Auto Media Select	Yes	Yes	Yes	Yes
Auto I/O Addr. Res.	Yes	Yes	No	No
Hardware Switches	None	None	None	No
Flash EPROM	**Yes**	Yes	No	Yes
Remote IPL	Standard	Standard	Additional cost	
Diagnostic LEDs	**2 (7 states)**	**2 (7 states)**	No	Yes
MAC Address Label	**Yes**	Yes	No	No
Memory[2]				
LAN Client Driver	**Yes**	**Yes**	No	No
640K DOS Memory	**2-5K**	**2-5K**	70K (est.)	Under review
Download Protocols	Yes (802.2)	Yes	No	Yes
On-Board RAM	128K	128K	128K	
Warranty	Life	Life	Life	Life
Strengths/Weaknesses	•Equiv. or better performance in most real networks •Lowest DOS/ Windows memory use	•Equiv. or better performance in most real networks •Lowest DOS/Windows memory use •Wake On LAN	•Low price strategy	•New 3Com chipset

1) Prices subject to change.
2) DOS Memory Use numbers reflect 0 – 640k Conventional Memory use. IBM Turbo ISA also uses 16k Shared RAM page and 8k ROM page in Upper Memory.

PCI Adapters

IBM's PCI Token-Ring Adapter is the highest performing PCI Token-Ring Adapter on the market (as measured by the Tolly Group). As shown on the following page, it outperforms and supports more features than either Madge's or Olicom's PCI adapters. Madge's PCI adapter is based on the Texas Instrument chipset, although they plan to develop their own.

	IBM PCI Token-Ring Adapter	Madge Presto	Madge Smart 16/4 PCI Ringnode	Olicom PCI II 16/4	3Com TokenLink Velocity
Mfg. Part No.		60-05 (diskette only) (no hardcopy)	51-02[3] (diskette only)	OC3137 (diskette only)	3C339[4] (diskette only)
US List Price[1]		$199	$330	$325	$329
Technology					
Bus Access	BusMaster	BusMaster	BusMaster	BusMaster/ IO Map	BusMaster
Full-Duplex Enabled	Yes	No[5]	Yes	Yes	Yes
Silicon	IBM (Industry's benchmark)	Madge (TR and PCI)	TI (Madge chipset planned)	TI380C30	TI (3Com chipset planned)
Software	**LAN Client Code LANAID**	Madge Win 95/NT One-step	LSS 5.0 LAN Support Software	PowerMACH	3Com
Ease of Use					
Plug & Play	Yes	Yes	Yes	Yes	Yes
Auto Ring Speed	**Yes**	Yes (16M preset)	No	No	No
Auto Media Select	Yes	Yes	Yes	Yes	Yes
Flash EPROM	Yes	No	Yes	Yes	Yes
SNMP Agent	No	No	No	Integrated	Yes
DMI	**Yes**	No	No	Enabled	Enabled
Remote IPL	Standard	No	Enabled/ Opti SmartRom	Optional at additional charge	No
Diagnostic LEDs	**2 LEDs for 7 states**	No	No	Yes	Yes
MAC Address Label	**Yes**	No	No	No	No
Memory[2]					
LAN Client Code	Yes	No	No	No	No
Use of DOS Memory	**2-5K**	Under review	16K	70K (est.)	Under review
Download Protocols	Yes (802.2)	No	Yes (up to 7)	Yes	Yes
On-Board RAM	256K	0K	512K	128K	512K
Warranty	Life	Life	Life	Life	Life
DOS Client Throughput Ranking by *Tolly Group	1	n/a	2	n/a	n/a
Strengths/Weaknesses	• Best performance • Low CPU utilization • Low memory requirement	• New Madge chipset • Reduced function for low price • Poor CPU utilization • Requires unique driver			

1) Prices subject to change.
2) DOS Memory Use numbers reflect 0 – 640k Conventional Memory use.
3) Madge Smart PCI 51-02 is based on TI silicon.
4) 3Com is reportedly working on their own Token-Ring PCI silicon.
5) Madge sales literature does not state full-duplex capabilities, but the adapter may operate in this mode.

* The Tolly Group measured throughput in Windows NT Client and OS/2 Warp with "PERFORM3".

IBM Competitive Summary

In general, in a competitive sales situation you should emphasize the following reasons to buy IBM Token-Ring adapters:

- **Customer Support.** IBM is an industry leader in customer support. Lifetime warranties are offered on most adapters. Technical support is available 24 hours per day, 7 days per week. In addition, IBM offers a host of sales and customer support activities including education, consulting and service.

- **Technology Leader.** IBM pioneered Token-Ring technology and leads in experience, support, breadth of product and functionality. IBM was one of the first to introduce full-duplex Token-Ring adapters.

- **Low Cost.** IBM has competitively priced its Token-Ring adapters.

- **Performance.** IBM's LANStreamer adapters are the industry's fastest, running at media speed. For client adapters, both performance and memory usage is important. With IBM's LAN Client code, less conventional upper memory is required and performance is competitive.

- **Exclusive Features.** IBM offers many exclusive features including ring speed listen and auto speed selection.

- **Award-Winning Products.** IBM's Token-Ring products have been winning awards for outstanding products, support and technology since their introduction. IBM Token-Ring adapters have won awards for best technology, best price and performance, best service and support, best documentation and best vendor to do business with.

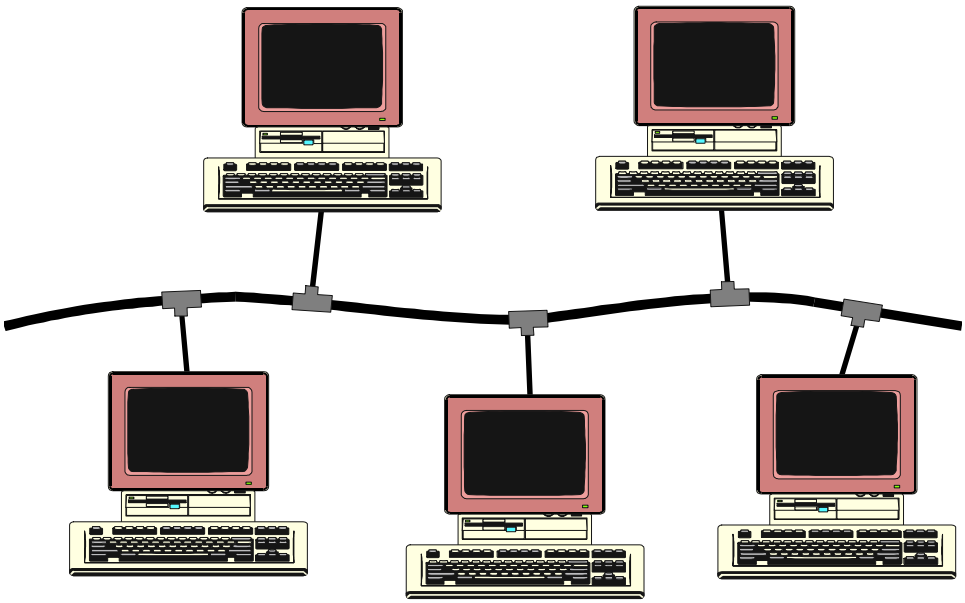
- **Standards-based.** IBM offers total networking solutions with broad compatibility. Its products are based on standards and are compatible with IBM and other manufacturer's products. Device drivers are included for most operating systems.

- **Easy to Install.** IBM's adapters are easy to install because of their switchless design, the UTP/STP support, external LEDs and IBM's auto speed and media selection. The Turbo 16/4 Token-Ring ISA and PCI Token-Ring adapters are Plug and Play enabled for automatic installation.

ETHERNET ADAPTERS
Market Information

Background

Ethernet is one of the most popular LAN topologies in use today. It is defined by IEEE Standard 802.3. Ethernet networks can be configured in either bus or star topologies. The bus topology consists of nodes linked together in a series by cable or bus.



Traditional Ethernet Bus Topology

The star topology links all workstations to a central wiring hub (or repeater). Repeaters and hubs connect the Ethernet segments into one network. Ethernet networks are classified as:

- **10BASE-T** (or UTP). This type of Ethernet network uses a star topology with unshielded twisted pair cable. 10BASE-T is used for single, point-to-point connections between a computer and a hub or repeater.
- **10BASE2** (or thin coax). This type of Ethernet uses a bus topology with thin coax cable. It is generally used for small networks, departmental networks or wiring a number of nodes together in the same room.
- **10BASE5** (or thickwire or AUI). This type of Ethernet was the original form of Ethernet. It consisted of a bus topology using thick coaxial cable. Due to its bulky cable, 10BASE5 is being replaced by 10BASE2 and 10BASE-T.
- **100BASE-T** (Fast Ethernet). This type of Ethernet network uses a star topology with unshielded twisted pair cable. Data transmission occurs at 100 Mbps.

Market Trends

The market for Ethernet adapters is larger than for Token-Ring adapters. Annual Ethernet shipments are six times larger than Token-Ring. Customers are starting to evaluate higher bandwidth technologies such as ATM and 100 Mbps Fast Ethernet. IBM has strategic products and technologies such as the 8271 Nways Ethernet LAN Switch and full-duplex Ethernet to facilitate this migration and protect the customer's investment in Ethernet.

IBM Products

IBM provides a complete product line of Ethernet network adapters to complement its campus networking products. IBM's product line offers solutions for three bus structures (ISA, PCI, and PCMCIA).

Features

IBM's adapters offer many advanced features and capabilities. Some of these features are described below. Others are specific to particular adapters, and are discussed in the sections devoted to those products.

- **Easy Installation**. IBM Ethernet adapters are easy to install because there are no switches to set and the microcode is upgradable for easy changes.

- **Self Configuring Adapters.** All IBM Ethernet adapters are software configurable. In addition, all ISA and PCI adapters are **Plug and Play** enabled. If installed in a Plug and Play operating system such as Windows 95 or OS/2 Warp, these adapters will automatically attach to the LAN upon power up.

- **Full-Duplex. IBM** was the **first major vendor to offer a full-duplex Ethernet adapter and switch**. Full-duplex allows stations to transmit and receive at the same time. With these adapters and a full-duplex switch (instead of a hub), workstations and servers with high data transfer requirements can have 20 Mbps or 200 Mbps of available bandwidth. The IBM full-duplex Ethernet adapter and 8-port switch offer up to 8 times the network bandwidth because they:
  - have no collisions
  - have less than 50 micro-seconds network latency through the switch
  - are 18 times faster than bridges
  - are 28 times faster than router latency

- **System Interface Choices**. IBM's Ethernet adapters offer a choice of system interfaces, Shared RAM, Programmed I/O and Busmaster, depending upon the application for the adapter. Adapters with **Shared RAM** utilize their own on-board memory to reduce the drain on system memory. Adapters with Shared RAM require the use of the system CPU to handle data transfers. Adapters with **Programmed I/O** mode require no system memory space. The system accesses the adapter memory one word at a time, via a port in the system's I/O space. It requires the system CPU to access the adapter's memory. **Busmaster** is a performance-boosting technique in which a device borrows control of the system bus to handle data transfer without involving the PC's processor. Busmaster adapters offer higher throughput and lower CPU utilization for high-end applications.

- **LAN Client.** Reduces conventional DOS memory usage to under 5K, freeing up more room for DOS and Windows applications. Available on EtherJet, 10 Mbps PCI adapters and EtherJet PCMCIA adapters.

- **Remote Program Load (RPL)**. This makes it easy to update, control and maintain consistent Initial Program Load (IPL) levels across the LAN. RPL is available on all IBM Ethernet client adapters (except Credit Card adapters) for all media types.

- **LEDs**. All ISA and PCI adapters are equipped with external LEDs, making the adapters easy to install and use.

- **Wake On LAN**. Allows a network administrator to remotely power up a workstation to perform software upgrades or download an application. The advantages of this feature include:
  - energy cost savings
  - ability to perform network upgrades at any time
  - ability to stagger network PC startups to prevent server overloading

- **Lifetime Warranty**. IBM offers a lifetime warranty on all Ethernet adapters purchased on or after September 13, 1994. This lifetime warranty is in effect as long as the original customer owns the adapter. In addition, IBM offers a 30-day, money-back guarantee, no questions asked, on all of its adapters.

- **ISO 9000 Certification**. In order to insure the highest quality, IBM develops its Ethernet adapters in an ISO 9000 registered laboratory.

- **Low Cost.** IBM prides itself in offering top-of-the-line Ethernet adapters at a very competitive price.

EtherJet 10 Mbps Adapters

Product Description

The EtherJet adapters are the **industry's highest** performance 10 Mbps adapter. Equipped with an IBM VLSI (Very Large Scale Integration) chip to achieve maximum speed, these adapters also are Plug and Play enabled and support full-duplex operation. The three available EtherJet adapters are:

- EtherJet 10BASE-T Adapter
- EtherJet 10BASE-T Wake On LAN Adapter
- EtherJet ISA Adapter

Positioning

EtherJet Adapters are best used in the following ways:

Adapter	Bus	Positioning
EtherJet 10BASE-T Adapter	ISA	Full-function ISA adapter for 10BASE-T networks
EtherJet Wake On LAN Adapter	ISA	Full-function ISA adapter for 10BASE-T networks with Wake On LAN capability
EtherJet ISA Adapter	ISA	Full-function ISA adapter supporting all Ethernet media types

Features

EtherJet adapters have two features that are currently exclusive in the industry. First, the adapters support LAN Client software, which reduces an adapter's conventional DOS memory usage to under 5K. In addition, Wake On LAN is supported on the 10BASE-T Wake On LAN adapter. This feature enables an Ethernet (or Token-Ring) connected PC to be remotely powered on, thus enabling energy cost savings and allowing network upgrades to be performed at any time. A summary of the EtherJet adapters' features follows:

Feature	EtherJet 10BASE-T Adapter	EtherJet 10BASE-T Wake On LAN Adapter	EtherJet ISA Adapter
Bus	ISA	ISA	ISA
PRIMARY USE • Clients DOS or Windows OS/2 • Servers	 Yes Yes Yes	 Yes Yes Yes	 Yes Yes Yes
MEDIA • 10BASE-T • 10BASE2 • AUI (10BASE5 and fiber)	 Yes No No	 Yes No No	 Yes Yes Yes
Data Width	16	16	16
System Interface	SRAM[1]/PIO[2]/ DMA Slave	SRAM/PIO/ DMA Slave	SRAM/PIO/ DMA Slave
LAN Client	Yes	Yes	Yes
Software Configurable	Yes (Plug and Play)	Yes (Plug and Play)	Yes (Plug and Play)
Full-Duplex	Yes	Yes	Yes
Remote Program Load	Yes	Yes	Yes
Status LEDs	Yes	Yes	Yes
Wake On LAN	No	Yes	No
Lifetime Warranty	Yes	Yes	Yes

1) SRAM=Shared RAM
2) PIO=Programmed I/O

Part Options

Adapter	Part Options
EtherJet 10BASE-T	Single 5-Pack 30-Pack Optional RPL[1]
EtherJet Wake On LAN	Single Optional RPL
EtherJet ISA	Single 5-Pack 30-Pack Optional RPL

1) Remote Program Load

Drivers for EtherJet 10BASE-T, Wake On LAN, and ISA Adapters

LAN Environment	Driver	LAN Environment	Driver
Artisoft LANtastic IBM LSP 1.33 or higher Banyan NDIS Client 5.5+ DEC Pathworks IBM DOS LAN Requester IBM LAN Station Mgr. IBM PC/3270 v.3.11, v4.0 IBM PC Support 400 IBM TCP/IP-DOS v2.1 Microsoft WFW v3.1 NDIS 2.0 NetManage Chameleon Banyan Native Client	IBMEINDI.DOS	Novell NetWare 4.x client - DOS Novell NetWare 3.x client - DOS Novell Personal 1.0 NetWare Novell NetWare Lite IBM PC/3270 v3.11, v4.0 IBM PC Support 400 IBM TCP/IP-DOS v2.1 Novell LANalyzer Novell 3.x client - OS/2 Novell 4.x client - OS/2	IBMEINWC.COM IBMEINWC.OS2
IBM COMM Mgr./2 v1.0 IBM LAN Network Mgr. 1.1 IBM LAN Station Mgr. 1 IBM MPTS IBM OS/2 v2.1 IBM OS/2 Extended SVC IBM OS/2 LAN Requester IBM TCP/IP v1.21 Microsoft LAN Mgr. v2.1, v2.2 IBM LAN Server v2.0+	IBMEINDI.OS2	Novell UnixWare SCO LAN Mgr. on UNIX SCO TCP/IP on UNIX SCO NSF, Open Desktop Banyan Vines Server	N/A
Novell NetWare 4.X server Novell NetWare 3.X server Novell NetWare for OS/2 Novell NetWare 4.x client NT Novell LANalyzer IBM LAN Client	IBMEINWS.LAN	Microsoft WFW v3.11 - NDIS 3.0 Microsoft Windows NT 3.1, 3.50 Microsoft Windows NT 3.51 Microsoft Windows 95 Packet Driver	IBMEIWFW.386 IBMWNT.SYS IBMEIW95.VXD N/A

Target Market EtherJet adapters are ideal for establishing client/server LAN connections in an office setting.

Key Selling Points The following features of EtherJet adapters may be of most interest to customers:

- Industry-leading performance
- Plug and Play support
- Full-duplex support
- LAN Client DOS memory reduction
- Wake On LAN version available
- Symmetrical Multi-Processing (SMP) support
- Graphical configuration utility
- Remote Program Load option
- Support for a wide range of network operating systems
- Easy installation
- Competitive pricing

PCI Ethernet Adapter

Product Description

The PCI Ethernet Adapter is a 32-bit, bus-mastering network interface card capable of handling high-end PCI systems.

Positioning

This is a low-cost, high performance adapter for clients and servers.

Features

Like the EtherJet adapters, the PCI Ethernet adapter supports LAN Client DOS memory reduction software. In addition, the PCI Ethernet adapter supports PCs with multiple processors (SMP) and has full-duplex connectivity. The PCI Ethernet adapter is Plug and Play enabled, but does ship with a graphical configuration utility to change adapter parameters (interrupt level, memory location, etc.). Features of the PCI Ethernet adapter are shown below:

Feature	PCI Ethernet Adapter
Bus	PCI
PRIMARY USE	
• Clients	
DOS or Windows	Yes
OS/2	Yes
• Servers	Yes
MEDIA	
• 10BASE-T	Yes
• 10BASE2	No
• AUI (10BASE5 and fiber)	Yes
• 100BASE-TX	No
Data Width	32
System Interface	Busmaster
Software Configurable	Yes (Plug and Play)
LAN Client	Yes
Full-Duplex	Yes
Remote Program Load	Yes
Status LEDs	Yes
Wake On LAN	No
Lifetime Warranty	Yes

Part Options

Adapter	Part Options
PCI Ethernet	Single 5-Pack 30-Pack Optional RPL[1]

1) Remote Program Load

Drivers for PCI Ethernet Adapter

LAN Environment	Driver	LAN Environment	Driver
Artisoft LANtastic IBM LSP 1.33 or higher Banyan NDIS Client 5.5+ DEC Pathworks IBM DOS LAN Requester IBM LAN Station Mgr. IBM PC/3270 v.3.11, v4.0 IBM PC Support 400 IBM TCP/IP-DOS v2.1 Microsoft WFW v3.1 NDIS 2.0 NetManage Chameleon Banyan Native Client	IBMEANDI.DOS	Novell NetWare 4.x client - DOS Novell NetWare 3.x client - DOS Novell Personal 1.0 NetWare Novell NetWare Lite IBM PC/3270 v3.11, v4.0 IBM PC Support 400 IBM TCP/IP-DOS v2.1 Novell LANalyzer Novell 3.x client - OS/2 Novell 4.x client - OS/2	IBMEANWC.COM IBMEANWC.OS2
IBM COMM Mgr/2 v1.0 IBM LAN Network MGR 1.1 IBM LAN Station Mgr. 1 IBM MPTS IBM OS/2 v2.1 IBM OS/2 Extended SVC IBM OS/2 LAN Requester IBM TCP/IP v1.21 Microsoft LAN Mgr. v2.1, v2.2 IBM LAN Server v2.0+	IBMEANDI.OS2	Novell UnixWare SCO LAN Mgr. on UNIX SCO TCP/IP on UNIX SCO NSF, Open Desktop Banyan Vines Server	N/A
Novell NetWare 4.X server Novell NetWare 3.X server Novell NetWare for OS/2 Novell NetWare 4.x client NT Novell LANalyzer IBM LAN Client	IBMEANWS.LAN	Microsoft WFW v3.11 - NDIS 3.0 Microsoft Windows NT 3.1, 3.50 Microsoft Windows NT 3.51 Microsoft Windows 95 Packet Driver	IBMEAWFW.SYS IBMEAWNT.SYS IBMEA351.SYS AMD driver in Win95 IBMEAPKT.COM

Target Market The PCI Ethernet adapter will appeal to customers who desire a high performance, low cost PCI-bus adapter for client and server connections.

Key Selling Points

The following points should be emphasized to customers:

- 32-bit busmaster adapter for high performance and low CPU utilization
- Plug and Play enabled
- Full-duplex support
- Remote Program Load option
- LAN Client DOS memory reduction
- Symmetrical Multi-Processing (SMP)
- Graphical configuration utility
- Support for a wide range of network operating systems
- Competitive pricing

IBM 100/10 EtherJet PCI Adapter

IBM 100/10 EtherJet PCI Adapter with Wake On LAN

Product Description

The 100/10 EtherJet PCI adapters are 32-bit bus-mastering network interface cards that operate at either 100 Mbps or 10 Mbps in full-duplex or half-duplex modes, with Plug and Play hardware installation. They follow the Fast Ethernet specification for 100 Mbps operation as defined by IEEE 802.3. The Wake On LAN version provides advanced management capability to enhance the effectiveness of customer networks.

Positioning

These adapters are for customers who want the flexibility to operate their networks at either 10 Mbps or 100 Mbps, at a very attractive cost. They are also ideal for customers that are operating at 10 Mbps now but may want to upgrade to 100 Mbps in the future.

Features

The 100/10 EtherJet PCI adapters have many ease-of-use features. The adapters are Plug and Play enabled, but ship with a graphical configuration utility to change adapter parameters. The adapters automatically sense whether they are connected to a full-duplex switch or half-duplex hub, and set themselves for that operation. The adapters also sense the network's speed (10 Mbps or 100 Mbps) and set themselves up for that speed. The Wake On LAN feature provides a high level of control and manageability. A summary of features follows:

Feature	100/10 EtherJet PCI Adapter	100/10 EtherJet PCI Adapter with Wake On LAN
Bus	PCI	PCI
PRIMARY USE • Clients DOS or Windows OS/2 • Servers	 Yes Yes Yes	 Yes Yes Yes
MEDIA • 10BASE-T • 10BASE2 • AUI (10BASE5 and fiber) • 100BASE-TX	 Yes No No Yes	 Yes No No Yes
Data Width	32	32
System Interface	Busmaster	Busmaster
Software Configurable	Yes (Plug and Play)	Yes (Plug and Play)
LAN Client	No	No
Full-Duplex	Yes	Yes
Remote Program Load	Yes	Yes
Status LEDs	Yes	Yes
Wake On LAN	No	Yes
Lifetime Warranty	Yes	Yes

Part Options

Adapter	Part Options
100/10 EtherJet PCI	Single 20-Pack 100-Pack
100/10 EtherJet PCI with Wake On LAN	Single 20-Pack 100-Pack Optional RPL[1]

1) Remote Program Load

Drivers for 100/10 PCI Ethernet Adapter

LAN Environment	Driver	LAN Environment	Driver
IBM LSP 1.33 or higher Banyan NDIS Client 5.5+ DEC Pathworks IBM DOS LAN Requester IBM LAN Station Mgr. IBM PC/3270 v.3.11, v4.0 IBM PC Support 400 IBM TCP/IP-DOS v2.1 Microsoft WFW v3.1 NDIS 2.0 NetManage Chameleon Banyan Native Client	IBMFE.DOS	Novell NetWare 4.x client - DOS Novell NetWare 3.x client - DOS Novell Personal 1.0 NetWare Novell NetWare Lite IBM PC/3270 v3.11, v4.0 IBM PC Support 400 IBM TCP/IP-DOS v2.1 Novell LANalyzer Novell 3.x client - OS/2 Novell 4.x client - OS/2	IBMEANWC.COM IBMEANWC.OS2
IBM COMM Mgr/2 v1.0 IBM LAN Network MGR 1.1 IBM LAN Station Mgr. 1 IBM MPTS IBM OS/2 v2.1 IBM OS/2 Extended SVC IBM OS/2 LAN Requester IBM TCP/IP v1.21 Microsoft LAN Mgr. v2.1, v2.2 IBM LAN Server v2.0+	IBMFE.OS2	Novell UnixWare SCO LAN Mgr. on UNIX SCO TCP/IP on UNIX SCO NSF, Open Desktop	N/A
Novell NetWare 4.X server Novell NetWare 3.X server Novell NetWare for OS/2 Novell NetWare 4.x client NT Novell LANalyzer	IBMFE.LAN	Microsoft WFW v3.11 - NDIS 3.0 Microsoft Windows NT 3.1, 3.50 Microsoft Windows NT 3.51 Microsoft Windows 95 Packet Driver	N/A IBMFE.SYS IBMFE.SYS IBMFE.VXD IBMFE.VXD

Target Market

The 100/10 EtherJet PCI Adapter will appeal to customers who want high-speed connections either now or in the future. These customers will be interested in upgrading their existing Ethernet network. The Wake On LAN adapter will appeal to customers seeking a high level of network management and cost effective network operations.

Key Selling Points

The following features of the 100/10 PCI Ethernet Adapter will be of most interest to customers:

- High performance 32-bit busmaster adapter
- Operates at 10 Mbps or 100 Mbps
- Wake On LAN capability
- Low CPU utilization
- Plug and Play enabled
- Auto-sense and select ring speed
- Full-duplex at 10 Mbps and 100 Mbps with auto-negotiation
- Graphical configuration utility
- Support for a wide range of network operating systems
- Competitive pricing

EtherJet PCCard Adapter

Product Description

The EtherJet PCCard Adapter, which comes with a 10BASE-T or 10BASE2 connector, has the function of a full-size adapter in a lightweight, convenient size. Designed to work with portable systems complying with PCMCIA release 2.0, the adapter offers high-speed access to LAN networks. It is compatible with IEEE 802.3/Ethernet Version 2.0.

Positioning

These Credit Card Adapters are for customers who have laptop computers and workstations with Type II slots and Socket Servers Release 2.

Features

Following are the features of the EtherJet PCCard Adapter:

Feature	EtherJet PCCard Adapter 10BASE-T	EtherJet PCCard Adapter 10BASE2
Bus	PCMCIA	PCMCIA
PRIMARY USE • Clients DOS or Windows OS/2 • Servers	 Yes Yes No	 Yes Yes No
MEDIA • 10BASE-T • 10BASE2 • AUI (10BASE5 and fiber) • 100BASE-TX	 Yes No No No	 No Yes No No
Data Width	16	16
System Interface	SRAM[1]	SRAM
Software Configurable	Yes	Yes
LAN Client	Yes	Yes
Full-Duplex	Yes	Yes
Remote Program Load	Yes	Yes
Status LEDs	Yes	Yes
Wake On LAN	Yes	Yes
Lifetime Warranty	Yes	Yes

1) SRAM=Shared RAM

Part Options

Adapter	Part Options
EtherJet 10Mbps PCCard 10BASE-T	Single 5-Pack
EtherJet 10Mbps PCCard 10BASE-T/10BASE2	Single 5-Pack

Drivers for EtherJet PCCard 10BASE-T and 10BASE2 Adapters

LAN Environment	Driver	LAN Environment	Driver
Artisoft LANtastic IBM LSP 1.33 or higher Banyan NDIS Client 5.5+ DEC Pathworks IBM DOS LAN Requester IBM LAN Station Mgr. IBM PC/3270 v.3.11, v4.0 IBM PC Support 400 IBM TCP/IP-DOS v2.1 Microsoft WFW v3.1 NDIS 2.0 NetManage Chameleon Banyan Native Client	PCMNICCS.DOS	Novell NetWare 4.x client - DOS Novell NetWare 3.x client - DOS Novell Personal 1.0 NetWare Novell NetWare Lite IBM PC/3270 v3.11, v4.0 IBM PC Support 400 IBM TCP/IP-DOS v2.1 Novell LANalyzer Novell 3.x client - OS/2 Novell 4.x client - OS/2	PCMDMCS.COM PCMDMCS.SYS
IBM COMM Mgr/2 v1.0 IBM LAN Network MGR 1.1 IBM LAN Station Mgr. 1 IBM MPTS IBM OS/2 v2.1 IBM OS/2 Extended SVC IBM OS/2 LAN Requester IBM TCP/IP v1.21 Microsoft LAN Mgr. v2.1, v2.2 IBM LAN Server v2.0+	PCMNICCS.OS2	Novell UnixWare SCO LAN Mgr. on UNIX SCO TCP/IP on UNIX SCO NSF, Open Desktop Banyan Vines Server	N/A
Novell NetWare 4.X server Novell NetWare 3.X server Novell NetWare for OS/2 Novell NetWare 4.x client NT Novell LANalyzer	N/A	Microsoft WFW v3.1+ - NDIS 3.0 Microsoft Windows NT 3.50+ Microsoft Windows NT 3.51 Microsoft Windows 95 Packet Drivers for TCP/IP	 IBMETHCC.SYS NE2000.SYS in WIN95

Target Market

The EtherJet PCCard Adapters will appeal to customers who count on their portable or notebook computers to help maintain productivity while away from the office. With these adapters, customers can access both applications and information on their company's LAN and host systems.

Key Selling Points

The following points should be emphasized when selling the 10BASE-T and 10BASE2 versions of the EtherJet PCCard Adapter:

- Ease of Installation with IBM's LANAID program
- Full-duplex capability that supports up to 20Mbps
- Lower power consumption that offers users more time between battery changes
- Diagnostic LEDs to simplify problem determination
- Support for IBM and non-IBM notebook and desktops with Type II PCMCIA slots
- Competitive performance
- Competitive pricing

Migration Strategies

Ethernet customers are already experiencing considerable bandwidth problems. IBM offers strategies to increase network bandwidth while preserving the customer's existing networking investment.

- **Segmented LANs.** By splitting LANs into smaller segments, greater total network bandwidth can be created. One method of segmenting LANs is through the 8237 and 8225 Ethernet Stackable Hubs. The 8237 and 8225 have a maximum of three independent segments per stack to improve the performance of the attached devices on a LAN.

- **Ethernet Switches.** Many customers who are experiencing bandwidth problems with their Ethernet networks are adding Ethernet switches such as the 8271 Nways Ethernet LAN Switch to eliminate congestion, allocate bandwidth, and postpone major network upgrades for some time. Switches divide a large network into smaller segments and filter unnecessary traffic from individual segments. Switches also allow a network administrator to dedicate bandwidth to servers or high performance workstations that need it. The other ports on the switch can then be used to connect these stations to the rest of the network. Used in conjunction with shared hubs on the desktop, switches provide a cost-effective solution to performance enhancement.

- **Full-Duplex Operation with Ethernet Switches**. To get more than 10 Mbps bandwidth for servers and high performance workstations, IBM pioneered full-duplex Ethernet technology. Full-duplex Ethernet allows users to simultaneously transmit and receive information, thereby effectively doubling the available dedicated bandwidth to 20 or 200 Mbps. All ports on the 8271 Nways Ethernet LAN Switch support full- and half-duplex modes.

- **100BASE-T (Fast Ethernet).** Fast Ethernet technology allows transmission of Ethernet frames at 100 Mbps. Products that offer 10 Mbps and 100 Mbps capability on one adapter are available, allowing attachment to existing 10 Mbps networks and enabling migration to 100 Mbps connections as they become available. One function on these products, auto-negotiation of operating speed, should ease this upgrade. The 8271 Nways Ethernet LAN Switch offers a 100 Mbps universal feature port, which allows users to connect their current Ethernet networks to a 100 Mbps backbone.

- **100BASE-VG/AnyLAN.** This technology is another future migration path. It allows transmission of Ethernet frames at 100 Mbps. This network uses a demand-priority access method instead of CSMA/CD. This allows packets being sent on the network to be assigned different priority levels.

- **Cardbus Ethernet.** This PCCard technology will be needed to support the Cardbus Platforms that are being developed by notebook manufacturers.

- **Ethernet/Modem Cards**. Many customers are experiencing the need to increase their mobility with notebooks by using a multifunction card to connect to the LAN and also have analog capability to connect to the Internet. This reserves the other slot for other PC cards, such as Scisi adapters for CD-ROM support.

Sales Strategies

Network adapters usually will not be purchased independently. They are usually bought at the time the workstations or servers are purchased. Also, network adapters are often purchased in conjunction with the purchase of campus networking products such as hubs or switches. For the purposes of this Sales Guide, we will focus only on the sale of network adapters.

Target Customer

In an Ethernet adapter sale, the network administrator or the network planner is very instrumental in the evaluation process. In accounts where the network manager is committed to another vendor's Ethernet adapters, you may wish to call on a higher level decision-maker.

Target Environments

Ethernet networks are pervasive in the industry. They are well suited for:

- **Environments where price is an issue.** Ethernet networks are less expensive than Token-Ring.
- **Environments where small workgroup LANs predominate.** Bandwidth constraints will not be an issue in the small workgroups where bandwidth requirements are known and contained.
- **Environments requiring many vendors' products or many different types of attached products.**
- **Environments with established Ethernet networks.**

Sales Tools

IBM provides a broad range of selling tools to assist you in your sales efforts with network adapters. These tools include marketing deliverables, collateral materials, special bid programs, loaner programs, and presale hotline support. Please refer to the *Sales Tools* unit later in this guide for complete information.

Handling Sales Objections

In your sales activities with IBM Ethernet adapters, you may encounter customers who raise a few common sales objections. These can be easily handled with the following responses:

IBM is not committed to Ethernet, only Token-Ring.

As a full networking product provider, IBM offers a full range of Ethernet products including adapters, hubs, switches and routers. It is investing heavily in Ethernet technology and has announced such technological innovations as the first Ethernet full-duplex adapter and full-duplex Switching System (8271 Nways Switch), LAN Client DOS memory reduction software, and Wake On LAN capability. It is fully committed to meeting its customers' needs for Ethernet products.

Whenever I have a problem with an adapter, IBM always tells me that there is a new device driver to fix it.

IBM is implementing a new procedure to fix this problem. It will ship a diskette with the device driver rev. number clearly indicated on the label. Instructions will be included which ask the customer to first call our 800 number to determine the drivers and rev. level required. Instructions will also be provided for downloading the device drivers from our bulletin board if a new one is needed.

IBM's adapters are more expensive.

IBM has lowered prices on Ethernet adapters and is determined to provide high quality products at a low price. IBM's Ethernet adapters provide excellent value for features such as full-duplex, Plug and Play, automatic media detection, status LEDs and lifetime warranties. In addition, IBM has established a special pricing process for securing approvals to meet a competitive price. (See *Sales Tools* later in this Guide for more information about the special bid process.)

Q's and A's

To facilitate your sales efforts, IBM has provided answers to some commonly asked customer questions regarding Ethernet adapters.

Q) Has IBM abandoned Token-Ring in favor of Ethernet?
A) No. Because IBM is a full networking product provider, we are committed to providing products to meet the needs of both Ethernet and Token-Ring customers.

Q) What is the difference between 100BASE-T and 100-VG/AnyLAN?
A) Both are derivatives of Ethernet but 100BASE-T retains Ethernet's CSMA/CD method of media-access control. 100-VG/AnyLAN uses a new Demand Priority MAC. 100BASE-T is a shared media network while 100VG/AnyLAN is a dedicated media, shared bandwidth network.

Q) What kinds of 100BASE-T networks are available?
A) Currently, there are two versions of 100BASE-T networks available:

- 100BASE-TX. This Ethernet network transmits at 100 Mbps or higher over 2 pairs of category 5 unshielded twisted pair cable.
- 100BASE-T4. This type of Ethernet network transmits at 100 Mbps over 4 pairs of category 3 unshielded twisted pair cable.

All of IBM's Fast Ethernet products support 100BASE-TX cabling. At this time, 100BASE-T4 is not widely available in the marketplace.

Q) Do IBM's Ethernet adapters support promiscuous mode?
A) Yes, all of IBM's Ethernet adapters support promiscuous mode, which is important for network analyzer applications.

Q) How does IBM position 100 Mbps Ethernet versus ATM?
A) IBM is committed to both the Ethernet and ATM markets. As the Ethernet market moves to 100 Mbps, IBM intends to lead that market. At the same time, IBM continues to enhance its ATM product line. At such time as our customers are prepared to migrate from Ethernet to ATM, IBM will be there to ease that migration. For the present, IBM intends to be a major player in both the growing Ethernet and ATM markets.

Ethernet Adapter Competition

Market Share

IBM has been in the Ethernet adapter market since 1992. IBM continues to grow its market share, and is investing in the development of high performance, cost-effective Ethernet adapters in order to become the industry leader. IBM's major competitors for Ethernet adapters are:

- 3Com
- Intel
- SMC

3Com

3Com offers the EtherLink III family of adapters for most bus types (ISA, PCI, EISA, MC, and PCMCIA combo cards). IBM's Ethernet adapters successfully measure up to each of 3Com's adapters, especially since IBM is committed to meeting competitor's prices. Comparing IBM's EtherJet Adapters with 3Com's EtherLink III 16-Bit ISA (3C509B performance upgrade replaces 3C509), IBM's adapters are very competitive.

For PCs with PCI buses, 3Com has both 10 Mbps and 100 Mbps adapters. When selling against these, emphasize IBM's low CPU utilization for servers.

Intel

Intel is another major Ethernet adapter vendor. It offers adapters for ISA and PCI buses (but not PCMCIA). For an ISA client, the IBM EtherJet Adapters compete against Intel's EtherExpress PRO/10 Adapter. This adapter comes with and without flash memory.

SMC

The third largest vendor of Ethernet adapters is Standard Microsystems Corporation (SMC). They currently sell three different lines of Ethernet ISA adapters: Their newest, EtherEZ, as well as Elite Ultra and Elite 16**.**

IBM EtherJet ISA versus Competitors

Feature	IBM EtherJet	3Com EtherLink III 3C509B	SMC EtherEZ ISA Plug and Play SMC8416	Intel EtherExpress PRO/10 PCLA8225B
List Price[1]		$110	$104	$99
Features:				
• Full-Duplex	Yes	No	No	No
• Auto-Negotiation (Duplex)	Yes	No	No	No
• Support of SMPs	Yes	No	No	No
• LAN Client Memory Reduction	Yes	No	No	No
• Wake On LAN Capable	Yes[2]	No	No	No
• Bus Modes	Prog I/O Shared RAM DMA Slave	Prog I/O	Prog I/O	Prog I/O Shared RAM
Ease of Use:				
• Plug and Play/SW Configurable	Yes/Yes	Yes/Yes	Yes/Yes	Yes/Yes
• Power-on Self Test	No	No	No	No
• Anti-Virus Protection	No	Yes	Yes	Yes
• Flash Memory	No	Yes	No	Yes
• Status LEDs	Yes	TP	Yes	Yes
• MAC Address Label	Yes	Yes	Yes	Yes
Strengths/Weaknesses	• Throughput equiv. To 3Com • Improved CPU utilization • Wake On LAN leadership • Low memory requirement	• Perceived as best throughput • Easy install	• Claim fastest and easiest installation • 18% slower than 3Com	• Perceived as one of the best • Throughput equiv. to 3Com • Anti-virus

1) Prices subject to change
2) 72H2613 IBM EtherJet ISA 10BASE-T Adapter with Wake On LAN feature.

IBM PCI Ethernet versus Competitors

Feature	IBM PCI Ethernet	3Com EtherLink XL PCI-TPO 3C900	Intel EtherExpress PRO/10 PCI PILA8520	SMC EtherPower PCI SMC8432
List Price[1]		$135	$99	$83
Features:				
• Full-Duplex	Yes	Yes	Yes	Yes
• Auto-Negotiation (Duplex)	Yes	No	No	No
• Support of SMPs	Yes	No	No	No
• LAN Client Memory Reduction	Yes	No	No	No
• Wake On LAN Capable	No	No	No	No
Ease of Use:				
• Plug and Play/SW Configurable	Yes/Yes	Yes/Yes	Yes/Yes	Yes/Yes
• Power-on Self Test	No	No	No	No
• Anti-Virus Protection	No	Yes	Yes	Yes
• Flash Memory	No	No	Yes	No
• Status LEDs	Yes	Yes	Yes	Yes
• MAC Address Label	Yes	No	No	No
Strengths/Weaknesses	• Throughput equiv. to 3Com • Low CPU utilization for servers	• Perceived as fastest • Claim fastest; easy install • Dynamic Access technology (degrades throughput 4%-6%)	• Throughput equiv. to 3Com	• 8% slower than competition • One set of drivers for 10M and 10/100

1) Price subject to change.

IBM 100/10 PCI Ethernet versus Competition

Feature	IBM 100/10 EtherJet PCI 86H2432	3Com Fast EtherLink XL 10/100 PCI 3C905	Intel EtherExpress PRO/100 PCI PCLA8465B	SMC EtherPower 10/100 PCI SMC9432
List Price[1]		$116	$99	$94
Features:				
• Connector	Single RJ-45 for TX (cat. 5)	Single RJ-45 for TX (cat. 5)	Single RJ-45 for TX (cat. 5)	Single RJ-45 for TX (cat. 5) DB-9 for STP & IBM T1
• Auto-Sense Hub Speed	Yes	Yes	Yes	Yes
• Full-Duplex	Yes	Yes	Yes	Yes
• Support of SMPs	Yes	No	Yes	No
• Wake On LAN Capable	Yes[2]	No	No	No
Ease of Use:				
• Plug and Play/SW Configurable	Yes/Yes	Yes/Yes	Yes/Yes	Yes/Yes
• Power-on Self Test	No	No	No	No
• Status LEDs	Yes	Yes	Yes	Yes
Strengths/Weaknesses	• Throughput leadership (same as Intel PRO/100 PCI) • Robust driver support • Lowest CPU utilization	• Perceived as fastest • Higher CPU utilization • Dynamic Access technology (degrades throughput 4%-6%)	• Throughput leadership • Robust driver support • Lowest CPU utilization	• 15% slower than 3Com • low CPU utilization • DB-9 connector

1) Price subject to change
2) Wake On LAN capability available on IBM 100/10 EtherJet PCI with Wake On LAN, Part Number 85H9921

IBM Competitive Summary

In general, in a competitive sales situation you should emphasize the following reasons to buy IBM Ethernet adapters:

- **Customer Support.** IBM is an industry leader in customer support. Lifetime warranties are offered on all Ethernet adapters. Technical support is available 24 hours per day, 7 days per week.

- **Low Cost.** IBM adapters are competitively priced.

- **Performance.** IBM's EtherJet adapters are the industry's highest performance 10 Mbps adapter, running at media speed. IBM's Ethernet adapters are as fast as any of the leading Ethernet adapters on the market.

- **Exclusive Features.** IBM offers many exclusive features, including POST, RPL (standard on most client adapters), LAN client memory reduction, and Wake On LAN capability.

- **Easy to Install.** IBM's adapters are easy to install because of their switchless design, POST, automatic slot size detection, automatic media detection and external LEDs.

- **Standards-based.** IBM offers total networking solutions with broad compatibility. Its products are based on standards and are compatible with IBM and other manufacturers' products. Device drivers are included for most operating systems.

ATM ADAPTERS
Market Information

Background

Asynchronous Transfer Mode (ATM) is the international standard for cell relay that the industry is developing to:

- support both public and private networks
- use the same technology for local area, metropolitan area and wide area networks
- multiplex voice, video and data (including image) traffic
- deliver bandwidth on-demand
- offer low-cost networking and use low-cost technology

ATM is a high speed, high bandwidth technology that combines the flexibility and efficiency of packet-switching with the minimal delay characteristics of circuit switching. ATM enables voice, video and data signals to travel at exceptionally high speeds over a single network line. ATM is regarded as the technology that will provide guaranteed bandwidth and quality of service to applications such as multimedia, imaging, advanced engineering and visualization.

IBM Products

IBM is committed to becoming a major provider of ATM networking hardware and software. IBM's ATM products are positioned to bring ATM capabilities all the way to the desktop PC and provide a cost-effective migration path from today's shared LAN environment to LAN switching and ultimately to the high-performance, dedicated connections of ATM, while preserving customer investment in cabling and applications.

Positioning

There are currently several kinds of ATM adapters in IBM's ATM product line:

- The **TURBOWAYS 25 ATM Adapter** is positioned as a low cost client adapter that brings high bandwidth ATM connectivity to Micro Channel, Sbus, ISA- and PCI-bus desktop PCs running under DOS, Windows, OS/2, Solaris, or SunOS.

- The **TURBOWAYS 100 ATM Adapter** is positioned as a high performance Micro Channel adapter that provides ATM connectivity for the RS/6000 Series 300, 500 and 900 and high-end PS/2s over a local area network. Operating systems supported include AIX, NetWare, and OS/2. The TURBOWAYS 100 provides dedicated 100 Mbps ATM connection for high performance servers or workstations.

- **TURBOWAYS 100 ATM Adapter** for the 3172 Interconnect Controller Model 3 provides a 100 Mbps LAN-to-host ATM gateway via the IBM 3172.

- The **TURBOWAYS 155 Mbps ATM Adapter** offers Micro Channel or Sbus connections providing 155 Mbps dedicated bandwidth for high-end workstations and servers.

- **Interphase 155 Mbps ATM Adapters** bring high-speed connectivity for devices with PCI, GIO, or EISA bus support.

Features

IBM's ATM product line offers many impressive features, including:

- **Bandwidth Options**. ATM offers customers scalable options for bandwidth. Currently, adapters are available for 25 Mbps, 100 Mbps and 155 Mbps, and future offerings will include client and server options ranging to 622 Mbps.

- **Scalability.** Because ATM is scalable, investment in current ATM products is preserved, since they will interoperate with future higher speed ATM products.

- **LAN Emulation.** This capability gives existing network devices transparent access to the ATM network. With LAN emulation, a customer's current network applications will work with an ATM switch-based network. LAN emulation lets existing workstations and applications run on an ATM network without modifications.

  ATM can be installed in a step-by-step fashion, without having to make wholesale changes to workstations at the outset. Both Token-Ring and Ethernet LANs can be emulated. The LAN Emulation client runs on ATM workstation adapters. Client software is available for machines running DOS, OS/2, Windows and NetWare. LAN emulation is provided free of charge with the adapters. Forum-compliant LAN Emulation is now available.

- **Application Protection.** Using ATM LAN emulation, existing applications run transparently on the ATM network. This capability protects customers' investments in network applications.

- **Cabling Support.** Both UTP and STP wiring are supported, thus minimizing the customer's migration cost to high-speed networks.

- **Standards Support.** IBM is an active member of the ATM Forum standards-setting body. As new standards emerge, IBM will ensure its products meet specifications.

- **Interoperability.** IBM's ATM products are designed to be interoperable with ATM networks built on other vendors' equipment. IBM also participates in interoperability tests at the University of New Hampshire.

TURBOWAYS 25 Adapters

IBM has four TURBOWAYS 25 ATM Adapters providing a 25 Mbps full-duplex connection to the ATM network, and utilizing either ISA, PCI, Micro Channel or Sbus connections. The ISA and PCI adapters operate in PCs running DOS or Windows; the Micro Channel Adapter functions in an OS/2 system; and the Sbus adapter works with the Solaris and SunOS operating systems. The ISA, PCI and Micro Channel adapters operate in ATM Forum-compliant LAN Emulation or Classical IP environments; the Sbus adapter is available only with Classical IP support. Each of the four adapters use existing STP or UTP (category 3, 4, or 5) wiring.

The TURBOWAYS 25 connects to the ATM network via the 8282 ATM Workgroup Concentrator or the IBM 8285 Nways ATM Workgroup Switch. The adapter supports up to 32 full-duplex virtual circuits. Only one TURBOWAYS 25 Adapter may be installed in a system.

The **TURBOWAYS 25 ISA** features include:

- A specialized ATM chip for handling the cell segmentation and reassembly (SAR) function
- Easy to use configuration
- Easy to use diagnostics
- Signaling channel setup
- Virtual connection setup and tear down
- Bandwidth allocation and management
- Capability to transmit and receive data on virtual connections
- A reliable, connection-oriented circuit between an ATM Forum version 3.0 SVC component and the ATM switch
- ISA Busmaster
- A lifetime warranty

The **TURBOWAYS 25 PCI** features include:

- AAL-5 adaptation layer interface
- High through-put by implementation of a specialized chip that handles ATM segmentation and reassembly
- Easy to use configuration, installation and diagnostics
- Bandwidth allocation and management
- Virtual connection setup and teardown
- PCI busmaster
- A lifetime warranty

The **TURBOWAYS 25 Micro Channel** features include:

- Micro Channel bus
- A lifetime warranty

The **TURBOWAYS 25 Sbus** features include:

- TCP/IP protocol support in a Classical IP environment
- A lifetime warranty

Operating Systems/ Device Drivers

IBM TURBOWAY 25 ATM Adapters support drivers for the following operating systems:

- OS/2 2.11 or higher (MC bus)
- OS/2 Warp 3.0 (MC or PCI bus)
- PC DOS 6.3 or higher (PCI bus)
- MS-DOS 6.2 or higher (PCI bus)
- Windows 3.1 or Windows NT 3.5 and 4.0 (PCI bus)
- Solaris 2.3 and 2.4 (Sbus)
- SunOS 4.1.3 (Sbus)

Part Options

Adapter	Part Options
TURBOWAYS 25 ATM ISA	Single 5 Pack
TURBOWAYS 25 ATM PCI	Single 5 Pack 30 Pack
TURBOWAYS 25 ATM MC for PS/2,	Single: 5 Pack:
TURBOWAYS 25 ATM Sbus	Single 5 Pack

Q's and A's

Q) Since the TURBOWAYS 25 ATM Adapter does not have its own processor, will ATM processing be off-loaded onto the PC causing applications to fail?

A) There are no performance problems with PC applications. Cell segmentation and reassembly (SAR) is handled by specialized logic on the TURBOWAYS 25, so the only communication with the host is through direct memory access (DMA), which doesn't consume CPU cycles.

Q) Is 25 Mbps fast enough to run ATM applications such as desktop video?

A) IBM tests have shown that users can set up multiple compressed interactive video windows (applications that are both bandwidth-and compute-intensive) over a single 25 Mbps connection.

TURBOWAYS 100 Adapters

The TURBOWAYS 100 ATM Adapter is a Micro Channel-based adapter for RS/6000 and high-end PS/2 connectivity to ATM networks. It provides dedicated bandwidth of 100 Mbps between the RS/6000, PS/2 and other devices on the ATM network. Its features include:

- On-board i960 processor plus a specialized chipset to handle ATM segmentation and reassembly, resulting in extremely high throughput
- SNMP sub-agent
- Easy-to-use configuration
- Signaling channel setup
- Virtual connection setup and tear down
- Bandwidth allocation and management
- Capable of transmitting and receiving data on up to 1024 virtual connections
- A reliable, connection-oriented circuit between an ATM Forum version 3.0 SVC component and the ATM switch
- Process synchronization
- Micro Channel streaming
- Handling of hardware and software interrupts
- Support of ATM Forum-compliant LAN Emulation (PS/2) or Classical IP for AIX (RS/6000) environments
- Supports IBM LANE for OS/2 and NetWare, and ATMF LANE for OS/2
- Full-duplex capabilities
- Up to two TURBOWAYS 100 MC adapters can be installed in a single client or server
- Multimode fiber wiring
- A lifetime warranty

TURBOWAYS 100 for 3172

This adapter provides 3172 Interconnect Controller Model 3 users with direct access to high-bandwidth, high-speed ATM LANs. The adapter also provides Token-Ring and Ethernet LAN emulation, allowing users to run existing applications transparently to the ATM network. Other features include:

- Switched virtual circuit (SVC) support
- ATM Adaptation Layer 5 (AAL-5)
- Transmission and receipt of data on virtual connection

Operating Systems/ Device Drivers

TURBOWAYS 100 ATM adapters support drivers for the following operating systems:

- AIX 3.2.5, AIX 4.1.4, and AIX 4.2 (RS/6000)
- NetWare 3.1.2 and 4.01 or higher (PS/2)
- OS/2 2.0 or higher (PS/2)

Part Options

Adapter	Part Options
TURBOWAYS 100 ATM MC	Single for PS/2 5 Pack for PS/2 Single for RS/6000
Device Drivers for TURBOWAYS 100 ATM for RS/6000	
TURBOWAYS 100 ATM for 3172-3	

NOTE: Cables are not provided with the TURBOWAYS 100 adapters and must be ordered separately. See page 67 for a list of Part Options for cables.

TURBOWAYS 155 Adapters

The IBM TURBOWAYS 155 is a high performance adapter designed to operate with Micro Channel bus or Sbus computers. It offers the following features:

- SNMP subagent support for TCP/IP network management capability
- On-board processor plus a specialized chipset to handle ATM segmentation and reassembly, resulting in extremely high throughput
- Support for the following interfaces: ATM Forum UNIX Specification V3.0 for SVCs; ATM Adaptation Layer 5 (AAL-5); and, Open Data Link Interface (ODI) and Network Driver Interface Specification (NDIS)
- Support for NetBIOS, SNA, Internetwork Packet Exchange (IPX) and TCP/IP through LAN Emulation, and TCP/IP through AIX
- Up to two TURBOWAYS 155 adapters may be installed in an RS/6000
- Multimode fiber or UTP wiring
- A lifetime warranty

Operating Systems/ Device Drivers

TURBOWAYS 155 ATM adapters support drivers for the following operating systems:

- AIX 3.2.5, AIX 4.1.4, and AIX 4.2 (RS/6000)
- NetWare 3.1.2 and 4.01 or higher (PS/2)
- OS/2 2.11 or higher or OS/2 Warp 3.0 for Forum-compliant LAN Emulation (PS/2)
- Solaris 2.3 or 2.4 (Sbus)
- SunOS 4.1.3 (Sbus)

Part Options

Adapter	Part Options
TURBOWAYS 155 ATM MC	MMF for PS/2 MMF for RS/6000 UTP for PS/2 UTP for RS/6000
TURBOWAYS 155 ATM Sbus	MMF, Single MMF, 5 Pack UTP5, Single UTP5, 5 Pack

NOTE: Cables are not provided with the TURBOWAYS 155 adapters and must be ordered separately. See page 67 for a list of Part Options for cables.

Interphase 155 Adapters

IBM offers three Interphase 155 ATM adapters supporting PCI, GIO, or EISA buses: the 5515 PCI Adapter for PCI 2.1 compliant or PowerPC workstations, the 4915 GIO Adapter for GIO-based workstations, and the 4815 EISA Adapter for Intel EISA V.3.12 workstations. These adapters use either UTP or multimode fiber wiring.

The 5515 PCI and 4815 EISA Adapters feature:

- UTP (category 5) or multimode wiring
- Support for ATM Forum-compliant LAN Emulation, Classical IP for Windows NT, and SMP environments
- Support for NetBIOS, SNA, IPX, and TCP/IP
- A one year warranty

The 4915 GIO Adapter features:

- UTP (category 5) or multimode wiring
- TCP/IP protocol enabling
- ATM Forum-compliant LAN Emulation and Classical IP support
- A one year warranty

Operating/Systems/ Device Drivers

INTERPHASE 155 ATM adapters support the following operating systems:

- NetWare 3.x or 4.x (PCI or EISA bus)
- Windows NT 3.5.1 or 4.0 (PCI or EISA bus)
- IRIX 5.3 (GIO bus)

Part Options

Adapter	Part Options
INTERPHASE 155 ATM 5515 PCI	UTP MMF
INTERPHASE 155 ATM 4915 GIO	UTP MMF
INTERPHASE 155 4815 EISA	UTP MMF

NOTE: Fiber cables are not provided with the Interphase 155 adapters and must be ordered separately. See page 67 for a list of Part Options for cables.

Cable Options

Fiber cables are not provided with the TURBOWAYS 100 and 155 ATM or the Interphase 155 adapters. They must be purchased separately.

Cable Options
MIC to SC, Cable ASM, 2-meter fiber
MIC to SC, Cable ASSM, 4-meter fiber
MIC to SC, Cable ASM, 6-meter fiber
MIC to SC, Cable ASSM, 10-meter fiber
MIC to SC, Cable ASSM, 20-meter fiber
MIC to SC, Cable ASSM, 40-meter fiber
MIC to SC, Cable ASSM, custom lengths
ST to SC, Cable ASM, 2-meter fiber
ST to SC, Cable ASSM, 4-meter fiber
ST to SC, Cable ASM, 6-meter fiber
ST to SC, Cable ASSM, 10-meter fiber
ST to SC, Cable ASSM, 20-meter fiber
ST to SC, Cable ASSM, 40-meter fiber
ST to SC, Cable ASSM, custom lengths
SC to SC, Cable ASSM, 4-meter fiber
SC to SC, Cable ASM, 6-meter fiber
SC to SC, Cable ASSM, 10-meter fiber
SC to SC, Cable ASSM, 20-meter fiber
SC to SC, Cable ASSM, 40-meter fiber

Sales Strategies

Target Market

Customers who are ideal prospects for ATM will be those who need to:

- Increase LAN bandwidth
- Avoid re-segmenting via dedicated ATM connections
- Improve overall network performance
- Enable new, high bandwidth application development
- Reduce network latency
- Meet multimedia requirements of mixed datastreams such as voice, video, and data at the desktop

Initially, the best candidates for ATM are those who have a strategic need for high-speed, high-bandwidth network applications. If the application is vital to their success, a customer is far more likely to make the change to a new technology. Customers with less pressing needs will wait until the technology has evolved to a standards-based and widely implemented solution.

Specifically, the TURBOWAYS 25 adapters may be best for those who are just entering the ATM market, and want a cost-effective upgrade to their existing Ethernet or Token-Ring network.

The TURBOWAYS 100 adapter is for customers who want ATM connectivity for their client/servers or who have intensive multimedia applications.

The TURBOWAYS 155 adapter is for customers who need great versatility; the adapter comes with either multimode fiber or copper wiring, and SNMP subagent support for TCP/IP.

Sales Tools

IBM provides a broad range of selling tools to assist you in your sales efforts with network adapters. These tools include collateral materials, special bid programs, loaner programs and presale hotline support. Articles about the ATM adapters can be obtained from:

http://www.raleigh.ibm.com/per/perprod.html

Selling Points

When selling the IBM TURBOWAYS ATM adapters, the following key points should be emphasized:

- Complete IBM ATM solution
- Scalability offered by the adapters
- High performance levels of the adapters
- Ideally suited for high volume, high capacity applications
- Adherence to standards
- Protection of investment in cabling, applications and hardware
- Interoperability with other vendors' equipment
- IBM service and support
- IBM technology leadership and breadth of product
- Competitively priced

Competition

ATM is a growing technology and IBM is committed to continuing its development of ATM networking hardware and software. Currently, IBM competes with adapters from Adaptec, Madge, Interphase, Efficient and FORE. Not only do IBM’s adapters compare favorably to those currently on the market, they are also competitively priced. For a comparison of IBM’s adapters, see the tables on the following two pages.

IBM Turboways 25 ATM PCI Adapter vs. Competition

	IBM Turboways 25 ATM PCI	Adaptec ATM 25 PCI	Madge Collage 25	Interphase 5525 PCI	Efficient	FORE ForeRunner LE for PCs
Mfg. Part No.		ANA-5910EL	32-00	5525	ENI-25p	4402250
US List Price[1]		$199	$295	$222	$249	$295
Cabling	Cat 3-5	Cat 3-5	Cat 3-5	Cat 3-5	Cat 3-5	Cat 3-5
LANE Client	Yes	Yes	Yes	Yes	Yes	Yes
Class of Service	AAL5	AAL5	AAL0, 5	AAL5; UBR Class 0	AAL5, VBR, CBR; UBR con/con-less; ABR (1Q97)	AAL3/4 VBR; AAL5 VBR con-less; AAL null support
PVC	32 VCs	1024 VCs	No	1024 VCs	1024 VCs	990 PVCs
SVC	Yes	Yes	1024 SVCs	Yes	Yes	1024 VCs
MPOA	No	Yes	No	Yes	Planned	No
Classical IP	Yes	Yes	Planned	Yes	Yes	Yes
UNI Version	3.0/3.1	3.0/3.1	3.0/3.1	3.0/3.1	3.0/3.1	3.0
Congestion Control	N/A	N/A	Proprietary; UBR, CBR, VBR	ABR planned	Traffic shaping; Config. Buffers	Buffer size
Warranty	Lifetime	5 years	Lifetime			

1) Prices subject to change.

IBM Interphase 155 PCI Adapter vs. Competition

	IBM Interphase 155 PCI	Adaptec PCI bus ATM 155	Madge Collage 155[2]	Efficient	FORE ForeRunner
Mfg. Part No. **UTP** **MMF**		 ANA-5930 ANA-5940	 32-06/02 32-05/01	 155p-US 155p-MF	 PCA-200EPC/UTP5 PCA-200EPC/OC35CST
US List Price[1] **UTP** **MMF**		 $495 $595	 $995/$495 $1095/$595	 See note 3	 $995 $1195
LANE Client	Yes	Yes	Yes	Yes	Yes
Class of Service	AAL5 UBR Class O	AAL5	AAL0/5, CBR, UBR	AAL5, VBR, CBR, UBR con/con-less	AAL3/4 VBR, AAL5 con-less AAL null support
PVC	1024 VCs	1024 VCs	No	1024 VCs	990 PVCs
SVC	Yes	Yes	1024 SVCs	Yes	1024 VCs
MPOA	Yes	Yes	No	Planned	No
Classical IP	Yes	Yes	Planned	Yes	Yes
UNI Version	3.0/3.1	3.0/3.1	3.0/3.1	3.0/3.1	3.0
Congestion Control	N/A	N/A	Proprietary UBR, CBR, VBR traffic profiling	Traffic shaping Config. Buffers	Buffer size
Warranty	1 year	5 years	Lifetime		

1) Prices subject to change.
2) Madge offers both server and client version of the Collage 155.
3) Below $1,000 to OEMs.

WAN ADAPTERS
Market Information

Background

Remote access to a company's network is becoming increasingly important today, as workers often spend a substantial portion of their time working at home, connecting their home computers to an office network miles away – a phenomenon called telecommuting. Wide Area Networking (WAN) provides the ability to connect these PCs and LANs via telephone communications.

Analog technology and the voice telephone service infrastructure limit analog modems to a maximum speed of 28.8 Kbps. However, today's applications and connections require much higher speed in order to transmit the data required to support the user's needs. Moreover, all of the links in the U.S. Public Switch Telephone Network (PSTN) are digital except for the local connection from each subscriber's home or business to the nearest Central Office. This local link causes noise in phone lines and is incapable of transmitting at high speeds. Most current WAN technology supports higher speeds than 28.8 Kbps and is entirely digital, ensuring more reliable, less noisy connections.

Businesses typically are faced with two types of service offerings for WAN connections:

- **Leased Line.** Provides a dedicated connection for private use; is chosen due to bandwidth needs; is best suited for LAN to LAN or backbone connections; is either analog or digital.
- **Switched (Dial Up) WAN** (ISDN, Switch 56, Switched T1, X.25, Frame Relay, ATM). Analog or digital.

ISDN

Although reaching the limits of modem technology, the analog modem is still the dial-up service most used today in much of the world. ISDN (Integrated Services Digital Network) is positioned to replace the analog/digital telephone system as a primary transmission technology. Although it has experienced a slow start in sales, national ISDN standards have now been established, assuring cross-vendor compatibility for terminal and switching hardware, network connectivity, and operations, administration and maintenance functions.

ISDN is a multi-pipe service capable of carrying voice and data traffic, as opposed to an analog service, which is a single point-to-point channel. With ISDN products, users can connect to their enterprise network and transmit voice, video and data over a digital line. ISDN uses 64 Kbps circuit-switched B (bearer) channels to carry voice and data and a separate D (data) channel to carry control signals via a packet-switched network.

The two types of ISDN service offerings are:

- **Basic Rate Interface (BRI)**. This service includes two 64 Kbps B channels and one 16 Kbps D channel (2B+D), for a total throughput of 144 Kbps.
- **Primary Rate Interface (PRI)**. In North America, this service includes twenty-three 64 Kbps B channels and one 64 Kbps D channel (23B+D), for a total throughput of 1.536 Mbps; it is similar to T1. In Europe, PRI includes 30 B channels and one 64 Kbps D channel (30B+D), similar to European E1 service. PRI is usually used at server sites to handle multiple simultaneous connections with remote users.

Market Trends

The need for higher speeds is driving the wide area network segment of the business. As competition by carriers increases, prices are expected to come down. The ability to link servers back to corporate LANs and provide remote access to LANs will continue to be the primary WAN market for the foreseeable future. Backbone or leased line links will continue to increase in speed to handle the growing LAN traffic. As companies have more and more workers who telecommute, the need for switched access solutions will become critical. Currently 5% of homes in the U.S. have more than one phone line. This number is expected to grow to 35% by the end of the 1990s. With approximately 400 million phone lines currently installed, this projected growth indicates a significant opportunity in the switched WAN business, which is related directly to the growth in the remote LAN access and telecommuting markets.

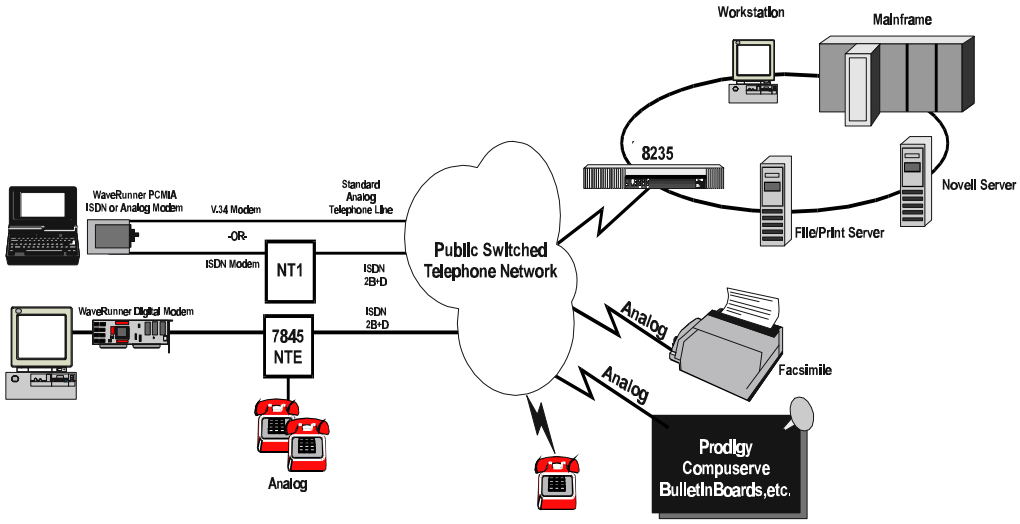
IBM Products

IBM Products Positioning

IBM offers a complete digital and analog Remote LAN access solution as well as leased connection adapters. The following table can classify the adapters and remote access servers:

Function	Product	Type of Connection
Server Adapters	Wide Area Connector	Leased or Switched
Client Adapters	WaveRunner Digital Modem 7845 Network Terminator Extended Wide Area Connector WaveRunner ISDN or Analog Modem 33.6 Data/Fax Modem PCMCIA	ISDN ISDN Leased or Switched ISDN Analog
Remote Access	8235	Analog and ISDN

- **IBM 8235** is a family of hardware-based remote access solutions running as nodes on Token-Ring or Ethernet networks, independent of a PC "host". It supports IP, IPX, SNA and other routable protocols. The 8235 supports Analog 28.8 and ISDN connections with internal integrated cards. The ISDN connections support both 64 and 128 connections to the LAN.



DIGITAL ADAPTERS

WaveRunner Digital Modem

The IBM WaveRunner is an internal adapter that allows a PC or PS/2 to communicate with ISDN Data Terminal Equipment (DTE) at speeds up to 128 Kbps. It comes in full-size versions for ISA buses and in a PCMCIA version. All of the full size versions support Windows 3.1 and Windows 95, or OS/2 2.1 or higher. All models attach to ISDN Basic Rate Interface telephone service lines. In addition, the PCMCIA model can also attach to analog "Plain Old Telephone Service" lines. With the PCMCIA model, the user would most likely use the ISDN functions when available and the analog functions in situations when an ISDN line is not available, such as in a hotel room. The features of the three WaveRunner models include:

- **Standards-based**. The WaveRunner will communicate with other V.120 ISDN adapters (regardless of vendor) over ISDN at digital speeds up to 64 Kbps on 1 B channel and up to 128 Kbps on 2 B channels.

- **Modem/fax emulation**. In addition to its ISDN capability, the WaveRunner can interoperate with analog modems and G3 fax equipment over ISDN. This feature provides the user with the flexibility to experience the speed and reliability of ISDN with other ISDN devices while retaining interoperability with existing analog and fax equipment.

- **Digital Signal Processor**. Based on the Mwave (from IBM Microelectronics) Digital Signal Processor, the WaveRunner's functions are primarily software-based rather than hardware-based. This means that additional functionality can be gained by software updates, preserving the customer's investment.

- **Com Port Emulation**. The WaveRunner functions as a standard com/serial port at speeds up to 64 Kbps over ISDN. This exclusive function allows existing communications packages to enjoy the speed and reliability of ISDN. Using com port accelerators maximizes the throughput of com/serial port applications.

- **Auto-Sensing Modem/Digital Selection**. WaveRunner automatically interprets incoming D (signaling) channel messages to select analog or digital transmission mode for incoming calls

- **TCP/IP Support**. WaveRunner supports the TCP/IP Serial Line Internet Protocol (SLIP) and will work with commonly available TCP/IP packages. You can also use the Microsoft ISDN acceleration package to perform standards-based PPP and MLP connections with the WaveRunner. The combination of WaveRunner and standards-based connections will allow connections to many Internet Service Providers at 64 Kbps or 128 Kbps.

- **Fax Emulation**. The WaveRunner supports the exchange of standard Group III facsimile with fax machines connected to analog lines. It also includes Trio DataFAX Lite software for Windows that allows users to send and receive faxes directly through the WaveRunner adapter. WaveRunner also supports the CLASS II fax interface used by other popular fax programs.

- **Windows 95**. Take advantage of native ISDN support in Windows 95 to access the Web or dial-up networking for remote access. WaveRunner support of Windows 95 features make Web access and telecommuting seamless over ISDN at four times the speed of analog modems.

Note: Refer to the December 1, 1994 announcement about software enhancements. Free software upgrades are available via the IBM PC Company BBS ((919) 517-0001). For the latest product announcements the ISDN product Web page is:

http//www.networking.ibm.com/wav/waveprod.html.

The WaveRunner's competitive advantage is its ability to interoperate with other ISDN devices using commonly available communications packages while retaining the ability to continue operating with existing analog modem or fax destinations. Customers already using modems and standard modem packages can move to ISDN's speed and reliability for remote LAN access while still using the same communications packages and be able to communicate with the same analog and fax destinations.

Another competitive advantage is the Digital Signal Processor, which is software upgradable. Free software enhancements are made available to current WaveRunner customers via the IBM PC Company BBS or IBM's Internet FTP site. Most other competitive products are hardware-based. By providing updates in software, IBM protects the user's investment in hardware.

7845 Network Terminator Extended

Every ISDN BRI line requires a Network Terminator to connect the ISDN customer premise's equipment (whether it be a data adapter or an ISDN phone) to the ISDN service line from the telephone company. IBM's 7845 Network Terminator Extended is such a product and more. The 7845 is another unique and exclusive IBM product. In addition to functioning as a standard network terminator, it can also be configured to support an ISDN adapter such as WaveRunner on one B channel, while supporting a standard analog phone (or a whole house full of phones) on the other B channel. With the 7845, a single ISDN line can provide the business voice services and data capabilities required by telecommuters, while leaving the family's current analog phone service intact.

The 7845 is configured using an attached analog phone. It provides standard analog support as well as a number of custom calling features such as speed dialing, redial, call hold/return, call retrieve, call waiting and conference calling. The 7845 also comes with a rechargeable battery so that phone service continues via the ISDN line during a power outage.

Wide Area Connector

The IBM Wide Area Connector (WAC) is not an ISDN card but it can be a Switched 56 card and is fully supported by LAN Distance, OS/2 Communications Manager, and RxR/2. Therefore, it is a Switched 56 alternative to ISDN for Remote LAN Access customers. The WAC card is used in many applications as a leased line connection providing links between host and remote sites.

The WAC is a high-speed, protocol-independent, ISA serial communications adapter. A single port PCI WAC version is available and supports Windows NT using Microsoft Backoffice or Communications Server on NT.

- **Ports**. One port can support speeds up to 2.048 Mbps while the other can simultaneously support speeds up to 64 Kbps on leased connections. Both ports are capable of supporting up to 56 Kbps on switched connections. The WAC PCI adapter is a single port card supporting speeds up to 64 Kbps.
- **Interchangeable, Industry-Standard Interfaces**. The dual port concept is implemented using removable and interchangeable Electrical Interface Boards, one for each port. Four standard connection types are provided:
  - V.35, supporting speeds of 56 Kbps to 2.048 Mbps
  - X.21, also supporting speeds of 56 Kbps to 2.048 Mbps
  - RS442/449, for speeds of 56 Kbps to 1.544 Mbps
  - RS232, supporting speeds up to 19.2 Kbps

  Any two can be plugged into the WAC base card.
- **Device Drivers**. WAC provides a MAC-level NDIS driver for OS/2 and DOS Windows NT support.
- **IBM Software Supported**. In addition to LAN Distance, WAC is supported by the RouteXpander family, Comm Manager/2, TCP/IP for OS/2, Communications Server for OS/2 and NT.
- **Typical Applications.** WAC and CM/2 are used by banks to link branch offices; by retail stores for inventory management between outlets; and by insurance, particularly health care, for linking database servers.

33.6 Data/Fax Modem

This PCMCIA modem offers state of the art technology. The modem comes with an integrated DDA, which allows for a very lightweight cable. The cable also has a patented half-moon locking connector for durable and secure connections to the PCMCIA card. The modem currently ships with QuicklinkII fax software from SmithMicro and IBM's Global Networks Internet Access package, which includes the Netscape 2.0 browser. The modem has cellular kits (sold separately) available for many of the popular phone models available today. For more information, see IBM's modem home page at http://www.raleigh.ibm.com/mod/modprod.html.

Part Options

Description	Part Options
WaveRunner Digital Modem	ISA bus or PCMCIA
7845 Network Terminator Extended	
WaveRunner Digital Modem - and 7845 Network Terminator Extended	ISA bus or PCMCIA
Wide Area Connector v.35 x.21 RS422 RS232	 ISA or PCI

Sales Strategies

Sales Strategy

WAN products are best sold as solutions. WAN adapters, software and hardware should be sold as solutions for the particular needs of an I/S or network manager. To meet a customers' needs you first have to understand their basic WAN requirements. Do they need to connect servers to the backbone network? Do they have remote offices or workers that need to have access to applications on the server or host system? Based on this information, you can position IBM solutions that will best meet the needs of the customer. Always keep in mind that WAN services carry a monthly fee and the solution that can best demonstrate efficient use of this bandwidth will win with the customer.

Target Customers

For WAN adapter sales, you might have several points of entry into an account. The network manager or administrator is a good prospect for WAN adapter sales since users look to him/her to solve remote access problems.

Another prospect might be the operational manager or vice president over the function that has workers engaged in telecommuting. For instance, if salespeople in a company often work out of their houses, you could call on the vice-president of sales. He/she would be receptive to the productivity improvements that IBM's WAN products could offer.

Target Environments

The most important point about WAN solutions is their ability to bridge across many vertical markets, from Insurance to Banking. The need to link remote offices, remote workers or connect servers to backbones are solutions constantly needed by IS and network managers. Applications that can use ISDN links include database access, printer sharing, e-mail, and other productivity programs available to networks. IS and network managers will be familiar with monthly WAN (Analog, ISDN, Leased Line, etc.) charges and will make buying decisions based on the solution's overall benefit to the company.

Selling Points

The emphasis here is to demonstrate the innerworking of the WAN adapters as part of the solution to meet the customer's WAN needs. The points below can help you position our solutions:

- **Technology** — IBM is a technology leader committed to continued investment in WAN solutions. The enhancement of the 8235 to provide industry standard ISDN connections to the LAN, the award-winning WaveRunner ISDN or analog modem, and other state-of-the-art analog modem products are examples of this commitment.

- **Flexibility** — IBM's WAN products offer remote users unparalleled flexibility and options. The need to connect analog equipment and digital equipment to an ISDN line and the ability to connect to services at the office while at home or on the road were important factors in the development of the 8235, WaveRunner products, and 7845 Network Terminator Extended.

- **Customer Support** — IBM offers a full range of customer support activities, such as updates on new products via FAX from IBM, CompuServe or IBMLink, 800 support, consulting services, a bulletin board to download new drivers, and integration services and support. This wealth of services has made IBM the leader in customer support.

- **Investment Protection** — IBM's WAN solutions are designed to protect a customer's existing investment while permitting the customer to expand as needed. Its ISDN products are designed to maintain connectivity with analog services and equipment, and the 8235 has the capability to increase from analog speeds up to ISDN.

- **Cost Reduction/Productivity** — From monthly charges to increased productivity, WAN solutions have been developed for the customer to get the best use of their WAN services. ISDN means two things to most customers: faster connect times and higher transmission speeds. This translates directly into time saved and increased productivity, which means money saved for the customer.

- **Breadth of Products** — IBM offers a total networking systems solution. In addition to adapters, it offers a complete line of ISDN products. IBM also supports all major LAN technologies, including Ethernet, Token-Ring, FDDI and ATM as well as wireless technologies.

- **Quality** — IBM is committed to quality in all of its products. It backs up its commitment to quality with a one-year warranty on its WAN adapters and a five-year warranty on its PCMCIA WaveRunner.

Sales Tools

IBM provides a broad range of selling tools to assist you in your sales efforts with network adapters. These tools include marketing deliverables, collateral materials, special bid programs, loaner programs and presale hotline support. Please refer to the *Sales Tools* unit, later in this guide, for complete information on the sales support available for WAN adapters.

Q's and A's

To facilitate your sales efforts, IBM has provided answers to some commonly asked customer questions regarding WAN adapters.

Q) Why is remote LAN access such a significant portion of WAN business?
A) The mobile workforce is something many companies are now dealing with, either because of real estate considerations or government regulations (for example, the Clean Air Act).

Q) Why would I consider ISDN for a small home office or for a remote worker?
A) ISDN offers fast connect times and faster line speeds and also offers multiple channels over the same service. This allows you to continue to have a data connection at 64 Kbps and have an independent voice call on the other channel.

Q) Why doesn't IBM include the NT1 function with its WaveRunner?
A) The NT1 offered by IBM is much more than a standard NT1. Most people do not realize that once the NT1 is put on a PC card, use of the ISDN line is lost when the PC is turned off. The IBM 7845 Network Terminator Extended allows the user to maintain use of the ISDN line even if the PC is turned off.

Q) Does the WaveRunner support the Hayes Command Set?
A) Yes.

Q) Does the IBM WaveRunner Digital Modem attach only to ISDN lines?
A) The full size versions of the WaveRunner attach only to an ISDN Basic Rate Interface line. The PCMCIA version of the WaveRunner attaches to either an ISDN BRI line or an analog line.

SALES TOOLS

IBM provides a broad range of selling tools to assist you in your sales efforts with network adapters.

Canada Support

The phone numbers listed in this section are for United States services only. For IBM Direct in Canada, call (800) 465-7999 or call the IBM HelpFax at (800) 465-3299 and request document number 35132.

Collateral Material

The following marketing brochures and collateral materials are available.

- **Spec. Sheets.** Available from Mechanicsburg or by fax are the following:

LANStreamer Adapters - PCI and MC	G2213632-03
Token-Ring 16/4 Shared RAM Family	G2214004-03
Credit Card Adapter Family	G2213456-01
Ethernet LAN Adapters	G2214074-01
Turboways 100 ATM Adapter	G2214150-00
ISDN Primary Rate Adapter	G2214145-00
WaveRunner Digital Modem	G2213906-00
Wide Area Connector	G2214198-00
7845 ISDN NT-Extended	G2214199-00
9741 High-Speed Inverse Multiplexer	GX27-3955
IBM Token-Ring Adapters (flyer)	
IBM Ethernet Adapters (flyer)	
IBM ATM Adapters (flyer)	
IBM Adapter Family Executive Presentation	

To obtain these by fax call (800)-IBM4FAX or (800) 426-3395.

- **Presentations.** The Campus Networking Products presentation is available on MKTTOOLS (CN PROD). There is also a WaveRunner Digital Modem presentation available on MKTTOOLS (WAVERUNN).

- **Performance Information.** Performance information is available on the following products on MKTTOOLS:

Token-Ring Adapters	LANTPERF
Token-Ring Micro Channel Adapters	LANPERF
Credit Card Adapters	LANCPERF

- **General Information**. Information on other topics of interest is available on MKTTOOLS:

Cabling Guidelines	LANCABLE
Notebooks tested with credit card adapters	LANNOTEB
Positioning information for adapters	LANPOS

Loaner Program

If your customer would like to obtain adapters for evaluation, IBM offers a loaner program. Call (919) 543-6665 for further information.

Special Bid IBM offers a special bid process to assist in large adapter opportunities. For aggregators, regionals and distributors, a new "meets competition" program and process has been established for order quantities of 100-1999. For more information, contact your IBM rep.

For IBM salespeople, the special bid process is available for order quantities of 100+ (any LAN adapter can be aggregated to meet quantity requirement). The PC Company Area Opportunity Manager must certify. To participate in the program, select one of the following AEFORMS:

- BIDS01 for announced or customized bids
- BIDS02 for unannounced or customized bids. Instructions for submission are included on the form. Use multipack 5- or 30-pack part numbers when submitting.

Pre-Sale Support The PC Pre-Sale Support Center is open from 9:00 am E.S.T. to 9:00 pm E.S.T. to assist you with your sales efforts. Call (800) 426-7299.

Friends from the Factory Tour IBM adapter developers are available to assist with your selling efforts. Through the Friends from the Factory Tour, they offer presentations on products and directions as well as personal discussions with customers or customer advocates. For more information, call (919) 543-1925.

Newsletter The LAN Screamer is a quarterly newsletter with the latest development information about IBM network adapters and related products. It provides information about fax-back services available on the IBM Personal Computer Company Automatic Fax System, (800) IBM-3395.

LAN Support Technical support is available to you and your customers, 24 hours per day, 7 days per week through IBM's LAN support hotline, (800) 426-7299.

ISDN Support Technical support is available for ISDN products by calling the ISDN Support Line at (919) 254-4736.

NHD Pre-Marketing Support Face to face contact with customers, to assist in your sales efforts.

Compatibility Guide To identify hardware and software compatibilities for IBM network adapters, refer to the IBM Features and Options Guide which was distributed to all dealers. For additional copies of this guide, please call (919) 543-8173.

PC Product Guide The IBM PC Product Guide is available from the IBM PC Company.

Promotions IBM continually offers advertising and special promotions that involve network adapters. For current information on sales incentive programs, contact your authorized reseller.

Customer Input	Customers are encouraged to contact IBM with their reactions to and suggestions for adapter products. Through the Your Voice Counts Market Research program, customers can call (800) 426-0017 to participate.
Networking Center	Wide variety of customized customer programs to meet your needs.

NETeam
IBM's Innovative Remarketer Program

NETeam is a program that provides exclusive support and information tools for remarketers of IBM Networking products. Offered at no cost or obligation to participants, this program, a partnership between IBM and its remarketers, makes businesses more competitive and, hence, more valuable to their customers.

Features

NETeam gives its members timely, easy access to technical and non-technical information on topics ranging from IBM networking hardware products to marketing techniques, plus information on other IBM information resources:

- **Monthly NETeam Mailings.** CD-ROMs, videos, white papers and more.
- **Priority Technical Support Access.** Immediate technical information via an exclusive, dedicated toll-free line.
- **Special Product Previews.** An early look (even before customer pre-announcements) at new IBM network hardware products and future product strategies.
- **Exclusive NETeam teleconferences and events.** Remarketers and IBM personnel discuss new products, business strategies, and more.
- **IBM Business Partner Conference Participation.**
- **IBM Fax-Back System & World Wide Web sites**. Provide links to IBM and NETeam information.

NETeam also features business, marketing and technical support benefits:

- **Active Sales Leads.** Pre- and Post-Sale support, including joint sales calls.
- **Dedicated Account Managers and Technical Support Personnel.**
- **Competitive Market Intelligence.** IBM helps NETeam members assess the selling strengths of IBM versus competitive offerings.
- **Lead-Generation and Closing Tools.** Includes advertising and marketing collateral materials, event and trade show support, bid proposal assistance, promotional kits, and presentation materials.
- **NETeam Conferences, Remarketer Campaigns and Events.** Designed to broaden a company's business expertise.
- **Access to Loaner Equipment and Demo Products.**
- **Technical Training.** Hands-on teaching of product-specific subject matter.
- **NETeam Certification Program.** A new, multi-tiered program providing both individual and company-focused benefits.
- **Non-technical education.** Sales and marketing information to help companies increase their IBM networking hardware business.

Companies may call IBM at (800) 426-7472 to request an application to become a member of NETeam.

GLOSSARY

Access Point A network component that provides connectivity between a wireless LAN and a wired LAN. See also 'Base Station'.

Analog A network in which the information is encoded as a continuously varying wave.

ANSI American National Standards Institute. Standards-setting organization founded in 1918.

AnyLAN A proposed high-speed local area network for which Hewlett-Packard Co. and IBM have created the specifications.

ARDIS Nationwide packet-radio network providing two-way data communications. It provides host connectivity, connectivity to third-party information services and e-mail and messaging services.

ATM Asynchronous Transfer Mode. A fast, cell-switched technology based on a fixed-length 53-byte cell. All broadband transmissions (whether audio, data, imaging or video) are divided into a series of cells and routed across an ATM network consisting of links connected by ATM switches. Each ATM link comprises a constant stream of ATM cell slots into which transmissions are placed or left idle, if unused.

Auto Speed The adapter automatically determines and sets the correct Token-Ring speed.

Base Station The controller for a wireless cell, often serving as an access point to a fixed (wired) network which relays traffic among the members of the cell. Base stations are used in hub-oriented wireless LANs and in wireless WANs, such as cellular telephone networks and packet-radio networks.

BRI The Basic Rate Interface (BRI) in ISDN. A single ISDN circuit divided into two 64 Kbps digital channels for voice or data and one 16 Kbps channel for low speed data (up to 9,600 baud) and signaling. In ISDN 2B+D is known as the Basic Rate Interface.

Busmaster A performance-boosting technique in which a device borrows control of the system bus to handle data transfer without involving the PC's processor.

CDPD Cellular Digital Packet Data. An overlay network providing packet data transmission over an analog cellular (AMPS) infrastructure. Data is transmitted between conversations or through unused voice channels.

Cell The geographic unit forming the basis of a cellular system. Cells vary greatly in size, from a few meters for some wireless LANs to hundreds of kilometers for some satellite systems. Use of smaller cells can increase system capacity roughly proportionately to the square of the cell radius.

Cellular System A system that reuses scarce radio spectrum on a geographic basis to provide a radio communication service. An area is divided into partially overlapping cells, each with a base station. The base stations are typically connected via a wired network. Connections can be handed off to adjacent cells to maintain connectivity as a user moves.

Coprocessor A secondary processor used to speed up operations by handling some of the workload of the main CPU.

CSMA/CA Carrier Sense Multiple Access/Collision Avoidance. A scheme for multiple users (usually Ethernet) to share a common channel. Nodes contend for access by listening before transmission (carrier sense). If collisions occur, further collisions are avoided through the use of random-backoff times before transmission.

Digital A network in which the information is encoded as a series of ones and zeros rather than as a continuing wave (analog).

DMA Direct Memory Access is a technique in which an adapter bypasses a computer's CPU, and handles the transfer of data between itself and the system's memory directly.

DAS Dual Attaching Station. The FDDI configuration that can attach to both the primary and secondary rings of FDDI.

EISA Extended Industry Standard Architecture. The PC bus standard that extends the AT bus (ISA bus) to 32 bits and provides busmastering. It was announced in 1988 as a 32-bit alternative to the Micro Channel that would preserve investment in existing boards. PC and AT cards (ISA cards) can plug into an EISA slot.

Ethernet Local area network connecting up to 1,024 nodes in a bus topology at 10 Mbps over twisted pair, coax and optical fiber.

Fast Ethernet Emerging standards for Ethernet at 100 Mbps.

FDDI Fiber Distributed Data Interface. ANSI standard token passing network that uses optical fiber cabling and transmits at 100 Mbps up to two kilometers.

Flash Memory Memory chip that holds its content without power but must be erased in fixed blocks rather than single bytes.

Full-Duplex	Full-duplex enabled adapters allow stations to transmit and receive at the same time, doubling their bandwidth potential.
Hub	A physical layer device for the concentration of wiring media for either homogeneous or heterogeneous LAN types.
IPX	Internet Packet Exchange. A Novell NetWare transport protocol that is used with NetWare SPX (Sequenced Packet Exchange).
ISA	Industry Standard Architecture. Expansion bus commonly used in PCs. It accepts the plug-in boards that control the video display, disks and other peripherals. The majority of PC expansion boards on the market are ISA boards. ISA was originally called the AT bus.
ISDN	Integrated Services Digital Network. International telecommunications standard for transmitting voice, video and data over a digital line. It uses 64 Kbps circuit-switched B (Bearer) channels to carry voice and data and uses a separate D (Data) channel to carry control signals via a packet-switched network.
ISO	International Standards Organization. A standards-setting body founded in 1946 and headquartered in Geneva.
MC	Micro Channel. Also known as MCA (Micro Channel Architecture), it is an IBM 32-bit bus used in most PS/2s, the RS/6000 series and certain ES/9370 models. MCA boards are not interchangeable with ISA and EISA boards.
NDIS	Network Driver Interface Spec. Microsoft specification for hardware-independent drivers at the data link (media access control) layer. When transport protocols are written to NDIS, network adapters with NDIS-compliant MAC drivers can be freely interchanged.
NetBIOS	Commonly-used network protocol for PC local area networks, introduced with IBM's PC Network and implemented in Microsoft's MS-Net and LAN Manager. Application programs access NetBIOS to transfer files and provide client/server interaction.
NOS	Network Operating System.
NSA	Term used with FDDI networks meaning "Next Station Addressing".
ODI	Open Data-Link Interface. Common interface for network drivers developed by Novell. It allows multiple transport protocols to run on one network adapter.
Packet Radio	The application of packet technology to radio links. This allows sharing channels between multiple users, which is more cost effective for many data applications.

PCI Peripheral Component Interconnect. Local bus for PCs from Intel that provides a high-speed data path between the CPU and up to 10 peripherals (video, disk, network, etc.). The PCI bus coexists in the PC with the ISA or EISA bus. ISA and EISA boards still plug into an ISA or EISA slot, while high-speed PCI controllers plug into a PCI slot.

PCMCIA Personal Computer Memory Card International Association. Standardized credit-card size packages for memory and I/O (modems, LAN cards, etc.) for computers, laptops, palmtops, etc. There are three standards for PCMCIA cards -- Types 1, 2 and 3.

PVC Permanent Virtual Circuit. A virtual circuit that provides the equivalent of a dedicated private line service over a packet switching network between two DTEs.

Plug & Play Hardware and software that dynamically configure resources and eliminate user intervention during installation process.

RPL Remote Program Load. Also known as Remote Initial Program Load. RPL makes it easy to update, control and maintain consistent Initial Program Load (IPL) levels across the LAN.

PRI Primary Rate Interface in ISDN . In North America, it includes 23 B channels and one 64 Kbps D channel (23B+D), equivalent to T1. In Europe, it includes 30 B channels and one 64 Kbps D channel (30B+D), equivalent to European E1 service.

RAM Mobile Data Natural two-way packet radio network using the Mobitex architecture. RAM Mobile Data provides host connectivity, connectivity to third-party information services, and broad e-mail connectivity.

SAR Cell segmentation and reassembly.

SAS Single-attaching stations. FDDI stations can be configured as Single-Attached Stations (SAS) connected to concentrators.

Shared RAM Shared Memory. Adapter with on-board memory and requiring use of system CPU.

SNMP Simple Network Management Protocol. The protocol governing network management and monitoring of network devices and their functions. SNMP came out of the TCP/IP environment.

Spread Spectrum Frequency-Hopping A technique for signaling whereby the available spectrum is divided into a large number of bands, and users, or groups of users, "hop" from band to band in rapid sequence. This synchronized hopping creates logical communication channels. Interference between groups is minimized through the use of orthogonal codes, which are hopping patterns that minimize the number of times two groups will be in the same band at the same time.

STP Shielded Twisted Pair. Telephone wire wrapped in a metal sheath to eliminate external interference.

SVC Switched Virtual Circuit. A connection across a network. It is established on an as-needed basis and can provide connection to any other user in the network.

TCP/IP Transmission Control Protocol/Internet Protocol. Communications protocols developed under contract from the U.S. Department of Defense to internetwork dissimilar systems. It is a de facto UNIX standard, but is supported on almost all systems.

TDMA Time Division Multiple Access. An access architecture in which a channel is subdivided into multiple time slots. Pure TDMA systems create multiple logical channels by assigning the logical channels to regularly occurring time slots. TDMA is one of the technologies being used by second-generation, digital cellular telephone services in the US.

Token-Ring A LAN technology pioneered by IBM in the 1980s. Originally a ring, this type of local area network now commonly uses a star topology in which all of the workstations connect to a central wiring hub (or concentrator). Tokens are passed to each of up to 255 workstations in a sequential, ring-like sequence. It is defined by the IEEE 802.5 standard.

UTP Unshielded Twisted Pair. A cable medium with one or more pairs of twisted insulated copper conductors bound in a single plastic sheath.

WAN Wide Area Network. A data network typically extending a LAN (local area network) outside the building, over telephone common carrier lines to link to other LANs in remote buildings in possibly remote cities.

10BASE-T This type of Ethernet network uses a star topology with unshielded twisted pair cable. 10BASE-T is used for single, point-to-point connections between a computer and a hub or repeater.

10BASE2 This type of Ethernet uses a bus topology with thin coaxial cable. It is generally used for small networks, departmental networks or wiring a number of nodes together in the same room.

10BASE5 This type of Ethernet uses the bus topology with thick coaxial cable.

100BASE-TX This type of Ethernet network transmits at 100 Mbps over 2 pairs of category 5 UTP cable.

100 BASE-T4 This type of network transmits at 100 Mbps over 4 pairs of category 3 UTP cable.

100BASE-VG A joint Hewlett-Packard/AT&T proposal for fast-Ethernet running at 100 million bits per second. It would use all four pairs using Category 5 cabling in the 10BASE-T twisted pair wiring scheme to transmit or receive, rather than today's present system of using one pair to transmit and one pair to receive.

APPENDIX
LAN Adapter Driver/OS Certification Information

PCI Token-Ring

Notes: *IMPORTANT! Just because a driver is not certified does not mean that it is not supported by IBM!
*The latest drivers are available at http://www.networking.ibm.com/nes/neshome.html.

NOS	Driver	Cert?	Cert Date	Bulletin	On CD?	Notes
Windows 95 GA/OSR2	IBMTRP.VXD NDIS 3.0 Full MAC	In Plan	In Plan	In Plan	No	None
Windows 95 OSR2	See Note NDIS 4.0 Miniport	N/A	N/A	N/A	N/A	M1
Windows 97	In Plan NDIS 4.0 Miniport	In Plan	In Plan	In Plan	No	None
Windows NT 4.0	**IBMTRP.SYS** NDIS 3.0 Full MAC	**Yes**	**8/14/96**	**3763**	No	None
Windows NT 4.0	In Plan NDIS 4.0 Miniport	In Plan	In Plan	In Plan	No	None
Windows NT 3.51	IBMTRP.SYS NDIS 3.0 Full MAC	No	None	None	No	None
Windows for Workgroups 3.11	IBMTRP.386 NDIS 3.0 Full MAC	N/A	N/A	N/A	No	None
NetWare 4.10	**IBMTRPO.LAN** ODI	**Yes**	**12/1/96**	**L4634**	**No**	**None**
NetWare 4.11	**IBMTRPO.LAN** ODI	**Yes**	**12/1/96**	**L4634**	**No**	**N4**
NetWare 4.11 SFTIII	**IBMTRPO.LAN** ODI	**Yes**	**12/1/96**	**L4634**	**No**	**N4**
NetWare 3.12	**IBMTRPO.LAN** ODI	**Yes**	**12/1/96**	**L4634**	**No**	**None**
NetWare 4.10 SFTIII	**IBMTRPO.LAN** ODI	**Yes**	**8/1/96**	**L4040**	**No**	**None**
Client32 NIOS for Win95	**IBMTRPO.LAN** ODI	**Yes**	**12/1/96**	**L4634**	**No**	**N4, N5**
Client32 NIOS for Win3.1	**IBMTRPO.LAN** ODI	**Yes**	**12/1/96**	**L4634**	**No**	**N4, N5**
Client32 NIOS for DOS	**IBMTRPO.LAN** ODI	**Yes**	**12/1/96**	**L4634**	**No**	**N4, N5**
OS/2 ODI (NetWare 4.10)	**IBMTRPO.SYS** ODI	**Yes**	**8/1/96**	**L4041**	**No**	**None**
OS/2 ODI (NetWare 4.11)	**IBMTRPO.SYS** ODI	**Yes**	**10/1/96**	**L4374**	**Yes**	**N5**
DOS ODI (NetWare 4.10)	**IBMTRPO.EXE** ODI	**Yes**	**10/1/96**	**L4516**	**No**	**None**
DOS ODI (NetWare 4.11)	None ODI	N/A	N/A	N/A	N/A	None
IBM OS/2 Warp Server SMP 4.0	IBMTRP.OS2 NDIS 2.0	N/A	N/A	N/A	No	None
IBM OS/2 Warp 4.0	IBMTRP.OS2 NDIS 2.0	N/A	N/A	N/A	No	None
IBM DOS NDIS2 Client	IBMTRP.DOS NDIS 2.0	N/A	N/A	N/A	N/A	None

Auto LANStreamer PCI

Notes: *IMPORTANT! Just because a driver is not certified does not mean that it is not supported by IBM!
*The latest drivers are available at http://www.networking.ibm.com/nes/neshome.html.

NOS	Driver	Cert?	Cert Date	Bulletin	On CD?	Notes
Windows 95 GA/OSR2	**STREAMER.VXD** NDIS 3.0 Full MAC	**Yes**	**9/15/95**	**1659**	**No**	**None**
Windows 95 OSR2	See Notes NDIS 4.0 Miniport	N/A	N/A	N/A	N/A	M1
Windows 97	In Plan NDIS 4.0 Miniport	In Pan	In Plan	In Plan	In Plan	None
Windows NT 4.0	**STREAMER.SYS** NDIS 3.0 Full MAC	**Yes**			**Yes**	**M7**
Windows NT 4.0	In Plan NDIS 4.0 Miniport	In Plan	In Plan	In Plan	Yes	None
Windows NT 3.51	**STREAMER.SYS** NDIS 3.0 Full MAC	**Yes**	**10/5/95**	**473**	**Yes**	**None**
Windows for Workgroups 3.11	STREAMER.386 NDIS 3.0 Full MAC	N/A	N/A	N/A	No	None
NetWare 4.10	**IBMMPCO.LAN** ODI	**Yes**	**10/1/96**	**L4547**	**No**	**None**
NetWare 4.11	**IBMMPCO.LAN** ODI	**Yes**	**10/1/96**	**L4546**	**Yes**	**None**
NetWare 4.11 SFTIII	**IBMMPCO.LAN** ODI	**Yes**	**10/1/96**	**L4547**	**Yes**	**None**
NetWare 3.12	**IBMMPCO.LAN** ODI	**Yes**	**10/1/96**	**L4547**	**No**	**None**
NetWare 4.10 SFTIII	**IBMMPCO.LAN** ODI	**Yes**	**10/1/96**	**See Note**	**No**	**N2**
NetWare 4.10 for OS/2	**IBMMPCO.LAN** ODI	**Yes**	**2/1/96**	**L3642**	**No**	**None**
Client32 NIOS for Win95	**IBMMPCO.LAN** ODI	**Yes**	**10/1/96**	**L4546**	**Yes**	**N5**
Client32 NIOS for Win3.1	**IBMMPCO.LAN** ODI	**Yes**	**10/1/96**	**L4546**	**Yes**	**N5**
Client32 NIOS for DOS	**IBMMPCO.LAN** ODI	**Yes**	**10/1/96**	**L4546**	**Yes**	**N5**
OS/2 ODI (NetWare 4.10)	None ODI	N/A	N/A	N/A	N/A	None
OS/2 ODI (NetWare 4.11)	In Plan ODI	In Plan	In Plan	In Plan	No	None
DOS ODI (NetWare 4.10)	**IBMMPCO.COM** ODI	**Yes**	**11/1/95**	**L3388**	**No**	**N1**
DOS ODI (NetWare 4.11)	**IBMMPCO.COM** ODI	**Yes**	**10/1/96**	**L4367**	**Yes**	**N5**
IBM OS/2 Warp Server SMP 4.0	IBMMPC.OS2 NDIS 2.0	N/A	N/A	N/A	No	None
IBM OS/2 Warp 4.0	IBMMPC.OS2 NDIS 2.0	N/A	N/A	N/A	No	None
IBM DOS NDIS2 Client	IBMMPC.DOS NDIS 2.0	N/A	N/A	N/A	N/A	None

Turbo 16/4 Token-Ring ISA

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NOS	Driver	Cert?	Cert Date	Bulletin	On CD?	Notes
Windows 95 GA/OSR2	IBMTOK5.VXD NDIS 3.0 Full MAC	In Plan	In Plan	In Plan	No	None
Windows 95 OSR2	See Note NDIS 4.0 Miniport	N/A	N/A	N/A	N/A	M1
Windows 97	In Plan NDIS 4.0 Miniport	In Plan	In Plan	In Plan	Yes	None
Windows NT 4.0	IBMTOK5.SYS NDIS 3.0 Full MAC	In Plan	In Plan	In Plan	No	None
Windows NT 4.0	In Plan NDIS 4.0 Miniport	In Plan	In Plan	In Plan	No	None
Windows NT 3.51	IBMTOK5.SYS NDIS 3.0 Full MAC	No	None	None	No	None
Windows for Workgroups 3.11	IBMTOK5.386 NDIS 3.0 Full MAC	N/A	N/A	N/A	No	None
NetWare 4.10	**TOKEN.LAN** ODI	**Yes**	**10/1/96**	**L4526**	**No**	**None**
NetWare 4.11	**TOKEN.LAN** ODI	**Yes**	**2/1/97**	**L4834**	**No**	**None**
NetWare 4.11 SFTIII	**TOKEN.LAN** ODI	**Yes**	**2/1/97**	**L4834**	**No**	**None**
NetWare 3.12	**TOKEN.LAN** ODI	**Yes**	**10/1/96**	**L4526**	**No**	**None**
NetWare 4.10 SFTIII	**TOKEN.LAN** ODI	**Yes**	**10/1/96**	**L4526**	**No**	**None**
Client32 NIOS for Win95	**TOKEN.LAN** ODI	**Yes**	**10/1/96**	**L4526**	**No**	**None**
Client32 NIOS for Win3.1	**TOKEN.LAN** ODI	**Yes**	**10/1/96**	**L4526**	**No**	**None**
Client32 NIOS for DOS	**TOKEN.LAN** ODI	**Yes**	**10/1/96**	**L4526**	**No**	**None**
OS/2 ODI (NetWare 4.10)	**TOKEN.LAN** ODI	**Yes**	**8/1/96**	**L4082**	**No**	**None**
OS/2 ODI (NetWare 4.11)	None ODI	N/A	N/A	N/A	N/A	None
DOS ODI (NetWare 4.10)	**TOKEN.COM** ODI	**Yes**	**9/1/96**	**L4096**	**No**	**None**
DOS ODI (NetWare 4.11)	**TOKEN.COM** ODI	**Yes**	**10/1/96**	**L4368**	**Yes**	**N5**
IBM OS/2 Warp Server SMP 4.0	IBMTOK.OS2 NDIS 2.0	N/A	N/A	N/A	No	None
IBM OS/2 Warp 4.0	IBMTOK.OS2 NDIS 2.0	N/A	N/A	N/A	No	None
IBM DOS NDIS2 Client	IBMTOK.DOS NDIS 2.0	N/A	N/A	N/A	N/A	None

Auto 16/4 Token-Ring ISA WoL

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NOS	Driver	Cert?	Cert Date	Bulletin	On CD?	Notes
Windows 95 GA/OSR2	IBMTOK5.VXD NDIS 3.0 Full MAC	In Plan	In Plan	In Plan	No	None
Windows 95 OSR2	See Note NDIS 4.0 Miniport	N/A	N/A	N/A	N/A	M1
Windows 97	In Plan NDIS 4.0 Miniport	In Plan	In Plan	In Plan	In Plan	None
Windows NT 4.0	IBMTOK5.SYS NDIS 3.0 Full MAC	In Plan	In Plan	In Plan	No	None
Windows NT 4.0	In Plan NDIS 4.0 Miniport	In Plan	In Plan	In Plan	No	None
Windows NT 3.51	IBMTOK5.SYS NDIS 3.0 Full MAC	No	None	None	No	None
Windows for Workgroups 3.11	IBMTOK5.386 NDIS 3.0 Full MAC	N/A	N/A	N/A	No	None
NetWare 4.10	**TOKEN.LAN** ODI	**Yes**	**11/1/96**	**L4579**	**No**	**None**
NetWare 4.11	None ODI	N/A	N/A	N/A	N/A	None
NetWare 4.11 SFTIII	None ODI	N/A	N/A	N/A	N/A	None
NetWare 3.12	**TOKEN.LAN** ODI	**Yes**	**11/1/96**	**L4579**	**No**	**None**
NetWare 4.10 SFTIII	**TOKEN.LAN** ODI	**Yes**	**11/1/96**	**L4579**	**No**	**None**
NetWare 4.10 for OS/2	**TOKEN.LAN** ODI	**Yes**	**11/1/96**	**L4579**	**No**	**None**
Client32 NIOS for Win95	**TOKEN.LAN** ODI	**Yes**	**11/1/96**	**L4579**	**No**	**None**
Client32 NIOS for Win3.1	**TOKEN.LAN** ODI	**Yes**	**11/1/96**	**L4579**	**No**	**None**
Client32 NIOS for DOS	**TOKEN.LAN** ODI	**Yes**	**11/1/96**	**L4579**	**No**	**None**
OS/2 ODI (NetWare 4.10)	**TOKEN.SYS** ODI	**Yes**	**11/1/96**	**L4579**	**No**	**None**
OS/2 ODI (NetWare 4.11)	None ODI	N/A	N/A	N/A	N/A	None
DOS ODI (NetWare 4.10)	**TOKEN.COM** ODI	**Yes**	**11/1/96**	**L4550**	**No**	**None**
DOS ODI (NetWare 4.11)	None ODI	N/A	N/A	N/A	N/A	None
IBM OS/2 Warp Server SMP 4.0	IBMTOK.OS2 NDIS 2.0	N/A	N/A	N/A	No	None
IBM OS/2 Warp 4.0	IBMTOK.OS2 NDIS 2.0	N/A	N/A	N/A	No	None
IBM DOS NDIS2 Client	IBMTOK.DOS NDIS 2.0	N/A	N/A	N/A	N/A	None

Auto 16/4 Token-Ring ISA

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NOS	Driver	Cert?	Cert Date	Bulletin	On CD?	Notes
Windows 95 GA/OS	**See Note** NDIS 3.0 Full MAC	**Yes**	**3/31/95**	**464**	**See Note**	**M3**
Windows 95 OSR2	See Note NDIS 4.0 Miniport	N/A	N/A	N/A	N/A	M1
Windows 97	In Plan NDIS 4.0 Miniport	In Plan	In Plan	In Plan	In Plan	None
Windows NT 4.0	**See Note** NDIS 3.0 Full MAC	**Yes**			**See Note**	**M3**
Windows NT 4.0	In Plan NDIS 4.0 Miniport	In Plan	In Plan	In Plan	No	None
Windows NT 3.51	**See Note** NDIS 3.0 Full MAC	**Yes**			**See Note**	**M3**
Windows for Workgroups 3.11	IBMTOK4.386 NDIS 3.0 Full MAC	N/A	N/A	N/A	No	None
NetWare 4.10	**TOKEN.LAN** ODI	**Yes**	**10/1/95**	**L3344**	**No**	**None**
NetWare 4.11	None ODI	N/A	N/A	N/A	N/A	None
NetWare 4.11 SFTIII	None ODI	N/A	N/A	N/A	N/A	None
NetWare 3.12	**TOKEN.LAN** ODI	**Yes**	**10/1/95**	**L3344**	**No**	**None**
NetWare 4.10 SFTIII	**TOKEN.LAN** ODI	**Yes**	**10/1/95**	**L3344**	**No**	**None**
NetWare 4.10 for OS/2	**TOKEN.LAN** ODI	**Yes**	**10/1/95**	**L3344**	**No**	**None**
Client32 NIOS for Win95	None ODI	N/A	N/A	N/A	N/A	None
Client32 NIOS for Win3.1	None ODI	N/A	N/A	N/A	N/A	None
Client32 NIOS for DOS	None ODI	N/A	N/A	N/A	N/A	None
OS/2 ODI (NetWare 4.10)	**TOKEN.SYS** ODI	**Yes**	**8/1/96**	**L4080**	**No**	**None**
OS/2 ODI (NetWare 4.11)	None ODI	N/A	N/A	N/A	N/A	None
DOS ODI (NetWare 4.10)	**TOKEN.COM** ODI	**Yes**	**8/1/96**	**L4079**	**No**	**None**
DOS ODI (NetWare 4.11)	None ODI	N/A	N/A	N/A	N/A	None
IBM OS/2 Warp Server SMP 4.0	IBMTOK.OS2 NDIS 2.0	N/A	N/A	N/A	No	None
IBM OS/2 Warp 4.0	IBMTOK.OS2 NDIS 2.0	N/A	N/A	N/A	No	None
IBM DOS NDIS2 Client	IBMTOK.DOD NDIS 2.0	N/A	N/A	N/A	N/A	None

16/4 Credit Card Adapter

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NOS	Driver	Cert?	Cert Date	Bulletin	On CD?	Notes
Windows 95 GA/OSR2	**IBMTOK.VXD** NDIS 3.0 Full MAC	**Yes**	**11/28/95**	**465**	**See Note**	**M5**
Windows 95 OSR2	See Note NDIS 4.0 Miniport	N/A	N/A	N/A	N/A	M1
Windows 97	In Plan NDIS 4.0 Miniport	In Plan	In Plan	In Plan	In Plan	None
Windows NT 4.0	**See Note** NDIS 3.0 Full MAC	**Yes**			**See Note**	**M6**
Windows NT 4.0	In Plan NDIS 4.0 Miniport	In Plan	In Plan	In Plan	No	None
Windows NT 3.51	**IBMTKPCM.SYS** NDIS 3.0 Full MAC	**Yes**			**No**	**None**
Windows for Workgroups 3.11	None NDIS 3.0 Full MAC	N/A	N/A	N/A	No	None
NetWare 4.10	TOKEN.LAN ODI	In Plan	In Plan	In Plan	No	None
NetWare 4.11	None ODI	N/A	N/A	N/A	N/A	None
NetWare 4.11 SFTIII	None ODI	N/A	N/A	N/A	N/A	None
NetWare 3.12	TOKEN.LAN ODI	In Plan	In Plan	In Plan	No	None
NetWare 4.10 SFTIII	TOKEN.LAN ODI	In Plan	In Plan	In Plan	No	None
Client32 NIOS for Win95	TOKEN.LAN ODI	In Plan	In Plan	In Plan	No	None
Client32 NIOS for Win3.1	TOKEN.LAN ODI	In Plan	In Plan	In Plan	No	None
Client32 NIOS for DOS	TOKEN.LAN ODI	In Plan	In Plan	In Plan	No	None
OS/2 ODI (NetWare 4.10)	**TOKENCS.SYS** ODI	**Yes**	**12/1/96**	**L4640**	**No**	**None**
OS/2 ODI (NetWare 4.11)	None ODI	N/A	N/A	N/A	N/A	None
DOS ODI (NetWare 4.10)	**TOKENCS.COM** ODI	**Yes**	**11/1/96**	**L4555**	**No**	**None**
DOS ODI (NetWare 4.11)	None ODI	N/A	N/A	N/A	N/A	None
IBM OS/2 Warp Server SMP 4.0	IBMTOKCS.OS2 NDIS 2.0	N/A	N/A	N/A	No	None
IBM OS/2 Warp 4.0	IBMTOKCS.OS2 NDIS 2.0	N/A	N/A	N/A	No	None
IBM DOS NDIS2 Client	IBMTOKCS.DOS NDIS 2.0	N/A	N/A	N/A	N/A	None

Triple Auto LANStreamer PCI

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NOS	Driver	Cert?	Cert Date	Bulletin	On CD?	Notes
Windows 95 GA/OSR2	STREAMER.VXD NDIS 3.0 Full MAC	No	None	None	No	M2
Windows 95 OSR2	See Note NDIS 4.0 Miniport	N/A	N/A	N/A	N/A	M1
Windows 97	In Plan NDIS 4.0 Miniport	In Plan	In Plan	In Plan	In Plan	None
Windows NT 4.0	**STREAMER.SYS** NDIS 3.0 Full MAC	**Yes**	**12/10/96**	**5086**	**No**	**None**
Windows NT 4.0	In Plan NDIS 4.0 Miniport	In Plan	In Plan	In Plan	No	None
Windows NT 3.51	STREAMER.SYS NDIS 3.0 Full MAC	No	None	N/A	No	None
Windows for Workgroups 3.11	None NDIS 3.0 Full MAC	N/A	N/A	N/A	No	None
NetWare 4.10	**IBMMPCO.LAN** ODI	**Yes**	**12/1/96**	**L4632**	**No**	**None**
NetWare 4.11	**IBMMPCO.LAN** ODI	**Yes**	**12/1/96**	**L4632**	**Yes**	**None**
NetWare 4.11 SFTIII	**IBMMPCO.LAN** ODI	**Yes**	**12/1/96**	**L4632**	**Yes**	**None**
NetWare 3.12	**IBMMPCO.LAN** ODI	**Yes**	**12/1/96**	**L4632**	**Yes**	**None**
NetWare 4.10 SFTIII	**IBMMPCO.LAN** ODI	**Yes**	**12/1/96**	**L4632**	**No**	**None**
NetWare 4.10 for OS/2	**IBMMPCO.LAN** ODI	**Yes**	**11/1/96**	**L3467**	**No**	**None**
Client32 NIOS for Win95	None ODI	N/A	N/A	N/A	N/A	None
Client32 NIOS for Win3.1	None ODI	N/A	N/A	N/A	N/A	None
Client32 NIOS for DOS	None ODI	N/A	N/A	N/A	N/A	None
OS/2 ODI (NetWare 4.10)	None ODI	N/A	N/A	N/A	N/A	None
OS/2 ODI (NetWare 4.11)	None ODI	N/A	N/A	N/A	N/A	None
DOS ODI (NetWare 4.10)	None ODI	N/A	N/A	N/A	N/A	None
DOS ODI (NetWare 4.11)	None ODI	N/A	N/A	N/A	N/A	None
IBM OS/2 Warp Server SMP 4.0	IBMMPC.OS2 NDIS 2.0	N/A	N/A	N/A	No	None
IBM OS/2 Warp 4.0	IBMMPC.OS2 NDIS 2.0	N/A	N/A	N/A	No	None
IBM DOS NDIS2 Client	None NDIS 2.0	N/A	N/A	N/A	N/A	None

Auto LANStreamer MC32

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NOS	Driver	Cert?	Cert Date	Bulletin	On CD?	Notes
Windows 95 GA/OSR2	**STREAMER.VXD** NDIS 3.0 Full MAC	**Yes**	**9/1/96**	**1659**	**No**	**None**
Windows 95 OSR2	See Note NDIS 4.0 Miniport	N/A	N/A	N/A	N/A	M1
Windows 97	In Plan NDIS 4.0 Miniport	In Plan	In Plan	In Plan	In Plan	None
Windows NT 4.0	STREAMER.SYS NDIS 3.0 Full MAC	In Plan	In Plan	In Plan	No	None
Windows NT 4.0	In Plan NDIS 4.0 Miniport	In Plan	In Plan	In Plan	No	None
Windows NT 3.51	**STREAMER.SYS** NDIS 3.0 Full MAC	**Yes**	**10/5/95**	**1660**	**Yes**	**None**
Windows for Workgroups 3.11	STREAMER.386 NDIS 3.0 Full MAC	N/A	N/A	N/A	No	None
NetWare 4.10	**IBMMPCO.LAN** ODI	**Yes**	**12/1/96**	**L4633**	**No**	**None**
NetWare 4.11 SMP	**IBMMPCO.LAN** ODI	**Yes**	**12/1/96**	**L4633**	**Yes**	**None**
NetWare 4.11	**IBMMPCO.LAN** ODI	**Yes**	**12/1/96**	**L4633**	**Yes**	**None**
NetWare 3.12	**IBMMPCO.LAN** ODI	**Yes**	**12/1/96**	**L4633**	**No**	**None**
Client32 NIOS for Win95	None ODI	N/A	N/A	N/A	N/A	None
Client32 NIOS for Win3.1	None ODI	N/A	N/A	N/A	N/A	None
Client32 NIOS for DOS	None ODI	N/A	N/A	N/A	N/A	None
OS/2 ODI (NetWare 4.10)	None ODI	N/A	N/A	N/A	N/A	None
OS/2 ODI (NetWare 4.11)	None ODI	N/A	N/A	N/A	N/A	None
DOS ODI (NetWare 4.10)	None ODI	N/A	N/A	N/A	N/A	None
DOS ODI (NetWare 4.11)	None ODI	N/A	N/A	N/A	N/A	None
IBM OS/2 Warp Server SMP 4.0	IBMMPC.OS2 NDIS 2.0	N/A	N/A	N/A	No	None
IBM OS/2 Warp 4.0	IBMMPC.OS2 NDIS 2.0	N/A	N/A	N/A	No	None
IBM DOS NDIS2 Client	IBMMPC.DOS NDIS 2.0	N/A	N/A	N/A	N/A	None

10/100 PCI Ethernet

Notes: *IMPORTANT! Just because a driver is not certified does not mean that it is not supported by IBM!
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NOS	Driver	Cert?	Cert Date	Bulletin	On CD?	Notes
Windows 95 GA/OSR2	**IBMFE.SYS** NDIS 3.0 Full MAC	**Yes**	**1/14/97**	**5575**	**No**	**None**
Windows 95 OSR2	In Plan NDIS 4.0 Miniport	In Plan	In Plan	In Plan	In Plan	None
Windows 97	In Plan NDIS 4.0 Miniport	In Plan	In Plan	In Plan	In Plan	None
Windows NT 4.0	**IBMFE.SYS** NDIS 3.0 Full Mac	**Yes**	**1/14/97**	**5576**	**No**	**None**
Windows NT 4.0	In Plan NDIS 4.0 Miniport	In Plan	In Plan	In Plan	No	None
Windows NT 3.51	**IBMFE.SYS** NDIS 3.0 Full MAC	**Yes**			**No**	**None**
Windows for Workgroups 3.11	IBMFE.386 NDIS 3.0 Full MAC	N/A	N/A	N/A	No	None
NetWare 4.10	**IBMFE.LAN** ODI	**Yes**	**1/1/97**	**L4698**	**No**	**None**
NetWare 4.11	**IBMFE.LAN** ODI	**Yes**	**1/1/97**	**L4757**	**See Note**	**N1, N8**
NetWare 4.11 SFTIII	**IBMFE.LAN** ODI	**Yes**	**1/1/97**	**L4757**	**See Note**	**N1, N8**
NetWare 3.12	**IBMFE.LAN** ODI	**Yes**	**1/1/97**	**L4698**	**No**	**None**
NetWare 4.10 SFTIII	**IBMFE.LAN** ODI	**Yes**	**1/1/97**	**L4698**	**No**	**None**
Client32 NIOS for Win95	**IBMFE.LAN** ODI	**Yes**	**1/1/97**	**L4757**	**See Note**	**N1, N5, N8**
Client32 NIOS for Win3.1	**IBMFE.LAN** ODI	**Yes**	**1/1/97**	**L4757**	**See Note**	**N1, N5, N8**
Client32 NIOS for DOS	**IBMFE.LAN** ODI	**Yes**	**1/1/97**	**L4757**	**See Note**	**N1, N5, N8**
OS/2 ODI (NetWare 4.10)	**IBMFEODI.SYS** ODI	**Yes**	**1/1/97**	**L4700**	**No**	**None**
OS/2 ODI (NetWare 4.11)	**IBMFEODI.SYS** ODI	**Yes**	**1/1/97**	**L4700**	**Yes**	**N5**
DOS ODI (NetWare 4.10)	**IBMFEODI.COM** ODI	**Yes**	**1/1/97**	**L4699**	**No**	**None**
DOS ODI (NetWare 4.11)	**IBMFEODI.COM** ODI	**Yes**	**1/1/97**	**L4699**	**No**	**N9**
IBM OS/2 Warp Server SMP 4.0	IBMFE.OS2 NDIS 2.0	N/A	N/A	N/A	No	None
IBM OS/2 Warp 4.0	IBMFE.OS2 NDIS 2.0	N/A	N/A	N/A	No	None
IBM DOS NDIS2 Client	IBMFE.DOS NDIS	N/A	N/A	N/A	N/A	None

PCI Ethernet

Notes: *IMPORTANT! Just because a driver is not certified does not mean that it is not supported by IBM!
*The latest drivers are available at http://www.networking.ibm.com/nes/neshome.html.

NOS	Driver	Cert?	Cert Date	Bulletin	On CD?	Notes
Windows 95 GA/OSR2	**PCNTN3.VXD** NDIS 3.0 Full MAC	**Yes**	**1/2/96**	**1547**	**Yes**	**M4**
Windows 95 OSR2	In Plan NDIS 4.0 Miniport	In Plan	In Plan	In Plan	Yes	None
Windows 97	In Plan NDIS 4.0 Miniport	In Plan	In Plan	In Plan	In Plan	None
Windows NT 4.0	**IBMEA351.SYS** NDIS 3.0 Full MAC	**Yes**	**10/10/96**	**4596**	**No**	**None**
Windows NT 4.0	In Plan NDIS 4.0 Miniport	In Plan	In Plan	In Plan	No	None
Windows NT 3.51	**IBMEA351.SYS** NDIS 3.0 Full MAC	**Yes**	**1/2/96**	**1548**	**No**	**None**
Windows for Workgroups 3.11	IBMEAWFW.386 NDIS 3.0 Full MAC	N/A	N/A	N/A	No	None
NetWare 4.11	**IBMEANWS.LAN** ODI	**Yes**	**2/1/97**	**L4798**	**No**	**None**
NetWare 4.11 SFTIII	**IBMEANWS.LAN** ODI	**Yes**	**2/1/97**	**L4798**	**No**	**None**
NetWare 3.12	**IBMEANWS.LAN** ODI	**Yes**	**2/1/97**	**4798**	**No**	**None**
Client32 NIOS for Win95	**IBMEANWS.LAN** ODI	**Yes**	**2/1/97**	**L4798**	**No**	**None**
Client32 NIOS for Win3.1	**IBMEANWS.LAN** ODI	**Yes**	**2/1/97**	**L4798**	**No**	**None**
Client32 NIOS for DOS	**IBMEANWS.LAN** ODI	**Yes**	**2/1/97**	**L4798**	**No**	**None**
OS/2 ODI (NetWare 4.11)	**IBMEANWC.OS2** ODI	**Yes**	**2/1/97**	**L4799**	**No**	**N10**
DOS ODI (NetWare 4.11)	**IBMEANWC.COM** ODI	**Yes**	**1/1/97**	**L4741**	**No**	**N1**
IBM OS/2 Warp Server SMP 4.0	IBMEANDI.OS2 NDIS 2.0	N/A/	N/A	N/A	No	None
IBM OS/2 Warp 4.0	IBMEANDI.OS2 NDIS 2.0	N/A	N/A	N/A	No	None
IBM DOS NDIS2 Client	IBMEANDI.DOS NDIS 2.0	N/A	N/A	N/A	N/A	None

EtherJet 10BASE-T ISA

Notes: *IMPORTANT! Just because a driver is not certified does not mean that it is not supported by IBM!
*The latest drivers are available at http://www.networking.ibm.com/nes/neshome.html.

NOS	Driver	Cert?	Cert Date	Bulletin	On CD?	Notes
Windows 95 GA/OSR2	**IBMEIW95.VXD** NDIS 3.0 Full MAC	**Yes**	**11/17/95**	**1110**	**No**	**None**
Windows 95 OSR2	In Plan NDIS 4.0 Miniport	In Plan	In Plan	In Plan	No	None
Windows 97	In Plan NDIS 4.0 Miniport	In Plan	In Plan	In Plan	In Plan	None
Windows NT 4.0	IBMEIWNT.SYS NDIS 3.0 Full MAC	In Plan	In Plan	In Plan	No	None
Windows NT 4.0	In Plan NDIS 4.0 Miniport	In Plan	In Plan	In Plan	No	None
Windows NT3.51	IBMEIWNT.SYS NDIS 3.0 Full MAC	No	None	None	No	None
Windows for Workgroups 3.11	IBMEIWFW.386 NDIS 3.0 Full MAC	N/A	N/A	N/A	No	None
NetWare 4.10	**IBMEINWS.LAN** ODI	**Yes**	**12/1/96**	**L4662**	**No**	**None**
NetWare 4.11	In Plan ODI	In Plan	In Plan	In Plan	No	None
NetWare 4.11 SFTIII	In Plan ODI	In Plan	In Plan	In Plan	No	None
NetWare 4.10 for OS/2	**IBMEINWS.LAN** ODI	**Yes**	**12/1/96**	**L4662**	**No**	**None**
NetWare 3.12	**IBMEINWS.LAN** ODI	**Yes**	**12/1/96**	**L4662**	**No**	**None**
NetWare 4.10 SFTIII	**IBMEINWS.LAN ODI**	**Yes**	**11/1/95**	**L3461**	**No**	**None**
Client32 NIOS for Win95	**IBMEINWS.LAN** ODI	**Yes**	**12/1/96**	**L4662**	**No**	**None**
Client32 NIOS for Win3.1	**IBMEINWS.LAN** ODI	**Yes**	**12/1/96**	**L4662**	**No**	**None**
Client32 NIOS for DOS	**IBMEINWS.LAN** ODI	**Yes**	**12/1/96**	**L4662**	**No**	**None**
OS/2 ODI (NetWare 4.10)	**IBMEINWC.OS2** ODI	**Yes**	**1/1/97**	**L4720**	**No**	**None**
OS/2 ODI (NetWare 4.11)	**IBMEINWC.OS2** ODI	**Yes**	**2/1/97**	**L4831**	**See Note**	**N7**
DOS ODI (NetWare 4.10)	**IBMEINWC.COM** ODI	**Yes**	**12/1/96**	**L4660**	**No**	**None**
DOS ODI (NetWare 4.11)	In Plan ODI	In Plan	In Plan	In Plan	See Note	N3
IBM OS/2 Warp Server SMP 4.0	IBMEINDI.OS2 NDIS 2.0	N/A	N/A	N/A	No	None
IBM OS/2 Warp 4.0	IBMEINDI.OS2 NDIS 2.0	N/A	N/A	N/A	No	None
IBM DOS NDIS2 Client	IBMEINDI.DOS NDIS 2.0	N/A	N/A	N/A	N/A	None

EtherJet 10BASE-T WoL ISA

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*The latest drivers are available at http://www.networking.ibm.com/nes/neshome.html.

NOS	Driver	Cert?	Cert Date	Bulletin	On CD?	Notes
Windows 95 GA/OSR2	IBMEIW95.VXD NDIS 3.0 Full MAC	In Plan	In Plan	In Plan	No	None
Windows 95 OSR2	In Plan NDIS 4.0 Miniport	In Plan	In Plan	In Plan	No	None
Windows 97	In Plan NDIS 4.0 Miniport	In Plan	In Plan	In Plan	In Plan	None
Windows NT 4.0	IBMEIWNT.SYS NDIS 3.0 Full MAC	In Plan	In Plan	In Plan	No	None
Windows NT 4.0	In Plan NDIS 4.0 Miniport	In Plan	In Plan	In Plan	No	None
Windows NT 3.51	IBMEIWNT.SYS NDIS 3.0 Full MAC	No	None	None	No	None
Windows for Workgroups 3.11	IBMEIWFW.386 NDIS 3.0 Full MAC	N/A	N/A	N/A	No	None
NetWare 4.10	**IBMEINWS.LAN** ODI	**Yes**	**12/1/96**	**L4662**	**No**	**None**
NetWare 4.11	In Plan ODI	In Plan	In Plan	In Plan	No	None
NetWare 4.11 SFTIII	In Plan ODI	In Plan	In Plan	In Plan	No	None
NetWare 4.10 for OS/2	**IBMEINWS.LAN** ODI	**Yes**	**12/1/96**	**L4662**	**No**	**None**
NetWare 3.12	**IBMEINWS.LAN** ODI	**Yes**	**12/1/96**	**L4662**	**No**	**None**
NetWare 4.10 SFTIII	**IBMEINWS.LAN** ODI	**Yes**	**11/1/95**	**L3461**	**No**	**None**
Client32 NIOS for Win95	**IBMEINWS.LAN** ODI	**Yes**	**12/1/96**	**L4662**	**No**	**None**
Client32 NIOS for Win3.1	**IBMEINWS.LAN** ODI	**Yes**	**12/1/96**	**L4662**	**No**	**None**
Client32 NIOS for DOS	**IBMEINWS.LAN** ODI	**Yes**	**12/1/96**	**L4662**	**No**	**None**
OS/2 ODI (NetWare 4.10)	**IBMEINWC.OS2** ODI	**Yes**	**1/1/97**	**L4720**	**No**	**None**
OS/2 ODI (NetWare 4.11)	**IBMEINWC.OS2** ODI	**Yes**	**2/1/97**	**L4831**	**See Note**	**N7**
DOS ODI (NetWare 4.10)	**IBMEINWC.COM** ODI	**Yes**	**12/1/96**	**L4660**	**No**	**None**
DOS ODI (NetWare 4.11)	In Plan ODI	In Plan	In Plan	In Plan	See Note	N3
IBM OS/2 Warp Server SMP 4.0	IBMEINDI.OS2 NDIS 2.0	N/A	N/A	N/A	No	None
IBM OS/2 Warp 4.0	IBMEINDI.OS2 NDIS 2.0	N/A	N/A	N/A	No	None
IBM DOS NDIS2 Client	IBMEINDI.DOS NDIS 2.0	N/A	N/A	N/A	N/A	None

EtherJet Combo ISA

Notes: *IMPORTANT! Just because a driver is not certified does not mean that it is not supported by IBM!
*The latest drivers are available at http://www.networking.ibm.com/nes/neshome.html.

NOS	Driver	Cert?	Cert Date	Bulletin	On CD?	Notes
Windows 95 GA/OSR2	IBMEIW95.VXD NDIS 3.0 Full MAC	In Plan	In Plan	In Plan	No	None
Windows 95 OSR2	In Plan NDIS 4.0 Miniport	In Plan	In Plan	In Plan	No	None
Windows 97	In Plan NDIS 4.0 Miniport	In Plan	In Plan	In Plan	In Plan	None
Windows NT 4.0	IBMEIWNT.SYS NDIS 3.0 Full MAC	In Plan	In Plan	In Plan	No	None
Windows NT 4.0	In Plan NDIS 4.0 Miniport	In Plan	In Plan	In Plan	No	None
Windows NT 3.51	IBMEIWNT.SYS NDIS 3.0 Full MAC	No	None	None	No	None
Windows for Workgroups 3.11	IBMEIWFW.386 NDIS 3.0 Full MAC	N/A	N/A	N/A	No	None
NetWare 4.10	**IBMEINWS.LAN** ODI	**Yes**	**12/1/96**	**L4662**	**No**	**None**
NetWare 4.11	In Plan ODI	In Plan	In Plan	In Plan	No	None
NetWare 4.11 SFTIII	In Plan ODI	In Plan	In Plan	In Plan	No	None
NetWare 4.10 for OS/2	**IBMEINWS.LAN** ODI	**Yes**	**12/1/96**	**L4662**	**No**	**None**
NetWare 3.12	**IBMEINWS.LAN** ODI	**Yes**	**12/1/96**	**L4662**	**No**	**None**
NetWare 4.10 SFTIII	**IBMEINWS.LAN** ODI	**Yes**	**11/1/95**	**L3461**	**No**	**None**
Client32 NIOS for Win95	**IBMEINWS.LAN** ODI	**Yes**	**12/1/96**	**L4662**	**No**	**None**
Client32 NIOS for Win3.1	**IBMEINWS.LAN** ODI	**Yes**	**12/1/96**	**L4662**	**No**	**None**
Client32 NIOS for DOS	**IBMEINWS.LAN** ODI	**Yes**	**12/1/96**	**L4662**	**No**	**None**
OS/2 ODI (NetWare 4.10)	**IBMEINWC.OS2** ODI	**Yes**	**1/1/97**	**L4720**	**No**	**None**
OS/2 ODI (NetWare 4.11)	**IBMEINWC.OS2** ODI	**Yes**	**2/1/97**	**L4831**	**See Note**	**N7**
DOS ODI (NetWare 4.10)	**IBMEINWC.COM** ODI	**Yes**	**12/1/96**	**L4660**	**No**	**None**
DOS ODI (NetWare 4.11)	In Plan ODI	In Plan	In Plan	In Plan	See Note	N3
IBM OS/2 Warp Server SMP 4.0	IBMEINDI.OS2 NDIS 2.0	N/A	N/A	N/A	No	None
IBM OS/2 Warp 4.0	IBMEINDI.OS2 NDIS 2.0	N/A	N/A	N/A	No	None
IBM DOS NDIS2 Client	IBMEINDI.DOS NDIS 2.0	N/A	N/A	N/A	N/A	None

EtherJet PC Card

Notes: *IMPORTANT! Just because a driver is not certifird dows not mean that it is not supported by IBM!
*The latest drivers are available at http://www.networking.ibm.com/nes/neshome.html.

NOS	Driver	Cert?	Cert Date	Bulletin	On CD?	Notes
Windows 95 GA/OSR2	**IBMEXW95.VXD** NDIS 3.0 Full MAC	**Yes**	**1/28/97**	**5472**	**No**	**None**
Windows 95 OSR2	In Plan NDIS 4.0 Miniport	In Plan	In Plan	In Plan	No	None
Windows 97	In Plan NDIS 4.0 Miniport	In Plan	In Plan	In Plan	In Plan	None
Windows NT 4.0	**IBMEXWNT.SYS** NDIS 3.0 Full MAC	**Yes**	**10/28/96**	**4712**	**No**	**None**
Windows NT 4.0	In Plan NDIS 4.0 Miniport	In Plan	In Plan	In Plan	No	None
Windows NT 3.51	IBMEXWNT.386 NDIS 3.0 Full MAC	No	None	None	No	None
Windows for Workgroups 3.11	IBMEXWFW.SYS NDIS 3.0 Full MAC	N/A	N/A	N/A	No	None
NetWare 4.10	None ODI	N/A	N/A	N/A	N/A	None
NetWare 4.11	In Plan ODI	In Plan	In Plan	In Plan	No	None
NetWare 4.11 SFTIII	None ODI	N/A	N/A	N/A	N/A	None
NetWare 3.12	None ODI	N/A	N/A	N/A	N/A	None
NetWare 4.10 SFTIII	None ODI	N/A	N/A	N/A	N/A	None
Client32 NIOS for Win95	In Plan ODI	In Plan	In Plan	In Plan	No	None
Client32 NIOS for Win3.1	In Plan ODI	In Plan	In Plan	In Plan	No	None
Client32 NIOS for DOS	In Plan ODI	In Plan	In Plan	In Plan	No	None
OS/2 ODI (NetWare 4.10)	**IBMEXNWC.OS2** ODI	**Yes**	**10/1/96**	**L4525**	**No**	**None**
OS/2 ODI (NetWare 4.11)	None ODI	N/A	N/A	N/A	N/A	None
DOS ODI (NetWare 4.10)	**IBMEXNWC.COM** ODI	**Yes**	**10/1/96**	**L4517**	**No**	**N1, N6**
DOS ODI (NetWare 4.11)	None ODI	N/A	N/A	N/A	N/A	None
IBM OS/2 Warp Server SMP 4.0	IBMEXNDI.OS2 NDIS 2.0	N/A	N/A	N/A	No	None
IBM OS/2 Warp 4.0	IBMEXNDI.OS2 NDIS 2.0	N/A	N/A	N/A	No	None
IBM DOS NDIS2 Client	IBMEXNDI.DOS NDIS 2.0	N/A	N/A	N/A	N/A	None

Notes

Ref. No.	Note Text
General	IMPORTANT! Just because a driver is not certified does not mean that it is not supported by IBM!
General	The latest drivers are available at http://www.networking.ibm.com/nes/neshome.html.
N1	The driver version on NetWare 4.11 CD is v3.00 and not v3.10 of IBMEANWC.COM. Bulletin for v3.00 is L4362
N2	This certification was done, however, it is not on Novell's bulletin site. We will have to contact Novell to obtain the bulletin.
N3	The driver version on NetWare 4.11 CD is v2.21 of IBMEINWC.COM. The bulletin for v2.21 is L4363, however, the version number is missing in this bulletin which we will have to contact Novell about.
N4	The driver version on NetWare 4.11 CD is v1.04 and not v1.05 of IBMTRPO.LAN.
N5	The driver is shipped on the NetWare 4.11 NOS CD and is not included in Win95, Win3.1X, OS/2 or DOS operating systems.
N6	The version number is missing from the Novell bulletin. We will have to contact Novell and have them post it.
N7	The driver version on NetWare 4.11 CD is v2.21 and not v2.59 of IBMEINWC.OS2.
N8	The driver version on NetWare 4.11 CD is v1.47 and not v1.48 of IBMFE.LAN
N9	The driver version on NetWare 4.11 CD is v2.03 and not v2.10 of IBMFEODI.COM.
N10	The driver version on NetWare 4.11 CD is v3.00 and not v3.10 of IBMEANWC.OS2. Also, the driver on 4.11 CD is called IBMEANWC.SYS and not *.OS2 and bulletin for v3.00 is L4369.
M1	Since there are bugs in the NDIS API for Microsoft Windows OSR2, there will not be any NDIS 4 Miniport drivers for this release of Windows. The NDIS 3.0 Full MAC driver should be used instead.
M2	Triple Auto LANStreamer PCI was not certified for use with Windows 95 since Triple Auto LANStreamer PCI is primarily a server adapter and Windows 95 is not a server NOS.
M3	Auto 16/4 Token-Ring ISA is supported/certified on these NOSes with drivers that are on the CD (IBMTOK4). However, the latest Full MAC NDIS 3.0 driver (IBMTOK5.*) is available on the IBM NES WWW Site/BBS.
M4	PCI Ethernet uses the AMD Pcnet adapter driver, which is located on the Windows 95 GA and OSR2 distribution media.
M5	Drivers included with Windows 95 are for older versions of the PC card (i.e. IBM 16/4 Token-Ring Credit Card Adapter I/II), but they still function with RA3.
M6	The certified driver included with Windows NT 4.0 is called IBMTOK4.SYS, version 4.02. The most recent driver available is called IBMTKPCM.SYS and is located on the IBM NHD WWW Site/BBS.
M7	This driver is located within the \DRVLIB directory tree of the Windows NT CD.