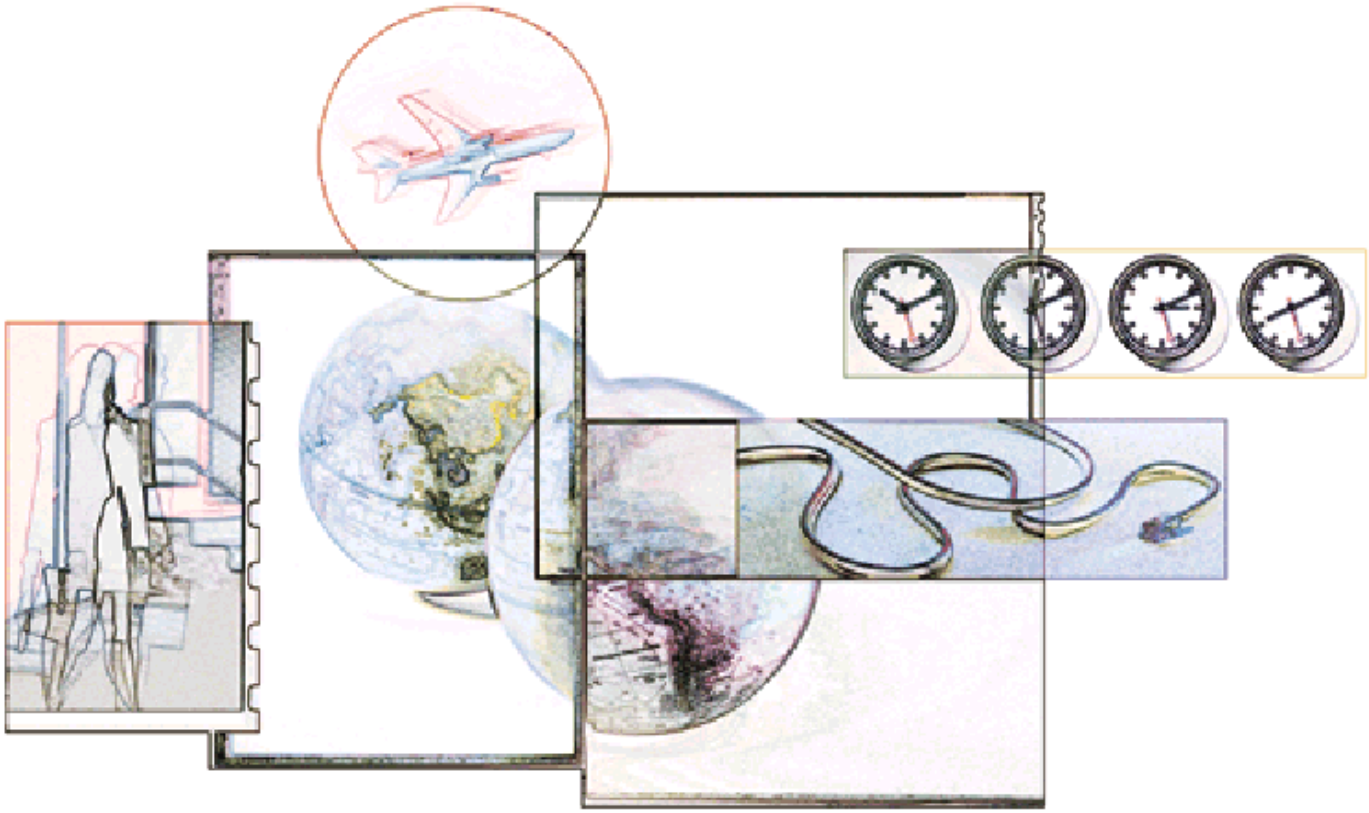
5250 Express and IP/Twinax

Are you ready for e-business?



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April 21, 1998

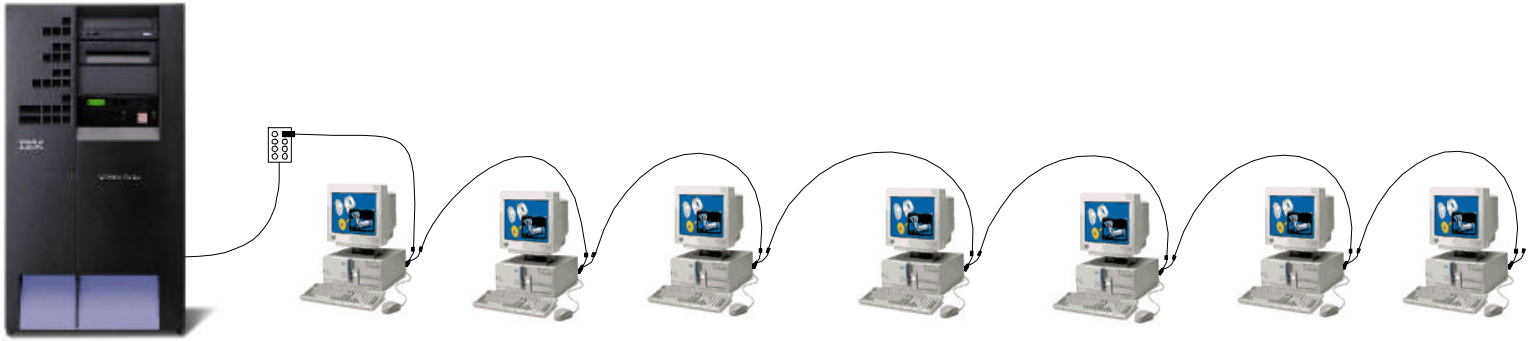
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Overview

- TCP/IP Over Twinax can enhance and protect your twinax investment
- 5250 Express Data Stream provides a significant increase in twinax throughput
- Connecting 'twinax devices' over UTP, FTP, and fiber optic cabling enhances connectivity options

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Do you use twinax in your AS/400 network?



Are you ready for

e™

e-business ?

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OS/400 V4 - Robust, Integrated TCP/IP

"The migration to TCP/IP networks and applications continues unabated." IDC 6/97

All vendors agree TCP/IP is central to future networking strategy

Most e-business technologies are designed exclusively for TCP/IP

- Internet, Domino, Java, Network Stations, secure web applications

OS/400 delivers a robust, complete and fully integrated TCP/IP suite

- LAN and WAN networking and secure TCP/IP routing support built in
  - 100M Eth, TR, ATM, Frame Relay, PPP, ISDN, Sw56, T1/E1,...
- Complete set of TCP/IP servers and services built in
  - New: Domain Name Server, DHCP for automated workstation configuration and native IMAP4 Domino mail server
- Client Access over TCP/IP
  - New: printer emulation, selectable device ID and TCP/IP over twinax

TCP/IP Servers & Services

- **GUI Configuration support**
- **FTP, SMTP, POP3, NFS**
- **DNS, DHCP, secure HTTP**
- **Direct HP Network Print, LPR, LPD**
- **5250/HTML gateway, TELNET**
- **REXEC, BOOTP, Remote IPL TFTP**

Physical interfaces

- **T-R, Ethernet 10/100**
- **ATM, Async**
- **X.25, ISDN**
- **DDI, Wireless,**
- **Frame relay**
- **Wireless (LAN), Twinax**

TCP/IP protocols supported

- **TCP, UDP, IP, SNMP**
- **NETSTAT, PING**
- **ICMP, ARP, Proxy ARP**
- **SLIP, PPP, RIP Ver 1 & 2,**
- **IP multilink load balancing**
- **Sockets API, SOCKS proxy**
- **UDP multicast support**

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TCP/IP OVER TWINAX

- Significant Features
  - Works with TCP/IP applications compatible with Windows 95 and NT
  - Multiple applications can use the same 5250 Station Address
  - Fully enabled for the 5250 Express Data Stream (4X throughput)
  - Compatible with other twinax attached devices
- Deliverable
  - TCP/IP Device Drivers that enables a TCP/IP stack to communicate with a 5250 Express Adapter
  - Windows 95 and Windows NT Support
- Cabling Requirements
  - Works over existing Twinax, Shielded or Unshielded Twisted Pair Cabling

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TCP/IP OVER TWINAX

Software Requirements

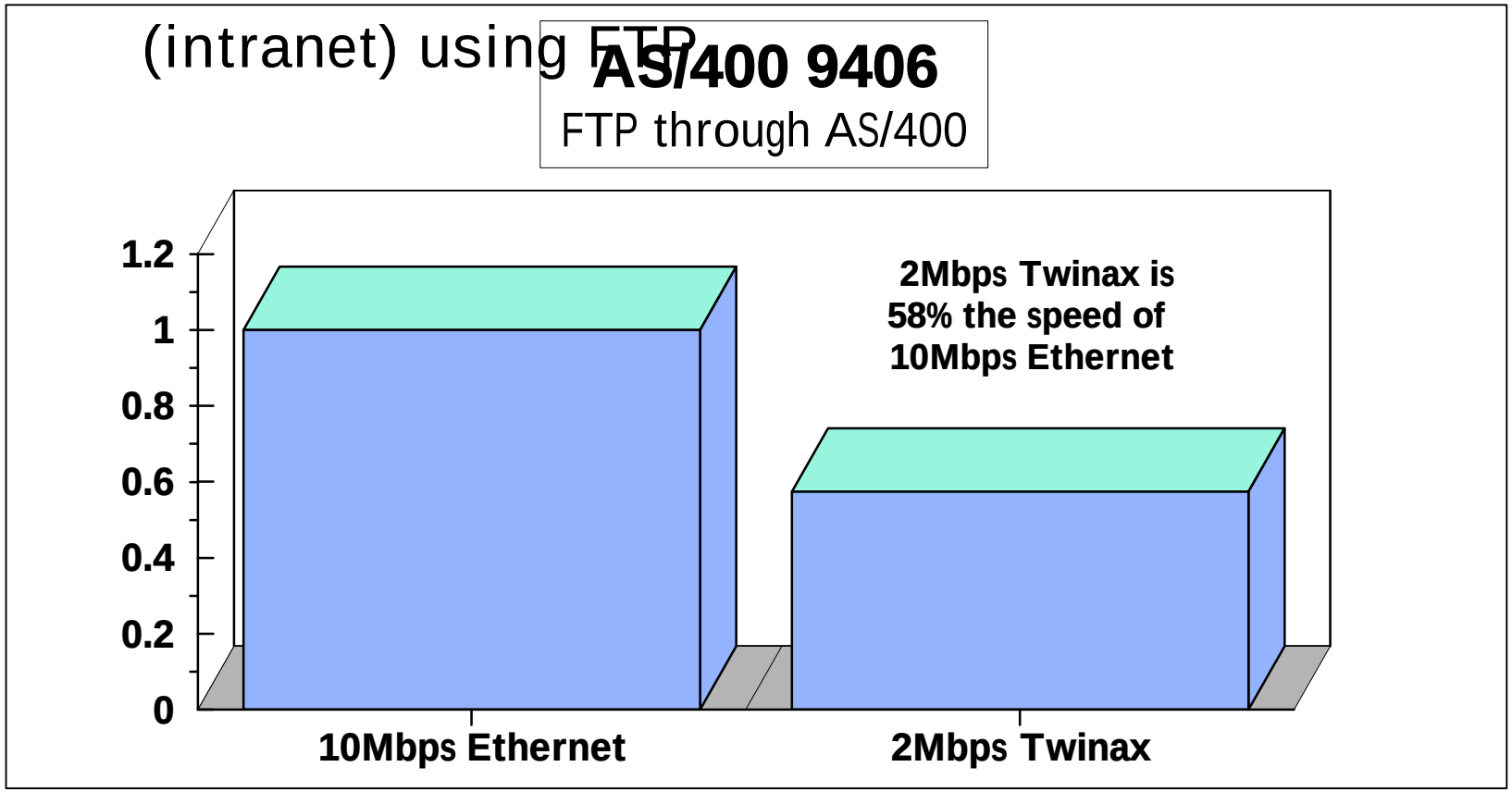
- AS/400 Requirements
  - OS/400 V4R2
- PC Requirements
  - Microsoft Windows NT V4.0 or Windows 95
    - *Latest service packs required*
- Examples of applications new to twinax attached PC's:
  - World Wide Web Browsers
    - *Netscape Communicator*
    - *Microsoft Internet Explorer*
  - eMail and Work Group Applications
    - *Lotus Notes*
    - *File and Printer Sharing*
  - 5250 Emulation Applications
    - *Client Access/400 for Windows 95 and Windows NT*
    - *Personal Communications AS/400 for Windows 95 and Windows NT*

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TCP/IP Over Twinax

Ethernet vs. Twinax Measured Performance

- Average file transfer time from 4-6 PCs through the AS/400 to another server (intranet) using FTP



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TCP/IP Over Twinax

IP/Twinax is an alternative to rewiring for Ethernet

- Protects customers investment in twinax devices and cabling
- 2Mbps Twinax is 58% the speed of 10Mbps Ethernet
  - For 4-6 PCs connected through the AS/400 to a remote server
- IP/Twinax supports the same types of TCP/IP applications under Windows 95/NT
- IP/Twinax supports much greater distances with fewer or no repeater hubs (saving money)
  - Ethernet supports devices up to 300ft @10Mbps
  - Repeater hubs must be used every 300ft for ethernet up to a maximum distance of 1,650ft

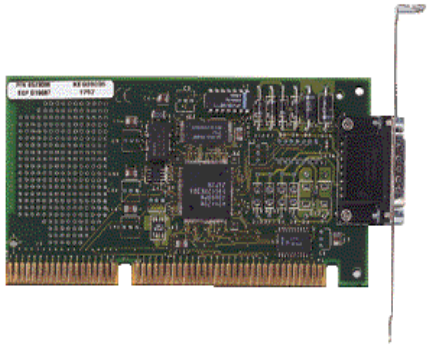
★ Twinax supports devices up to 4,000ft @2Mbps or 5,000ft @1Mbps

★ Twinax WSC attachment using UTP supports devices up to 3,150ft @2Mbps or 4,200 @1Mbps using a single active hub

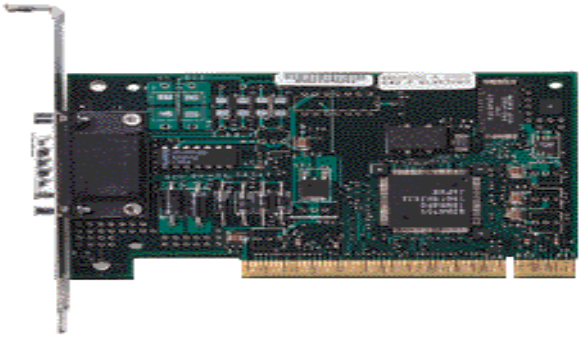
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TCP/IP OVER TWINAX

PC Hardware Requirements



- 5250 Express ISA Adapter (TM)



- 5250 Express PCI Adapter (TM)



- 5250 Express PC Card (TM)

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TCP/IP OVER TWINAX

U.S. IBM 5250 Adapter Part Numbers compatible with IP/Twinax

Description	Part Number
5250 Express ISA Adapter	88H0250
5250 Express ISA Adapt. + Cable	82H4725
5250 Express ISA 10-Pack	82H4706
5250 Express PCI Adapter	82H4708
5250 Express PCI Adapt. + Cable	82H4719
5250 Express PCI 10-Pack	82H4723
5250 Express PC Card	88H0256
5250 Express PC Card + Cable	88H0279
5250 Express PC Card 10-Pack	88H0286
5250 Enhanced Display Station Emulaton Adapter	92G5364, 88H0240

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TCP/IP Over Twinax

Supported AS/400 Models



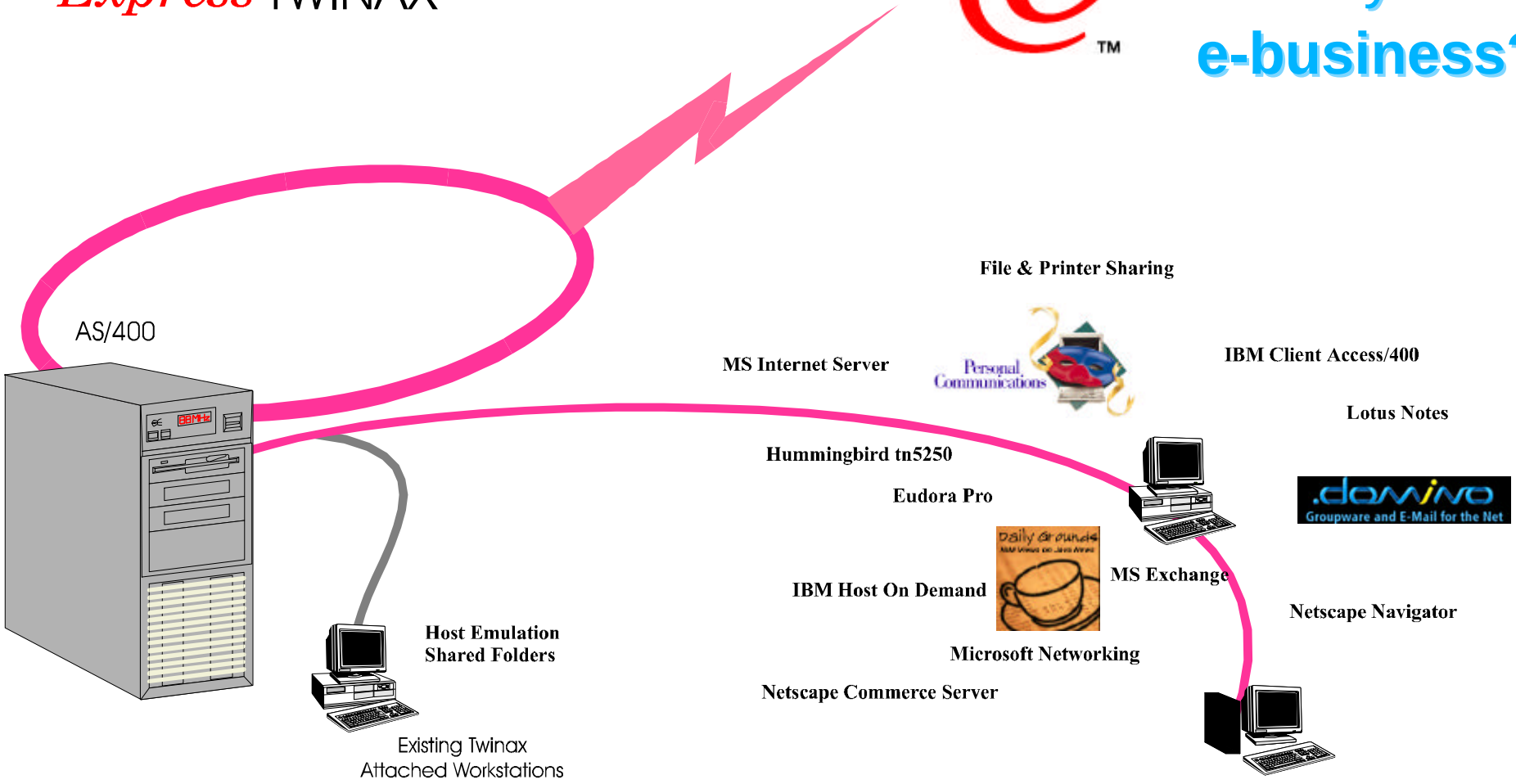
- ***All Twinaxial Workstation Controllers supported on all the following models:***
  - **AS/400 Advanced Series Models 600, 620, 640, and 650**
  - **AS/400 Advanced Series Models 400, 436, 500, 510, 530**
  - **AS/400 Advanced Server Models 170, S10, S20, S30, S40, 40S, 50S, and 53S**
  - **AS/400 Advanced Entry Model 150**

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TCP/IP

Express TWINAX

Are you ready for **e-business?**



yesterday today!

With TCP/IP Over Twinax, the answer is a resounding **'Yes'**!

AS/400 Twinaxial WSC
Throughput Enhancements



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Twinax WSC Enhancements

- New Twinax WSC enhancements include:
  - Split Controller- can significantly improve performance to all devices
  - 5250 Express Data Stream- improves media throughput by nearly 4 times
- AS/400 Hardware Requirements
  - PCI WAN/Twinaxial IOA (FC 2720/9720)
  - PCI Twinaxial Workstation IOA (FC 2722/9722)
  - Twinaxial Workstation IOA (FC 6180/9280)
- AS/400 Software Requirements
  - OS/400 V4R1 or V4R2, all models

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Twinax WSC Enhancements

Split Controller Enhancement

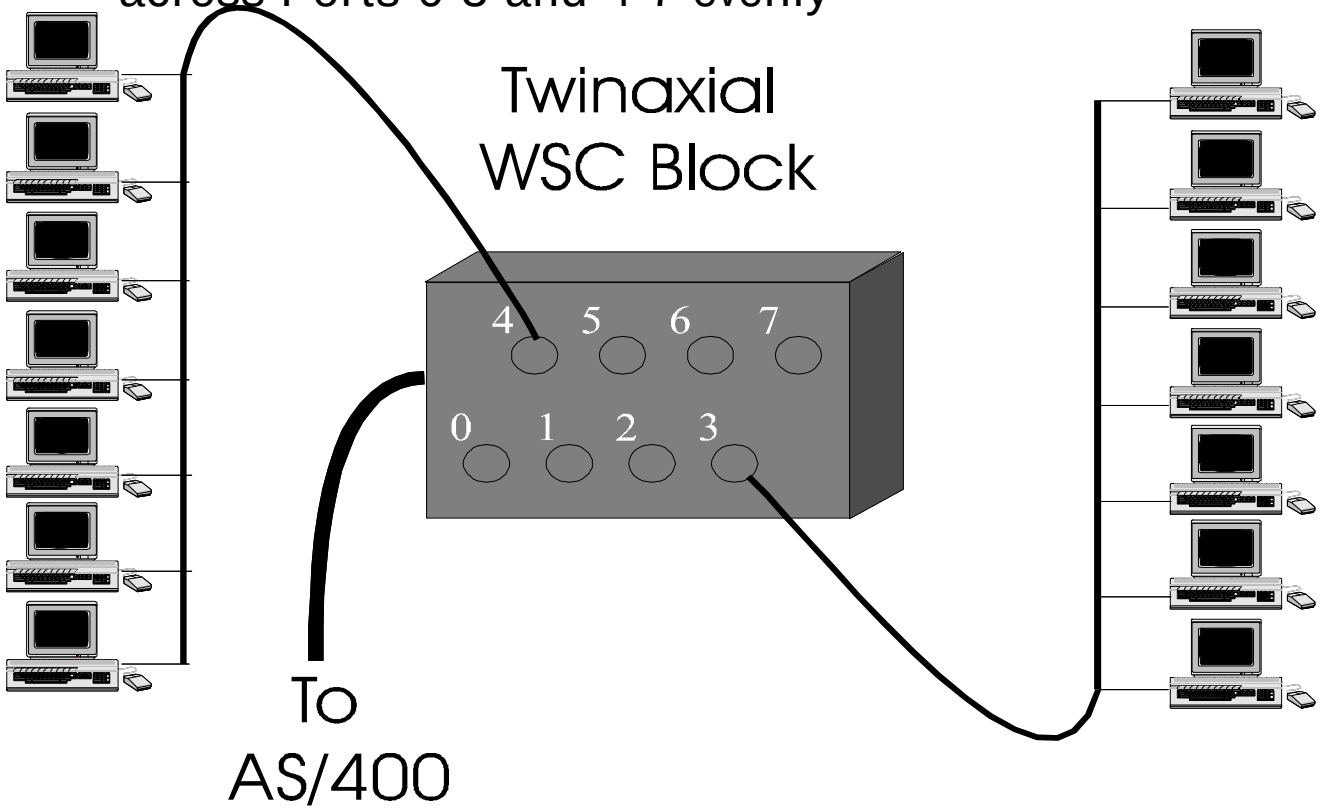
- Previous Twinax WSCs polled ports sequentially
- New WSC now polls two ports at a time
  - Splits workload between ports 0-3 and 4-7
- Increases overall throughput to multiple devices
- Compatible with all twinax NPTs, printers and 5250 adapters
  - Not compatible with some products that combine ports together such as the IBM 6299 Host Port Multiplexers
    - *For these products the WSC must be set to sequential operation (slowing down performance) using the following PTFs:*
      - ►*For OS/400 V4R1 use MF17855, SF43465, and MF17073*
      - ►*For OS/400 V4R2 use SF46211 and MF18258*

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Twinax WSC Enhancements

Split Controller Enhancement

- Configuration Benefit
  - Maximum throughput benefit obtained by spreading devices across Ports 0-3 and 4-7 evenly



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5250 Express Data Stream

Overview

- Two independent modes of operation
  - Optimized Mode transfers nearly twice the amount of data
  - 2Mbps Mode increases transmission speed from 1Mbps to 2Mbps
  - Each mode improves media throughput by nearly 2 times
- Optimized and 2Mbps combined can increase media throughput by nearly 4 times!
- Devices must be Optimized and/or 2Mbps enabled
  - Throughput to legacy devices remains the same

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5250 Express Data Stream

Optimized Mode

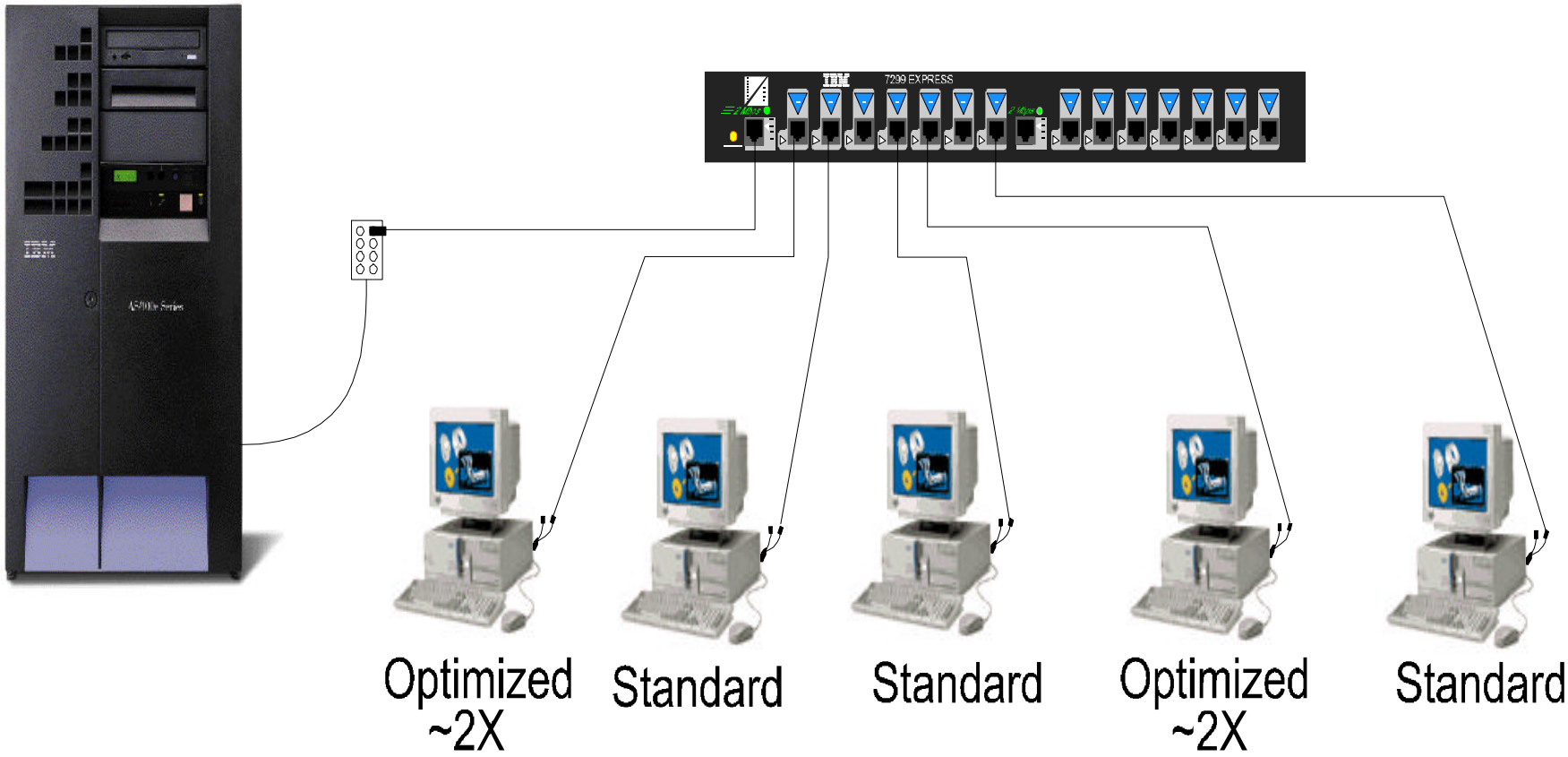
- Devices must be identified as Optimized enabled
  - All subsequent data transfers are Optimized
  - Includes enhanced error detection
- Can share the same WSC port with older devices
  - Media throughput to the Optimized device will be nearly 2X faster
  - The older devices will run at their normal rate
- Compatible with most UTP Hubs
  - Fully supported by IBM 5299/6299/7299 Hubs

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5250 Express Data Stream

Optimized Mode

Optimized Mode connections can be twinax or through a UTP hub as shown



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5250 Express Data Stream

2Mbps Mode

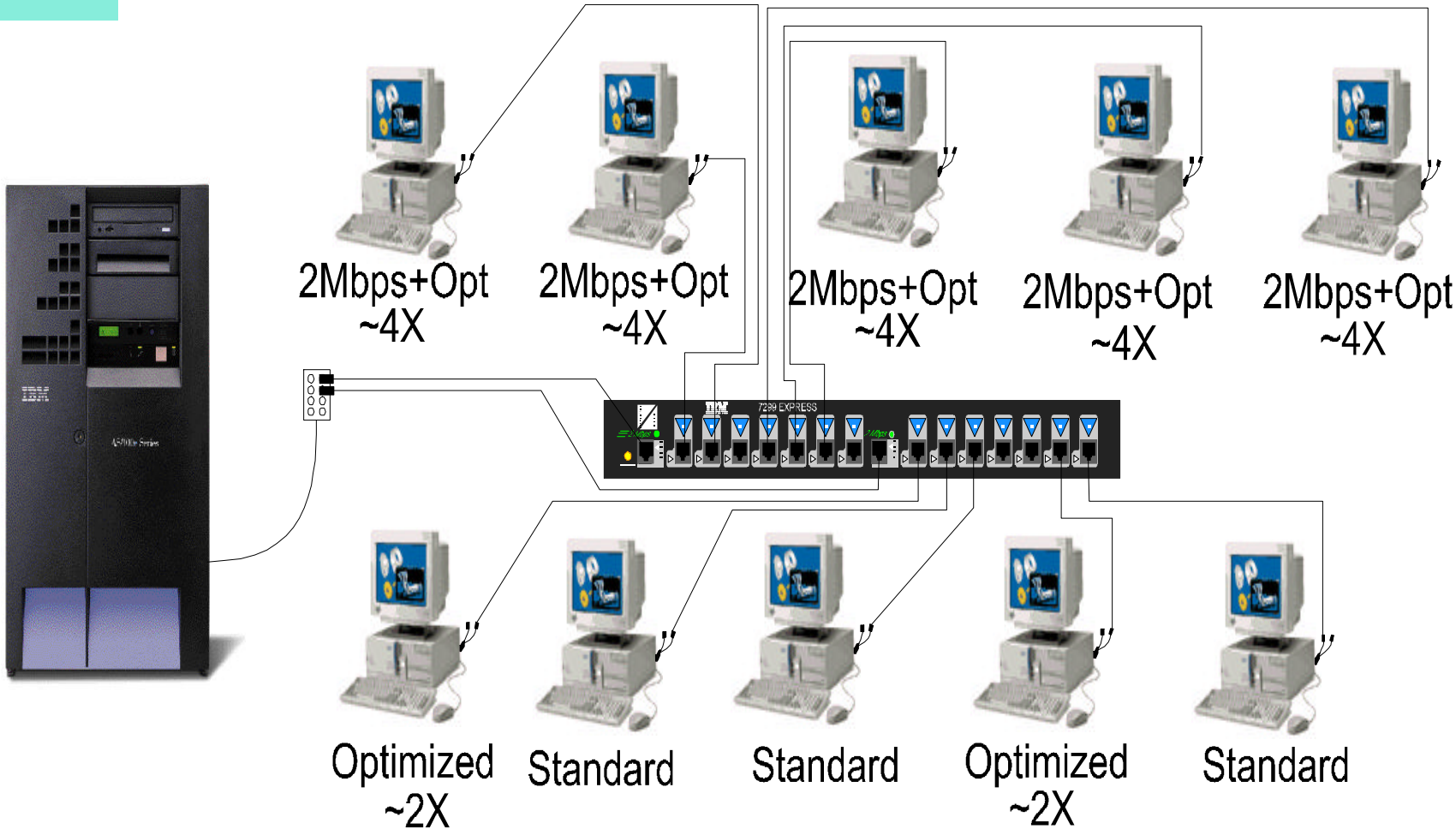
- All devices per WSC port must be identified as 2Mbps enabled
  - If any devices are not 2Mbps capable, port defaults to 1Mbps
- Older devices not compatible, will force port to 1Mbps
  - Should dedicate ports to run at either 1Mbps or 2Mbps rate
- Most Active UTP hubs and Multiplexers are not capable of running 2Mbps
  - The IBM 7299 Express Hub is 2Mbps enabled
- Maximum twinax/UTP distances reduced by about 20%
  - Twinax maximum distance at 2Mbps: 1,219.2m (4,000 ft)
  - UTP maximum distance at 2Mbps: 960.1m (3,150 ft) using 7299

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5250 Express Data Stream

2Mbps Mode

2Mbps Mode connections can be twinax or through a UTP hub as shown

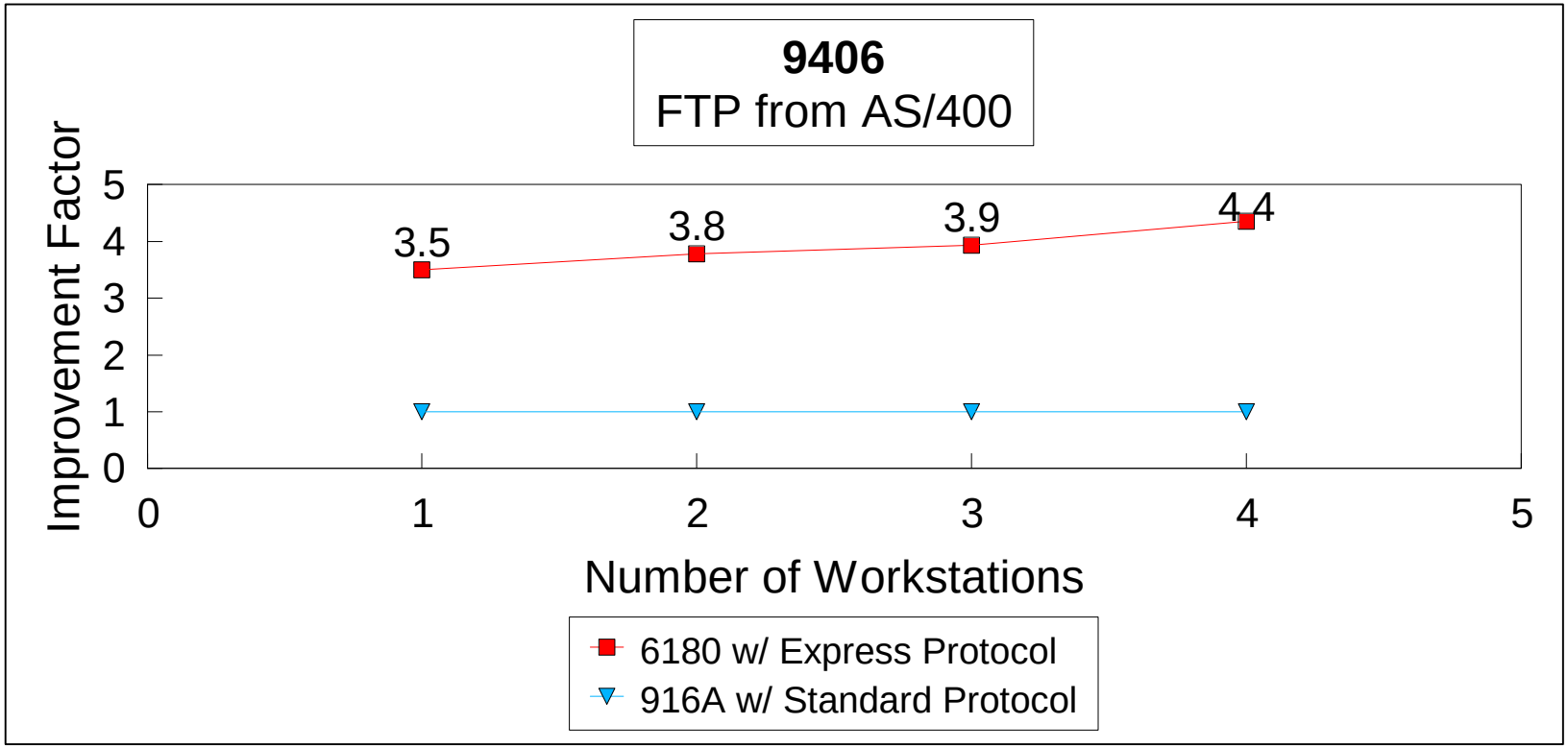


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5250 Express Data Stream

Measured Performance Improvements

- File Transfer using FTP over twinax

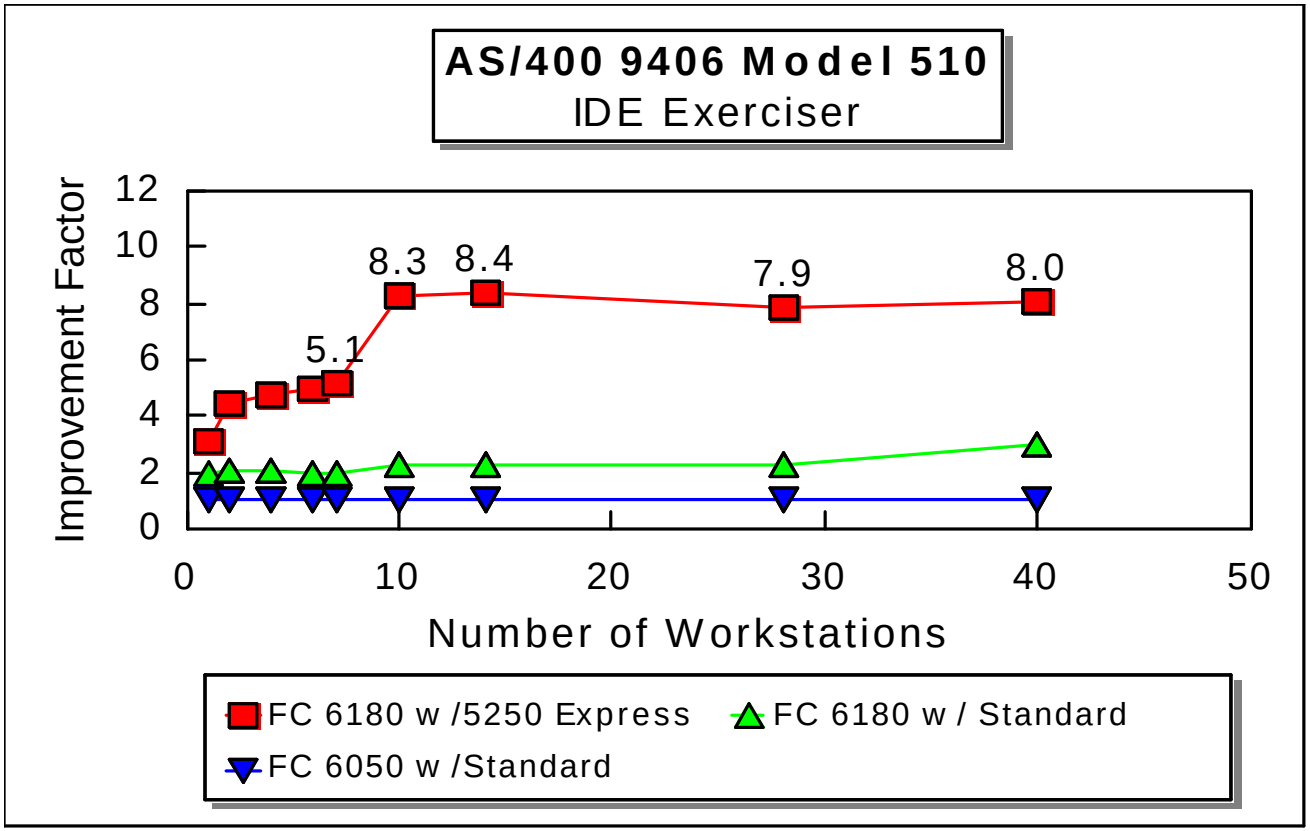


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5250 Express Data Stream

Measured Performance Improvements

- Display exerciser performance improvement times for 1 to 40 PCs



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5250 Express Device Support

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5250 Express Adapters

5250 Express Adapters vs. 5250 Emulation Adapters

Feature Comparison

	New Adapters	*Old Adapters*
ISA	5250 Express ISA Adapter (88H0250)	Enhanced 5250 Display Station Emulation Adapter (30F5383)
PCI	5250 Express PCI Adapter (82H4708)	5250 Emulation PCI Adapter (88H0207)
PCMCIA	5250 Express PC Card (88H0256)	5250 Emulation PCMCIA Adapter (92G5360)
Sessions	7 (Sys/3X) or 28 (AS/400)	2 (Sys/3X) or 8 (AS/400)
Plug& Play	5250 Express ISA Adapter 5250 Express PCI Adapter 5250 Express PC Card	5250 Emulation PCI Adapter 5250 Emulation PCMCIA Adapter
Warranty	Lifetime	1 Yr (ISA), 3 Yr (PCI) or 5 Yr (PCMCIA)
New Features	5250 Express Data Stream Support, TCP/IP Over Twinax	None

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5250 Express Adapters

U.S. Replacement Part Number Information

Description	New 5250 Express Part Number	Old Part Number being replaced
5250 ISA Adapter	88H0250	30F5383
5250 ISA Adapt. + Cable	82H4725	30F5622
5250 ISA 10-Pack	82H4706	82G7301
5250 PCI Adapter	82H4708	88H0207
5250 PCI Adapt. + Cable	82H4719	NONE
5250 PCI 10-Pack	82H4723	NONE
5250 PC Card	88H0256	92G5360
5250 PC Card + Cable	88H0279	11H0742
5250 PC Card 10-Pack	88H0286	04H0181
5250 ISA, Cable, Program for DOS or Windows 95	88H0200	51H5563
5250 ISA, Cable, Program for Windows 3.1X	82H4713	11H0763
5250 Express Program	88H0190	51H5580
5250 Express Program Upgrade	88H0215	51H5583

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5250 Express Adapters

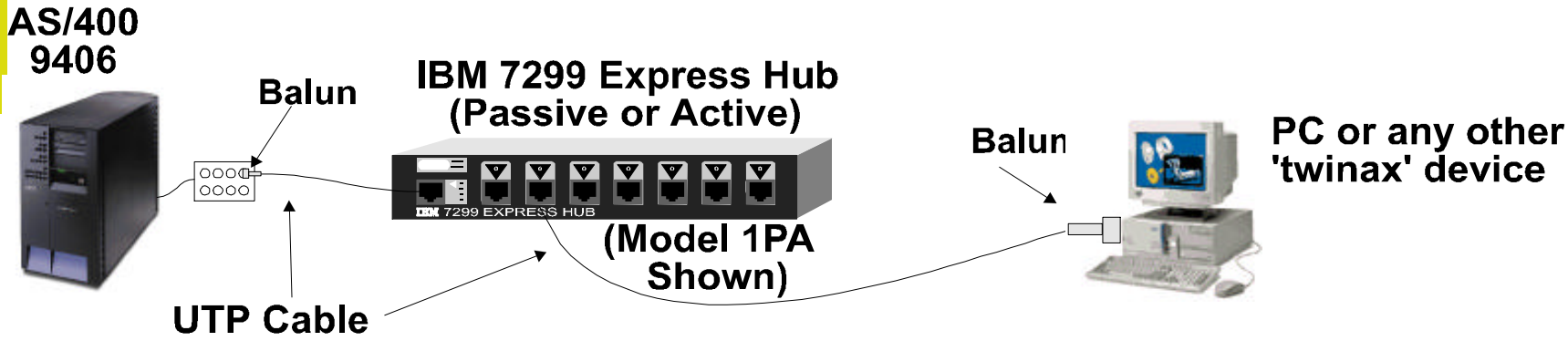
Application Support

- The following applications support both Optimized and 2Mbps modes:
  - TCP/IP Over Twinax Driver for Windows 95/NT
  - Client Access/400
    - *Windows 3.1 (5763-XK1/XC1 V3R1M0 w/PTFs), Windows 95/NT (5763-XD1 V3R1M2/3)*
  - eNetwork Personal Communications V4.2
    - *Windows 3.1, Windows 95 and Windows NT*
  - Personal Communications AS/400 V4.1
    - *Windows 3.1*
  - 5250 Express Program V4.0
    - *DOS, Windows 95 (DOS window) and OS/2 (DOS window)*

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5250 Express Data Stream Over UTP

UTP/FTP Connections



- IBM 7299 Express Hub
  - Completely supports Optimized and 2Mbps modes
  - Models 2EX/2FX
    - *Includes unique 2Mbps indicator light*
    - *Cable length at 2Mbps rate up to 960m (3,150 ft), 1Mbps up to 1,281m (4,200 ft)*
  - Models 1PA/2PA
    - *Cable length at 2Mbps rate up to 69m (225 ft), 1Mbps up to 91m (300 ft)*
- IBM 6299 Hub for Midrange Systems
  - Supports Optimized mode only

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Investment Protection

IP/Twinax and new WSC protect your twinax investment

- 100% Compatible with all twinax displays, printers, etc.
  - Some twinax multiplexers require split controller to be disabled
- IP/Twinax, Express Optimized devices and legacy devices can share the same cable
  - 2Mbps is flexible by supporting one port at a time
- New WSC improves throughput to all twinax adapters, displays and printers
  - Must be configured to take advantage of split controller feature

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Future Migration Tips

- Consider twinax as an easy migration path to e-business using IP/Twinax
  - *Don't wait until you can afford a whole new network to go to e-business!*
- Use Category 5 UTP or FTP cabling for twinax devices
  - Supports most types of data/voice transmission
- Evaluate your requirements for the desktop
  - PC vs. Network Station vs. NPT

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Summary

- IP/Twinax provides LAN-like function on existing 5250 Express Adapters over Twinax
- Twinax Throughput has Increased
  - All older twinax devices are still supported
- 5250 Express Adapters provide Significant New Function and Throughput Enhancements

Test drive TCP/IP Over Twinax to the Internet at the IBM booth

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