

IBM 7299 Express Hub for AS/400 Systems

- **Full line of hubs and multiplexers for connecting 5250-type twinax devices to AS/400 systems and remote controllers**
- **Supports all modes of the 5250 Express Data Stream and AS/400 PCI Twinaxial WSC 'split controller' feature**
- **Maximum throughput to 5250 Express Adapters and Twinax Network Stations**
- **Supports all IBM and compatible twinax displays, printers and 5250 emulation adapters**
- **7299 Express and Entry UTP/FTP Hubs**
 - **Choice of active and passive models with RJ-45 or RJ-11 connectors**
 - **1-Mbps or 2-Mbps line speed**
 - **Advanced dc filtering and transient suppression**
- **7299 Express Fiber Optic Multiplexer**
 - **Connects any twinax device to any twinax host's WSC using fiber optic cabling**
 - **Multiplexes data from one or two AS/400 or System/36 hosts or 5494 Remote Control Units over a single fiber pair**
 - **Supports up to 56 twinax devices**



IBM's 7299 Family of products for AS/400® systems can help you maximize throughput to your 5250 Express adapters and still support all of your other twin-attached devices. Six models, including the IBM 7299 Express Hubs, the 7299 Multiplexer and the 7299 Entry Hubs, all connect 5250-type devices to AS/400, AS/400 Advanced 36 and System/3x hosts, and 5394/5494 Remote Control Units.

The Express Hub—with four models—and the Entry Hub connect to devices using low-cost Category 5 unshielded twisted pair (UTP) or foiled twisted pair (FTP) cabling; the Express Multiplexer uses fiber optic cabling.

Product Overview

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When used with an AS/400 host—such as the AS/400 Advanced Model 600—and 5250 Express adapters, the 7299 supports all of the features of the 5250 Express Data Stream and the AS/400 PCI Twinaxial Workstation Controller. That means increased throughput to 5250 Express adapters—up to eight times as fast—and increased productivity through reduction of transmission-related delays.

The 5250 Express Data Stream has two enhanced modes not found in the legacy 5250 data stream:

- Optimized mode reduces the number of bits required to transmit the same amount of data compared with the traditional 5250 data stream.
- 2-Mbps mode doubles overall line speed from 1 Mbps to 2 Mbps.

When both optimized and 2-Mbps modes are in use, throughput can increase by nearly four times. Of course, actual application performance improvements depend on host and PC processor speed and system load. The AS/400 PCI Twinax WSC split controller mode can increase throughput by an additional two times. The 7299 family of hubs and multiplexers support all of these enhanced modes, equaling nearly eight times increased throughput as compared to the IBM 6299 hubs and multiplexers.

Meet the 7299 Express Family of Hubs and Multiplexers

The IBM 7299 Express Multiplexer takes advantage of all of the increased performance of the AS/400e™ Twinaxial Workstation Controllers to connect up to 56 remote 5250-type devices (such as 5250 Express Adapters or twinax displays) using fiber optic cabling. The 7299 Multiplexer also allows up to two AS/400e, AS/400, System/36™ hosts and 5494 Remote Control Units to simultaneously share a single set of fiber optic cabling to connect to 5250-type devices at a distant site.

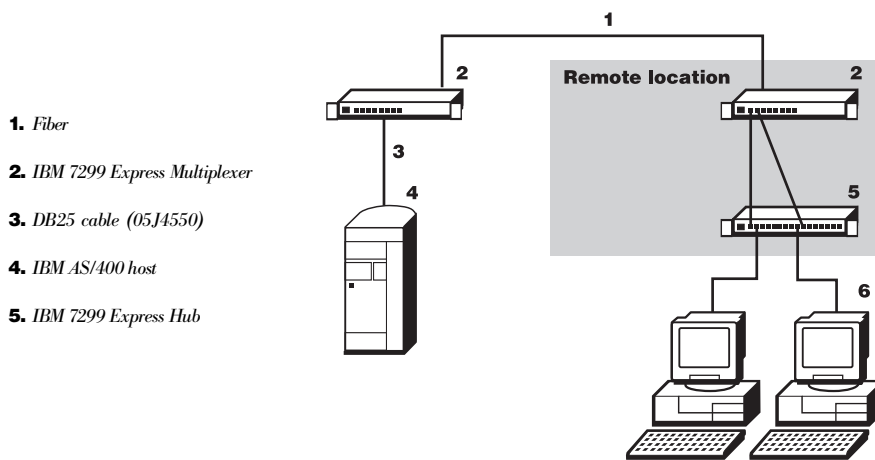
This multiplexer is different from other twinax multiplexers in that it supports all of the AS/400e Twinaxial WSC features, including split controller and the 5250 Express Data Stream. It has eight host port device activity LEDs on the front panel that indicate host/device activity. The 7299 Multiplexer can also be connected in a ring configuration that can save you money—more devices using fewer multiplexers with less fiber optic cabling.

The IBM 7299 Express Hub supports all IBM-compatible 5250-type devices to an IBM host with a Twinaxial WSC over UTP or FTP cabling. The 7299 Express Hubs can attach high-speed 5250 Express Adapters for browsing graphical Web sites (using TCP/IP to an AS/400 host) as well as legacy 3197 Color Display Station with green-screen access to a System/36 host. The same 7299 Express Hubs speed your data over UTP or FTP cabling.

The IBM 7299 Entry Hub is a low-cost, traditional 1-Mbps active UTP hub that can easily be upgraded to 2-Mbps enhanced 5250 Express Data Stream rates. The Entry Hub connects your legacy 5250-type devices to your AS/400, System/3x or 5494 Remote Control Unit if you don't need the faster 5250 Express Data Stream speeds today. You can upgrade to these higher speeds when you need them in the future.

Say good-bye to twinaxial daisy-chaining

The 7299 Express Hub and Entry Hub are star hubs, providing a superior alternative to twinaxial cabling for connecting to an AS/400 host and other twinax hosts. Twisted-pair cabling is far less expensive than twinaxial—about one-fifth the cost—and it can be used for other voice and data connections as well. All 7299 Express models connect one or two twinaxial workstation controller ports to seven or fourteen 5250-type devices, for maximum versatility. Each device is connected directly to the hub using star topology, enabling you to use a patch panel to connect each user instead of twinaxial daisy-chain topology.



A typical 7299 Express Multiplexer “point-to-point” connection

What's the advantage of star topology? It's simple. Devices are individually cabled to an isolated hub port instead of physically daisy-chained together as with twinaxial cabling. Removing a device and its attachment cable from a twinaxial line will break the chain and bring down everyone else on the line. Star topology allows devices to be dynamically added, moved or deleted without affecting other devices.

Migration made simpler

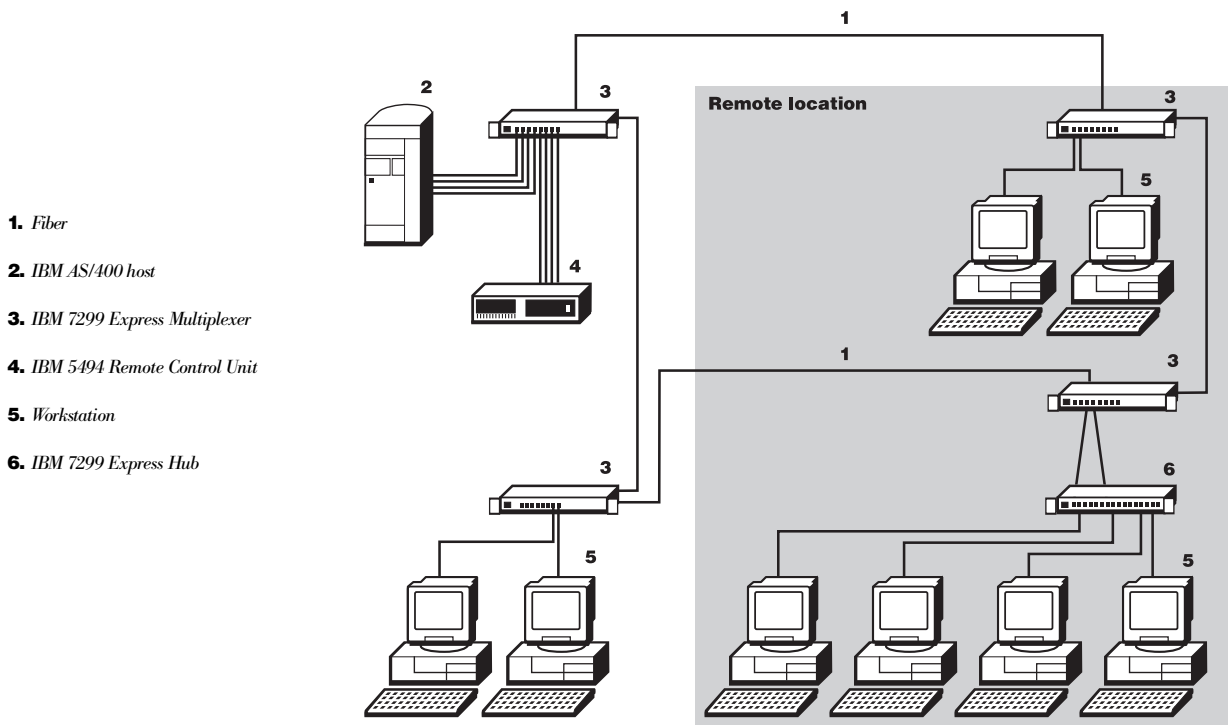
If you currently use AS/400 Advanced 36 or System/3x and plan to migrate to an AS/400 host, the 7299 Hub models can pave the way. They are easier to configure than the IBM 6299 Hub for midrange systems, and they support the connection of all types of IBM-compatible 5250 devices to AS/400 and System/3x hosts. The 7299 supports all models of AS/400, AS/400 Advanced 36 and System/3x, IBM 5394 and 5494 Remote Control Units, and all legacy 5250-type adapters, displays and printers that run at the standard 1-Mbps non-optimized data rate, for maximum investment protection.

Active models for noise reduction

7299 Express Hub Models 2EX, 2FX and 2EN are 2-port active star hubs that support up to 14 attached devices. Their receiver circuitry provides improved impedance-matching and reduces reflection problems. Advanced dc filtering and transient suppression provide excellent immunity to ac power line noise. These models provide true protocol transparency for maximum 5250-type device performance and reliability.

When used in conjunction with the IBM baluns, which filter out noise, these models provide a clear transmission path and prevent noise-related session loss. They also have phase-correcting circuitry that detects reverse twinaxial phase and automatically corrects it, thereby maintaining the correct phase for all connections.

Models 2EX, 2FX and 2EN have two host LEDs per host port and 14 device LEDs. One of the host LEDs and all of the device LEDs indicate host and device port activity, which is useful for debugging connection problems. The other host port LED indicates when the attached devices are running at the faster 2-Mbps data rate supported by the 5250 Express adapters (this LED is inactive on the 2EN until the 2 Mbps upgrade kit is installed). This unique feature helps with debugging network problems by indicating when your attached devices are running at the faster rate. Model 2FX has shielded RJ-45 connectors, Model 2EX has either unshielded RJ-45 or RJ-11 connectors and Model 2EN has unshielded RJ-45 connectors.



Four Multiplexers connected by a "ring" of fiber optic cabling

Features	Benefits
Support for 5250 Express Data Stream	Reduces transmission-related delays.
Foiled or unshielded twisted-pair cabling	<ul style="list-style-type: none"> • Saves costs over twinax. • Can provide voice or data connections in addition to the 5250 connection.
Connection of 5250-type devices to AS/400, AS/400 Advanced 36 and System/3x hosts at the legacy 1-Mbps data rate	Provides investment protection.
Six all-inclusive models	Meets all of your UTP, FTP, and fiber hub/multiplexer needs.
Supports PCI Twinax WSC split controller mode	Doubles the throughput to all 5250-type devices.

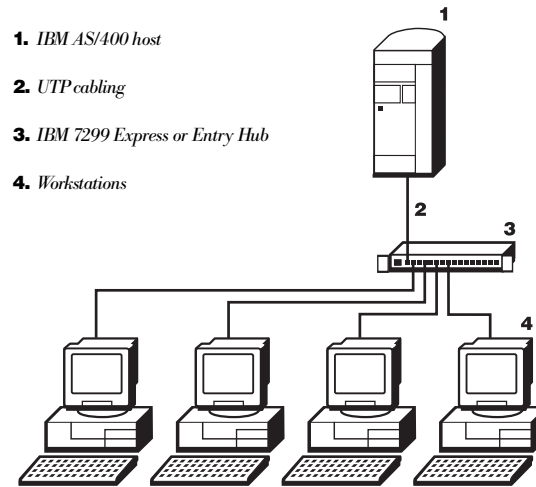
Passive models for low-cost connectivity

If you're looking for a low-cost solution for connecting 5250-type devices to AS/400, AS/400 Advanced 36 or System/3x host systems over short distances using Category 5 twisted-pair cabling, here it is. 7299 Express Hub Models 1PA and 2PA are passive UTP hubs that are an excellent choice for short-distance connections. In fact, the 7299 replaces the IBM 5299 Terminal Multiconnector as the IBM passive UTP hub offering. The 7299 Model 2PA supports two host ports and is rack-mountable, unlike the 5299. Model 1PA is functionally identical to the 5299.

Both passive models include true star circuitry, eliminating the need for cable-tuning and preventing interference from shorted or open devices. Model 1PA supports one host port and seven devices, whereas Model 2PA supports two host ports and 14 devices. Neither model requires power and can be used in wiring closets with no power available for active devices. Both models split the host signal from each host port and distribute it evenly among attached devices.

Year 2000 ready

These products do not have date dependencies and are therefore year 2000 ready.



1. IBM AS/400 host
2. UTP cabling
3. IBM 7299 Express or Entry Hub
4. Workstations

7299 Express or Entry Hub connecting twinax devices using UTP or FTP cabling

7299 Express Hubs/Multiplexers for AS/400 Systems Specifications

IBM 7299 Express and Entry Hubs model options

Part number	Model	Specify code	Host ports	Device ports	International power supply included	Diagnostic LEDs	5250 Express Support	Connector* type
05J3360	2EX	4545	2	14	Yes	Yes	Yes	U RJ-45
05J3365	2EX	1111	2	14	Yes	Yes	Yes	U RJ-11
05J3370	2FX	N/A	2	14	Yes	Yes	Yes	S RJ-45
05J4545	2EN	N/A	2	14	Yes	Yes	Yes**	U RJ-45
05J3380	1PA	4545	1	7	No	No	No	U RJ-45
05J3385	1PA	1111	1	7	No	No	No	U RJ-11
05J3390	2PA	4545	2	14	No	No	No	U RJ-45
05J3395	2PA	1111	2	14	No	No	No	U RJ-11

IBM 7299 Multiplexer model options

Part number	Model	Specify code	Host ports	Device ports	International power supply included	Diagnostic LEDs	5250 Express Support	Connector* type
05J4540	8MX	N/A	8	8***	Yes	Yes	Yes	DB25/Fiber/ S RJ-45

* S=shielded U=unshielded

** Requires 2 Mbps upgrade kit

*** The 7299 Express Multiplexer has eight shielded RJ-45 connectors that can be either directly connected to devices or input into the host side of 7299 hubs.

Maximum configuration

- The 7299 Models 2EX, 2EN, 2FX and 2PA support a maximum of 2 host ports and 14 devices each.
- 7299 Model 1PA supports a maximum of 1 host port and 7 devices.
- The 7299 Multiplexer Model 8MX supports up to 8 host ports and 56 devices (when used with any combination of four 7299 Express Hubs models 2EX, 2FX, 2EN, or 2PA).

Physical specifications

7299 Express Hub	7299 Multiplexer/7299 Entry Hub
<ul style="list-style-type: none"> • Models 2EN, 2EX, 2FX Width: 437 mm (17.2 in.) Depth: 222 mm (8.75 in.) Height: 42 mm (1.65 in.) Weight: 1.9 kg (4.21 lb) • Model 1PA Width: 229 mm (9 in.) Depth: 222 mm (8.7 in.) Height: 42 mm (1.65 in.) Weight: 1.5 kg (3.25 lb) • Model 2PA Width: 437 mm (17.2 in.) Depth: 222 mm (8.75 in.) Height: 42 mm (1.65 in.) Weight: 2.1 kg (4.75 lb) 	<ul style="list-style-type: none"> • Model 8MX Width: 437 mm (17.2 in.) Depth: 222 mm (8.75 in.) Height: 42 mm (1.65 in.) Weight: 1.9 kg (4.21 lb)

Operating environment

- Temperature: 0° to 55°C (32° to 131°F)
 Relative humidity: 10% to 90%
 Maximum wet-bulb temperature (caloric value): 26.7°C (80°F)
 Capacity of exhaust: None (no fan)
 Noise level: None (no fan)
 For Models 2EX, 2FX, 8MX and 2EN only:
- Electrical power: 0.023 kVA
 - Power consumption in active mode: 14 watts
 - Leakage and starting current: 0.00075/50 A

7299 Express Hubs / Multiplexers for AS/400 Systems (continued)

Compatibility The IBM 7299 Express Hub for AS/400 systems, the IBM 7299 multiplexer, and the IBM 7299 Entry Hub are compatible with all AS/400, System/36, System/38™ Twinax Controllers and 5394/5494 Remote Control Units. The 7299 family is also compatible with all IBM 5250-type devices and 100% IBM-compatible 5250-type devices.

Distance limitations**7299 Hub**

<i>Model</i>	<i>Connection</i>	<i>UTP Cat 3 at 1 Mbps</i>	<i>UTP Cat 3 at 2 Mbps</i>	<i>UTP Cat 5 at 1 Mbps</i>	<i>UTP Cat 5 at 2 Mbps</i>
2EN	Host to 7299	610 m (2000 ft)	305 m (1000 ft)*	610 m (2000 ft)	457 m (1500 ft)*
2EN	7299 to device	549 m (1800 ft)	274 m (900 ft)*	670 m (2200 ft)	503 m (1650 ft)*
2EX/2FX	Host to 7299	610 m (2000 ft)	305 m (1000 ft)	610 m (2000 ft)	457 m (1500 ft)
2EX/2FX	7299 to device	549 m (1800 ft)	274 m (900 ft)	670 m (2200 ft)	503 m (1650 ft)
1PA	Host to device	91 m (300 ft)	69 m (225 ft)	91 m (300 ft)	69 m (225 ft)
2PA	Host to device	91 m (300 ft)	69 m (225 ft)	91 m (300 ft)	69 m (225 ft)

* after 2 Mbps Upgrade kit is installed

7299 Express Multiplexer

<i>Model</i>	<i>Connection</i>	<i>UTP Cat 3 at 1 Mbps</i>	<i>UTP Cat 3 at 2 Mbps</i>	<i>UTP Cat 5 at 1 Mbps</i>	<i>UTP Cat 5 at 2 Mbps</i>	<i>Fiber Optic</i>	<i>High-Speed DB25 Cable</i>
8MX	Host to 7299 Mux	610 m (2000 ft)	305 m (1000 ft)	610 m (2000 ft)	457 m (1500 ft)		9.1 m (30 ft)
8MX	7299 Mux to Mux ¹					2012 m (6600 ft)	
8MX	7299 Mux to Mux ²					1509 m (4950 ft)	
8MX	7299 Mux to Mux ³					1006 m (3300 ft)	
8MX	7299 Mux-7299 hub	305 m (1000 ft)	152 m (500 ft)	366 m (1200 ft)	274 m (900 ft)		
8MX	7299 Mux-Device	549 m (1800 ft)	274 m (900 ft)	670 m (2200 ft)	503 m (1650 ft)		

¹ Maximum distance between two multiplexers attached point-to-point with fiber

² Maximum distance between each of three multiplexers connected in a ring with fiber

³ Maximum distance between each of four multiplexers connected in a ring with fiber

Warranty One year on-site installation information

Installation information**Hardware**

The IBM 7299 Express Hub for AS/400 systems, the 7299 Express Multiplexer, and the 7299 Entry Hub attach to the Twinaxial Workstation Controller of any model of the AS/400, AS/400 Advanced 36, System/36, System/38, 5394 Remote Control Unit or 5494 Remote Control Unit. 5250 Express Data Stream and split controller support require an AS/400 host configured with one of the following Twinaxial WSCs: 2720, 2722, 6180, 9280, 9720, 9722 and the latest PTF applied at the host. The 5250 Express Data Stream also requires an IBM 5250 Express ISA, PCI or PC Card installed in a supported PC or a Network Station™ Model 341.

Installation information (continued)

Software The AS/400 host must be running OS/400® V3 R7 with PTF MF15833 or later to take advantage of the 5250 Express Data Stream. If an earlier version of OS/400 is used, the product will automatically operate at the standard non-optimized, 1-Mbps 5250 data stream rates. To determine what PC software is required to support the 5250 Express Data Stream on PCs with 5250 Express adapters installed, refer to the IBM 5250 Emulation Family Home Page at www.networking.ibm.com/5250.

Publication *IBM 7299 Express Family for AS/400 Planning, Installation, and Maintenance Guide*, S05J-3355 is shipped with the products. A downloadable version is available from the Internet at www.networking.ibm.com/5250.

Baluns

The following unshielded, unterminated baluns work on most 5250 devices:

Part number	Description
05J4565	Twinax-to-UTP balun, RJ-45 (4/5), 8-pack
05J4570	Twinax-to-UTP balun, RJ-45 (4/5), 16-pack
31H5077	Twinax-to-UTP balun, RJ-45 (4/5) with 3-m (10-ft) UTP male-to-male
31H5073	Twinax-to-UTP balun, RJ-11 (2/5) with 3-m (10-ft) UTP male-to-male
31H5074	Twinax-to-UTP balun, RJ-11 (3/4) with 3-m (10-ft) UTP male-to-male
31H5075	Twinax-to-UTP balun, RJ-45 (1/2) with 3-m (10-ft) UTP male-to-male
31H5076	Twinax-to-UTP balun, RJ-45 (3/6) with 3-m (10-ft) UTP male-to-male

The following shielded, unterminated balun is for FTP networks:

Part number	Description
05J4560	Twinax-to-FTP balun, RJ-45 (4/5)

The following baluns are for IBM 3179, 3180, 3196 and 3197 displays only:

Part number	Description
31H5082	Twinax-to-UTP balun, self-terminating RJ-45 (4/5) with 3-m (10-ft) UTP male-to-male
31H5078	Twinax-to-UTP balun, self-terminating RJ-11 (2/5) with 3-m (10-ft) UTP male-to-male

The following baluns are for IBM 5250 Express Adapters or IBM 5250 Emulation Adapters only:

Part number	Description
31H5087	DB-15-to-UTP balun, self-terminating RJ-45 (4/5) with 3-m (10-ft) UTP male-to-male
60G1042	DB-15-to-UTP balun, self-terminating RJ-11 (2/5) with 3-m (10-ft) UTP male-to-male

Cables and connectors

This 10-m (30-ft) cable connects the AS/400 twinax WSC directly to the 7299 Express Multiplexer DB25 port.

(The 8-port twinax "brick" must be disconnected.)

Part number	Feature code	Description
05J4550	FC 4550	High-Speed, 10-m (33-ft) DB25 Cable

This Y-cable can connect two AS/400 PCI Twinax/WAN ports or both 5494 Remote controller ports to a single connection to the 7299 Express Multiplexer through the high-speed 10-m DB25 cable.

Part number	Feature code	Description
05J4533	FC 4533	4-Port WSC-to-DB25 Y-Cable

This connector allows a remote side 7299 Express Multiplexer to connect to the 8-port twinax "brick" directly.

Part number	Feature code	Description
05J4534	FC 4534	DB15 Female-to-Female Adapter

Upgrades

This kit includes everything required to upgrade the 7299 Entry Hub (Model 2EN) to support the 5250 Express Data Stream.

Part number	Feature code	Description
05J4555	FC 4555	7299 Entry Upgrade Kit

Key Customer Benefits

- Reduces transmission-related delays
- Saves money over twinaxial; can be used for other twisted-pair cabling/voice or data connections in addition to the 5250 connection
- Investment protection
- Makes setup easier and quicker
- Optimizes transmission capabilities

Supplementary Information

- Specification sheet:
IBM 7299 Express Family for AS/400 Systems, G224-4535
- Information on the IBM 7299 Express Hub for AS/400 Systems is available at:
www.networking.ibm.com/729/729over.html