

March 12, 2002



United States

configuration and options guide

@server **xSeries servers**

IntelliStation workstations

Storage enclosures

Fibre Channel solutions

Options



IBM Server *Proven™*

ibm.com/pc/us/eserver/xseries/library

Introducing in this issue ...

- xSeries 440
- New Datacenter Cluster Solution with xSeries 440 servers
- NetBAY11 Standard Rack Cabinet



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Information Sources

Canada		
Audience	Where to go	How to get
IBM xSeries Configuration and Options Guide		
Customers	www.pc.ibm.com/ca/eserver/xseries/index.shtml	
Business Partners	www.pc.ibm.com/partner/ca	Select "Sales Tools" and then "Marketing Essentials." User ID and Password required.
IBM Employees	Marketing Essentials	By Brand category --> IBM Netfinity or By Brand category --> PC Configurator
Feedback	www.pc.ibm.com/partner/ca/feedback.html	
IBM xSeries and Netfinity Rack Configurator		
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Feedback	ibm_netfinity_rack_configurator@vnet.ibm.com	E-mail
PCSales Guide/Configurator and WorkPad Pricer (updated twice weekly)		
Customers	www.can.ibm.com/config	Download PSC-NA1 and PSC-NA2.
Business Partners	www.pc.ibm.com/partner/ca/	Download PSC-NA1 and PSC-NA2, 3 or 4. User ID and Password required.
IBM Employees	PartnerNEWS	Configurator, PSC-NA1 and PSC-NA2, 3 or 4
Feedback	bburgess@ca.ibm.com	E-mail
Latest Product & Technical Information		
Customers	www.pc.ibm.com/ca/eserver/xseries/index.shtml	
Business Partners	www.pc.ibm.com/partner/ca or call the PSMT	User ID and Password required.
IBM Employees	Marketing Essentials	By Brand category --> IBM Netfinity or By Brand category --> PC Configurator.
Latin America		
IBM xSeries Configuration and Options Guide		
Customers	www.pc.ibm.com/us/eserver/xseries/library	Select "Configuration Tools."
Business Partners	Marketing Essentials in ePartner	See footnote 1.
IBM Employees	Marketing Essentials in Lotus Notes PartnerInfo	By Brand category --> IBM Netfinity or By Brand category --> PC Configurator
Feedback	laconfig@us.ibm.com	E-mail
IBM xSeries and Netfinity Rack Configurator		
Customers	www.pc.ibm.com/us/eserver/xseries/library	Select "Configuration Tools."
Business Partners	Marketing Essentials in ePartner	See footnote 1.
IBM Employees	Marketing Essentials in PartnerInfo	By Brand category --> IBM Netfinity or By Brand category --> PC Configurator
Feedback	ibm_netfinity_rack_configurator@vnet.ibm.com	E-mail
Latest Product & Technical Information		
Customers	www.pc.ibm.com/la	
Business Partners	www.pc.ibm.com/la/ or www.pc.ibm.com/br	See footnote 1.
IBM Employees	Marketing Essentials in PartnerInfo	By Brand category --> IBM Netfinity or By Brand category --> PC Configurator

1. ID and Password required. Spanish==>www.pc.ibm.com/la. Select Partner World/VAR 2000. Then select either PartnerWorld or VAR2000 and request an ID and Password. Brazil==> www.pc.ibm.com/br/. Select PartnerWorld and then Formulario de Cadastramento. If you have an ID/Password, Spanish==> www.pc.ibm.com/la/. Select PartnerWorld/VAR2000. Then select Marketing Essentials, then PC Configurator. Brazil==> www.pc.ibm.com/br/. Select PartnerWorld and then Marketing Essentials.

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IBM xSeries Configuration and Options Guide		
Customers	www.pc.ibm.com/us/eserver/xseries/library	Select Configuration Tools.
	www.pc.ibm.com/us/compat	Select Configuration and Options Guide.
Business Partners	www.pc.ibm.com/partner/us/	Select Marketing Information --> Marketing Essentials --> Configuration and Options Guide. User ID and Password required.
IBM Employees	PC Marketing Essentials (US) on Lotus Notes database D04DB014	Main menu --> Configuration and Options Guide
Feedback	www.pc.ibm.com/partner/us/feedback.html	
IBM xSeries Rack Configurator		
Customers	www.pc.ibm.com/us/eserver/xseries/library	Select "Configuration Tools."
Business Partners	www.pc.ibm.com/partner/us/	Select Sales Tools, then Marketing Essentials, then IBM PC Server--> Rack Configurator. User ID and Password required.
IBM Employees	PC Marketing Essentials (US) on Lotus Notes database D04DB014	Main menu --> Configurators
Feedback	ibm_netfinity_rack_configurator@vnet.ibm.com	E-mail
Latest Product & Technical Information		
Customers	www.pc.ibm.com/us/eserver/xseries or call 1-800-772-2227	
Business Partners	www.pc.ibm.com/partner/us/ or call 1-800-426-7763	Select Products & Services; User ID and Password required.
IBM Employees	PC Marketing Essentials (US) on Lotus Notes database D04DB014	From main menu or by brand category.
Additional URLs		
Audience	Where to go	How to get
Technical spec sheets (PSREF)	www.ibm.com/us/eserver/xseries/library	Select "Technical spec sheets (PSREF)."
IBM Datacenter Solutions	www.developer.ibm.com/xseries/index.html	Under "News" select "Solutions Library." Under "Most Popular Solutions" select "Windows 2000 Datacenter Server."
Clustering (US, LA, CAN)	www.pc.ibm.com/ww/eserver/xseries/clustering/index.html	Select desired category or server.
Benchmark Results	www.pc.ibm.com/ww/eserver/xseries/benchmarks/	Select desired category or server.
Options/NOS/Server Compatibility	www.pc.ibm.com/us/compat	From pulldown select desired category.
NOS - Hot-Plug/Failover Support	www.pc.ibm.com/us/compat	From pulldown select "Netfinity Hotplug PCI and Failover Info."
IBM Storage Products	www.storage.ibm.com	
Adobe® Acrobat® Reader V 4.0 or 5.0	www.adobe.com/products/acrobat/readstep.html	Follow instructions.
Adv Sys Mgmt Adapter Firmware	www.pc.ibm.com/ww/eserver/xseries	Select Support and Downloads, server brand, Hardware Drivers (Fixes menu), family, model, then Advanced Systems Management in the Downloadable Files menu.
Flash BIOS Updates	www.pc.ibm.com/ww/eserver/xseries	Select Support and Downloads, server brand, Hardware Drivers BIOS (Fixes menu), family, model, then BIOS in the Downloadable Files menu.
ServeRAID™ Updates	www.pc.ibm.com/ww/eserver/xseries	Select Support and Downloads, server brand, then ServeRAID drivers in the Fixes menu.

INFORMATION SOURCES

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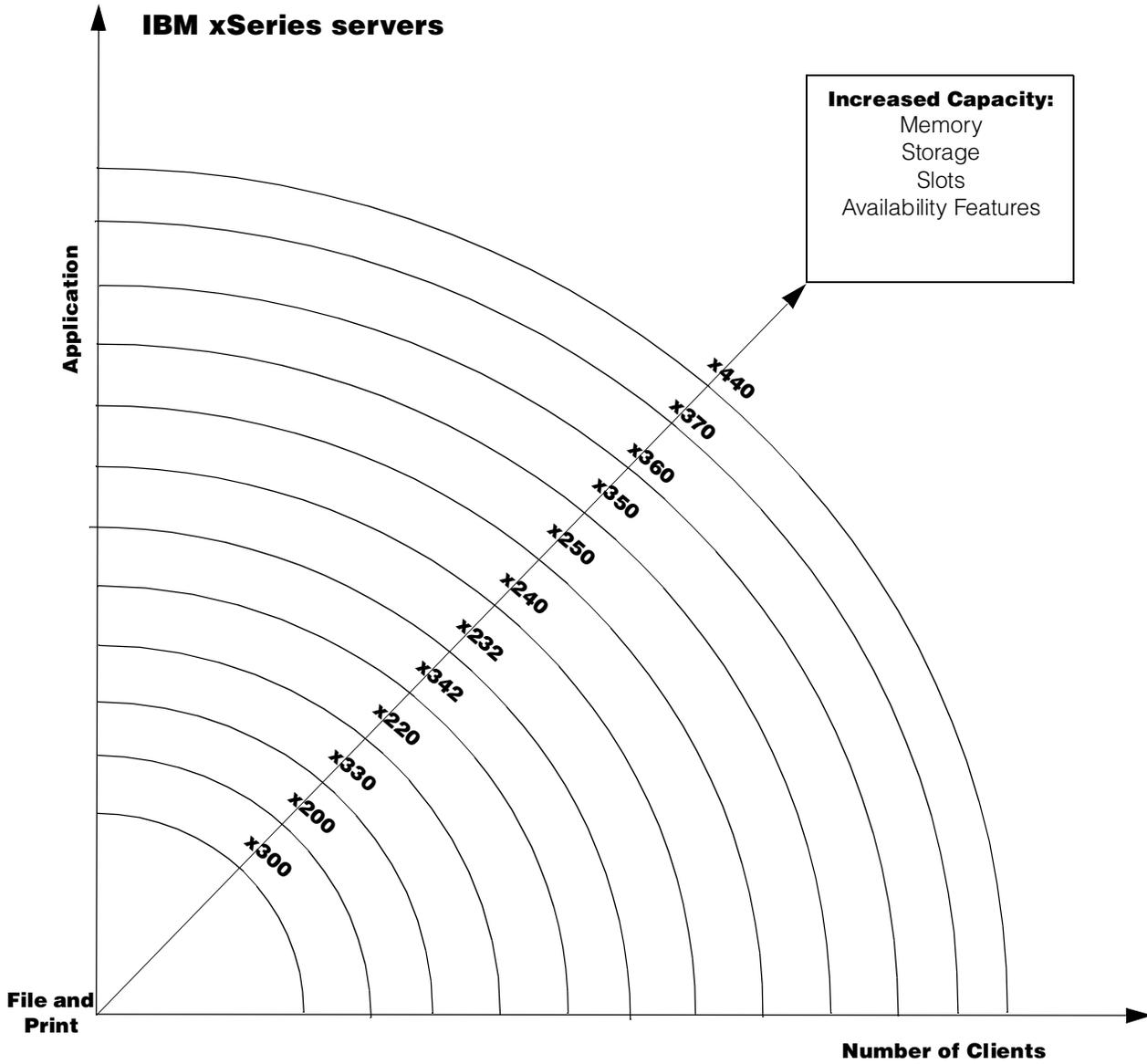
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The following sample configurations are for illustration only and may not be suitable for any specific customer installation. Contact your IBM Business Partner or IBM Marketing Representative for assistance with your specific configuration requirements.



Server Product Positioning





When in a competitive situation, this table suggests the appropriate IBM xSeries server to bid against other vendors' equipment. However, as an IBM business partner, you may determine that customer-specific requirements may make an alternative IBM solution a better choice.

	Value	Price Performance	Mission Critical	Rack Optimized
8-way			IBM: xSeries 370, xSeries 440 Compaq: ProLiant 8000, ML750 Dell: No Offering HP: NetServer LH 6000, LT6000R	IBM: xSeries 370, xSeries 440 Compaq: ProLiant 8500 Dell: PowerEdge 8450 HP: NetServer LXr 8000
4-way		IBM: xSeries 250 Compaq: ProLiant ML570 Dell: PowerEdge 6400 HP: NetServer LH4	IBM: xSeries 250 Compaq: No Offering Dell: No Offering HP: NetServer LXr 8000	IBM: xSeries 350, xSeries 360 Compaq: ProLiant DL580 Dell: PowerEdge 6450 HP: NetServer LH4r
2-way	IBM: xSeries 220 Compaq: ProLiant ML350 Dell: PowerEdge 1300 HP: NetServer E60	IBM: xSeries 232 Compaq: ProLiant ML370 Dell: PowerEdge 2400 HP: NetServer LC2000	IBM: xSeries 240 Compaq: ProLiant ML530 Dell: PowerEdge 4400 HP: NetServer LH 3000	IBM: xSeries 330, xSeries 342 Compaq: ProLiant DL380, DL360 Dell: PowerEdge 2450 HP: NetServer LPr
Uni	IBM: xSeries 200 Compaq: ProLiant ML330 Dell: No Offering HP: No Offering			IBM: xSeries 300 Compaq: ProLiant DL320 Dell: PowerEdge 350 HP: NetServer LPr

PRODUCT POSITIONING



IBM xSeries™ Selection Guide

This graph represents general guidelines for selecting the appropriate server based on the number of users that can be supported in a particular application environment. This chart is for general guidance since each customer environment is unique and is unlikely to be precisely represented by any of the specific applications in the chart, but by using the chart, a reasonable approximation can be derived. External Storage Units are utilized when internal capacities are exceeded. Utilize the chart by following the steps outlined at the end of this section. These are not published benchmark results. Access www.pc.ibm.com/www/eserver/xseries/benchmarks/index.html to obtain the benchmark data.

Application/ Expectation of Maximum # of Users		xSeries 200 Uni- Pentium® III 1.26GHz/ 512KB	xSeries 220 Dual Pentium III 1.4GHz/ 512KB	xSeries 300 Uni- Pentium III 1GHz/ 256KB	xSeries 330 Dual Pentium III 1.4GHz/ 512KB	xSeries 342 Dual Pentium III 1.4GHz/ 512KB
DB Transaction Processing Select, Update and Delete; Does not include image or Decision Support	# Users	1500	2030	1500	2175	3680
	# Processors	1	2	1	2	2
	Memory	1.5GB	2GB	1.5GB	2GB	4GB
	# Hard Disk Drives	12 to 18	40 to 50	12 to 20	36 to 48	50 to 70
	# RAID Adapters	≥1	≥2	1	≥2	≥2
	# Network Connections	1	1	1	1	1 to 2
File and Print Application is stored locally. (For server stored applications - cut number of users in half).	# Users	800	1000	800	2100	2300
	# Processors	1	2	1	2	2
	Memory	1.5GB	2GB	1.5GB	2GB	2GB
	# Hard Disk Drives	5 to 10	4 to 8	5 to 10	20 to 30	20 to 30
	# RAID Adapters	≥1	1	1	1 to 2	1 to 2
	# 100Mbps Ethernet Connections	≥2	2	2	4	4 or 1Gb
Lotus® Notes® 10% Power Users 40% Mail 50% Mail & DB	# Users	900	1215	900	2010	3200
	# Processors	1	1	1	2	2
	Memory	1.5GB	2GB	1.5GB	2GB	3GB
	# Hard Disk Drives	5 to 10	10 to 15	5 to 10	20 to 30	20 to 30
	# RAID Adapters	≥1	1	1	1 to 2	1 to 2
	# Network Connections	≥1	≥2	≥2	≥2	≥3
Microsoft® Exchange Server 2000 100% Med Users 30MB Mailbox	# Users	1600	3820	1600	5070	5320
	# Processors	1	2	1	2	2
	Memory	1GB	1GB	1GB	2GB	4GB
	# Hard Disk Drives	9	10	10 to 14	10	6
	# RAID Adapters	1	≥1	1	1	1
	# Network Connections	≥1	≥1	≥2	≥2	≥1
SAP 3-Tier Distributed Version 4.0b Processing Sales and Distribution Application (Minimum of 16-20 Servers)	# Users	-	-	-	-	-
	# Processors	-	-	-	-	-
	Memory	-	-	-	-	-
	# Hard Disk Drives	-	-	-	-	-
	# RAID Adapters	-	-	-	-	-
	# Network Connections	-	-	-	-	-
SAP Central Version 4.0b Processing Sales and Distribution Application (One Server)	# Users	75	80	75	130	130
	# Processors	1	1	1	2	2
	Memory	1GB	1GB	1GB	1GB	1GB
	# Hard Disk Drives	12	12	12	12 to 24	12 to 24
	# RAID Adapters	≥1	≥1	≥1	≥1	≥1
	# Network Connections	1	1	1	1	1
High Availability Features	Hot-Swap HDD Bays	-	-	-	X	X
	Hot-Plug PCI Slots	-	-	-	-	-
	Hot-Swap Power	-	-	-	-	X
	Hot-Swap Fans	-	-	-	-	X
	RAID	Opt	Opt	Opt	Opt	Opt
	Clustering Support	-	-	-	-	X
	Sys Mgt Processor	-	Opt	-	-	X
Other Distinguishing Features	Max # Processors	1	2	1	2	2
	Max Memory	1.5GB	4GB	1.5GB	4GB	4GB
	Max Int Storage	293.6GB ²	293.6GB	72.8GB	146.8GB	440.4GB
	Max Int Storage with Int Tape Drive	293.6GB	293.6GB	-	-	220.2GB
	Available PCI Slots	5	5	1	2	5
	19in Rack Models	-	-	X	X	X
	NetBAY 3x Support	-	-	-	-	-



IBM xSeries Selection Guide

Application/ Expectation of Maximum # of Users		xSeries 232 Dual Pentium III 1.4GHz/ 512KB	xSeries 240 Dual Pentium III 1GHz/ 256KB	xSeries 250 Quad Pentium III Xeon 900MHz ¹ / 2MB	xSeries 350 Quad Pentium III Xeon™ 900MHz/ 2MB	xSeries 360 Quad Pentium III Xeon 1.6GHz/ 1MB	xSeries 370 Eight-Way Pentium III Xeon 900MHz/ 2MB	xSeries 440 Eight-way Xeon MP 1.6GHz/ 1MB
DB Transaction Processing Select, Update and Delete; Does not include image or Decision Support	# Users	3680	2530	7030	7030	9225	12600	16740
	# Processors	2	2	4	4	4	8	8
	Memory	4GB	4GB	4GB	4GB	8GB	8GB	16GB
	# Hard Disk Drives	50 to 70	30 to 50	80 to 140	80 to 140	100 to 175	150 to 200	150 to 200
	# RAID Adapters	≥2	≥4	≥4	≥4	≥4	≥5 or Fibre	≥5 or Fibre
	# Network Connections	1 to 2	1 to 2	2 to 3	2 to 3	2 to 3	2 to 3	2 to 3
File and Print Application is stored locally. (For server stored applications cut number of users in half).	# Users	2300	2100	5000	5000	6500	6000	7150
	# Processors	2	2	2	2	3-4	3-4	3-4
	Memory	2GB	2GB	2 to 4GB	2 to 4GB	3 to 4GB	4GB	4GB
	# Hard Disk Drives	20 to 30	20 to 30	50 to 90	50 to 90	60 to 100	75 to 150	75 to 150
	# RAID Adapters	1 to 2	1 to 2	≥4	≥4	≥3	≥4 or Fibre	≥4 or Fibre
	# 100Mbps Ethernet Connections	4 or 1Gb	4	4 or 1Gb	4 or 1Gb	4 or 1Gb	4 or 1Gb	4 or 1Gb
Lotus Notes 10% Power Users 40% Mail 50% Mail & DB	# Users	3200	2200	4615	4615	5075	7335	8800
	# Processors	2	2	4	4	4	4	4
	Memory	3GB	2 to 3GB	3GB	3GB	3GB	4GB	4GB
	# Hard Disk Drives	20 to 30	20 to 30	20 to 30	20 to 30	25 to 30	30 to 40	30 to 40
	# RAID Adapters	1 to 2	1 to 2	2 to 3	2 to 3	2 to 3	≥3	≥3
	# Network Connections	≥3	≥2	≥3	≥3	≥3 or 1Gb	≥4	4 or 1Gb
Microsoft Exchange Server 2000 100% Med Users 30MB Mailbox	# Users	5320	4250	7250	8000	9500	10000	11000
	# Processors	2	2	4	4	4	8	8
	Memory	4GB	2GB	≥3GB	3GB	4GB	3GB	3GB
	# Hard Disk Drives	9	12	30 to 40	30	50 to 70	50 to 70	50 to 70
	# RAID Adapters	1	2	≥2	2	≥3	≥3	≥3
	# Network Connections	≥1	≥1	≥2	≥2	≥2	≥2	≥2
SAP 3-Tier Distributed Version 4.0b Processing Sales and Distribution Application (Minimum of 16-20 Servers)	# Users	-	2800	4000	4000	4600	6400	6400
	# Processors	-	2	4	4	4	8	8
	Memory	-	1 to 2GB	≥4GB	≥4GB	8GB	≥4GB	≥4GB
	# Hard Disk Drives	-	24 to 36	48 to 60	48 to 60	48 to 60	48 to 60	48 to 60
	# RAID Adapters	-	≥2	≥3	≥3	≥3	≥3	≥3
	# Network Connections	-	1	1	1	1	1	1
SAP Central Version 4.0b Processing Sales and Distribution Application (One Server)	# Users	130	180	300	300	345	480	480
	# Processors	2	2	4	4	4	8	8
	Memory	1GB	1 to 2GB	≥2GB	≥2GB	8GB	≥4GB	≥4GB
	# Hard Disk Drives	12 to 24	12 to 24	24 to 36	24 to 36	24 to 36	24 to 36	24 to 36
	# RAID Adapters	≥1	≥1	≥2	≥2	≥2	≥2	≥2
	# Network Connections	1	1	1	1	1	1	1
High Availability Features	Hot-Swap HDD Bays	X	X	X	X	X	X	X
	Hot-Plug PCI Slots	-	X	X	X	X	X	X
	Hot-Swap Power	X	X	X	X	X	X	X
	Hot-Swap Fans	-	X	X	X	X	X	X
	RAID	Opt	Opt	Opt	Opt	Opt	Opt	Opt
	Clustering Support	X	X	X	X	X	X	X
	Sys Mgt Processor	X	X	X	X	X	X	X
Other Distinguishing Features	Max # Processors	2	2	4	4	4	8	8
	Max Memory	4GB	4GB	16GB	16GB	8GB	32GB	32GB
	Max Int Storage	660.6GB	440.4GB	734GB	440.4GB	220.2GB	146.8GB	146.8GB
	Max Int Storage with Int Tape Drive	660.6GB	440.4GB	734GB	-	-	-	-
	Available PCI Slots	5	5	6	6	6	12	6
	19in Rack Models	X	X	X	X	X	X	X
	NetBAY3x Support	-	-	X	-	-	X ³	-

SERVER SELECTION GUIDE



1. MHz only measures microprocessor internal clock speed, not application performance. Many factors affect application performance.
2. When referring to hard disk drive capacity, GB equals one billion bytes. Total user accessible capacity may vary depending on operating environments.
3. With a Rack-to-Tower Conversion Kit installed.

Procedure for Server Selection Guidance Chart

File and Print numbers are Novell Netware-based with all others based on Microsoft Windows NT®. Other Network Operating System (NOS) results could vary. Extensive SAP sizings are available from IBM/SAP Competency Centers. Contact your IBM Marketing Representative for additional information.

Step 1: Determine which application (row) most closely represents the customer's environment.

Step 2: Move from left to right along the row (chosen in Step 1) noting which columns contain numbers that are equal to or greater than the maximum customer's planned number of users.

Step 3: Move up the columns (chosen in Step 2) to the top row to determine which IBM xSeries or Netfinity servers should be considered as possible solutions.

Step 4: Evaluate other features such as storage, memory capacity, high availability components, number of available expansion slots, etc., which are unique to each server, in order to determine which is the most appropriate to recommend.

For your reference, configuration information corresponding to the number of users is also provided.





IntelliStation® M Pro (uniprocessor)

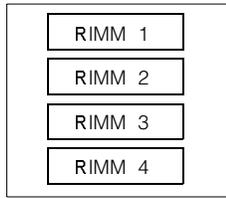
Part Number Processor Speed (GHz)²
 Number of Processors (Std/Max)
 L2 ECC Cache Memory (Std/Max)
 Video Adapter Form Factor
 Onboard Ethernet (Mbps)
 SCSI Controller (Dual, Ultra, RAID)
 Removable Media Bays (Total/Avail)
 Internal Hard Disk Drive (Std/Max)
 CD-ROM (IDE)⁶
 Bays (Total/Avail)
 Slots (Total/Avail)⁷

IntelliStation M Pro (uniprocessor) At-A-Glance													
6229-10U ¹	2	1/1	512KB	256MB/2GB	Matrox Millennium G450 DVI-I	Tower	10/100	IDE ³	3/1	40GB/240GB ⁴	48X-20X	7/4	5/5
6229-12U ¹	2	1/1	512KB	256MB/2GB	NVIDIA Quadro4 200NVS	Tower	10/100	IDE ³	3/1	40GB/240GB ⁴	48X-20X	7/4	5/5
6229-13U ¹	2	1/1	512KB	512MB/2GB	NVIDIA Quadro4 200NVS	Tower	10/100	U160 ³	3/1	18.2GB/293.6GB ⁵	48X-20X	7/4	5/4
6229-15U ¹	2	1/1	512KB	512MB/2GB	ATI Fire GL8800™	Tower	10/100	U160 ³	3/1	18.2GB/293.6GB ⁵	48X-20X	7/4	5/4
6229-16U ¹	2	1/1	512KB	512MB/2GB	3Dlabs Wildcat III 6110	Tower	10/100	U160 ³	3/1	18.2GB/293.6GB ⁵	48X-20X	7/4	5/3
6229-20U ¹	2.2	1/1	512KB	256MB/2GB	Matrox Millennium G450 DVI-I	Tower	10/100	IDE ³	3/1	40GB/240GB ⁴	48X-20X	7/4	5/5
6229-22U ¹	2.2	1/1	512KB	256MB/2GB	NVIDIA Quadro4 200NVS	Tower	10/100	IDE ³	3/1	40GB/240GB ⁴	48X-20X	7/4	5/5
6229-23U ¹	2.2	1/1	512KB	512MB/2GB	NVIDIA Quadro4 200NVS	Tower	10/100	U160 ³	3/1	18.2GB/293.6GB ⁵	48X-20X	7/4	5/4
6229-25U ¹	2.2	1/1	512KB	512MB/2GB	ATI Fire GL8800	Tower	10/100	U160 ³	3/1	18.2GB/293.6GB ⁵	48X-20X	7/4	5/4
6229-26U ¹	2.2	1/1	512KB	512MB/2GB	3Dlabs Wildcat III™ 6110	Tower	10/100	U160 ³	3/1	18.2GB/293.6GB ⁵	48X-20X	7/4	5/3

1. IntelliStation M Pro (uniprocessor) ships with a keyboard and mouse. See "Power, Monitors and Accessories" for a list of compatible monitors. Tower models are rack-mountable using an optional tower-to-rack conversion kit, or they can be turned on the side and installed as desktop units capable of supporting the weight of a monitor.
 2. Intel Pentium 4 processor with advanced transfer ECC L2 cache, 4 X 100MHz (quad-pumped) Front Side Bus (FSB) and MMX technology.
 3. All models include an integrated ATA-100 IDE controller that supports up to four IDE devices (four HDDs or three IDE HDDs and one CD-ROM) in IDE models. SCSI models include a single-channel Ultra160 SCSI PCI controller with one internal and one external port (each with high-density 68-pin connectors) installed in slot five. A five-drop, terminated 16-bit LVD internal SCSI cable is included with SCSI models, which support up to five SCSI HDDs.
 4. IDE models include two two-drop ATA-100 IDE cables. The CD-ROM must be disconnected to support four IDE HDDs. Maximum storage is based on four 60GB IDE HDDs, which requires replacing the standard 40GB HDD.
 5. Requires replacement of the standard 18.2GB 10,000rpm HDD with a 73.4GB HDD and installing three additional nonhot-swap 73.4GB HDDs.
 6. Variable read rate. Actual playback speed will vary and is often less than the maximum possible.
 7. Certain video adapters require additional space, preventing slot one from being used to install an optional PCI adapter. This applies to models with the 3Dlabs Wildcat III 6110 adapter.



IntelliStation M Pro (uniprocessor) Memory



Total System Memory ¹		Quantity of RIMMs Added		
256MB (2 x 128) Models	512MB (2 x 256) Models	128MB 33L3350 or 20L0275	256MB 33L3352 or 20L0277	512MB 33L3254
512MB	768MB	2	-	-
768MB	1024MB	-	2	-
1280MB	1536MB	-	-	2
2GB ²	2GB ²	-	-	4

Part Number	Memory Description ¹
33L3350	128MB PC800 4D ECC RDRAM RIMM (288Mb)
33L3352	256MB PC800 8D ECC RDRAM RIMM (288Mb)
33L3254	512MB 800MHz ECC 16D RDRAM RIMM Memory (288Mb)
20L0275	128MB 800MHz ECC 8D RDRAM RIMM Memory (144Mb)
20L0277	256MB 800MHz ECC 16D RDRAM RIMM Memory (144Mb)

This table does not represent all possible memory configurations. Memory modules may vary in price per MB. Selection of smaller RIMMs may provide a more cost-effective alternative to using larger RIMMs.

1. Network operating systems may limit the maximum amount of addressable memory. See operating system specifications for further information.
2. Requires replacing the standard RIMM.

1. Memory RIMMs must be installed in pairs using the same option part number according to the following order: RIMM connectors one and two (set one), then connectors three and four (set two).

IntelliStation M Pro (uniprocessor) Hard Disk Drive (HDD) Storage

Total Int Storage ¹	SCSI Models				
	10,000RPM HDDs			15,000RPM HDDs	
	18.2GB (06P5750)	36.4GB (06P5751)	73.4GB (06P5752)	18.2GB (06P5765)	36.4GB (06P5766)
18.2GB	(Standard on SCSI models)				
36.4GB	1	-	-	1	-
54.6GB	2	-	-	2	-
72.8GB	3	-	-	3	-
91GB	2	1	-	2	1
109.2GB	1	2	-	1	2
127.4GB	-	3	-	-	3
145.6GB ²	-	4	-	-	4
182.6GB ²	-	3	1	-	-
219.6GB ²	-	2	2	-	-
256.6GB ²	-	1	3	-	-
293.6GB ²	-	-	4	-	-

This table does not represent all possible HDD configurations.

1. Select a total storage row then add the quantity of HDDs from all columns in an RPM range to the standard HDD.
2. Requires replacement of the standard HDD.



EIDE Models		
Total Internal Storage ¹	7200RPM EIDE HDDs ²	
	40GB (P/N 22P7157)	60GB (P/N 09N4207)
40GB	Standard on EIDE models	
80GB	1	-
100GB	-	1
120GB	2	-
140GB	1	1
160GB	-	2
180GB ³	-	3
240GB ⁴	-	4

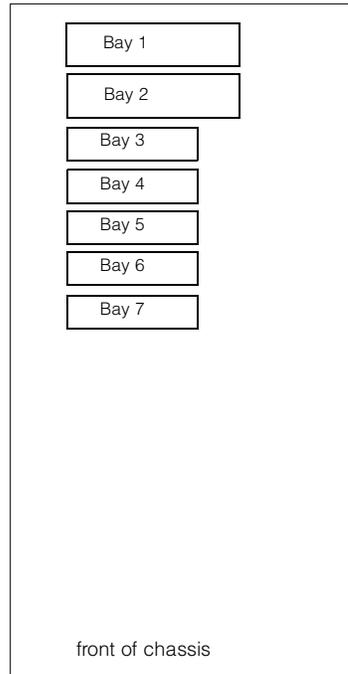
This table does not represent all possible HDD configurations. Total Internal Storage listed is within +/-0.2GB unless otherwise noted.

1. Select a total storage row then add the quantity of HDDs from all columns to the standard HDD.
2. Supports a maximum of four IDE devices including CD-ROM drives, HDDs and IDE tape drives.
3. Requires replacing the standard HDD.
4. Requires replacing the standard HDD and disconnecting the CD-ROM.

Bay	Form Factor	Height	Front Access	Usage	Part Number	Description	RPM	Height	Bays Supported ³	Max Qty
1	133mm (5.25in)	HH	yes	CD-ROM ¹	IDE HDD^{1, 2}					
2	133mm (5.25in)	HH	yes	open ¹	22P7157	40GB 7200rpm ATA-100 (EIDE) HDD	7200	SL	3 ... 7	4 ³
3	89mm (3.5in)	SL	yes	FDD	09N4207	60GB 7200rpm ATA-100 (EIDE) HDD	7200	SL	3 ... 7	4 ³
4	89mm (3.5in)	SL	yes	open ²	Ultra160 HDDs^{2, 4}					
5, 6	89mm (3.5in)	SL	no	open ²	06P5750	18.2GB 10Krpm Ultra160 SCSI SL HDD	10000	SL	3 ... 7	4 ⁴
7	89mm (3.5in)	SL	no	Std HDD	06P5751	36.4GB 10Krpm Ultra160 SCSI SL HDD	10000	SL	3 ... 7	4 ⁴
					06P5752	73.4GB 10Krpm Ultra 160 SCSI SL HDD	10000	SL	3 ... 7	4 ⁴
					06P5765	18.2GB 15Krpm Ultra160 SCSI SL HDD	15000	SL	3 ... 7	4 ⁴
					06P5766	36.4GB 15Krpm Ultra160 SCSI SL HDD	15000	SL	3 ... 7	4 ⁴
Removable Media Devices⁵							Bays Supported			
					10K3782	48X-20X IDE CD-ROM ^{5, 6}	1, 2			
					22P6965	24X/10X/40X Max Black CD-RW Drive ^{5, 6}	1, 2			

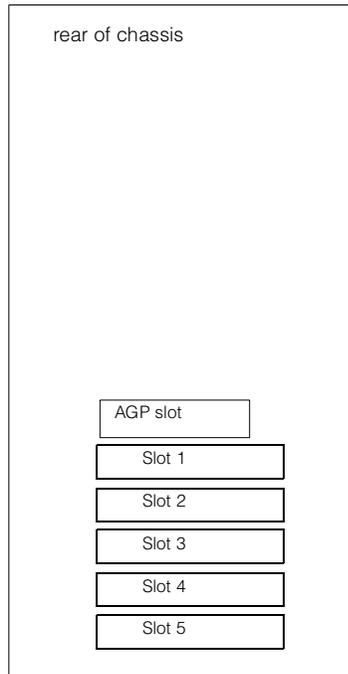
1. Supports removable media devices only. Hard disk drives are not supported.
2. Maximum of four SCSI HDDs supported in SCSI models and a maximum of four IDE HDDs supported (requires disconnecting the CD-ROM drive) in IDE models.

1. IDE models support a maximum of four IDE devices including CD-ROM drives, IDE hard disk drives and IDE tape drives.
2. Standard HDD installed in bay seven for both SCSI and IDE models.
3. Maximum quantity of IDE HDDs requires disconnecting the CD-ROM.
4. SCSI models support a maximum of four SCSI HDDs.
5. Install only in removable media bays (133mm/5.25in in width).
6. Either replace the standard CD-ROM or install in the available media bay. An IDE cable with three connectors is included with the optional optical drive. The included audio cable must be connected in order to support audio for music CDs but not for DVD-ROM.


IntelliStation M Pro (uniprocessor) I/O Options

Part Number	Description	Adapter Length	PCI Support ¹	Slots Supported ^{2, 3}
Storage Controllers⁴				
19K4646	PCI Wide Ultra160 SCSI Adapter ⁵	Half	32-bit	1 ... 5
Networking⁶				
Ethernet⁷				
09N3601	10/100 EtherLink PCI Management Adapter by 3Com	Half	32-bit	1 ... 5
22P6501	Pro/1000 T Desktop Adapter by Intel	Half	32-bit	1 ... 5
Token Ring				
34L5001	16/4 Token-Ring PCI Management Adapter	Half	32-bit	1 ... 5
34L5201	High-Speed 100/16/4 Token-Ring PCI Management Adapter	Half	32-bit	1 ... 5
Communications⁸				
19K4162	V.90 PCI Data/Fax WinModem (Low Profile Enabled)	Half	32-bit	1 ... 5

1. A 64-bit adapter installed into a 32-bit slot will transfer data at 32-bit rates. Adapters rated at 66MHz will operate at 33MHz when installed in a 33MHz slot.
2. IntelliStation M Pro (uniprocessor) has five full-length PCI expansion slots.
3. A dedicated PCI slot supports a standard AGP graphics adapter located above the five PCI expansion slots. When the standard graphics adapter is a 3DLabs Wildcat III 6110, slot one is not available to install another adapter.
4. IntelliStation M Pro (uniprocessor) includes an integrated dual channel ATA-100 IDE controller. SCSI models include a single-channel Ultra160 SCSI PCI controller with one internal and one external port (each with high-density 68-pin connectors) installed in slot five.
5. PCI Wide Ultra 160 SCSI Adapter (P/N 19K4646) provides a single channel with one internal connector, a five-drop multi-mode terminated LVD SCSI cable and one external 0.8mm VHDCI connector. Only one of the two connectors may be utilized.
6. Wake on LAN® is supported through PCI networking adapters that provide this function.
7. The integrated full duplex 10/100 Intel-based Ethernet controller supports Wake on LAN.
8. M Pro (uniprocessor) includes four USB ports (two each on front and rear of chassis), two 9-pin serial ports, one 25-pin parallel port, AC 97 audio line in/out jacks, and a microphone in jack.



All PCI expansion slots are full-length, 32-bit, 33MHz, 5V or universal on a single PCI bus.

IntelliStation M Pro (uniprocessor) Power , Monitors & Accessories

Part Number	Description
Power	
	IntelliStation M Pro (uniprocessor) includes a 340W voltage-sensing power supply and a single line cord.
Monitors¹	
66274AN	G78 Color Monitor 17in (406.4mm, 16in viewable image), stealth black
6657HG2	T750 Hybrid Flat Panel Color Monitor 17in (433mm, 17in viewable image), stealth black
6652U3N	P275 Color Monitor 21in (503mm, 19.8in viewable image), stealth black
6658HG2	T84H TFT LCD Color Monitor 18.1in (460mm, 18.1in viewable image), stealth black
9511AG4	T540 Flat Panel Color Monitor 15in (381mm, 15in viewable image), stealth black ²
6639U3N	P77 Color Monitor 17in (406mm, 16in viewable image), stealth black
6651U3N	P97 Color Monitor 19in (457.3mm, 18in viewable image), stealth black
6656HG2	T560 Hybrid Flat Panel Monitor 15in (381mm, 15in viewable image), stealth black
9494HBO	T860 Hybrid Flat Panel Monitor 18.1in (460mm, 18.1in viewable image), stealth black,
9494HBN	T860 Hybrid Flat Panel Monitor 18.1in (460mm, 18.1in viewable image), stealth black, w/o stand
Conversion Kits	
09N4300	4Ux20D Tower-to-Rack Kit
Keyboard and Mouse³	

1. One digital monitor is supported by systems with NVIDIA Quadro2 Pro, ATI Fire GL8800 and Matrox Millennium G450 DVI video adapters. Two digital monitors are supported by systems with NVIDIA Quadro4 200NV5, ATI Fire GL4 and 3DLabs Wildcat III 6110 video adapters. The previous generation of Matrox Millennium G450 does not support digital monitors. Digital-to-analog adapters to support analog monitors through digital video adapter connectors are shipped with the system.

2. Not compatible with models containing an NVIDIA Quadro4 200NV5 video adapter.

3. IntelliStation M Pro (uniprocessor) ships standard with an IBM 104-key keyboard and three-button mouse.





IntelliStation M Pro (dual processor)

Part Number
 Processor Speed (GHz)²
 Number of Processors (Std/Max)
 L2 ECC Cache (KB)
 Memory (Std/Max)
 Video Adapter

Form Factor
 Onboard Ethernet (Mbps)
 SCSI Controller (Dual, Ultra, RAID)
 Removable Media Bays (Total/Avail)
 Internal Hard Disk Drive (Std/Max)
 CD-ROM (IDE)⁶
 Bays (Total/Avail)
 Slots (Total/Avail)

IntelliStation M Pro (dual processor) At-A-Glance

Part Number	Processor Speed (GHz) ²	Number of Processors (Std/Max)	L2 ECC Cache (KB)	Memory (Std/Max)	Video Adapter	Form Factor	Onboard Ethernet (Mbps)	SCSI Controller (Dual, Ultra, RAID)	Removable Media Bays (Total/Avail)	Internal Hard Disk Drive (Std/Max)	CD-ROM (IDE) ⁶	Bays (Total/Avail)	Slots (Total/Avail)
6850-10U ¹	1.5GHz	1/2	256	256MB/4GB	Matrox Millennium G450	Tower	10/100	U160 ³	3/1	40GB/ 240GB ⁴	48X-20X	9/6	6/5
6850-20U ¹	1.7GHz	1/2	256	256MB/4GB	Matrox Millennium G450	Tower	10/100	U160 ³	3/1	40GB/ 240GB ⁴	48X-20X	9/6	6/5
6850-21U ¹	1.7GHz	1/2	256	256MB/4GB	Matrox Millennium G450	Tower	10/100	U160 ³	3/1	18.2GB/ 440.4GB ⁵	48X-20X	9/6	6/5
6850-22U ¹	1.7GHz	1/2	256	512MB/4GB	NVIDIA Quadro2 Pro	Tower	10/100	U160 ³	3/1	18.2GB/ 440.4GB ⁵	48X-20X	9/6	6/5
6850-25U ¹	1.7GHz	1/2	256	512MB/4GB	ATI Fire GL4	Tower	10/100	U160 ³	3/1	18.2GB/ 440.4GB ⁵	48X-20X	9/6	6/4
6850-30U	2	1/2	256	256MB/4GB	Matrox Millennium G450	Tower	10/100	U160 ³	3/1	40GB/ 240GB ⁴	48X-20X	9/6	6/5
6850-31U	2	1/2	256	256MB/4GB	Matrox Millennium G450	Tower	10/100	U160 ³	3/1	18.2GB/ 440.4GB ⁵	48X-20X	9/6	6/5
6850-32U	2	1/2	256	512MB/4GB	NVIDIA Quadro2 Pro	Tower	10/100	U160 ³	3/1	18.2GB/ 440.4GB ⁵	48X-20X	9/6	6/5
6850-35U	2	1/2	256	512MB/4GB	ATI Fire GL4	Tower	10/100	U160 ³	3/1	18.2GB/ 440.4GB ⁵	48X-20X	9/6	6/4
6850-40U ¹	2	1/2	512	512MB/4GB	Matrox Millennium G450 DVI-I	Tower	10/100	U160 ³	3/1	40GB/ 240GB ⁴	48X-20X	9/6	6/5
6850-42U ¹	2	1/2	512	512MB/4GB	NVIDIA Quadro4 200NVS	Tower	10/100	U160 ³	3/1	40GB/ 240GB ⁴	48X-20X	9/6	6/5
6850-43U ¹	2	1/2	512	512MB/4GB	NVIDIA Quadro4 200NVS	Tower	10/100	U160 ³	3/1	18.2GB/ 440.4GB ⁵	48X-20X	9/6	6/5
6850-45U ¹	2	1/2	512	512MB/4GB	ATI Fire GL8800	Tower	10/100	U160 ³	3/1	18.2GB/ 440.4GB ⁵	48X-20X	9/6	6/5
6850-46U ¹	2	1/2	512	512MB/4GB	3Dlabs Wildcat III 6110	Tower	10/100	U160 ³	3/1	18.2GB/ 440.4GB ⁵	48X-20X	9/6	6/4
6850-50U ¹	2.2	1/2	512	512MB/4GB	Matrox Millennium G450 DVI-I	Tower	10/100	U160 ³	3/1	40GB/ 240GB ⁴	48X-20X	9/6	6/5
6850-52U ¹	2.2	1/2	512	512MB/4GB	NVIDIA Quadro4 200NVS	Tower	10/100	U160 ³	3/1	40GB/ 240GB ⁴	48X-20X	9/6	6/5
6850-53U ¹	2.2	1/2	512	512MB/4GB	NVIDIA Quadro4 200NVS	Tower	10/100	U160 ³	3/1	18.2GB/ 440.4GB ⁵	48X-20X	9/6	6/5
6850-55U ¹	2.2	1/2	512	512MB/4GB	ATI Fire GL8800	Tower	10/100	U160 ³	3/1	18.2GB/ 440.4GB ⁵	48X-20X	9/6	6/5
6850-56U ¹	2.2	1/2	512	512MB/4GB	3Dlabs Wildcat III 6110	Tower	10/100	U160 ³	3/1	18.2GB/ 440.4GB ⁵	48X-20X	9/6	6/4

1. IntelliStation M Pro ships with a keyboard and mouse. See "Power, Monitors and Accessories" for a list of compatible monitors. Tower models are rack-mountable using an optional tower-to-rack conversion kit, or they can be turned on the side and installed as desktop units capable of supporting the weight of a monitor.

2. Intel Xeon™ processor with advanced transfer ECC L2 cache and 4 X 100MHz (quad-pumped) Front Side Bus (FSB).

3. All models include both an integrated ATA-100 IDE controller and an integrated Ultra160 SCSI controller. The IDE controller supports up to four IDE devices (four HDDs or three IDE HDDs and one CD-ROM or IDE tape drive) in IDE models, which ship with two two-drop IDE cables. The integrated Ultra160 SCSI controller has one internal and one external port. Both ports are 68-pin, 16-bit Ultra 160 (LVD) connectors. The external port supports external Ultra160 SCSI storage devices. SCSI models include a six-drop LVD SCSI cable that supports up to six internal SCSI HDDs.



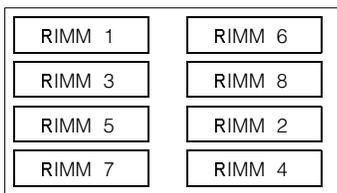
4. IDE models include a two-drop ATA-100 IDE cable and a two-drop ATA-33 cable. One connector of the ATA-33 cable is attached to the standard CD-ROM and the other connector can be used for an IDE HDD. The CD-ROM must be disconnected to support four IDE HDDs. Maximum storage is based on four 60GB IDE HDDs, which requires replacing the standard 40GB HDD.
5. Maximum amount requires replacement of the standard 18.2GB 10,000RPM HDD with a 73.4GB HDD.
6. Variable read rate. Actual playback speed will vary and is often less than the maximum possible.

IntelliStation M Pro (dual) Processors

Part Number	Processor Upgrades	SMP Support ¹	Processor Speed Upgrade ²
24P8401	1.5GHz/100MHz 256KB Cache Second Processor for 6850	10U	-
24P8402	1.7GHz/100MHz 256KB Cache Second Processor for 6850	20 ... 25U	10U
24P8453	2GHz/100MHz 256KB Cache Xeon Second Processor for 6850	30 ... 35U	10 ... 25U
25P2653	2GHz 512KB Cache Xeon Second Processor for 6850	40 ... 46U	-
32P8586	2.2GHz 512KB Cache Xeon Second Processor for 6850	50 ... 56U	40 ... 46U

1. One additional processor may be installed, providing a maximum of two. All processors must be identical in type, speed, and cache size.
2. Requires removal of the standard processor. A maximum of two processors may be installed. All processors must be identical in type, speed and cache size. Upgrades may require a BIOS update. To obtain the latest Flash BIOS, access www.pc.ibm.com/support and enter machine "Type-Model" in Quick Path. Select "Downloadable files" then "BIOS."

IntelliStation M Pro Memory



Part Number	Memory Description ¹
33L3350	128MB PC800 4D ECC RDRAM RIMM (288Mb)
33L3352	256MB PC800 8D ECC RDRAM RIMM (288Mb)
33L3254	512MB 800MHz ECC 16D RDRAM RIMM Memory (288Mb)
20L0275	128MB 800MHz ECC 16D RDRAM RIMM Memory (144Mb)
20L0277	256MB 800MHz ECC 16D RDRAM RIMM Memory (144Mb)

1. Memory RIMMs must be installed in pairs using the same option part number according to the following order: RIMM connectors one and two, three and four, five and six, and seven and eight.

Total System Memory ¹		Quantity of RIMMs Added		
256MB (2 x 128) Models	512MB (2 x 256) Models	128MB 33L3350 or 20L0275	256MB 33L3352 or 20L0277	512MB 33L3254
512MB	768MB	2	-	-
768MB	1024MB	4	-	-
1024MB	1280MB	6	-	-
1280MB	1536MB	4	2	-
1792MB	2048MB	4	-	2
2304MB	2560MB	-	4	2
2560MB	2816MB	2	-	4
2816MB	3072MB	-	2	4
3328MB	3584MB	-	-	6
4GB (max) ²	4GB (max) ²	-	-	8

This table does not represent all possible memory configurations. Memory modules may vary in price per MB. Selection of smaller RIMMs may provide a more cost-effective alternative to using larger RIMMs.

1. Network operating systems may limit the maximum amount of addressable memory. See operating system specifications for further information.
2. Requires replacing the standard RIMM.

INTELLISTATION M PRO 6850



IntelliStation M Pro Hard Disk Drive (HDD) Storage

SCSI Models					
Total Int Storage¹	10,000RPM HDDs			15,000RPM HDDs	
	18.2GB (06P5750)	36.4GB (06P5751)	73.4GB (06P5752)	18.2GB (06P5765)	36.4GB (06P5766)
18.2GB	(Standard on SCSI models)				
36.4GB	1	-	-	1	-
54.6GB	2	-	-	2	-
72.8GB	3	-	-	3	-
91GB	4	-	-	4	-
109.2GB	5	-	-	5	-
127.4GB	4	1	-	4	1
145.6GB	3	2	-	3	2
163.8GB	2	3	-	2	3
182GB	1	4	-	1	4
200.2GB	-	5	-	-	5
237.2GB	-	4	1	-	-
274.2GB	-	3	2	-	-
311.2GB	-	2	3	-	-
348.2GB	-	1	4	-	-
385.2GB	-	-	5	-	-
440.4GB ²	-	-	6	-	-

This table does not represent all possible HDD configurations.

1. Select a total storage row then add the quantity of HDDs from all columns within an RPM range to the standard HDD.
2. Requires replacement of the standard HDD.

EIDE Models			
Total Internal Storage¹	7200RPM EIDE HDDs²		
	20.4GB (P/N 19K4461)	40GB (P/N 22P7157)	60GB (P/N 09N4207)
40GB	-	Standard on EIDE models	
60.4GB	1	-	-
80GB	-	1	-
100GB	-	-	1
120GB	-	2	-
140GB	-	1	1
160GB	-	-	2
180GB ³	-	-	3
240GB ⁴	-	-	4

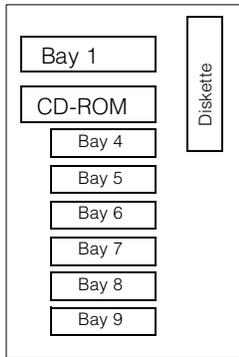
This table does not represent all possible HDD configurations. Total Internal Storage listed is within +/-0.2GB unless otherwise noted.

1. Select a total storage row then add the quantity of HDDs to the standard HDD.
2. Supports a maximum of four IDE devices including CD-ROM drives, HDDs and IDE tape drives.
3. Requires replacing the standard HDD.
4. Requires replacing the standard HDD and disconnecting the CD-ROM.



Bay	Form Factor	Height	Front Access	Usage	Part Number	Description	RPM	Height	Bays Supported ³	Max Qty
1	133mm (5.25in)	HH	yes	open ¹	IDE HDD^{1, 2}					
2	133mm (5.25in)	HH	yes	CD-ROM	19K4461	20.4GB 7200rpm ATA-100 (EIDE) HDD	7200	SL	4 ... 9	4
3	89mm (3.5in)	SL	yes	Diskette	22P7157	40GB 7200rpm ATA-100 (EIDE) HDD	7200	SL	4 ... 9	4
4 ... 8	89mm (3.5in)	SL	no	open ²	09N4207	60GB 7200rpm ATA-100 (EIDE) HDD	7200	SL	4 ... 9	4
9	89mm (3.5in)	SL	no	Std HDD ³	Ultra160 HDDs^{2, 4}					

- Supports removable media devices only. Hard disk drives are not supported.
- Maximum of six SCSI HDDs supported in SCSI models and a maximum of three IDE HDDs supported without disconnecting the CD-ROM drive in IDE models.
- The standard IDE HDD is installed in bay five in IDE models.

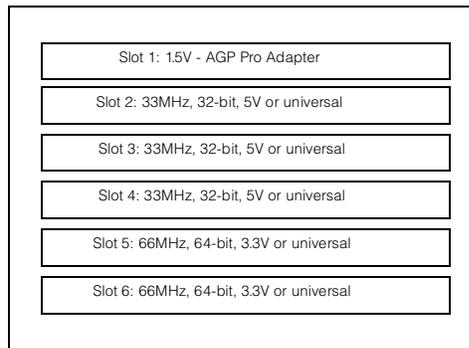


06P5750	18.2GB 10Krpm Ultra160 SCSI SL HDD	10000	SL	4 ... 9	6
06P5751	36.4GB 10Krpm Ultra160 SCSI SL HDD	10000	SL	4 ... 9	6
06P5752	73.4GB 10Krpm Ultra160 SCSI SL HDD	10000	SL	4 ... 9	6
06P5765	18.2GB 15Krpm Ultra160 SCSI SL HDD	15000	SL	4 ... 9	6
06P5766	36.4GB 15Krpm Ultra160 SCSI SL HDD	15000	SL	4 ... 9	6
Removable Media Devices⁵			Bays Supported		
10K3782	48X-20X IDE CD-ROM ⁶	1, 2			
10K3790	8X-4X-32X-8X Max CD-RW/DVD-ROM Combination Drive ⁶	1, 2			
22P6950	16X Max RAM-Read DVD-ROM Drive ⁶	1, 2			
00N8078	250MB IDE Internal Zip Drive	1, 2			

- IDE models support a maximum of four IDE devices including CD-ROM drives, IDE hard disk drives and IDE tape drives.
- Mixing of IDE and SCSI hard disk drives is not supported.
- Standard HDD installed in bay nine for SCSI models and bay five for IDE models.
- SCSI models support a maximum of six SCSI HDDs.
- Install only in removable media bays (133mm/5.25in in width).
- Either replace the standard CD-ROM or install in the available media bay. An IDE cable with three connectors is included with the optional optical drive. The included audio cable must be connected in order to support audio for music CDs but not for DVD-ROM.

INTELLISTATION M PRO 6850

IntelliStation M Pro (dual processor) I/O Options



All slots are full-length.



Part Number	Description	Adapter Length	PCI Support ¹	Slots Supported ^{2, 3}
Storage Controllers⁴				
19K4646	PCI Wide Ultra160 SCSI Adapter ⁵	Half	32-bit	2 ... 6
06P5740	ServeRAID-4Lx Ultra160 SCSI Controller ⁶	Half	64-bit	2 ... 6
24P2585	IDE 100 RAID Controller by AMI ⁷	Half	32-bit	2 ... 6
Networking⁸				
Ethernet⁹				
09N3601	10/100 EtherLink PCI Management Adapter by 3Com	Half	32-bit	2 ... 6
22P4501	Intel Pro/100S Desktop Adapter	Half	32-bit	2 ... 6
Token Ring				
34L5001	16/4 Token-Ring PCI Management Adapter	Half	32-bit	2 ... 6
34L5201	High-Speed 100/16/4 Token-Ring PCI Management Adapter	Half	32-bit	2 ... 6
Communications¹⁰				
19K4162	V90 PCI Data/Fax WinModem (Low Profile Enabled)	Half	32-bit	2 ... 6

1. A 64-bit adapter installed into a 32-bit slot will transfer data at 32-bit rates. Adapters rated at 66MHz will operate at 33MHz when installed in a 33MHz slot.
2. IntelliStation M Pro (dual processor) has six full-length PCI expansion slots.
3. Slot one supports a standard AGP graphics adapter. When the standard graphics adapter is a Fire GL4 or 3Dlabs Wildcat III 6110, slot two is not available to install another adapter.
4. IntelliStation M Pro (dual processor) includes integrated ATA-100 IDE and Ultra160 SCSI storage controllers.
5. PCI Wide Ultra160 SCSI Adapter (P/N 19K4646) provides a single channel with one internal connector, a five-drop multi-mode terminated LVD SCSI cable and one external 0.8mm VHDCI connector. Only one of the two connectors may be utilized.
6. ServeRAID-4Lx Ultra160 SCSI Controller is powered by a 100MHz Intel Zion GC80303 processor and provides a single channel, 32MB of ECC cache and either one internal or one external Ultra 160 connection. External connector is 0.8mm VHDCI.
7. Supported only in IDE models. Dual channel adapter includes two connectors, supporting one ATA-100 HDD per channel. Two 18in ATA-66 cables ship with the option. Allows RAID 0 and RAID 1 configurations.
8. Wake on LAN[®] and Alert-on-LAN are not supported through the PCI networking adapters.
9. The integrated full duplex 10/100 Intel-based Ethernet controller supports Wake on LAN and Alert-on-LAN.
10. M Pro (dual processor) includes two USB ports, two high-speed serial/asynchronous ports (NS16550A software compatible), one bidirectional parallel port supporting devices using EPP/ECP protocols, audio in/out jacks and a microphone in jack.

IntelliStation M Pro (dual processor) Power, Monitors & Accessories

Part Number	Description
Power	
	IntelliStation M Pro (dual processor) includes a 480W voltage-sensing power supply and a single line cord.
Monitors¹	
66274AN	G78 Color Monitor 17in (406.4mm, 16in viewable image), stealth black
6657HG2	T750 Hybrid Flat Panel Color Monitor 17in (433mm, 17in viewable image), stealth black
6652U3N	P275 Color Monitor 21in (503mm, 19.8in viewable image), stealth black
6658HG2	T84H TFT LCD Color Monitor 18.1in (460mm, 18.1in viewable image), stealth black
9511AG4	T540 Flat Panel Color Monitor 15in (381mm, 15in viewable image), stealth black ²
6639U3N	P77 Color Monitor 17in (406mm, 16in viewable image), stealth black
6651U3N	P97 Color Monitor 19in (457.3mm, 18in viewable image), stealth black
6656HG2	T560 Hybrid Flat Panel Monitor 15in (381mm, 15in viewable image), stealth black
9494HBO	T860 Hybrid Flat Panel Monitor 18.1in (460mm, 18.1in viewable image), stealth black
9494HBN	T860 Hybrid Flat Panel Monitor 18.1in (460mm, 18.1in viewable image), stealth black, w/o stand
Conversion Kits	
10L7006	Netfinity 5000 Tower-to-Rack Conversion Kit
Keyboard and Mouse³	
22P5185	Rapid Access III USB Keyboard, stealth black
22P5170	Wireless Keyboard and Mouse
33L3252	SpaceBall 3D Input Device

1. One digital monitor is supported by systems with NVIDIA Quadro2 Pro, ATI Fire GL8800 and Matrox Millennium G450 DVI-I video adapters. Two digital monitors are supported by systems with NVIDIA Quadro4 200NVs, ATI Fire GL4 and 3Dlabs Wildcat III 6110 video adapters. The previous generation of Matrox Millennium G450 does not support digital monitors. Digital-to-analog adapters to support analog monitors through digital video adapter connectors are shipped with the system.
2. Not compatible with models containing an NVIDIA Quadro4 200NVs video adapter.
3. IntelliStation M Pro ships standard with an IBM 104-key keyboard and three-button mouse.



IntelliStation M Pro (dual processor) Tape Options

Part Number	Tape Drives	Bays Supported	SCSI Interface (bit)	Form Factor	Termination Included	68/50-pin Converter Incl	Ext Tape Encl
20L0549	10/20GB TR5 Internal IDE Tape Drive	1	-	89mm (3.5in) SL or 133mm (5.25in) HH	-	-	-
09N4042	10/20GB NS Internal SCSI Tape Drive	1	8	89mm (3.5in) SL or 133mm (5.25in) HH	Y	Y	-
External Tape Enclosures							
3510020	External Half-High SCSI Storage Enclosure ¹	-	8, 16	Desktop	N	N	-
Associated Options							
00N7956	68-pin External Multimode LVD/SE SCSI Terminator	-	16 LVD/SE	External	Y	N	3510020

Note: An integrated Ultra160 SCSI controller with a five-drop multi-mode terminated LVD SCSI cable is standard. Single-ended devices attached to this cable will limit the entire SCSI bus to single-ended performance. Connecting an IDE tape drive to the standard IDE controller will limit the number of hard disk drives supported in IDE models.

1. Provides a black desktop 133mm (5.25in) half-high (HH) tape enclosure. Connector is configurable as 50-pin Centronix or 68-pin high density. Requires either tape drive self-termination or 68-pin External Multimode LVD/SE SCSI Terminator (P/N 00N7956).

Note: Additional tape attributes can be found in Appendix A: Tape Drive Attributes.

INTELLISTATION M PRO 6850



IntelliStation R Pro

Part Number Processor Speed (MHz)² Number of Processors (Std/Max) L2 ECC Cache (KB) Memory (Std/Max) (R = RDIMM) Video Adapter Form Factor Onboard Ethernet (Mbps) SCSI Controller (Dual, Ultra, RAID)⁵ Removable Media Bays (Total/Avail) Internal Hard Disk Drive (Std/Max) CD-ROM (IDE)³ Bays (Total/Avail) Slots (Total/Avail)⁴

IntelliStation R Pro At-A-Glance													
6851-10U ¹	1.13GHz	1/2	512	256MB/4GB	Matrox G200 NTSC	Rack (1U)	2 x 10/100	IDE	-	20.4GB/80GB	24X-10X	4/1	2/0
6851-11U ¹	1.13GHz	1/2	512	256MB/4GB	Matrox G200 NTSC	Rack (1U)	2 x 10/100	U160	-	18.2GB/146.8GB	24X-10X	4/1	2/0
6851-12U ^{1,6}	1.13GHz	1/2	512	256MB/4GB	Matrox G200 PAL	Rack (1U)	2 x 10/100	IDE	-	20.4GB/80GB	24X-10X	4/1	2/0
6851-13U ^{1,6}	1.13GHz	1/2	512	256MB/4GB	Matrox G200 PAL	Rack (1U)	2 x 10/100	U160	-	18.2GB/146.8GB	24X-10X	4/1	2/0
6851-20U ¹	1.26GHz	1/2	512	256MB/4GB	Matrox G200 NTSC	Rack (1U)	2 x 10/100	IDE	-	20.4GB/80GB	24X-10X	4/1	2/0
6851-21U ¹	1.26GHz	1/2	512	256MB/4GB	Matrox G200 NTSC	Rack (1U)	2 x 10/100	U160	-	18.2GB/146.8GB	24X-10X	4/1	2/0
6851-22U ^{1,6}	1.26GHz	1/2	512	256MB/4GB	Matrox G200 PAL	Rack (1U)	2 x 10/100	IDE	-	20.4GB/80GB	24X-10X	4/1	2/0
6851-23U ^{1,6}	1.26GHz	1/2	512	256MB/4GB	Matrox G200 PAL	Rack (1U)	2 x 10/100	U160	-	18.2GB/146.8GB	24X-10X	4/1	2/0

1. Housed in a 19in rack-mountable drawer. Ships standard with a keyboard and mouse. See Rack Cabinets and Options section for supported IBM racks. Refer to xSeries 330 information.
2. Intel Pentium III processor with advanced transfer L2 cache and 133MHz Front-side Bus (FSB).
3. Variable read rate. Actual playback speed will vary and is often less than the maximum possible.
4. All models are equipped with a Matrox G200 multimonitor video adapter and an IBM PCI audio adapter.
5. IntelliStation R Pro has an integrated single-channel Ultra160 SCSI Controller.
6. Not available in the United States.

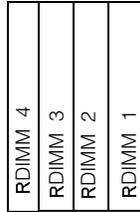
IntelliStation R Pro Processors

Part Number	Processor Upgrades	SMP Support ¹	Processor Speed Upgrade ²
25P2835	xSeries 1.13GHz Upgrade with 133MHz FSB and 512KB Advanced Transfer Cache Pentium III Processor	10 ... 13U	-
25P2836	xSeries 1.26GHz/133MHz, 512KB Cache Upgrade with Pentium III Processor	20 ... 23U	10 ... 13U

1. One additional processor may be installed, providing a maximum of two. All processors must be identical in type, speed, and cache size.
2. Requires removal of the standard processor. A maximum of two processors may be installed. All processors must be identical in type, speed and cache size. Upgrades may require a BIOS update. To obtain the latest Flash BIOS, access www.pc.ibm.com/support and enter machine "Type-Model" in Quick Path. Select "Downloadable files" then "BIOS."



IntelliStation R Pro Memory



Part Number	Memory Description ¹
10K0018	128MB PC133 ECC SDRAM RDIMM II
10K0020	256MB PC133 ECC SDRAM RDIMM II
10K0022	512MB PC133 ECC SDRAM RDIMM II
33L3326	1GB PC133 ECC SDRAM DIMM

1. Memory RDIMMs must be installed in sequence from RDIMM connector 1 through connector 4. RDIMM size is not relevant.

Total Memory ¹	Quantity of RDIMMs Added				
	256MB (1 x 256) Models	128MB (10K0018)	256MB (10K0020)	512MB (10K0022)	1GB (33L3326)
384MB		1	-	-	-
512MB		2 or	1	-	-
640MB		3	-	-	-
768MB		-	2 or	1	-
1024MB		-	3	-	-
1280MB		-	-	2 or	1
1792MB		-	-	3	-
2048MB		-	-	4 ²	-
2304MB		-	-	-	2
3328MB		-	-	-	3
4096MB (max)		-	-	-	4 ²

This table does not represent all possible memory configurations. Memory modules may vary in price per MB. Selection of smaller RDIMMs may provide a more cost-effective alternative to using larger RDIMMs.

1. Network operating systems may limit the maximum amount of addressable memory. See operating system specifications for further information.

2. Requires removal of standard memory.

IntelliStation R Pro Hard Disk Drive (HDD) Storage

Total Int Storage ¹	SCSI Models				
	10,000RPM HDDs			15,000RPM HDDs	
	18.2GB (06P5750)	36.4GB (06P5751)	73.4GB (06P5752)	18.2GB (06P5765)	36.4GB (06P5766)
18.2GB	(Standard on SCSI models)				
36.4GB	1	-	-	1	-
54.6GB	-	1	-	-	1
72.8GB ²	-	2	-	-	2
91.6GB	-	-	1	-	-
146.8GB (max) ²	-	-	2	-	-

This table does not represent all possible HDD configurations.

1. Select a total storage row then add the quantity of HDDs from all columns within an RPM range to the standard HDD. Total Internal Storage listed is within +/- 0.2GB unless otherwise noted.

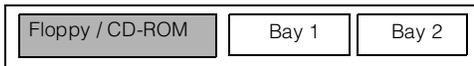
2. Requires replacing standard HDD.



EIDE Models			
Total Internal Storage ¹	7200RPM EIDE HDDs ²		
	20.4GB 19K4461	40GB 22P7157	60GB (09N4207)
20.4GB	(Standard on EIDE models)		
40.8GB	1	-	-
60.4GB	-	1	-
80GB ³	-	2	-
80.4GB	-	-	1
120GB ³	-	-	2

This table does not represent all possible HDD configurations. Total Internal Storage listed is within +/-0.2GB unless otherwise noted.

1. Select a total storage row then add the quantity of HDDs from all columns to the standard HDD.
2. The R Pro dual integrated EIDE controllers support a maximum of three IDE devices per machine including one CD-ROM and two IDE HDDs.
3. Requires removal of the standard HDD.



Bay	Form Factor	Height	Front Access	Usage	Part Number	Description	RPM	Height	Bays Supported	Max Qty
1 ¹	89mm (3.5in)	SL	no	HDD ²	IDE HDDs^{1, 2}					
2	89mm (3.5in)	SL	no	Open	19K4461	20.4GB 7200rpm ATA-100 (EIDE) HDD	7200	SL	1, 2	2
					22P7157	40GB 7200rpm ATA-100 (EIDE) HDD	7200	SL	1, 2	2
					09N4207	60GB 7200rpm ATA-100 (EIDE) HDD	7200	SL	1, 2	2
					Nonhot-swap Ultra160 HDDs²					
					06P5750	18.2GB 10,000rpm Ultra160 SCSI HDD	10000	SL	1, 2	2
					06P5751	36.4GB 10,000rpm Ultra160 SCSI HDD	10000	SL	1, 2	2
					06P5752	73.4GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD	10000	SL	1, 2	2
					06P5765	18.2GB 15,000rpm Ultra160 SCSI HDD	15000	SL	1, 2	2
					06P5766	36.4GB 15,000rpm Ultra160 SCSI HDD	15000	SL	1, 2	2

1. Boot drive should be located in bay one.
2. Both nonhot-swap and IDE models ship with one standard HDD.

1. The R Pro dual integrated EIDE controllers support a maximum of three IDE devices per machine including one CD-ROM and two IDE hard disk drives. IDE HDDs are supported only on IDE models.
2. Mixing of IDE and SCSI hard disk drives is not supported.



IntelliStation R Pro Power, Monitors & Accessories

Part Number	Description
Power¹	
Uninterruptible Power Supply (UPS)²	
32P1020	APC 2U Smart-UPS 1400RMB
94G6676	APC Smart-UPS 3000RMB ³
37L6861	APC Smart-UPS 5000RMB ⁴
Monitors⁵	
66274AN	G78 Color Monitor 17in (406.4mm, 16in viewable image), stealth black ⁶
655163N	P96 Color Monitor 19in (456mm, 17.9in viewable image), stealth black
6657HG2	T750 Hybrid Flat Panel Color Monitor 17in (433mm, 17in viewable image), stealth black
6658HG2	T84H TFT LCD Color Monitor 18.1in (460mm, 18.1in viewable image), stealth black
633147N	E54 Color Monitor 15in (350mm, 13.8in viewable image), stealth black ⁶
63324HN	E74 Color Monitor 17in (406mm, 16in viewable image), stealth black ⁶
6652U3N	P275 Color Monitor 21in (503mm, 19.8in viewable image), stealth black
6651U3N	P97 Color Monitor 19in (457.3mm, 18in viewable image), stealth black
6639U3N	P77 Color Monitor 17in (406mm, 16in viewable image), stealth black
32P1031	NetBAY 1U Flat Panel Monitor Console Kit (w/ US Space Saver keyboard) ⁷
32P1032	NetBAY 1U Flat Panel Monitor Console Kit (without keyboard) ⁷
9511AG4	T540 Flat Panel Color Monitor 15in (381mm, 15in viewable image), stealth black ⁶

1. IntelliStation R Pro includes a worldwide, voltage sensing 200W power supply with auto restart and two 9ft line cords. One line cord contains a 110V NEMA 5-15P connector while the other contains an IEC 320 C14 for attachment to a high voltage PDU or UPS.
2. For runtimes and UPS attributes see Appendix C: UPS Runtime Estimate.
3. Height is 3U. See Rack Cabinets and Options section for supported IBM racks.
4. Height is 5U. See Rack Cabinets and Options section for supported IBM racks.
5. Third-party sourcing is required for connecting the rack-mounted R Pro system to remote workstation console devices. Keyboard, video and mouse (KVM) connectivity hardware for IntelliStation R Pro is not available through IBM but can be purchased through various vendors including the following:
AmuletHotKey in London, England on the Web at www.amulet-hotkey.com or telephone +44(0)20 7407 2522.
Wey Technology AG in Rotkreuz, Germany at info@wey.ch (E-mail) or telephone +41 41 798 20 49.
IBM makes no representations or warranties with respect to non-IBM products.
These products are offered and warranted by third parties, not IBM.
6. Installation within a rack requires optional Monitor Compartment (P/N 94G7444).
7. Includes a 15in Flat Panel Monitor.
8. Installation within a rack requires optional Netfinity Flat Panel Monitor Rack Mount Kit II (P/N 37L6888) and Netfinity Rack Keyboard Tray (P/N 28L4707). A space saver keyboard may coexist within the same 28L4707 keyboard tray.

Part Number	Description
Rack and NetBAY^{1, 2}	
	Refer to the Rack Cabinets and Options section for information concerning IBM racks and rack-supported devices.
Keyboard and Mouse^{3, 4}	
28L3644	Space Saver II Keyboard ^{5, 6}
28L3621	Preferred Keyboard (stealth black) ⁷
10K3849	106-key Preferred USB Keyboard with 2-port USB Hub (stealth black) ^{7, 8}
28L3673	Sleek 2-button Stealth Black Mouse
33L3244	Sleek USB Mouse (stealth black)

1. IntelliStation R Pro is housed in a 19in rack-mountable drawer and requires one of the racks listed in the Rack Cabinets and Options section for the xSeries 330.
2. Note limitations and restrictions required for adequate cooling in the Rack Cabinets and Options section for xSeries 330. If non-IBM racks are to be used, make sure that both the front and rear doors offer a minimum of 48% open area uniformly distributed and in line with installed servers. A clearance of 51 to 64mm (2 to 2.5in) must be maintained between the front door and the system unit's front bezel. The rear door must maintain the same or greater clearance.
3. IntelliStation R Pro supports rack configurations only, but ships with a standard keyboard and mouse.
4. Third-party sourcing is required for connecting the rack-mounted R Pro system to remote workstation console devices. Keyboard, video and mouse (KVM) connectivity hardware for IntelliStation R Pro is not available through IBM but can be purchased through various vendors including the following:
AmuletHotKey in London, England on the Web at www.amulet-hotkey.com or telephone +44(0)20 7407 2522.
Wey Technology AG in Rotkreuz, Germany at info@wey.ch (E-mail) or telephone +41 41 798 20 49.
IBM makes no representations or warranties with respect to non-IBM products.
These products are offered and warranted by third parties, not IBM.
5. Installation within a rack requires optional keyboard tray (P/N 28L4707), which stows in ready-to-use position.
6. Advanced TrackPoint IV features are not available on IntelliStation R Pro systems.
7. Installation within a rack requires optional keyboard tray (P/N 28L4707). This keyboard cannot share a keyboard tray with a flat panel display.
8. USB keyboards attach to a single USB-capable server. They are not compatible with the NetBAY console switches.

INTELLISTATION R PRO



IntelliStation Z Pro

Part Number	Processor Speed (MHz) ³	Number of Processors (Std/Max)	L3 ECC Cache	Memory (Std/Max)	Video Adapter	Form Factor	Onboard Ethernet (Mbps)	SCSI Controller (Dual, Ultra, RAID)	Removable Media Bays (Total/Avail)	Internal Hard Disk Drive (Std/Max)	CD-ROM (IDE)	Bays (Total/Avail)	Slots (Total/Avail)
6894-10X ¹	800	2/2	2MB	2GB/16GB	Matrox Millennium G450	Tower	10/100	D,U160 ⁴	4/2	18.2GB/ 182GB	12X-8X- 32X ⁵	9/7	8/6
6894-12X ¹	800	2/2	2MB	2GB/16GB	NVIDIA Quadro2 Pro	Tower	10/100	D,U160 ⁴	4/2	36.4GB/ 182GB	12X-8X- 32X ⁵	9/7	8/6
6894-14X ^{1,2}	800	2/2	2MB	2GB/16GB	Matrox Millennium G450	Tower	10/100	D,U160 ⁴	4/2	18.2GB/ 182GB	12X-8X- 32X ⁵	9/7	8/6
6894-16X ^{1,2}	800	2/2	2MB	2GB/16GB	NVIDIA Quadro2 Pro	Tower	10/100	D,U160 ⁴	4/2	36.4GB/ 182GB	12X-8X- 32X ⁵	9/7	8/6

Note: This system is currently targeted at early adopters such as the scientific community and developers who are interested in porting their code to take advantage of the technological benefits of the Itanium processor. Users are advised to check with their sales representative or the Intel Web site regarding availability of operating systems and applications.

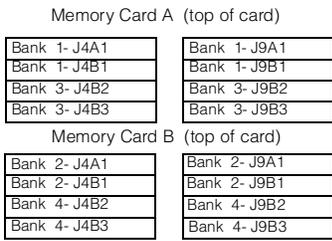
1. IntelliStation Z Pro ships with a keyboard and mouse. See "Power, Monitors and Accessories" for a list of compatible monitors.
2. This model is shipped preloaded with the Microsoft Windows XP 64-bit Edition operating system.
3. Intel Itanium™ processor with advanced transfer ECC L3 cache and 2 x 133MHz FSB.
4. IntelliStation Z Pro includes a dual channel Ultra160 SCSI controller installed in slot two. The controller provides two external 0.8mm VHDCI connectors on one channel and three internal connectors on the other channel. Two of the internal connectors are 68-pin, 16-bit Ultra160 (LVD) and the third is a 50-pin, 8-bit Ultra2 connector. A five-drop multi-mode terminated LVD SCSI cable is included.
5. Variable read rate. Actual playback speed will vary and is often less than the maximum possible.

IntelliStation Z Pro Memory

Total Memory ¹	Quantity of DIMMs Added ²			
	4x 512MB (2GB) Standard	4 x 256MB (33L3258)	4 x 512MB (33L3260)	4 x 1GB (33L3262)
3GB		1	-	-
4GB		2	-	-
5GB		1	1	-
6GB		-	2	-
7GB		1	2	-
8GB		-	3	-
9GB		1	1	1
10GB		-	2	1
11GB		1	-	2
12GB		-	1	2
13GB ³		1	-	3
14GB		-	-	3
16GB ³ (max)		-	-	4

This table does not represent all possible memory configurations. Memory options are available only in packs of four.

1. Network operating systems may limit the maximum amount of addressable memory. See operating system specifications for further information.
2. To obtain the quantity of memory identified in the "Total Memory" column, select the appropriate row and order the quantity of DIMMs identified in all columns for that row, which will be added to the standard memory noted at the top of the far left column.
3. Requires removal of standard DIMMs.





Part Number	Memory Description ¹
33L3258	4 x 256MB 100MHz SDRAM DIMM
33L3260	4 x 512MB 100MHz SDRAM DIMM
33L3262	4 x 1GB 100MHz SDRAM DIMM

1. Due to two- and four-way interleaving, all DIMMs installed in each of the two or four banks must be the same size to achieve maximum performance. Each of the four DIMMs installed in a bank must be the same size and each bank must contain four DIMMs if the bank is populated. DIMMs in other banks can be different sizes, which might affect performance. Install DIMMs in sequence bank one through four. All compatible memory options are available only in packs of four.

IntelliStation Z Pro Hard Disk Drive (HDD) Storage

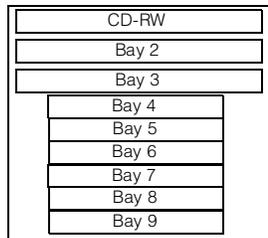
Total Internal Storage ¹	10,000RPM HDDs	
	18.2GB (00N8208)	36.4GB (00N8209)
18.2GB	1 ²	-
36.4GB	-	1 ³
54.6GB	1	1
72.8GB	-	2
91GB	1	2
109.2GB	-	3
127.4GB	1	3
145.6GB	-	4
163.8GB	1	4
182GB ⁴	-	5

This table does not represent all possible HDD configurations.

1. Select a total storage row and then add HDDs from both columns. Total Internal Storage is within +/- 0.2GB unless otherwise noted.
2. Standard on models 10X and 14X.
3. Standard on models 12X and 16X.
4. This HDD configuration requires replacement of the standard HDD in models 10X and 14X.

Bay	Form Factor	Height	Front Access	Usage	Part Number	Description	RPM	Height	Bays Supported	Max Qty
1	133mm (5.25in)	HH	yes	IDE CD-RW	Nonhot-swap Ultra 160 HDDs					
2	133mm (5.25in)	HH	yes	open ¹	00N8208	18.2GB 10Krpm Ultra160 SCSI HDD	10000	SL	4 ... 9 ¹	5 ²
3	133mm (5.25in)	HH	yes	open ¹	00N8209	36.4GB 10Krpm Ultra160 SCSI HDD	10000	SL	4 ... 9 ¹	5 ²
4 ... 8	89mm (3.5in)	SL	no	open						
9	89mm (3.5in)	SL	no	Std HDD						

1. Supports removable media devices only. Hard disk drives are not supported.

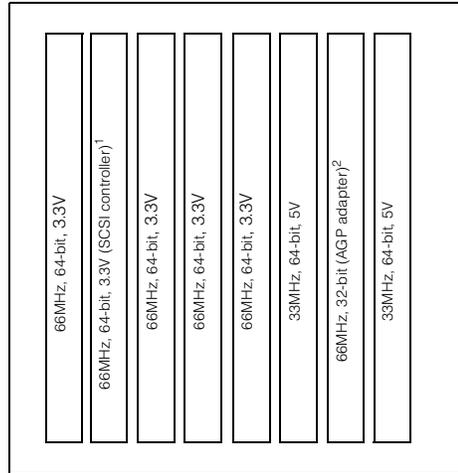




IntelliStation Z Pro I/O Options

Part Number	Description	Adapter Length	PCI Support	Slots Supported ²
Storage Controllers				
19K4646	PCI Wide Ultra160 SCSI Adapter ¹	Half	32-bit	1 ... 8

1. PCI Wide Ultra160 SCSI Adapter (P/N 19K4646) provides a single channel with one internal connector, a five-drop multi-mode terminated LVD SCSI cable and one external 0.8mm VHDCI connector. Only one of the two connectors may be utilized.
 2. A 64-bit adapter installed into a 32-bit slot will transfer data at 32-bit rates. Adapters rated at 66MHz will operate at 33MHz when installed in a 33MHz slot. 133MHz PCI-X adapters are backward compatible with 33/66MHz, 64-bit PCI-based servers.



All slots are full-length.

- 1. Dual channel Ultra 160 SCSI Adapter installed in slot two.
- 2. Supports Matrox Millennium G450 Graphics Accelerator with 16MB video memory (model 10X) or NVIDIA Quadro2 Pro with 64MB video memory (model 12X).

IntelliStation Z Pro Power, Monitors & Accessories

Part Number	Description
Power	
	IntelliStation Z Pro includes an 800W voltage-sensing power supply and a single line cord.
Monitors	
655163N	P96 Color Monitor 19in (456mm, 17.9in viewable image), stealth black
66274AN	G78 Color Monitor 17in (406.4mm, 16in viewable image), stealth black
6657HG2	T750 Hybrid Flat Panel Color Monitor 17in (433mm, 17in viewable image), stealth black
6652U3N	P275 Color Monitor 21in (503mm, 19.8in viewable image), stealth black
6639U3N	P77 Color Monitor 17in (406mm, 16in viewable image), stealth black
6651U3N	P97 Color Monitor 19in (457.3mm, 18in viewable image), stealth black
Keyboard and Mouse	
	IntelliStation Z Pro ships standard with an IBM 104-key keyboard and three-button mouse.





Appliance Servers

IBM xSeries 130/135

Part Number
 Processor Speed
 Number of Processors (Std/Max)
 L2 ECC Cache (KB)
 Memory (Std/Max) (R = RDIMM)
 Form Factor
 Power Supply Quantity (Std/Max)
 Hot-Swap (Power, Slots, HDD, Fans)
 Redundancy (Optional, Standard)
 Adv System Management Processor
 Onboard Ethernet (Mbps)
 SCSI Controller (Qual, Ultra, RAID)
 Removable Media Bays (Total/Avail)
 Internal Hard Disk Drive (Std/Max)
 CD-ROM (IDE)³
 Bays (Total/Avail)
 Slots (Total/Avail)

xSeries 130 At-A-Glance																
8672-25X ^{1,4}	800	1/1	128	256MB(R) / 1.5GB	Rack (1U)	1/1	-	-	N	2 x 10/ 100	IDE	-	20.4GB/ 80GB	24X-10X	4/1	2/2
8654-5DX ^{1,4}	1GHz	1/2	256	256MB(R) / 2GB	Rack (1U)	1/1	-	-	N	2 x 10/ 100	U160	-	18.2GB/ 72.8GB	24X-10X	4/1	2/2
xSeries 135 At-A-Glance																
8672-24X ^{1,5}	800	1/1	128	256MB(R) / 1.5GB	Rack (1U)	1/1	-	-	N	2 x 10/ 100	IDE	-	20.4GB/ 80GB	24X-10X	4/1	2/2
8654-5CX ^{1,5}	1GHz	1/2	256	256MB(R) / 4GB	Rack (1U)	1/1	-	-	Y	2 x 10/ 100	U160	-	18.2GB/ 72.8GB	24X-10X	4/1	2/2

1. Housed in a 19in rack-mountable drawer and ships standard without a keyboard or mouse. See Rack Cabinets and Options section for supported IBM racks.
2. Intel Pentium III processor with advanced transfer L2 cache and 133MHz Front-Side Bus (FSB). Models 1YX, 1XX, 25X and 24X do not provide SMP support.
3. Variable read rate. Actual playback speed will vary and is often less than the maximum possible.
4. This system is a superior Web hosting appliance delivering full X-architecture™ integration and system management capabilities. Powered by Windows 2000 technology, Microsoft Internet Information Services, and Web Server Accelerator, the x130 offers the performance and reliability for the most demanding e-business companies.
5. This system is a price/performance Web hosting solution based on Linux and IBM HTTP Server. The x135 is an ideal solution for customers who have chosen the open source architecture and are seeking the lowest possible price for Web hosting. A key offering for ISPs.

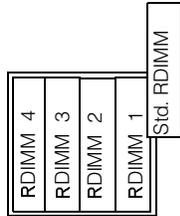
xSeries 130 / 135 Processors

Part Number	Processor Upgrades	SMP Support ¹
10K0053	1GHz Upgrade with 133MHz FSB and 256KB Advanced Transfer Cache Pentium III Processor	5CX, 5DX

1. One additional processor may be installed, providing a maximum of two. All processors must be identical in type, speed, and cache size. SMP support is not available for 800MHz models. Upgrading processor speed for those models requires removing the standard processor and installing one or two 1GHz processors.

xSeries 130 / 135 Memory

Models 5CX and 5DX



Part Number	Memory Description ¹
10K0018	128MB PC133 ECC SDRAM RDIMM
10K0020	256MB PC133 ECC SDRAM RDIMM
10K0022	512MB PC133 ECC SDRAM RDIMM
33L3326	1GB PC133 ECC SDRAM RDIMM

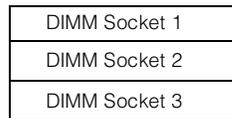
1. Memory RDIMMs must be installed in sequence from RDIMM connector 1 through connector 4. RDIMM size is not relevant.

Models 5CX and 5DX				
Total System Memory ¹	Quantity of RDIMMs Added			
	1 x 256MB (std)	128MB (10K0018)	256MB (10K0020)	512MB (10K0022) 1GB (33L3326)
384MB		1	-	-
512MB		2 or	1	-
640MB		3	-	-
768MB		-	2 or	1
1024MB		-	3	-
1280MB		-	-	2 or 1
1792MB		-	-	3
2048MB ²		-	-	4 or 2

This table does not represent all possible memory configurations. Memory modules may vary in price per MB. Selection of smaller RDIMMs may provide a more cost-effective alternative to using larger RDIMMs.

1. Network operating systems may limit the maximum amount of addressable memory. See operating system specifications for further information. Optimum performance occurs with 1GB total memory.
2. Requires removal of standard memory.

Models 24X and 25X



Part Number	Memory Description ¹
33L3081	128MB 133MHz ECC SDRAM Unbuffered DIMM Memory
33L3083	256MB 133MHz ECC SDRAM Unbuffered DIMM Memory
33L3085	512MB 133MHz ECC SDRAM Unbuffered DIMM Memory

Models 24X and 25X			
Total System Memory ¹	Quantity of RDIMMs Added		
	1 x 256MB (std)	128MB (33L3081)	256MB (33L3083) 512MB (33L3085)
384MB		1	-
512MB		2	-
640MB		1	1
768MB		-	2
1024MB		-	1 1
1280MB		-	- 2
1536MB ²		-	- 3

This table does not represent all possible memory configurations. Memory modules may vary in price per MB. Selection of smaller RDIMMs may provide a more cost-effective alternative to using larger RDIMMs.

1. Network Operating Systems may limit the maximum amount of addressable memory. See operating system specifications for further information. Optimum performance occurs with 1GB total memory.
2. Requires removal of standard memory.



xSeries 130 / 135 Hard Disk Drive (HDD) Storage

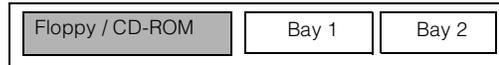
SCSI Models		
Total Int Storage ¹	10,000RPM HDDs	
	18.2GB	36.4GB
	(P/N 37L7205)	(P/N 37L7206)
18.2GB ²	1	-
36.4GB	2	-
54.6GB	1	1
72.8GB max ³	-	2

This table does not represent all possible HDD configurations.

1. Select a total storage row then add the quantity of HDDs from all columns. Total Internal Storage listed is within +/- 0.2GB unless otherwise noted.
2. An 18.2GB 10,000rpm HDD is standard in models 8654-5CX, 5DX.
3. Requires removal of the standard HDD. Boot CD with software preload shipped with the system.

Bay	Form Factor	Height	Front Access	Usage	SCSI Models					
					Part Number	Description	RPM	Height	Bays Supported	Max Qty
1 ¹	HS ²	SL	yes ²	HDD	Ultra160 HDDs					
2	HS	SL	yes ²	Open	37L7205	18.2GB 10K-4 Ultra160 SCSI Hot-swap SL HDD	10000	SL	1, 2	2
					37L7206	36.4GB 10K-4 Ultra160 SCSI Hot-swap SL HDD	10000	SL	1, 2	2

1. Boot drive should be located in bay 1.
2. Models 24X and 25X support IDE HDDs only and are not front-accessible



IDE Models		
Total Int Storage ¹	7200RPM IDE HDDs ²	
	20.4GB	40GB
	(P/N 19K4461)	(P/N 22P7157)
20.4GB	Standard on EIDE models	-
40.8GB	1	-
60.4GB	-	1
80GB ³	-	2

This table does not represent all possible HDD configurations. Total Internal Storage listed is within +/- 0.2GB unless otherwise noted.

1. Select a total storage row then add the quantity of HDDs from all columns to the standard HDD.
2. The xSeries 130/135 dual integrated EIDE controllers support a maximum of three IDE devices per machine including one CD-ROM and two IDE HDDs.
3. Requires removal of the standard 20.4GB IDE HDD. Boot CD with software preload is shipped with the system.

IDE Models					
Part Number	Description	RPM	Height	Bays Supported	Max Qty
IDE HDDs¹					
19K4461	20.4GB 7200rpm ATA-100 (EIDE) HDD	7200	SL	1, 2	2
22P7157	40GB 7200rpm ATA-100 (EIDE) HDD	7200	SL	1, 2	2

1. Mixing of IDE and SCSI hard disk drives is not supported.

xSeries 130 / 135 I/O Options

Part Number	Description	Adapter Length	PCI Support	Slots Supported ²
Networking¹				
22P6801	PRO/1000XT Server Adapter by Intel (copper) w/CD, manuals	Half	64-bit	1, 2

1. xSeries 130 / 135 includes dual full-duplex, 10/100Mbps Ethernet controllers.

2. A 64-bit adapter installed into a 32-bit slot will transfer data at 32-bit rates. Adapters rated at 66MHz will operate at 33MHz when installed in a 33MHz slot. 133MHz PCI-X adapters are backward compatible with 33/66MHz, 64-bit PCI-based servers.



Exterior Connector Access



xSeries 130 / 135 Power, Monitors & Accessories

Part Number	Description
Power¹	
Uninterruptible Power Supply (UPS)²	
32P1020	APC 2U Smart-UPS 1400RMB
94G6676	APC Smart-UPS 3000RMB ³
37L6861	APC Smart-UPS 5000RMB ⁴
Monitors⁵	
06P4792	Cable Chain Technology Cable Kit ⁶
633147N	E54 Color Monitor 15in (350mm, 13.8in Viewable Image) , stealth black ⁷
63324HN	E74 Color Monitor 17in (406mm, 16in Viewable Image), stealth black ⁷
66274AN	G78 Color Monitor 17in (406.4mm, 16in Viewable Image) , stealth black ⁷
9511AG4	T540 Flat Panel Color Monitor 15in (381mm, 15in viewable image), stealth black ⁸

1. The xSeries 130/135 includes a worldwide, voltage sensing 200W power supply with auto restart and two 9ft line cords. One line cord contains a 110V NEMA 5-15P connector while the other contains an IEC 320 C 14 for attachment to a high voltage PDU or UPS.
2. For runtimes and UPS attributes see Appendix C: UPS Runtime Estimate.
3. Height is 3U. See Rack Cabinets and Options section for supported IBM racks.
4. Height is 5U. See Rack Cabinets and Options section for supported IBM racks.
5. The xSeries 130 / 135 uses an SVGA controller (S-3 Savage4 chipset) with 8MB of video memory.
6. A C2T Interconnect™ cable chaining technology Cable Kit (P/N 06P4792) is available for models 5DX and 5CX for attachment of console devices to one or multiple chained systems if the standard breakout cable (265mm/10in) is not long enough. Chaining technology is not applicable to models 24X and 25X. A short chaining cable is provided standard with models 5DX and 5CX. The C2T Interconnect Cable Kit contains a 2M (6.5ft) breakout cable for attachment to a keyboard, mouse and monitor as well as a 2M (6.5ft) chaining cable for extending the distance requirement for models 5DX and 5CX if the 260mm (10in) chaining cable is not long enough. A maximum of 42 xSeries 130/135s are supported in a single standard chain. No more than one C2T Interconnect Cable Kit may be used. If the last server in the chain is connected to a console switch rather than directly to a monitor, a console cable (P/N 09N4293 or 94G7447) is required in addition to the C2T Interconnect Cable Kit.
7. Installation within a rack requires optional Monitor Compartment (P/N94G7444).
8. Installation within a rack requires optional Netfinity Flat Panel Monitor Rack Mount Kit II (P/N 37L6888) and Netfinity Rack Keyboard Tray (P/N 28L4707). A space saver keyboard may coexist within the same 28L4707 keyboard tray.

Rack and NetBAY¹	
	Refer to the Rack Cabinets and Options section for information concerning IBM racks and rack-supported devices.
Keyboard and Mouse²	
06P4792	Cable Chain Technology Cable Kit ³
28L3644	Space Saver II Keyboard ⁴
28L3621	Preferred Keyboard (stealth black) ⁵
28L3673	Sleek 2-button Stealth Black Mouse

1. xSeries 130 / 135 are housed in a 19in rack-mountable drawer and require one of the racks listed in the Rack Cabinets and Options section.
2. xSeries 130/135 supports rack configurations only and ships without a keyboard or mouse.
3. A C2T Interconnect™ cable chaining technology Cable Kit (P/N 06P4792) is available for models 5DX and 5CX for attachment of console devices to one or multiple chained systems if the standard breakout cable (265mm/10in) is not long enough. Chaining technology is not applicable to models 24X and 25X. A short chaining cable is provided standard with models 5DX and 5CX. The C2T Interconnect Cable Kit contains a 2M (6.5ft) breakout cable for attachment to a keyboard, mouse and monitor as well as a 2M (6.5ft) chaining cable for models 5DX and 5CX if the standard 260mm (10in) chaining cable is not long enough. A maximum of 42 xSeries 130/135s are supported in a single chain. No more than one C2T Interconnect Cable Kit may be used. If the last server in the chain is connected to a console switch rather than directly to a monitor, a console cable (P/N 09N4293 or 94G7447) is required in addition to the C2T Interconnect Cable Kit.
4. Installation within a rack requires optional keyboard tray (P/N 28L4707) which stows in ready-to-use position.
5. Installation within a rack requires optional keyboard tray (P/N 28L4707). This keyboard cannot share a keyboard tray with a flat panel display.





IBM xSeries 200

Part Number Withdrawal Date ⁷ Processor Speed Number of Processors (Std/Max) L2 ECC Cache (KB) Memory (Std/Max) Form Factor Power Supply Quantity (Std/Max) Hot-Swap (Power, HDD, Fans) Redundancy (Optional, Standard) Adv System Management Processor Onboard Ethernet (Mbps) SCSI Controller (Dual, Ultra, RAID) Removable Media Bays (Total/Avail) Internal Hard Disk Drive (Std/Max) CD-ROM (IDE) Bays (Total/Avail) Slots (Total/Avail)

xSeries 200 At-A-Glance																	
8479-10X ¹	-	850MHz	1/1	128	128MB/1.5GB	Tower	1/1	-	-	-	10/100	U160 ³	4/2	0/293.6GB	48X-20X	7/5	5/4
8479-11X ¹	-	850MHz	1/1	128	128MB/1.5GB	Tower	1/1	-	-	-	10/100	IDE	4/2	20.4/180GB ⁴	48X-20X	7/4	5/5
8479-13X ^{1, 5}	26-Mar	850MHz	1/1	128	128MB/1.5GB	Tower	1/1	-	-	-	10/100	U160 ⁵	4/2	18.2/293.6GB ⁴	48X-20X	7/4	5/4
8479-31X ¹	-	1GHz	1/1	128	128MB/1.5GB	Tower	1/1	-	-	-	10/100	IDE	4/2	20.4GB/180GB ⁴	48X-20X	7/4	5/5
8479-40X ²	26-Mar	1GHz	1/1	256	128MB/1.5GB	Tower	1/1	-	-	-	10/100	U160 ³	4/2	0/293.6GB	48X-20X	7/5	5/4
8479-41X ²	26-Mar	1GHz	1/1	256	128MB/1.5GB	Tower	1/1	-	-	-	10/100	IDE	4/2	20.4/180GB ⁴	48X-20X	7/4	5/5
8479-42X ^{2, 5}	-	1GHz	1/1	256	128MB/1.5GB	Tower	1/1	-	-	-	10/100	U160 ³	4/2	18.2/293.6GB ⁴	48X-20X	7/4	5/4
8479-50X ²	-	1.13GHz	1/1	512	128MB/1.5GB	Tower	1/1	-	-	-	10/100	U160 ³	4/2	0/293.6GB	48X-20X	7/5	5/4
8479-51X ²	-	1.13GHz	1/1	512	128MB/1.5GB	Tower	1/1	-	-	-	10/100	IDE	4/2	20.4/180GB ⁴	48X-20X	7/4	5/5
8479-52X ^{2, 5}	-	1.13GHz	1/1	512	128MB/1.5GB	Tower	1/1	-	-	-	10/100	U160 ³	4/2	18.2/293.6GB ⁴	48X-20X	7/4	5/4
8479-60X ²	-	1.26GHz	1/1	512	128MB/1.5GB	Tower	1/1	-	-	-	10/100	U160 ³	4/2	0/293.6GB	48X-20X	7/5	5/4
8479-61X ²	-	1.26GHz	1/1	512	128MB/1.5GB	Tower	1/1	-	-	-	10/100	IDE	4/2	20.4/180GB ⁴	48X-20X	7/4	5/5
8479-62X ^{2, 5}	-	1.26GHz	1/1	512	128MB/1.5GB	Tower	1/1	-	-	-	10/100	U160 ³	4/2	18.2/293.6GB ⁴	48X-20X	7/4	5/4
8481-11X ^{1, 6}	-	850MHz	1/1	128	128MB/1.5GB	Tower	1/1	-	-	-	10/100	IDE	4/2	20.4/180GB ⁴	48X-20X	7/4	5/5
8481-21X ^{2, 6}	-	1GHz	1/1	256	128MB/1.5GB	Tower	1/1	-	-	-	10/100	IDE	4/2	20.4/180GB ⁴	48X-20X	7/4	5/5

- Includes Intel Celeron processor with 100MHz FSB.
- Includes Intel Pentium III processor with advanced transfer L2 cache and 133MHz FSB.
- Includes a single-channel, 32-bit Ultra 160 SCSI PCI storage adapter installed in slot three.
- Maximum capacity assumes replacement of standard hard disk drives with the largest supported IBM hard disk drive.
- Not available in the United States.
- This model features a one-year on-site limited warranty instead of a three-year parts, one-year on-site limited warranty.
- Not available from IBM after this date. Business Partner inventory may be available.

xSeries 200 Processors

Part Number	Processor Upgrades	Processor Speed Upgrade ¹
32P0650	xSeries 1GHz/133MHz 256KB Cache Upgrade with Pentium III Processor	8479-1xX, 8481-11X
32P0651	xSeries 1.13GHz/133MHz 512KB Cache Upgrade with Pentium III Processor SVR	8479-1xX, 4xX, 8481-11X, 21X
32P0652	xSeries 1.26GHz/133MHz 512KB Cache Upgrade with Pentium III Processor SVR	8479-1xX, 4xX, 5xX, 8481-11X, 21X

¹ Requires removal of the standard processor. A maximum of one processor may be installed. Upgrades may require a BIOS update. To obtain the latest Flash BIOS, access www.pc.ibm.com/support and enter machine "Type-Model" in Quick Path. Select "Downloadable files" then "BIOS."



xSeries 200 Memory

DIMM Socket
DIMM Socket
DIMM Socket

Part Number	Memory Description
33L3081	128MB 133MHz ECC SDRAM Unbuffered DIMM Memory
33L3083	256MB 133MHz ECC SDRAM Unbuffered DIMM Memory
33L3085	512MB 133MHz ECC SDRAM Unbuffered DIMM Memory

Total System Memory (Standard Models) ¹	DIMMs		
	128MB (1 x 128)	256MB (33L3083)	512MB (33L3085)
192MB	-	-	-
256MB	1	-	-
384MB	2 or	1	-
640MB	-	2 or	1
768MB ²	-	3	-
1152MB	-	-	2
1536MB ²	-	-	3

This table does not represent all possible memory configurations. Memory modules may vary in price per MB. Selection of smaller DIMMs may provide a more cost-effective alternative to using larger DIMMs. Select the desired total memory, then select a quantity in that row from one of the DIMM columns.

1. Network operating systems may limit the maximum amount of addressable memory. See operating system specifications for further information.
2. Requires removal of standard DIMMs.

IBM XSERIES 200

xSeries 200 Internal SCSI Cabling

EIDE Models

In xSeries 200 models using the EIDE interface for storage device attachment, a two-drop cable is used to attach the standard EIDE HDD to one of the EIDE connectors. A second EIDE controller provides the interface for the IDE CD-ROM drive. A two-drop cable connects the IDE controller to the IDE CD-ROM. Up to two additional IDE devices can be installed (one off of each controller).

SCSI Models

xSeries 200 models with a SCSI adapter are cabled internally with a five-drop, 16-bit wide LVD SCSI cable with a built-in multi-mode active terminator at one end of the cable. The other end of the cable is attached to the internal 68-pin connector of the standard Ultra160 SCSI adapter. SCSI devices can be connected to any of the five cable connectors. If 8-bit (narrow) devices are to be installed, a 68- to 50-pin converter (32G3925) is required for each narrow device.

Other Configuration Alternatives

In the case where a RAID controller is used to support internal drives in an xSeries 200, the standard cable is moved from the standard PCI storage controller to the RAID adapter. To connect a tape drive to the standard SCSI controller, use the 16-bit multi-mode terminated, two-drop SCSI cable included with optional Media Bay Tray and LVD Cable Kit (P/N 10K2340) unless the tape option includes a terminated SCSI cable.

External SCSI support can be obtained by installing an optional SCSI adapter or RAID controller and using appropriate external SCSI cabling.

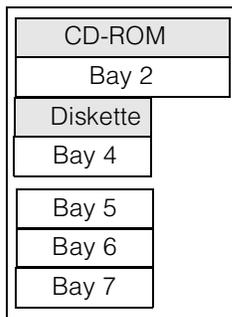
For additional information regarding internal cabling, refer to Appendix F: Internal Cabling Overview.



xSeries 200 Hard Disk Drive (HDD)

Total Internal Storage ¹	10,000RPM SCSI HDDs			15,000RPM SCSI HDDs	
	18.2GB (06P5750)	36.4GB (06P5751)	73.4GB (06P5752)	18.2GB (06P5765)	36.4GB (06P5766)
0GB	Standard on some base models ²				
18.2GB	1	-	-	1	-
36.4GB	2	1	-	2	1
54.6GB	3	-	-	3	-
72.8GB	4	2	-	4	2
109.2GB	-	3	-	-	3
145.6GB	-	4	-	-	4
146.8GB	-	-	2	-	-
220.2GB	-	-	3	-	-
293.6GB (Max)	-	-	4	-	-

This table does not represent all possible hard disk drive (HDD) configurations.
 1. Select a total storage row and select the quantity of HDDs from a column corresponding to the hard disk drive of choice. Total Internal Storage listed is within +/- 0.2GB unless otherwise noted.
 2. Models 8479-13X, 42X, 52X, 62X ship standard with one 18.2GB HDD.



Total Internal Storage ¹	7200RPM IDE HDDs ²			
	20.4GB (P/N 19K4461)	30GB (P/N 00N8203)	40GB (P/N 22P7157)	60GB (P/N 09N4207)
20.4GB	Std on EIDE models	-	-	-
40.8GB	1	-	-	-
50.4GB	-	1	-	-
60.4GB	-	-	1	-
61.2GB	2	-	-	-
80.4GB	-	2	-	-
100.4GB	-	-	2	-
120GB ³	-	-	3	-
140.4GB	-	-	-	2
180GB ³	-	-	-	3

This table does not represent all possible HDD configurations. Total Internal Storage listed is within +/-0.2GB unless otherwise noted.

1. Select a total storage row then add the quantity of HDDs from all columns to the standard HDD.
2. The two EIDE controllers support a maximum of four IDE devices per machine including CD-ROM drives, HDDs and IDE tape drives.
3. Requires removal of the standard HDD.

Bay	Form Factor	Height	Front Access	Usage	Part Number	Description	RPM	Height	Bays Supported	Max Qty
1	133mm (5.25in)	HH	yes	IDE CD-ROM	IDE HDDs^{1, 2}					
2	133mm (5.25in)	HH	yes	open ¹	19K4461	20.4GB 7200rpm ATA-100 (EIDE) HDD	7200	SL	4 ... 7	3
3	89mm (3.5in)	SL	yes	Diskette	00N8203	30GB 7200rpm ATA-100 (EIDE) HDD	7200	SL	4 ... 7	3
4	89mm (3.5in)	SL	yes	open	22P7157	40GB 7200rpm ATA-100 (EIDE) HDD	7200	SL	4 ... 7	3
5 ... 7	89mm (3.5in)	SL	no	open	09N4207	60GB 7200rpm ATA-100 (EIDE) HDD	7200	SL	4 ... 7	3
Ultra160 HDDs²										
					06P5750	18.2GB 10Krpm Ultra160 SCSI SL HDD	10000	SL	4 ... 7	4
					06P5751	36.4GB 10Krpm Ultra160 SCSI SL HDD	10000	SL	4 ... 7	4
					06P5752	73.4GB 10Krpm Ultra160 SCSI SL HDD	10000	SL	4 ... 7	4
					06P5765	18.2GB 15Krpm Ultra160 SCSI SL HDD	15000	SL	4 ... 7	4
					06P5766	36.4GB 15Krpm Ultra160 SCSI SL HDD	15000	SL	4 ... 7	4

1. Supports removable media devices only. Hard disk drives are not supported.

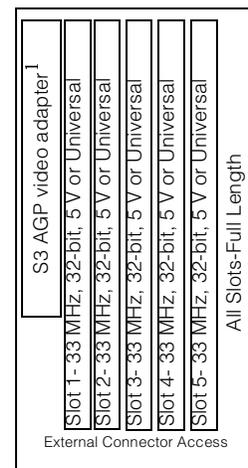


Optical Devices		Bays Supported
22P6950	16X Max RAM-Read DVD-ROM Drive ^{3, 4}	1, 2
External Storage Expansion Units ⁵		Form Factor
35311RU	EXP300 Storage Expansion Unit ⁶	Rack (3U)
09N7296	EXP300 Rack-to-Tower Conversion Kit	-

- The xSeries 200 IDE controllers support a maximum of four IDE devices per machine including CD-ROM drives, HDDs and IDE tape drives.
- Mixing of internal IDE and SCSI HDDs is not supported.
- Either replace the standard CD-ROM or install in the available media bay. An IDE cable with three connectors is included with the optional optical drive (same cable is provided standard in the system). If installing as an additional device, connect the cable to each optical device and the IDE connector on the system board. Configure the optional device as a master using the preset configuration if replacing the standard device or as a slave if installed as a redundant device.
- Audio not supported for DVD-ROM drives. The drive operates in video mode only.
- Not supported by the external SCSI port included in SCSI models. Select an optional SCSI controller then refer to Appendix D: Cables - Storage Unit - Controllers to confirm the controller supports the desired External Storage Expansion Unit and to select a supported cable. For HDD or other expansion unit options, see the specific expansion unit section.
- EXP300 includes a single 2M Ultra2 SCSI cable and dual hot-swap 500W redundant power supplies, each with its own power cord. To convert an EXP300 to a tower form factor, EXP300 Rack-to-Tower Conversion Kit (P/N 09N7296) is required.

xSeries 200 I/O Options

Part Number	Description	Adapter Length	PCI Support ¹	Slots Supported ^{2, 3}
Storage Controllers^{4, 5}				
06P5736	ServeRAID-4Mx Ultra160 SCSI Controller ⁶	Full	64-bit	2 ... 5
06P5740	ServeRAID-4Lx Ultra160 SCSI Controller ⁷	Half	64-bit	2 ... 5
19K4646	PCI Wide Ultra160 SCSI Adapter ⁸	Half	32-bit	2 ... 5
02K3454	PCI Fast/Wide Ultra SCSI Adapter ⁹	Half	32-bit	2 ... 5
24P2585	IDE 100 RAID Controller by AMI ¹⁰	Half	32-bit	2 ... 5
Networking¹¹				
Ethernet¹²				
09N9901	10/100 EtherLink Server Adapter by 3Com ¹³	Half	32-bit	1 ... 5
06P3601	10/100 Ethernet Server Adapter ¹³	Half	32-bit	1 ... 5
06P3701	Gigabit Ethernet SX Server Adapter (fiber)	Half	64-bit	1 ... 5
22P4901	10/100 Dual Port Server Adapter ¹³	Half	64-bit	1 ... 5
Token Ring				
34L5001	16/4 Token-Ring PCI Management Adapter ¹³	Half	32-bit	1 ... 5
34L5201	High-Speed 100/16/4 Token-Ring PCI Management Adapter ¹³	Half	32-bit	1 ... 5
Communications¹⁴				
33L4618	V.90 PCI Data/Fax Modem	Half	32-bit	2 ... 5
37L14xx	Serial I/O SST 8, 16 and 128 Port Adapters ¹⁵	Half	32-bit	2 ... 5



1. xSeries 200 ships standard with an AGP video adapter. Alternate video adapters are not supported.

- A 64-bit adapter installed into a 32-bit slot will transfer data at 32-bit rates. Adapters rated at 66MHz will operate at 33MHz when installed in a 33MHz slot.
- The xSeries 200 has five full-length, 33MHz PCI expansion slots. The number of available slots is model specific.
- The Ultra160 SCSI controller shipped standard in SCSI models is installed in slot two.
- xSeries 200 SCSI models include a standard single-channel Ultra160 SCSI adapter with a five-drop, multimode terminated LVD SCSI Cable. All models include dual IDE connectors. IDE models require an optional SCSI PCI adapter for SCSI functionality. See At-A-Glance for model attributes.
- Storage controllers are supported in slots two through five only. When a bootable SCSI device such as the standard SCSI PCI controller in SCSI models or an optional RAID controller are installed with a second storage controller, they should be installed in slots two and four or slots three and five (standard SCSI adapter is installed in slot two). Networking adapters would then be installed in slots one, three or five. Networking and internal storage adapters cannot share slots two and four or three and five. If a bootable SCSI device is not installed in any PCI slot, then pairing restrictions do not apply.
- ServeRAID-4Mx Ultra160 SCSI Controller is powered by a 100MHz Intel Zion GC80303 processor that provides 64MB of battery-backed ECC cache and two internal and two external Ultra160 connections (only two connectors may be used). External connections are 0.8mm VHDCI.
- ServeRAID-4Lx Ultra160 SCSI Controller is powered by a 100MHz Intel Zion GC80303 processor and provides a single channel, 32MB of ECC cache and either one internal or one external Ultra160 connection. External connector is 0.8mm VHDCI.
- PCI Wide Ultra160 SCSI Adapter (P/N 19K4646) provides a single channel with one internal connector, a five-drop multi-mode terminated LVD SCSI cable and one external 0.8mm VHDCI connector. Only one of the two connectors may be utilized.
- PCI Fast/Wide Ultra SCSI Adapter (P/N 02K3454) provides one external 68-pin high density connector that supports external SCSI devices such as tape enclosures.
- Supported only in IDE models. Dual channel adapter includes two connectors, supporting one ATA-100 HDD per channel. Two 18in ATA-66 cables ship with the option. Allows RAID 0 and RAID 1 configurations.
- xSeries 200 includes an integrated full-duplex, 10/100Mbps Ethernet controller. Networking adapters are supported in slots one through five. Slots two and four or slots three and five cannot share a networking adapter with a bootable SCSI controller.
- In a fault-tolerant networking environment, using the fault-tolerant software delivered with the Ethernet adapters of a single manufacturer is recommended. Installing fault-tolerant solutions provided by multiple manufacturers may cause failures if the intermediate drivers provided with the adapters are not compatible. The onboard Ethernet is Intel-based, which is compatible with the three Intel-based optional Ethernet adapters (P/N 06P3601, 06P3701, 22P4901).
- Wake on LAN is supported for this option when installed in slots one through five. Networking adapters cannot share slots two and four or three and five with a bootable SCSI controller.
- xSeries 200 includes two USB ports, two high-speed serial/asynchronous ports (NS16550A software compatible) and one high-speed parallel port supporting devices using SSP/EPP/ECP protocols adhering to the IEEE 1284 Standard.⁷
- See Appendix E for details on Serial I/O options and configuration limitations.



xSeries 200 Power, Monitors & Accessories

Part Number	Description
Power¹	
Free Standing Uninterruptible Power Supply (UPS)²	
94G3134	APC Smart-UPS 700
94G3135	APC Smart-UPS 1000
94G3136	APC Smart-UPS 1400
Rack Mount Uninterruptible Power Supply (UPS)²	
32P1020	APC 2U Smart-UPS 1400RMB
94G6676	APC Smart-UPS 3000RMB ³
37L6861	APC Smart-UPS 5000RMB ⁴
Monitors⁵	
633147N	E54 Color Monitor 15in (350mm, 13.8in viewable image), stealth black ⁶
63324HN	E74 Color Monitor 17in (406mm, 16in viewable image), stealth black ⁶
66274AN	G78 Color Monitor 17in (406.4mm, 16in viewable image), stealth black ⁶
9511AG4	T540 Flat Panel Color Monitor 15in (381mm, 15in viewable image), stealth black ⁷
32P1031	NetBAY 1U Flat Panel Monitor Console Kit (w/ US Space Saver keyboard) ⁸
32P1032	NetBAY 1U Flat Panel Monitor Console Kit (w/o keyboard) ⁸

1. The xSeries 200 includes a 330W voltage sensing power supply and a single line cord.
2. For runtimes and UPS attributes see Appendix C: UPS Runtime Estimate.
3. Height is 3U. See Rack Cabinets and Options section for supported IBM racks.
4. Height is 5U. See Rack Cabinets and Options section for supported IBM racks.
5. The xSeries 200 contains an ATI Savage-4 LT video adapter with 8MB of video memory that is plugged into the standard AGP slot.
6. Installation within a rack requires optional Monitor Compartment (P/N 94G7444).
7. Installation within a rack requires optional Netfinity Flat Panel Monitor Rack Mount Kit II (P/N 37L6888) and Netfinity Rack Keyboard Tray (P/N 28L4707). A space saver keyboard may coexist within the same 28L4707 keyboard tray.
8. Includes a 15in Flat Panel Monitor.

Part Number	Description
Conversion Kits	
09N4300	4Ux20D Tower-to-Rack Kit
Rack and NetBAY¹	
	Refer to the Rack Cabinets and Options section for information concerning IBM racks and rack-supported devices.
Keyboard and Mouse²	
28L3644	Space Saver II Keyboard ^{3, 4}
28L3621	Preferred Keyboard (stealth black) ⁵
10K3849	106-key Preferred USB Keyboard with 2-port USB Hub (stealth black) ^{5, 6}
28L3673	Sleek 2-button Stealth Black Mouse
33L3244	Sleek USB Mouse (stealth black)

1. Rack installation of an xSeries 200 requires 4Ux20D Tower-to-Rack Kit (P/N 09N4300) and one of the racks listed in the Rack Cabinets and Options section.
2. The xSeries 200 includes both a mouse and nonspace saver keyboard.
3. Installation within a rack requires optional keyboard tray (P/N 28L4707) which stows in "ready-to-use" position.
4. Advanced TrackPoint IV features are not available on IBM xSeries systems.
5. Installation within a rack requires optional keyboard tray (P/N 28L4707). This keyboard cannot share a keyboard tray with a flat panel display.
6. USB keyboards attach to a single USB-capable server. They are not compatible with the NetBAY console switches.



xSeries 200 Tape Options

Part Number	Tape Drives	Bays Supported	SCSI Interface (bit)	Form Factor	Termination Included	68/50-pin Converter Incl	Ext Tape Enclosures ¹
20L0549	10/20GB TR5 Internal IDE Tape Drive ²	2, 4	-	89mm (3.5in) SL or 133mm (5.25in) HH	-	-	-
09N4041	12/24GB DDS/3 4mm Internal SCSI Tape Drive ^{3, 4}	2	8	89mm (3.5in) HH or 133mm (5.25in) HH	Y	Y	3510020, 3551001
09N4042	10/20GB NS Internal SCSI Tape Drive ^{3, 4}	2, 4	8	89mm (3.5in) SL or 133mm (5.25in) HH	Y	Y	3510020, 3551001
00N7991	20/40 GB DDS/4 4mm Internal Tape Drive ⁵	2	16 Ultra2 LVD	89mm (3.5in) HH or 133mm (5.25in) HH	Y ⁶	-	3510020 ⁷ 3551001 ⁸
00N8015	110/220GB Super DLT Internal SCSI Tape Drive	-	16 Ultra2 LVD	133mm (5.25in) FH	Y ⁶	-	3551001 ⁸
00N8016	100/200GB LTO Tape Drive	-	16 Ultra2 LVD	133mm (5.25in) FH	Y ⁶	-	3551001 ⁸
24P2398	40/80GB Half-High DLTVS Internal SCSI Tape Drive ⁵	2	16 Ultra2 LVD	133mm (5.25in) HH	Y ⁶	-	3551001 ⁸
External Tape Enclosures							
3510020	External Half High SCSI Storage Enclosure ⁹	-	8, 16	Desktop	N	N	-
3551001	NetMEDIA Storage Expansion Unit EL ¹⁰	-	16	Rack	Y	N	-
10L7113	NetMEDIA Systems Management Adapter ¹¹	-	16 LVD	-	N	N	3551001
Associated Options							
00N7956	68-pin External Multimode LVD/SE SCSI Terminator	-	16 LVD/SE	External	Y	N	3510020
10K2340	Media Bay Tray and LVD Cable Kit ⁴	-	16 LVD	Internal	Y	N	3551001

Note: SCSI models include an Ultra160 SCSI controller with a five-drop multi-mode terminated LVD SCSI cable. Single-ended devices attached to this cable will limit the entire SCSI bus to single-ended performance. SCSI tape drives and external tape enclosures are supported by PCI Wide Ultra160 SCSI Adapter (P/N 19K4646) which includes a five-drop multi-mode LVD SCSI cable and an external 0.8-mm VHDCI connector.

- To determine cable requirements, note the tape drive's SCSI interface, the appropriate SCSI controller from the system configurator section and the desired enclosure, then refer to Appendix D: Cables - Storage Units - Controllers.
- SCSI models include a two-drop EIDE cable for attachment to the CD-ROM and an IDE tape drive.
- This single-ended device will limit the SCSI bus to which it is attached to Ultra SCSI speeds. To provide a dedicated tape SCSI bus, install PCI Wide Ultra160 SCSI Adapter (P/N 19K4646) which includes a five-drop multi-mode LVD SCSI cable.
- Internal RAID configurations (SCSI models only) where the standard internal SCSI cable is attached to a RAID adapter require the two-drop multi-mode terminated LVD SCSI cable included with Media Bay Tray and LVD Cable Kit (P/N 10K2340) in order to connect tape drives to the standard PCI storage controller.
- EIDE models require optional PCI Wide Ultra160 SCSI Adapter (P/N 19K4646), which includes a five-drop multi-mode LVD SCSI cable.
- Termination requires installing the 42in single-drop, terminated LVD SCSI cable provided with the option or is provided in a NetMEDIA Storage Expansion Unit with the installation of NetMEDIA Systems Management Adapter (P/N 10L7113).
- Requires 68-pin External Multimode LVD/SE SCSI Terminator (P/N 00N7956).
- LVD support for LVD devices installed in a NetMEDIA Storage Expansion Unit EL (P/N 3551001) requires installation of NetMEDIA Systems Management Adapter (P/N 10L7113), which also provides termination, and replacement of the standard single-ended internal cable with the terminated single-drop LVD SCSI cable provided with this option. If the standard cables are used for attachment to LVD devices, single-ended SCSI rules and bus speeds apply.
- Provides a black desktop 133mm (5.25in) half-high (HH) tape enclosure. Connector is configurable as 50-pin Centronix or 68-pin high density. Requires either tape drive self termination or 68-pin External Multimode LVD/SE SCSI Terminator (P/N 00N7956).
- NetMEDIA Storage Expansion Unit EL (P/N 3551001) is a black 3U, 19in rack mountable tape enclosure which includes two full high (FH) or four half high (HH) extended length 133mm (5.25in) bays, two external 0.8mm VHDCI connectors and two internal four-drop single-ended terminated 16-bit SCSI cables for device attachment. Two power supplies and two power cords are also included. Tip: The front rail clips will need to be reversed and screwed in from behind to secure the unit in a 930842x rack.
- NetMEDIA Systems Management Adapter (P/N 10L7113) may be installed in a 3551001 to provide repeater function, LVDS interface, aggregate cable lengths up to 12 meters when attached to an LVD SCSI controller, and auto-termination when the 3551001 is powered off. External connector is 0.8mm VHDCI.

Note: Additional tape attributes can be found in Appendix A: Tape Drive Attributes.

IBM XSERIES 200



xSeries 200 Sample Configurations

Note: The following sample configurations are for illustration only and may not be suitable for any specific customer installation. Contact your IBM Business Partner or IBM Marketing Representative for assistance with your specific configuration requirements.

Internet Server

Part Number	Description	Quantity
8479-51X	xSeries 200 1.13GHz/512KB Pentium III, 128MB ECC, 20.4GB EIDE, 48X	1
33L3081	128MB 133Mhz ECC SDRAM DIMM Memory	1 ¹
19K4461	20.4GB 7200rpm ATA/100 (EIDE) HDD	1 ²
20L0549	10/20GB TR5 Internal IDE Tape Drive	1
633147N	E54 Color Monitor 15in (350mm, 13.8in viewable image), stealth black	1
94G3134	APC Smart-UPS 700	1

1. For a total of 256MB of system memory.
2. For a total of 40.8GB of internal storage.

An Internet server handles all requests from the Internet (Intranet or Extranet). Usually, this type of server has the same characteristics as a normal file server. The main difference is that an Internet server talks a different language (TCP/IP vs NETBEUI or IPX/SPX) and often needs to do an extra security check (firewall). In the case of an Internet server, the server itself talks mostly to one client, the Internet Service Provider (ISP), instead of many clients as a file server does.

With this in mind, the xSeries 200 was selected to provide an affordable price point for the growing Internet server market with an Intel Pentium III processor, 256MB of system memory (expandable to 1.5GB), and power protection with an APC Smart-UPS.

The network configuration depends on the method that will be used to connect the server to the Internet. Usually fast Ethernet routers are used, but if other methods are used you can add the appropriate adapter. The configuration includes a tape backup unit for secure backup of critical data in the event of a system or storage failure.

File and Print Server

Part Number	Description	Quantity
8479-50X	xSeries 200 1.13GHz/512KB Pentium III, 128MB ECC, Open, 48X	1
33L3081	128MB 133MHz ECC SDRAM DIMM Memory	1 ¹
06P5750	18.2GB 10Krpm Ultra160 SCSI SL HDD	3 ²
00N7991	20/40GB DDS/4 4mm Internal Tape Drive	1
633147N	E54 Color Monitor 15in (350mm, 13.8in viewable image), stealth black	1
94G3134	APC Smart-UPS 700	1

1. For a total of 256MB of system memory.
2. For a total of 54.6GB of internal storage.

A small business or departmental server is usually required to perform all typical server functions while servicing up to 100 users in a normal workgroup computing environment, but doesn't require the high-end performance and fault-tolerance properties of larger servers.

The sample configuration above consists of an xSeries 200 with 256MB of memory and 54.6GB of hard disk drive space. It has enough processor power and memory to run most current network operating systems comfortably and enough hard disk drive space to store a significant amount of data with additional external storage expansion still available. Demanding network traffic is effectively handled by the standard 100Mbps Ethernet connection.

This configuration also includes a tape backup unit, monitor, and a UPS to keep the system protected during power surges and outages.

Application Server

Part Number	Description	Quantity
8479-60X	xSeries 200 1.26GHz/512KB Pentium III, 128MB ECC, Open, 48X	1
33L3083	256MB 133MHz ECC SDRAM DIMM Memory	1 ¹
06P5740	ServeRAID-4Lx Ultra160 SCSI Controller	1
06P5750	18.2GB 10Krpm Ultra160 SCSI SL HDD	3 ²
10K2340	Media Bay Tray and LVD Cable Kit ³	1
09N4042	10/20GB NS Internal SCSI Tape Drive	1
633147N	E54 Color Monitor 15in (350mm, 13.8in viewable image), stealth black	1
94G3134	APC Smart-UPS 700	1

1. For a total of 384MB of system memory.
2. Three HDDs are used for RAID 5 protection. Effective capacity is two HDDs or 36.4GB.
3. Cable for dedicated attachment of tape to standard controller.

An application server differs from a file and print server in that it has a higher workload in providing application serving requirements for users. With this in mind, the xSeries 200 was selected to provide an affordable price point for an application server with Pentium III processing, 384MB of system memory (expandable to 1.5GB), and availability features such as RAID-protected internal storage and power protection with an APC Smart-UPS.





IBM xSeries 220

Part Number
Withdrawal Date
Processor Speed² (GHz)
Number of Processors (Std/Max)
L2 ECC Cache (KB)
Memory (Std/Max) (R=RDIMM)
Form Factor
Power Supply Quantity (Std/Max)
Hot-Swap (Power, Slots, HDD, Fans)
Redundancy (Optional, Standard)
Adv System Management Processor
Onboard Ethernet (Mbps)
SCSI Controller (Dual, Ultra, BAID)
Removable Media Bays (Total/Avail)
Internal Hard Disk Drive (Std/Max)
CD-ROM (IDE)³
Bays (Total/Avail)
Slots (Total/Avail)

xSeries 220 At-A-Glance																	
8646-21X	26-Mar	1	1/2	256	128MB(R)/4GB	Tower	1/1	-	-	-	10/100	U160	4/2	0/293.6GB	48X-20X	7/5	5/5
8646-22X ¹	26-Mar	1	1/2	256	128MB(R)/4GB	Tower	1/1	-	-	-	10/100	U160	4/2	18.2GB/293.6GB	48X-20X	7/4	5/5
8646-2AX	26-Mar	1	1/2	256	256MB(R)/4GB	Tower	1/1	H	-	-	10/100	U160	4/2	0/220.2GB	48X-20X	7/5	5/5
8646-31X	-	1.13	1/2	512	128MB(R)/4GB	Tower	1/1	-	-	-	10/100	U160	4/2	0/293.6GB	48X-20X	7/5	5/5
8646-32X ¹	-	1.13	1/2	512	128MB(R)/4GB	Tower	1/1	-	-	-	10/100	U160	4/2	18.2GB/293.6GB	48X-20X	7/4	5/5
8646-3AX	-	1.13	1/2	512	256MB(R)/4GB	Tower	1/1	H	-	-	10/100	U160	4/2	0/220.2GB	48X-20X	7/5	5/5
8646-41X	-	1.26	1/2	512	128MB(R)/4GB	Tower	1/1	-	-	-	10/100	U160	4/2	0/293.6GB	48X-20X	7/5	5/5
8646-42X ¹	-	1.26	1/2	512	128MB(R)/4GB	Tower	1/1	-	-	-	10/100	U160	4/2	18.2GB/293.6GB	48X-20X	7/4	5/5
8646-4AX	-	1.26	1/2	512	256MB(R)/4GB	Tower	1/1	H	-	-	10/100	U160	4/2	0/220.2GB	48X-20X	7/5	5/5
8646-51X	-	1.4	1/2	512	128MB(R)/4GB	Tower	1/1	-	-	-	10/100	U160	4/2	0/293.6GB	48X-20X	7/5	5/5
8646-52X ¹	-	1.4	1/2	512	128MB(R)/4GB	Tower	1/1	-	-	-	10/100	U160	4/2	18.2GB/293.6GB	48X-20X	7/4	5/5
8646-5AX	-	1.4	1/2	512	256MB(R)/4GB	Tower	1/1	H	-	-	10/100	U160	4/2	0/220.2GB	48X-20X	7/5	5/5

1. Not available in the United States.
2. Intel Pentium III processor with advanced transfer L2 cache and 133MHz FSB.
3. Variable read rate. Actual playback speed will vary and is often less than the maximum possible.
4. Not available from IBM after this date. Business Partner inventory may be available.

xSeries 220 Processor Upgrades

Part Number	Processor Upgrades	SMP Support ¹	Processor Speed Upgrade ²
32P0650	xSeries 1GHz/133MHz 256KB Cache Upgrade with Pentium III Processor	2xX	-
32P0651	xSeries 1.13GHz/133MHz 512KB Cache Upgrade with Pentium III Processor SVR	3xX	2xX
32P0652	xSeries 1.26GHz/133MHz 512KB Cache Upgrade with Pentium III Processor SVR	4xX	2xX, 3xX
25P2090	xSeries 1.4GHz/133MHz-512KB Cache Upgrade with Pentium III Processor	5xX	2 ... 4xX

1. One additional processor may be installed, providing a maximum of two. All processors must be identical in type, speed, and cache size.
2. Requires removal of the standard processor. A maximum of two processors may be installed. Upgrades may require a BIOS update. To obtain the latest Flash BIOS, access www.pc.ibm.com/support and enter machine "Type-Model" in Quick Path. Select "Downloadable files" and then "BIOS".



xSeries 220 Memory

RDIMM Socket
RDIMM Socket
RDIMM Socket
RDIMM Socket

Part Number	Memory Description ¹
10K0018	128MB PC133 ECC SDRAM RDIMM
10K0020	256MB PC133 ECC SDRAM RDIMM
10K0022	512MB PC133 ECC SDRAM RDIMM
33L3326	1GB PC133 ECC SDRAM RDIMM

1. Install additional RDIMMs in sequence of socket two through four.

Total System Memory ¹		Quantity of RDIMMs Added			
128MB (1 x 128) Models	256MB (1 x 256) Models	128MB (10K0018)	256MB (10K0020)	512MB (10K0022)	1GB (33L3326)
256MB	384MB	1	-	-	-
384MB	512MB	2 or	1	-	-
512MB	640MB	3	-	-	-
640MB	768MB	-	2 or	1	-
896MB	1024MB	-	3	-	-
1024MB ²	-	-	4	-	-
1152MB	1280MB	-	-	2 or	1
1664MB	1792MB	-	-	3	-
2048MB ²	2048MB ²	-	-	4	-
2176MB	2304MB	-	-	-	2
3200MB	3328MB	-	-	-	3
4096MB ² (max)	4096MB ² (max)	-	-	-	4

This table does not represent all possible memory configurations. Memory modules may vary in price per MB. Selection of smaller RDIMMs may provide a more cost-effective alternative to using larger RDIMMs. Select the desired total memory from the appropriate column (Standard Model128MB), then select a quantity in that row from one of the RDIMM columns.

1. Network operating systems may limit the maximum amount of addressable memory. See operating system specifications for further information.
2. Requires removal of standard memory.

xSeries 220 Internal SCSI Cabling

Nonhot-swap Models

xSeries 220 nonhot-swap models are cabled internally with a five-drop, 16-bit wide LVD SCSI cable with a built-in multi-mode active terminator on one end of the cable. The other end of the cable is attached to the internal 68-pin connector of the integrated Ultra160 SCSI controller. SCSI devices can be connected to any of the five cable connectors. If 8-bit (narrow) devices are to be installed, a 68- to 50-pin converter (32G3925) is required for each narrow device.

Hot-swap Models

xSeries 220 hot-swap models are cabled internally with a two-drop, 16-bit wide LVD SCSI cable. One end is connected to the internal 68-pin connector of the integrated Ultra160 SCSI controller. The second drop is connected to the hot-swap SCSI backplane. The SCSI backplane provides termination for the SCSI bus. Tape options installed in the removable media bay are not supported on the same SCSI bus as the hot-swap backplane.

Other Configuration Alternatives

In the case where a RAID controller is used to support internal drives in an xSeries 220, the standard cable is moved from the onboard controller to the RAID adapter. To connect a tape drive to the onboard SCSI controller, the two-drop cable from Media Bay Tray and LVD Cable Kit (P/N 10K2340) must be used unless the tape option includes a terminated SCSI cable.

External SCSI support can be obtained by installing an optional SCSI adapter or RAID controller and using appropriate external SCSI cabling.

For additional information regarding internal cabling, refer to Appendix F: Internal Cabling Overview.



xSeries 220 Hard Disk Drive (HDD) and External Storage

Total Internal Storage ¹	10,000RPM HDDs			15,000RPM HDDs	
	18.2GB (06P5750, 06P5754) ²	36.4GB (06P5751, 06P5755) ²	73.4GB (06P5752, 06P5756) ²	18.2GB (06P5765, 06P5767) ²	36.4GB (06P5766, 06P5768) ²
0GB	Standard on some base models ⁴				
18.2GB	1	-	-	1	-
36.4GB	2	1	-	2	1
54.6GB	3	-	-	3	-
72.8GB	4 ³	2	-	4 ³	2
109.2GB	-	3	-	-	3
145.6GB	-	4 ³	-	-	4 ³
146.8GB	-	-	2	-	-
220.2GB	-	-	3	-	-
293.6GB (max)	-	-	4 ³	-	-

This table does not represent all possible HDD configurations.

1. Select a total storage row then select the quantity of HDDs from a column corresponding to the HDD of choice. Total Internal Storage listed is within +/- 0.2 GB unless otherwise noted.

2. Both hot-swap and nonhot-swap HDDs are listed. Select the appropriate part number for the model of xSeries 220 being configured.

3. Only three hot-swap HDDs are supported on hot-swap models. A nonhot-swap HDD installed in bay four and connected to the same SCSI bus as the hot-swap backplane is not supported.

4. Models 8646-22X, 32X, 42X, 52X ship standard with an 18.2GB Ultra160 SCSI HDD.

Part Number	Description	RPM	Height	Hot-swap Models		Nonhot-swap Models	
				Bays Supported ²	Maximum Quantity	Bays Supported	Maximum Quantity
Nonhot-swap Ultra160 HDDs¹							
06P5750	18.2GB 10Krpm Ultra160 SCSI SL HDD	10000	SL	4	1	4 ... 7	4
06P5751	36.4GB 10Krpm Ultra160 SCSI SL HDD	10000	SL	4	1	4 ... 7	4
06P5752	73.4GB 10Krpm Ultra160 SCSI SL HDD	10000	SL	4	1	4 ... 7	4
06P5765	18.2GB 15Krpm Ultra160 SCSI SL HDD	15000	SL	4	1	4 ... 7	4
06P5766	36.4GB 15Krpm Ultra160 SCSI SL HDD	15000	SL	4	1	4 ... 7	4
Hot-swap Ultra160 HDDs²							
06P5754	18.2GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD	10000	SL	5 ... 7	3	-	-
06P5755	36.4GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD	10000	SL	5 ... 7	3	-	-
06P5756	73.4GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD	10000	SL	5 ... 7	3	-	-
06P5767	18.2GB 15Krpm Ultra160 SCSI Hot-Swap SL HDD	15000	SL	5 ... 7	3	-	-
06P5768	36.4GB 15Krpm Ultra160 SCSI Hot-Swap SL HDD	15000	SL	5 ... 7	3	-	-
Optical Devices		Bays Supported					
22P6950	16X Max RAM-Read DVD-ROM Drive ^{3,4}	1, 2					
External Storage Expansion Units⁵		Form Factor					
35311RU	EXP300 Storage Expansion Unit ⁶	Rack (3U)					
09N7296	EXP300 Rack-to-Tower Conversion Kit	-					

1. Nonhot-swap HDDs are supported in bays 4 ... 7 of nonhot-swap models and in bay four of hot-swap models. Nonhot-swap HDDs are not supported on the same SCSI bus as the hot-swap backplane in hot-swap models.

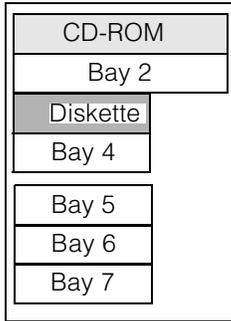
2. Hot-swap HDDs are supported in bays 5 ... 7 of hot-swap models. Bay four supports nonhot-swap HDDs only. Nonhot-swap HDDs are not supported on the same SCSI bus as the hot-swap backplane in hot-swap models.

3. Either replace the standard CD-ROM or install in the available media bay. An IDE cable with three connectors is included with the optional optical drive (same cable is standard in the system). If installing as an additional device, connect the cable to each optical device and the IDE connector on the system board. Configure the optional device as a master using the preset configuration if replacing the standard device or as a slave if installed as a redundant device.

4. Audio not supported for DVD-ROM drives. The drive operates in video mode only.

5. Not supported by the onboard SCSI controller. Select an optional SCSI controller then refer to Appendix D: Cables - Storage Units - Controllers to confirm the controller supports the desired External Storage Expansion Unit and to select a supported cable. For HDD or other expansion unit options, see the specific expansion unit section.

6. EXP300 includes a single 2M Ultra2 SCSI cable and dual hot-swap 500W redundant power supplies, each with its own power cord. To convert an EXP300 to a tower form factor, EXP300 Rack-to-Tower Conversion Kit (P/N 09N7296) is required.

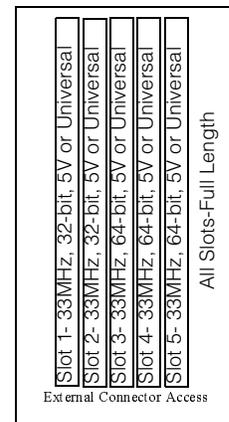


Bay	Form Factor	Height	Front Access	Usage
1	133mm (5.25in)	HH	yes	IDE CD-ROM
2	133mm (5.25in)	HH	yes	open ¹
3	89mm (3.5in)	SL	yes	Floppy
4	89mm (3.5in)	SL	yes	open
5 ... 7	89mm (3.5in)	SL ²	yes	open

1. Supports removable media devices only. Hard disk drives are not supported.
2. Bays five, six and seven are configured as hot-swap bays on xAX models. These bays are not front-accessible in nonhot-swap models.

xSeries 220 I/O Options

Part Number	Description	Adapter Length	PCI Support ¹	Slots Supported ^{1, 2}
Storage Controllers³				
06P5736	ServeRAID-4Mx Ultra160 SCSI Controller ⁴	Full	64-bit	1, 2, 3, 5
06P5740	ServeRAID-4Lx Ultra160 SCSI Controller ⁵	Half	64-bit	1, 2, 3, 5
19K4646	PCI Wide Ultra160 SCSI Adapter ⁶	Half	32-bit	1 ... 5
02K3454	PCI Fast/Wide Ultra SCSI Adapter ⁷	Half	32-bit	1 ... 5
Networking⁸				
Ethernet⁹				
09N9901	10/100 EtherLink Server Adapter by 3Com ¹⁰	Half	32-bit	1 ... 5
06P3601	10/100 Ethernet Server Adapter ¹⁰	Half	32-bit	1 ... 5
06P3701	Gigabit Ethernet SX Server Adapter (fiber)	Half	64-bit	1 ... 5
22P4901	10/100 Dual Port Server Adapter ¹⁰	Half	64-bit	1 ... 5
22P6801	PRO/1000XT Server Adapter by Intel (copper) w/CD, manuals ¹⁰	Half	64-bit	1 ... 5
Token Ring				
34L5001	16/4 Token-Ring PCI Management Adapter ¹⁰	Half	32-bit	1 ... 5
34L5201	High-Speed 100/16/4 Token-Ring PCI Management Adapter ¹⁰	Half	32-bit	1 ... 5
Communications¹¹				
33L4618	V.90 PCI Data/Fax Modem	Half	32-bit	1 ... 5
37L14xx	Serial I/O SST 8, 16 and 128 Port Adapters ¹²	Half	32-bit	1 ... 5
Systems Management				
09N7585	Remote Supervisor Adapter	Half	32-bit	2



1. A 64-bit adapter installed into a 32-bit slot will transfer data at 32-bit rates. Adapters rated at 66MHz will operate at 33MHz when installed in a 33MHz slot. 133MHz PCI-X adapters are backward compatible with 33/66MHz, 64-bit PCI-based servers.
2. The xSeries 220 has five full-length, 33MHz PCI expansion slots, three 64-bit and two 32-bit.
3. xSeries 220 has an integrated Ultra160 SCSI Controller with a single internal channel. Nonhot-swap models ship with a five-drop, multi-mode terminated LVD SCSI cable. Hot-swap models ship with a two-drop nonterminated LVD SCSI cable.
4. ServeRAID-4Mx Ultra160 SCSI Controller is powered by a 100MHz Intel Zion GC80303 processor that provides 64MB of battery-backed ECC cache and two internal and two external Ultra160 connections (only two connectors may be used). External connections are 0.8mm VHDCI.
5. ServeRAID-4Lx Ultra160 SCSI Controller is powered by a 100MHz Intel Zion GC80303 processor and provides a single channel, 32MB of ECC cache and either one internal or one external Ultra160 connection. External connector is 0.8mm VHDCI.
6. PCI Wide Ultra160 SCSI Adapter (P/N 19K4646) provides a single channel with one internal connector, a five-drop multi-mode terminated LVD SCSI cable and one external 0.8mm VHDCI connector. Only one of the two connectors may be utilized.
7. PCI Fast/Wide Ultra SCSI Adapter (P/N 02K3454) provides one external 68-pin high density connector that supports external SCSI devices such as tape enclosures.
8. The xSeries 220 includes an integrated full-duplex, 10/100Mbps Ethernet controller.
9. In a fault-tolerant networking environment, using the fault-tolerant software delivered with the Ethernet adapters of a single manufacturer is recommended. Installing fault-tolerant solutions provided by multiple manufacturers may cause failures if the intermediate drivers provided with the adapters are not compatible. The onboard Ethernet is Intel-based, which is compatible with the four Intel-based optional Ethernet adapters (P/N 06P3601, 06P3701, 22P4901, 22P6801).
10. The Wake on LAN feature of this adapter is supported only in slot one.
11. xSeries 220 includes two USB ports, two high-speed serial/asynchronous ports. (NS16550A software compatible) and one high-speed parallel port supporting devices using SSP/EPP/ECP protocols adhering to the IEEE 1284 Standard.
12. See Appendix E for details on Serial I/O Options and configuration limitations.



xSeries 220 Power, Monitors & Accessories

Part Number	Description
Power¹	
Free Standing Uninterruptible Power Supply (UPS)²	
94G3134	APC Smart-UPS 700
94G3135	APC Smart-UPS 1000
94G3136	APC Smart-UPS 1400
Rack Mount Uninterruptible Power Supply (UPS)²	
32P1020	APC 2U Smart-UPS 1400RMB
94G6676	APC Smart-UPS 3000RMB ³
37L6861	APC Smart-UPS 5000RMB ⁴
Monitors⁵	
633147N	E54 Color Monitor 15in (350mm, 13.8in viewable image), stealth black ⁶
63324HN	E74 Color Monitor 17in (406mm, 16in viewable image), stealth black ⁶
66274AN	G78 Color Monitor 17in (406.4mm, 16in viewable image), stealth black ⁶
9511AG4	T540 Flat Panel Color Monitor 15in (381mm, 15in viewable image), stealth black ⁷
32P1031	NetBAY 1U Flat Panel Monitor Console Kit (w/ US Space Saver keyboard) ⁸
32P1032	NetBAY 1U Flat Panel Monitor Console Kit (w/o keyboard) ⁸

1. The xSeries 220 includes a 330W voltage sensing power supply and a single line cord.
2. For runtimes and UPS attributes see Appendix C: UPS Runtime Estimate.
3. Height is 3U. See Rack Cabinets and Options section for supported IBM racks.
4. Height is 5U. See Rack Cabinets and Options section for supported IBM racks.
5. The xSeries 220 includes an integrated SVGA controller (S3 Savage4 Chipset) with 8MB of video memory.
6. Installation within a rack requires optional Monitor Compartment (P/N 94G7444).
7. Installation within a rack requires optional Netfinity Flat Panel Monitor Rack Mount Kit II (P/N 37L6888) and Netfinity Rack Keyboard Tray (P/N 28L4707). A space saver keyboard may coexist within the same 28L4707 keyboard tray.
8. Includes a 15in Flat Panel Monitor.

Part Number	Description
Conversion Kits	
09N4300	4Ux20D Tower-to-Rack Kit
Rack and NetBAY¹	
	Refer to the Rack Cabinets and Options section for information concerning IBM racks and rack-supported devices.
Keyboard and Mouse²	
28L3644	Space Saver II Keyboard ^{3, 4}
28L3621	Preferred Keyboard (stealth black) ⁵
10K3849	106-key Preferred USB Keyboard with 2-port USB Hub (stealth black) ^{5, 6}
28L3673	Sleek 2-button Stealth Black Mouse
33L3244	Sleek USB Mouse (stealth black)

1. Rack installation of an xSeries 220 requires 4Ux20D Tower-to-Rack Kit (P/N 09N4300) and one of the racks listed in the Rack Cabinets and Options section.
2. The xSeries 220 includes both a mouse and nonspace saver keyboard.
3. Installation within a rack requires optional keyboard tray (P/N 28L4707) which stows in "ready-to-use" position.
4. Advanced TrackPoint IV features are not available on IBM xSeries systems.
5. Installation within a rack requires optional keyboard tray (P/N 28L4707). This keyboard cannot share a keyboard tray with a flat panel display.
6. USB keyboards attach to a single USB-capable server. They are not compatible with the NetBAY console switches.



xSeries 220 Tape Options

Part Number	Tape Drives	Bays Supported	SCSI Interface (bit)	Form Factor	Termination Included	68/50-pin Converter Incl	Ext Tape Enclosures ¹
09N4041	12/24GB DDS/3 4mm Internal SCSI Tape Drive ^{2,3}	2	8	89mm (3.5in) HH or 133mm (5.25in) HH	Y	Y	3510020, 3551001
09N4042	10/20GB NS Internal SCSI Tape Drive ^{2,3}	2, 4	8	89mm (3.5in) SL or 133mm (5.25in) HH	Y	Y	3510020, 3551001
00N7991	20/40GB DDS/4 4mm Internal Tape Drive	2	16 Ultra2 LVD	89mm (3.5in) HH or 133mm (5.25in) HH	Y ⁴	-	3510020 ⁵ , 3551001 ⁶
00N8015	110/220GB Super DLT Internal SCSI Tape Drive	-	16 Ultra2 LVD	133mm (5.25in) FH	Y ⁴	-	3551001 ⁶
00N8016	100/200GB LTO Tape Drive	-	16 Ultra2 LVD	133mm (5.25in) FH	Y ⁴	-	3551001 ⁶
24P2398	40/80GB Half-High DLTVS Internal SCSI Tape Drive	2	16 Ultra2 LVD	133mm (5.25in) HH	Y ⁴	-	3551001 ⁶
Tape Autoloaders							
00N7992	120/240GB DDS/4 Tape Autoloader	-	16 Ultra2 LVD	133mm (5.25in) FH	Y ⁴	-	3551001 ⁶
External Tape Libraries⁷							
3570C2x	Magstar MP 3570 Tape Subsystem	-	HVD	6U Rack	Y	-	-
External Tape Enclosures							
3510020	External Half High SCSI Storage Enclosure ⁸	-	8, 16	Desktop	N	N	-
3551001	NetMEDIA Storage Expansion Unit EL ⁹	-	16	Rack	Y	N	-
10L7113	NetMEDIA Systems Management Adapter ¹⁰	-	16 LVD	-	N	N	3551001
Associated Options							
00N7956	68-pin External Multimode LVD/SE SCSI Terminator	-	16 LVD/SE	External	Y	N	3510020
10K2340	Media Bay Tray and LVD Cable Kit ³	-	16 LVD	Internal	Y	N	3551001

Note: All models include an integrated Ultra160 SCSI controller. Nonhot-swap models include a five-drop multimode terminated LVD SCSI cable. Hot-swap models include a two-drop nonterminated cable. Hot-swap models do not support attachment of an additional SCSI device to the bus that supports the hot-swap backplane. If a single-ended tape drive is attached to the same SCSI bus as the HDDs in nonhot-swap models, performance of the bus will be limited to single-ended performance. All tape drives and external tape enclosures are supported by PCI Wide Ultra160 SCSI Adapter (P/N 19K4646), which includes a five-drop multimode terminated LVD SCSI cable and an external 0.8mm VHDCI connector.

- To determine cable requirements, note the tape drive's SCSI interface, the appropriate SCSI controller from the system configurator section and the desired enclosure, then refer to Appendix D: Cables - Storage Units - Controllers.
- This single-ended device will limit the SCSI bus to which it is attached to Ultra SCSI speeds. To provide a dedicated tape SCSI bus, install PCI Wide ultra160 SCSI Adapter (P/N 19K4646) which includes a five-drop multi-mode LVD SCSI cable.
- RAID configurations, where the standard SCSI cable is attached to a RAID adapter, require the two-drop multi-mode terminated LVD SCSI cable included with Media Bay Tray and LVD Cable Kit (P/N 10K2340) for attachment of the tape drive to the standard SCSI controller.
- Termination requires installing the 42in single-drop, terminated LVD SCSI cable provided with the option or is provided in a NetMEDIA Storage Expansion Unit with the installation of NetMEDIA Systems Management Adapter (P/N 10L7113).
- Requires 68-pin External Multimode LVD/SE SCSI Terminator (P/N 00N7956).
- LVD support for LVD devices installed in a NetMEDIA Storage Expansion Unit EL (P/N 3551001) requires installation of NetMEDIA Systems Management Adapter (P/N 10L7113), which also provides termination, and replacement of the standard single-ended internal cable with the terminated single-drop LVD SCSI cable provided with this option. If the standard cables are used for attachment to LVD devices, single-ended SCSI rules and bus speeds apply.
- Tape library attributes and prerequisites are located in Appendix B: Tape Library Attributes.
- Provides a black desktop 133mm (5.25in) half-high (HH) tape enclosure. Connector is configurable as 50-pin Centronix or 68-pin high density. Requires either tape drive self termination or 68-pin External Multimode LVD/SE SCSI Terminator (P/N 00N7956).
- NetMEDIA Storage Expansion Unit EL (P/N 3551001) is a black 3U, 19in rack mountable tape enclosure which includes two full-high (FH) or four half-high (HH) extended length 133mm (5.25in) bays, two external 0.8mm VHDCI connectors and two internal four-drop single-ended terminated 16-bit SCSI cables for device attachment. Two power supplies and two power cords are also included. Tip: The front rail clips will need to be reversed and screwed in from behind to secure the unit in a 930842x rack.
- NetMEDIA Systems Management Adapter (P/N 10L7113) may be installed in a 3551001 to provide repeater function, LVDS interface, aggregate cable lengths up to 12m when attached to an LVD SCSI controller, and auto-termination when the 3551001 is powered off. External connector is 0.8mm VHDCI.

Note: Additional tape attributes can be found in Appendix A: Tape Drive Attributes.



xSeries 220 Sample Configurations

Note: The following sample configurations are for illustration only and may not be suitable for any specific customer installation. Contact your IBM Business Partner or IBM Marketing Representative for assistance with your specific configuration requirements.

Internet Server

Part Number	Description	Quantity
8646-5AX	xSeries 220 1.4GHz/512KB Pentium III, 256MB ECC, open hot-swap, 48X	1
10K0018	128MB PC133 ECC SDRAM RDIMM	1 ¹
06P5754	18.2GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD	2 ²
00N7991	20/40GB DDS/4 4mm Internal Tape Drive	1
19K4646	PCI Wide Ultra160 SCSI Adapter	1
633147N	E54 Color Monitor 15in (350mm, 13.8in viewable image), stealth black	1
94G3134	APC Smart-UPS 700	1

1. For a total of 384MB of system memory.

2. For a total of 36.4GB of internal storage.

An Internet server handles all requests from the Internet (Intranet or Extranet). Usually, this type of server has the same characteristics as a normal file server. The main difference is that an Internet server talks a different language (TCP/IP vs NETBEUI or IPX/SPX) and often needs to do an extra security check (firewall). In the case of an Internet server, the server itself talks mostly to just one client, the Internet Service Provider (ISP), instead of many clients as a file server does.

With this in mind, the xSeries 220 was selected to provide an affordable price point for the growing Internet server market with two-way Pentium III processing, 384MB of system memory (expandable to 4GB), and power protection with an APC Smart-UPS.

The network configuration depends on the method that will be used to connect the server to the Internet. Usually fast Ethernet routers are used, but if other methods are used you can add the appropriate adapter. The configuration includes a tape backup unit for secure backup of critical data in the event of a system or storage failure.

File and Print Server

Part Number	Description	Quantity
8646-31X	xSeries 220 1.13GHz/512KB, 128MB ECC, Open, 48X	1
10K0018	128MB PC133 ECC SDRAM RDIMM	1 ¹
06P5750	18.2GB 10Krpm Ultra160 SCSI SL HDD	3 ²
00N7991	20/40GB DDS/4 4mm Internal Tape Drive	1
633147N	E54 Color Monitor 15in (350mm, 13.8in viewable image), stealth black	1
94G3134	APC Smart-UPS 700	1

1. For a total of 256MB of system memory.

2. For a total of 54.6GB of internal storage.

A small business or departmental server is usually required to perform all typical server functions while servicing up to 100 users in a normal workgroup computing environment, but doesn't require the high-end performance and fault-tolerance properties of larger servers.

The sample configuration above consists of an xSeries 220 with 256MB of memory and 54.6GB of HDD space. It has enough processor power and memory to run most current network operating systems comfortably and enough hard disk drive space to store a significant amount of data with additional external storage expansion still available. Demanding network traffic is effectively handled by the standard 100Mbps Ethernet connection.

This configuration also includes a tape backup unit, monitor, and a UPS to keep the system protected during power surges and outages.

Application Server

Part Number	Description	Quantity
8646-4AX	xSeries 220 1.26GHz/512KB, 256MB ECC, open hot-swap, 48X	1
32P0652	xSeries 220 1.26GHz /133MHz 512KB Cache Upgrade with Pentium III Processor SVR	1
10K0020	256MB PC133 ECC SDRAM RDIMM	1 ¹
06P5740	ServeRAID-4Lx Ultra 160 SCSI Controller	1
06P5754	18.2GB 10Krpm Ultra 160 SCSI Hot-Swap SL HDD	3 ²
10K2340	Media Bay Tray and LVD Cable Kit ³	1
00N7991	20/40GB DDS/4 4mm Internal Tape Drive NS Internal SCSI Tape Drive	1
633147N	E54 Color Monitor 15in (350mm, 13.8in viewable image), stealth black	1
94G3134	APC Smart-UPS 700	1

1. For a total of 512MB of system memory.

2. Three HDDs are used for RAID 5 protection. Effective capacity is two HDDs or 36.4GB

3. Cable for dedicated attachment of tape to standard controller.

An application server differs from a file and print server in that it has a higher workload in providing application serving requirements for users. With this in mind, the xSeries 220 was selected to provide an affordable price point for an application server with two-way Pentium III processing, 512MB of system memory (expandable to 4GB), and availability features such as RAID-protected internal storage and power protection with an APC Smart-UPS.





IBM xSeries 232

Part Number
Withdrawal Date⁹
Processor Speed (GHz)²
Number of Processors (Std/Max)
L2 ECC Cache (KB)
Memory (Std/Max) (DIMM)³
Form Factor
Power Supply
Hot-Swap Quantity (Std/Max)
Redundancy (Optional, Standard)
Integrated System Management Processor
Onboard Ethernet (Mbps)
SCSI Controller (Dual, Ultra, RAID)
Removable Media Bays (Total/Avail)⁵
Internal Hard Disk Drive (Std/Max)
CD-ROM (IDE)⁷
Bays (Total/Avail)⁸
Slots (Total/Avail)

xSeries 232 At-A-Glance																	
8668-11X	26-Mar	1	1/2	256	256MB/4GB	Tower	1/3	H	O - Power ⁴	Y	10/100	D,U160	4/2	0/660.6GB ⁶	48X-20X	10/8	5/5
8668-1RX ¹	26-Mar	1	1/2	256	256MB/4GB	Rack (5U)	1/3	H	O - Power ⁴	Y	10/100	D,U160	4/2	0/660.6GB ⁶	48X-20X	10/8	5/5
8668-21X	-	1.13	1/2	512	256MB/4GB	Tower	1/3	H	O - Power ⁴	Y	10/100	D,U160	4/2	0/660.6GB ⁶	48X-20X	10/8	5/5
8668-2RX ¹	-	1.13	1/2	512	256MB/4GB	Rack (5U)	1/3	H	O - Power ⁴	Y	10/100	D,U160	4/2	0/660.6GB ⁶	48X-20X	10/8	5/5
8668-22X	-	1.13	1/2	512	256MB/4GB	Tower	2/3	P, H	S - Power	Y	10/100	D,U160	4/2	0/660.6GB ⁶	48X-20X	10/8	5/5
8668-2SX ¹	-	1.13	1/2	512	256MB/4GB	Rack (5U)	2/3	P, H	S - Power	Y	10/100	D,U160	4/2	0/660.6GB ⁶	48X-20X	10/8	5/5
8668-24X	-	1.13	1/2	512	256MB/4GB	Tower	2/3	P, H, F	S - Power, S-Fans	Y	10/100	D,U160	4/2	0/660.6GB ⁶	48X-20X	10/8	5/5
8668-2TX ¹	-	1.13	1/2	512	256MB/4GB	Rack (5U)	2/3	P, H, F	S - Power, S-Fans	Y	10/100	D,U160	4/2	0/660.6GB ⁶	48X-20X	10/8	5/5
8668-41X	-	1.26	1/2	512	256MB/4GB	Tower	1/3	H	O - Power ⁴	Y	10/100	D,U160	4/2	0/660.6GB ⁶	48X-20X	10/8	5/5
8668-4RX ¹	-	1.26	1/2	512	256MB/4GB	Rack (5U)	1/3	H	O - Power ⁴	Y	10/100	D,U160	4/2	0/660.6GB ⁶	48X-20X	10/8	5/5
8668-42X	-	1.26	1/2	512	256MB/4GB	Tower	2/3	P, H	S - Power	Y	10/100	D,U160	4/2	0/660.6GB ⁶	48X-20X	10/8	5/5
8668-4SX ¹	-	1.26	1/2	512	256MB/4GB	Rack (5U)	2/3	P, H	S - Power	Y	10/100	D,U160	4/2	0/660.6GB ⁶	48X-20X	10/8	5/5
8668-44X	-	1.26	1/2	512	256MB/4GB	Tower	2/3	P, H, F	S - Power, S-Fans	Y	10/100	D,U160	4/2	0/660.6GB ⁶	48X-20X	10/8	5/5
8668-4TX ¹	-	1.26	1/2	512	256MB/4GB	Rack (5U)	2/3	P, H, F	S - Power, S-Fans	Y	10/100	D,U160	4/2	0/660.6GB ⁶	48X-20X	10/8	5/5
8668-54X	-	1.4	1/2	512	256MB/4GB	Tower	2/3	P, H, F	S - Power, S-Fans	Y	10/100	D,U160	4/2	0/660.6GB ⁶	48X-20X	10/8	5/5
8668-5TX	-	1.4	1/2	512	256MB/4GB	Rack (5U)	2/3	P, H, F	S - Power, S-Fans	Y	10/100	D,U160	4/2	0/660.6GB ⁶	48X-20X	10/8	5/5

1. Housed in a 19in rack-mountable drawer and ships standard without a keyboard or mouse. See Rack Cabinets and Options section for supported IBM racks.

2. Intel Pentium III processor with advanced transfer L2 cache and 133MHz FSB.

3. High-speed, 133MHz SDRAM.

4. Power supply redundancy requires removal of the standard 385W power supply and the addition of either two or three 250W Hot-Swap Redundant Power Supply (P/N 33L3760) and an IBM eServer xSeries Hot-Swap Power Conversion Kit (P/N 24P3513). See xSeries 232 Power, Monitor & Accessories for additional information.

5. xSeries 232 includes two available removable media bays that can be converted to three slim-line (SL) hot-swap bays with the addition of optional 3-Pack Ultra160 Hot-Swap Expansion Kit (P/N 33L5050).

6. Assumes installation of optional 3-Pack Ultra160 Hot-Swap Expansion Kit (P/N 33L5050), which converts the two available removable media bays into three slim-line (SL) hot-swap bays.

7. Variable read rate. Actual playback speed will vary and is often less than the maximum possible.

8. The total number of bays can be increased to 11 by installing an optional 3-Pack Ultra 160 Hot-Swap Expansion Kit (P/N 33L5050), which converts the two available removable media bays to three SL hot-swap HDD bays.

9. Not available from IBM after this date. Business Partner inventory may be available.

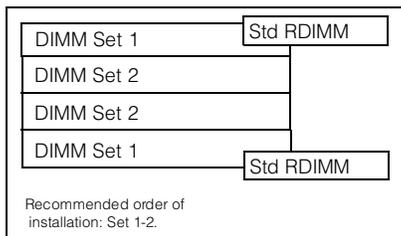
xSeries 232 Processors

Part Number	Processor Upgrades	SMP Support ¹	Processor Speed Upgrade ²
24P3511	xSeries 1GHz/133MHz, 256KB Cache Upgrade with Pentium III Processor	11X, 1RX	-
22P1997	xSeries 1.13GHz/133MHz, 512KB Cache Upgrade with Pentium III Processor	21X, 2RX, 22X, 2SX, 24X, 2TX	11X, 1RX
22P1998	xSeries 1.26GHz/133MHz, 512KB Cache Upgrade with Pentium III Processor	41X, 4RX, 42X, 4SX, 44X, 4TX	11X, 1RX, 21X, 2RX, 22X, 2SX, 24X, 2TX
48P7467	xSeries 1.4GHz/133MHz-512KB Cache Upgrade with Pentium III Processor	54X, 5TX	11X, 1RX, 21X, 2RX, 22X, 2SX, 24X, 2TX, 41X, 4RX, 42X, 4SX, 44X, 4TX

1. One additional processor may be installed, providing a maximum of two. All processors must be identical in type, speed, and cache size.

2. Requires removal of the standard processor. A maximum of two processors may be installed. All processors must be identical in type, speed and cache size. Upgrades may require a BIOS update. To obtain the latest Flash BIOS, access www.pc.ibm.com/support and enter machine "Type-Model" in Quick Path. Select "Downloadable files" then "BIOS."

xSeries 232 Memory



Part Number	Memory Description ¹
33L3320	128MB PC133 ECC SDRAM RDIMM
33L3322	256MB PC133 ECC SDRAM RDIMM
33L3324	512MB PC133 ECC SDRAM RDIMM
33L3326	1GB PC133 ECC SDRAM RDIMM

1. Due to two-way interleaving, installation of memory options in pairs beginning with set 1 is required.

Total Memory ¹	Quantity of RDIMMs Added			
	128MB (33L3320)	256MB (33L3322)	512MB (33L3324)	1GB (33L3326)
256MB (2 x 128) Models				
512MB	2	-	-	-
768MB	-	2	-	-
1GB ²	-	4	-	-
1.25GB	-	-	2	-
2GB ²	-	-	4	-
2.25GB	-	-	-	2
4GB ²	-	-	-	4

This table does not represent all possible memory configurations. Memory modules may vary in price per MB. Selection of smaller RDIMMs may provide a more cost-effective alternative to using larger RDIMMs. RDIMMs must be added in pairs to support interleaving technology.

1. Network operating systems may limit the maximum amount of addressable memory. See operating system specifications for further information.

2. Requires removal of standard memory.

xSeries 232 Internal SCSI Cabling

The xSeries 232 contains 10 drive bays. The six 3.5in hot-swap bays are located on the lower half of the xSeries 232 tower models or on the left side of the rack models. These bays support various hot-swap drive options. There are four bays on the top portion of tower models or the right side of rack models, which are primarily designed for removable media devices. One bay contains the standard 3.5in SL diskette drive and another bay contains the standard CD-ROM drive. The remaining two 5.25in/3.5in half-high bays can support tape back-up or other devices. Using an optional 3-Pack Ultra160 Hot-Swap Expansion Kit, these two bays can support three 3.5in SL hot-swap HDDs.

The xSeries 232 contains a backplane supporting six hot-swap drive bays. The backplane is connected to the integrated dual-channel, Ultra160 SCSI controller connector through a 16-bit LVD SCSI cable. If internal RAID support is required, this cable can be used to connect a supported RAID adapter rather than the integrated SCSI controller. A two-drop, 16-bit SCSI cable with integrated terminator is included with the Media Bay Tray and LVD Cable Kit (P/N 10K2340). The two-drop cable supports up to two internal devices in the open 5.25in/3.5in device bays. This cable can be attached to the integrated Ultra160 SCSI controller connector if a RAID adapter is used to support the internal hot-swap drive bays or to the second channel of this controller if the other channel supports the hot-swap bays. (If the tape option includes a terminated SCSI cable, 10K2340 is not required.) The 48x-20x IDE CD-ROM is cabled directly to the IDE port. To attach external SCSI devices, a supported SCSI adapter is required.

For additional information regarding internal cabling, refer to Appendix F: Internal Cabling Overview.



xSeries 232 Hard Disk Drive (HDD) Storage

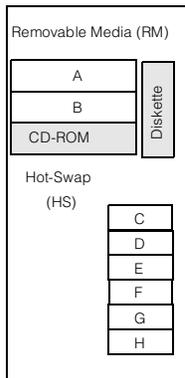
Total Int Storage ¹	10,000RPM HDDs			15,000RPM HDDs	
	18.2GB (06P5754)	36.4GB (06P5755)	73.4GB (06P5756)	18.2GB (06P5767)	36.4GB (06P5768)
0GB	Standard on base models				
18.2GB	1	-	-	1	-
36.4GB	2	1	-	2	1
54.6GB	3	-	-	3	-
72.8GB	4	2	-	4	2
91GB	5	-	-	5	-
109.2GB	6	3	-	6	3
145.6GB	-	4	-	-	4
182GB	-	5	-	-	5
218.4GB	-	6	-	-	6
327.6GB ²	-	9	-	-	9
440.4GB	-	-	6	-	-
660.6GB ³	-	-	9	-	-

This table does not represent all possible HDD configurations.
 1. Select a total storage row then select the quantity of HDDs from a column corresponding to the HDD of choice. Total Internal Storage listed is within +/- 0.2GB unless otherwise noted.
 2. Internal storage using 36.4GB HDD can be increased to 327.6GB by converting the two available removable bays to three hot-swap HDD bays using an optional 3-Pack Ultra160 Hot-Swap Expansion Kit (P/N 33L5050).
 3. Maximum internal storage using 73.4GB HDD can be increased to 660.6GB by converting the two available removable media bays to three hot-swap HDD bays using an optional 3-Pack Ultra160 Hot-Swap Expansion Kit (P/N 33L5050).

Bay	Form Factor	Height	Front Access	Usage	Part Number	Description	RPM	Height	Bays Supported	Max Qty ¹
A ¹	133mm (5.25in)	HH ²	Yes	Open	Hot-Swap Ultra160 HDDs					
B ¹	133mm (5.25in)	HH ²	Yes	Open	06P5754	18.2GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD	10000	SL	C ... H	6
-	133mm (5.25in)	HH	Yes	IDE CD-ROM	06P5755	36.4GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD	10000	SL	C ... H	6
-	89mm (3.5in)	SL	Yes	Diskette	06P5756	73.4GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD	10000	SL	C ... H	6
C ... H	HS	SL	Yes	Open	06P5767	18.2GB 15Krpm Ultra160 SCSI Hot-Swap SL HDD	15000	SL	C ... H	6
					06P5768	36.4GB 15Krpm Ultra160 SCSI Hot-Swap SL HDD	15000	SL	C ... H	6
Associated Options										
					33L3760	250W Hot-Swap Redundant Power Supply	-			
					24P3513	xSeries Hot-Swap Power Conversion Kit ²	-			

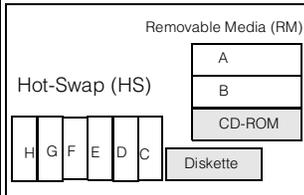
1. Bays A and B can be converted to three hot-swap HDDs using the optional 3-Pack Ultra160 Hot-Swap Expansion Kit (P/N 33L5050).
 2. Two half-high (HH) bays can be combined to support a single full-high (FH) device.

Tower Model View



For clarity purposes, bay labels in these diagrams are for reference by the accompanying tables and are not the actual labels. Refer to the documentation shipped with the system for further details on actual labels.

Rack Model View



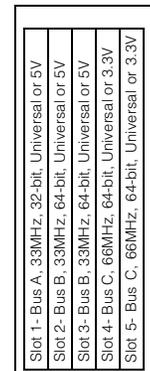
33L5050	IBM 3-Pack Ultra160 Hot-Swap Expansion Kit ³	-
	Optical Devices	Bays Supported
22P6950	16X Max RAM-Read DVD-ROM Drive ^{4, 5}	A, B, C
	External Storage Expansion Units⁶	Form Factor
35311RU	EXP300 Storage Expansion Unit ⁷	Rack (3U)
09N7296	EXP300 Rack-to-Tower Conversion Kit	-
35601RU	FAST EXP500 Storage Expansion Unit ⁸	Rack (3U)
35421RU	FAST200 Storage Server ^{9, 10}	Rack (3U)
35422RU	FAST200 HA Storage Server ⁹	Rack (3U)
19K 1121	FAST200 Redundant RAID Controller	-

1. Maximum quantity of HDDs can be increased to nine by converting the two removable media bays to three SL HDD bays using the 3-Pack Ultra160 Hot-Swap Expansion Kit (P/N 33L5050).
2. xSeries Hot-Swap Power Conversion Kit (24P3513) contains a hot-swap power backplane that supports installation for up to three 250W hot-swap power supplies.
3. Bays A and B can be converted to three hot-swap bays using the optional 3-Pack Ultra 160 Hot-Swap Expansion Kit (P/N 33L5050). The hot-swap backplane can be cabled as an independent bus or as an extension of the standard backplane using the included jumper cable.
4. Either replace standard CD-ROM or install in one of the media bays. An IDE cable with three connectors is included with the optional optical drive. If installing as an additional device, connect the cable to each optical device and the IDE connector on the system board. Configure the optional device as a master using the preset configuration if replacing the standard device or as a slave if installed as a redundant device.
5. Audio not supported for DVD-ROM drives. The drive operates in video mode only.
6. To configure a SCSI storage device, select an optional SCSI controller then refer to Appendix D: Cables - Storage Units - Controllers to confirm the controller supports the desired External Storage Expansion Unit and to select a supported cable. For HDD or other expansion unit options, see the specific expansion unit section. For Fibre Channel storage devices, refer to the Fibre Channel Solutions Overview section.
7. EXP300 includes a single 2M Ultra2 SCSI cable and dual hot-swap 500W redundant power supplies, each with its own power cord.
8. FAST EXP500 Storage Expansion Unit (P/N 35601RU) includes dual hot-swap 350W power supplies, each with its own power cord.
9. The FAST200 includes two hot-swap, 350W auto-ranging redundant power supplies, each with its own power cord.
10. Can be upgraded to FAST200 HA Storage Server through the addition of a FAST200 Redundant RAID Controller (P/N 19K1121).



xSeries 232 I/O Options

Part Number	Description	Adapter Length	PCI Support ¹	Slots Supported ¹
Storage Controllers²				
37L6889	ServeRAID-4H Ultra160 SCSI Controller ³	Full	64-bit	2 ... 5
06P5736	ServeRAID-4Mx Ultra160 SCSI Controller ⁴	Full	64-bit	2 ... 5
06P5740	ServeRAID-4Lx Ultra160 SCSI Controller ⁵	Half	64-bit	1 ... 5
19K4646	PCI Wide Ultra160 SCSI Adapter ⁶	Half	32-bit	1 ... 5
02K3454	PCI Fast/Wide Ultra SCSI Adapter ⁷	Half	32-bit	1 ... 5
Fibre Storage Controllers and Options⁸				
00N6881	Netfinity FASTT Host Adapter	Half	64-bit	1 ... 5
19K1246	FASTT FC-2 Host Bus Adapter	Half	64-bit	1 ... 5
17421RU	FASTT700 Fibre Channel Storage Server	-	-	-
35521RU	FASTT500 Storage Server	-	-	-
35421RU	FASTT200 Storage Server	-	-	-
35422RU	FASTT200 HA Storage Server	-	-	-
35341RU	SAN Fibre Channel Managed Hub	-	-	-
2109S08	SAN Fibre Channel Switch, 8-Port	-	-	-
2109S16	SAN Fibre Channel Switch, 16-Port	-	-	-
2109F16	SAN Fibre Channel Switch, 16-Port	-	-	-
2108R3L	SAN Data Gateway Router Ultra SCSI LVD Port ⁹	-	-	-
Networking¹⁰				
Ethernet^{11, 12}				
06P3601	10/100 Ethernet Server Adapter	Half	32-bit	1 ... 5
06P3701	Gigabit Ethernet SX Server Adapter (fiber)	Half	64-bit	1 ... 5
09N9901	10/100 EtherLink Server Adapter by 3Com	Half	32-bit	1 ... 5
22P4901	10/100 Dual Port Server Adapter	Half	64-bit	1 ... 5
22P6801	PRO/1000XT Server Adapter by Intel (copper) w/CD, manuals	Half	64-bit	1 ... 5
Token Ring¹²				
34L5201	High-Speed 100/16/4 Token-Ring PCI Management Adapter	Half	32-bit	1 ... 5
34L5001	16/4 Token-Ring PCI Management Adapter	Half	32-bit	1 ... 5
Communications¹³				
33L4618	V90 PCI Data/Fax Modem ¹⁴	Half	32-bit	1 ... 5
37L14xx	Serial I/O SST 8, 16 and 128 port adapters ¹⁵	Half	32-bit	1 ... 5
Systems Management				
09N7585	Remote Supervisor Adapter ¹⁶	Half	32-bit	1



Exterior Connector Access

1. A 64-bit adapter installed into a 32-bit slot will transfer data at 32-bit rates. Adapters rated at 66MHz will operate at 33MHz when installed in a 33MHz slot. 33MHz adapters will reduce 66MHz buses to 33MHz. 133MHz PCI-X adapters are backward compatible with 33/66MHz, 64-bit PCI-based servers.

2. xSeries 232 includes a dual-port, dual-channel Ultra 160 SCSI controller for internal use only. No standard external port is available. See "Internal SCSI Cabling" for cabling alternatives.

3. ServeRAID-4H Ultra160 SCSI Controller is powered by a 266MHz PowerPC 750 processor and provides 128MB of battery-backed ECC cache with two internal and four external Ultra160 connectors (a combination of four connectors may be utilized). External connectors are 0.8mm VHDCI.

4. ServeRAID-4Mx Ultra160 SCSI Controller is powered by a 100MHz Intel Zion GC80303 processor that provides 64MB of battery-backed ECC cache and two internal and two external Ultra160 connections (only two connectors may be used). External connections are 0.8mm VHDCI.

5. ServeRAID-4Lx Ultra160 SCSI Controller is powered by a 100MHz Intel Zion GC80303 processor and provides a single channel, 32MB of ECC cache and either one internal or one external Ultra160 connection. External connector is 0.8mm VHDCI.

6. PCI Wide Ultra160 SCSI Adapter (P/N 19K4646) provides a single channel with one internal connector, a five-drop multi-mode terminated LVD SCSI cable and one external 0.8mm VHDCI connector. Only one of the two connectors may be utilized.

7. PCI Fast/Wide Ultra SCSI Adapter (P/N 02K3454) provides one external 68-pin high density connector that supports external SCSI devices such as tape enclosures.

8. See Fibre Channel Solutions Overview section for additional configuration information.

9. The 2108R3L SAN Data Gateway Router Ultra SCSI LVD port provides one integrated short-wave optical port and two SCSI ports for tape storage connections (LVD, HVD and single-ended).

10. xSeries 232 includes a full-duplex, 10/100Mbps Ethernet PCI controller.

11. In a fault-tolerant networking environment, using the fault-tolerant software delivered with the Ethernet adapters of a single manufacturer is recommended. Installing fault-tolerant solutions provided by multiple manufacturers may cause failures if the intermediate drivers provided with the adapters are not compatible. The onboard Ethernet is Intel-based, which is compatible with the four Intel-based optional Ethernet adapters (P/N 06P3601, 06P3701, 22P4901, 22P6801).

12. This server supports Wake on LAN and Alert-on-LAN functions through the integrated Ethernet controller only. These functions are not supported for optional PCI adapters.

13. xSeries 232 includes two USB ports and two serial ports.

14. Due to homologation variances, modem availability may differ by country.

15. See Appendix E for details on Serial I/O options and configuration limitations.

16. Disables the Integrated System Management Processor when installed in xSeries 232 and provides full system management functionality through a customer-supplied Ethernet cable or modem connection or as part of an interconnected system management bus (option includes all interconnect hardware).



xSeries 232 Power, Monitors & Accessories

Part Number	Description
Power¹	
33L3760	250W Hot-Swap Redundant Power Supply ²
24P3513	xSeries Hot-Swap Power Conversion Kit ³
Uninterruptible Power Supply (UPS)⁴	
94G3134	APC Smart-UPS 700
94G3135	APC Smart-UPS 1000
94G3136	APC Smart-UPS 1400
32P1020	APC 2U Smart-UPS 1400RMB
94G6676	APC Smart-UPS 3000RMB ⁵
37L6861	APC Smart-UPS 5000RMB ⁶
Monitors⁷	
633147N	E54 Color Monitor 15in (350mm, 13.8in viewable image), stealth black ⁸
63324HN	E74 Color Monitor 17in (406mm, 16in viewable image size), stealth black ⁸
66274AN	G78 Color Monitor 17in (406.4mm, 16in viewable image size), stealth black ⁸
9511AG4	T540 Flat Panel Color Monitor 15in (381mm, 15in viewable image), stealth black ⁹
32P1031	NetBAY 1U Flat Panel Monitor Console Kit (w/ US Space Saver keyboard) ¹⁰
32P1032	NetBAY 1U Flat Panel Monitor Console Kit (w/o keyboard) ¹⁰

1. xSeries 232 models 11X, 1RX, 21X, 2RX, 41X and 4RX include a single 385W power supply and a single 9ft 110V power cord with an IEC 320-C13 connector on the system end and NEMA 5-15P on the other end. Power supply redundancy in base models may be achieved by removing the standard power supply and installing two or three optional 250W Hot-Swap Redundant Power Supplies (P/N 33L3760). xSeries Hot-Swap Power Conversion Kit (P/N 24P3513) is required when optional power supplies are added to base models. Models shipped standard with power redundancy are equipped with two hot-swap 250W power supplies. A third hot-swap 250W power supply may be added for robust configurations. The hot-swap power supply backplane is included in redundant models. To assist in determining when an additional power supply is required to preserve redundancy, a "Non-Redundant LED" is a standard feature.

2. 250W Hot-Swap Redundant Power Supply (P/N 33L3760) includes a single 6ft power cord for connection to a low voltage wall outlet. xSeries Hot-Swap Power Supply Conversion Kit (P/N 24P3513) must be installed prior to adding optional power supplies in base models, which include a single 385W power supply.

3. xSeries Hot-Swap Power Supply Conversion Kit (P/N 24P3513) includes a hot-swap power backplane. Use when installing additional power supplies in base models (removal of standard power supply required).

4. For runtimes and UPS attributes see Appendix C: UPS Runtime Estimate.

5. Height is 3U. See Rack Cabinets and Options section for supported IBM racks.

6. Height is 5U. See Rack Cabinets and Options section for supported IBM racks.

7. xSeries 232 uses an SVGA controller (S3 Savage4 chipset) with 8MB of video memory.

8. Installation within a rack requires optional Netfinity Monitor Compartment (P/N 94G7444).

9. Installation within a rack requires optional Netfinity Flat Panel Monitor Rack Mount Kit II (P/N 37L6888) and Netfinity Rack Keyboard Tray (P/N 28L4707). A space saver keyboard may coexist within the same 28L4707 keyboard tray.

10. Includes a 15in Flat Panel Monitor.

Part Number	Description
Conversion Kits	
21P9593	5Ux24D Tower-to-Rack Kit II
Rack and NetBAY¹	
	Refer to the Rack Cabinets and Options section for information concerning IBM racks and rack-supported devices.
Keyboard and Mouse²	
28L3644	Space Saver II Keyboard ^{3, 5}
28L3621	Preferred Keyboard (stealth black) ⁴
10K3849	106-key Preferred USB Keyboard with 2-port USB Hub (stealth black) ^{4, 6}
22P5150	TrackPoint USB Space Saver Keyboard ^{3, 5, 6}
28L3673	Sleek 2-Button Stealth Black Mouse
33L3244	Sleek USB Mouse (stealth black)

1. xSeries 232 rack models are housed in a 19in rack-mountable drawer and require one of the racks listed in the Rack Cabinets and Options section.

2. Tower models include both a keyboard and mouse. Rack models include neither.

3. Installation within a rack requires optional keyboard tray (P/N 28L4707), which stows in ready-to-use position.

4. Installation within a rack requires optional keyboard tray (P/N 28L4707). This keyboard cannot share a keyboard tray with a flat panel display.

5. Advanced TrackPoint IV features are not available on IBM xSeries systems.

6. USB keyboards attach to a single USB-capable server. They are not compatible with the NetBAY console switches.



xSeries 232 Tape Options

Part Number	Tape Drives	Bays Supported	SCSI Interface (bit)	Form Factor	Termination Included	68/50-pin Converter Incl	Ext Tape Enclosures
00N7991	20/40GB DDS/4 4mm Internal Tape Drive	A, B	16 Ultra2 LVD	89mm (3.5in) HH or 133mm (5.25in) HH	Y ¹	-	3510020 ⁴ , 3551001 ³
09N4040	20/40GB DLT Internal SCSI Tape Drive	A+B	8	133mm (5.25in) FH	N ²	Y	3551001
00N7990	40/80GB DLT Internal SCSI Tape Drive	A+B	16 Ultra2 LVD	133mm (5.25in) FH	Y ¹	-	3551001 ³
00N8015	110/220GB Super DLT Internal SCSI Tape Drive	A+B	16 Ultra2 LVD	133mm (5.25in) FH	Y ¹	-	3551001 ³
00N8016	100/200GB LTO Tape Drive	A+B	16 Ultra2 LVD	133mm (5.25in) FH	Y ¹	-	3551001 ³
24P2396	100/200GB LTO Half-High Tape Drive	A, B	16 Ultra2 LVD	133mm (5.25in) HH	Y ¹	-	3551001 ³
24P2398	40/80GB Half-High DLT/VS Internal SCSI Tape Drive	A, B	16 Ultra2 LVD	133mm (5.25in) HH	Y ¹	-	3551001 ³
Tape Autoloaders							
00N7992	120/240GB DDS/4 Tape Autoloader	A+B	16 Ultra2 LVD	133mm (5.25in) FH	Y ¹	-	3551001 ³
3502108	DLT Tape Autoloader	-	16	Desktop	Y	-	-
External Tape Libraries⁵							
3502x14	DLT Tape Library	-	16	Desktop or Rack	Y	-	-
3570C2x	Magstar MP 3570 Tape Subsystem	-	HVD	6U Rack	Y	-	-
External Tape Enclosures							
3510020	External Half-High SCSI Storage Enclosure ⁶	-	8, 16	Desktop	N	N	-
3551001	NetMEDIA Storage Expansion Unit EL ⁷	-	16	Rack	Y	N	-
10L7113	NetMEDIA Systems Management Adapter ⁸	-	16 LVD	-	N	N	3551001
Associated Options							
10K2340	Media Bay Tray and LVD Cable Kit ²	-	16 LVD	Int	Y	N	3551001
00N7956	68-pin External Multimode LVD/SE SCSI Terminator	-	16 LVD/SE	Ext	Y	N	3510020
24P3513	xSeries Hot-Swap Power Conversion Kit ⁹	-	-	-	-	-	-
33L3760	250W Hot-Swap Redundant Power Supply	-	-	-	-	-	-

Note: Additional power is not required when installing a SCSI device in bay A or B. If adding additional power supplies to base models for redundancy, removal of the standard 385W power supply is required before adding both Hot-Swap Power Conversion Kit (P/N 24P3513) and two or three optional 250W Hot-Swap Redundant Power Supplies (P/N 33L3760). Models shipped standard with redundant power contain two hot-swap 250W power supplies (maximum of three). An optional SCSI cable is required for attachment of media bay devices to the Ultra160 controller B. No external SCSI port is available. External tape enclosures are supported by PCI Wide Ultra160 SCSI Adapter (P/N 19K4646) which has an external 0.8mm VHDCI connector.

1. Termination requires installing the 42in single-drop, terminated LVD SCSI cable provided with the option or is provided in a NetMEDIA Storage Expansion Unit with the installation of NetMEDIA Systems Management Adapter (P/N 10L7113).
2. Termination requires installation using the two-drop multimode terminated LVD SCSI cable included with the Media Bay Tray and LVD Cable Kit (P/N 10K2340) or is provided in a NetMEDIA Storage Expansion Unit with the installation of NetMEDIA Systems Management Adapter (P/N 10L7113).
3. LVD support for LVD devices installed in a NetMEDIA Storage Expansion Unit EL (P/N 3551001) requires installation of NetMEDIA Systems Management Adapter (P/N 10L7113), which also provides termination, and replacement of the standard single-ended internal cable with the terminated single-drop LVD SCSI cable provided with this option. If the standard cables are used for attachment to LVD devices, single-ended SCSI rules and bus speeds apply.
4. Requires 68-pin External Multimode LVD/SE SCSI terminator (P/N 00N7956).
5. Tape library attributes and prerequisites are located in Appendix B: Tape Library Attributes.
6. Provides a black desktop 133mm (5.25in) half-high (HH) tape enclosure. Connector is configurable as 50-pin Centronix or 68-pin high density. Requires either tape drive self-termination or 68-pin External Multimode LVD/SE SCSI Terminator (P/N 00N7956).
7. NetMEDIA Storage Expansion Unit EL (P/N 3551001) is a black 3U, 19in rack mountable tape enclosure which includes two full-high (FH) or four half-high (HH) extended length 133mm (5.25in) bays, two external 0.8mm VHDCI connectors and two internal four-drop single-ended terminated 16-bit SCSI cables for device attachment. Two power supplies and two power cords are also included. Tip: The front rail clips will need to be reversed and screwed in from behind to secure the unit in a 930842x rack.
8. NetMEDIA Systems Management Adapter (P/N 10L7113) may be installed in a 3551001 to provide repeater function, LVDS interface, aggregate cable lengths up to 12m when attached to an LVD SCSI controller, and auto-termination when the 3551001 is powered off. External connector is 0.8mm VHDCI.
9. IBM eServer xSeries Hot-Swap Power Conversion Kit (P/N 24P3513) includes a hot-swap power backplane. Required when upgrading standard power on base models, which are shipped with a single 385W power supply that must be removed when adding this option.

Note: Additional tape attributes can be found in Appendix A: Tape Drive Attributes.



xSeries 232 Sample Configurations

Note: The following sample configurations are for illustration only and may not be suitable for any specific customer installation. Contact your IBM Business Partner or IBM Marketing Representative for assistance with your specific configuration requirements.

Internet Server

Part Number	Description	Quantity
8668-54X	xSeries 232 1.4GHz/512KB Pentium III, 256MB ECC, open, 48X	1
33L3320	128MB PC133 ECC SDRAM RDIMM	2 ¹
06P5740	ServeRAID-4Lx Ultra160 SCSI Controller	1
06P5755	36.4GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD	4 ²
24P2396	100/200GB LTO Half-HighTape Drive	1
10K2340	Media Bay Tray and LVD Cable Kit	1
633147N	E54 Color Monitor 15in (350mm, 13.8in viewable image), stealth black	1
94G3135	APC Smart-UPS 1000	1

1. For a total of 512MB of system memory.

2. Three HDDs are used for RAID 5 protection. One HDD is identified as a hot-spare. Effective capacity is two HDDs or 72.8GB.

An Internet server handles all requests from the Internet (Intranet or Extranet). Usually this type of server has the same characteristics as a file server. The main difference is that an Internet server uses a different protocol (TCP/IP vs NETBEUI or IPX/SPX) and often needs to perform an extra security check (firewall). In the case of an Internet server, the server itself communicates primarily with one client, the Internet Service Provider (ISP), instead of many clients as applies to a file server.

With this in mind, the xSeries 232 was selected to provide an affordable price point for the growing Internet server market with two-way Pentium processing, 512MB of system memory (expandable to 4GB), availability features such as RAID-protected internal hot-swap storage and power protection with an APC Smart-UPS.

The network configuration depends on the method that will be used to connect the server to the Internet. Usually fast Ethernet routers are used, but if other methods are preferable, you can add the appropriate adapter. The configuration includes a tape back-up unit for secure storage of critical data in the event of a system or storage media failure.

File and Print Server

Part Number	Description	Quantity
8668-21X	xSeries 232 1.13GHz/512KB Pentium III, 256MB ECC, Open, 48X	1
33L3322	256MB PC133 ECC SDRAM RDIMM	2 ¹
06P5740	ServeRAID-4Lx Ultra160 SCSI Controller	1
06P5754	18.2GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD	5 ²
24P2396	100/200GB LTO Half-HighTape Drive	1
10K2340	Media Bay Tray and LVD Cable Kit	1
633147N	E54 Color Monitor 15in (350mm, 13.8in viewable image), stealth black	1
94G3135	APC Smart-UPS 1000	1
24P3513	xSeries Hot-Swap Power Conversion Kit	1
33L3760	250W Hot-Swap Redundant Power Supply	2

1. For a total of 768MB of system memory.

2. Four HDDs are used for RAID 5 protection. One HDD is identified as a hot-spare. Effective capacity is three HDDs or 54.6GB.

A small business or departmental server is usually required to perform all typical server functions while servicing up to 100 users in a normal workgroup computing environment, but doesn't require the high-end performance and fault-tolerance properties of larger servers.

The sample configuration above consists of an xSeries 232 with 768MB of memory (expandable to 4GB) and 54.6GB of RAID-protected hard disk drive space. It has enough processor power and memory to run most current network operating systems comfortably and enough hard disk drive space to store a significant amount of data with additional external storage expansion still available. Demanding network traffic is effectively handled by the standard 100Mbps Ethernet connection. This configuration also includes a tape back-up unit, monitor, and a UPS to protect the system during power surges and outages.



Rack-Mounted Application Server

Part Number	Description	Quantity
8668-2SX	xSeries 232 1.13GHz/512KB Pentium III, 256MB ECC, Open, 48X, PCI (5U Rack)	1
24P3512	xSeries 1.13GHz/133MHz 512KB Cache Upgrade with Pentium III Processor SVR	1
33L3324	512MB PC133 ECC SDRAM RDIMM	2 ¹
06P5736	ServeRAID-4Mx Ultra160 SCSI Controller	1
06P5754	18.2GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD	5 ²
24P2396	100/200GB LTO Half-HighTape Drive	1
10K2340	Media Bay Tray and LVD Cable Kit	1
633147N	E54 Color Monitor 15in (350mm, 13.8in viewable image), stealth black	1
32P1020	APC 2U Smart-UPS 1400RMB	1
33L3760	250W Hot-Swap Redundant Power Supply	1
Industry Standard 19in Rack, EIA-310D, min depth of 28in (711mm)		
9306250	NetBAY25 Standard Rack Cabinet	1
28L3644	Space Saver II Keyboard	1
94G6670	Blank Filler Panel Kit	2

1. For a total of 1.25GB of system memory.

2. Five HDDs are used for RAID 5 protection. Effective capacity is four HDDs or 72.8GB.

An application server differs from a file and print server in that it services a larger workload in providing application serving requirements for users. With this in mind, the xSeries 232 was selected to provide an affordable price point for an application server with two-way Pentium III processing, 1.25GB of system memory (expandable to 4GB), and availability features such as battery-backed cache, RAID-protected internal hot-swap storage and power protection with an APC Smart-UPS.





IBM xSeries 240

Part Number
Withdrawal Date⁶
Processor Speed²
Number of Processors (Std/Max)
L2 ECC Cache (KB)
Memory (Std/Max) (R = RDIMM)
Form Factor
Power Supply Quantity (Std/Max)
Hot-Swap (Power, Slots, HDD, Fans)
Redundancy (Optional, Standard)
Adv System Management Processor
Onboard Ethernet (Mbps)
SCSI Controller (Dual, Ultra, RAID)
Removable Media Bays (Total/Avail)
Internal Hard Disk Drive (Std/Max)
CD-ROM (IDE)
Bays (Total/Avail)
Slots (Total/Avail)

xSeries 240 At-A-Glance																	
8664-81Y	26-Mar	1GHz	1/2	256	256MB(R)/4GB ³	Tower	2/3	P, S, H, F	S-Power ⁴ S-Fans	Y	10/100	D, U2	4/2	0/ 440.6GB	40X-17X ⁵	10/8	5/5
8664-8RY ¹	26-Mar	1GHz	1/2	256	256MB(R)/4GB ³	Rack (5U)	2/3	P, S, H, F	S-Power ⁴ S-Fans	Y	10/100	D, U2	4/2	0/ 440.6GB	40X-17X ⁵	10/8	5/5

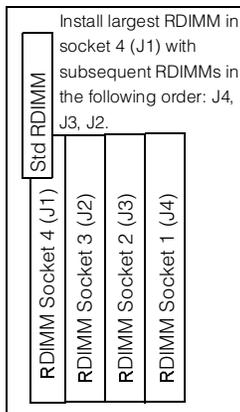
- Housed in a 19in rack-mountable drawer and ships standard without a keyboard or mouse. See Rack Cabinets and Options section for supported IBM racks.
- Intel Pentium III processor with advanced transfer L2 cache and 133MHz FSB.
- High-speed 133MHz SDRAM.
- Robust configurations may require optional 250W Hot-Swap Redundant Power Supply (P/N 33L3760) for redundancy. See "Power" under "Power, Monitor & Accessories" for additional information.
- Variable read rate. Actual playback speed will vary and is often less than the maximum possible.
- Not available from IBM after this date. Business Partner inventory may be available.

xSeries 240 Processors

Part Number	Processor Upgrades	SMP Support ¹	Processor Speed Upgrade ²
19K4640	1GHz Upgrade with 133MHz FSB and 256KB Advanced Transfer Cache Pentium III Processor	8xY	-

- One additional processor may be installed, providing a maximum of two. All processors must be identical in type, speed, and cache size.
- Requires removal of the standard processor. A maximum of two processors may be installed. All processors must be identical in type, speed and cache size. Upgrades may require a BIOS update. To obtain the latest Flash BIOS, access www.pc.ibm.com/support and enter machine "Type-Model" in Quick Path. Select "Downloadable files" and then "BIOS".

xSeries 240 Memory



Total Memory ¹	Quantity of RDIMMs Added			
	128MB (33L3058)	256MB (33L3060)	512MB (33L3062)	1GB (33L3064)
256MB (1 x 256) Models				
384MB	1	-	-	-
512MB	2 or	1	-	-
640MB	3	-	-	-
768MB	-	2 or	1	-
1024MB	-	3	-	-
1280MB	-	-	2 or	1
1792MB	-	-	3	-
2048MB	-	-	4 ²	-
2304MB	-	-	-	2
3328MB	-	-	-	3
4096MB (max)	-	-	-	4 ²

- This table does not represent all possible memory configurations.
- Network operating systems may limit the maximum amount of addressable memory. See operating system specifications for further information.
 - Requires removal of standard memory.



Part Number	Memory Description ¹
33L3058	128MB 133MHz SDRAM ECC RDIMM
33L3060	256MB 133MHz SDRAM ECC RDIMM
33L3062	512MB 133MHz SDRAM ECC RDIMM
33L3064	1GB 133MHz SDRAM ECC RDIMM

1. Install largest RDIMM in socket 4 (J1) with subsequent RDIMMs in the following order: J4, J3, J2.

xSeries 240 Internal SCSI Cabling

The xSeries 240 contains a backplane supporting six hot-swap drive bays. The backplane is connected to the integrated dual channel, wide Ultra2 SCSI controller connector through a 16-bit LVD SCSI cable. If internal RAID support is required, this cable can be used to connect to a supported RAID adapter rather than the integrated SCSI controller. A two-drop, 16-bit SCSI cable with integrated terminator is also included with the server to support up to two internal removable media devices. This cable can be attached to the integrated SCSI controller if a RAID adapter is used to support the internal hot-swap drive bays. It can also be used to attach to a supported SCSI adapter if the integrated Ultra2 SCSI controller is utilized for the hot-swap bays. The second channel is available through an industry-standard 0.8mm Very High Density Connector Interface (VHDCI) located on the rear panel for external use.

For additional information regarding internal cabling, refer to Appendix F: Internal Cabling Overview.

xSeries 240 Hard Disk Drive (HDD) and External Storage

Total Int Storage ¹	10,000RPM HDDs			15,000RPM HDDs	
	18.2GB (06P5754) ²	36.4GB (06P5755) ²	73.4GB (06P5756) ²	18.2GB (06P5767) ²	36.4GB (06P5768) ²
0GB	Standard on base models				
18.2GB	1	-	-	1	-
36.4GB	2	1	-	2	1
54.6GB	3	-	-	3	-
72.8GB	4	2	-	4	2
91GB	5	-	-	5	-
109.2GB	6	3	-	6	3
145.6GB	-	4	-	-	4
182GB	-	5	-	-	5
218.4GB	-	6	-	-	6
220.2GB	-	-	3	-	-
293.6GB	-	-	4	-	-
367GB	-	-	5	-	-
440.4GB (max)	-	-	6	-	-

This table does not represent all possible HDD configurations.

1. Select a total storage row then add the quantity of HDDs from a column corresponding to the HDD of choice. Total Internal Storage listed is within +/- 0.2GB unless otherwise noted.

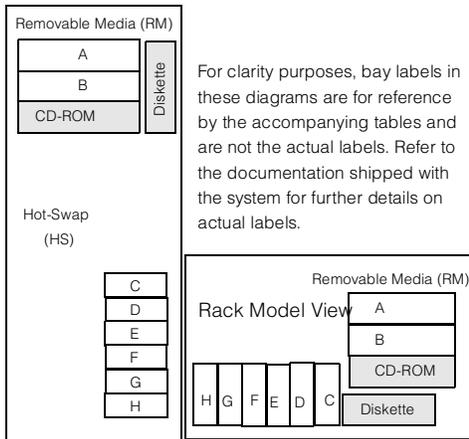
2. xSeries 240 contains an Ultra2 hot-swap backplane which limits Ultra160 HDDs to Ultra2 bus speeds.



Bay	Form Factor	Height	Front Access	Usage	P / N	Description	RPM	Height	Bays Supported	Max Qty
A	133mm (5.25in)	HH ¹	Yes	Open	Ultra160 HDDs¹					
B	133mm (5.25in)	HH ¹	Yes	Open	06P5754	18.2GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD	10000	SL	C ... H	6
-	133mm (5.25in)	HH	Yes	IDE CD-ROM	06P5755	36.4GB 10Krpm Ultra 160 SCSI Hot-Swap SL HDD	10000	SL	C ... H	6
-	89mm (3.5in)	SL	Yes	Diskette	06P5756	73.4GB 10Krpm Ultra 160 SCSI Hot-Swap SL HDD	10000	SL	C ... H	6
C ... H	HS	SL	Yes	Open	06P5767	18.2GB 15Krpm Ultra 160 SCSI Hot-Swap SL HDD	15000	SL	C ... H	6
					06P5768	36.4GB 15Krpm Ultra160 SCSI Hot-Swap SL HDD	15000	SL	C ... H	6
Optical Devices							Bays Supported			
					22P6950	16X Max RAM-Read DVD-ROM Drive ^{2,3}	A, B, C			
Ext Storage Expansion Units⁴							Form Factor			
					35311RU	EXP300 Storage Expansion Unit ⁵	Rack (3U)			
					09N7296	EXP300 Rack-to-Tower Conversion Kit	-			
					35601RU	FASiT EXP500 Storage Expansion Unit ⁶	Rack (3U)			
					35421RU	FASiT200 Storage Server ^{7,8}	Rack (3U)			
					35422RU	FASiT200 HA Storage Server ⁷	Rack (3U)			
					19K1121	FASiT200 Redundant RAID Controller	-			

1. Two half-high (HH) bays can be combined to support a single full-high (FH) device.

Tower Model



For clarity purposes, bay labels in these diagrams are for reference by the accompanying tables and are not the actual labels. Refer to the documentation shipped with the system for further details on actual labels.

- xSeries 240 contains an Ultra2 hot-swap backplane which limits Ultra160 HDDs to Ultra2 bus speeds.
- Either replace standard CD-ROM or install in one of the media bays. An IDE cable with three connectors is included with the optional optical drive. If installing as an additional device, connect the cable to each optical device and the IDE connector on the system board. Configure the optional device as a master using the preset configuration if replacing the standard device or as a slave if installed as a redundant device.
- Audio not supported for DVD-ROM drives. The drive operates in video mode only.
- Not supported by the onboard external SCSI port. To configure a SCSI storage device, select an optional SCSI controller then refer to Appendix D: Cables - Storage Units - Controllers to confirm the controller supports the desired External Storage Expansion Unit and to select a supported cable. For HDD or other expansion unit options, see the specific expansion unit section. For Fibre Channel storage devices, refer to the Fibre Channel Solutions Overview section.
- EXP300 includes a single 2M Ultra2 SCSI cable and dual hot-swap 500W redundant power supplies, each with its own power cord. To convert an EXP300 to a tower form factor, Netfinity EXP300 Rack-to-Tower Conversion Kit (P/N 09N7296) is required.
- FASiT EXP500 Storage Expansion Unit (P/N 35601RU) includes dual hot-swap 350W power supplies, each with its own power cord.
- The FASiT200 includes two hot-swap, 350W auto-ranging redundant power supplies, each with its own power cord.
- Can be upgraded to FASiT200 HA Storage Server through the addition of a FASiT200 Redundant RAID Controller (P/N 19K1121).



xSeries 240 I/O Options

Part Number	Description	Adapter Length	PCI Support ²	Slots Supported ²	Hot-Plug ³
Storage Controllers¹					
37L6889	ServeRAID-4H Ultra160 SCSI Controller ⁴	Full	64-bit	1 ... 5	X
06P5736	ServeRAID-4Mx Ultra160 SCSI Controller ⁵	Full	64-bit	1 ... 5	X
06P5740	ServeRAID-4Lx Ultra160 SCSI Controller ⁶	Half	64-bit	1 ... 5	X
19K4646	PCI Wide Ultra160 SCSI Adapter ⁷	Half	32-bit	1 ... 5	-
02K3454	PCI Fast/Wide Ultra SCSI Adapter ⁸	Half	32-bit	1 ... 5	-
Fibre Storage Controllers and Options⁹					
00N6881	Netfinity FASiT Host Adapter	Half	64-bit	1 ... 5	X
19K1246	FASiT FC-2 Host Bus Adapter	Half	64-bit	1 ... 5	X
17421RU	FASiT700 Fibre Channel Storage Server	-	-	-	-
35521RU	FASiT500 Storage Server	-	-	-	-
35421RU	FASiT200 Storage Server	-	-	-	-
35422RU	FASiT200 HA Storage Server	-	-	-	-
35341RU	SAN Fibre Channel Managed Hub	-	-	-	-
2109S08	SAN Fibre Channel Switch, 8-Port	-	-	-	-
2109S16	SAN Fibre Channel Switch, 16-Port	-	-	-	-
2109F16	SAN Fibre Channel Switch, 16-Port	-	-	-	-
2108R3L	SAN Data Gateway Router UltraSCSI LVD Port ¹⁰	-	-	-	-
Networking¹¹					
Ethernet¹²					
09N9901	10/100 EtherLink Server Adapter by 3Com ¹³	Half	32-bit	1 ... 5	X
06P3601	10/100 Ethernet Server Adapter ¹³	Half	32-bit	1 ... 5	X
06P3701	Gigabit Ethernet SX Server Adapter (fiber)	Half	64-bit	1 ... 5	X
22P4901	10/100 Dual Port Server Adapter ¹³	Half	64-bit	1 ... 5	X
22P6801	PRO/1000XT Server Adapter by Intel (copper) w/CD, manuals ¹³	Half	64-bit	1 ... 5	X
Token Ring					
34L5001	16/4 Token-Ring PCI Management Adapter ¹³	Half	32-bit	1 ... 5	X
34L5201	High-Speed 100/16/4 Token-Ring PCI Management Adapter ¹³	Half	32-bit	1 ... 5	X
34L0701	Token-Ring 16/4 PCI Adapter 2 with Wake on LAN ¹³	Half	32-bit	1 ... 5	X
Communications¹⁴					
33L4618	V.90 PCI Data/Fax Modem ¹⁵	Half	32-bit	1 ... 5	-
37L14xx	Serial I/O SST 8, 16 and 128 Port Adapters ¹⁶	Half	32-bit	1 ... 5 ¹⁶	-
Systems Management¹⁷					
01K7209	Advanced System Management PCI Adapter ¹⁸	Full	32-bit	1 ... 5 ¹⁹	-
03K9309	Advanced System Management Interconnect Cable Kit ²⁰	-	-	-	-

Rack Model

Slot 5- PCI, Hot-Plug, 32/64-bit, Full Length
Slot 4- PCI, Hot-Plug, 32/64-bit, Full Length
Slot 3- PCI, Hot-Plug, 32/64-bit, Full Length
Slot 2- PCI, 32-bit, Full Length
Slot 1- PCI, 32-bit, Full Length

1. xSeries 240 has two integrated Wide Ultra2 SCSI channels. One is internal and the other is external with a 0.8mm Very High Density Connection Interface (VHDCI).
 2. A 64-bit adapter installed into a 32-bit slot will transfer data at 32-bit rates. Adapters rated at 66MHz will operate at 33MHz when installed in a 33MHz slot. 33MHz adapters will reduce 66MHz buses to 33MHz. 133MHz PCI-X adapters are backward compatible with 33/66MHz, 64-bit PCI-based servers.
 3. Three of the five PCI slots are 32/64-bit Hot-Plug capable using IBM's Active™ PCI technology. For Network Operating System support, access www.pc.ibm.com/us/compat.
 4. ServeRAID-4H Ultra160 SCSI Controller is powered by a 266MHz PowerPC 750 processor and provides 128MB of battery-backed ECC cache with two internal and four external Ultra160 connectors (a combination of four connectors may be utilized). External connectors are 0.8mm VHDCI.
 5. ServeRAID-4Mx Ultra160 SCSI Controller is powered by a 100MHz Intel Zion GC80303 processor that provides 64MB of battery-backed ECC cache and two internal and two external Ultra160 connections (only two connectors may be used). External connections are 0.8mm VHDCI.
 6. ServeRAID-4Lx Ultra160 SCSI Controller is powered by a 100MHz Intel Zion GC80303 processor and provides a single channel, 32MB of ECC cache and either one internal or one external Ultra160 connection. External connector is 0.8mm VHDCI.



7. PCI Wide Ultra160 SCSI Adapter (P/N 19K4646) provides a single channel with one internal connector, a five-drop multi-mode terminated LVD SCSI cable and one external 0.8mm VHDCI connector. Only one of the two connectors may be utilized.
8. PCI Fast/Wide Ultra SCSI Adapter (P/N 02K3454) provides one external 68-pin high density connector that supports external SCSI devices such as tape enclosures.
9. See Fibre Channel Solutions Overview section for additional configuration information.
10. The 2108R3L SAN Data Gateway Router Ultra SCSI LVD port provides one integrated short-wave optical port and two SCSI ports for tape storage connections (LVD, HVD and single-ended).
11. xSeries 240 has an integrated 10/100 PCI Ethernet Controller.
12. In a fault-tolerant networking environment, using the fault-tolerant software delivered with the Ethernet adapters of a single manufacturer is recommended. Installing fault-tolerant solutions provided by multiple manufacturers may cause failures if the intermediate drivers provided with the adapters are not compatible. The onboard Ethernet is AMD-based. Four of the optional PCI Ethernet adapters listed are Intel-based (P/N 06P3601, 06P3701, 22P4901, 22P6801).
13. The Wake on LAN function of this option is not supported by this server.
14. xSeries 240 includes two USB ports, three high-speed serial/asynchronous ports (two NS 16550A compatible, one for the Advanced System Management Processor) and one high-speed (up to 2MB/sec data transfer speed) bidirectional parallel port supporting devices using ECP/EPP/SSP protocols adhering to the IEEE1284 standard.
15. Due to homologation variances, modem availability may differ by country.
16. See Appendix E for details on Serial I/O options and configuration limitations. A maximum of four Serial I/O adapters (any combination of P/Ns 37L1414, 37L1415, 37L1416, 37L1423) may be installed.
17. The Advanced System Management processor and interconnect bus integrated into xSeries 240 works with Netfinity Director to provide significant system management function. When used with optional Advanced System Management PCI Adapter (P/N 01K7209) or Advanced System Management Interconnect Cable Kit (P/N 03K9309), additional management and control of up to 12 service processors or optional adapters from a remote console through a single modem or LAN connection is possible.
18. Includes PCI adapter, Advanced System Management Interconnect Cable Kit components and 56W AC adapter, which requires a separate power source. Provides an integrated 10/100 Ethernet port.
19. A maximum quantity of one is supported.
20. Required to provide RS-485 ports to connect the standard Advanced System Management Processor to an interconnect network with other servers for system management support through a single LAN or modem connection. Optional Advanced System Management PCI Adapter (P/N 01K7209) includes the contents of this option. Up to 12 Advanced System Management Processors or optional Advanced System Management PCI Adapters may be interconnected with an aggregate connection length of no more than 91.4M (300ft). A customer-supplied Cat5 cable is required for each interconnection. An additional 12 Integrated Systems Management Processors or Remote Supervisor Adapters may be connected to the network for a total of 24 devices.

xSeries 240 Power, Monitors & Accessories

Part Number	Description
Power¹	
33L3760	250W Hot-Swap Redundant Power Supply
Uninterruptible Power Supply (UPS)²	
94G3135	APC Smart-UPS 1000
94G3136	APC Smart-UPS 1400
32P1020	APC 2U Smart-UPS 1400RMB
94G6676	APC Smart-UPS 3000RMB ³
37L6861	APC Smart-UPS 5000RMB ⁴
Monitors⁵	
633147N	E54 Color Monitor 15in (350mm, 13.8in viewable image), stealth black ⁶
63324HN	E74 Color Monitor 17in (406mm, 16in viewable image size), stealth black ⁶
66274AN	G78 Color Monitor 17in (406.4mm, 16in viewable image size), stealth black ⁶
9511AG4	T540 Flat Panel Color Monitor 15in (381mm, 15in viewable image), stealth black ⁷
32P1031	NetBAY 1U Flat Panel Monitor Console Kit (w/ US Space Saver keyboard) ⁸
32P1032	NetBAY 1U Flat Panel Monitor Console Kit (w/o keyboard) ⁸

1. xSeries 240 includes two 250W hot-swap power supplies, each with its own power cord. These standard power supplies are sufficient to operate fully configured systems; however, optional 250W Hot-Swap Redundant Power Supply (P/N 33L3760) is required to preserve redundancy if any of the following are exceeded:

Single Processor Configuration

- Six SL HDDs and two PCI adapters
(1 HH HDD = 2 SL, 1 tape = 2 SL, 1 PCI adapter = 2 SL)

E.g., to preserve power supply redundancy with three PCI adapters, only four SL HDDs can be installed before an optional power supply is required.

Dual Processor Configuration

- Four SL HDDs and two PCI adapters
(1 HH HDD = 2 SL, 1 tape = 2 SL, 1 PCI adapter = 2 SL)

A "nonredundant" LED on the system unit will indicate when 250W has been exceeded. 250W Hot-Swap Redundant Power Supply (P/N 33L3760) includes a power cord which requires an additional power source. An independent power source such as a second UPS or second circuit is not required.

2. For runtimes and UPS attributes see Appendix C: UPS Runtime Estimate.
3. Height is 3U. See Rack Cabinets and Options section for supported IBM racks.
4. Height is 5U. See Rack Cabinets and Options section for supported IBM racks.
5. xSeries 240 uses a SVGA controller (S3 Trio 3D chipset) with 4MB of video memory.
6. Installation within a rack requires optional Monitor Compartment (P/N 94G7444).
7. Installation within a rack requires optional Netfinity Flat Panel Monitor Rack Mount Kit II (P/N 37L6888) and Netfinity Rack Keyboard Tray (P/N 28L4707). A space saver keyboard may coexist within the same 28L4707 keyboard tray.
8. Includes a 15in Flat Panel Monitor.



Part Number	Description
Conversion Kits	
37L6858	5Ux24D Tower-to-Rack Kit
Rack and NetBAY¹	
	Refer to the Rack Cabinets and Options section for information concerning IBM racks and rack-supported devices.
Keyboard and Mouse²	
28L3644	Space Saver II Keyboard ^{3, 5}
28L3621	Preferred Keyboard (stealth black) ⁴
28L3673	Sleek 2-Button Stealth Black Mouse

1. xSeries 240 rack models are housed in a 19in rack-mountable drawer and require one of the racks listed in the Rack Cabinets and Options section.
2. Tower models include both a mouse and a keyboard. Rack models include neither.
3. Installation within a rack requires optional keyboard tray (P/N 28L4707), which stows in ready-to-use position.
4. Installation within a rack requires optional keyboard tray (P/N 28L4707). This keyboard cannot share a keyboard tray with a flat panel display.
5. Advanced TrackPoint IV features are not available on IBM xSeries systems.

xSeries 240 Tape Options

Part Number	Tape Drives	Bays Supported	SCSI Interface (bit)	Form Factor	Termination Included	68/50-pin Converter Incl	Ext Tape Enclosures
09N4042	10/20GB NS Internal SCSI Tape Drive ¹	A, B	8	89mm (3.5in) SL or 133mm (5.25in) HH	Y	Y	3510020
00N7991	20/40GB DDS/4 4mm Internal Tape Drive ²	A, B	16 Ultra2 LVD	89mm (3.5in) HH or 133mm (5.25in) HH	Y ³	-	3510020 ⁷ 3551001 ⁵
09N4040	20/40GB DLT Internal SCSI Tape Drive ¹	A+B	8	133mm (5.25in) FH	N ⁴	Y	3551001
00N7990	40/80GB DLT Internal SCSI Tape Drive ²	A+B	16 Ultra2 LVD	133mm (5.25in) FH	Y ³	-	3551001 ⁵
00N8016	100/200GB LTO Tape Drive ²	A+B	16 Ultra2 LVD	133mm (5.25in) FH	Y ³	-	3551001 ⁵
00N8015	110/220GB Super DLT Internal SCSI Tape Drive ²	A+B	16 Ultra2 LVD	133mm (5.25in) FH	Y ³	-	3551001 ⁵
24P2396	100/200GB LTO Half-High Tape Drive ²	A, B	16 Ultra2 LVD	133mm (5.25in) HH	Y ³	-	3551001 ⁵
24P2398	40/80GB Half-High DLT/VS Internal SCSI Tape Drive ²	A, B	16 Ultra2 LVD	133mm (5.25in) HH	Y ³	-	3551001 ⁵
Tape Autoloaders							
3502108	DLT Tape Autoloader	-	16	Desktop	Y	-	-
00N7992	120/240GB DDS/4 Tape Autoloader ²	A+B	16 Ultra2 LVD	133mm (5.25in) FH	Y ³	-	3551001 ⁵
3600109	3600 Series 900GB/1.8TB LTO Tape Autoloader ⁶	-	16 Ultra2 LVD	Tower or 6U Rack	Y	-	-
External Tape Libraries⁸							
3502x14	DLT Tape Library	-	16	Desktop or Rack	Y	-	-
3570C2X	Magstar MP 3570 Tape Subsystem	-	HVD	6U Rack	Y	-	-
3600220	3600 Series 2/4TB LTO Tape Library (Tower)	-	16 Ultra2 LVD	Tower	Y	-	-
3600R20	3600 Series 2/4TB LTO Tape Library (Rack)	-	16 Ultra2 LVD	5U Rack	Y	-	-
3600LXU	3600 Series 2-Drive, 20-Cartridge Expander Module ⁹	-	16 Ultra2 LVD	5U Rack	Y	-	-
09N4048	3600 Series LTO Drive Upgrade Option ¹⁰	-	16 Ultra2 LVD	-	N	-	-
External Tape Enclosures							
3510020	External Half-High SCSI Storage Enclosure ¹¹	-	8/16	Desktop	N	N	-
3551001	NetMEDIA Storage Expansion Unit EL ¹²	-	16	Rack	Y	N	-
10L7113	NetMEDIA Systems Management Adapter ¹³	-	16 LVD	-	N	N	3551001



Associated Options

00N7956	68-pin External Multimode LVD/SE SCSI Terminator	-	16 LVD/SE	Ext	Y	N	3510020
10K2340	Media Bay Tray and LVD Cable Kit ⁴	-	16 LVD	Int	Y	N	3551001

Note: xSeries 240 includes a wide two-drop, single-ended terminated cable which can be used for attachment of internal tape drives to the onboard Ultra2 controller when the hot-swap backplane is attached to a RAID controller. An external Ultra2 SCSI port with a 0.8mm VHDCI connector is standard. External tape enclosures are supported by the standard external SCSI port or PCI Wide Ultra160 SCSI Adapter (P/N 19K4646), which has an external 0.8mm VHDCI connector.

- Requires PCI Wide Ultra160 SCSI Adapter (P/N 19K4646), which has an external 0.8mm VHDCI connector.
- If the backplane is connected to the onboard Ultra2 SCSI controller, PCI Wide Ultra160 SCSI Adapter (P/N 19K4646), which contains a five-drop multi-mode terminated LVD SCSI cable, is required to support LVD mode. If the backplane is connected to an optional RAID controller, LVD mode is supported by connecting the single -drop, terminated LVD SCSI cable shipped with this option to the internal connector of the onboard controller.
- Termination requires installing the 42in single-drop, terminated LVD SCSI cable provided with the option or is provided in a NetMEDIA Storage Expansion Unit with the installation of NetMEDIA Systems Management Adapter (P/N 10L7113).
- Termination requires installation using the two-drop multimode terminated LVD SCSI cable included with the Media Bay Tray and LVD Cable Kit (P/N 10K2340) or is provided in a NetMEDIA Storage Expansion Unit with the installation of NetMEDIA Systems Management Adapter (P/N 10L7113).
- LVD support for LVD devices installed in a NetMEDIA Storage Expansion Unit EL (P/N 3551001) requires installation of NetMEDIA Systems Management Adapter (P/N 10L7113), which also provides termination, and replacement of the standard single-ended internal cable with the terminated single-drop LVD SCSI cable provided with this option. If the standard cables are used for attachment to LVD devices, single-ended SCSI rules and bus speeds apply.
- If installed in a rack, a fixed shelf is required. Allow an additional 1U for the fixed shelf. One unit only per shelf is supported.
- Requires 68-pin External Multimode LVD/SE SCSI terminator (P/N 00N7956).
- Tape library attributes and prerequisites are located in Appendix B: Tape Library Attributes.
- Supported only with the 3600 Series LTO Tape Library (rack) (P/N 3600R20). Allow one additional EIA space when installing either one or two (maximum) units to accommodate a filler plate for cable routing. Up to two 3600 Series LTO Drive Upgrade Options can be installed in each module or the module can operate off the LTO drives installed in the LTO tape library.
- Install in second drive bay of 3600 Series LTO Tape Libraries or in either of the two bays of 3600 Series 2-Drive 20-Cartridge Expander Module to increase performance. Includes an LTO (Ultrium) drive and a one-meter external LVD SCSI cable.
- Provides a black desktop 133mm (5.25in) half-high (HH) tape enclosure. Connector is configurable as 50-pin Centronix or 68-pin high density. Requires either tape drive self termination or 68-pin External Multimode LVD/SE SCSI Terminator (P/N 00N7956).
- NetMEDIA Storage Expansion Unit EL (P/N 3551001) is a black 3U, 19in rack mountable tape enclosure which includes two full-high (FH) or four half-high (HH) extended length 133mm (5.25in) bays, two external 0.8mm VHDCI connectors and two internal four-drop single-ended terminated 16-bit SCSI cables for device attachment. Two power supplies and two power cords are also included. Tip: The front rail clips will need to be reversed and screwed in from behind to secure the unit in a 930842x rack.
- NetMEDIA Systems Management Adapter (P/N 10L7113) may be installed in a 3551001 to provide repeater function, LVDS interface, aggregate cable lengths up to 12m when attached to an LVD SCSI controller, and auto-termination when the 3551001 is powered off. External connector is 0.8mm VHDCI.

Note: Additional tape attributes can be found in Appendix A: Tape Drive Attributes.

xSeries 240 Sample Configurations

Note: The following sample configurations are for illustration only and may not be suitable for any specific customer installation. Contact your IBM Business Partner or IBM Marketing Representative for assistance with your specific configuration requirements.

High-Availability Application Server

Part Number	Description	Quantity	Usage
8664-81Y	xSeries 240 1GHz/256KB, 256MB(R) ECC, Open, 40X, PCI	1	-
33L3060	256MB, 133MHz SDRAM ECC RDIMM	1	512MB total system memory
06P5754	18.2GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD	2	18.2GB HDDs mirrored for NOS
06P5755	36.4GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD	4 ¹	-
24P2396	100/200GB LTO Half-HighTape Drive	1	-
10K2340	Media Bay Tray and LVD Cable Kit	1	-
06P5740	ServeRAID-4Lx Ultra160 SCSI Controller	1	RAID 5
33L3760	250W Hot-Swap Redundant Power Supply	1	Full power redundancy
633147N	E54 Color Monitor 15in (350mm, 13.8in viewable image), stealth black	1	-
94G3135	APC Smart-UPS 1000	1	-

1. Four HDDs are used for RAID 5 protection. Effective capacity is three HDDs or 1092GB.

This tower server is configured to act as the foundation for business critical applications your business cannot afford to be without. Configured with enough HDD storage to mirror the operating system and provide a standard RAID 5 environment for data, optional hot-swap redundant power and UPS for power even during a blackout, this server represents the leading edge in high availability. An internal tape drive is included to back up that all important asset--data. A modem could be included to allow out-of-band (non-LAN) system management utilizing the integrated Netfinity Advanced System Management Processor.



High-Availability File Server

Part Number	Description	Quantity	Usage
8664-81Y	xSeries 240 1GHz/256KB, 256MB ECC, Open, 40X, PCI	1	-
06P5754	18.2GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD	6 ¹	-
24P2396	100/200GB LTO Half-HighTape Drive	1	-
10K2340	Media Bay Tray and LVD Cable Kit	1	-
37L6889	ServeRAID-4H Ultra160 SCSI Controller	1	RAID 5 with hot-spare
33L3760	250W Hot-Swap Redundant Power Supply	1	Full power redundancy
633147N	E54 Color Monitor 15in (350mm, 13.8in viewable image), stealth black	1	-
94G3135	APC Smart-UPS 1000	1	-

1. Six HDDs are used for RAID 5 protection. One HDD is identified as a hot-spare. Effective capacity is four HDDs or 72.8GB.

This tower model is configured to meet the need of server consolidation. Many businesses are trying to get their arms around the dispersed departmental servers that have grown up around the enterprise. By moving multiple servers onto one platform there is only one system to manage both hardware and software. There is potentially less expense for service, software licenses, etc., and there is less concern about single points of failure because the xSeries240 is designed for high availability. This configuration includes RAID-protected internal storage, a third power supply which provides fully redundant power, a UPS to help protect the system against a momentary electricity loss, and an internal tape drive that backs up as much as 200GB per tape--in addition to all the standard features of the xSeries 240.



IBM xSeries 250

Part Number
 Processor Speed (MHz)²
 Number of Processors (Std/Max)
 L2 ECC Cache
 Memory (Std/Max) (R = RDIMM)³
 Form Factor
 Power Supply
 Hot-Swap Quantity (Std/Max)
 Redundancy (Optional, Standard)
 Adv System Management Processor
 Onboard Ethernet (Mbps)
 SCSI Controller (Dual, Ultra, RAID)
 Removable Media Bays (Total/Avail)
 Internal Hard Disk Drive (Std/Max)
 CD-ROM (IDE)
 Bays (Total/Avail)
 Slots (Total/Avail)

xSeries 250 At-A-Glance

8665-61Y	700	1/4	1MB	512MB(R)/16GB	Tower	2/4	P, S, H, F	S-Fans O-Power ⁴	Y	10/100	D,U2	4/2	0/734GB	48X-20 ⁵	14/12	6/6
8665-6RY ¹	700	1/4	1MB	512MB(R)/16GB	Rack (8U)	2/4	P, S, H, F	S-Fans O-Power ⁴	Y	10/100	D,U2	4/2	0/734GB	48X-20 ⁵	14/12	6/6
8665-71Y	700	1/4	2MB	512MB(R)/16GB	Tower	2/4	P, S, H, F	S-Fans O-Power ⁴	Y	10/100	D,U2	4/2	0/734GB	48X-20 ⁵	14/12	6/6
8665-7RY ¹	700	1/4	2MB	512MB(R)/16GB	Rack (8U)	2/4	P, S, H, F	S-Fans O-Power ⁴	Y	10/100	D,U2	4/2	0/734GB	48X-20 ⁵	14/12	6/6
8665-81Y	900	1/4	2MB	512MB(R)/16GB	Tower	2/4	P, S, H, F	S-Fans O-Power ⁴	Y	10/100	D,U2	4/2	0/734GB	48X-20 ⁵	14/12	6/6
8665-8RY ¹	900	1/4	2MB	512MB(R)/16GB	Rack (8U)	2/4	P, S, H, F	S-Fans O-Power ⁴	Y	10/100	D,U2	4/2	0/734GB	48X-20 ⁵	14/12	6/6

Note: xSeries 250 supports the IXA Adapter (P/N 1519100) for connection to iSeries models 270, 820, 830 and 840 (V5 R1 or newer). The adapter must be installed in PCI slots one or two only.

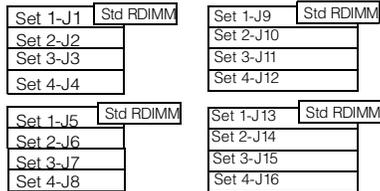
1. Housed in a 19in rack-mountable drawer and ships standard without a keyboard or mouse. See Rack Cabinets and Options section for supported IBM racks.
2. Intel Pentium III Xeon processor with integrated full-speed ECC L2 cache and 100MHz access to memory and I/O buses.
3. Advanced Chipkill ECC memory corrects two-, three-, and four-bit memory errors.
4. An optional 250W Hot-Swap Redundant Power Supply (P/N 33L3760) is required for redundancy. See "Power" under "xSeries 250 Power, Monitor & Accessories" for additional information.
5. Variable read rate. Actual playback speed will vary and is often less than the maximum possible.

xSeries 250 Processor Upgrades

Part Number	Processor Upgrades	SMP Support ¹	Processor Speed Upgrade ²
10K2331	Netfinity 700MHz/1MB Upgrade II with Pentium III Xeon Processor	6xY	-
10K2332	Netfinity 700MHz/2MB Upgrade II with Pentium III Xeon Processor	7xY	6xY
19K4635	xSeries 250 900MHz/2MB Upgrade with Pentium III Xeon Processor	8xY	6xY, 7xY

1. Three additional processors may be installed, providing a maximum of four. All processors must be identical in type, speed, and cache size.
2. Requires removal of the standard processor. A maximum of four processors may be installed. All processors must be identical in type, speed and cache size. Upgrades may require a BIOS update. To obtain the latest Flash BIOS, access www.pc.ibm.com/support and enter machine "Type-Model" in Quick Path. Select "Downloadable files" and then "BIOS."

xSeries 250 Memory



All RDIMMs installed in each set must be the same size, but all the sets do not have to contain RDIMMs of the same size. Install RDIMM sets in numerical sequence from one to four.

Total Memory ¹	Quantity of RDIMMs Added ²			
	128MB (33L3113)	256MB (33L3115)	512MB (33L3117) ⁴	1GB (33L3119)
4 x 128 RDIMMs standard				
512MB	-	-	-	-
1GB	4	-	-	-
1.5GB	-	4	-	-
2GB	4	4	-	-
2.5GB	-	8	-	-
3GB	4	-	4	-
4GB	4	4	4	-
5GB	4	-	8	-
6GB ³	-	8	8	-
7GB ³	-	4	12	-
8GB ³	-	-	16	-
9GB	4	-	-	8
10GB ³	-	-	12	4
12GB ³	-	-	8	8
14GB ³	-	-	4	12
16GB ³ (max)	-	-	-	16

This table does not represent all possible memory configurations. Memory modules may vary in price per MB. Selection of smaller RDIMMs may provide a more cost-effective alternative to using larger RDIMMs.

1. Network operating systems may limit the maximum amount of addressable memory. See operating system specifications for further information.
2. To obtain the Quantity of memory identified in the "Total Memory" column, select the appropriate row and order the quantity of RDIMMs identified in all columns for that row. Example: For 2GB, order 4 x 33L3113 plus 4 x 33L3115.
3. Requires removal of standard RDIMMs.
4. The 2GB memory option (P/N 33L3147), each of which includes four 512MB RDIMMs, can be substituted for a quantity of four 512MB (P/N 33L3117) RDIMMs.

Part Number	Memory Description ¹
33L3113	Netfinity 128MB, 100MHz ECC SDRAM RDIMM
33L3115	Netfinity 256MB, 100MHz ECC SDRAM RDIMM
33L3117	Netfinity 512MB, 100MHz ECC SDRAM RDIMM ²
33L3119	Netfinity 1GB 100MHz ECC SDRAM RDIMM
33L3147	2GB 100MHz ECC SDRAM RDIMM Kit (4 x 512MB) ²

1. Due to four-way interleaving all RDIMMs installed in each set must be the same size, but all the sets do not have to contain RDIMMs of the same size. Memory must be installed in sets of four identical RDIMMs (example: quantity four of 33L3113). Install RDIMM sets in numerical sequence from Set 1 to Set 4. Chipkill support is provided on the memory card.
2. Due to the new technology used by the 512MB RDIMMs contained in P/N 33L3147, they should not be mixed within a set with Netfinity 512MB 100MHz ECC SDRAM RDIMM (P/N 33L3117).

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xSeries 250 Internal SCSI Cabling

The xSeries 250 contains a hot-swap backplane architected into two backplanes, each containing five drives. This split backplane supports a total of 10 hot-swap SCA-2 compliant drives. One of the backplanes is connected to one of the internal connectors of the standard Ultra2 SCSI controller through a 16-bit LVDS cable. Another 16-bit LVDS cable is connected to the other backplane connector; however, this cable is left disconnected at the other end. The standard configuration allows support of five drives from the standard SCSI controller. If additional drive bays are needed, an optional xSeries Ultra160 SCSI Repeater Card (P/N 37L7086) must be installed to connect both backplanes into a single channel, 10-bay configuration. The repeater card is shipped with a jumper cable and installation hardware. Channel A of the dual-channel, Wide Ultra2 SCSI controller only supports external SCSI attachment and is connected directly to an external 0.8mm VHDCI SCSI connector. To support SCSI devices in the internal 5.25in half-high bays, a two-drop terminated, 16-bit LVD SCSI cable shipped with the system can be used to connect channel B of the integrated Wide Ultra2 SCSI controller to SCSI devices in one or both of the removable media bays when an optional RAID controller is used to support the internal hot-swap drive bays. If the standard SCSI controller is used to support the hot-swap drive bays, then an optional SCSI adapter is required to support installation of devices in these 5.25/3.5in half-high bays. Most configurations for this class of server will generally incorporate an optional ServeRAID-4 Ultra160 SCSI controller to support internal RAID protection. The split backplane of the xSeries 250 is optimized to support a two-channel ServeRAID controller to enhance performance. Each backplane can be cabled to an internal connector of the RAID controller by removing the standard 16-bit LVDS cable from the Ultra2 SCSI controller and attaching it to one of the RAID controller connections. The other standard 16-bit LVDS cable is attached to the remaining internal connector of the RAID controller. In configurations where a single channel RAID array is required, an xSeries Ultra160 SCSI Repeater Card must be installed.

For additional information regarding internal cabling, refer to Appendix F: Internal Cabling Overview.



xSeries 250 Hard Disk Drive (HDD) Storage

Total Int Storage ¹	10,000RPM HDDs			15,000RPM HDDs	
	18.2GB (06P5754) ²	36.4GB (06P5755) ²	73.4GB (06P5756) ²	18.2GB (06P5767) ²	36.4GB (06P5768) ²
0GB	Standard on base models				
18.2GB	1	-	-	1	-
36.4GB	2	1	-	2	1
54.6GB	3	-	-	3	-
72.8GB	4	2	-	4	2
91GB	5	-	-	5	-
109.2GB	6	3	-	6	3
127.4GB	7	-	-	7	-
145.6GB	8	4	-	8	4
163.8GB	9	-	-	9	-
182GB	10	5	-	10	5
218.4GB	-	6	-	-	6
254.8GB	-	7	-	-	7
291.2GB	-	8	-	-	8
327.6GB	-	9	-	-	9
364GB	-	10	-	-	10
367GB	-	-	5	-	-
440.4GB	-	-	6	-	-
513.8GB	-	-	7	-	-
587.2GB	-	-	8	-	-
660.6GB	-	-	9	-	-
734GB (max)	-	-	10	-	-

This table does not represent all possible HDD configurations.

1. Select a total storage row then select the quantity of HDDs from a column corresponding to the HDD of choice.

Total Internal Storage listed is within +/- 0.2GB unless otherwise noted.

2. xSeries 250 ships standard with an Ultra2 SCSI storage controller. The standard backplane supports Ultra160 HDDs at Ultra2 speeds (80MBps) when connected to the standard integrated storage controller or at Ultra160 speeds (160MBps) with the addition of an optional Ultra160 storage controller.

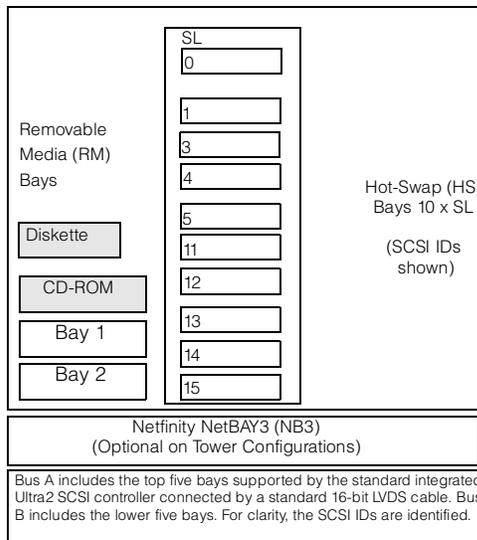


Bay	Form Factor	Height	Front Access	Usage	Part Number	Description	RPM	Height	Bays Supported	Max Qty
-	89mm (3.5in)	SL	Yes	Diskette	Ultra160 HDDs¹					
-	133mm (5.25in)	HH	Yes	IDE CD-ROM	06P5754	18.2GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD	10000	SL	See diagram	10
RM 1	133mm (5.25in)	HH ¹	Yes	Open	06P5755	36.4GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD	10000	SL	See diagram	10
RM 2	133mm (5.25in)	HH ¹	Yes	Open	06P5756	73.4GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD	10000	SL	See diagram	10
1... 10	HS	SL	Yes	Open	06P5767	18.2GB 15Krpm Ultra160 SCSI Hot-Swap SL HDD	15000	SL	See diagram	10
NB3 ²	19in Rack	3U	Yes	Open	06P5768	36.4GB 15Krpm Ultra160 SCSI Hot-Swap SL HDD	15000	SL	See diagram	10

1. Two half-high (HH) bays can be combined to support a single full-high (FH) device
 2. Tower models support installation of up to three NetBAY3s. See IBM Netfinity NetBAY3 Stackable Enclosure section for supported devices

Associated Options					
37L7086	xSeries Ultra160 SCSI Repeater Card ²	-	-	-	1

External Storage Expansion Units³		Form Factor	
35311RU	EXP300 Storage Expansion Unit ⁴	Rack (3U)	
09N7296	EXP300 Rack-to-Tower Conversion Kit	-	
35601RU	FAST EXP500 Storage Expansion Unit ⁵	Rack (3U)	
35421RU	FAST200 Storage Server ^{6, 7}	Rack (3U)	
35422RU	FAST200 HA Storage Server ⁶	Rack (3U)	
19K1121	FAST200 Redundant RAID Controller	-	



1. xSeries 250 contains an Ultra2 hot-swap, split backplane which supports Ultra160 HDDs at Ultra2 bus speeds when connected to the standard integrated storage controller. Ultra160 bus speeds are supported with the addition of an optional Ultra160 storage controller.
2. xSeries Ultra160 SCSI Repeater Card kit includes a jumper cable and installation hardware. This option is used to convert the standard split backplane into a single SCSI channel supporting up to 10 HDDs.
3. Not supported by the onboard external SCSI port. To configure one of the SCSI storage devices listed here, select an optional SCSI controller then refer to Appendix D: Cables - Storage Units - Controllers to confirm that the controller supports the desired External Storage Expansion Unit and to select a supported cable. For HDD or other expansion unit options, see the specific expansion unit section. For Fibre Channel storage devices, refer to the Fibre Channel Solutions Overview section.
4. EXP300 includes a single 2M Ultra2 SCSI cable and dual hot-swap 500W power supplies, each with its own power cord. To convert an EXP300 to a tower form factor, Netfinity EXP300 Rack-to-Tower Conversion Kit (P/N 09N7296) is required.
5. FAST EXP500 Storage Expansion Unit (P/N 35601RU) includes dual hot-swap 350W power supplies, each with its own power cord.
6. The FAST200 includes two hot-swap, 350W auto-ranging redundant power supplies, each with its own power cord.
7. Can be upgraded to FAST200 HA Storage Server through the addition of a FAST200 Redundant RAID Controller (P/N 19K1121).

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xSeries 250 I/O Options

Part Number	Description	Adapter Length	PCI Support ¹	Slots Supported ¹	Hot-Plug ²	PCI Voltage Key	MHz
Storage Controllers³							
37L6889	ServeRAID-4H Ultra160 SCSI Controller ⁴	Full	64-bit	1 ... 6	X	Universal	33
06P5736	ServeRAID-4Mx Ultra160 SCSI Controller ⁵	Full	64-bit	1 ... 6	X	Universal	66
06P5740	ServeRAID-4Lx Ultra160 SCSI Controller ⁶	Half	64-bit	1 ... 6	X	Universal	66
19K4646	PCI Wide Ultra160 SCSI Adapter ⁷	Half	32-bit	1 ... 6	-	Universal	66
02K3454	PCI Fast/Wide Ultra SCSI Adapter ⁸	Half	32-bit	3 ... 6	-	5	33
Fiber Storage Controllers and Options⁹							
00N6881	Netfinity FASTT Host Adapter	Half	64-bit	1 ... 6	X	Universal	66
19K1246	FASTT FC-2 Host Bus Adapter	Half	64-bit	1 ... 6	X	Universal	66
17421RU	FASTT700 Fibre Channel Storage Server	-	-	-	-	-	-
35521RU	FASTT500 Storage Server	-	-	-	-	-	-
35421RU	FASTT200 Storage Server	-	-	-	-	-	-
35422RU	FASTT200 HA Storage Server	-	-	-	-	-	-
35341RU	SAN Fibre Channel Managed Hub	-	-	-	-	-	-
2109S08	SAN Fibre Channel Switch, 8-port	-	-	-	-	-	-
2109S16	SAN Fibre Channel Switch, 16-port	-	-	-	-	-	-
2109F16	SAN Fibre Channel Switch, 16-Port	-	-	-	-	-	-
2108R3L	SAN Data Gateway Router Ultra SCSI LVD Port ¹⁰	-	-	-	-	-	-
Networking¹¹							
Ethernet¹²							
09N9901	10/100 EtherLink Server Adapter by 3Com ¹³	Half	32-bit	1 ... 6	X	Universal	33
06P3601	10/100 Ethernet Server Adapter ¹³	Half	32-bit	1 ... 6	X	Universal	33
06P3701	Gigabit Ethernet SX Server Adapter (fiber)	Half	64-bit	1 ... 6	X	Universal	66
22P4901	10/100 Dual Port Server Adapter ¹³	Half	64-bit	1 ... 6	X	Universal	66
Token Ring							
34L0701	Token-Ring 16/4 PCI Adapter 2 with Wake on LAN ¹³	Half	32-bit	1 ... 6	X	Universal	33
34L5001	16/4 Token-Ring PCI Management Adapter ¹³	Half	32-bit	1 ... 6	X	Universal	33
34L5201	High-Speed 100/16/4 Token-Ring PCI Management Adapter ¹³	Half	32-bit	1 ... 6	X	Universal	33
Communications¹⁴							
33L4618	V90 PCI Data/Fax Modem ¹⁵	Half	32-bit	3 ... 6	-	5	33
37L14xx	Serial I/O SST 8, 16, and 128 port adapters ¹⁶	Half	32-bit	3 ... 6	-	5	33
Systems Management¹⁷							
01K7209	Advanced System Management PCI Adapter ¹⁸	Full	32-bit	3 ... 6 ¹⁹	-	5	33

1. The 5V slots support Universal or 5V adapters. The 3.3V slots support Universal or 3.3V adapters. A 66MHz adapter plugged into a 33MHz slot will operate at 33MHz. A 33MHz adapter plugged into a 66MHz slot limits other adapters installed on the same bus to 33MHz. A 64-bit adapter installed into a 32-bit slot will transfer data at 32-bit rates. 133MHz PCI-X adapters are backward compatible with 33/66MHz, 64-bit PCI-based servers.

2. Slots three through six include hot-plug capability using IBM's Active PCI technology. For Network Operating System support access www.pc.ibm.com/us/compat.

3. All models include a dual-port, dual-channel, 64-bit Wide Ultra2 SCSI controller with one internal connector (connected to Channel A of the hot-swap split backplane) and one external port with a 0.8mm Very High Density Connection Interface (VHDCI).

4. ServeRAID-4H Ultra160 SCSI Controller is powered by a 266MHz PowerPC 750 processor and provides 128MB of battery-backed ECC cache with two internal and four external Ultra160 connectors (a combination of four connectors may be utilized). External connectors are 0.8mm VHDCI.

5. ServeRAID-4Mx Ultra160 SCSI Controller is powered by a 100MHz Intel Zion GC80303 processor that provides 64MB of battery-backed ECC cache and two internal and two external Ultra160 connections (only two connectors may be used). External connections are 0.8mm VHDCI.

6. ServeRAID-4Lx Ultra160 SCSI Controller is powered by a 100MHz Intel Zion GC80303 processor and provides a single channel, 32MB of ECC cache and either one internal or one external Ultra160 connection. External connector is 0.8mm VHDCI.

7. PCI Wide Ultra160 SCSI Adapter (P/N 19K4646) provides a single channel with one internal connector, a five-drop multi-mode terminated LVD SCSI cable and one external 0.8mm VHDCI connector. Only one of the two connectors may be utilized.

8. PCI Fast/Wide Ultra SCSI Adapter (P/N 02K3454) provides one external 68-pin high density connector that supports external SCSI devices such as tape enclosures.

9. See Fibre Channel Solutions Overview section for additional configuration information.



10. The 2108R3L SAN Data Gateway Router Ultra SCSI LVD port provides one integrated short-wave optical port and two SCSI ports for tape storage connections (LVD, HVD and single-ended).
11. xSeries 250 includes a full-duplex, 10/100Mbps Ethernet PCI Controller.
12. In a fault-tolerant networking environment, using the fault-tolerant software delivered with the Ethernet adapters of a single manufacturer is recommended. Installing fault-tolerant solutions provided by multiple manufacturers may cause failures if the intermediate drivers provided with the adapters are not compatible. The onboard Ethernet is AMD-based. Four of the optional PCI Ethernet adapters listed are Intel-based (P/N 06P3601, 06P3701, 22P4901, 22P6801).
13. The Wake-on LAN function of this option is not supported by this server.
14. xSeries 250 includes two USB ports, two high-speed serial/asynchronous ports (NS16550A compatible), and one high-speed (up to 2MB/sec data transfer speed) bidirectional parallel port supporting devices using ECP/EPP/SPP protocols adhering to the IEEE 1284 standard.
15. Due to homologation variances, modem availability may differ by country.
16. See Appendix E for details on Serial I/O Options and configuration limitations.
17. The Advanced System Management Processor and interconnect bus integrated into xSeries 250 work with IBM Director to provide significant system management functionality when used with optional Advanced System Management PCI Adapter (P/N 01K7209) or connected directly into an interconnect network using the integrated RS-485 ports located on the rear of the system chassis. Additional management and control of up to 12 Advanced System Management Processors or optional Advanced System Management PCI Adapters may be interconnected with an aggregate connection length of no more than 91.4m (300ft). A customer-supplied Cat5 cable is required for each interconnection. An additional 12 Integrated System Management Processors or Remote Supervisor Adapters may be connected to the network for a total of 24 devices.
18. Includes PCI adapter, Advanced System Management Interconnect Cable Kit components and 56W AC adapter, which requires a separate power source. Provides an integrated 10/100 Ethernet port.
19. A maximum quantity of one is supported.

Slot 1- Bus A- 66MHz- 3.3v or Universal
Slot 2- Bus A- 66MHz- 3.3v or Universal
Slot 3- Bus B- 33MHz- 5v or Universal, Active PCI
Slot 4- Bus B- 33MHz- 5v or Universal, Active PCI
Slot 5- Bus B- 33MHz- 5v or Universal, Active PCI
Slot 6- Bus B- 33MHz- 5v or Universal, Active PCI
All Slots- Full Length, 64-bit

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xSeries 250 Power, Monitors & Accessories

Part Number	Description
Power¹	
33L3760	250W Hot-Swap Redundant Power Supply
Uninterruptible Power Supply (UPS)²	
94G3135	APC Smart-UPS 1000
94G3136	APC Smart-UPS 1400
94G6676	APC Smart-UPS 3000RMB ³
37L6861	APC Smart-UPS 5000RMB ⁴
Monitors⁵	
633147N	E54 Color Monitor 15in (350mm, 13.8in viewable image), stealth black ⁶
63324HN	E74 Color Monitor 17in (406mm, 16in viewable image), stealth black ⁶
66274AN	G78 Color Monitor 17in (406.4mm, 16in viewable image), stealth black ⁶
9511AG4	T540 Flat Panel Color Monitor 15in (381mm, 15in viewable), stealth black ⁷
655163N	P96 Color Monitor 19in (456mm, 17.9in viewable image), stealth black ⁹
9519AG1	T85A Flat Panel Color Monitor (459mm, 18.1in viewable image), stealth black ⁹
32P1031	NetBAY 1U Flat Panel Monitor Console Kit (w/ US Space Saver keyboard) ¹⁰
32P1032	NetBAY 1U Flat Panel Monitor Console Kit (w/o keyboard) ¹⁰

1. xSeries 250 includes two 250W hot-swap redundant power supplies, with the ability to accept two additional 250W Hot-Swap Redundant Power Supply (P/N 33L3760). Each power supply includes its own 9ft power cord for attachment to a low voltage UPS, PDU or wall outlet. To assist in determining when an additional power supply is required to preserve redundancy, a "Non-Redundant LED" is a standard feature of the xSeries 250. Predicting whether a particular configuration will require an additional power supply for redundancy is very complex. However, once the system is installed, the "Non-Redundant LED" will indicate when an additional power supply is required. The following sample configuration is provided as a reference.



Number of Power Supplies	System Configuration Supported
Typical Nonredundant Configuration	
2	2 x Processors
	3 x PCI Adapters
	5 x Slim-Line HDDs
	8 x 512MB RDIMMs
Typical Redundant Configuration	
3 ⁸	4 x Processors
	6 x PCI Adapters
	10 x Slim-Line HDDs
	16 x 512MB RDIMMs
4	Full Configuration with Redundancy

2. For runtimes and UPS attributes see Appendix C: UPS Runtime Estimate.
3. Height is 3U. See Rack Cabinets and Options section for supported IBM racks.
4. Height is 5U. See Rack Cabinets and Options section for supported IBM racks.
5. xSeries 250 uses an SVGA controller (S3 Trio 3D chipset) with 4MB of video memory.
6. Installation within a rack requires optional Monitor Compartment (P/N 94G7444).
7. Installation within a rack requires optional Netfinity Flat Panel Monitor Rack Mount Kit II (P/N 37L6888) and Netfinity Rack Keyboard Tray (P/N 28L4707). A space saver keyboard may coexist within the same 28L4707 keyboard tray.
8. The addition of a DLT tape drive may require a fourth power supply to preserve redundancy.
9. Not supported for rack installations.
10. Includes a 15in Flat Panel Monitor.

Part Number	Description
Conversion Kits	
37L6860	8Ux24D Rack-to-Tower Kit ¹
37L6859	8Ux24D Tower-to-Rack Kit
Rack and NetBAY²	
	Refer to the Rack Cabinets and Options section for information concerning IBM racks and rack-supported devices.
Keyboard and Mouse³	
28L3644	Space Saver II Keyboard ^{4, 6}
28L3621	Preferred Keyboard (stealth black) ⁵
10K3849	106-key Preferred USB Keyboard with 2-port USB Hub (stealth black) ^{5, 7}
22P5150	TrackPoint USB Space Saver Keyboard ^{4, 6, 7}
33L3244	Sleek USB Mouse (stealth black)
28L3673	Sleek 2-Button Stealth Black Mouse

1. Includes one Netfinity NetBAY3 with casters.
2. xSeries 250 rack models are housed in a 19in rack-mountable drawer and require one of the racks listed in the Rack Cabinets and Options section.
3. xSeries 250 rack models ship without a keyboard or mouse.
4. Installation within a rack requires optional keyboard tray (P/N 28L4707), which stows in ready-to-use position.
5. Installation within a rack requires optional keyboard tray (P/N 28L4707). This keyboard cannot share a keyboard tray with a flat panel display.
6. Advanced TrackPoint IV features are not available on IBM xSeries systems.
7. USB keyboards attach to a single USB-capable server. They are not compatible with the NetBAY console switches.



xSeries 250 Tape Options

Part Number	Tape Drives	Bays Supported	SCSI Interface (bit)	Form Factor	Termination Included	68/50-pin Converter Incl	Ext Tape Enclosures
00N7991	20/40GB DDS/4 4mm Internal Tape Drive	1, 2	16 Ultra2 LVD	89mm (3.5in) HH or 133mm (5.25in) HH	Y ¹	-	3510020 ⁴ , 3551001 ³
00N7990	40/80GB DLT Internal SCSI Tape Drive	1+2	16 Ultra2 LVD	133mm (5.25in) FH	Y ¹	-	3551001 ³
00N8015	110/220GB Super DLT Internal SCSI Tape Drive	1+2	16 Ultra2 LVD	133mm (5.25in) FH	Y ¹	-	3551001 ³
09N4040	20/40GB DLT Internal SCSI Tape Drive	1+2	8	133mm (5.25in) FH	N ²	Y	3551001
00N8016	100/200GB LTO Tape Drive	1+2	16 Ultra2 LVD	133mm (5.25in) FH	Y ¹	-	3551001 ³
24P2396	100/200GB LTO Half-High Tape Drive	1, 2	16 Ultra2 LVD	133mm (5.25in) HH	Y ¹	-	3551001 ³
24P2398	40/80GB Half-High DLT/VS Internal SCSI Tape Drive	1, 2	16 Ultra2 LVD	133mm (5.25in) HH	Y ¹	-	3551001 ³
Tape Autoloaders							
3502108	DLT Tape Autoloader	-	16	Desktop	Y	-	-
00N7992	120/240GB DDS/4 Tape Autoloader	1+2	16 Ultra2 LVD	133mm (5.25in) FH	Y ¹	-	3551001 ³
3600109	3600 Series 900GB/1.8TB LTO Tape Autoloader ⁵	-	16 Ultra2 LVD	Tower or 6U Rack	Y	-	-
External Tape Libraries⁶							
3502x14	DLT Tape Library	-	16	Desktop or Rack	Y	-	-
3570C2X	Magstar MP 3570 Tape Subsystem	-	HVD	6U Rack	Y	-	-
3600220	3600 Series 2/4TB LTO Tape Library (Tower)	-	16 Ultra2 LVD	Tower	Y	-	-
3600R20	3600 Series 2/4TB LTO Tape Library (Rack)	-	16 Ultra2 LVD	5U Rack	Y	-	-
3600LXU	3600 Series 2-Drive, 20-Cartridge Expander Module ⁷	-	16 Ultra2 LVD	5U Rack	Y	-	-
09N4048	3600 Series LTO Drive Upgrade Option ⁸	-	16 Ultra2 LVD	-	N	-	-
External Tape Enclosures							
3510020	External Half High SCSI Storage Enclosure ⁹	-	8, 16	Desktop	N	N	-
3551001	NetMEDIA Storage Expansion Unit EL ¹⁰	-	16	Rack	Y	N	-
10L7113	NetMEDIA Systems Management Adapter ¹¹	-	16 LVD	-	N	N	3551001
Associated Options							
00N7956	68-pin External Multimode LVD/SE SCSI Terminator	-	16 LVD/SE	Ext	Y	N	3510020
10K2340	Media Bay Tray and LVD Cable Kit ²	-	16 LVD	Int	Y	N	3551001

Note: xSeries 250 includes a two-drop, multimode terminated LVD SCSI cable, an available internal Ultra2 SCSI port and an external Ultra2 0.8mm VHDCI connector.

- Termination requires installing the 42in single-drop, terminated LVD SCSI cable provided with the option or is provided in a NetMEDIA Storage Expansion Unit with the installation of NetMEDIA Systems Management Adapter (P/N 10L7113).
- Termination requires installation using the two-drop multimode terminated LVD SCSI cable included with the Media Bay Tray and LVD Cable Kit (P/N 10K2340) or is provided in a NetMEDIA Storage Expansion Unit with the installation of NetMEDIA Systems Management Adapter (P/N 10L7113).
- LVD support for LVD devices installed in a NetMEDIA Storage Expansion Unit EL (P/N 3551001) requires installation of NetMEDIA Systems Management Adapter (P/N 10L7113), which also provides termination, and replacement of the standard single-ended internal cable with the terminated single-drop LVD SCSI cable provided with this option. If the standard cables are used for attachment to LVD devices, single-ended SCSI rules and bus speeds apply.
- Requires 68-pin External Multimode LVD/SE SCSI terminator (P/N 00N7956).
- If installed in a rack, a fixed shelf is required. Allow an additional 1U for the fixed shelf. One unit only per shelf is supported.
- Tape library attributes and prerequisites are located in Appendix B: Tape Library Attributes.
- Supported only with the 3600 Series LTO Tape Library (rack) (P/N 3600R20). Allow one additional EIA space when installing either one or two (maximum) units to accommodate a filler plate for cable routing. Up to two 3600 Series LTO Drive Upgrade Options can be installed in each module or the module can operate off the LTO drives installed in the LTO tape library.
- Install in second drive bay of 3600 Series LTO Tape Libraries or in either of the two bays of 3600 Series 2-Drive 20-Cartridge Expander Module to increase performance. Includes an LTO (Ultraium) drive and a one-meter external LVD SCSI cable.
- Provides a black desktop 133mm (5.25in) half-high (HH) tape enclosure. Connector is configurable as 50-pin Centronix or 68-pin high density. Requires either tape drive self-termination or 68-pin External Multimode LVD/SE SCSI Terminator (P/N 00N7956).
- NetMEDIA Storage Expansion Unit EL (P/N 3551001) is a black 3U, 19in rack or NetBAY3/3E mountable tape enclosure which includes two full-high (FH) or four half-high (HH) extended length 133mm (5.25in) bays, two external 0.8mm VHDCI connectors and two internal four-drop single-ended terminated 16-bit SCSI cables for device attachment. Two power supplies and two power cords are also included. Tip: The front rail clips will need to be reversed and screwed in from behind to secure the unit in a 930842x rack.
- NetMEDIA Systems Management Adapter (P/N 10L7113) may be installed in a 3551001 to provide repeater function, LVDS interface, aggregate cable lengths up to 12m when attached to an LVD SCSI controller, and auto-termination when the 3551001 is powered off. External connector is 0.8mm VHDCI.

Note: Additional tape attributes can be found in Appendix A: Tape Drive Attributes.

IBM XSERIES 250



xSeries 250 Sample Configurations

Note: The following sample configurations are for illustration only and may not be suitable for any specific customer installation. Contact your IBM Business Partner or IBM Marketing Representative for assistance with your specific configuration requirements.

High-Availability Application Server

Part Number	Description	Quantity	Usage
8665-7RY	xSeries 250 Pentium III Xeon 700/2MB, 512MB(R) ECC, OPEN, 40X (Rack 8U)	1	-
33L3113	Netfinity 128MB, 100MHz ECC SDRAM RDIMM	4	-
33L3115	Netfinity 256MB, 100MHz ECC SDRAM RDIMM	4	-
33L3119	Netfinity 1GB, 100MHz ECC SDRAM RDIMM	4	6GB total system memory
10K2332	Netfinity 700MHz/2MB Upgrade II with Pentium III Xeon Processor	3	Total of 4 SMP processors
06P5736	ServeRAID-4Mx Ultra160 SCSI Controller	1	Optional RAID adapter
06P5754	18.2GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD	2	18.2GB HDDs mirrored for NOS
06P5754	18.2GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD	6 ¹	72.8GB RAID 5 with hot-spare
00N7990	40/80GB DLT Internal SCSI Tape Drive	1	-
33L3760	250W Hot-Swap Redundant Power Supply	2	Full power redundancy
66274AN	G78 Color Monitor 17in (406.4mm, 16in Viewable Image Size), stealth black	1	-
28L3644	Space Saver II Keyboard	1	-
32P1020	APC 2U Smart-UPS 1400RMB	1	-
External Storage			
35311RU	EXP300 Storage Expansion Unit	1	Includes 2M Ultra2 cable
06P5755	36.4GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD	14	RAID 5 data storage with hot-spare
Rack			
9306250	NetBAY25 Standard Rack Cabinet	1	-
09N4290	NetBAY 1x4 Console Switch	1	-
94G6667	Power Cable - Type A14	1	-
94G7447	NetBAY Console Cable Set-12ft	1	-
94G6670	Blank Filler Panel Kit	1	-

1. Six HDDs are used for RAID 5 protection. One HDD is identified as a hot-spare. Effective capacity is four HDDs or 72.8GB.

This rack server is configured to act as the foundation for business critical applications, applications your business cannot afford to be without. Configured with enough HDDs to mirror the operating system and provide a standard RAID 5 environment for data, optional hot-swap redundant power and UPS for power even during a blackout, this server represents the leading edge in high availability for Intel-architecture servers. An internal tape drive is included to back up that all important asset--data. A modem could be included to allow out-of-band (non-LAN) system management utilizing the integrated Netfinity Advanced System Management Processor.

Server Consolidation

Part Number	Description	Quantity	Usage
8665-6RY	xSeries 250 Pentium III Xeon 700/1MB, 512MB(R) ECC, OPEN, 40X (Rack 8U)	1	-
33L3113	Netfinity 128MB, 100MHz ECC SDRAM RDIMM	4	1GB total system memory
10K2331	Netfinity 700MHz/1MB Upgrade II with Pentium III Xeon Processor	1	Total of 2 SMP processors
06P5736	ServeRAID-4Mx Ultra160 SCSI Controller	1	Optional RAID adapter
06P5754	18.2GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD	2	18.2GB HDDs mirrored for NOS
06P5755	36.4GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD	8 ¹	218.4GB RAID 5 with hot-spare
06P3601	10/100 Ethernet Server Adapter	3	Total of 4 Ethernet connections
00N7990	40/80GB DLT Internal SCSI Tape Drive	1	-
66274AN	G78 Color Monitor 17in (406.4mm, 16in Viewable Image Size), stealth black	1	-
28L3644	Space Saver II Keyboard	1	-
32P1020	APC 2U Smart-UPS 1400RMB	1	-
Rack			
9306250	NetBAY25 Standard Rack Cabinet	1	-
09N4290	NetBAY 1x4 Console Switch	1	-
94G6667	Power Cable - Type A14	1	Attaches to monitor
94G7447	NetBAY Console Cable Set 12ft	1	-
94G6670	Blank Filler Panel Kit	2	-

1. Eight HDDs are used for RAID 5 protection. One HDD is identified as a hot-spare. Effective capacity is six HDDs or 218.4GB.

This rack server is configured to meet the need of server consolidation. Many businesses are trying to achieve better control of the dispersed departmental servers that have grown up around the enterprise. By moving multiple servers on to one platform, there is only one system to manage both hardware and software. There is potentially less expense for service, software licenses, etc., and there is less concern about single points of failure because the xSeries 250 is designed for high availability. This configuration includes 109GB of internal HDD storage, features three power supplies which provide fully redundant power, a UPS to help protect the system against a momentary electricity loss, and an internal tape drive that backs up as much as 80GB per tape--in addition to all the standard features of the xSeries 250.



High-Availability File and Print Server

Part Number	Description	Quantity	Usage
8665-61Y	xSeries 250 Pentium III Xeon 700/1MB, 512MB(R) ECC, OPEN, 40X (Tower)	1	-
33L3113	Netfinity 128MB, 100MHz ECC SDRAM RDIMM	4	1GB total system memory
10K2331	Netfinity 700MHz/1MB Upgrade II with Pentium III Xeon Processor	1	Total of 2 SMP processors
06P5736	ServeRAID-4Mx Ultra160 SCSI Controller	1	Optional RAID adapter
37L7086	xSeries Ultra160 SCSI Repeater Card	1	Create single SCSI bus from split backplane
06P5754	18.2GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD	2	18.2GB HDDs mirrored for NOS
06P5755	36.4GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD	8 ¹	218.4GB RAID 5 with hot-spare
06P3601	10/100 Ethernet Server Adapter	3	Total of 4 Ethernet connections
00N7990	40/80GB DLT Internal SCSI Tape Drive	1	-
66274AN	G78 Color Monitor 17in (406.4mm, 16in Viewable Image Size), stealth black	1	-
94G3136	APC Smart-UPS 1400	1	-

1. Eight HDDs are used for RAID 5 protection. One HDD is identified as a hot-spare. Effective capacity is six HDDs or 218.4GB

This file and print server is designed to handle a high workload with significant storage and availability requirements. With this in mind, the IBM xSeries 250 was selected to provide an affordable price point for a high end file and print server with optional four-way Pentium III Xeon processing, 1GB of system memory (expandable to 16GB), and availability such as battery-backed cache RAID-protected internal hot-swap storage and power protection with an APC Smart-UPS.



IBM xSeries 300

Part Number
Processor Speed (MHz)
Number of Processors (Std/Max)
L2 ECC Cache (KB)
Memory (Std/Max) (R = RDIMM)
Form Factor
Power Supply Quantity (Std/Max)
Hot-Swap (Power, Slots, HDD, Fans)
Redundancy (Optional, Standard)
Adv System Management Processor
Onboard Ethernet (Mbps)
SCSI Controller (Dual, Ultra, RAID)
Removable Media Bays (Total/Avail)
Internal Hard Disk Drive (Std/Max)
CD-ROM (IDE)⁴
Bays (Total/Avail)
Slots (Total/Avail)⁷

xSeries 300 At-A-Glance																
8672-21X ¹	800 ²	1/1	128	128MB/1.5GB	Rack (1U)	1/1	-	-	N	2 x 10/ 100	U160	-	0/ 146.8GB	24X-10X	4/2	2/1
8672-22X ¹	800 ²	1/1	128	128MB/1.5GB	Rack (1U)	1/1	-	-	N	2 x 10/ 100	IDE	-	20.4GB/ 120GB	24X-10X	4/1	2/2
8672-23X ^{1, 5}	800 ²	1/1	128	128MB/1.5GB	Rack (1U)	1/1	-	-	N	2 x 10/ 100	U160	-	18.2GB/ 146.8GB	24X-10X	4/1	2/1
8672-2AX ^{1, 6}	800 ²	1/1	128	128MB/1.5GB	Rack (1U)	DC	-	-	N	2 x 10/ 100	IDE	-	20.4GB/ 120GB	24X-10X	4/1	2/2
8672-51X ¹	950 ²	1/1	128	128MB/1.5GB	Rack (1U)	1/1	-	-	N	2 x 10/ 100	U160	-	0/ 146.8GB	24X-10X	4/2	2/1
8672-52X ¹	950 ²	1/1	128	128MB/1.5GB	Rack (1U)	1/1	-	-	N	2 x 10/ 100	IDE	-	20.4GB/ 120GB	24X-10X	4/1	2/2
8672-53X ^{1, 5}	950 ²	1/1	128	128MB/1.5GB	Rack (1U)	1/1	-	-	N	2 x 10/ 100	U160	-	18.2GB/ 146.8GB	24X-10X	4/1	2/1
8672-81X ¹	1GHz ³	1/1	256	256MB/1.5GB	Rack (1U)	1/1	-	-	N	2 x 10/ 100	U160	-	0/ 146.8GB	24X-10X	4/2	2/1
8672-82X ¹	1GHz ³	1/1	256	256MB/1.5GB	Rack (1U)	1/1	-	-	N	2 x 10/ 100	IDE	-	20.4GB/ 120GB	24X-10X	4/1	2/2
8672-83X ^{1, 5}	1GHz ³	1/1	256	256MB/1.5GB	Rack (1U)	1/1	-	-	N	2 x 10/ 100	U160	-	18.2GB/ 146.8GB	24X-10X	4/1	2/1

1. Housed in a 19in rack-mountable drawer and ships standard without a keyboard or mouse. See Rack Cabinets and Options section for supported IBM racks.
 2. Intel Celeron processor with 100MHz FSB. xSeries 300 does not support processor upgrades.
 3. Intel Pentium III processor with advanced transfer L2 cache and 133MHz FSB. xSeries 300 does not support processor upgrades.
 4. Variable read rate. Actual playback speed will vary and is often less than the maximum possible.
 5. Not available in the United States.
 6. This direct current (DC) power model includes a 200W, 48V direct current power supply requiring a direct current power source for utilization in a telecommunications network infrastructure.
 7. A single-channel Ultra160 SCSI controller installed in slot two is standard in SCSI models. The external connector is not supported.



xSeries 300 Memory

DIMM Socket
DIMM Socket
DIMM Socket

Part Number	Memory Description
33L3081	128MB 133MHz ECC SDRAM Unbuffered DIMM Memory
33L3083	256MB 133MHz ECC SDRAM Unbuffered DIMM Memory
33L3085	512MB 133MHz ECC SDRAM Unbuffered DIMM Memory

Total System Memory (Standard Models) ¹		DIMMs		
128MB (1 x 128)	256MB (1 x 256)	128MB (33L3081)	256MB (33L3083)	512MB (33L3085)
256MB	384MB	1	-	-
384MB	512MB	2	-	-
512MB	640MB	1	1	-
640MB	768MB	-	2	-
896MB	1024MB	-	1	1
1152MB	1280MB	-	-	2
1536MB (max) ²	1536MB (max) ²	-	-	3

This table does not represent all possible memory configurations. Memory modules may vary in price per MB. Selection of smaller DIMMs may provide a more cost-effective alternative to using larger DIMMs. Select the desired total memory from the appropriate column (Standard 128MB or 256MB models), then add the quantities in that row from the DIMM columns.

1. Network operating systems may limit the maximum amount of addressable memory. See operating system specifications for further information.
2. Requires removal of standard DIMMs.

xSeries 300 Internal SCSI Cabling

EIDE Configuration Cabling

The xSeries 300 contains two integrated ATA-100 EIDE controllers. One controller is cabled directly to the 24x-10x IDE CD-ROM. xSeries 300 models that ship with a standard EIDE HDD use the second EIDE controller to attach the standard HDD. This controller supports up to two EIDE HDDs through the use of a two-drop cable.

SCSI Configuration Cabling

xSeries 300 SCSI models contain a single channel, Ultra 160 SCSI adapter. A two-drop, 16-bit LVD SCSI cable is attached to the internal connector of this adapter to support the standard Ultra 160 HDD (model dependent). The second drop can be used to attach a second SCSI HDD. In configurations where external SCSI device attachment is required, a supported SCSI adapter or ServeRAID controller must be installed.

For additional information regarding internal cabling, refer to Appendix F: Internal Cabling Overview.



xSeries 300 Hard Disk Drive (HDD) Storage

Total Internal Storage ¹	SCSI Models				
	10,000RPM SCSI HDDs			15,000RPM SCSI HDDs	
	18.2GB (06P5750)	36.4GB (06P5751)	73.4GB (06P5752)	18.2GB (06P5765)	36.4GB (06P5766)
0GB ²	Standard on some base models				
18.2GB ²	1	-	-	1	-
36.4GB	2	1	-	2	1
72.8GB	-	2	-	-	2
73.4GB	-	-	1	-	-
146.8GB	-	-	2	-	-

This table does not represent all possible HDD configurations.

1. Select a total storage row then select the quantity of HDDs from a column corresponding to the HDD of choice. Total Internal Storage listed is within +/- 0.2GB unless otherwise noted.

2. Standard on some models.

Total Internal Storage ¹	EIDE Models		
	7200RPM EIDE HDDs ²		
	20.4GB (P/N 19K4461)	40GB (P/N 22P7157)	60GB (P/N 09N4207)
20.4GB	(Std on EIDE models)	-	-
40.8GB	1	-	-
60.4GB	-	1	-
80GB ³	-	2	-
80.4GB	-	-	1
120GB ³	-	-	2

This table does not represent all possible HDD configurations. Total Internal Storage listed is within +/-0.2GB unless otherwise noted.

1. Select a total storage row then add the quantity of HDDs from all columns to the standard HDD.

2. The xSeries 300 dual integrated EIDE controllers support a maximum of three IDE devices per machine including one CD-ROM and two IDE HDDs.

3. Requires removal of the standard HDD.



Floppy / CD-ROM	Bay 1	Bay 2
-----------------	-------	-------

Bay	Form Factor	Height	Front Access	Usage
1 ¹	89mm (3.5in)	SL	no	HDD ²
2	89mm (3.5in)	SL	no	Open

1. Boot drive should be located in bay 1.
2. SCSI models offered in the United States ship open bay.

Part Number	Description	RPM	Height	Bays Supported	Max Qty
IDE HDDs^{1, 2}					
19K4461	20.4GB 7200rpm ATA-100 (EIDE) HDD	7200	SL	1, 2	2
22P7157	40GB 7200rpm ATA-100 (EIDE) HDD	7200	SL	1, 2	2
09N4207	60GB 7200rpm ATA-100 (EIDE) HDD	7200	SL	1, 2	2
Ultra160 HDDs²					
06P5750	18.2GB 10Krpm Ultra160 SCSI SL HDD	10000	SL	1, 2	2
06P5751	36.4GB 10Krpm Ultra160 SCSI SL HDD	10000	SL	1, 2	2
06P5752	73.4GB 10Krpm Ultra160 SCSI SL HDD	10000	SL	1, 2	2
06P5765	18.2GB 15,000rpm Ultra160 SCSI HDD	15000	SL	1, 2	2
06P5766	36.4GB 15,000rpm Ultra 160 SCSI HDD	15000	SL	1, 2	2
External Storage Expansion Units³			Form Factor		
35311RU	Netfinity EXP300 Storage Expansion Unit ⁴	Rack (3U)			
35601RU	Netfinity FASiT EXP500 Storage Expansion Unit ⁵	Rack (3U)			
35421RU	FASiT200 Storage Server ^{6, 7}	Rack (3U)			
35422RU	FASiT200 HA Storage Server ⁶	Rack (3U)			
19K1121	FASiT200 Redundant RAID Controller	-			

1. The xSeries 300 dual integrated EIDE controllers support a maximum of three IDE devices per machine including one CD-ROM, and two IDE hard disk drives.
2. Mixing of internal IDE and SCSI hard disk drives is not supported.
3. xSeries 300 does not include an external SCSI connector. To configure a SCSI storage device, select an optional SCSI controller then refer to Appendix D: Cables - Storage Units - Controllers to confirm the controller supports the desired External Storage Expansion Unit and to select a supported cable. For HDD or other expansion unit options, see the specific expansion unit section. For Fibre Channel storage devices, refer to the Fibre Channel Solutions Overview section.
4. EXP300 includes a single 2M Ultra2 SCSI cable and dual hot-swap 500W redundant power supplies, each with its own power cord.
5. FASiT EXP500 Storage Expansion Unit (P/N 35601RU) includes dual hot-swap 350W power supplies, each with its own power cord.
6. The FASiT200 includes two hot-swap, 350W auto-ranging redundant power supplies, each with its own power cord.
7. Can be upgraded to FASiT200 HA Storage Server through the addition of a FASiT200 Redundant RAID Controller (P/N 19K1121).



xSeries 300 I/O Options

Part Number	Description	Adapter Length	PCI Support ⁴	Slots Supported ^{3, 4}
Storage Controllers^{1, 2}				
37L6889	ServeRAID-4H Ultra160 SCSI Controller ⁵	Full	64-bit	1
06P5736	ServeRAID-4Mx Ultra160 SCSI Controller ⁵	Full	64-bit	1
06P5740	ServeRAID-4Lx Ultra160 SCSI Controller ⁷	Half	64-bit	1, 2
19K4646	PCI Wide Ultra160 SCSI Adapter ⁸	Half	32-bit	1, 2
02K3454	PCI Fast/Wide Ultra SCSI Adapter ⁹	Half	32-bit	1, 2
24P2585	IDE 100 RAID Controller by AMI ¹⁰	Half	32-bit	1
Fibre Storage Controllers and Options¹¹				
00N6881	Netfinity FAST Host Adapter	Half	64-bit	1, 2
19K1246	FAST FC-2 Host Bus Adapter	Half	64-bit	1, 2
17421RU	FAST700 Fibre Channel Storage Server	-	-	-
35521RU	FAST500 Storage Server	-	-	-
35421RU	FAST200 Storage Server	-	-	-
35422RU	FAST200 HA Storage Server	-	-	-
35341RU	SAN Fibre Channel Managed Hub	-	-	-
2109S08	SAN Fibre Channel Switch, 8-Port	-	-	-
2109S16	SAN Fibre Channel Switch, 16-Port	-	-	-
2109F16	SAN Fibre Channel Switch, 16-Port	-	-	-
2108R3L	SAN Data Gateway Router Ultra SCSI LVD Port ¹²	-	-	-
Networking¹³				
Ethernet¹⁴				
09N9901	10/100 EtherLink Server Adapter by 3Com ¹⁵	Half	32-bit	1, 2
06P3601	10/100 Ethernet Server Adapter ¹⁵	Half	32-bit	1, 2
22P4901	10/100 Dual Port Server Adapter ¹⁵	Half	64-bit	1, 2
22P6801	PRO/1000XT Server Adapter by Intel (copper) w/CD, manuals ¹⁵	Half	64-bit	1, 2
Token Ring				
34L5001	16/4 Token-Ring PCI Management Adapter ¹⁵	Half	32-bit	1, 2
34L5201	High-Speed 100/16/4 Token-Ring PCI Management Adapter ¹⁵	Half	32-bit	1, 2
Communications¹⁶				
33L4618	V.90 PCI Data/Fax Modem	Half	32-bit	1, 2



Exterior
Connector
Access

1. xSeries 300 has dual integrated EIDE (ATA-100) bus master controllers. SCSI models ship standard with a single-channel Ultra160 SCSI Controller in slot two. The SCSI controller includes a two-drop cable for connection to two internal HDDs. External connection of a SCSI device requires a supported SCSI adapter.
2. When storage controllers are installed in both PCI slots, the BIOS for the integrated storage controller must be disabled, i.e., it cannot support either external or internal storage media. If the two storage controllers in slots one and two are both RAID adapters, the boot media must be attached to the RAID adapter in slot one.
3. Slot one only is available for SCSI models (Ultra160 SCSI Controller is installed in slot two). The external connector does not support external SCSI devices.
4. A 64-bit adapter installed into a 32-bit slot will transfer data at 32-bit rates. Adapters rated at 66MHz will operate at 33MHz when installed in a 33MHz slot. 133MHz PCI-X adapters are backward compatible with 33/66MHz, 64-bit PCI-based servers.
5. ServeRAID-4H Ultra160 SCSI Controller is powered by a 266MHz Power PC 750 processor and provides 128MB of battery-backed ECC cache. The internal connectors are not accessible due to a cabling interference. Four external Ultra160 0.8mm VHDCI connectors are available. Some operating systems will function with this adapter only if the latest version of IPSSSEND is installed.
6. ServeRAID-4Mx Ultra160 SCSI Controller is powered by a 100MHz Intel Zion GC80303 processor that provides 64MB of battery-backed ECC cache and two internal and two external Ultra160 connections (only two connectors may be used). External connections are 0.8mm VHDCI.
7. ServeRAID-4Lx Ultra160 SCSI Controller is powered by a 100MHz Intel Zion GC80303 processor and provides a single channel, 32MB of ECC cache and either one internal or one external Ultra160 connection. External connector is 0.8mm VHDCI. If attached to the internal HDDs, installation is supported only in slot one.
8. PCI Wide Ultra160 SCSI Adapter (P/N 19K4646) provides a single channel with one internal connector and one external 0.8mm VHDCI Ultra160 connector. Support for external SCSI devices only. A five-drop terminated LVD SCSI cable is included but not supported for use in this server.
9. PCI Fast/Wide Ultra SCSI Adapter (P/N 02K3454) provides one external 68-pin high density connector that supports external SCSI devices such as tape enclosures.
10. Supported only in IDE models. Dual channel adapter includes two connectors, supporting one ATA-100 HDD per channel. Two 18in ATA-66 cables ship with the option. Allows RAID 0 and RAID 1 configurations.
11. See the Fibre Channel Solutions Overview section for additional configuration information.
12. The 2108R3L SAN Data Gateway Router Ultra SCSI LVD port provides one integrated short-wave optical port and two SCSI ports for tape storage connections (LVD, HVD and single-ended).
13. xSeries 300 includes dual full-duplex, 10/100Mbps Ethernet controllers.
14. In a fault-tolerant networking environment, using the fault-tolerant software delivered with the Ethernet adapters of a single manufacturer is recommended. Installing fault-tolerant solutions provided by multiple manufacturers may cause failures if the intermediate drivers provided with the adapters are not compatible. The onboard Ethernet is Intel-based, which is compatible with the four Intel-based optional Ethernet adapters (P/N 06P3601, 06P3701, 22P4901, 22P6801).
15. Wake on LAN function provided with this networking adapter is supported by this server.
16. xSeries 300 includes two USB ports and a high speed serial/asynchronous port (NS16550A compatible).



xSeries 300 Power, Monitors & Accessories

Part Number	Description
Power^{1, 2}	
Uninterruptible Power Supply (UPS)³	
32P1020	APC 2U Smart-UPS 1400RMB
94G6676	APC Smart-UPS 3000RMB ⁴
37L6861	APC Smart-UPS 5000RMB ⁵
Monitors⁶	
633147N	E54 Color Monitor 15in (350mm, 13.8in viewable image), stealth black ⁷
63324HN	E74 Color Monitor 17in (406mm, 16in viewable image), stealth black ⁷
66274AN	G78 Color Monitor 17in (406.4mm, 16in viewable image), stealth black ⁷
9511AG4	T540 Flat Panel Color Monitor 15in (381mm, 15in viewable image), stealth black ⁸
32P1031	NetBAY 1U Flat Panel Monitor Console Kit (w/ US Space Saver keyboard) ⁹
32P1032	NetBAY 1U Flat Panel Monitor Console Kit (w/o keyboard) ⁹

1. Most xSeries 300 models include a worldwide, voltage-sensing 200W power supply with auto restart and two 9ft line cords. One line cord contains a 110V NEMA 5-15P connector while the other contains an IEC 320 C14 for attachment to a high voltage PDU or UPS.
2. A direct current model (2AX) includes a 200W, 48V direct current power supply. The line cord is customer-supplied. This model is designed for specific application in a telecommunications infrastructure.
3. For runtimes and UPS attributes see Appendix C: UPS Runtime Estimate.
4. Height is 3U. See Rack Cabinets and Options section for supported IBM racks.
5. Height is 5U. See Rack Cabinets and Options section for supported IBM racks.
6. xSeries 300 uses an SVGA controller (S-3 Savage4 chipset) with 8MB of video memory.
7. Installation within a rack requires optional Monitor Compartment (P/N94G7444).
8. Installation within a rack requires optional Netfinity Flat Panel Monitor Rack Mount Kit II (P/N 37L6888) and Netfinity Rack Keyboard Tray (P/N 28L4707). A space saver keyboard may coexist within the same 28L4707 keyboard tray.
9. Includes a 15in Flat Panel Monitor.

Part Number	Description
Rack and NetBAY^{1, 2}	
	Refer to the Rack Cabinets and Options section for information concerning IBM racks and rack-supported devices.
Keyboard and Mouse³	
28L3644	Space Saver II Keyboard ^{4, 5}
28L3621	Preferred Keyboard (stealth black) ⁶
10K3849	106-key Preferred USB Keyboard with 2-port USB Hub (stealth black) ^{6, 7}
28L3673	Sleek 2-button Stealth Black Mouse
33L3244	Sleek USB Mouse (stealth black)

1. xSeries 300 is housed in a 19in rack-mountable drawer and requires one of the racks listed in the Rack Cabinets and Options section.
2. Note limitations and restrictions for adequate cooling in the Rack Cabinets and Options section. If non-IBM racks are to be used, assure that both the front and rear doors offer a minimum of 48% open area uniformly distributed and in line with installed servers. A clearance of 51 to 64mm (2 to 2.5in) must be maintained between the front door and the system unit's front bezel. The rear door must maintain the same or greater clearance.
3. xSeries 300 supports rack configurations only and ships without a keyboard or mouse.
4. Installation within a rack requires optional keyboard tray (P/N 28L4707), which stows in ready-to-use position.
5. Advanced TrackPoint IV features are not available on IBM xSeries systems.
6. Installation within a rack requires optional keyboard tray (P/N 28L4707). This keyboard cannot share a keyboard tray with a flat panel display.
7. USB keyboards attach to a single USB-capable server. They are not compatible with the NetBAY console switches.

IBM XSERIES 300



xSeries 300 Tape Options

Part Number	Tape Drives	Bays Supported ¹	SCSI Interface (bit)	Form Factor	Termination Included	68/50-pin Converter Incl	Ext Tape Enclosures
09N4041	12/24GB DDS/3 4mm Internal SCSI Tape Drive	-	8	89mm (3.5in) HH or 133mm (5.25in) HH	Y	Y	3551001
09N4042	10/20GB NS Internal SCSI Tape Drive	-	8	89mm (3.5in) SL or 133mm (5.25in) HH	Y	Y	3551001
00N7991	20/40GB DDS/4 4mm Internal Tape Drive	-	16 Ultra2 LVD	89mm (3.5in) HH or 133mm (5.25in) HH	Y ²	-	3551001 ³
24P2396	100/200GB LTO Half-High Tape Drive	-	16 Ultra2 LVD	133mm (5.25in) HH	Y ²	-	3551001 ³
24P2398	40/80GB Half-High DLTVS Internal SCSI Tape Drive	-	16 Ultra2 LVD	133mm (5.25in) HH	Y ²	-	3551001 ³
00N8015	110/220GB Super DLT Internal SCSI Tape Drive	-	16 Ultra2 LVD	133mm (5.25in) FH	Y ²	-	3551001 ³
00N8016	100/200GB LTO Tape Drive	-	16 Ultra2 LVD	133mm (5.25in) FH	Y ²	-	3551001 ³
External Tape Libraries⁴							
3570C2x	Magstar MP 3570 Tape Subsystem	-	HVD	6U Rack	Y	-	-
External Tape Enclosures							
3551001	NetMEDIA Storage Expansion Unit EL ⁵	-	16	Rack	Y	N	-
10L7113	NetMEDIA Systems Management Adapter ⁶	-	16 LVD	-	N	N	3551001

1. xSeries 300 does not support internal tape drives and does not include an external SCSI connector. An external tape library or internal tape drive with a tape enclosure, supported SCSI adapter and appropriate cable must be selected. All tape drives and enclosures are supported by PCI Wide Ultra160 SCSI Adapter (P/N 19K4646) which has an external 0.8mm VHDCI connector. Select tape drive, enclosure and supported adapter then use Appendix D: Cables - Storage Units - Controllers to select an appropriate external cable.

2. Termination requires installing the 42in single-drop, terminated LVD SCSI cable provided with the option or is provided in a NetMEDIA Storage Expansion Unit with the installation of NetMEDIA Systems Management Adapter (P/N 10L7113).

3. LVD support for LVD devices installed in a NetMEDIA Storage Expansion Unit EL (P/N 3551001) requires installation of NetMEDIA Systems Management Adapter (P/N 10L7113), which also provides termination, and replacement of the standard single-ended internal cable with the terminated single-drop LVD SCSI cable provided with this option. If the standard cables are used for attachment to LVD devices, single-ended SCSI rules and bus speeds apply.

4. Tape library attributes and prerequisites are located in Appendix B: Tape Library Attributes.

5. NetMEDIA Storage Expansion Unit EL (P/N 3551001) is a black 3U, 19in rack mountable tape enclosure which includes two full-high (FH) or four half-high (HH) extended length 133mm (5.25in) bays, two external 0.8mm VHDCI connectors and two internal four-drop single-ended terminated 16-bit SCSI cables for device attachment. Two power supplies and two power cords are also included. Tip: The front rail clips will need to be reversed and screwed in from behind to secure the unit in a 930842x rack.

6. NetMEDIA Systems Management Adapter (P/N 10L7113) may be installed in a 3551001 to provide repeater function, LVDS interface, aggregate cable lengths up to 12m when attached to an LVD SCSI controller, and auto-termination when the 3551001 is powered off. External connector is 0.8mm VHDCI.

Note: Additional tape attributes can be found in Appendix A: Tape Drive Attributes.

xSeries 300 Sample Configurations

Note: The following sample configurations are for illustration only and may not be suitable for any specific customer installation. Contact your IBM Business Partner or IBM Marketing Representative for assistance with your specific configuration requirements.

Internet Server¹

Part Number	Description	Quantity
8672-81X	xSeries 300 1GHz/256KB Pentium III, 256MB ECC, Open, 24X	1
06P5750	18.2GB 10Krpm Ultra160 SCSI SL HDD	2 ²
9511AG4	T540 Flat Panel Color Monitor 15in (381mm, 15in viewable image), stealth black	1
28L3644	Space Saver II Keyboard	1
32P1020	APC 2U Smart-UPS 1400RMB	1

1. This example shows a 19in rackable configuration. The rack components are not included.

2. For a total of 36.4GB of internal storage.

An Internet server handles all requests from the Internet (Intranet or Extranet). Usually, this type of server has the same characteristics as a normal file server. The main difference is that an Internet server talks a different language (TCP/IP vs. NETBEUI or IPX/SPX) and often needs to do an extra security check (firewall). In the case of an Internet server, the server itself talks mostly to one client, the Internet Service Provider (ISP), instead of many clients as a file server does.

With this in mind, the xSeries 300 was selected to provide an affordable price point for the growing Internet server market with Pentium III processing, 256MB of system memory (expandable to 1.5GB), and power protection with an APC Smart-UPS.

The network configuration depends on the method that will be used to connect the server to the Internet. Usually fast Ethernet routers are used, but if other methods are used you can add the appropriate adapter.



File and Print Server¹

Part Number	Description	Quantity
8672-21X	xSeries 300 800MHz/128MB Celeron, 128MB ECC, Open, 24X	1
33L3083	256MB 133MHz ECC SDRAM DIMM Memory	1 ²
06P5751	36.4GB 10Krpm Ultra160 SCSI SL HDD	2 ³
9511AG4	T540 Flat Panel Color Monitor 15in (381mm, 15in viewable image), stealth black	1
28L3644	Space Saver II Keyboard	1
32P1020	APC 2U Smart-UPS 1400RMB	1

1. This example shows a 19in rackable configuration. The rack components are not included.
2. For a total of 384MB of system memory.
3. For a total of 72.8GB of internal storage.

A small business or departmental server is usually required to perform all typical server functions while servicing up to 100 users in a normal workgroup computing environment, but doesn't require the high-end performance and fault-tolerance properties of larger servers.

The sample configuration above consists of an xSeries 300 with 384MB of memory and 72.8GB of HDD space. It has enough processor power and memory to run most current network operating systems comfortably and enough HDD space to store a significant amount of data with additional external storage expansion still available. Demanding network traffic is effectively handled by the standard 100Mbps Ethernet connection.

This configuration also includes a UPS to keep the system protected during power surges and outages.

Application Platform¹

Part Number	Description	Quantity
8672-81X	xSeries 300 1GHz/256KB Pentium III, 256MB ECC, Open, 24X	1
33L3085	512MB 133MHz ECC SDRAM Unbuffered DIMM Memory	1 ²
06P5750	18.2GB 10Krpm Ultra160 SCSI SL HDD	2 ³
9511AG4	T540 Flat Panel Color Monitor 15in (381mm, 15in viewable image), stealth black	1
28L3644	Space Saver II Keyboard	1
32P1020	APC 2U Smart-UPS 1400RMB	1

1. This example shows a 19in rackable configuration. The rack components are not included.
2. For a total of 768MB of system memory.
3. For a total of 36.4GB of internal storage.

An application server differs from a file and print server in that it has a higher workload in providing application serving requirements for users. As an appliance platform, this server efficiently delivers task-specific solutions using a single application, e.g., Web hosting, Web caching, firewalls or gateways. With this in mind, the xSeries 300 was selected to provide an affordable price point for an application server with Pentium III processing, 768MB of system memory (expandable to 1.5GB), and availability features such as RAID-protected internal storage and power protection with an APC Smart-UPS.



IBM xSeries 330

Part Number Processor Speed (GHz) Number of Processors (Std/Max) L2 ECC Cache (KB) Memory (Std/Max) (R = RDIMM) Form Factor Power Supply Quantity (Std/Max) Hot-Swap (Power, HDD, Fans) Redundancy (Optional, Standard) Adv System Management Processor Onboard Ethernet (Mbps) SCSI Controller (Dual, Ultra, RAID) Removable Media Bays (Total/Avail) Internal Hard Disk Drive (Std/Max) CD-ROM (IDE)⁴ Bays (Total/Avail) Slots (Total/Avail)

xSeries 330 At-A-Glance																
8674-11X ¹	1.13 ²	1/2	512	256MB(R)/4GB	Rack (1U)	1/1	H	-	Y	2 x 10/100	U160	-	0/146.8GB	24X-10X	4/2	2/2
8674-12X ¹	1.13 ²	1/2	512	256MB(R)/4GB	Rack (1U)	1/1	-	-	Y	2 x 10/100	IDE	-	20.4GB/120GB	24X-10X	4/1	2/2
8674-13X ¹	1.13 ²	1/2	512	256MB(R)/4GB	Rack (1U)	1/1	-	-	Y	2 x 10/100	U160	-	18.2GB/146.8GB ³	24X-10X	4/1	2/2
8674-31X ¹	1.26 ²	1/2	512	256MB(R)/4GB	Rack (1U)	1/1	H	-	Y	2 x 10/100	U160	-	0/146.8GB	24X-10X	4/2	2/2
8674-32X ¹	1.26 ²	1/2	512	256MB(R)/4GB	Rack (1U)	1/1	-	-	Y	2 x 10/100	IDE	-	20.4GB/120GB	24X-10X	4/1	2/2
8674-33X ¹	1.26 ²	1/2	512	256MB(R)/4GB	Rack (1U)	1/1	-	-	Y	2 x 10/100	U160	-	18.2GB/146.8GB ³	24X-10X	4/1	2/2
8674-3AX ^{1,5}	1.26 ²	1/2	512	256MB(R)/4GB	Rack (1U)	DC	H	-	Y	2 x 10/100	U160	-	0/146.8GB	24X-10X	4/2	2/2
8674-41X ¹	1.4 ²	1/2	512	256MB(R)/4GB	Rack (1U)	1/1	H	-	Y	2 x 10/100	U160	-	0/146.8GB	24X-10X	4/2	2/2
8674-42X ¹	1.4 ²	1/2	512	256MB(R)/4GB	Rack (1U)	1/1	-	-	Y	2 x 10/100	IDE	-	40GB/120GB	24X-10X	4/1	2/2
8674-43X ¹	1.4 ²	1/2	512	256MB(R)/4GB	Rack (1U)	1/1	-	-	Y	2 x 10/100	U160	-	18.2GB/146.8GB	24X-10X	4/1	2/2
8675-4MX ^{1,6}	1.4 ²	1/2	512	512MB(R)/4GB	Rack (1U)	1/1	H	-	Y	2 x 10/100	U160	-	0/146.8GB	24X-10X	4/2	2/2

- Housed in a 19in rack-mountable drawer and ships standard without a keyboard or mouse. See Rack Cabinets and Options section for supported IBM racks.
- Intel Pentium III processor with 133MHz FSB and 512KB advanced transfer cache.
- This model does not support hot-swap HDDs.
- Variable read rate. Actual playback speed will vary and is often less than the maximum possible.
- This direct current (DC) power model includes a 200W, 48V direct current power supply requiring a direct current power source for utilization in a telecommunications network infrastructure.
- This MXT (Memory Xpansion Technology) system uses an advanced memory controller and caching process for increased performance. Advanced Chipkill ECC corrects two-, three-, and four-bit memory errors.

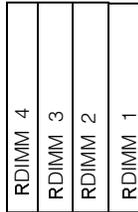
xSeries 330 Processors

Part Number	Processor Upgrades	SMP Support ¹	Processor Speed Upgrade ²
25P2835	xSeries 1.13GHz Upgrade with 133MHz FSB and 512KB Advanced Transfer Cache Pentium III Processor	1xX	-
25P2836	xSeries 1.26GHz/133MHz, 512KB Cache Upgrade with Pentium III Processor	3xX	1xX
48P7466	xSeries 1.4GHz/133MHz, 512KB Cache Upgrade with Pentium III Processor	4xX	1 ... 3xX

- One additional processor may be installed, providing a maximum of two. All processors must be identical in type, speed, and cache size.
- Requires removal of the standard processor. A maximum of two processors may be installed. All processors must be identical in type, speed and cache size. Upgrades may require a BIOS update. To obtain the latest Flash BIOS, access www.pc.ibm.com/support and enter machine "Type-Model" in Quick Path. Select "Downloadable files" then "BIOS."

xSeries 330 Memory

Machine type 8674 models



Part Number	Memory Description ¹
10K0018	128MB PC133 ECC SDRAM RDIMM
10K0020	256MB PC133 ECC SDRAM RDIMM
10K0022	512MB PC133 ECC SDRAM RDIMM
33L3326	1GB PC133 ECC SDRAM RDIMM

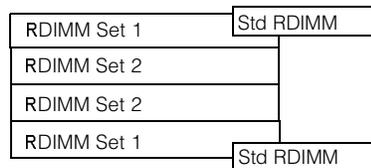
1. Memory RDIMMs must be installed in sequence from RDIMM connector 1 through connector 4. RDIMM size is not relevant.

Total Memory ¹	Quantity of RDIMMs Added			
	256MB (1 x 256) Models	128MB (10K0018)	256MB (10K0020)	512MB (10K0022) 1GB (33L3326)
384MB		1	-	-
512MB		2 or	1	-
640MB		3	-	-
768MB		-	2 or	1
1024MB		-	3	-
1280MB		-	-	2 or 1
1792MB		-	-	3
2048MB		-	-	4 ²
2304MB		-	-	-
2304MB		-	-	2
3328MB		-	-	-
3328MB		-	-	3
4096MB (max)		-	-	4 ²

This table does not represent all possible memory configurations. Memory modules may vary in price per MB. Selection of smaller RDIMMs may provide a more cost-effective alternative to using larger RDIMMs.

1. Network operating systems may limit the maximum amount of addressable memory. See operating system specifications for further information.
2. Requires removal of standard memory.

Machine type 8675 models



Recommended order of installation: Set 1-2.

Total Memory ¹	Quantity of RDIMMs Added		
	512MB (2 x 256) Models	256MB (33L3322)	512MB (33L3324) 1GB (33L3326)
1024MB		2	-
1536MB		-	2
2560MB		-	-
3072MB ²		-	2
4GB ^{2,3}		-	4

This table does not represent all possible memory configurations. Memory modules may vary in price per MB. Selection of smaller RDIMMs may provide a more cost-effective alternative to using larger RDIMMs. RDIMMs must be added in pairs to support interleaving technology.

1. Network operating systems may limit the maximum amount of addressable memory. See operating system specifications for further information.
2. Requires removal of standard memory.
3. When memory options total 4GB, slot two does not support dual address cycle (DAC) PCI options (RAID controllers, gigabit Ethernet adapters, Fibre Channel host adapters) in 8675 models.

Part Number	Memory Description ¹
33L3322	256MB PC133 ECC SDRAM RDIMM
33L3324	512MB PC133 ECC SDRAM RDIMM
33L3326	1GB PC133 ECC SDRAM RDIMM ²

1. Due to two-way interleaving, installation of memory options in pairs beginning with set 1 is required. Chipkill support is provided on the memory card.
2. When four 1GB RDIMMs are installed in 8675 models, slot two does not support dual address cycle (DAC) PCI options (RAID controllers, gigabit Ethernet adapters, Fibre Channel host adapters).



xSeries 330 Internal SCSI Cabling

xSeries 330 hot-swap models contain a DASD backplane supporting two hot-swap, SCA-2 compliant drive bays. The backplane is connected to the internal connector of the integrated Ultra160 SCSI controller through a 16-bit LVD SCSI cable. If internal RAID is required, the cable can be attached to the internal connector of the optional RAID adapter. The cable is of sufficient length to attach to adapters in slot one but not slot two.

xSeries 330 nonhot-swap models contain either of the following:

- 20.4GB EIDE HDD cabled directly to an integrated EIDE controller through a two-drop cable that can support up to two EIDE HDDs
- 18.2GB 10,000RPM Ultra160 SCSI HDD cabled directly to the Ultra160 SCSI controller through a terminated two-drop LVDS SCSI cable that can support up to two HDDs.

In configurations where external SCSI device attachment is required, a supported SCSI adapter or ServeRAID controller must be installed.

For additional information regarding internal cabling, refer to Appendix F: Internal Cabling Overview.

xSeries 330 Hard Disk Drive (HDD) Storage

SCSI Models					
Total Int Storage ¹	10,000RPM HDDs			15,000RPM HDDs	
	18.2GB (06P5750, 06P5754)	36.4GB (06P5751, 06P5755)	73.4GB (06P5752, 06P5756)	18.2GB (06P5765, 06P5767)	36.4GB (06P5766, 06P5768)
0GB	Standard on some base models				
18.2GB ²	1 ²	-	-	1	-
36.4GB	-	1	-	-	1
72.8GB	-	2	-	-	2
73.4GB	-	-	1	-	-
146.8GB (max) ³	-	-	2	-	-

This table does not represent all possible HDD configurations.

1. Select a total storage row then select the quantity of HDDs from a column corresponding to the HDD of choice. Total Internal Storage listed is within +/- 0.2GB unless otherwise noted.
2. Some SCSI models support only nonhot-swap HDDs and ship standard with one 18.2GB nonhot-swap HDD.
3. Requires replacing standard HDD in nonhot-swap SCSI models.

EIDE Models			
Total Internal Storage ¹	7200RPM HDDs ²		
	20.4GB (P/N 19K4461)	40GB (P/N 22P7157)	60GB (P/N 09N4207)
20.4GB	(Std on EIDE models)		
40.8GB	1	-	-
60.4GB	-	1	-
80GB ³	-	2	-
80.4GB	-	-	1
120GB ³	-	-	2

This table does not represent all possible HDD configurations. Total Internal Storage listed is within +/- 0.2GB unless otherwise noted.

1. Select a total storage row then add the quantity of HDDs from all columns to the standard HDD.
2. The xSeries 330 dual integrated EIDE controllers support a maximum of three IDE devices per machine including one CD-ROM and two IDE HDDs.
3. Requires removal of the standard HDD.



Floppy / CD-ROM	Bay 1	Bay 2
-----------------	-------	-------

Bay	Form Factor	Height	Front Access	Usage	Part Number	Description	RPM	Height	Bays Supported	Max Qty
1 ¹	HS or 89mm (3.5in) ²	SL	yes	Open ³	IDE HDDs^{1, 2}					
2	HS or 89mm (3.5in) ²	SL	yes	Open ³	19K4461	20.4GB 7200rpm ATA-100 (EIDE) HDD	7200	SL	1, 2	2
					22P7157	40GB 7200rpm ATA-100 (EIDE) HDD	7200	SL	1, 2	2
					09N4207	60GB 7200rpm ATA-100 (EIDE) HDD	7200	SL	1, 2	2
Nonhot-swap Ultra160 HDDs^{2, 3}										
					06P5750	18.2GB 10Krpm Ultra160 SCSI SL HDD	10000	SL	1, 2	2
					06P5751	36.4GB 10Krpm Ultra160 SCSI SL HDD	10000	SL	1, 2	2
					06P5752	73.4GB 10Krpm Ultra160 SCSI SL HDD	10000	SL	1, 2	2
					06P5765	18.2GB 15Krpm Ultra160 SCSI SL HDD	15000	SL	1, 2	2
					06P5766	36.4GB 15Krpm Ultra160 SCSI SL HDD	15000	SL	1, 2	2
Hot-swap Ultra160 HDDs⁴										
					06P5754	18.2GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD	10000	SL	1, 2	2
					06P5755	36.4GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD	10000	SL	1, 2	2
					06P5756	73.4GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD	10000	SL	1, 2	2
					06P5767	18.2GB 15Krpm Ultra160 SCSI Hot-Swap SL HDD	15000	SL	1, 2	2
					06P5768	36.4GB 15Krpm Ultra160 SCSI Hot-Swap SL HDD	15000	SL	1, 2	2
External Storage Expansion Units⁵							Form Factor			
					35311RU	Netfinity EXP300 Storage Expansion Unit ⁶	Rack (3U)			
					35601RU	Netfinity FASiT EXP500 Storage Expansion Unit ⁷	Rack (3U)			
					35421RU	FASiT200 Storage Server ^{8, 9}	Rack (3U)			
					35422RU	FASiT200 HA Storage Server ⁸	Rack (3U)			
					19K1121	FASiT200 Redundant RAID Controller	-			

1. Boot drive should be located in bay 1.
2. x330 includes IDE, nonhot-swap and hot-swap models.
3. Nonhot-swap and IDE models ship with one standard HDD. Bays one and two in these models are not front-accessible.

1. The xSeries 330 dual integrated EIDE controllers support a maximum of three IDE devices per machine including one CD-ROM and two IDE hard disk drives. IDE HDDs are supported only on IDE models.
2. Mixing of IDE and SCSI hard disk drives is not supported.
3. Nonhot-swap HDDs are supported only in fixed disk models.
4. Hot-swap HDDs are supported only in hot-swap models.
5. xSeries 330 does not include an external SCSI connector. To configure a SCSI storage device, select an optional SCSI controller then refer to Appendix D: Cables - Storage Units - Controllers to confirm the controller supports the desired External Storage Expansion Unit and to select a supported cable. For HDD or other expansion unit options, see the specific expansion unit section. For Fibre Channel storage devices, refer to the Fibre Channel Solutions Overview section.
6. EXP300 includes a single 2M Ultra2 SCSI cable and dual hot-swap 500W redundant power supplies, each with its own power cord.
7. FASiT EXP500 Storage Expansion Unit (P/N 35601RU) includes dual hot-swap 350W power supplies, each with its own power cord.
8. The FASiT200 includes two hot-swap, 350W auto-ranging redundant power supplies, each with its own power cord.
9. Can be upgraded to FASiT200 HA Storage Server through the addition of a FASiT200 Redundant RAID Controller (P/N 19K1121).



xSeries 330 I/O Options

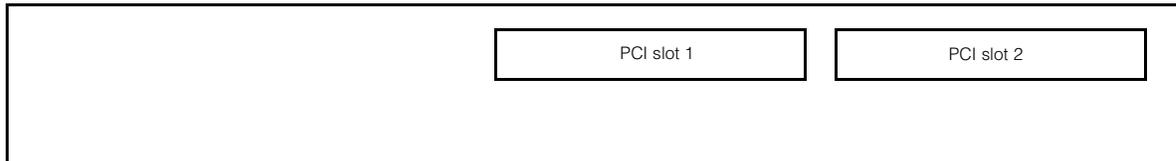
Part Number	Description	Adapter Length	PCI Support³	Slots Supported³
Storage Controllers^{1, 2}				
37L6889	ServeRAID-4H Ultra160 SCSI Controller ⁴	Full	64-bit	1
06P5736	ServeRAID-4Mx Ultra160 SCSI Controller ⁵	Full	64-bit	1
06P5740	ServeRAID-4Lx Ultra160 SCSI Controller ⁶	Half	64-bit	1, 2
19K4646	PCI Wide Ultra160 SCSI Adapter ⁷	Half	32-bit	1, 2
02K3454	PCI Fast/Wide Ultra SCSI Adapter ⁸	Half	32-bit	1, 2 ¹⁹
24P2585	IDE 100 RAID Controller by AMI ⁹	Half	32-bit	1
Fibre Storage Controllers and Options¹⁰				
00N6881	Netfinity FASTT Host Adapter	Half	64-bit	1, 2
19K1246	FASTT FC-2 Host Bus Adapter	Half	64-bit	1, 2 ³
17421RU	FASTT700 Fibre Channel Storage Server	-	-	-
35521RU	FASTT500 Storage Server	-	-	-
35421RU	FASTT200 Storage Server	-	-	-
35422RU	FASTT200 HA Storage Server	-	-	-
35341RU	SAN Fibre Channel Managed Hub	-	-	-
2109S08	SAN Fibre Channel Switch, 8-Port	-	-	-
2109S16	SAN Fibre Channel Switch, 16-Port	-	-	-
2109F16	SAN Fibre Channel Switch, 16-Port	-	-	-
2108R3L	SAN Data Gateway Router Ultra SCSI LVD Port ¹¹	-	-	-
Networking¹²				
Ethernet¹³				
09N9901	10/100 EtherLink Server Adapter by 3Com ¹⁴	Half	32-bit	1, 2
06P3601	10/100 Ethernet Server Adapter ¹⁴	Half	32-bit	1, 2
06P3701	Gigabit Ethernet SX Server Adapter (fiber)	Half	64-bit	1, 2
22P4901	10/100 Dual Port Server Adapter ¹⁴	Half	64-bit	1, 2
22P6801	PRO/1000XT Server Adapter by Intel (copper) w/CD, manuals ¹⁴	Half	64-bit	1, 2 ³
Token Ring				
34L0701	Token-Ring 16/4 PCI Adapter ² with Wake on LAN ¹⁴	Half	32-bit	1, 2
34L5001	16/4 Token-Ring PCI Management Adapter ¹⁴	Half	32-bit	1, 2
34L5201	High-Speed 100/16/4 Token-Ring PCI Management Adapter ¹⁴	Half	32-bit	1, 2
Communications¹⁵				

33L4618	V90 PCI Data/Fax Modem	Half	32-bit	1, 2 ¹⁹
37L14xx	Serial I/O SST 8, 16 and 128 port adapters ¹⁶	Half	32-bit	1, 2 ¹⁹
Systems Management¹⁷				
09N7585	Remote Supervisor Adapter ¹⁸	Half	32-bit	1, 2 ¹⁹

1. xSeries 330 has an integrated single channel Ultra160 SCSI Controller.
2. When storage controllers are installed in both PCI slots, the BIOS for the integrated storage controller must be disabled, i.e., it cannot support either external or internal storage media. If the two storage controllers in slots one and two are both RAID adapters, the boot media must be attached to the RAID adapter in slot one.
3. A 64-bit adapter installed into a 32-bit slot will transfer data at 32-bit rates. Adapters rated at 66MHz will operate at 33MHz when installed in a 33MHz slot. 33MHz adapters will reduce 66MHz buses to 33MHz. 133MHz PCI-X adapters are backward compatible with 33/66MHz, 64-bit PCI-based servers.
4. ServeRAID-4H Ultra160 SCSI Controller is powered by a 266MHz Power PC 750 processor and provides 128MB of battery-backed ECC cache. The internal connectors are not accessible due to a cabling interference. Four external Ultra160 0.8mm VHDCI connectors are available. Not compatible with machine type 8675 models.
5. ServeRAID-4Mx Ultra160 SCSI Controller is powered by a 100MHz Intel Zion GC80303 processor that provides 64MB of battery-backed ECC cache and two internal and two external Ultra160 connections (only two connectors may be used). External connections are 0.8mm VHDCI.
6. ServeRAID-4Lx Ultra160 SCSI Controller is powered by a 100MHz Intel Zion GC80303 processor and provides a single channel, 32MB of ECC cache and either one internal or one external Ultra160 connection. External connector is 0.8mm VHDCI. If attached to the internal HDDs, installation is supported only in slot one.
7. PCI Wide Ultra160 SCSI Adapter (P/N 19K4646) provides a single channel with one internal connector and one external 0.8mm VHDCI Ultra160 connector. Support for external SCSI devices only. A five-drop terminated LVD SCSI cable is included but not supported for use in this server.
8. PCI Fast/Wide Ultra SCSI Adapter (P/N 02K3454) provides one external 68-pin high density connector that supports external SCSI devices such as tape enclosures.
9. Supported only in IDE models. Dual channel adapter includes two connectors, supporting one ATA-100 HDD per channel. Two 18in ATA-66 cables ship with the option. Allows RAID 0 and RAID 1 configurations.
10. See the Fibre Channel Solutions Overview section for additional configuration information.
11. The 2108R3L SAN Data Gateway Router Ultra SCSI LVD port provides one integrated short-wave optical port and two SCSI ports for tape storage connections (LVD, HVD and single-ended).
12. xSeries 330 includes dual full-duplex, 10/100Mbps Ethernet controllers.
13. In a fault-tolerant networking environment, using the fault-tolerant software delivered with the Ethernet adapters of a single manufacturer is recommended. Installing fault-tolerant solutions provided by multiple manufacturers may cause failures if the intermediate drivers provided with the adapters are not compatible. The onboard Ethernet is Intel-based, which is compatible with the four Intel-based optional Ethernet adapters (P/N 06P3601, 06P3701, 22P4901, 22P6801).
14. The Wake on LAN function of this option is supported by machine type 8674 models.
15. xSeries 330 includes two USB ports and a high speed serial/asynchronous port (NS16550A compatible).
16. See Appendix E for details on Serial I/O Options and configuration limitations.
17. xSeries 330 has two integrated RS-485 system management interconnect ports located on the back of the system chassis. Connection of the standard service processor to other servers in an interconnect network requires only a customer-supplied Cat5 cable.
18. When installed in an xSeries 330, the optional adapter is connected externally to the integrated service processor using the integrated RS-485 ports. The optional adapter serves only as an Ethernet and interconnect gateway. The onboard ASM processor will provide all service processor data.
19. Supported in slot two only for machine type 8675 models.

Machine type 8674

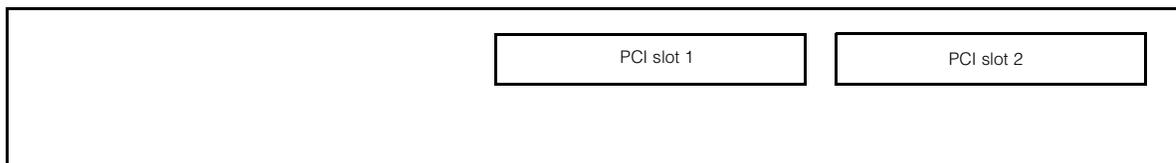
(rear view)



Slot 1: 33MHz, 64-bit, 5v or universal, full-length
 Slot 2: 33MHz, 64-bit, 5v or universal, half-length

Machine type 8675

(rear view)



Slot 1: 66MHz, 64-bit, 3.3v, full-length
 Slot 2: 33MHz, 64-bit, 5v, half-length



xSeries 330 Power, Monitors & Accessories

Part Number	Description
Power^{1, 2}	
Uninterruptible Power Supply (UPS)³	
32P1020	APC 2U Smart-UPS 1400RMB
94G6676	APC Smart-UPS 3000RMB ⁴
37L6861	APC Smart-UPS 5000RMB ⁵
Monitors⁶	
06P4792	Cable Chain Technology Cable Kit ⁷
633147N	E54 Color Monitor 15in (350mm, 13.8in viewable image), stealth black ⁸
63324HN	E74 Color Monitor 17in (406mm, 16in Viewable Image), stealth black ⁹
66274AN	G78 Color Monitor 17in (406.4mm, 16in Viewable Image), stealth black ⁴
9511AG4	T540 Flat Panel Color Monitor 15in (381mm, 15in viewable image), stealth black ⁹
32P1031	NetBAY 1U Flat Panel Monitor Console Kit (w/ US Space Saver keyboard) ¹⁰
32P1032	NetBAY 1U Flat Panel Monitor Console Kit (without keyboard) ¹⁰

1. Most xSeries 330 models include a worldwide, voltage-sensing 200W power supply with auto restart and two 9ft line cords. One line cord contains a 110V NEMA 5-15P connector while the other contains an IEC 320 C 14 for attachment to a high voltage PDU or UPS.
2. A direct current model (8674-3AX) includes a 200W, 48V direct current power supply. The line cord is customer-supplied. This model is designed for specific application in a telecommunications infrastructure.
3. For runtimes and UPS attributes see Appendix C: UPS Runtime Estimate.
4. Height is 3U. See Rack Cabinets and Options section for supported IBM racks.
5. Height is 5U. See Rack Cabinets and Options section for supported IBM racks.
6. xSeries 330 uses an SVGA controller (S-3 Savage4 chipset) with 8MB of video memory.
7. A C2T Interconnect cable chaining technology Cable Kit (P/N 06P4792) is required for the attachment of console devices to one or multiple chained xSeries 330s. The kit contains a 2M (6.5ft) breakout cable for attachment to a keyboard, mouse and monitor as well as a 2M (6.5ft) chaining cable for connecting two xSeries 330s together when the standard 260mm (10in) chaining cable is not long enough. A maximum of 42 xSeries 330s are supported in a single chain. No more than one C2T Interconnect Cable Kit may be used. If the last server in the chain is connected to a console switch rather than directly to a monitor, a console cable (P/N 09N4293 or 94G7447) is required in addition to the C2T Interconnect Cable Kit.
8. Installation within a rack requires optional Monitor Compartment (P/N94G7444).
9. Installation within a rack requires optional Netfinity Flat Panel Monitor Rack Mount Kit II (P/N 37L6888) and Netfinity Rack Keyboard Tray (P/N 28L4707). A space saver keyboard may coexist within the same 28L4707 keyboard tray.
10. Includes a 15in Flat Panel Monitor.

Part Number	Description
Rack and NetBAY^{1, 2}	
	Refer to the Rack Cabinets and Options section for information concerning IBM racks and rack-supported devices.
Keyboard and Mouse³	
06P4792	Cable Chain Technology Cable Kit ⁴
28L3644	Space Saver II Keyboard ^{5, 6}
28L3621	Preferred Keyboard (stealth black) ⁷
10K3849	106-key Preferred USB Keyboard with 2-port USB Hub (stealth black) ^{4, 8}
28L3673	Sleek 2-button Stealth Black Mouse
33L3244	Sleek USB Mouse (stealth black)

1. xSeries 330 is housed in a 19in rack-mountable drawer and requires one of the racks listed in the Rack Cabinets and Options section.
2. Note limitations and restrictions for adequate cooling in the Rack Cabinets and Options section. If non-IBM racks are to be used, assure that both the front and rear doors offer a minimum of 48% open area uniformly distributed and in line with installed servers. A clearance of 51 to 64mm (2 to 2.5in) must be maintained between the front door and the system unit's front bezel. The rear door must maintain the same or greater clearance.
3. xSeries 330 supports rack configurations only and ships without a keyboard or mouse.
4. A C2T Interconnect cable chaining technology Cable Kit (P/N 06P4792) is required for the attachment of console devices to one or multiple chained xSeries 330s. The kit contains a 2M (6.5ft) breakout cable for attachment to a keyboard, mouse and monitor as well as a 2M (6.5ft) chaining cable for connecting two xSeries 330s together when the standard 260mm (10in) chaining cable is not long enough. A maximum of 42 xSeries 330s are supported in a single chain. No more than one C2T Interconnect Cable Kit may be used. If the last server in the chain is connected to a console switch rather than directly to a monitor, a console cable (P/N 09N4293 or 94G7447) is required in addition to the C2T Interconnect Cable Kit.
5. Installation within a rack requires optional keyboard tray (P/N 28L4707), which stows in ready-to-use position.
6. Advanced TrackPoint IV features are not available on IBM xSeries systems.
7. Installation within a rack requires optional keyboard tray (P/N 28L4707). This keyboard cannot share a keyboard tray with a flat panel display.
8. USB keyboards attach to a single USB-capable server. They are not compatible with the NetBAY console switches.



xSeries 330 Tape Options

Part Number	Tape Drives	Bays Supported ¹	SCSI Interface (bit)	Form Factor	Termination Included	68/50-pin Converter Incl	Ext Tape Enclosures
09N4041	12/24GB DDS/3 4mm Internal SCSI Tape Drive	-	8	89mm (3.5in) HH or 133mm (5.25in) HH	Y	Y	3551001
09N4042	10/20GB NS Internal SCSI Tape Drive	-	8	89mm (3.5in) SL or 133mm (5.25in) HH	Y	Y	3551001
00N7991	20/40GB DDS/4 4mm Internal Tape Drive	-	16 Ultra2 LVD	89mm (3.5in) HH or 133mm (5.25in) HH	Y ²	-	3551001 ⁴
09N4040	20/40GB DLT Internal SCSI Tape Drive	-	8	133mm (5.25in) FH	N ³	Y	3551001
00N7990	40/80GB DLT Internal SCSI Tape Drive	-	16 Ultra2 LVD	133mm (5.25in) FH	Y ²	-	3551001 ⁴
00N8015	110/220GB Super DLT Internal SCSI Tape Drive ¹¹	-	16 Ultra2 LVD	133mm (5.25in) FH	Y ²	-	3551001 ⁴
00N8016	100/200GB LTO Tape Drive	-	16 Ultra2 LVD	133mm (5.25in) FH	Y ²	-	3551001 ⁴
24P2396	100/200GB LTO Half-High Tape Drive	-	16 Ultra2 LVD	133mm (5.25in) HH	Y ²	-	3551001 ⁴
24P2398	40/80GB Half-High DLT/VS Internal SCSI Tape Drive	-	16 Ultra2 LVD	133mm (5.25in) HH	Y ²	-	3551001 ⁴
Tape Autoloaders							
3502108	DLT Tape Autoloader	-	16	Desktop	Y	-	-
00N7992	120/240GB DDS/4 Tape Autoloader	-	16 Ultra2 LVD	133mm (5.25in) FH	Y ²	-	3551001 ⁴
3600109	3600 Series 900GB/1.8TB LTO Tape Autoloader ⁵	-	16 Ultra2 LVD	Tower or 6U Rack	Y	-	-
External Tape Libraries⁶							
3502R14	DLT Tape Library	-	16	Rack	Y	-	-
3570C2X	Magstar MP 3570 Tape Subsystem	-	HVD	6U Rack	Y	-	-
3600220	3600 Series 2/4TB LTO Tape Library (Tower)	-	16 Ultra2 LVD	Tower	Y	-	-
3600R20	3600 Series 2/4TB LTO Tape Library (Rack)	-	16 Ultra2 LVD	5U Rack	Y	-	-
3600LXU	3600 Series 2-Drive, 20-Cartridge Expander Module ⁷	-	16 Ultra2 LVD	5U Rack	Y	-	-
09N4048	3600 Series LTO Drive Upgrade Option ⁸	-	16 Ultra2 LVD	-	N	-	-
External Tape Enclosures							
3551001	NetMEDIA Storage Expansion Unit EL ⁹	-	16	Rack	Y	N	-
10L7113	NetMEDIA Systems Management Adapter ¹⁰	-	16 LVD	-	N	N	3551001
Associated Options							
10K2340	Media Bay Tray and LVD Cable Kit ⁹	-	16 LVD	Int	Y	N	3551001

- xSeries 330 does not support internal tape drives and does not include an external SCSI connector. An external tape library or internal tape drive with a tape enclosure, supported SCSI adapter and appropriate cable must be selected. All tape drives and enclosures are supported by PCI Wide Ultra160 SCSI Adapter (P/N 19K4646) which has an external 0.8mm VHDCI connector. Select tape drive, enclosure and supported adapter then use Appendix D: Cables - Storage Units - Controllers to select an appropriate external cable.
- Termination requires installing the 42in single-drop, terminated LVD SCSI cable provided with the option or is provided in a NetMEDIA Storage Expansion Unit with the installation of NetMEDIA Systems Management Adapter (P/N 10L7113).
- Termination requires installation using the two-drop multimode terminated LVD SCSI cable included with the Media Bay Tray and LVD Cable Kit (P/N 10K2340) or is provided in a NetMEDIA Storage Expansion Unit with the installation of NetMEDIA Systems Management Adapter (P/N 10L7113).
- LVD support for LVD devices installed in a NetMEDIA Storage Expansion Unit EL (P/N 3551001) requires installation of NetMEDIA Systems Management Adapter (P/N 10L7113), which also provides termination, and replacement of the standard single-ended internal cable with the terminated single-drop LVD SCSI cable provided with this option. If the standard cables are used for attachment to LVD devices, single-ended SCSI rules and bus speeds apply.
- If installed in a rack, a fixed shelf is required. Allow an additional 1U for the fixed shelf. One unit only per shelf is supported.
- Tape library attributes and prerequisites are located in Appendix B: Tape Library Attributes.
- Supported only with the 3600 Series LTO Tape Library (rack) (P/N 3600R20). Allow one additional EIA space when installing either one or two (maximum) units to accommodate a filler plate for cable routing. Up to two 3600 Series LTO Drive Upgrade Options can be installed in each module or the module can operate off the LTO drives installed in the LTO tape library.
- Install in second drive bay of 3600 Series LTO Tape Libraries or in either of the two bays of 3600 Series 2-Drive 20-Cartridge Expander Module to increase performance. Includes an LTO (Ultrium) drive and a one-meter external LVD SCSI cable.
- NetMEDIA Storage Expansion Unit EL (P/N 3551001) is a black 3U, 19in rack mountable tape enclosure which includes two full-high (FH) or four half-high (HH) extended length 133mm (5.25in) bays, two external 0.8mm VHDCI connectors and two internal four-drop single-ended terminated 16-bit SCSI cables for device attachment. Two power supplies and two power cords are also included. Tip: The front rail clips will need to be reversed and screwed in from behind to secure the unit in a 930842x rack.
- NetMEDIA Systems Management Adapter (P/N 10L7113) may be installed in a 3551001 to provide repeater function, LVDS interface, aggregate cable lengths up to 12m when attached to an LVD SCSI controller, and auto-termination when the 3551001 is powered off. External connector is 0.8mm VHDCI.
- Not compatible with machine type 8675 models.

Note: Additional tape attributes can be found in Appendix A: Tape Drive Attributes.



xSeries 330 Sample Configurations

Note: The following sample configurations are for illustration only and may not be suitable for any specific customer installation. Contact your IBM Business Partner or IBM Marketing Representative for assistance with your specific configuration requirements.

Internet Server¹

Part Number	Description	Quantity
8674-11X	xSeries 330 1.13GHz/512KB Pentium III, 256MB ECC, Open Hot-Swap, 24X	1
06P5754	18.2GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD	2 ²
06P4792	Cable Chain Technology Cable Kit	1 ³
633147N	E54 Color Monitor 15in (350mm, 13.8in viewable image), stealth black	1
28L3644	Space Saver II Keyboard	1
32P1020	APC 2U Smart-UPS 1400RMB	1

1. This example shows a 19in rackable configuration. The rack components are not included.
2. For a total of 36.4GB of internal storage.
3. A single Cable Chain Technology Cable Kit (P/N 06P4792) is required for attachment of one or multiple (up to 42) chained xSeries 330s to a single monitor, mouse and keyboard.

An Internet server handles all requests from the Internet (Intranet or Extranet). Usually, this type of server has the same characteristics as a normal file server. The main difference is that an Internet server talks a different language (TCP/IP vs. NETBEUI or IPX/SPX) and often needs to do an extra security check (firewall). In the case of an Internet server, the server itself talks mostly to one client, the Internet Service Provider (ISP), instead of many clients as a file server does.

With this in mind, the xSeries 330 was selected to provide an affordable price point for the growing Internet server market with two-way Pentium III processing, 256MB of system memory (expandable to 4GB), and power protection with an APC Smart-UPS.

The network configuration depends on the method that will be used to connect the server to the Internet. Usually fast Ethernet routers are used, but if other methods are used you can add the appropriate adapter.

File and Print Server¹

Part Number	Description	Quantity
8674-11X	xSeries 330 1.13GHz/512KB Pentium III, 256MB ECC, Open Hot-Swap, 24X	1
10K0018	128MB PC133 ECC SDRAM RDIMM	1 ²
06P5755	36.4GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD	2 ³
06P4792	Cable Chain Technology Cable Kit	1 ⁴
633147N	E54 Color Monitor 15in (350mm, 13.8in viewable image), stealth black	1
28L3644	Space Saver II Keyboard	1
32P1020	APC 2U Smart-UPS 1400RMB	1

1. This example shows a 19in rackable configuration. The rack components are not included.
2. For a total of 384MB of system memory.
3. For a total of 72.8GB of internal storage.
4. A single Cable Chain Technology Cable Kit (P/N 06P4792) is required for attachment of one or multiple (up to 42) chained xSeries 330s to a single monitor, mouse and keyboard.

A small business or departmental server is usually required to perform all typical server functions while servicing up to 100 users in a normal workgroup computing environment, but doesn't require the high-end performance and fault-tolerance properties of larger servers.

The sample configuration above consists of an xSeries 330 with 384MB of memory and 72.8GB of HDD space. It has enough processor power and memory to run most current network operating systems comfortably and enough HDD space to store a significant amount of data with additional external storage expansion still available. Demanding network traffic is effectively handled by the standard 100Mbps Ethernet connection.

This configuration also includes a UPS to keep the system protected during power surges and outages.



Application Server¹

Part Number	Description	Quantity
8674-31X	xSeries 330 1.26GHz/512KB Pentium III, 256MB ECC, Open Hot-Swap, 24X	1
25P2836	xSeries 1.26GHz/133MHz, 512KB Cache Upgrade with Pentium III Processor	1
10K0020	256MB PC133 ECC SDRAM RDIMM	1 ²
06P5754	18.2GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD	2 ³
06P4792	Cable Chain Technology Cable Kit	1 ⁴
633147N	E54 Color Monitor 15in (350mm, 13.8in viewable image), stealth black	1
28L3644	Space Saver II Keyboard	1
32P1020	APC 2U Smart-UPS 1400RMB	1

1. This example shows a 19in rackable configuration. The rack components are not included.

2. For a total of 512MB of system memory.

3. For a total of 36.4GB of internal storage.

4. A single Cable Chain Technology Cable Kit (P/N 06P4792) is required for attachment of one or multiple (up to 42) chained xSeries 330s to a single monitor, mouse and keyboard.

An application server differs from a file and print server in that it has a higher workload in providing application serving requirements for users. With this in mind, the xSeries 330 was selected to provide an affordable price point for an application server with two-way Pentium III processing, 512MB of system memory (expandable to 4GB), power protection with an APC Smart-UPS, and optional availability features such as RAID-protected internal storage.



IBM xSeries 342

Part Number
 Withdrawal Date ⁷
 Processor Speed (GHz)²
 Number of Processors (Std/Max)
 L2 ECC Cache (KB)
 Memory (Std/Max) (DIMM)
 Form Factor
 Power Supply Quantity (Std/Max)
 Hot-Swap (Power, Slots, HDD, Fans)
 Redundancy (Optional, Standard)
 Integrated System Management Processor
 Onboard Ethernet (Mbps)
 SCSI Controller (Dual, Ultra, RAID)
 Removable Media Bays (Total/Avail)
 Internal Hard Disk Drive (Std/Max)
 CD-ROM (IDE)⁶
 Bays (Total/Avail)
 Slots (Total/Avail)

xSeries 342 At-A-Glance

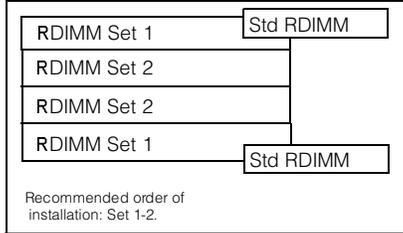
8669-1RX ¹	26-Mar	1	1/2	256	256MB/4GB	Rack (3U)	1/2	P, H, F	O - Power ³ S - Fans	Y	10/100	D,U160	4/2 ⁴	0/ 440.4GB ⁵	24X-10X	8/6 ⁵	5/5
8669-2RX ¹	-	1.13	1/2	512	256MB/4GB	Rack (3U)	1/2	P, H, F	O - Power ³ S - Fans	Y	10/100	D,U160	4/2 ⁴	0/ 440.4GB ⁵	24X-10X	8/6 ⁵	5/5
8669-4RX ¹	-	1.26	1/2	512	256MB/4GB	Rack (3U)	1/2	P, H, F	O - Power ³ S - Fans	Y	10/100	D,U160	4/2 ⁴	0/ 440.4GB ⁵	24X-10X	8/6 ⁵	5/5
8669-5RX ¹	-	1.4	1/2	512	256MB/4GB	Rack (3U)	1/2	P, H, F	O - Power ³ S - Fans	Y	10/100	D,U160	4/2 ⁴	0/ 440.4GB ⁵	24X-10X	8/6 ⁵	5/5

- Housed in a 19in rack-mountable drawer and ships standard without a keyboard or mouse. See Rack Cabinets and Options section for supported IBM racks.
- Intel Pentium III processor with advanced transfer L2 cache and 133MHz FSB.
- Power supply redundancy requires installation of optional 270W Hot-Swap Redundant Power Supply (P/N 37L6880).
- xSeries 342 includes two available removable media bays that can be converted to three slim-line (SL) hot-swap bays with the addition of optional 3-Pack Ultra160 Hot-Swap Expansion Kit (P/N 33L5050), doubling internal hard disk drive storage capacity.
- Assumes installation of optional Netfinity 3-Pack Ultra160 Hot-Swap Expansion Kit (P/N 33L5050) which converts the two available removable media bays into three slim-line (SL) hot-swap bays.
- Variable read rate. Actual playback speed will vary and is often less than the maximum possible.
- Not available from IBM after this date. Business Partner inventory may be available.

xSeries 342 Processors

Part Number	Processor Upgrades	SMP Support ¹	Processor Speed Upgrade ²
24P3511	xSeries 1GHz/133MHz 256KB Cache Upgrade with Pentium III Processor	1RX	-
22P1997	xSeries 1.13GHz/133MHz 512KB Cache Upgrade with Pentium III Processor	2RX	1RX
22p1998	xSeries 1.26GHz/133MHz, 512KB Cache Upgrade with Pentium III Processor	4RX	1RX, 2RX
48P7467	xSeries 1.4GHz/133MHz-512KB Cache Upgrade with Pentium III Processor	5RX	1 ... 4RX

- One additional processor may be installed, providing a maximum of two. All processors must be identical in type, speed, and cache size.
- Requires removal of the standard processor. A maximum of two processors may be installed. All processors must be identical in type, speed and cache size. Upgrades may require a BIOS update. To obtain the latest Flash BIOS, access www.pc.ibm.com/support and enter machine "Type-Model" in Quick Path. Select "Downloadable files" then "BIOS."

xSeries 342 Memory


Total Memory ¹	Quantity of RDIMMs Added				
	256MB (2 x 128) Models	128MB (33L3320)	256MB (33L3322)	512MB (33L3324)	1GB (33L3326)
512MB		2	-	-	-
768MB		-	2	-	-
1GB ²		-	4	-	-
1.25GB		-	-	2	-
2GB ²		-	-	4	-
2.25GB		-	-	-	2
4GB (max) ²		-	-	-	4

This table does not represent all possible memory configurations. Memory modules may vary in price per MB. Selection of smaller RDIMMs may provide a more cost-effective alternative to using larger RDIMMs.

1. Network operating systems may limit the maximum amount of addressable memory. See operating system specifications for further information.
2. Requires removal of standard memory.

Part Number	Memory Description ¹
33L3320	128MB PC133 ECC SDRAM RDIMM
33L3322	256MB PC133 ECC SDRAM RDIMM
33L3324	512MB PC133 ECC SDRAM RDIMM
33L3326	1GB PC133 ECC SDRAM RDIMM

1. Due to two-way interleaving, installation of memory options in pairs beginning with set 1 is required.

xSeries 342 Internal SCSI Cabling

The xSeries 342 contains seven standard drive bays. The top bay on the left contains the standard 3.5in slim-line (SL) diskette drive and the bay beneath contains the standard CD-ROM drive. Three 3.5in SL hot-swap bays in the center of the server support various hot-swap drive options. Two 5.25/3.5in half-high (HH) bays on the left support either tape back-up or an optional 3-Pack Ultra160 Hot-Swap Expansion Kit. The 24X-10X IDE CD-ROM is cabled directly to the IDE port.

The xSeries 342 contains a DASD backplane supporting three hot-swap, SCA-2 compliant drive bays. The backplane is connected to one of the internal connectors of the integrated dual-channel Ultra160 SCSI controller through a 16-bit LVD SCSI cable.

Additional Cabling Requirements:

xSeries 342 supports two storage alternatives in the two 5.25in HH media bays. An optional 3-Pack Ultra160 Hot-Swap Expansion Kit can be installed to provide additional internal HDD storage capacity. Included with this option is a 16-bit LVD SCSI cable that can be attached from the 3-Pack Ultra160 hot-swap backplane to the second connector of the Ultra160 controller, or through the use of a repeater card that is included with the option, it can be cabled directly to the standard backplane. If internal SCSI devices are required, a two-drop SCSI cable available in the Media Bay Tray and LVD Cable Kit (P/N10K2340) must be ordered to connect these devices to the Ultra160 controller unless the tape option includes a terminated SCSI cable. In configurations where external SCSI device attachment is required, a supported SCSI adapter must be installed.

For additional information regarding internal cabling, refer to Appendix F: Internal Cabling Overview.

xSeries 342 Hard Disk Drive (HDD) Storage

Total Int Storage ¹	10,000RPM HDDs			15,000RPM HDDs	
	18.2GB (06P5754)	36.4GB (06P5755)	73.4GB (06P5756)	18.2GB (06P5767)	36.4GB (06P5768)
0GB	Standard on base models				
18.2GB	1	-	-	1	-
36.4GB	2	1	-	2	1
54.6GB	3	-	-	3	-
72.8GB	4 ²	2	-	4 ²	2
91GB	5 ²	-	-	5 ²	-
109.2GB	6 ²	3	-	6 ²	3
145.6GB	-	4 ²	-	-	4 ²
182GB	-	5 ²	-	-	5 ²
218.4GB	-	6 ²	-	-	6 ²
220.2GB	-	-	3	-	-
293.6GB	-	-	4 ²	-	-
367GB	-	-	5 ²	-	-

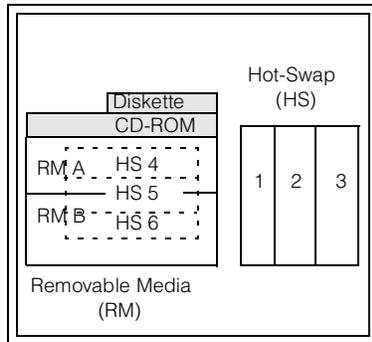


440.6GB (max)	-	-	6 ²	-	-
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This table does not represent all possible HDD configurations.
 1. Select a total storage row then select the quantity of HDDs from a column corresponding to the HDD of choice. Total Internal Storage listed is within +/- 0.2GB unless otherwise noted.
 2. Requires IBM 3-Pack Ultra160 Hot-Swap Expansion Kit (P/N 33L5050).

Bay	Form Factor	Height	Front Access	Usage	Part Number	Description	RPM	Height	Bays Supported ¹	Max Qty
-	89mm (3.5in)	-	Yes	Diskette	Ultra160 HDDs					
-	133mm (5.25in)	-	Yes	IDE CD-ROM	06P5754	18.2GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD	10000	SL	1 ... 6	6 ¹
1 ... 3	HS	SL	Yes	Open	06P5755	36.4GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD	10000	SL	1 ... 6	6 ¹
A, B	133mm (5.25in)	HH ¹	Yes	Open	06P5756	73.4GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD	10000	SL	1 ... 6	6 ¹
4 ... 6 ²	HS	SL	Yes	Open	06P5767	18.2GB 15Krpm Ultra160 SCSI Hot-Swap SL HDD	15000	SL	1 ... 6	6 ¹
					06P5768	36.4GB 15Krpm Ultra160 SCSI Hot-Swap SL HDD	15000	SL	1 ... 6	6 ¹

1. Two half-high (HH) bays can be combined to support a single full-high (FH) device. By installing the 3-Pack Ultra160 Hot-Swap Expansion Kit (P/N 33L5050), bays A and B are transformed into three SL hot-swap bays 4 ... 6.
 2. To enable bays 4 ... 6, optional 3-Pack Ultra160 Hot-Swap Expansion Kit (P/N 33L5050) is required.

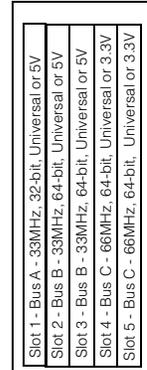


Associated Options						
Optical Devices						
External Storage Expansion Units⁵						
33L5050	IBM 3-Pack Ultra160 Hot-Swap Expansion Kit ²	-	3 x SL	4 ... 6	-	
				Bays Supported		
22P6950	16X Max RAM-Read DVD-ROM Drive ^{3, 4}					A, B
				Form Factor		
35311RU	EXP300 Storage Expansion Unit ⁶					Rack (3U)
35601RU	FAS6T EXP500 Storage Expansion Unit ⁷					Rack (3U)
35421RU	FASiT200 Storage Server ^{8, 9}					Rack (3U)
35422RU	FASiT200 HA Storage Server ⁸					Rack (3U)
19K1121	FASiT200 Redundant RAID Controller					-

1. xSeries 342 ships with Bays 1 ... 3 enabled. To enable installation of greater than three HDDs requires Netfinity 3-Pack Ultra160 Hot-Swap Expansion Kit (P/N 33L5050).
 2. IBM 3-Pack Ultra160 Hot-Swap Expansion Kit (P/N 33L5050) includes a hot-swap backplane and associated components for two cabling options. The backplane may be cabled directly to the second integrated SCSI channel or be supported by the same SCSI channel as the standard backplane through the use of an included repeater card.
 3. Install in one of the media bays, disconnecting power to the standard slim-line CD-ROM. Connect one end of the IDE cable included with the option to the IDE connector on the system board and the other end to the optical device. The middle connector on the cable may be used to connect a second optional optical device installed in the other media bay. Configure the first device as master using the preset configuration. If a second is installed, configure it as slave. The standard CD-ROM may not be used when an optional optical device is installed.
 4. Audio not supported for DVD-ROM drives. The drive operates in video mode only.
 5. To configure a SCSI storage device, select an optional SCSI controller then refer to Appendix D: Cables - Storage Units - Controllers to confirm the controller supports the desired External Storage Expansion Unit and to select a supported cable. For HDD or other expansion unit options, see the specific expansion unit section. For Fibre Channel storage devices, refer to the Fibre Channel Solutions Overview section.
 6. EXP300 includes a single 2M Ultra2 SCSI cable and dual hot-swap 500W redundant power supplies, each with its own power cord.
 7. FASiT EXP500 Storage Expansion Unit (P/N 35601RU) includes dual hot-swap 350W power supplies, each with its own power cord.
 8. The FASiT200 includes two hot-swap, 350W auto-ranging redundant power supplies, each with its own power cord.
 9. Can be upgraded to FASiT200 HA Storage Server through the addition of a FASiT200 Redundant RAID Controller (P/N 19K1121).

xSeries 342 I/O Options

Part Number	Description	Adapter Length	PCI Support ¹	Slots Supported ^{1, 2}
Storage Controllers³				
37L6889	ServeRAID-4H Ultra160 SCSI Controller ^{2, 4}	Full	64-bit	2 ... 5
06P5736	ServeRAID-4Mx Ultra160 SCSI Controller ^{2, 5}	Full	64-bit	2 ... 5
06P5740	ServeRAID-4Lx Ultra 160 SCSI Controller ⁶	Half	64-bit	1 ... 5
19K4646	PCI Wide Ultra160 SCSI Adapter ⁷	Half	32-bit	1 ... 5
02K3454	PCI Fast/Wide Ultra SCSI Adapter ⁸	Half	32-bit	1 ... 5
Fibre Storage Controllers and Options⁹				
00N6881	Netfinity FASiT Host Adapter	Half	64-bit	1 ... 5
19K1246	FASiT FC-2 Host Bus Adapter	Half	64-bit	1 ... 5
17421RU	FASiT700 Fibre Channel Storage Server	-	-	-
35521RU	FASiT500 Storage Server	-	-	-
35421RU	FASiT200 Storage Server	-	-	-
35422RU	FASiT200 HA Storage Server	-	-	-
35341RU	SAN Fibre Channel Managed Hub	-	-	-
2109S08	SAN Fibre Channel Switch, 8-Port	-	-	-
2109S16	SAN Fibre Channel Switch, 16-Port	-	-	-
2109F16	SAN Fibre Channel Switch, 16-Port	-	-	-
2108R3L	SAN Data Gateway Router Ultra SCSI LVD Port ¹⁰	-	-	-
Networking¹¹				
Ethernet¹²				
06P3601	10/100 Ethernet Server Adapter ¹³	Half	32-bit	1 ... 5
06P3701	Gigabit Ethernet SX Server Adapter (fiber)	Half	64-bit	1 ... 5
09N9901	10/100 EtherLink Server Adapter by 3Com ¹³	Half	32-bit	1 ... 5
22P4901	IBM 10/100 Dual Port Server Adapter ¹³	Half	64-bit	1 ... 5
22P6801	PRO/1000XT Server Adapter by Intel (copper) w/CD, manuals ¹³	Half	64-bit	1 ... 5 ¹
Token Ring				
34L5201	High-Speed 100/16/4 Token-Ring PCI Management Adapter ¹³	Half	32-bit	1 ... 5
34L5001	16/4 Token-Ring PCI Management Adapter ¹³	Half	32-bit	1 ... 5
Communications¹⁴				
33L4618	V90 PCI Data/Fax Modem ¹⁵	Half	32-bit	1 ... 5
37L14xx	Serial I/O SST 8, 16 and 128 port adapters ¹⁶	Half	32-bit	1 ... 5
Systems Management				
09N7585	Remote Supervisor Adapter ¹⁷	Half	32-bit	1



Exterior Connector Access

All Slots - Full Length

1. A 64-bit adapter installed into a 32-bit slot will transfer data at 32-bit rates. Adapters rated at 66MHz will operate at 33MHz when installed in a 33MHz slot. 33MHz adapters will reduce 66MHz buses to 33MHz. 133MHz PCI-X adapters are backward compatible with 33/66MHz, 64-bit PCI-based servers.

2. To avoid damage to internal cables, do not route cabling under a full-length PCI adapter.

3. xSeries 342 includes a dual-port, dual-channel Ultra160 SCSI controller for internal use only. No standard external port is available. See "Internal SCSI Cabling" for cabling alternatives. Due to xSeries 342 low profile, some adapters with connectors on the top edge may not have sufficient clearance to attach a cable. Cabling interferences are identified in the footnotes.

4. ServeRAID-4H Ultra160 SCSI Controller is powered by a 266MHz PowerPC 750 processor and provides 128MB of battery-backed ECC cache. The internal connectors are not accessible due to cabling interference. Four external Ultra 160 0.8mm VHDCI connectors are available.

5. ServeRAID-4Mx Ultra160 SCSI Controller is powered by a 100MHz Intel Zion GC80303 processor that provides 64MB of battery-backed ECC cache and two internal and two external Ultra160 connections (only two connectors may be used). External connections are 0.8mm VHDCI.

6. ServeRAID-4Lx Ultra160 SCSI Controller is powered by a 100MHz Intel Zion GC80303 processor and provides a single channel, 32MB of ECC cache and either one internal or one external Ultra160 connection. External connector is 0.8mm VHDCI.

7. PCI Wide Ultra160 SCSI Adapter (P/N 19K4646) provides a single channel with one internal connector, a five-drop multi-mode terminated LVD SCSI cable and one external 0.8mm VHDCI connector. Only one of the two connectors may be utilized.

8. PCI Fast/Wide Ultra SCSI Adapter provides one external 68-pin high density connector. The internal connectors are not accessible due to a cabling interference.

9. See Fibre Channel Solutions Overview section for additional configuration information.

10. The 2108R3L SAN Data Gateway Router Ultra SCSI LVD port provides one integrated short-wave optical port and two SCSI ports for tape storage connections (LVD, HVD and single-ended).

11. xSeries 342 includes a full-duplex, 10/100Mbps Ethernet PCI controller.

12. In a fault-tolerant networking environment, using the fault-tolerant software delivered with the Ethernet adapters of a single manufacturer is recommended. Installing fault-tolerant solutions provided by multiple manufacturers may cause failures if the intermediate drivers provided with the adapters are not compatible. The onboard Ethernet is Intel-based, which is compatible with the four Intel-based optional Ethernet adapters (P/N 06P3601, 06P3701, 22P4901, 22P6801).

13. This server supports Wake on LAN or Alert-on-LAN functions through the integrated Ethernet controller only. These functions are not supported for optional PCI adapters.

14. xSeries 342 includes two USB ports and two serial ports.

15. Due to homologation variances, modem availability may differ by country.

16. See Appendix E for details on Serial I/O options and configuration limitations.

17. Disables the Integrated System Management Processor when installed in xSeries 342 and provides full system management functionality through a customer-supplied Ethernet cable or modem connection or as part of an interconnected system management bus (option includes all interconnect hardware).



xSeries 342 Power, Monitors & Accessories

Part Number	Description
Power¹	
37L6880	270W Hot-Swap Redundant Power Supply
Uninterruptible Power Supply (UPS)²	
32P1020	APC 2U Smart-UPS 1400RMB
94G6676	APC Smart-UPS 3000RMB ³
37L6861	APC Smart-UPS 5000RMB ⁴
Monitors⁵	
633147N	E54 Color Monitor 15in (350mm, 13.8in viewable image), stealth black ⁶
63324HN	E74 Color Monitor 17in (406mm, 16in viewable image), stealth black ⁶
66274AN	G78 Color Monitor 17in (406.4mm, 16in viewable image), stealth black ⁶
9511AG4	T540 Flat Panel Color Monitor 15in (381mm, 15in viewable image), stealth black ⁷
32P1031	NetBAY 1U Flat Panel Monitor Console Kit (w/ US Space Saver keyboard) ⁸
32P1032	NetBAY 1U Flat Panel Monitor Console Kit (w/o keyboard) ⁸

1. xSeries 342 systems include a single 270W, hot-swap power supply and two 9ft power cords, one high voltage IEC 320-C13 to IEC 320-C14 and one low voltage IEC 320-C13 to NEMA 5-15P. Power supply redundancy can be achieved with the addition of optional 270W Hot-Swap Redundant Power Supply (P/N 37L6880).
2. For runtimes and UPS attributes see Appendix C: UPS Runtime Estimate.
3. Height is 3U. See Rack Cabinets and Options section for supported IBM racks.
4. Height is 5U. See Rack Cabinets and Options section for supported IBM racks.
5. xSeries 342 uses an SVGA controller (S3 Savage4 chipset) with 8MB of video memory.
6. Installation within a rack requires optional Monitor Compartment (P/N 94G7444).
7. Installation within a rack requires optional Netfinity Flat Panel Monitor Rack Mount Kit II (P/N 37L6888) and Netfinity Rack Keyboard Tray (P/N 28L4707). A space saver keyboard may coexist within the same 28L4707 keyboard tray.
8. Includes a 15in Flat Panel Monitor.

Part Number	Description
Rack and NetBAY¹	
	Refer to the Rack Cabinets and Options section for information concerning IBM racks and rack-supported devices.
Keyboard and Mouse²	
28L3644	Space Saver II Keyboard ^{3, 5}
28L3621	Preferred Keyboard (stealth black) ⁴
10K3849	106-key Preferred USB Keyboard with 2-port USB Hub (stealth black) ^{4, 6}
22P5150	TrackPoint USB Space Saver Keyboard ^{3, 5, 6}
28L3673	Sleek 2-Button Stealth Black Mouse
33L3244	Sleek USB Mouse (stealth black)

1. xSeries 342 is housed in a 19in rack-mountable drawer and requires one of the racks listed in the Rack Cabinets and Options section.
2. xSeries 342 supports rack configurations only and ships without a mouse or keyboard.
3. Installation within a rack requires optional keyboard tray (P/N 28L4707), which stows in ready-to-use position.
4. Installation within a rack requires optional keyboard tray (P/N 28L4707). This keyboard cannot share a keyboard tray with a flat panel display.
5. Advanced TrackPoint IV features are not available on IBM xSeries systems.
6. USB keyboards attach to a single USB-capable server. They are not compatible with the NetBAY console switches.



xSeries 342 Tape Options

Part Number	Tape Drives	Bays Supported	SCSI Interface (bit)	Form Factor	Termination Included	68/50-pin Converter Incl	Ext Tape Enclosures
00N7991	20/40GB DDS/4 4mm Internal Tape Drive	A, B	16 Ultra2 LVD	89mm (3.5in) HH or 133mm (5.25in) HH	Y ¹	-	3551001 ⁴ 3510020 ³
09N4040	20/40GB DLT Internal SCSI Tape Drive	A+B	8	133mm (5.25in) FH	N ²	Y	3551001
00N7990	40/80GB DLT Internal SCSI Tape Drive	A+B	16 Ultra2 LVD	133mm (5.25in) FH	Y ¹	-	3551001 ⁴
00N8015	110/220GB Super DLT Internal SCSI Tape Drive	A+B	16 Ultra2 LVD	133mm (5.25in) FH	Y ¹	-	3551001 ⁴
00N8016	100/200GB LTO Tape Drive	A+B	16 Ultra2 LVD	133mm (5.25in) FH	Y ¹	-	3551001 ⁴
24P2396	100/200GB LTO Half-High Tape Drive	A, B	16 Ultra2 LVD	133mm (5.25in) HH	Y ¹	-	3551001 ⁴
24P2398	40/80GB Half-High DLT/VS Internal SCSI Tape Drive	A, B	16 Ultra2 LVD	133mm (5.25in) HH	Y ¹	-	3551001 ⁴
Tape Autoloaders							
00N7992	120/240GB DDS/4 Tape Autoloader	A+B	16 Ultra2 LVD	133mm (5.25in) FH	Y ¹	-	3551001 ⁴
3502108	DLT Tape Autoloader	-	16	Desktop	Y	-	-
3600109	3600 Series 900GB/1.8TB LTO Tape Autoloader ⁵	-	16 Ultra2 LVD	Tower or 6U Rack	Y	-	-
External Tape Libraries⁶							
3502R14	DLT Tape Library	-	16	Rack	Y	-	-
3570C2x	Magstar MP 3570 Tape Subsystem	-	HVD	6U Rack	Y	-	-
3600220	3600 Series 2/4TB LTO Tape Library (Tower)	-	16 Ultra2 LVD	Tower	Y	-	-
3600R20	3600 Series 2/4TB LTO Tape Library (Rack)	-	16 Ultra2 LVD	5U Rack	Y	-	-
3600LXU	3600 Series 2-Drive, 20-Cartridge Expander Module ⁷	-	16 Ultra2 LVD	5U Rack	Y	-	-
09N4048	3600 Series LTO Drive Upgrade Option ⁸	-	16 Ultra2 LVD	-	N	-	-
External Tape Enclosures							
3510020	External Half High SCSI Storage Enclosure ⁹	-	8, 16	Desktop	N	N	-
3551001	NetMEDIA Storage Expansion Unit EL ¹⁰	-	16	Rack	Y	N	-
10L7113	NetMEDIA Systems Management Adapter ¹¹	-	16 LVD	-	N	N	3551001
Associated Options							
10K2340	Media Bay Tray and LVD Cable Kit ²	-	16 LVD	Int	Y	N	3551001
00N7956	68-pin External Multimode LVD/SE SCSI Terminator	-	16 LVD/SE	Ext	y	N	3510020

Note: No external SCSI port is available. All tape drives and enclosures are supported by PCI Wide Ultra160 SCSI Adapter (P/N 19K4646) which has an external 0.8mm VHDCI connector.

1. Termination requires installing the 42in single-drop, terminated LVD SCSI cable provided with the option or is provided in a NetMEDIA Storage Expansion Unit with the installation of NetMEDIA Systems Management Adapter (P/N 10L7113).
2. Termination requires installation using the two-drop multimode terminated LVD SCSI cable included with the Media Bay Tray and LVD Cable Kit (P/N 10K2340) or is provided in a NetMEDIA Storage Expansion Unit with the installation of NetMEDIA Systems Management Adapter (P/N 10L7113).
3. Requires 68-pin External Multimode LVD/SE SCSI Terminator (P/N 00N7956).
4. LVD support for LVD devices installed in a NetMEDIA Storage Expansion Unit EL (P/N 3551001) requires installation of NetMEDIA Systems Management Adapter (P/N 10L7113), which also provides termination, and replacement of the standard single-ended internal cable with the terminated single-drop LVD SCSI cable provided with this option. If the standard cables are used for attachment to LVD devices, single-ended SCSI rules and bus speeds apply.
5. If installed in a rack, a fixed shelf is required. Allow an additional 1U for the fixed shelf. One unit only per shelf is supported.
6. Tape library attributes and prerequisites are located in Appendix B: Tape Library Attributes.
7. Supported only with the 3600 Series LTO Tape Library (rack) (P/N 3600R20). Allow one additional EIA space when installing either one or two (maximum) units to accommodate a filler plate for cable routing. Up to two 3600 Series LTO Drive Upgrade Options can be installed in each module or the module can operate off the LTO drives installed in the LTO tape library.
8. Install in second drive bay of 3600 Series LTO Tape Libraries or in either of the two bays of 3600 Series 2-drive 20-cartridge Expander Module to increase performance. Includes an LTO (Ultrium) drive and a one-meter external LVD SCSI cable.
9. Provides a black desktop 133mm (5.25in) half-high (HH) tape enclosure. Connector is configurable as 50-pin Centronix or 68-pin high density. Requires either tape drive self-termination or 68-pin External Multimode LVD/SE SCSI Terminator (P/N 00N7956).
10. NetMEDIA Storage Expansion Unit EL (P/N 3551001) is a black 3U, 19in rack mountable tape enclosure which includes two full-high (FH) or four-half high (HH) extended length 133mm (5.25in) bays, two external 0.8mm VHDCI connectors and two internal four-drop single-ended terminated 16-bit SCSI cables for device attachment. Two power supplies and two power cords are also included. Tip: The front rail clips will need to be reversed and screwed in from behind to secure the unit in a 930842x rack.
11. NetMEDIA Systems Management Adapter (P/N 10L7113) may be installed in a 3551001 to provide repeater function, LVDS interface, aggregate cable lengths up to 12m when attached to an LVD SCSI controller, and auto-termination when the 3551001 is powered off. External connector is 0.8mm VHDCI.

Note: Additional tape attributes can be found in Appendix A: Tape Drive Attributes.



xSeries 342 Sample Configurations

Note: The following sample configurations are for illustration only and may not be suitable for any specific customer installation. Contact your IBM Business Partner or IBM Marketing Representative for assistance with your specific configuration requirements.

Internet Server

Part Number	Description	Quantity
8669-5RX	xSeries 342 1.4GHz/512KB Pentium III, 256MB ECC, open, 24X (3U Rack)	1
33L3320	128MB PC133 ECC SDRAM RDIMM	2 ¹
06P5736	ServeRAID-4Mx Ultra160 SCSI Controller	1
06P5754	18.2GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD	3 ²
24P2396	100/200GB LTO Half-High Tape Drive	1
10K2340	Media Bay Tray and LVD Cable Kit	1
633147N	E54 Color Monitor 15in (350mm, 13.8in viewable image), stealth black	1
32P1020	APC 2U Smart-UPS 1400RMB	1
37L6880	270W Hot-Swap Redundant Power Supply	1
Industry Standard 19in Rack, EIA-310D, min depth of 28in (711mm)		
9306250	NetBAY25 Standard Rack Cabinet	1
28L3644	Space Saver II Keyboard	1
94G6670	Blank Filler Panel Kit	2

1. For a total of 512MB of system memory.

2. Three HDDs are used for RAID 5 protection. Effective capacity is two HDDs or 36.4GB.

An Internet server handles all requests from the Internet (Intranet or Extranet). Usually this type of server has the same characteristics as a file server. The main difference is that an Internet server uses a different protocol (TCP/IP vs NETBEUI or IPX/SPX) and often performs an additional security check (firewall). In the case of an Internet server, the server itself communicates primarily with only one client, the Internet Service Provider (ISP), instead of many clients as applies to a file server.

With this in mind, the xSeries 342 was selected to provide an affordable price point for the growing Internet server market. The system includes two-way Pentium III processing, 512MB of system memory (expandable to 4GB), power protection with an APC Smart-UPS and availability features such as RAID-protected internal hot-swap storage.

The network configuration depends on the method that will be used to connect the server to the Internet. Usually fast Ethernet routers are used, but if other methods are preferable, you can add the appropriate adapter. The configuration includes a tape back-up unit for secure storage of critical data in the event of a system or storage media failure.

Application Server

Part Number	Description	Quantity
8669-2RX	xSeries 342 1.13GHz/512KB Pentium III, 256MB ECC, Open, 24X (3U Rack)	1
24P3512	xSeries 1.13GHz/133MHz 512KB Cache Upgrade with Pentium III Processor SVR	1
33L3322	256MB PC133 ECC SDRAM RDIMM	2 ¹
06P5736	ServeRAID-4Mx Ultra160 SCSI Controller	1
06P5754	18.2GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD	3 ²
24P2396	100/200GB LTO Half-High Tape Drive	1
10K2340	Media Bay Tray and LVD Cable Kit	1
633147N	E54 Color Monitor 15in (350mm, 13.8in viewable image), stealth black	1
37L6880	270W Hot-Swap Redundant Power Supply	1
32P1020	APC 2U Smart-UPS 1400RMB	1
Industry Standard 19in Rack, EIA-310D, min depth of 28in (711mm)		
9306250	NetBAY25 Standard Rack Cabinet	1
28L3644	Space Saver II Keyboard	1
94G6670	Blank Filler Panel Kit	2

1. For a total of 768MB of system memory.

2. Three HDDs are used for RAID 5 protection. Effective capacity is two HDDs or 36.4GB.

An application server is designed to handle a high workload while providing application serving requirements for users. With this in mind, the xSeries 342 was selected to provide an affordable price point for an application server with two-way Pentium III processing, 768MB of system memory (expandable to 4GB), power protection with an APC Smart-UPS and availability features such as battery-backed cache RAID-protected internal hot-swap storage.





IBM xSeries 350

Part Number
Processor Speed (MHz)³
Number of Processors (Std/Max)
L2 ECC Cache
Memory (Std/Max) (R = RDIMM)
Form Factor
Power Supply Quantity (Std/Max)
Hot-Swap (Power, Slots, HDD, Fans)
Redundancy (Optional, Standard)
Adv System Management Processor
Onboard Ethernet (Mbps)
SCSI Controller (Dual, Ultra, RAID)
Removable Media Bays (Total/Avail)
Internal Hard Disk Drive (Std/Max)
CD-ROM (IDE)⁶
Bays (Total/Avail)
Slots (Total/Avail)

xSeries 350 At-A-Glance

8682-4RY ¹	700	1/4	1MB	512MB(R)/16GB ⁴	Rack (4U)	1/3	P, S, H, F	S-Fans O-Power ⁵	Y	10/100	D,U160	2/0	0/440.4GB	48X-20X	8/6 ⁷	6/6
8682-4AX ^{1, 2}	700	1/4	1MB	512MB(R)/16GB ⁴	Rack (4U)	1/3	P, S, H, F	S-Fans O-Power ⁵	Y	10/100	D,U160	2/0	0/440.4GB	48X-20X	8/6 ⁷	6/6
8682-5RY ¹	700	1/4	2MB	512MB(R)/16GB ⁴	Rack (4U)	1/3	P, S, H, F	S-Fans O-Power ⁵	Y	10/100	D,U160	2/0	0/440.4GB	48X-20X	8/6 ⁷	6/6
8682-5AX ^{1, 2}	700	1/4	2MB	512MB(R)/16GB ⁴	Rack (4U)	1/3	P, S, H, F	S-Fans O-Power ⁵	Y	10/100	D,U160	2/0	0/440.4GB	48X-20X	8/6 ⁷	6/6
8682-6RY ^{1, 8}	900	1/4	2MB	512MB(R)/16GB ⁴	Rack (4U)	1/3	P, S, H, F	S-Fans O-Power ⁵	Y	10/100	D,U160	2/0	0/440.4GB	48X-20X	8/6 ⁷	6/6

- Housed in a 19in rack-mountable drawer and ships standard without a keyboard or mouse. See Rack Cabinets and Options section for supported IBM racks.
- Installation of this model is recommended only to support attachment to iSeries systems. Contains an updated system board designed specifically to support the Integrated xSeries Adapter (IXA) for iSeries option.
- Intel Pentium III Xeon processor with integrated full speed ECC L2 cache and 100MHz access to memory and I/O buses.
- Advanced Chipkill ECC memory corrects two-, three-, and four-bit memory errors.
- N+1 power supply redundancy requires a minimum of one optional 270W Hot-Swap Redundant Power Supply (P/N 37L6880). Robust configurations may require two. See "Power" under xSeries 350 Power, Monitor & Accessories for additional information.
- Variable read rate. Actual playback speed will vary and is often less than the maximum possible.
- xSeries 350 includes three hot-swap bays. Optional 3-Pack Ultra 160 Hot-Swap Expansion Kit (P/N 33L5050) expands the total hot-swap bays to six.
- The 6RY model system board supports attachment of the IXA adapter.

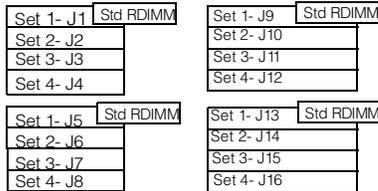
xSeries 350 Processors

Part Number	Processor Upgrades	SMP Support ¹	Processor Speed Upgrade ²
00N7946	Netfinity 700MHz/1MB Upgrade with Pentium III Xeon Processor	4xx	-
00N7944	Netfinity 700MHz/2MB Upgrade with Pentium III Xeon Processor	5xx	4xx
19K4633	900MHz/2MB Upgrade with Pentium III Xeon Processor	6RY	4xx, 5xx

- Three additional processors may be installed, providing a maximum of four. All processors must be identical in type, speed, and cache size. Processors must be installed in numerical order from slot one to slot four.
- Requires removal of the standard processor. A maximum of four processors may be installed. All processors must be identical in type, speed and cache size. Upgrades may require a BIOS update. To obtain the latest Flash BIOS, access www.pc.ibm.com/support and enter machine "Type-Model" in Quick Path. Select "Downloadable files" then "BIOS."



xSeries 350 Memory



All RDIMMs installed in each set must be the same size, but all the sets do not have to contain RDIMMs of the same size. Install RDIMM sets in numerical sequence from one to four.

Total Memory ¹	Quantity of RDIMMs Added ²			
	128MB (33L3113)	256MB (33L3115)	512MB (33L3117, 33L3147) ⁴	1GB (33L3119)
512MB	4 x 128 RDIMMs standard	-	-	-
1GB	4	-	-	-
1.5GB	-	4	-	-
2GB	4	4	-	-
2.5GB	-	8	-	-
3GB	4	-	4	-
4GB	4	4	4	-
5GB	4	-	8	-
6GB ³	-	8	8	-
7GB ³	-	4	12	-
8GB ³	-	-	16	-
9GB	4	-	-	8
10GB ³	-	-	12	4
12GB ³	-	-	8	8
14GB ³	-	-	4	12
16GB ³ (max)	-	-	-	16

This table does not represent all possible memory configurations. Memory modules may vary in price per MB. Selection of smaller RDIMMs may provide a more cost-effective alternative to using larger RDIMMs.

1. Network operating systems may limit the maximum amount of addressable memory. See operating system specifications for further information.
2. To obtain the quantity of memory identified in the "Total Memory" column, select the appropriate row and order the quantity of RDIMMs identified in all columns for that row. Example: For 2GB, order 4 x 33L3113 plus 4 x 33L3115.
3. Requires removal of standard RDIMMs.
4. Intermixing of 33L3117 and 33L3147 in the same bank (set of four RDIMMs) is not supported.

Part Number	Memory Description ¹
33L3113	Netfinity 128MB, 100MHz ECC SDRAM RDIMM
33L3115	Netfinity 256MB, 100MHz ECC SDRAM RDIMM
33L3117	Netfinity 512MB, 100MHz ECC SDRAM RDIMM
33L3119	Netfinity 1GB 100MHz ECC SDRAM RDIMM
33L3147	2GB 100MHz ECC SDRAM RDIMM KIT (4 x 512MB) ²

1. Due to four-way interleaving all RDIMMs installed in each set must be the same size, but all the sets do not have to contain RDIMMs of the same size. Install RDIMM sets in numerical sequence from one to four. Chipkill support is provided on the memory card.
2. Intermixing of this option with 33L3117 in the same bank (set) is not supported.

xSeries 350 Internal SCSI Cabling

The xSeries 350 contains a DASD backplane supporting three hot-swap, SCA-2 compliant drive bays. The backplane is connected to one of the internal connectors of the integrated dual-channel Ultra160 SCSI controller through a 16-bit LVD SCSI cable. An optional 3-Pack Ultra160 Hot-Swap Expansion Kit (P/N 33L5050) can be installed to provide additional internal HDD storage capacity. Within this option are two 16-bit LVD SCSI cables. One can be attached from the 3-Pack Ultra Hot-Swap backplane to the second connector of the dual-channel Ultra160 SCSI controller, the other, through the use of a repeater card included with the option, can be cabled directly to the standard backplane.

In configurations where external SCSI device attachment is required instead of additional internal HDD storage, a second 16-bit LVD SCSI cable is included with the server. One end of the cable can be attached to the second Ultra160 connector and the other is attached to the external 0.8mm VHDCI connector on the back of the chassis. This provides an external connection to support LVDS devices.

For additional information regarding internal cabling, refer to Appendix F: Internal Cabling Overview.



xSeries 350 Hard Disk Drive (HDD) Storage

Total Int Storage ¹	10,000RPM HDDs			15,000RPM HDDs	
	18.2GB (06P5754)	36.4GB (06P5755)	73.4GB (06P5756)	18.2GB (06P5767)	36.4GB (06P5768)
0GB	Standard on base models				
18.2GB	1	-		1	-
36.4GB	2	1		2	1
54.6GB	3	-		3	-
72.8GB	4 ²	2		4 ²	2
91GB	5 ²	-		5 ²	-
109.2GB	6 ²	3		6 ²	3
145.6GB	-	4 ²		-	4 ²
182GB	-	5 ²		-	5 ²
218.4GB	-	6 ²		-	6 ²
220.2GB	-	-	3	-	-
293.6GB	-	-	4 ²	-	-
367GB	-	-	5 ²	-	-
440.4GB (max)	-	-	6 ²	-	-

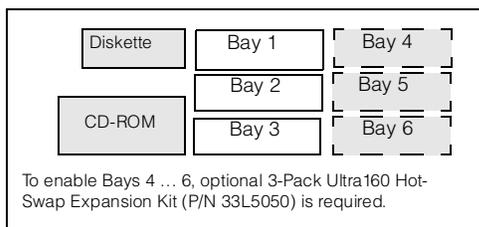
This table does not represent all possible HDD configurations.

1. Select a total storage row and then select the quantity of HDDs from a column corresponding to the HDD of choice. Total Internal Storage listed is within +/- 0.2GB unless otherwise noted.

2. Requires IBM 3-Pack Ultra 160 Hot-Swap Expansion Kit (P/N 33L5050).

Bay	Form Factor	Height	Front Access	Usage	Part Number	Description	RPM	Height	Bays Supported ¹	Max Qty ¹
-	89mm (3.5in)	SL	Yes	Diskette	Ultra160 HDDs					
-	133mm (5.25in)	HH	Yes	IDE CD-ROM	06P5754	18.2GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD	10000	SL	1 ... 6	6
1 ... 3	HS	SL	Yes	Open	06P5755	36.4GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD	10000	SL	1 ... 6	6
4 ... 6 ¹	HS	SL	Yes	Open	06P5756	73.4GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD	10000	SL	1 ... 6	6
					06P5767	18.2GB 15Krpm Ultra160 SCSI Hot-Swap SL HDD	15000	SL	1 ... 6	6
					06P5768	36.4GB 15Krpm Ultra160 SCSI Hot-Swap SL HDD	15000	SL	1 ... 6	6

1. To enable Bays 4 ... 6, optional 3-Pack Ultra160 Hot-Swap Expansion Kit (P/N 33L5050) is required.



Associated Options										
33L5050	IBM 3-Pack Ultra160 Hot-Swap Expansion Kit ²	-	3 x SL	4 ... 6	-					
External Storage Expansion Units³						Form Factor				
35311RU	EXP300 Storage Expansion Unit ⁴	Rack (3U)								
35601RU	FAST EXP500 Storage Expansion Unit ⁵	Rack (3U)								
35421RU	FAST200 Storage Server ^{6, 7}	Rack (3U)								
35422RU	FAST200 HA Storage Server ⁶	Rack (3U)								
19K1121	FAST200 Redundant RAID Controller	-								

- xSeries 350 ships with bays 1 ... 3 enabled. Installation of greater than three HDDs requires IBM 3-Pack Ultra160 Hot-Swap Expansion Kit (P/N 33L5050).
- IBM 3-Pack Ultra160 Hot-Swap Expansion Kit (P/N 33L5050) includes a hot-swap backplane and associated components that allow two ways to connect the expansion backplane. Within the option kit are two 16-bit LVD SCSI cables. One can be attached from the 3-Pack Ultra160 Hot-Swap backplane to the second connector of the onboard dual-channel Ultra160 SCSI controller, creating two independent buses. (Utilizing the second channel will eliminate the possibility of attaching external devices to that channel.) Using the repeater card included with the option kit, the other cable can be connected to the standard backplane, creating a single bus with six hot-swap HDD bays. Install tip: Do not route cabling over a memory card. If necessary, the longer standard SCSI cable can be disconnected from the standard backplane and connected to the backplane included in the expansion kit. Then the LVD SCSI cable that comes with the expansion kit would be connected to the standard backplane. Cabling can be routed either over or under the fans.
- Not supported by the onboard external SCSI port. To configure one of the SCSI storage devices listed here, select an optional SCSI controller then refer to Appendix D: Cables - Storage Units - Controllers to confirm that the controller supports the desired External Storage Expansion Unit and to select a supported cable. For HDD or other expansion unit options, see the specific expansion unit section. For Fibre Channel storage devices, refer to the Fibre Channel Solutions Overview section.
- EXP300 includes a single 2M Ultra2 SCSI cable and dual hot-swap 500W redundant power supplies, each with its own power cord.
- FAST EXP500 Storage Expansion Unit (P/N 35601RU) includes dual hot-swap 350W power supplies, each with its own power cord.
- The FAST200 includes two hot-swap, 350W auto-ranging redundant power supplies, each with its own power cord.
- Can be upgraded to FAST200 HA Storage Server through the addition of a FAST200 Redundant RAID Controller (P/N 19K1121).

IBM XSERIES 350



xSeries 350 I/O Options

Part Number	Description	Adapter Length	PCI Support ²	Slots Supported ^{1, 2}	Hot-Plug ³	PCI Voltage Key	MHz
Storage Controllers⁴							
37L6889	ServeRAID-4H Ultra160 SCSI Controller ⁵	Full	64-bit	1 ... 6	X	Universal	33
06P5736	ServeRAID-4Mx Ultra160 SCSI Controller ⁶	Full	64-bit	1 ... 6	X	Universal	66
06P5740	ServeRAID-4Lx Ultra160 SCSI Controller ⁷	Half	64-bit	1 ... 6	X	Universal	66
02K3454	PCI Fast/Wide Ultra SCSI Adapter ⁸	Half	32-bit	1, 5, 6	-	5	33
19K4646	PCI Wide Ultra160 SCSI Adapter ⁹	Half	32-bit	1 ... 6	-	Universal	66
Fiber Storage Controllers and Options¹⁰							
00N6881	Netfinity FASTT Host Adapter	Half	64-bit	1 ... 6	X	Universal	66
19K1246	FASTT FC-2 Host Bus Adapter	Half	64-bit	1 ... 6	X	Universal	66
17421RU	FASTT700 Fibre Channel Storage Server	-	-	-	-	-	-
35521RU	FASTT500 Storage Server	-	-	-	-	-	-
35421RU	FASTT200 Storage Server	-	-	-	-	-	-
35422RU	FASTT200 HA Storage Server	-	-	-	-	-	-
35341RU	SAN Fibre Channel Managed Hub	-	-	-	-	-	-
2109S08	SAN Fibre Channel Switch, 8-Port	-	-	-	-	-	-
2109S16	SAN Fibre Channel Switch, 16-Port	-	-	-	-	-	-
2109F16	SAN Fibre Channel Switch, 16-Port	-	-	-	-	-	-
2108R3L	SAN Data Gateway Router Ultra SCSI LVD Port ¹¹	-	-	-	-	-	-
Networking¹²							
Ethernet¹³							
09N9901	10/100 EtherLink Server Adapter by 3Com ¹⁴	Half	32-bit	1 ... 6	X	Universal	33
06P3601	10/100 Ethernet Server Adapter ¹⁴	Half	32-bit	1 ... 6	X	Universal	33
06P3701	Gigabit Ethernet SX Server Adapter (fiber)	Half	64-bit	1 ... 6	X	Universal	66
22P4901	10/100 Dual Port Server Adapter ¹⁴	Half	64-bit	1 ... 6	X	Universal	66
22P6801	PRO/1000XT Server Adapter by Intel (copper) w/CD, manuals ¹⁴	Half	64-bit	1 ... 6	X	Universal	133 ^c
Token Ring							
34L0701	Token-Ring 16/4 PCI Adapter 2 with Wake on LAN ¹⁴	Half	32-bit	1 ... 6	X	Universal	33
34L5201	High-Speed 100/16/4 Token-Ring PCI Management Adapter ¹⁴	Half	32-bit	1 ... 6	X	Universal	33
Communications¹⁵							
33L4618	V90 PCI Data/Fax Modem ¹⁶	Half	32-bit	1, 5, 6	-	5	33
37L14xx	Serial I/O SST 8, 16, and 128 port adapters ¹⁷	Half	32-bit	1, 5, 6 ¹⁷	-	5	33
Systems Management¹⁸							
01K7209	Advanced System Management PCI Adapter ¹⁹	Full	32-bit	1, 5, 6 ²⁰	-	5	33

1. The 5V - 33MHz slots support universal or 5V adapters. A universal voltage-66MHz adapter plugged into these slots will operate at 33MHz. The 3.3V slots support universal or 3.3V adapters. A universal voltage-33MHz adapter plugged into these slots limits a 66MHz PCI adapter installed on the same bus to 33MHz.

2. A 64-bit adapter installed into a 32-bit slot will transfer data at 32-bit rates. Adapters rated at 66MHz will operate at 33MHz when installed in a 33MHz slot. 33MHz adapters will reduce 66MHz buses to 33MHz. 133MHz PCI-X adapters are backward compatible with 33/66MHz, 64-bit PCI-based servers.

3. All six slots are full-length hot-plug capable using IBM's Active PCI technology. For Network Operating System support, access www.pc.ibm.com/us/compat.

4. xSeries 350 includes a dual-port, dual-channel Ultra160 SCSI controller. See "Internal SCSI Cabling" for cabling alternatives. Install tip: For RAID configurations, the RAID cable provided with the system is routed underneath the PCI adapters because there is not sufficient space between the case lid and the top of the optional adapters.

5. ServeRAID-4H Ultra160 SCSI Controller is powered by a 266MHz PowerPC 750 processor and provides 128MB of battery-backed ECC cache with two internal and four external Ultra160 connectors (a combination of four connectors may be utilized). External connectors are 0.8mm VHDCI.

6. ServeRAID-4Mx Ultra160 SCSI Controller is powered by a 100MHz Intel Zion GC80303 processor that provides 64MB of battery-backed ECC cache and two internal and two external Ultra160 connections (only two connectors may be used). External connections are 0.8mm VHDCI.

7. ServeRAID-4Lx Ultra160 SCSI Controller is powered by a 100MHz Intel Zion GC80303 processor and provides a single channel, 32MB of ECC cache and either one internal or one external Ultra160 connection. External connector is 0.8mm VHDCI.

8. PCI Fast/Wide Ultra SCSI Adapter (P/N 02K3454) provides one external 68-pin high density connector that supports external SCSI devices such as tape enclosures.

9. PCI Wide Ultra160 SCSI Adapter (P/N 19K4646) provides a single channel with one internal connector, a five-drop multi-mode terminated LVD SCSI cable and one external 0.8mm VHDCI connector. Only one of the two connectors may be utilized.

10. See Fibre Channel Solutions Overview section for additional configuration information.

11. The 2108R3L SAN Data Gateway Router Ultra SCSI LVD port provides one integrated short-wave optical port and two SCSI ports for tape storage connections (LVD, HVD and single-ended).

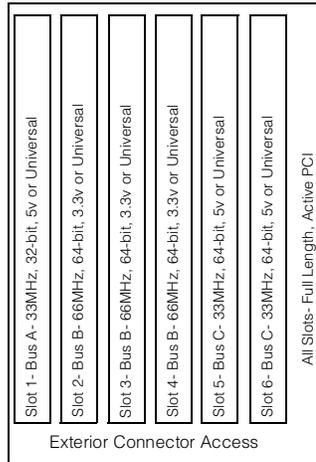
12. xSeries 350 has an integrated 10/100 PCI Ethernet Controller.

13. In a fault-tolerant networking environment, using the fault-tolerant software delivered with the Ethernet adapters of a single manufacturer is recommended. Installing fault-tolerant solutions provided by multiple manufacturers may cause failures if the intermediate drivers provided with the adapters are not compatible. The onboard Ethernet is AMD-based. Four of the optional PCI Ethernet adapters listed are Intel-based (P/N 06P3601, 06P3701, 22P4901, 22P6801).

14. The Wake on LAN function of this option is not supported by this server.



- 15. xSeries 350 includes two USB ports, two serial and one parallel port.
- 16. Due to homologation variances, modem availability may differ by country.
- 17. See Appendix E for details on Serial I/O options and configuration limitations. A maximum of four Serial I/O adapters (any combination of P/Ns 37L1414, 37L1415, 37L1416, 37L1423) may be installed.
- 18. The Advanced System Management Processor and interconnect bus integrated into xSeries 350 work with IBM Director to provide significant system management functionality when used either with optional Advanced System Management PCI Adapter (P/N 01K7209) or connected directly into an interconnect network using the integrated RS-485 ports located on the rear of the system chassis. Up to 12 Advanced System Management Processors or optional Advanced System Management PCI Adapters may be interconnected with an aggregate connection length of no more than 91.4m (300ft). A customer-supplied Cat5 cable is required for each interconnection. An additional 12 Integrated System Management Processors or Remote Supervisor Adapters may be connected to the network for a total of 24 devices.
- 19. Includes PCI adapter, Advanced System Management Interconnect Cable Kit components and 56W AC adapter which requires a separate power source. Provides an integrated 10/100 Ethernet port.
- 20. A maximum quantity of one is supported.





xSeries 350 Power, Monitors & Accessories

Part Number	Description
Power¹	
37L6880	270W Hot-Swap Redundant Power Supply
Uninterruptible Power Supply (UPS)²	
32P1020	APC 2U Smart-UPS 1400RMB
94G6676	APC Smart-UPS 3000RMB ³
37L6861	APC Smart-UPS 5000RMB ⁴
Monitors⁵	
633147N	E54 Color Monitor 15in (350mm, 13.8in viewable image), stealth black ⁶
63324HN	E74 Color Monitor 17in (406mm, 16in Viewable Image), stealth black ⁶
66274AN	G78 Color Monitor 17in (406.4mm, 16in Viewable Image), stealth black ⁶
9511AG4	T540 Flat Panel Color Monitor 15in (381mm, 15in viewable image), stealth black ⁷
32P1031	NetBAY 1U Flat Panel Monitor Console Kit (w/ US Space Saver keyboard) ⁸
32P1032	NetBAY 1U Flat Panel Monitor Console Kit (w/o keyboard) ⁸

1. xSeries 350 systems include a single 270W, hot-swap power supply and two 9ft power cords, one high voltage IEC 320-C13 to IEC 320-C14 and one low voltage IEC 320-C13 to NEMA 5-15P. N+1 power supply redundancy may be achieved with the addition of an optional 270W Hot-Swap Redundant Power Supply (P/N 37L6880). Redundancy for configurations of greater than 270W requires installation of a second optional power supply, i.e., a total of three 270W power supplies. To assist in determining when an additional power supply is required to preserve redundancy, a "Non-Redundant LED" is a standard feature of the xSeries 350.

The following table is provided as a reference. The table shows an example of a maximum configuration that can be supported by a single 270W power supply. Any additional power draw would require another power supply. Redundancy for the configuration displayed requires a second 270W power supply.

Number of Power Supplies	System Configuration Supported
1	Nonredundant
	Up to two processors
	Up to three PCI adapters
	Up to three HDDs
	Up to eight memory RDIMMs

2. For runtimes and UPS attributes see Appendix C: UPS Runtime Estimate.
3. Height is 3U. See Rack Cabinets and Options section for supported IBM racks.
4. Height is 5U. See Rack Cabinets and Options section for supported IBM racks.
5. xSeries 350 uses an SVGA controller (S3 Savage4 chipset) with 8MB of video memory.
6. Installation within a rack requires optional Monitor Compartment (P/N 94G7444).
7. Installation within a rack requires optional Netfinity Flat Panel Monitor Rack Mount Kit II (P/N 37L6888) and Netfinity Rack Keyboard Tray (P/N 28L4707). A space saver keyboard may coexist within the same 28L4707 keyboard tray.
8. Includes a 15in Flat Panel Monitor.

Part Number	Description
Rack and NetBAY¹	
	Refer to the Rack Cabinets and Options section for information concerning IBM racks and rack-supported devices.
Keyboard and Mouse²	
28L3644	Space Saver II Keyboard ^{3, 4}
28L3621	Preferred Keyboard (stealth black) ⁵
28L3673	Sleek 2-Button Stealth Black Mouse

1. xSeries 350 is housed in a 19in rack-mountable drawer and requires one of the racks listed in the Rack Cabinets and Options section.
2. xSeries 350 supports rack configurations only and ships without a keyboard or mouse.
3. Installation within a rack requires optional keyboard tray (P/N 28L4707), which stows in "ready-to-use" position.
4. Advanced TrackPoint IV features are not available on IBM xSeries systems.
5. Installation within a rack requires optional keyboard tray P/N 28L4707. This keyboard cannot share a keyboard tray with a flat panel display.



xSeries 350 Tape Options

Part Number	Tape Drives	Bays Supported ¹	SCSI Interface (bit)	Form Factor	Termination Included	68/50-pin Converter Incl	Ext Tape Enclosures
00N7991	20/40GB DDS/4 4mm Internal Tape Drive	-	16 Ultra2 LVD	89mm (3.5in) HH or 133mm (5.25in) HH	Y ²	-	3551001 ⁴
09N4040	20/40GB DLT Internal SCSI Tape Drive	-	8	133mm (5.25in) FH	N ³	Y	3551001
00N7990	40/80GB DLT Internal SCSI Tape Drive	-	16 Ultra2 LVD	133mm (5.25in) FH	Y ²	-	3551001 ⁴
00N8016	100/200GB LTO Tape Drive	-	16 Ultra2 LVD	133mm (5.25in) FH	Y ²	-	3551001 ⁴
00N8015	110/220GB Super DLT Internal SCSI Tape Drive	-	16 Ultra2 LVD	133mm (5.25in) FH	Y ²	-	3551001 ⁴
24P2396	100/200GB LTO Half-High Tape Drive	-	16 Ultra2 LVD	133mm (5.25in) HH	Y ²	-	3551001 ⁴
24P2398	40/80GB Half-High DLT/VS Internal SCSI Tape Drive	-	16 Ultra2 LVD	133mm (5.25in) HH	Y ²	-	3551001 ⁴
Tape Autoloaders							
3502108	DLT Tape Autoloader	-	16	Desktop	Y	-	-
00N7992	120/240GB DDS/4 Tape Autoloader	-	16 Ultra2 LVD	133mm (5.25in) FH	Y ²	-	3551001 ⁴
3600109	3600 Series 900GB/1.8TB LTO Tape Autoloader ⁵	-	16 Ultra2 LVD	Tower or 6U Rack	Y	-	-
External Tape Libraries⁶							
3502R14	DLT Tape Library	-	16	Rack	Y	-	-
3570C2x	Magstar MP 3570 Tape Subsystem	-	HVD	6U Rack	Y	-	-
3600220	3600 Series 2/4TB LTO Tape Library (Tower)	-	16 Ultra2 LVD	Tower	Y	-	-
3600R20	3600 Series 2/4TB LTO Tape Library (Rack)	-	16 Ultra2 LVD	5U Rack	Y	-	-
3600LXU	3600 Series 2-Drive, 20-Cartridge Expander Module ⁷	-	16 Ultra2 LVD	5U Rack	Y	-	-
09N4048	3600 Series LTO Drive Upgrade Option ⁸	-	16 Ultra2 LVD	-	N	-	-
External Tape Enclosures							
3551001	NetMEDIA Storage Expansion Unit EL ⁹	-	16	Rack	Y	N	-
10L7113	NetMEDIA Systems Management Adapter ¹⁰	-	16 LVD	-	N	N	3551001
Associated Options							
10K2340	Media Bay Tray and LVD Cable Kit ⁴	-	16 LVD	Int.	Y	N	3551001

1. IBM xSeries 350 does not support internal tape drives. An external tape library or tape enclosure must be used. If not used internally, the second integrated Ultra160 connector may be routed to an external 0.8mm VHDCI connector with a cable included with the server. All tape drives and enclosures are supported by PCI Wide Ultra160 SCSI Adapter (P/N 19K4646) which has an external 0.8mm VHDCI connector. Select tape drive, enclosure and controller then use Appendix D: Cables-Storage Units-Controllers to select an appropriate external cable.
2. Termination requires installing the 42in single-drop, terminated LVD SCSI cable provided with the option or is provided in a NetMEDIA Storage Expansion Unit with the installation of NetMEDIA Systems Management Adapter (P/N 10L7113).
3. Termination requires installation using the two-drop multimode terminated LVD SCSI cable included with the Media Bay Tray and LVD Cable Kit (P/N 10K2340) or is provided in a NetMEDIA Storage Expansion Unit with the installation of NetMEDIA Systems Management Adapter (P/N 10L7113).
4. LVD support for LVD devices installed in a NetMEDIA Storage Expansion Unit EL (P/N 3551001) requires installation of NetMEDIA Systems Management Adapter (P/N 10L7113), which also provides termination, and replacement of the standard single-ended internal cable with the terminated single-drop LVD SCSI cable provided with this option. If the standard cables are used for attachment to LVD devices, single-ended SCSI rules and bus speeds apply.
5. If installed in a rack, a fixed shelf is required. Allow an additional 1U for the fixed shelf. One unit only per shelf is supported.
6. Tape library attributes and prerequisites are located in Appendix B: Tape Library Attributes.
7. Supported only with the 3600 Series LTO Tape Library (rack) (P/N3600R20). Allow one additional EIA space when installing either one or two (maximum) units to accommodate a filler plate for cable routing. Up to two 3600 Series LTO Drive Upgrade Options can be installed in each module or the module can operate off the LTO drives installed in the LTO tape library.
8. Install in second drive bay of 3600 Series LTO Tape Libraries or in either of the two bays of 3600 Series 2-drive, 20-cartridge Expander Module to increase performance. Includes an LTO (Ultrium) drive and a one-meter external LVD SCSI cable.
9. NetMEDIA Storage Expansion Unit EL (P/N 3551001) is a black 3U, 19in rack mountable tape enclosure which includes two full-high (FH) or four half-high (HH) extended length 133mm (5.25in) bays, two external 0.8mm VHDCI connectors and two internal four-drop single-ended terminated 16-bit SCSI cables for device attachment. Two power supplies and two power cords are also included. Tip: The front rail clips will need to be reversed and screwed in from behind to secure the unit in a 930842x rack.
10. NetMEDIA Systems Management Adapter (P/N 10L7113) may be installed in a 3551001 to provide repeater function, LVDS interface, aggregate cable lengths up to 12M when attached to an LVD SCSI controller, and auto-termination when the 3551001 is powered off. External connector is 0.8mm VHDCI.

Note: Additional tape attributes can be found in Appendix A: Tape Drive Attributes.

IBM XSERIES 350



xSeries 350 Sample Configurations

Note: The following sample configurations are for illustration only and may not be suitable for any specific customer installation. Contact your IBM Business Partner or IBM Marketing Representative for assistance with your specific configuration requirements.

Internet Server

Part Number	Description	Quantity
8682-4RY	xSeries 350 Pentium III Xeon 700/1MB, 512MB(R) ECC, Open, 48X (Rack 4U)	1
06P5740	ServeRAID-4Lx Ultra160 SCSI Controller	1
33L5050	3-Pack Ultra160 Hot-Swap Expansion Kit	1
06P5754	18.2GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD	4 ¹
24P2396	100/200GB LTO Half-HighTape Drive	1 ²
10K2340	Media Bay Tray and LVD Cable Kit	1
3551001	NetMEDIA Storage Expansion Unit EL	1
03K9310	2M External Ultra2 SCSI Cable	1
633147N	E54 Color Monitor 15in (350mm, 13.8in viewable image), stealth black	1
32P1020	APC 2U Smart-UPS 1400RMB	1
Industry Standard 19in Rack, EIA-310D, min depth of 28in (711mm)		
9306250	NetBAY25 Standard Rack Cabinet	1
28L3644	Space Saver II Keyboard	1
94G6670	Blank Filler Panel Kit	2

1. Four HDDs are used for RAID 5 protection. One HDD is identified as a hot-spare. Effective capacity is two HDDs or 36.4GB.
2. Installs in the external tape enclosure (P/N 3551001).

An Internet server handles all requests from the Internet (Intranet or Extranet). Usually, this type of server has the same characteristics as a file server. The main difference is that an internet server talks a different language (TCP/IP vs NETBEUI or IPX/SPX) and often needs to do an extra security check (firewall). In the case of an Internet server, the server itself talks mostly to one client, the Internet Service Provider (ISP), instead of many clients as a file server does.

With this in mind, the IBM xSeries 350 was selected to provide an affordable price point for the growing Internet server market, featuring 512MB of system memory (expandable to 16GB), availability features such as RAID-protected internal hot-swap storage and power protection with an APC Smart-UPS.

The network configuration depends on the method that will be used to connect the server to the Internet. Usually fast ethernet routers are used, but if other methods are used, you can add the appropriate adapter. The configuration includes a tape backup unit for secure backup of critical data in the event of a system or storage failure.

Application Server

Part Number	Description	Quantity
8682-5RY	xSeries 350 Pentium III Xeon 700/2MB, 512MB(R) ECC, Open, 48X (Rack 4U)	1
00N7944	Netfinity 700MHz/2MB Upgrade with Pentium III Xeon Processor	3
33L3113	Netfinity 128MB, 100MHz ECC SDRAM RDIMM	4 ¹
33L3115	Netfinity 256MB, 100MHz ECC SDRAM RDIMM	4 ¹
33L5050	3-Pack Ultra160 Hot-Swap Expansion Kit	1
06P5755	36.4GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD	4 ²
06P5736	ServeRAID-4Mx Ultra160 SCSI Controller	1
00N7990	40/80GB DLT Internal SCSI Tape Drive	1 ³
10K2340	Media Bay Tray and LVD Cable Kit	1
3551001	NetMEDIA Storage Expansion Unit EL	1
10L7113	NetMEDIA Systems Management Adapter	1
03K9310	Netfinity 2M Ultra2 SCSI Cable	1
633147N	E54 Color Monitor 15in (350mm, 13.8in viewable image), stealth black	1
32P1020	APC Smart-UPS 1400RMB	1
37L6880	Netfinity 270W Hot-Swap Redundant Power Supply	2
Industry Standard 19in Rack, EIA-310D, min depth of 28in (711mm)		
9306250	NetBAY25 Standard Rack Cabinet	1
28L3644	Space Saver II Keyboard	1
94G6670	Blank Filler Panel Kit	2

1. For a total of 2GB of system memory.
2. Four HDDs are used for RAID 5 protection. Effective capacity is three HDDs or 109.2GB.
3. Installs in the external tape enclosure (P/N 3551001).

An application server is designed to handle a high workload while providing application serving requirements for users. With this in mind, the xSeries 350 was selected to provide an affordable price point for an application server with four-way Pentium III Xeon processing, 2GB of system memory (expandable to 16GB), and availability features such as battery-backed cache RAID-protected internal hot-swap storage and power protection with an APC Smart-UPS.





IBM xSeries 360

Part Number	Processor Speed (GHz) ²	Number of Processors (Std/Max)	L3 ECC Cache	Memory (Std/Max)	Form Factor	Power Supply Quantity (Std/Max)	Hot-Swap (Power, Slots, HDD, Fans)	Redundancy (Optional, Standard)	Adv System Management Adapter ⁵	Onboard Ethernet (Mbps)	SCSI Controller (Dual, Ultra, RAID)	Removable Media Bays (Total/Avail)	Internal Hard Disk Drive (Std/Max)	CD-ROM (IDE) ⁷	Bays (Total/Avail) ⁸	Slots (Total/Avail) ⁸
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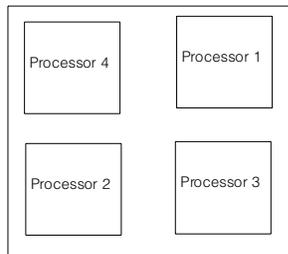
xSeries 360 At-A-Glance																
8686-1RX ¹	1.4	1/4	512KB	1GB/8GB ³	Rack (3U)	1/3	P, S, H, F	O - Power ⁴ S - Fans	Y	10/100	U160	-	0/220.2GB	24X-10X	5/3	6/6
8686-2RX ¹	1.5	2/4	512KB	2GB/8GB ³	Rack (3U)	2/3	P, S, H, F	S - Power ⁴ S - Fans	Y	10/100	U160	-	72.8GB/ 220.2GB ⁶	24X-10X	5/1	6/6
8686-3RX ¹	1.6	2/4	1MB	2GB/8GB ³	Rack (3U)	2/3	P, S, H, F	S - Power ⁴ S - Fans	Y	10/100	U160	-	72.8GB/ 220.2GB ⁶	24X-10X	5/1	6/6

- Housed in a 19in rack-mountable drawer and ships standard without a keyboard or mouse. See Rack Cabinets and Options section for supported IBM racks.
- Intel Xeon MP processor with integrated full-speed ECC L3 cache and 4x100MHz (quad-pumped) access to memory and I/O buses.
- Advanced Chipkill ECC memory corrects two-, three-, and four-bit memory errors.
- N+1 power supply redundancy is provided standard in models 2RX and 3RX (optional in 1RX). One optional 370W Hot-Swap Redundant Power Supply (P/N 31P6108) is available for maximum configurations in models 2RX and 3RX, or up to two optional power supplies can be added to model 1RX. See "Power" under xSeries 360 Power Monitor & Accessories for additional information.
- Advanced system management is provided by a standard Remote Supervisor Adapter installed in a dedicated PCI slot, which allows six optional PCI adapters to be installed.
- Two 36.4GB 10,000rpm hot-swap HDDs are standard (installed in bays four and five). Maximum HDD storage requires replacing the two standard HDDs with 73.4GB hot-swap HDDs and adding one additional 73.4GB HDD.
- Variable read rate. Actual playback speed will vary and is often less than the maximum possible.
- Support for an additional 12 64-bit slots available through installation of the optional RXE-100 Remote Expansion Unit (one unit only supported by xSeries 360).

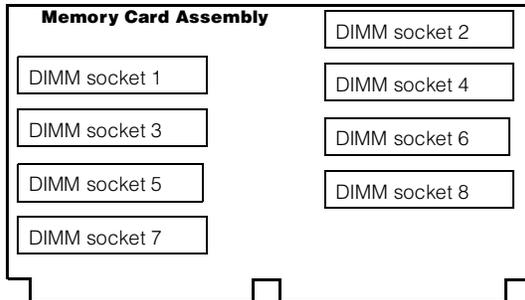
xSeries 360 Processors

Part Number	Processor Upgrades	SMP Support	Processor Speed Upgrade ³
19K4638	xSeries 1.4GHz/512KB L3 Cache Upgrade with Xeon Processor MP	1RX ¹	-
19K4639	xSeries 1.5GHz/512KB L3 Cache Upgrade with Xeon Processor MP	2RX ²	1RX
19K4647	xSeries 1.6GHz/1MB L3 Cache Upgrade with Xeon Processor MP	3RX ²	2RX

- Three additional processors may be installed, providing a maximum of four. All processors must be identical in type, speed and cache size. Install processors in the order indicated in the diagram below.
- Two additional processors may be installed, providing a maximum of four. All processors must be identical in type, speed and cache size. Install processors in the order indicated in the diagram below.
- Requires removal of the standard processor. A maximum of four processors can be installed. All processors must be identical in type, speed and cache size. Upgrades may require a BIOS update. To obtain the latest Flash BIOS, access www.pc.ibm.com/support and enter machine "Type-Model" in Quick Path. Select "Downloadable files" then "BIOS."



xSeries 360 Memory



Total Memory ¹		Quantity of RDIMMs Added ²		
1GB (2x512MB model)	2GB (4x512MB models)	256MB (33L3281)	512MB (33L3283)	1GB (33L3285)
2GB	3GB	4	-	-
2.5GB	3.5GB	2	2	-
3GB	4GB	-	4	-
3.5GB	4.5GB	2	-	2
4GB	5GB	-	2	2
5GB	6GB	-	-	4
6GB	-	-	2	4
7GB	-	-	-	6
8GB (max) ³	8GB ³	-	-	8

This table does not represent all possible memory configurations.

1. Network operating systems may limit the maximum amount of addressable memory. See operating system specifications for further information.

2. To obtain the quantity of memory identified in the "Total Memory" column, select the appropriate row and order the quantity of RDIMMs identified in all columns for that row.

3. Requires removal of standard RDIMMs.

Part Number	Memory Description ¹
33L3281	256MB PC 1600 ECC DDR SDRAM RDIMM
33L3283	512MB PC1600 ECC DDR SDRAM RDIMM
33L3285	1GB PC1600 ECC DDR SDRAM RDIMM

1. Due to two-way interleaving, all RDIMMs must be installed in pairs in the order indicated by the diagram. Chipkill support is provided on the memory card. Only installation in pairs is supported. The order of installation in pairs is sockets one and two, three and four, five and six, and seven and eight.

xSeries 360 Internal SCSI Cabling

xSeries 360 contains five front-accessible drive bays located on the right side of the server. The top two bays contain the standard slim-line CD-ROM and 1.44MB slim-line diskette drive. Three 3.5in slim-line, hot-swap drive bays are located beneath them. The IDE CD-ROM is docked to a media interposer card that is cabled to the lightpath card before terminating at the system planar. The three SCA2-compliant hot-swap bays attach to a hot-swap backplane that connects to the integrated single-channel Ultra 160 controller through an integrated bus. For RAID configurations, a cable provided with the system is connected to one of the internal connectors of the RAID controller and the other end of the cable is attached to a connector that supports the hot-swap HDD backplane, located on the planar between slot one and the memory card, beneath the memory options.

For additional information regarding internal cabling, refer to Appendix F: Internal Cabling Overview.

xSeries 360 Hard Disk Drive (HDD) Storage

Total Int Storage ¹	10,000RPM HDDs			15,000RPM HDDs	
	18.2GB (06P5754)	36.4GB (06P5755)	73.4GB (06P5756)	18.2GB (06P5767)	36.4GB (06P5768)
18.2GB	1	-	-	1	-
36.4GB	2	1	-	2	1
54.6GB	3	-	-	3	-
72.8GB ²	-	2 ²	-	-	2
109.2GB	-	3	-	-	3
146.8GB	-	-	2 ³	-	-
220.2GB	-	-	3 ³	-	-

This table does not represent all possible HDD configurations.

1. Select a total storage row then select the quantity of HDDs from a column corresponding to the HDD of choice.

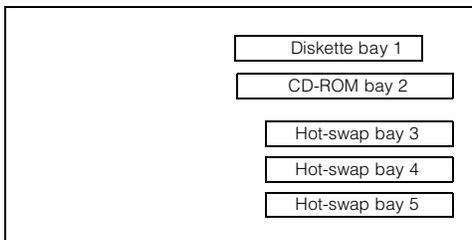
2. Models 2RX and 3RX include two standard 36.4GB 10,000rpm HDDs installed in bays four and five.

3. Requires replacing one or both of the standard HDDs in models 2RX and 3RX.



Bay	Form Factor	Height	Front Access	Usage	Part Number	Description	RPM	Height	Bays Supported ¹	Max Qty
1	89mm (3.5in)	SL	Yes	Diskette	Ultra160 HDDs					
2	133mm (5.25in)	SL	Yes	IDE CD-ROM	06P5756	73.4GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD	10000	SL	3 ... 5	3
3	HS	SL	Yes	Open	06P5754	18.2GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD	10000	SL	3 ... 5	3
4, 5	HS	SL	Yes	HDD ¹	06P5755	36.4GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD	10000	SL	3 ... 5	3
					06P5767	18.2GB 15Krpm Ultra160 SCSI Hot-Swap SL HDD	15000	SL	3 ... 5	3
					06P5768	36.4GB 15Krpm Ultra160 SCSI Hot-Swap SL HDD	15000	SL	3 ... 5	3

1. Two 36.4GB 10,000rpm hot-swap HDDs are standard in models 2RX and 3RX. Model 1RX ships open bay HDDs are installed in open bay models beginning with the bottom bay (5-4-3).



External Storage Expansion Units¹		Form Factor
35311RU	EXP300 Storage Expansion Unit ²	Rack (3U)
35601RU	FAST EXP500 Storage Expansion Unit ³	Rack (3U)
35421RU	FAST200 Storage Server ^{4, 5}	Rack (3U)
35422RU	FAST200 HA Storage Server ⁴	Rack (3U)
19K1121	FAST200 Redundant RAID Controller	-

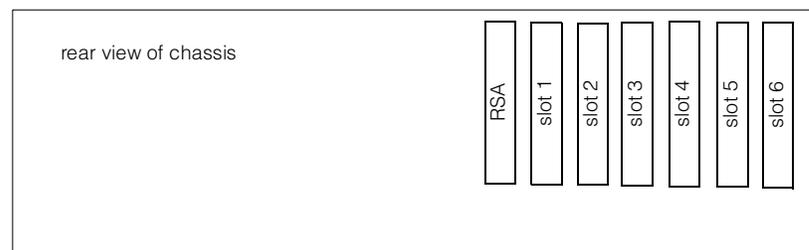
- To configure an external SCSI storage device, select an optional SCSI controller then refer to Appendix D: Cables - Storage Units - Controllers to confirm the controller supports the desired External Storage Expansion Unit and to select a supported cable. For HDD or other expansion unit options, see the specific expansion unit section. For Fibre Channel storage devices, refer to the Fibre Channel Solutions Overview section.
- EXP300 includes a single 2M Ultra2 SCSI cable and dual hot-swap 500W redundant power supplies, each with its own power cord.
- FAST EXP500 Storage Expansion Unit (P/N 35601RU) includes dual hot-swap 350W power supplies, each with its own power cord.
- The FAST200 includes two hot-swap, 350W auto-ranging redundant power supplies, each with its own power cord.
- Can be upgraded to FAST200 HA Storage Server through the addition of a FAST200 Redundant RAID Controller (P/N 19K1121).

xSeries 360 I/O Options

Part Number	Description	Adapter Length	PCI Support ¹	Slots Supported ¹	Hot-Plug ²	PCI Voltage Key	MHz ³
Storage Controllers⁴							
37L6889	ServeRAID-4H Ultra160 SCSI Controller ⁵	Full	64-bit	1 ... 6	X	Universal	33
06P5736	ServeRAID-4Mx Ultra160 SCSI Controller ⁵	Full	64-bit	1 ... 6 ⁷	X	Universal	66
06P5740	ServeRAID-4Lx Ultra160 SCSI Controller ⁷	Half	64-bit	1 ... 6	X	Universal	66
19K4646	PCI Wide Ultra160 SCSI Adapter ⁸	Half	32-bit	1 ... 6	-	Universal	66
Fibre Storage Controllers and Options⁹							
00N6881	Netfinity FAST Host Adapter	Half	64-bit	1 ... 6	X	Universal	66
19K1246	FAST FC-2 Host Bus Adapter	Half	64-bit	1 ... 6	X	Universal	66
17421RU	FAST700 Fibre Channel Storage Server	-	-	-	-	-	-
35521RU	FAST500 Storage Server	-	-	-	-	-	-
35421RU	FAST200 Storage Server	-	-	-	-	-	-
35422RU	FAST200 HA Storage Server	-	-	-	-	-	-
35341RU	SAN Fibre Channel Managed Hub	-	-	-	-	-	-
2109S08	SAN Fibre Channel Switch, 8-Port	-	-	-	-	-	-
2109S16	SAN Fibre Channel Switch, 16-Port	-	-	-	-	-	-
2109F16	SAN Fibre Channel Switch, 16-Port (2Gb)	-	-	-	-	-	-
2108R3L	SAN Data Gateway Router Ultra SCSI LVD Port ¹⁰	-	-	-	-	-	-
Networking¹¹							
Ethernet¹²							

09N9901	10/100 EtherLink Server Adapter by 3Com ¹³	Half	32-bit	1 ... 6	X	Universal	33
06P3601	10/100 Ethernet Server Adapter ¹³	Half	32-bit	1 ... 6	X	Universal	33
06P3701	Gigabit Ethernet SX Server Adapter (fiber)	Half	64-bit	1 ... 6	X	Universal	66
22P4901	10/100 Dual Port Server Adapter ¹³	Half	64-bit	1 ... 6	X	Universal	66
22P6801	PRO/1000XT Server Adapter by Intel (copper) w/CD, manuals ¹³	Half	64-bit	1 ... 6	X	Universal	133
Token Ring							
34L5001	16/4 Token-Ring PCI Management Adapter ¹³	Half	32-bit	1 ... 6	X	Universal	33
34L5201	High-Speed 100/16/4 Token-Ring PCI Management Adapter ¹³	Half	32-bit	1 ... 6	X	Universal	33
Systems Management¹⁴							
03K9309	Advanced System Management Interconnect Cable Kit ¹⁵	-	-	-	-	-	-
Remote I/O Expansion							
8684-1RU	RXE-100 Remote Expansion Enclosure ¹⁶	-	-	-	-	-	-

1. Adapters rated at a lower frequency than the slots in which they are installed will reduce the bus to the frequency of the slowest adapter. 133MHz PCI-X adapters are backward compatible with 33/66MHz, 64-bit PCI-based servers.
2. All six slots are full-length hot-plug capable. For Network Operating System support, access www.pc.ibm.com/us/compat.
3. Slots one and two operate at 100MHz on the same bus and support two 100MHz adapters. An adapter rated at 133MHz may be installed in slot one, but slot two must remain empty.
4. xSeries 360 includes an integrated single-channel Ultra160 SCSI controller. See "Internal SCSI Cabling" for cabling alternatives.
5. ServeRAID-4H Ultra160 SCSI Controller is powered by a 266MHz PowerPC 750 processor and provides 128MB of battery-backed ECC cache. The two internal connectors are not accessible due to a cabling interference. Four external Ultra160 0.8mm VHDCI connectors are available.
6. ServeRAID-4Mx Ultra160 SCSI Controller is powered by a 100MHz Intel Zion GC80303 processor that provides 64MB of battery-backed ECC cache and two internal and two external Ultra160 connections (only two connectors may be used). External connectors are 0.8mm VHDCI.
7. ServeRAID-4Lx Ultra160 SCSI Controller is powered by a 100MHz Intel Zion GC80303 processor and provides a single channel, 32MB of ECC cache and either one internal or one external Ultra160 connection. External connector is 0.8mm VHDCI.
8. PCI Wide Ultra160 SCSI Adapter (P/N 19K4646) provides a single channel with one internal connector, a five-drop multi-mode terminated LVD SCSI cable and one external 0.8mm VHDCI connector. This system supports external connection only.
9. See Fibre Channel Solutions Overview section for additional configuration information.
10. The 2108R3L SAN Data Gateway Router Ultra SCSI LVD port provides one integrated short-wave optical port and two SCSI ports for tape storage connections (LVD, HVD and single-ended).
11. xSeries 360 has an integrated 10/100 PCI Ethernet controller. Wake on LAN is supported only for the integrated controller.
12. In a fault-tolerant networking environment, using the fault-tolerant software delivered with the Ethernet adapters of a single manufacturer is recommended. Installing fault-tolerant solutions provided by multiple manufacturers may cause failures if the intermediate drivers provided with the adapters are not compatible. The onboard Ethernet is Intel-based. Four of the optional PCI Ethernet adapters listed are Intel-based (P/N 06P3601, 06P3701, 22P4901, 22P6801).
13. The Wake on LAN function of this option is not supported by this server.
14. xSeries 360 includes a Remote Supervisor Adapter installed in a dedicated PCI slot with an external connector, leaving six PCI slots available for optional adapters. Support for connection to other servers requires an optional Advanced System Management Interconnect Cable Kit (P/N 03K9309). Direct connection to the RXE drawer management controller in an RXE-100 Remote Expansion Enclosure is supported through a standard Interconnect Management Cable Kit with 3.5m cable connecting to an integrated RS-485 port on the rear of the system chassis. An 8m optional cable is available.
15. Required to connect the standard Remote Supervisor Adapter to an interconnect network with other servers for system management support through a single LAN or modem connection. Up to 24 Integrated System Management Processors or Remote Supervisor Adapters may be interconnected with an aggregate connection length of no more than 91.4m (300ft). This interconnect network of 24 devices may include a maximum of 12 Advanced System Management Processors or Advanced System Management PCI Adapters. A customer-supplied Cat5 cable is required for each interconnection.
16. RXE-100 Remote Expansion Enclosure supports up to 12 additional PCI-X slots. Cable required for connection included with expansion unit, which attaches to a standard external connector located on the back of the x360 chassis. An optional longer cable is available. See section on RXE-100.
17. Not supported in slot one if the RAID adapter is attached to the connector on the planar that controls the hot-swap backplane as a result of a cabling interference with the standard RAID cable, which must be routed under the adapter. External RAID attachment only is supported for full-length RAID adapters installed in slot one.



- RSA: standard Remote Supervisor Adapter
 Slot 1: Bus 2, 100MHz, 64-bit, full-length, Active PCI-X, 3.3v (Bus 2 also supports one 133MHz adapter installed in slot 1.)
 Slot 2: Bus 2, 100MHz, 64-bit, full-length, Active PCI-X, 3.3v (Slot 2 must be empty if a 133MHz adapter installed in slot 1.)
 Slot 3: Bus 1, 66MHz, 64-bit, full-length, Active PCI-X, 3.3v
 Slot 4: Bus 1, 66MHz, 64-bit, full-length, Active PCI-X, 3.3v
 Slot 5: Bus 1, 66MHz, 64-bit, full-length, Active PCI-X, 3.3v
 Slot 6: Bus 1, 66MHz, 64-bit, full-length, Active PCI-X, 3.3v



xSeries 360 Power, Monitors & Accessories

Part Number	Description
Power¹	
31P6108	370W Hot-Swap Redundant Power Supply ²
Uninterruptible Power Supply (UPS)^{3, 4}	
32P1020	APC 2U Smart-UPS 1400RMB
94G6676	APC Smart-UPS 3000RMB ⁵
37L6861	APC Smart-UPS 5000RMB ⁶
Monitors⁷	
633147N	E54 Color Monitor 15in (350mm, 13.8in viewable image), stealth black ⁸
63324HN	E74 Color Monitor 17in (406mm, 16in viewable image), stealth black ⁸
66274AN	G78 Color Monitor 17in (406.4mm, 16in viewable image), stealth black ⁸
9511AG4	T540 Flat Panel Color Monitor 15in (381mm, 15in viewable image), stealth black ⁹
32P1031	NetBAY 1U Flat Panel Monitor Console Kit (w/ US Space Saver Keyboard) ¹⁰
32P1032	NetBAY 1U Flat Panel Monitor Console Kit (without keyboard) ¹⁰

1. xSeries 360 models 2RX and 3RX include two 370W, hot-swap power supplies, each with two 9ft power cords--one high voltage IEC 320-C13 to IEC 320-C14 and one low voltage IEC 320-C13 to NEMA 5-15P. N+1 power supply redundancy is standard for these models. The addition of an optional 370W Hot-Swap Redundant Power Supply (P/N 31P6108) is supported for configurations of greater than 370W with power redundancy, i.e., a total of three 370W power supplies. Model 1RX includes one standard power supply and may be upgraded to two or three power supplies according to the same rules for redundancy as models 2RX and 3RX.

The following table is provided as a reference. The table shows an example of a maximum configuration that can be supported by two 370W power supplies with power redundancy.

Number of power supplies	System configuration supported
2	Redundant
	Up to three processors
	Up to four PCI adapters
	Up to two HDDs
	Up to six memory RDIMMs

2. 370W Hot-Swap Redundant Power Supply (P/N 31P6108) includes two 9ft power cords, one high voltage IEC 320-C13 to IEC 320-C14 and one low voltage IEC 320-C13 to NEMA 5-15P.

3. For runtimes and UPS attributes see Appendix C: UPS Runtime Estimate.

4. Because the x360 is not equipped with a serial port, UPS remote management requires a USB to serial adapter such as the Belkin USB to Serial Adapter (P/N 10K3661), which is available at www.pc.ibm.com/ww/eserver/xseries. Select Accessories, Upgrades & Monitors and the country, then click Go. Scroll to the bottom of the page, select Cables and Adapters, then open the Adapters pulldown menu.

5. Height is 3U. See Rack Cabinets and Options section for supported IBM racks.

6. Height is 5U. See Rack Cabinets and Options section for supported IBM racks.

7. xSeries 360 uses an SVGA controller (S3 Savage4 LT chipset) with 8MB of video memory. Optional video adapters are not supported.

8. Installation within a rack requires optional Monitor Compartment (P/N 94G7444).

9. Installation within a rack requires optional Netfinity Flat Panel Monitor Rack Mount Kit II (P/N 37L6888) and Netfinity Rack Keyboard Tray (P/N 28L4707). A space saver keyboard may coexist within the same 28L4707 keyboard tray. Or NetBAY 1U Flat Panel Monitor Console Kit (P/N 32P1031 with a space saver keyboard, 32P1032 without) can be used.

10. Includes a 15in Flat Panel Monitor.



Part Number	Description
Rack and NetBAY¹	
	Refer to the Rack Cabinets and Options section for information concerning IBM racks and rack-supported devices.
Keyboard and Mouse²	
28L3644	Space Saver II Keyboard ^{3, 4}
28L3621	Preferred Keyboard (stealth black) ⁵
22P5150	TrackPoint USB Space Saver Keyboard ^{3, 4, 6}
10K3849	106-key Preferred USB Keyboard with 2-port USB Hub (stealth black) ^{5, 6}
28L3673	Sleek 2-Button Stealth Black Mouse
33L3244	Sleek USB Mouse (stealth black)

1. xSeries 360 is housed in a 19in rack-mountable drawer and requires one of the racks listed in the Rack Cabinets and Options section.
2. xSeries 360 supports rack configurations only and ships without a keyboard or mouse. The system includes three USB ports, SVGA video port, mouse port and keyboard port.
3. Installation within a rack requires optional keyboard tray (P/N 28L4707), which stows in ready-to-use position.
4. Advanced TrackPoint IV features are not available on IBM xSeries systems.
5. Installation within a rack requires optional keyboard tray (P/N 28L4707). This keyboard cannot share a keyboard tray with a flat panel display.
6. USB keyboards attach to a single USB-capable server. They are not compatible with the NetBAY console switches.

xSeries 360 Tape Options

Part Number	Tape Drives	Bays Supported ¹	SCSI Interface (bit)	Form Factor	Termination Included	68/50-pin Converter Incl	Ext Tape Enclosures
00N8016	100/200GB LTO Tape Drive	-	16 Ultra2 LVD	133mm (5.25in) FH	Y ²	-	3551001 ³ 3503B 1X
00N8015	110/220GB Super DLT Internal SCSI Tape Drive	-	16 Ultra2 LVD	133mm (5.25in) FH	Y ²	-	3551001 ³ 3503B 1X
24P2396	100/200GB LTO Half-High Tape Drive	-	16 Ultra2 LVD	133mm (5.25in) HH	Y ²	-	3551001 ³
Tape Autoloaders							
3600109	3600 Series 900GB/1.8TB LTO Tape Autoloader ⁴	-	16 Ultra2 LVD	Tower or 6U Rack	Y	-	-
External Tape Libraries⁵							
3570C2x	Magstar MP 3570 Tape Subsystem	-	HVD	6U Rack	Y	-	-
3600220	3600 Series 2/4TB LTO Tape Library (Tower)	-	16 Ultra2 LVD	Tower	Y	-	-
3600R20	3600 Series 2/4TB LTO Tape Library (Rack)	-	16 Ultra2 LVD	5U Rack	Y	-	-
3600LXU	3600 Series 2-Drive, 20-Cartridge Expander Module ⁶	-	16 Ultra2 LVD	5U Rack	Y	-	-
09N4048	3600 Series LTO Drive Upgrade Option ⁷	-	16 Ultra2 LVD	-	N	-	-
External Tape Enclosures							
3551001	NetMEDIA Storage Expansion Unit EL ⁸	-	16	Rack	Y	N	-
10L7113	NetMEDIA Systems Management Adapter ⁹	-	16 LVD	-	N	N	3551001
3503B 1X	Full-High SCSI Tape Enclosure ¹⁰	-	16 Ultra2 LVD	Desktop or 3U Rack	Y	N	-

IBM XSERIES 360



1. IBM xSeries 360 does not support internal tape drives. An external tape library or tape enclosure must be used. All tape drives and enclosures are supported by PCI Wide Ultra160 SCSI Adapter (P/N 19K4646) which has an external 0.8mm VHDCI connector. Select tape drive, enclosure and controller then use Appendix D: Cables - Storage Units - Controllers to select an appropriate external cable.
2. Termination requires installing the 42in single-drop, terminated LVD SCSI cable provided with the option or is provided in a NetMEDIA Storage Expansion Unit with the installation of NetMEDIA Systems Management Adapter (P/N 10L7113).
3. LVD support for LVD devices installed in a NetMEDIA Storage Expansion Unit EL (P/N 3551001) requires installation of NetMEDIA Systems Management Adapter (P/N 10L7113), which also provides termination, and replacement of the standard single-ended internal cable with the terminated single-drop LVD SCSI cable provided with this option. If the standard cables are used for attachment to LVD devices, single-ended SCSI rules and bus speeds apply.
4. If installed in a rack, a fixed shelf is required. Allow an additional 1U for the fixed shelf. One unit only per shelf is supported.
5. Tape library attributes and prerequisites are located in Appendix B: Tape Library Attributes.
6. Supported only with the 3600 Series LTO Tape Library (rack) (P/N 3600R20). Allow one additional EIA space when installing either one or two (maximum) units to accommodate a filler plate for cable routing. Up to two 3600 Series LTO Drive Upgrade Options can be installed in each module or the module can operate off the LTO drives installed in the LTO tape library.
7. Install in second drive bay of 3600 LTO Tape Libraries or in either of the two bays of 3600 Series 2-Drive 20-Cartridge Expander Module to increase performance. Includes an LTO (Ultrium) drive and a one-meter external LVD SCSI cable.
8. NetMEDIA Storage Expansion Unit EL (P/N 3551001) is a black 3U, 19in rack mountable tape enclosure which includes two full-high (FH) or four half-high (HH) extended length 133mm (5.25in) bays, two external 0.8mm VHDCI connectors and two internal four-drop single-ended terminated 16-bit SCSI cables for device attachment. Two power supplies and two power cords are also included. Tip: The front rail clips will need to be reversed and screwed in from behind to secure the unit in a 930842x rack.
9. NetMEDIA Systems Management Adapter (P/N 10L7113) may be installed in a 3551001 to provide repeater function, LVDS interface, aggregate cable lengths up to 12m when attached to an LVD SCSI controller, and auto-termination when the 3551001 is powered off. External connector is 0.8mm VHDCI.
10. Black desktop or 3U rack tape enclosure supports 133mm (5.25in) full-high LVD tape devices including DLT technology. Requires a fixed shelf if installed in a rack (allow additional 1U for fixed shelf). Supports the following full-high tape options: 00N8015, 00N8016, 00N7992, 00N7990.

Note: Additional tape attributes can be found in Appendix A: Tape Drive Attributes.

xSeries 360 Sample Configurations

Note: The following sample configurations are for illustration only and may not be suitable for any specific customer installation. Contact your IBM Business Partner or IBM Marketing Representative for assistance with your specific configuration requirements.

Microsoft Exchange SCSI Solution¹

Part Number	Description	Quantity
8686-3RX	xSeries 360 Pentium III Xeon, 2x1.6GHz/4x100MHz, 1MB L3 Cache, 2GB(R) ECC, 72.8GB, 24X	1
19K4647	xSeries 1.6GHz/1MB L3 Cache Upgrade with Xeon Processor MP	2 ²
31P6108	xSeries 370W Hot-swap Redundant Power Supply	1 ³
33L3283	512MB PC 1600 ECC DDR SDRAM RDIMM	2 ⁴
37L6889	ServeRAID-4H Ultra160 SCSI Controller	1 ⁵
06P5755	36.4GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD	1 ⁶
06P3601	10/100 Ethernet Server Adapter	1
633147N	E54 Color Monitor 15in (350mm, 13.8in viewable image), stealth black	1
37L6861	APC Smart-UPS 5000RMB	1
External Storage		
35311RU	EXP300 Storage Expansion Unit	2
06P5755	36.4GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD	14 ⁷
3600109	3600 Series 900GB/1.8TB LTO Tape Autoloader	1
Rack Options		
9306250	NetBAY25 Standard Rack Cabinet	1
28L3644	Space Saver II Keyboard	1
94G6670	Blank Filler Panel Kit	1

1. This configuration supports 8,000 users.
2. Total of four processors.
3. Required to maintain N+1 power redundancy in this configuration--total of three 370W power supplies.
4. Total memory of 3GB.
5. External connectors only can be used due to internal cabling restriction.
6. Total of three 36.4GB internal HDDs (109.2GB).
7. Six HDDs are used for RAID-5E protection in each EXP300. One HDD is identified as a hot-spare. Effective capacity is five HDDs in each storage enclosure (total of 182GB).



Microsoft Exchange High-Availability Fibre Channel Solution¹

Part Number	Description	Quantity
8686-3RX	xSeries 360 Pentium III Xeon, 2x1.6GHz/4x100MHz, 1MB L3 Cache, 2GB(R) ECC, 72.8GB, 24X	1
19K4647	xSeries 1.6GHz/1MB L3 Cache Upgrade with Xeon Processor MP	2 ²
31P6108	xSeries 370W Hot-swap Redundant Power Supply	1 ³
33L3283	512MB PC 1600 ECC DDR SDRAM RDIMM	2 ⁴
06P5736	ServeRAID-4MX Ultra160 SCSI Controller	1
06P5755	36.4GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD	1 ⁵
06P3601	10/100 Ethernet Server Adapter	1
19K1246	FAStT FC-2 Host Bus Adapter	2
8684-1RX	RXE-100 Remote Expansion Enclosure	1
17421RU	FAStT700 Storage Server	1 ⁶
37L6861	APC Smart-UPS 5000RMB	1
94G6676	APC Smart-UPS 3000RMB	1
External Storage		
35601RU	FAStT EXP500 Storage Expansion Unit	3
19K0653	Netfinity 36.4GB 10K-4 FC Hot-Swap HDD	18 ⁷
3600109	3600 Series 900GB/1.8TB LTO Tape Autoloader	1
Rack Options		
9306420	NetBAY42 Standard Rack Cabinet	1
32P1031	NetBAY 1U Flat Panel Monitor Console Kit (w/ US Space Saver Keyboard)	1
94G6670	Blank Filler Panel Kit	1

1. This configuration supports 8,000 users.

2. Total of four processors.

3. Required to maintain N+1 power redundancy in this configuration--total of three 370W power supplies.

4. Total memory of 3GB.

5. Total of three 36.4GB internal HDDs (109.2GB).

6. Fibre Channel cable, SFP Modules and FAStT700 Mini Hubs not included.

7. Six HDDs are used for RAID-5E protection in each FAStT EXP500. One HDD is identified as a hot-spare. Effective capacity is five HDDs in each storage enclosure (total of 182GB).



IBM xSeries 370

Part Number
 Processor Speed (MHz)²
 Number of Processors (Std/Max)
 L2 ECC Cache
 Memory (Std/Max) (R=RDIMM)
 Form Factor
 Power Supply Quantity (Std/Max)
 Hot-Swap (Power, Slots, HDD, Fans)
 Redundancy (Optional, Standard)
 Adv System Management Adapter³
 Onboard Ethernet (Mbps)
 SCSI Controller (Dual, Ultra, RAID)
 Removable Media Bays (Total/Avail)
 Internal Hard Disk Drive (Std/Max)
 CD-ROM (IDE)⁴
 Bays (Total/Avail)
 Slots (Total/Avail)

xSeries 370 At-A-Glance																
8681-1RX ¹	700	1/8	1MB	512MB ^R /32GB	Rack (8U)	3/3	P, S, H, F	S-Fans, S-Power	Y	-	D, U2	2/0	0/146.8GB	48X-20X	4/2	12/12
8681-2RX ¹	700	1/8	2MB	512MB ^R /32GB	Rack (8U)	3/3	P, S, H, F	S-Fans, S-Power	Y	-	D, U2	2/0	0/146.8GB	48X-20X	4/2	12/12
8681-3RX ¹	900	1/8	2MB	512MB ^R /32GB	Rack (8U)	3/3	P, S, H, F	S-Fans, S-Power	Y	-	D, U2	2/0	0/146.8GB	48X-20X	4/2	12/12

1. Housed in a 19in rack-mountable drawer and ships standard without a keyboard or mouse. See Rack Cabinets and Options section for supported IBM racks.
2. Intel Pentium III Xeon processor with integrated full-speed ECC L2 cache and 100 MHz access to memory and I/O buses.
3. xSeries 370 includes a system management adapter equivalent to the one shipped with option 01K7209 (Netfinity Advanced System Management PCI Adapter).
4. Variable read rate. Actual playback speed will vary and is often less than the maximum possible.

xSeries 370 Processors

Part Number	Processor Upgrades ¹	SMP Support ²	Processor Speed/Cache Upgrade ³
10K2330	Netfinity 8500R 700MHz/1MB Upgrade with Pentium III Xeon Processor	1RX	-
10K2166	Netfinity 8500R 700MHz/2MB Upgrade with Pentium III Xeon Processor	2RX	1RX
19K4637	xSeries 370 900MHz/2MB Upgrade with Pentium III Xeon Processor	3RX	1RX, 2RX
10K2335	Netfinity 4X Accelerator Filter	1 ... 3RX ⁴	1RX, 2RX
10K2337	Netfinity Mezzanine Expansion Kit	1 ... 3RX ⁴	1RX, 2RX

1. xSeries 370 architecture optimizes memory and bus performance using a 100MHz, five-port crossbar core chipset. Up to eight Pentium III Xeon processors are supported on two 100MHz P-6 CPU buses. The recommended order of processor installation is: Sockets A1, A3, A2, A4, B1, B3, B2, B4.
2. Up to seven additional processors may be installed, providing a maximum of eight. All processors must be identical in type, speed, and cache size. The fifth through eighth processors require a Netfinity Mezzanine Expansion Kit (P/N 10K2337).
3. Requires removal of the standard processor(s). A maximum of eight processors may be installed. Installation of greater than four processors requires the addition of a mezzanine board and two cache coherency filters. Required options which provide the board and filters vary by model. For more information refer to "Processor Upgrade Requirements." All processors must be identical in type, speed and cache size. Upgrades may require a BIOS update. To obtain the latest Flash BIOS, access www.pc.ibm.com/support and enter machine "Type-Model" in Quick Path. Select "Downloadable files" and then "BIOS."
4. The fifth through eighth processors require this option. See "Processor Upgrade Requirements" for more information on when this option is required.

Processor Upgrade Requirements^{1, 2}

Upgrade From	Upgrade To			
	≤ 4 x 550MHz processors	> 4 x 550MHz processors	≤ 4 x 700, 900MHz processors	> 4 x 700, 900MHz processors
≤ 4 x 550MHz processors	-	1 x 28L4730 or 1 x 28L4727	1 x 10K2337 ³	1 x 10K2335, 2 x 10K2337 ³
> 4 x 550MHzprocessors	n/a	-	1 x 10K2337 ^{3, 4}	2 x 10K2337 ^{3, 5}
≤ 4 x 700, 900MHz processors	n/a	n/a	-	1 x 10K2335, 1 x 10K2337

1. This table does not address the processor part numbers required. It does address the optional Enablement Kit, Filters, and Mezzanine Board part numbers required. 900MHz processors can be substituted for 700MHz processors in this table.
2. All processors must be identical in type, speed, and cache size. Upgrades may require a BIOS update. To obtain the latest Flash BIOS, access www.pc.ibm.com/support and enter machine "Type-Model" in Quick Path. Select "Downloadable files" then "BIOS."
3. Remove the standard processor mezzanine board.
4. Remove all optional Enablement Kit components.
5. Remove Enablement Kit mezzanine board. The Enablement Kit 4X cache coherency filters are supported for use with Netfinity Mezzanine Expansion Kit (P/N 10K2337).

xSeries 370 ships with a single mezzanine board containing four Pentium III Xeon processor sockets with terminators in the unoccupied sockets. An additional mezzanine board may be added, expanding the number of processor sockets to eight. The two mezzanine boards are then linked through two cache coherency filter cards, one for each mezzanine board.

Option Content

xSeries 370 / Netfinity 8500R > 4-Way Enablement Kits

(P/N 28L4730 and P/N 28L4727)

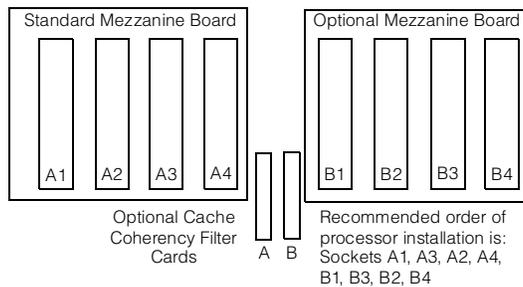
- Support for 550MHz models only
- Required for installation of processors 5 ... 8.
- One Processor Mezzanine Board
- Two cache coherency filter modules
 - 28L4730 economical 1X (256K entries)
 - 28L4727 high performance 4X (1M entries)
- Filters may be used with Mezzanine Expansion Kit (P/N 10K2337)

Netfinity 4X Accelerator Filter (P/N 10K2335)

- Two cache coherency filter modules
- Requires Mezzanine Kit (P/N 10K2337)

Netfinity Mezzanine Expansion Kit (P/N 10K2337)

- One Processor Mezzanine Board
- Supports cache coherency filters from the following options:
 - P/N 10K2335
 - P/N 28L4730
 - P/N 28L4727
- Supports 700MHz and above processors only
- Required when upgrading models 8681-4RY ... 6RY to 700MHz or above
- Required when adding fifth through eighth processors rated at 700MHz or above



All installed processors must be identical in type, speed and cache size. Upgrades may require a BIOS update. To obtain the latest Flash BIOS, access www.pc.ibm.com/support and enter machine "Type-Model" in Quick Path. Select "Downloadable files" then "BIOS."

xSeries 370 Memory

Total System Memory	Quantity of RDIMMs Added			
	Std Models	128MB (20L0245)	256MB (20L0247)	512MB (33L3149)
640	1	-	-	-
768	2 or	1	-	-
1024	4 or	2 or	1	-
1280	6 or	3	-	-
1536	8 or	4 or	2 or	1
1792	10 or	5	-	-
2048	12 or	6 or	3	-
2560	16 ² or	8 or	4 or	2
2816	18 ² or	9	-	-
3072	20 ² or	10 or	5	-
3328	22 ² or	11	-	-
3584	24 ² or	12 or	6 or	3
4096	28 ² or	14 ² or	7	-
4608	-	16 ² or	8 or	4
5120	-	18 ² or	9	-
5632	-	20 ² or	10 or	5
6144	-	22 ² or	11	-
6656	-	24 ² or	12 or	6
7680	-	28 ² or	14 ² or	7
8192	-	32 ^{2,3} or	16 ³ or	8 ³
8704	-	-	16 ² or	8
9728	-	-	18 ² or	9
10752	-	-	20 ² or	10
11776	-	-	22 ² or	11
12800	-	-	24 ² or	12
13824	-	-	26 ² or	13
14848	-	-	28 ² or	14 ²

Memory Card A- Std	Memory Card B- Optional
A1 Socket	B1 Socket
A2 Socket	B2 Socket
A3 Socket	B3 Socket
A4 Socket	B4 Socket
A5 Socket	B5 Socket
A6 Socket	B6 Socket
A7 Socket	B7 Socket
A8 Socket	B8 Socket
A9 Socket	B9 Socket
A10 Socket	B10 Socket
A11 Socket	B11 Socket
A12 Socket	B12 Socket
A13 Socket	B13 Socket
A14 Socket	B14 Socket
A15 Socket	B15 Socket
A16 Socket (J1-J16)	B16 Socket (J1-J16)

Recommended order of RDIMM population for optimum cooling: 1, 5, 9, 13, 3, 7, 11, 15, 2, 6, 10, 14, 4, 8, 12, 16.



15488	-	-	-	15 ⁵
16384	-	-	32 ^{2,3} or	16 ³
16896	-	-	-	16 ²
18944	-	-	-	18 ²
20992	-	-	-	20 ²
23040	-	-	-	22 ²
25088	-	-	-	24 ²
27136	-	-	-	26 ²
29184	-	-	-	28 ²
30720	-	-	-	30 ⁴
32768	-	-	-	32 ³

This table does not represent all possible memory configurations. Memory modules may vary in price per MB. Selection of smaller RDIMMs may provide a more cost-effective alternative to using larger RDIMMs.

NOTE: Cache line interleaving may be enabled by installing Netfinity 8500R Memory Expansion Card (P/N 28L4454) with as few as two RDIMMs. Matched pairs must be installed if the memory expansion card is present. Two standard RDIMMs may be removed from Card A and installed in Card B to create two matched pairs or four additional 128MB RDIMMs may be purchased and installed in corresponding Card B sockets.

1. Network operating systems may limit the maximum amount of addressable memory. See the operating system specifications for further information.
2. Netfinity 8500R Memory Expansion Card (P/N 28L4454) is required for installation of greater than 16 RDIMMs.
3. Requires removal of standard memory.
4. Requires removal of all but two of the standard RDIMMs.
5. Requires removal of all but one of the standard RDIMMs.

Part Number	Memory Description ¹
20L0245	Netfinity 128MB SDRAM ECC RDIMM II
20L0247	Netfinity 256MB SDRAM ECC RDIMM II
28L4454	Netfinity 8500R Memory Expansion Card ²
33L3056	Netfinity 1GB SDRAM ECC RDIMM II
33L3149	512MB 100MHZ ECC SDRAM RDIMM ³

1. xSeries 370 includes a single memory card with the ability to support up to 16GB of memory. All models contain four standard RDIMMs, but there is no requirement to add memory options in sets of four. For memory installation of greater than 16GB or to enable cache line interleaving, Netfinity 8500R Memory Expansion Card (P/N 28L4454) is required. Cache line interleaving can be implemented with as few as two memory options. Installation of memory in systems containing a single memory card (standard on all models) has no restrictions on size or placement. When Netfinity 8500R Memory Expansion Card (P/N 28L4454) is installed, the memory RDIMM in each socket of Card A must match the RDIMM in the same socket on Card B. To enable cache line interleaving, both memory cards must be installed and configured identically. Adding RDIMMs is not required to enable cache line interleaving, i.e., the standard RDIMMs in sockets A9 and A13 can be removed from card A and installed in sockets B1 and B5.
2. Required for enablement of cache line interleaving or installation of greater than 16 RDIMMs. Configuration of the standard memory card (Card A) and optional 28L4454 (Card B) must be identical.
3. Due to the new technology used by 512MB 100MHz ECC SDRAM RDIMM (P/N 33L3149), it should not be matched with Netfinity 512MB SDRAM ECC RDIMM II (P/N 20L0249) when populating Memory Card B.

xSeries 370 Internal SCSI Cabling

xSeries 370 systems contains an LVDS backplane supporting two hot-swap drive bays that support installation of up to two 3.5in, slim-high HDDs. The backplane is connected to the internal connector of the Wide Ultra2 SCSI controller through a 16-bit LVD SCSI cable. RAID support for the internal hot-swap drive bays is provided by adding a supported RAID adapter and moving the standard SCSI cable from the onboard controller to the optional RAID controller. The standard external Wide Ultra2 SCSI port uses a 0.8mm Very High Density Connector Interface (VHDCI).

For additional information regarding internal cabling, refer to Appendix F: Internal Cabling Overview.

xSeries 370 Hard Disk Drive (HDD) Storage

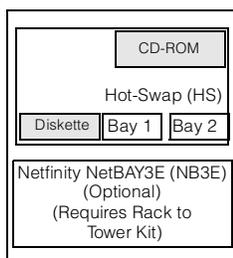
Total Internal Storage ¹	10,000RPM HDDs			15,000RPM HDDs	
	18.2GB (06P5754) ²	36.4GB (06P5755) ²	73.4GB (06P5756) ²	18.2GB (06P5767) ²	36.4GB (06P5768) ²
0GB	Standard on base models				
18.2GB	1	-	-	1	-
36.4GB	2	1	-	2	1
72.8GB	-	2	-	-	2
73.4GB	-	-	1	-	-
146.8GB (max)	-	-	2	-	-

This table does not represent all possible HDD configurations.

1. Select a total storage row and then select the quantity of HDDs from a column corresponding to the HDD of choice. Total Internal Storage listed is within +/- 0.2GB unless otherwise noted.
2. xSeries 370 contains an Ultra2 hot-swap backplane which limits Ultra160 HDDs to Ultra2 bus speeds.

Bay	Form Factor	Height	Front Access	Usage
-	133mm (5.25in)	HH	Yes	IDE CD-ROM
-	89mm (3.5in)	SL	Yes	Diskette
1 ... 2	HS	HH	Yes	Open
NB3E ¹	19in Rack	3U	Yes	Open

1. A total of three optional 3U NetBAY3Es can be stacked beneath an xSeries 370 which has Netfinity 8Ux28D Rack-to-Tower Kit (P/N 28L4705) installed. See IBM Netfinity NetBAY3x Stackable Enclosure section for supported devices.



Part Number	Description	RPM	Height	Bays Supported	Max Qty
Ultra160 HDDs¹					
06P5754	18.2GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD	10000	SL	1, 2	2
06P5755	36.4GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD	10000	SL	1, 2	2
06P5756	73.4GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD	10000	SL	1, 2	2
06P5767	18.2GB 15Krpm Ultra160 SCSI Hot-Swap SL HDD	15000	SL	1, 2	2
06P5768	36.4GB 15Krpm Ultra160 SCSI Hot-Swap SL HDD	15000	SL	1, 2	2
External Storage Expansion Units²			Form Factor		
35311RU	EXP300 Storage Expansion Unit ³	Rack (3U)			
09N7296	EXP300 Rack-to-Tower Conversion Kit	-			
35601RU	FAST EXP500 Storage Expansion Unit ⁴	Rack (3U)			
35421RU	FAST200 Storage Server ^{5, 6}	Rack (3U)			
35422RU	FAST200 HA Storage Server ⁵	Rack (3U)			
19K 1121	FAST200 Redundant RAID Controller	-			

1. xSeries 370 contains an Ultra2 hot-swap backplane which limits Ultra160 HDDs to Ultra2 bus speeds.
2. Not supported by the onboard external SCSI port. To configure one of the SCSI storage devices listed here, select an optional SCSI controller then refer to Appendix D: Cables - Storage Units - Controllers to confirm that the controller supports the desired External Storage Expansion Unit and to select a supported cable. For HDD or other expansion unit options, see the specific expansion unit section. For Fibre Channel storage devices, refer to the Fibre Channel Solutions Overview section.
3. EXP300 includes a single 2M Ultra2 SCSI cable and dual hot-swap 500W redundant power supplies, each with its own power cord. To convert an EXP300 to a tower form factor, Netfinity EXP300 Rack-to-Tower Conversion Kit (P/N 09N7296) is required.
4. FAST EXP500 Storage Expansion Unit (P/N 35601RU) includes dual hot-swap 350W power supplies, each with its own power cord.
5. The FAST200 includes two hot-swap, 350W auto-ranging redundant power supplies, each with its own power cord.
6. Can be upgraded to FAST200 HA Storage Server through the addition of a FAST200 Redundant RAID Controller (P/N 19K 1121).



xSeries 370 I/O Options

Part Number	Description	Adapter Length	PCI Support ²	Slots Supported ^{1, 2}	Hot-Plug ³	PCI Voltage Key	MHz
Storage Controllers⁴							
37L6889	ServeRAID-4H Ultra160 SCSI Controller ⁵	Full	64-bit	1 ... 12	X	Universal	33
06P5736	ServeRAID-4Mx Ultra160 SCSI Controller ⁶	Full	64-bit	1 ... 12	X	Universal	66
06P5740	ServeRAID-4Lx Ultra160 SCSI Controller ⁷	Half	64-bit	1 ... 12	X	Universal	66
19K4646	PCI Wide Ultra160 SCSI Adapter ⁸	Half	32-bit	1 ... 12	-	Universal	66
02K3454	PCI Fast/Wide Ultra SCSI Adapter ⁹	Half	32-bit	1 ... 5, 10 ... 12	-	5	33
Fibre Storage Controllers and Options¹⁰							
00N6881	Netfinity FAST Host Adapter	Half	64-bit	1 ... 12	X	Universal	66
19K1246	FAST FC-2 Host Bus Adapter	Half	64-bit	1 ... 12	X	Universal	66
17421RU	FAST700 Fibre Channel Storage Server	-	-	-	-	-	-
35521RU	FAST500 Storage Server	-	-	-	-	-	-
35421RU	FAST200 Storage Server	-	-	-	-	-	-
35422RU	FAST200 HA Storage Server	-	-	-	-	-	-
35341RU	SAN Fibre Channel Managed Hub	-	-	-	-	-	-
2109S08	SAN Fibre Channel Switch, 8-Port	-	-	-	-	-	-
2109S16	SAN Fibre Channel Switch, 16-Port	-	-	-	-	-	-
2109F16	SAN Fibre Channel Switch, 16-Port	-	-	-	-	-	-
2108R3L	SAN Data Gateway Router Ultra SCSI LVD Port ¹¹	-	-	-	-	-	-
Networking¹²							
Ethernet¹³							
09N9901	10/100 EtherLink Server Adapter by 3Com ¹⁴	Half	32-bit	1 ... 12	X	Universal	33
06P3601	10/100 Ethernet Server Adapter ¹⁴	Half	32-bit	1 ... 12	X	Universal	33
06P3701	Gigabit Ethernet SX Server Adapter (fiber)	Half	64-bit	1 ... 12	X	Universal	66
22P4901	10/100 Dual Port Server Adapter ¹⁴	Half	64-bit	1 ... 12	X	Universal	66
22P6801	PRO/1000XT Server Adapter by Intel (copper) w/CD, manuals ¹⁴	Half	64-bit	1 ... 12	X	Universal	133 ²
Token Ring							
34L0701	Token-Ring 16/4 PCI Adapter 2 with Wake on LAN ¹⁴	Half	32-bit	1 ... 12	X	Universal	33
34L5001	16/4 Token-Ring PCI Management Adapter ¹⁴	Half	32-bit	1 ... 12	X	Universal	33
34L5201	High-Speed 100/16/4 Token-Ring PCI Management Adapter ¹⁴	Half	32-bit	1 ... 12	X	Universal	33
Communications¹⁵							
33L4618	V90 PCI Data/Fax Modem ¹⁶	Half	32-bit	1 ... 5, 10 ... 12	-	5	33
37L14xx	Serial I/O SST 8, 16 and 128 Port Adapters ¹⁷	Half	32-bit	(1 ... 5, 10 ... 12) ¹⁷	-	5	33
Systems Management¹⁸							
03K9309	Advanced System Management Interconnect Cable Kit ¹⁹	-	-	-	-	-	-

1. The P-6 I/O bus supports four independent 64-bit PCI buses, two of which drive eight 33MHz, 5V slots (1-5, 10-12), while the other two buses drive four 66MHz, 3.3V slots (6-9). The 5V slots support universal or 5V adapters. A 66MHz adapter plugged into these slots will operate at 33MHz. The 3.3V slots support universal or 3.3V adapters. A 33MHz adapter plugged into these slots limits a 66MHz PCI adapter installed on the same bus to 33MHz.

2. A 64-bit adapter installed into a 32-bit slot will transfer data at 32-bit rates. Adapters rated at 66MHz will operate at 33MHz when installed in a 33MHz slot. 33MHz adapters will reduce 66MHz buses to 33MHz. 133MHz PCI-X adapters are backward compatible with 33/66MHz, 64-bit PCI-based servers.

3. All 12 slots are hot-plug capable using IBM's Active PCI technology. For Network Operating System support, access www.pc.ibm.com/us/compat.

4. xSeries 370 includes a dual-port, dual-channel, 64-bit Wide Ultra2 SCSI controller which supports either Single Ended (SE) or Low Voltage Differential SCSI (LVDS) modes. One internal connector and one external port with a 0.8mm Very High Density Connection Interface (VHDCI) are standard. The internal LVD SCSI cable has sufficient length to attach to an adapter located in slots 10 ... 12. If a boot device (internal or external) is to be attached to an adapter, the adapter must reside in slots 10 ... 12 due to BIOS scanning sequences.

5. ServeRAID-4H Ultra160 SCSI Controller is powered by a 266MHz PowerPC 750 processor and provides 128MB of battery-backed ECC cache with two internal and four external Ultra160 connectors (a combination of four connectors may be utilized). External connectors are 0.8mm VHDCI.

6. ServeRAID-4Mx Ultra160 SCSI Controller is powered by a 100MHz Intel Zion GC80303 processor that provides 64MB of battery-backed ECC cache and two internal and two external Ultra160 connections (only two connectors may be used). External connections are 0.8mm VHDCI.

7. ServeRAID-4Lx Ultra160 SCSI Controller is powered by a 100MHz Intel Zion GC80303 processor and provides a single channel, 32MB of ECC cache and either one internal or one external Ultra160 connection. External connector is 0.8mm VHDCI.

8. PCI Wide Ultra160 SCSI Adapter (P/N 19K4646) provides a single channel with one internal connector, a five-drop multi-mode terminated LVD SCSI cable and one external 0.8mm VHDCI connector. This system supports external connection only.

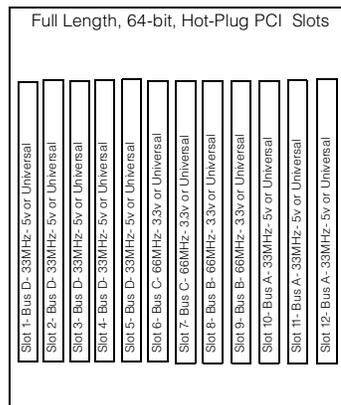
9. PCI Fast/Wide Ultra SCSI Adapter (P/N 02K3454) provides one external 68-pin high density connector that supports external SCSI devices such as tape enclosures.

10. See Fibre Channel Solutions Overview section for additional configuration information.

11. The 2108R3L SAN Data Gateway Router Ultra SCSI LVD port provides one integrated short-wave optical port and two SCSI ports for tape storage connections (LVD, HVD and single-ended).



12. xSeries 370 does not include an onboard network controller.
13. In a fault-tolerant networking environment, using the fault-tolerant software delivered with the Ethernet adapters of a single manufacturer is recommended. Installing fault-tolerant solutions provided by multiple manufacturers may cause failures if the intermediate drivers provided with the adapters are not compatible. The four Intel-based optional Ethernet adapters (P/N 06P3601, 06P3701, 22P4901, 22P6801) provide compatible intermediate drivers for failover support.
14. The Wake on LAN function of this option is not supported by this server.
15. xSeries 370 includes two USB ports, two high-speed serial/asynchronous ports (NS 16550A compatible), and one high-speed (up to 2Mbps data transfer speed) bidirectional parallel port supporting devices using ECP/EPP/SSP protocols adhering to the IEEE 1284 standard.
16. Due to homologation variances, modem availability may differ by country.
17. See Appendix E for details on Serial I/O options and configuration limitations. A maximum of four Serial I/O adapters (any combination of P/N 37L1414, 37L1415, 37L1416, 37L1423) may be installed.
18. xSeries 370 ships standard with a Advanced System Management PCI Adapter installed in a separate PCI slot connected through a dedicated PCI bus, leaving all 12 standard PCI slots available for PCI adapters.
19. Required to connect the standard Advanced System Management PCI Adapter to an interconnect network with other servers for system management support through a single LAN or modem connection. Up to 12 Advanced System Management Processors or optional Advanced System Management PCI Adapters may be interconnected with an aggregate connection length of no more than 91.4m (300ft). A customer-supplied Cat5 cable is required for each interconnection. An additional 12 Integrated Systems Management Processors or Remote Supervisor Adapters may be connected to the network for a total of 24 devices.



xSeries 370 Power, Monitors & Accessories

Part Number	Description
Power¹	
Uninterruptible Power Supply (UPS)²	
32P1020	APC 2U Smart-UPS 1400RMB
94G6676	APC Smart-UPS 3000RMB ³
37L6861	APC Smart-UPS 5000RMB ⁴
Monitors⁵	
633147N	E54 Color Monitor 15in (350mm, 13.8in viewable image), stealth black ⁶
63324HN	E74 Color Monitor 17in (406mm, 16in viewable image), stealth black ⁶
66274AN	G78 Color Monitor 17in (406.4mm, 16in viewable image), stealth black ⁶
9511AG4	T540 Flat Panel Color Monitor 15in (381mm, 15in viewable image), stealth black ⁷
32P1031	NetBAY 1U Flat Panel Monitor Console Kit (w/ US Space Saver keyboard) ⁸
32P1032	NetBAY 1U Flat Panel Monitor Console Kit (w/o keyboard) ⁸

1. xSeries 370 systems contain three 750W (at 220V), hot-swap power supplies which handle robust configurations while providing full redundancy. When operating at 110V, redundancy is limited to configurations not exceeding six processors, 24 memory RDIMMs, or eight PCI adapters. Each system ships with nine power cords: 3 x 220V, 3 x 110V, 3 x intra-rack 220V. Even though multiple UPSs may provide redundant power sources, systems management software does not currently take advantage of its power outage alerts.
2. For runtimes and UPS attributes see Appendix C: UPS Runtime Estimates.
3. Height is 3U. See Rack Cabinets and Options section for supported IBM racks.
4. Height is 5U. See Rack Cabinets and Options section for supported IBM racks.
5. xSeries 370 uses an SVGA controller (S3 Trio 3D chipset) with 4MB of video memory.
6. Installation within a rack requires optional Monitor Compartment (P/N 94G7444).
7. Installation within a rack requires optional Netfinity Flat Panel Monitor Rack Mount Kit II (P/N 37L6888) and Netfinity Rack Keyboard Tray (P/N 28L4707). A space saver keyboard may coexist within the same 28L4707 keyboard tray.
8. includes a 15in Flat Panel Monitor.



Part Number	Description
Conversion Kits	
28L4705	8Ux28D Rack-to-Tower Kit ¹
Rack and NetBAY²	
	Refer to the Rack Cabinets and Options section for information concerning IBM racks and rack-supported devices.
Keyboard and Mouse³	
28L3644	Space Saver II Keyboard ^{4, 5}
28L3621	Preferred Keyboard (stealth black) ⁶
28L3673	Sleek 2-Button Stealth Black Mouse

1. Includes one Netfinity NetBAY3E with casters.
2. xSeries 370 is housed in a 19in rack-mountable drawer and requires one of the racks listed in the Rack Cabinets and Options section.
3. xSeries 370 ships without a keyboard or mouse.
4. Installation within a rack requires optional keyboard tray (P/N 28L4707), which stows in ready-to-use position.
5. Advanced TrackPoint IV features are not available on IBM xSeries systems.
6. Installation within a rack requires optional keyboard tray P/N 28L4707. This keyboard cannot share a keyboard tray with a flat panel display.

xSeries 370 Tape Options

Part Number	Tape Drives	Bays Supported	SCSI Interface (bit)	Form Factor	Termination Included	68/50-pin Converter Incl	Ext Tape Enclosures
00N7991	20/40GB DDS/4 4mm Internal Tape Drive	-	16 Ultra2 LVD	89mm (3.5in) HH or 133mm (5.25in) HH	Y ¹	-	3510020 ⁴ 3551001 ³
09N4040	20/40GB DLT Internal SCSI Tape Drive	-	8	133mm (5.25in) FH	N ²	Y	3551001
00N7990	40/80GB DLT Internal SCSI Tape Drive	-	16 Ultra2 LVD	133mm (5.25in) FH	Y ¹	-	3551001 ³
00N8016	100/200GB LTO Tape Drive	-	16 Ultra2 LVD	133mm (5.25in) FH	Y ¹	-	3551001 ³
00N8015	110/220GB Super DLT Internal SCSI Tape Drive	-	16 Ultra2 LVD	133mm (5.25in) FH	Y ¹	-	3551001 ³
24P2396	100/200GB LTO Half-High Tape Drive	-	16 Ultra2 LVD	133mm (5.25in) HH	Y ¹	-	3551001 ³
24P2398	40/80GB Half-High DLT/VS Internal SCSI Tape Drive	-	16 Ultra2 LVD	133mm (5.25in) HH	Y ¹	-	3551001 ³
Tape Autoloaders							
3502108	DLT Tape Autoloader	-	16	Desktop	Y	-	-
00N7992	120/240GB DDS/4 Tape Autoloader	-	16 Ultra2 LVD	133mm (5.25in) FH	Y ¹	-	3551001 ³
3600109	3600 Series 900GB/1.8TB LTO Tape Autoloader ⁵	-	16 Ultra2 LVD	Tower or 6U Rack	Y	-	-
External Tape Libraries⁶							
3502x14	DLT Tape Library	-	16	Desktop or Rack	Y	-	-
3570C2x	Magstar MP 3570 Tape Subsystem	-	HVD	6U Rack	Y	-	-
3600220	3600 Series 2/4TB LTO Tape Library (Tower)	-	16 Ultra2 LVD	Tower	Y	-	-
3600R20	3600 Series 2/4TB LTO Tape Library (Rack)	-	16 Ultra2 LVD	5U Rack	Y	-	-
3600LXU	3600 Series 2-Drive, 20-Cartridge Expander Module ⁷	-	16 Ultra2 LVD	5U Rack	Y	-	-
09N4048	3600 Series LTO Drive Upgrade Option ⁸	-	16 Ultra2 LVD	-	N	-	-
External Tape Enclosures							
3510020	External Half High SCSI Storage Enclosure ⁹	-	8, 16	Desktop	N	N	-
3551001	NetMEDIA Storage Expansion Unit EL ¹⁰	-	16	Rack	Y	N	-
10L7113	NetMEDIA Systems Management Adapter ¹¹	-	16 LVD	-	N	N	3551001
Associated Options							
00N7956	68-pin External Multimode LVD/SE SCSI Terminator	-	16 LVD/SE	Ext	Y	N	3510020
10K2340	Media Bay Tray and LVD Cable Kit ²	-	16 LVD	Int	Y	N	3551001



Note: xSeries 370 does not support internal tape drives but does include an external Ultra2 0.8mm VHDCI SCSI connector for attachment of an external tape library or tape enclosure. All tape drives and enclosures are also supported by PCI Wide Ultra160 SCSI Adapter (P/N 19K4646) which has an external 0.8mm VHDCI connector. Select tape drive, enclosure and controller then use Appendix D: Cables - Storage Units - Controllers to select an appropriate external cable.

1. Termination requires installing the 42in single-drop, terminated LVD SCSI cable provided with the option or is provided in a NetMEDIA Storage Expansion Unit with the installation of NetMEDIA Systems Management Adapter (P/N 10L7113).
2. Termination requires installation using the two-drop multimode terminated LVD SCSI cable included with the Media Bay Tray and LVD Cable Kit (P/N 10K2340) or is provided in a NetMEDIA Storage Expansion Unit with the installation of NetMEDIA Systems Management Adapter (P/N 10L7113).
3. LVD support for LVD devices installed in a NetMEDIA Storage Expansion Unit EL (P/N 3551001) requires installation of NetMEDIA Systems Management Adapter (P/N 10L7113), which also provides termination, and replacement of the standard single-ended internal cable with the terminated single-drop LVD SCSI cable provided with this option. If the standard cables are used for attachment to LVD devices, single-ended SCSI rules and bus speeds apply.
4. Requires 68-pin External Multimode LVD/SE SCSI terminator (P/N 00N7956).
5. If installed in a rack, a fixed shelf is required. Allow an additional 1U for the fixed shelf. One unit only per shelf is supported.
6. Tape library attributes and prerequisites are located in Appendix B: Tape Library Attributes.
7. Supported only with the 3600 Series LTO Tape Library (rack) (P/N3600R20). Allow one additional EIA space when installing either one or two (maximum) units to accommodate a filler plate for cable routing. Up to two 3600 Series LTO Drive Upgrade Options can be installed in each module or the module can operate off the LTO drives installed in the LTO tape library.
8. Install in second drive bay of 3600 Series LTO Tape Libraries or in either of the two bays of 3600 Series 2-drive, 20-cartridge Expander Module to increase performance. Includes an LTO (Ultraium) drive and a one-meter external LVD SCSI cable.
9. Provides a black desktop 133mm (5.25in) half-high (HH) tape enclosure. Connector is configurable as 50-pin Centronix or 68-pin high density. Requires either tape drive self termination or 68-pin External Multimode LVD/SE SCSI Terminator (P/N 00N7956).
10. NetMEDIA Storage Expansion Unit EL (P/N 3551001) is a black 3U, 19in rack or NetBAY3/3E mountable tape enclosure which includes two full-high (FH) or four half-high (HH) extended length 133mm (5.25in) bays, two external 0.8mm VHDCI connectors and two internal four-drop single-ended terminated 16-bit SCSI cables for device attachment. Two power supplies and two power cords are also included. Tip: The front rail clips will need to be reversed and screwed in from behind to secure the unit in a 930842x rack.
11. NetMEDIA Systems Management Adapter (P/N 10L7113) may be installed in a 3551001 to provide repeater function, LVDS interface, aggregate cable lengths up to 12m when attached to an LVD SCSI controller, and auto-termination when the 3551001 is powered off. External connector is 0.8mm VHDCI.

Note: Additional tape attributes can be found in Appendix A: Tape Drive Attributes.

xSeries 370 Sample Configurations

The following sample configurations are for illustration only and may not be suitable for any specific customer installation. Contact your IBM Business Partner or IBM Marketing Representative for assistance with your specific configuration requirements.

High Availability - Rack

Part Number	Description	Quantity	Usage
8681-2RX	xSeries 370 700MHz/2MB, 512MB ECC, Open, 48X (Rack 8U)	1	Power redundancy standard
10K2166	Netfinity 8500R 700MHz/2MB Upgrade with Pentium III Xeon Processor	5	Total of 6 SMP processors
10K2335	Netfinity 4X Accelerator Filter	1	Required for greater than 4 processors
10K2337	Netfinity Mezzanine Expansion Kit	1	Required for greater than 4 processors
20L0247	Netfinity 256MB SDRAM ECC RDIMM II	8	Total of over 2GB of memory
28L4454	Netfinity 8500R Memory Expansion Card	1	Enables cache line interleaving
06P5754	18.2GB 10Krpm Ultra 160 SCSI Hot-Swap SL HDD	2	NOS mirroring
37L6889	ServeRAID-4H Ultra160 SCSI Controller	1	RAID Controller - NOS plus EXP300
06P3601	10/100 Ethernet Server Adapter	1	-
633147N	E54 Color Monitor 15in (350mm, 13.8in viewable image), stealth black	1	-
28L3644	Space Saver II Keyboard	1	-
37L6861	APC Smart-UPS 5000RMB (5U)	1	-
External Storage			
3551001	NetMEDIA Storage Expansion Unit EL	1	External tape enclosure
00N7990	40/80GB DLT Internal SCSI Tape Drive	2	Installs in 3551001
10K2340	Media Bay Tray and LVD Cable Kit	1	-
03K9310	2M External Ultra2 SCSI Cable	1	3551001 to onboard SCSI
35311RU	EXP300 Storage Expansion Unit	1	Provides additional 14 bays
06P5754	18.2GB 10Krpm Ultra 160 SCSI Hot-Swap SL HDD	6	RAID 5 with hot-spare in EXP300
Rack Options			
9306250	NetBAY25 Standard Rack Cabinet	1	Monitor and keyboard mount on top
94G6667	Power Cable - Type A14	2	-
94G6670	Blank Filler Panel Kit	1	-

This high availability server is configured to act as the foundation for business critical applications, applications your business cannot afford to be without. The configuration includes enough disk drives to mirror the operating system and provide a RAID 5 data environment, power supply redundancy by the server and EXP300 and a UPS for power even during a blackout. A rack mounted tape drive is included to back up that all important asset--data. This server represents the leading edge in high availability for Intel-architecture servers.



Notes/Exchange - Stack

Part Number	Description	Quantity	Usage
8681-3RX	xSeries 370 900MHz/2MB Pentium III Xeon, 512MB ECC, OPEN, 48X (Rack 8U)	1	Power redundancy standard
19K4637	xSeries 370 900MHz/2MB Upgrade with Pentium III Xeon Processor	5	Total of 6 SMP processors
10K2335	Netfinity 4X Accelerator Filter	1	Required for greater than 4 processors
10K2337	Netfinity Mezzanine Expansion Kit	1	Required for greater than 4 processors
33L3149	512MB 100MHz ECC SDRAM RDIMM	4	2.5GB total memory
28L4454	Netfinity 8500R Memory Expansion Card	1	Enables cache line interleaving
06P5754	18.2GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD	2	NOS mirroring
06P3601	10/100 Ethernet Server Adapter	2	-
37L6889	ServeRAID-4H Ultra160 SCSI Controller	1	RAID Controller-NOS plus EXP300
633147N	E54 Color Monitor 15in (350mm, 13.8in viewable image), stealth black	1	-
28L3644	Space Saver II Keyboard	1	-
37L6861	APC Smart-UPS 5000RMB (5U)	1	-
External Storage			
3551001	NetMEDIA Storage Expansion Unit EL	1	External tape enclosure (Install in NetBAY3E)
00N7990	40/80GB DLT Internal SCSI Tape Drive	2	Installs in 3551001
10K2340	Media Bay Tray and LVD Cable Kit	1	-
03K9310	2M External Ultra2 SCSI Cable	1	3551001 to onboard SCSI
35311RU	EXP300 Storage Expansion Unit	1	Provides additional 14 Bays, 1 x 2M cable
06P5754	18.2GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD	14	RAID 5 with hot-spare in EXP300
Stack Options			
28L4705	Netfinity 8Ux28D Rack-to-Tower Kit	1	-
36L9701	Netfinity NetBAY3E	3	3 x 3U enclosure for UPS, EXP300, tape





IBM xSeries 380

Part Number	Processor Speed (MHz) ³	Number of Processors (Std/Max)	L3 ECC Cache	Memory (Std/Max)	Form Factor	Power Supply Quantity (Std/Max)	Hot-Swap (Power, Slots, HDD, Fans)	Redundancy (Optional, Standard)	Adv System Management Processor	Onboard Ethernet (Mbps) ⁵	SCSI Controller (Dual, Ultra, RAID)	Removable Media Bays (Total/Avail)	Internal Hard Disk Drive (Std/Max)	CD-ROM (IDE) ⁶	Bays (Total/Avail)	Slots (Total/Avail)
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xSeries 380 At-A-Glance																
8683-1RX ¹	733	1/4	2MB	1GB/64GB	Rack (7U)	4/4	P, S, H, F	S-Fans, S-Power	-	10/100	D, U160 ⁷	-	72.8GB/72.8GB ⁴	24X-10X	4/0	8/8
8683-2RX ¹	800	1/4	4MB	1GB/64GB	Rack (7U)	4/4	P, S, H, F	S-Fans, S-Power	-	10/100	D, U160 ⁷	-	72.8GB/72.8GB ⁴	24X-10X	4/0	8/8
8683-3RX ^{1, 2}	733	1/4	2MB	1GB/64GB	Rack (7U)	4/4	P, S, H, F	S-Fans, S-Power	-	10/100	D, U160 ⁷	-	72.8GB/72.8GB ⁴	24X-10X	4/0	8/8
8683-4RX ^{1, 2}	800	1/4	4MB	1GB/64GB	Rack (7U)	4/4	P, S, H, F	S-Fans, S-Power	-	10/100	D, U160 ⁷	-	72.8GB/72.8GB ⁴	24X-10X	4/0	8/8

Note: This system is currently targeted at early adopters such as the scientific community and developers who are interested in porting their code from IA-32 to IA-64 to take advantage of the technological benefits of the Itanium processor. Users are advised to check with their sales representative or the Intel Web site regarding availability of operating systems and applications.

- Housed in a 19in rack-mountable drawer and ships standard without a keyboard or mouse. See Rack Cabinets and Options section for supported IBM racks.
- This model includes the installation CD for Microsoft Windows Advanced Server Limited Edition for 64-bit systems.
- Intel Itanium 64-bit processor with integrated full-speed ECC L3 cache and 2 X 133MHz FSB.
- xSeries 380 supports both Fibre Channel and SCSI external storage. The system ships with two 36.4GB HDDs installed in the two internal hot-swap HDD bays. See External Storage Expansion Overview and the sections on external storage enclosures that follow this section.
- The integrated 10/100 Ethernet adapter is Intel-based.
- Variable read rate. Actual playback speed will vary and is often less than the maximum possible.
- xSeries 380 includes an integrated dual-channel Ultra160 storage controller with one internal connector and one external 0.8mm VHDCI port.

xSeries 380 Processors

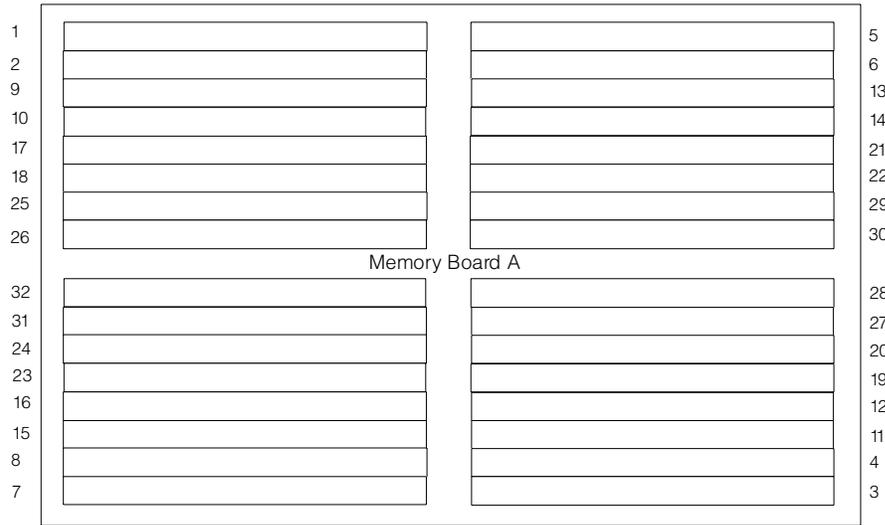
Part Number	Processor Upgrades ¹	SMP Support ¹	Processor Speed Upgrade ²
10K3815	xSeries 380 733MHz/2MB Cache Upgrade with Itanium Processor	1RX, 3RX	-
10K0050	xSeries 380 800MHz/4MB Cache Upgrade with Itanium Processor	2RX, 4RX	1RX, 3RX

- Three additional processors may be installed, providing a maximum of four. All processors must be identical in type, speed, and cache size.
- Requires removal of the standard processor. A maximum of four processors may be installed. All processors must be identical in type, speed, and cache size. Upgrades may require a BIOS update. To obtain the latest Flash BIOS, access www.pc.ibm.com/support and enter machine "Type-Model" in Quick Path. Select "Downloadable files" and then "BIOS."

xSeries 380 Memory

Part Number	Memory Description ¹
33L3258	4 x 256MB 100MHz SDRAM DIMM
33L3260	4 x 512MB 100MHz SDRAM DIMM
33L3262	4 x 1GB 100MHz SDRAM DIMM

1. Due to four-way interleaving, all DIMMs must be installed in groups of four. All compatible memory options are available only in packs of four.



Install memory options according to the order shown for Memory Board A above. Repeat for Memory Board B.

Total Memory ¹	Quantity of DIMMs Added ²			
	4 x 256MB (1GB Std)	4 x 256MB (33L3258)	4 x 512MB (33L3260)	4 x 1GB (33L3262)
2GB		1	-	-
3GB		2	-	-
4GB		1	1	-
5GB		-	2	-
6GB		1	2	-
7GB		-	3	-
8GB		1	1	1
9GB		-	2	1
10GB		1	-	2
11GB		-	1	2
12GB		1	1	2
15GB		-	1	3
17GB		-	-	4
21GB		-	-	5
25GB		-	-	6
29GB		-	-	7
33GB		-	-	8
37GB		-	-	9
41GB		-	-	10
45GB		-	-	11
49GB		-	-	12
53GB		-	-	13
57GB		-	-	14
61GB		-	-	15
64GB ³		-	-	16

This table does not represent all possible memory configurations. Memory options are available only in packs of four.

1. Network operating systems may limit the maximum amount of addressable memory. See operating system specifications for further information.
2. To obtain the quantity of memory identified in the "Total Memory" column, select the appropriate row and order the quantity of DIMMs identified in all columns for that row, which will be added to the standard memory noted at the top of the far left column.
3. Requires removal of standard DIMMs.



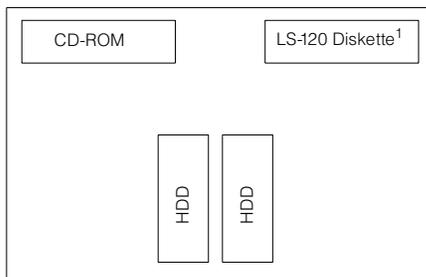
xSeries 380 Hard Disk Drive (HDD) Storage

Bay	Form Factor	Height	Front Access	Usage
1	133mm (5.25in)	SL	yes	CD-ROM
2	89mm (3.5in)	SL	yes	Diskette
3, 4	89mm (3.5in)	HH ¹	yes	Std hot-swap HDDs

1. The hot-swap HDDs supported for installation in bays three and four are slim-line (SL). Half-high (HH) height is required to accommodate the carrier in which the HDDs are installed before insertion into the bays.

Part Number	External Storage Expansion Units ¹	Form Factor
35311RU	EXP300 Storage Expansion Unit ²	Rack (3U)
35601RU	FASiT EXP500 Storage Expansion Unit ³	Rack (3U)
35421RU	FASiT200 Storage Server ^{4, 5}	Rack (3U)
35422RU	FASiT200 HA Storage Server ⁴	Rack (3U)
19K1121	FASiT200 Redundant RAID Controller	-

Note: xSeries 380 ships standard with a 36.4GB, 10,000RPM hot-swap HDD installed in each of the two internal HDD bays.



1. LS-120 slim-line diskette drive supports a diskette with capacity of 120MB.

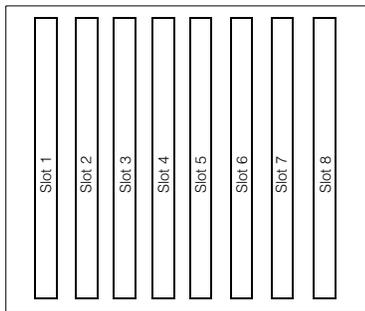
1. xSeries 380 includes an integrated dual-channel Ultra160 storage controller. External storage is supported through the external 0.8mm VHDCI connector or a supported SCSI controller. To configure an external SCSI storage device, refer to Appendix D: Cables - Storage Units - Controllers to confirm the preferred controller supports the desired External Storage Expansion Unit and to select a supported cable. For HDD or other expansion unit options, see the specific expansion unit section. For Fibre Channel storage devices, refer to the Fibre Channel Solutions Overview section.

2. EXP300 includes a single 2M Ultra2 SCSI cable and dual hot-swap 500W redundant power supplies, each with its own power cord. An optional RAID adapter is required to support external HDD storage. Refer to ServerProven test results for supported RAID options at www.pc.ibm.com/us/compat. Select x380 from the Fast Access pulldown menu and click Go. Select SCSI and RAID Controllers. IBM makes no representations or warranties with respect to non-IBM products. These products are offered and warranted by third parties, not IBM.

3. FASiT EXP500 Storage Expansion Unit (P/N 35601RU) includes dual hot-swap 350W power supplies, each with its own power cord.

4. The FASiT200 includes two hot-swap, 350W auto-ranging redundant power supplies, each with its own power cord.

5. Can be upgraded to FASiT200 HA Storage Server through the addition of a FASiT200 Redundant RAID Controller (P/N 19K1121).



All slots are full-length, 64-bit, 66MHz, 3.3V (5V tolerant).



xSeries 380 I/O Options

Part Number	Description	Adapter Length	PCI Support ⁴	Slots Supported	Hot-Plug ⁵	PCI Voltage Key	MHz
Storage Controllers^{1, 2}							
19K4646	PCI Wide Ultra160 SCSI Adapter ³	Half	32-bit	1 ... 8	-	Universal	66
Fibre Storage Controllers and Options⁶							
00N6881	Netfinity FASiT Host Adapter	Half	64-bit	1 ... 8	X	Universal	66
19K1246	FASiT FC-2 Host Bus Adapter	Half	64-bit	1 ... 8	X	Universal	66
17421RU	FASiT 700 Fibre Channel Storage Server	-	-	-	-	-	-
35521RU	FASiT500 Storage Server	-	-	-	-	-	-
35421RU	FASiT200 Storage Server	-	-	-	-	-	-
35422RU	FASiT200 HA Storage Server	-	-	-	-	-	-
Networking⁷							
Ethernet⁸							
06P3601	10/100 Ethernet Server Adapter ⁹	Half	32-bit	1 ... 8	X	Universal	33
06P3701	Gigabit Ethernet SX Server Adapter (fiber)	Half	64-bit	1 ... 8	X	Universal	66
22P6801	PRO/1000XT Server Adapter by Intel (copper) w/CD, manuals ⁹	Half	64-bit	1 ... 8	X	Universal	133 ⁴

- xSeries 380 includes an integrated dual-channel Ultra160 storage controller. External storage is supported through the external 0.8mm VHDCI connector or a supported optional PCI SCSI controller.
- An optional RAID adapter is required to support external HDD storage. Refer to ServerProven test results for supported RAID options at www.pc.ibm.com/us/compat. Select x380 from the Fast Access pulldown menu and click Go. Select SCSI and RAID Controllers. IBM makes no representations or warranties with respect to non-IBM products. These products are offered and warranted by third parties, not IBM.
- PCI Wide Ultra160 SCSI Adapter (P/N 19K4646) provides a single channel with one internal connector, a five-drop multi-mode terminated LVD SCSI cable and one external 0.8mm VHDCI connector. This system supports external connection only.
- 33MHz adapters will reduce 66MHz buses to 33MHz. 133MHz PCI-X adapters are backward compatible with 33/66MHz, 64-bit PCI-based servers.
- All eight slots are hot-plug capable. For Network Operating System support, access www.pc.ibm.com/us/compat.
- See Fibre Channel Solutions Overview section for additional configuration information.
- In a fault-tolerant networking environment, using the fault-tolerant software delivered with the Ethernet adapters of a single manufacturer is recommended. Installing fault-tolerant solutions provided by multiple manufacturers may cause failures if the intermediate drivers provided with the adapters are not compatible. The three Intel-based optional Ethernet adapters (P/N 06P3601, 06P3701, 22P6801) provide compatible intermediate drivers for failover support.
- xSeries 380 includes an integrated 10/100 Intel-based Ethernet adapter that supports Wake on Lan.
- The Wake on LAN function of this option is not supported by this server.

xSeries 380 Power, Monitors & Accessories

Part Number	Description
Power¹	
94G6676	APC Smart-UPS 3000RMB ²
37L6861	APC Smart-UPS 5000RMB ³
Monitors⁴	
63324HN	E74 Color Monitor 17in (406mm, 16in viewable image), stealth black ⁵

- xSeries 380 contains four 800W, hot-swap power supplies which handle robust configurations while providing full redundancy.
- Height is 3U. See Rack Cabinets and Options section for supported IBM racks.
- Height is 5U. See Rack Cabinets and Options section for supported IBM racks.
- xSeries 380 uses an integrated ATI-Rage XL video controller with 8MB memory.
- Installation within a rack requires optional Monitor Compartment (P/N 94G7444).

Part Number	Description
Rack and NetBAY¹	
	Refer to the Rack Cabinets and Options section for information concerning IBM racks and rack-supported devices.
Keyboard and Mouse²	
28L3644	Space Saver II Keyboard ^{3, 4}
22P5150	TrackPoint USB Space Saver Keyboard ^{3, 4, 5}
33L3244	Sleek USB Mouse (stealth black)
28L3673	Sleek 2-Button Stealth Black Mouse

- xSeries 380 is housed in a 19in rack-mountable drawer. For selection of a supported rack, refer to the Rack Cabinets and Options section.
- xSeries 380 ships without a keyboard or mouse.
- Installation within a rack requires optional keyboard tray (P/N 28L4707), which stows in ready-to-use position.
- Advanced TrackPoint IV features are not available on IBM xSeries systems.
- USB keyboards attach to a single USB-capable server. They are not compatible with the NetBAY console switches.



IBM xSeries 440

Part Number
 Processor Speed (GHz)²
 Number of Processors (Std/Max)³
 L3 ECC Cache
 Memory (Std/Max)⁴
 Form Factor
 Power Supply Quantity (Std/Max)⁵
 Hot-Swap (Power, Slots, HDD, Fans)
 Redundancy (Optional, Standard)
 Adv System Management Adapter⁶
 Onboard Ethernet (Mbps)
 SCSI Controller (Dual, Ultra, RAID)
 Removable Media Bays (Total/Avail)
 Internal Hard Disk Drive (Std/Max)
 CD-ROM (IDE)⁷
 Bays (Total/Avail)
 Slots (Total/Avail)⁸

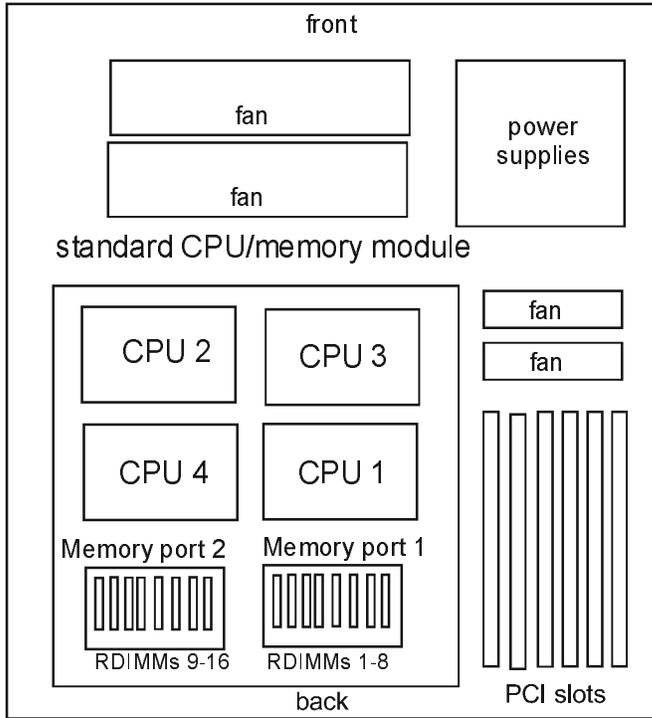
xSeries 440 At-A-Glance																
8687-1RX ¹	1.4	2/8	512KB	2GB/32GB	Rack (4U)	2/2	P, S, H, F	S-Fans, S-Power	Y	10/100/1000	D, U 160	2/0	0/146.8GB	24X-10X	4/2	6/6
8687-2RX ¹	1.5	2/8	512KB	2GB/32GB	Rack (4U)	2/2	P, S, H, F	S-Fans, S-Power	Y	10/100/1000	D, U 160	2/0	0/146.8GB	24X-10X	4/2	6/6
8687-3RX ¹	1.6	2/8	1MB	2GB/32GB	Rack (4U)	2/2	P, S, H, F	S-Fans, S-Power	Y	10/100/1000	D, U 160	2/0	0/146.8GB	24X-10X	4/2	6/6

- Housed in a 19in rack-mountable drawer and ships standard without a keyboard or mouse. See Rack Cabinets and Options section for supported IBM racks.
- Intel Xeon MP processor with integrated full-speed ECC L3 cache and 4x100MHz (quad-pumped) data bus to the memory controller.
- Either two or six additional optional processors are supported. xSeries SMP Expansion Module (P/N 32P8340) is required to increase maximum support of processors from four to eight and memory options from 16 to 32. The SMP Expansion Module requires four processors prepopulated and a minimum of four RDIMMs (eight if memory mirroring is enabled).
- Advanced Chipkill ECC memory corrects two-, three-, and four-bit memory errors. Memory options are four-way interleaved. Sixteen sockets are provided in standard models, four of which are populated with 512MB RDIMMs. Additional 16 connectors are supported with the installation of xSeries SMP Expansion Module (P/N 32P8340 or 36L9502, 3, 4).
- Two 1050W, voltage-sensing, hot-swap power supplies that support N+1 redundancy on full configurations are standard.
- Advanced system management is provided by a standard Remote Supervisor Adapter installed in a dedicated PCI slot, which allows six optional PCI adapters to be installed.
- Variable read rate. Actual playback speed will vary and is often less than the maximum possible.
- Support for an additional 12 64-bit slots available through installation of the optional RXE-100 Remote Expansion Unit. Refer to x440 I/O options or the RXE-100 section for more information.

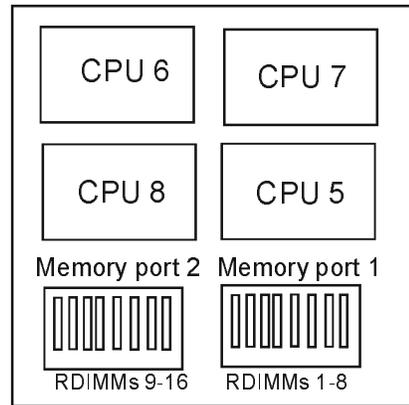
xSeries 440 Processors

Part Number	Processor Upgrades ¹	SMP Support ²	Processor Speed/Cache Upgrade ³
32P8705	xSeries 1.4GHz/512KB L3 Cache Upgrade with Xeon Processor MP	1RX	-
32P8706	xSeries 1.5GHz/512KB L3 Cache Upgrade with Xeon Processor MP	2RX	1RX
32P8707	xSeries 1.6GHz/1MB L3 Cache Upgrade with Xeon Processor MP	3RX	1RX, 2RX
32P8340	xSeries SMP Expansion Module ⁴	1 ... 3RX	-
36L9502	xSeries SMP Expansion Module with Four 1.4GHz Xeon MP Processors ⁴	1RX	-
36L9503	xSeries SMP Expansion Module with Four 1.5GHz Xeon MP Processors ⁴	2RX	1RX
36L9504	xSeries SMP Expansion Module with Four 1.6GHz Xeon MP Processors ⁴	3RX	1RX, 2RX

- IBM xSeries 440 architecture optimizes memory and bus performance using an XA-32 core chipset with up to two CPU/memory cards and two PCI-X host-bridge controllers. Up to eight Pentium Xeon MP processors are supported. The recommended order of processor installation is shown in the accompanying diagrams. Two processors are standard in each system with additional support for either two optional processors (total of four) or six optional processors (total of eight). Eight processors require an xSeries SMP Expansion Module with four processors prepopulated.
- Up to six additional processors may be installed, providing a maximum of eight. All processors must be identical in type, speed and cache size. The fifth through eighth processors require an xSeries SMP Expansion Module prepopulated with four processors.
- Requires removal of standard processors. A maximum of eight processors may be installed. Installation of greater than four processors requires the addition of an xSeries SMP Expansion Module. All processors must be identical in type, speed and cache size. Upgrades may require a BIOS update. To obtain the latest Flash BIOS, access www.pc.ibm.com/support and enter machine "Type-Model" in Quick Path. Select "Downloadable files" then "BIOS."
- The fifth through eighth processors require one of these options. The option is installed directly above the standard CPU/memory board. Two 10in scalability cables (P/N 32P8336) are included with this option. See CEC cabling diagrams below for scalability cabling configuration. Four CPUs are shipped standard with each optional SMP Expansion Module. A minimum of four RDIMMs installed in each SMP Expansion Module are required (not included). Memory mirroring requires a minimum of eight RDIMMs in each SMP Expansion Module.



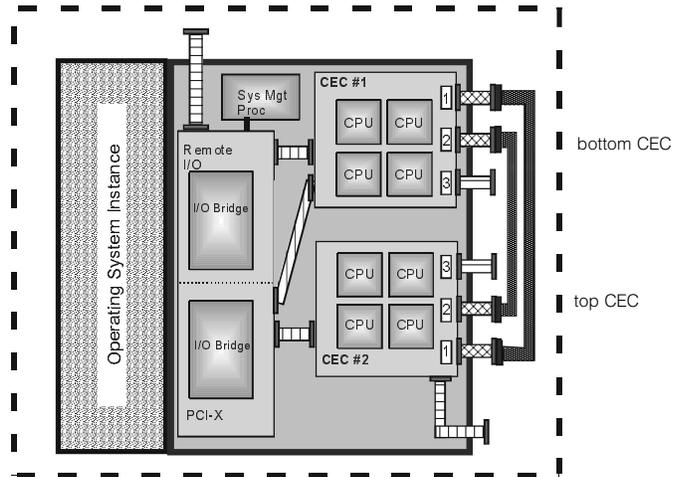
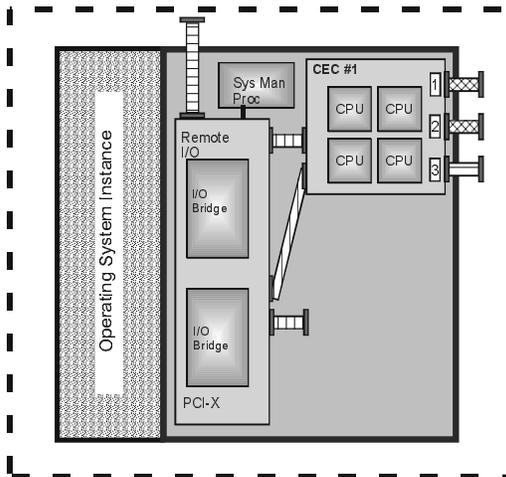
Optional SMP Expansion Module (P/N 32P8340) (installs directly above standard CPU/memory board). Ships prepopulated with four processors. Requires a minimum of four RDIMMs.



IBM XSERIES 440

Logical diagram of CEC cabling for single node, four-way x440 running one operating system

for single node, eight-way x440 running one operating system



Key:

- Scalability Cable
- Forwarding Scalability Port
- Non-forwarding Scalability Port
- RIO Port



xSeries 440 Memory

Part Number	Memory Description ¹
33L3324	512MB PC133 ECC DDR SDRAM RDIMM
33L3326	1GB PC133 ECC DDR SDRAM RDIMM

1. Due to four-way interleaving, installation of memory options in banks of four is required. Banks may be populated in any order. A minimum of four RDIMMs are required for each SMP module (minimum of eight required to enable memory mirroring).

Notes:

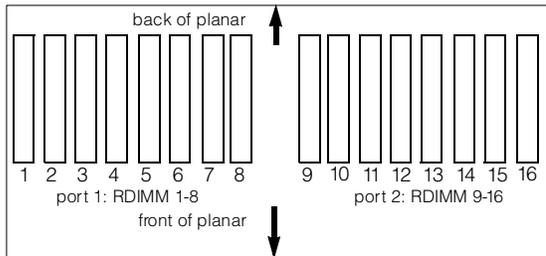
1. See numbering of RDIMM sockets on memory card for bank configuration.
2. Performance is optimized by balancing the amount of memory between ports (and between SMP Expansion Modules).
3. In order to enable memory mirroring during BIOS set-up, the same memory configuration must be installed in each port (memory mirroring reduces the amount of memory available to the operating system by half).
4. Memory mirroring is specific to each SMP Expansion Module, i.e., it is not required in both the standard and optional CPU/memory boards.

Total Memory ¹	Quantity of RDIMMs Added ²	
	2GB (4 x 512MB)	512MB (33L3324)
4GB	4	-
6GB	8	-
8GB	12	-
10GB ³	8	4
12GB	4	8
14GB	-	12
16GB ³	28	-
18GB ³	24	4
20GB ³	20	8
22GB ³	16	12
24GB ³	12	16
26GB ³	8	20
28GB ³	4	24
30GB ³	-	28
32GB ³	-	32

This table does not represent all possible memory configurations. RDIMMs must be added in sets of four to support interleaving technology.

1. Network operating systems may limit the maximum amount of addressable memory. See operating system specifications for further information.
2. To obtain the quantity of memory identified in the "Total Memory" column, select the appropriate row and order the quantity of RDIMMs identified in all columns for that row, which will be added to the standard memory noted at the top of the left column.
3. Optional xSeries SMP Expansion Module (P/N 32P8340 or 36L9502, 3, 4) is required if total RDIMMs exceeds 16.
4. Requires removal of standard memory. Installation of greater than 16 RDIMMs requires optional xSeries SMP Expansion Module (P/N 32P8340 or 36L9502, 3, 4).

Numbering of RDIMM sockets on memory card



- Bank 1: sockets 1, 3, 5, 7
- Bank 2: sockets 9, 11, 13, 15
- Bank 3: sockets 2, 4, 6, 8
- Bank 4: sockets 10, 12, 14, 16

xSeries 440 Internal SCSI Cabling

xSeries 440 provides four drive bays on the lower front panel of the system chassis. At the bottom, two adjacent slim-line bays contain the standard CD-ROM and a 1.44MB diskette drive. Two 3.5in, SCA-2-compliant slim-line hot-swap hard disk drive bays are located directly above. The IDE CD-ROM is cabled directly to the IDE port on the planar, and the hot-swap backplane that supports two hot-swap bays is connected to one channel of the dual channel integrated SCSI controller through a 16-bit LVDS cable.

An optional ServeRAID controller is supported for internal and external RAID applications. An additional, longer 16-bit LVDS SCSI cable is provided standard with the system to connect the hot-swap backplane to the ServeRAID controller for internal RAID configurations. The integrated controller includes a second channel that supports external tape enclosures. A 16-bit LVDS cable connects this channel to an industry-standard, 0.8mm VHDCI connector.

For additional information regarding internal cabling, refer to Appendix F: Internal Cabling Overview.



xSeries 440 Hard Disk Drive (HDD) Storage

Total Internal Storage ¹	10,000RPM HDDs			15,000RPM HDDs	
	18.2GB	36.4GB	73.4GB	18.2GB	36.4GB
	(06P5754)	(06P5755)	(06P5756)	(06P5767)	(06P5768)
0GB	Standard on base models				
18.2GB	1	-	-	1	-
36.4GB	2	1	-	2	1
72.8GB	-	2	-	-	2
73.4GB	-	-	1	-	-
146.8GB (max)	-	-	2	-	-

This table does not represent all possible HDD configurations.
 1. Select a total storage row then select the quantity of HDDs from column corresponding to the HDD of choice. Total Internal Storage listed is within +/- 0.2GB unless otherwise noted.

IBM XSERIES 440

Bay	Form Factor	Height	Front Access	Usage	Part Number	Description	RPM	Height	Bays Supported ¹	Max Qty
1, 2	HS	SL	Yes	open	Ultra160 HDDs					
3	133mm (5.25in)	SL ¹	Yes	FDD	06P5754	18.2GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD	10000	SL	1, 2	2
4	133mm (5.25in)	SL ²	Yes	CD-ROM	06P5755	36.4GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD	10000	SL	1, 2	2
					06P5756	73.4GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD	10000	SL	1, 2	2
					06P5767	18.2GB 15Krpm Ultra160 SCSI Hot-Swap SL HDD	15000	SL	1, 2	2
					06P5768	36.4GB 15Krpm Ultra160 SCSI Hot-Swap SL HDD	15000	SL	1, 2	2
					Removable Media		Bays Supported			
					08K9603	ThinkPad Removable Diskette Drive ¹	3			
					08K9616	ThinkPad SuperDisk (LS240) Ultrabay 2000 Drive ²	3			
					05K9233	ThinkPad 24X-10X CD-ROM Ultrabay 2000 Drive ³	3, 4			
					22P9101	ThinkPad Enhanced 8X/4X/24X Max CD-RW Ultrabay 2000 Drive ⁴	3, 4			
					22P9202	ThinkPad Ultralight 8X DVD-ROM Ultrabay 2000 Drive ⁴	3, 4			
					External Storage Expansion Units⁵		Form Factor			
					35311RU	EXP300 Storage Expansion Unit ⁶	Rack (3U)			
					09N7296	EXP300 Rack-to-Tower Conversion Kit	-			
					35601RU	FASiT EXP500 Storage Expansion Unit ⁷	Rack (3U)			
					35421RU	FASiT200 Storage Server ^{8, 9}	Rack (3U)			
					35422RU	FASiT200 HA Storage Server ⁸	Rack (3U)			
					19K1121	FASiT200 Redundant RAID Controller	-			





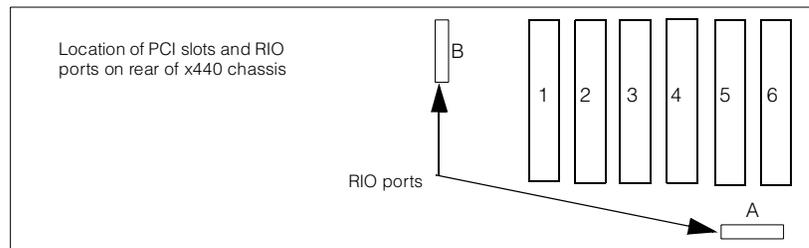
1. Installed standard in bay 3. Not compatible with bay four.
2. Install only as an option in bay three, requiring removal of standard FDD.
3. Installed standard in bay four.
4. Install in either bay three or four, requiring removal of standard devices. If only one optical drive is installed, it must be installed in bay four. If a second optical drive is installed, use bay three configured as slave.
5. Not supported by the onboard external SCSI port, which supports external tape enclosures only. External SCSI HDD storage requires a RAID controller. Fibre Channel HDD storage requires a Fibre Channel controller. For HDD expansion unit options, see the specific expansion unit section. For Fibre Channel storage devices, refer to the Fibre Channel Solutions Overview section.
6. EXP300 includes a single 2M Ultra2 SCSI cable and dual hot-swap 500W redundant power supplies, each with its own power cord. To convert an EXP300 to a tower form factor, EXP300 Rack-to-tower Conversion Kit (P/N 09N7296) is required.
7. FAST EXP500 Storage Expansion Unit (P/N 35601RU) includes dual hot-swap 350W power supplies, each with its own power cord.
8. The FAST200 includes two hot-swap, 350W auto-ranging redundant power supplies, each with its own power cord.
9. Can be upgraded to FAST200 HA Storage Server through the addition of a FAST200 Redundant RAID Controller (P/N 19K1121).

xSeries 440 I/O Options

Part Number	Description	Adapter Length	PCI Support ¹	Slots Supported ¹	Hot-Plug ²	PCI Voltage Key	MHz
Storage Controllers³							
37L6889	ServeRAID-4H Ultra160 SCSI Controller ⁴	Full	64-bit	1 ... 6	X	Universal	33
06P5736	ServeRAID-4Mx Ultra160 SCSI Controller ⁵	Full	64-bit	1 ... 6	X	Universal	66
06P5740	ServeRAID-4Lx Ultra160 SCSI Controller ⁶	Half	64-bit	1 ... 6	X	Universal	66
19K4646	PCI Wide Ultra160 SCSI Adapter ⁷	Half	32-bit	1 ... 6	-	Universal	66
Fibre Storage Controllers and Options⁸							
00N6881	Netfinity FAST Host Adapter	Half	64-bit	1 ... 6	X	Universal	66
19K1246	FAST FC-2 Host Bus Adapter	Half	64-bit	1 ... 6	X	Universal	66
17421RU	FAST700 Fibre Channel Storage Server	-	-	-	-	-	-
35521RU	FAST500 Storage Server	-	-	-	-	-	-
35421RU	FAST200 Storage Server	-	-	-	-	-	-
35422RU	FAST200 HA Storage Server	-	-	-	-	-	-
35341RU	SAN Fibre Channel Managed Hub	-	-	-	-	-	-
2109S08	SAN Fibre Channel Switch, 8-Port	-	-	-	-	-	-
2109S16	SAN Fibre Channel Switch, 16-Port	-	-	-	-	-	-
2109F16	SAN Fibre Channel Switch, 16-Port (2Gb)	-	-	-	-	-	-
2108R3L	SAN Data Gateway Router Ultra SCSI LVD Port ⁹	-	-	-	-	-	-
Networking¹⁰							
Ethernet¹¹							
09N9901	10/100 EtherLink Server Adapter by 3Com ¹²	Half	32-bit	1 ... 6	X	Universal	33
06P3601	10/100 Ethernet Server Adapter ¹²	Half	32-bit	1 ... 6	X	Universal	33
06P3701	Gigabit Ethernet SX Server Adapter (fiber)	Half	64-bit	1 ... 6	X	Universal	66
22P4901	10/100 Dual Port Server Adapter ¹²	Half	64-bit	1 ... 6	X	Universal	66
22P6801	PRO/1000XT Server Adapter by Intel (copper) w/CD, manuals ¹²	Half	64-bit	1 ... 6	X	Universal	133
Token Ring							
34L5001	16/4 Token-Ring PCI Management Adapter ¹²	Half	32-bit	1 ... 6	X	Universal	33
34L5201	High-Speed 100/16/4 Token-Ring PCI Management Adapter ¹²	Half	32-bit	1 ... 6	X	Universal	33

Systems Management ¹³							
03K9309	Advanced System Management Interconnect Cable Kit ¹⁴	-	-	-	-	-	-
Remote I/O Expansion							
8684-1RX	RXE-100 Remote Expansion Enclosure ^{15, 16}	-	-	-	-	-	-

- Adapters rated at a lower frequency than the slots in which they are installed will reduce the bus to the frequency of the slowest adapter. 133MHz PCI-X adapters are backward compatible with 33/66MHz, 64-bit PCI-based servers.
- All six slots are full-length hot-plug capable. For network operating system support, access www.pc.ibm.com/us/compat.
- xSeries 440 includes an integrated dual channel Ultra160 SCSI controller with one external and one internal connector. See Internal SCSI Cabling or Internal Cabling Overview for cabling alternatives.
- ServeRAID-4H Ultra160 SCSI Controller is powered by a 266MHz PowerPC 750 processor and provides 128MB of battery-backed ECC cache. The two internal connectors are not accessible due to a cabling interference. Four external Ultra160 0.8mm VHDCI connectors are available.
- ServeRAID-4Mx Ultra160 SCSI Controller is powered by a 100MHz Intel Zion GC80303 processor that provides 64MB of battery-backed ECC cache and two internal and two external Ultra160 connections (only two connectors may be used). External connectors are 0.8mm VHDCI.
- ServeRAID-4Lx Ultra160 SCSI Controller is powered by a 100MHz Intel Zion GC80303 processor and provides a single channel, 32MB of ECC cache and either one internal or one external Ultra160 connection. External connector is 0.8mm VHDCI.
- PCI Wide Ultra160 SCSI Adapter (P/N 19K4646) provides a single channel with one internal connector, a five-drop multi-mode terminated LVD SCSI cable and one external 0.8mm VHDCI connector. This system supports external connection only.
- See Fibre Channel Solutions Overview section for additional configuration information.
- The 2108R3L SAN Data Gateway Router Ultra SCSI LVD port provides one integrated short-wave optical port and two SCSI ports for tape storage connections (LVD, HVD and single-ended).
- xSeries 440 has an integrated 10/100/1000 PCI Ethernet controller (copper). Wake on LAN is supported only for the integrated controller.
- In a fault-tolerant networking environment, using the fault-tolerant software delivered with the Ethernet adapters of a single manufacturer is recommended. Installing fault-tolerant solutions provided by multiple manufacturers may cause failures if the intermediate drivers provided with the adapters are not compatible. The onboard Ethernet is Broadcom-based. Four of the optional PCI Ethernet adapters listed are Intel-based (P/N 06P3601, 06P3701, 22P4901, 22P6801), and one is 3Com-based (P/N 09N9901). All five adapters are compatible with the Broadcom-based integrated Ethernet for failover.
- The Wake on LAN function of this option is not supported by this server.
- xSeries 440 includes a Remote Supervisor Adapter installed in a dedicated PCI slot with an external connector, leaving six PCI slots available for optional adapters. Support for connection to other servers requires an optional Advanced System Management Interconnect Cable Kit (P/N 03K9309). Direct connection to the RXE drawer management controller in an RXE-100 Remote Expansion Enclosure is supported through a standard Interconnect Management Cable Kit with 3.5m cable. An 8m optional cable is available.
- Required to connect the standard Remote Supervisor Adapter to an interconnect network with other servers for system management support through a single LAN or modem connection. Up to 24 Integrated System Management Processors or Remote Supervisor Adapters may be interconnected with an aggregate connection length of no more than 91.4m (300ft). This interconnect network of 24 devices may include a maximum of 12 Advanced System Management Processors or Advanced System Management PCI Adapters. A customer-supplied Cat5 cable is required for each interconnection.
- RXE-100 Remote Expansion Enclosure supports up to 12 additional PCI-X slots. Cable required for connection included with expansion unit, which attaches to a standard integrated RIO port located on the back of the x440 chassis. An optional longer cable is available. Refer to RXE-100 section for diagrams and supported options.
- xSeries 440 initially supports only one RXE-100 for two-, four- and eight-way systems. Two- and four-way systems use only RIO port A because port B is inactive unless an SMP Expansion Module is installed. Only one RIO connection to the RXE-100 is supported initially for both four- and eight-way systems.



- Slot 1: Bus A, 66MHz, 64-bit, full-length, 3.3v
- Slot 2: Bus A, 66MHz, 64-bit, full-length, 3.3v
- Slot 3: Bus B, 100MHz, 64-bit, full-length, 3.3v
- Slot 4: Bus B, 100MHz, 64-bit, full-length, 3.3v
- Slot 5: Bus C, 133MHz, 64-bit, full-length, 3.3v
- Slot 6: Bus D, 133MHz, 64-bit, full-length, 3.3v

Optimal order of installation (highest frequency adapters first): 6-5-4-2-3-1.



xSeries 440 Power, Monitors & Accessories

Part Number	Description
Power¹	
Uninterruptible Power Supply (UPS)^{2, 3}	
32P1020	APC 2U Smart-UPS 1400RMB
94G6676	APC Smart-UPS 3000RMB ⁴
37L6861	APC Smart-UPS 5000RMB ⁵
Monitors⁶	
633147N	E54 Color Monitor 15in (350mm, 13.8in viewable image), stealth black ⁷
63324HN	E74 Color Monitor 17in (406mm, 16in viewable image), stealth black ⁷
66274AN	G78 Color Monitor 17in (406.4mm, 16in viewable image), stealth black ⁷
9511AG4	T540 Flat Panel Color Monitor 15in (381mm, 15in viewable image), stealth black ⁸
32P1031	NetBAY 1U Flat Panel Monitor Console Kit (w/ US Space Saver Keyboard) ⁹
32P1032	NetBAY 1U Flat Panel Monitor Console Kit (without keyboard) ⁹

1. xSeries 440 systems include two 1050W, hot-swap power supplies with two 2.8m/9ft IEC 320-C13 to IEC 320-C14 power cables for intrarack power distribution. Models shipped in the US also include two 2.8m/9ft IEC 320-C13 to NEMA 6-15P power cords for attachment to high voltage power sources. Power supply redundancy is standard for all configurations with a high voltage power source. If a low voltage source is used, power supplies operate at 550w and redundancy is supported only for configurations with two processors.
2. For runtimes and UPS attributes see Appendix C: UPS Runtime Estimate.
3. Because the x440 is not equipped with an external serial port, UPS remote management requires a USB to serial adapter such as the Belkin USB to Serial Adapter (P/N 10K3661), or IBM USB Serial/Parallel Adapter (P/N 22P5298), which are available at www.pc.ibm.com/ww/eserver/xseries. Select Accessories, Upgrades & Monitors and the country, then click Go. Scroll to the bottom of the page, select Cables and Adapters, then open the Adapters pulldown menu.
4. Height is 3U. See Rack Cabinets and Options section for supported IBM racks.
5. Height is 5U. See Rack Cabinets and Options section for supported IBM racks.
6. xSeries 440 uses an SVGA controller (S3 Savage4 LT chipset) with 8MB of video memory. Optional video adapters are not supported.
7. Installation within a rack requires optional Monitor Compartment (P/N 94G7444).
8. Installation within a rack requires optional Netfinity Flat Panel Monitor Rack Mount Kit II (P/N 37L6888) and Netfinity Rack Keyboard Tray (P/N 28L4707). A space saver keyboard may coexist within the same 28L4707 keyboard tray. Or NetBAY 1U Flat Panel Monitor Console Kit (P/N 32P1031 with a space saver keyboard, 32P1032 without) can be used.
9. Includes a 15in Flat Panel Monitor.

Part Number	Description
Stack Option	
9306110	NetBAY11 Standard Rack Cabinet
Rack and NetBAY¹	
	Refer to the Rack Cabinets and Options section for information concerning IBM racks and rack-supported devices.
Keyboard and Mouse²	
28L3644	Space Saver II Keyboard ^{3, 4}
28L3621	Preferred Keyboard (stealth black) ⁵
22P5150	TrackPoint USB Space Saver Keyboard ^{3, 4, 6}
10K3849	106-key Preferred USB Keyboard with 2-port USB Hub (stealth black) ^{5, 6}
28L3673	Sleek 2-Button Stealth Black Mouse
33L3244	Sleek USB Mouse (stealth black)

1. xSeries 440 is housed in a 19in rack-mountable drawer and requires one of the racks listed in the Rack Cabinets and Options section.
2. xSeries 440 supports rack configurations only and ships without a keyboard or mouse. The system includes a serial port, three USB ports, SVGA video port, mouse port and keyboard port.
3. Installation within a rack requires optional keyboard tray (P/N 28L4707), which stows in ready-to-use position.
4. Advanced TrackPoint IV features are not available on IBM xSeries systems.
5. Installation within a rack requires optional keyboard tray (P/N 28L4707). This keyboard cannot share a keyboard tray with a flat panel display.
6. USB keyboards attach to a single USB-capable server. They are not compatible with the NetBAY console switches.



xSeries 440 Tape Options

Part Number	Tape Drives	Bays Supported ¹	SCSI Interface (bit)	Form Factor	Termination Included	68/50-pin Converter Incl	Ext Tape Enclosures
00N8016	100/200GB LTO Tape Drive	-	16 Ultra2 LVD	133mm (5.25in) FH	Y ²	-	3551001 ³ 3503B1X
00N8015	110/220GB Super DLT Internal SCSI Tape Drive	-	16 Ultra2 LVD	133mm (5.25in) FH	Y ²	-	3551001 ³ 3503B1X
24P2396	100/200GB LTO Half-High Tape Drive	-	16 Ultra2 LVD	133mm (5.25in) HH	Y ²	-	3551001 ³
Tape Autoloaders							
3600109	3600 Series 900GB/1.8TB LTO Tape Autoloader ⁴	-	16 Ultra2 LVD	Tower or 6U Rack	Y	-	-
External Tape Libraries⁵							
3600220	3600 Series 2/4TB LTO Tape Library (Tower)	-	16 Ultra2 LVD	Tower	Y	-	-
3600R20	3600 Series 2/4TB LTO Tape Library (Rack)	-	16 Ultra2 LVD	5U Rack	Y	-	-
3600LXU	3600 Series 2-Drive, 20-Cartridge Expander Module ⁶	-	16 Ultra2 LVD	5U Rack	Y	-	-
09N4048	3600 Series LTO Drive Upgrade Option ⁷	-	16 Ultra2 LVD	-	N	-	-
External Tape Enclosures							
3551001	NetMEDIA Storage Expansion Unit EL ⁸	-	16	Rack	Y	N	-
10L7113	NetMEDIA Systems Management Adapter ⁹	-	16 LVD	-	N	N	3551001
3503B1X	Full-High SCSI Tape Enclosure ¹⁰	-	16 Ultra2 LVD	Desktop or 3U Rack	Y	N	-

1. IBM xSeries 440 does not support internal tape drives. An external tape library or tape enclosure must be used. All tape drives and enclosures are supported by PCI Wide Ultra160 SCSI Adapter (P/N 19K4646) which has an external 0.8mm VHDCI connector. Select tape drive, enclosure and controller then use Appendix D: Cables - Storage Units - Controllers to select an appropriate external cable.
2. Termination requires installing the 42in single-drop, terminated LVD SCSI cable provided with the option or is provided in a NetMEDIA Storage Expansion Unit with the installation of NetMEDIA Systems Management Adapter (P/N 10L7113).
3. LVD support for LVD devices installed in a NetMEDIA Storage Expansion Unit EL (P/N 3551001) requires installation of NetMEDIA Systems Management Adapter (P/N 10L7113), which also provides termination, and replacement of the standard single-ended internal cable with the terminated single-drop LVD SCSI cable provided with this option. If the standard cables are used for attachment to LVD devices, single-ended SCSI rules and bus speeds apply.
4. If installed in a rack, a fixed shelf is required. Allow an additional 1U for the fixed shelf. One unit only per shelf is supported.
5. Tape library attributes and prerequisites are located in Appendix B: Tape Library Attributes.
6. Supported only with the 3600 Series LTO Tape Library (rack) (P/N 3600R20). Allow one additional EIA space when installing either one or two (maximum) units to accommodate a filler plate for cable routing. Up to two 3600 Series LTO Drive Upgrade Options can be installed in each module or the module can operate off the LTO drives installed in the LTO tape library.
7. Install in second drive bay of 3600 LTO Tape Libraries or in either of the two bays of 3600 Series 2-Drive 20-Cartridge Expander Module to increase performance. Includes an LTO (Ultraium) drive and a one-meter external LVD SCSI cable.
8. NetMEDIA Storage Expansion Unit EL (P/N 3551001) is a black 3U, 19in rack mountable tape enclosure which includes two full-high (FH) or four half-high (HH) extended length 133mm (5.25in) bays, two external 0.8mm VHDCI connectors and two internal four-drop single-ended terminated 16-bit SCSI cables for device attachment. Two power supplies and two power cords are also included. Tip: The front rail clips will need to be reversed and screwed in from behind to secure the unit in a 930842x rack.
9. NetMEDIA Systems Management Adapter (P/N 10L7113) may be installed in a 3551001 to provide repeater function, LVDS interface, aggregate cable lengths up to 12m when attached to an LVD SCSI controller, and auto-termination when the 3551001 is powered off. External connector is 0.8mm VHDCI.
10. Black desktop or 3U rack tape enclosure supports 133mm (5.25in) full-high LVD tape devices including DLT technology. Requires a fixed shelf if installed in a rack (allow additional 1U for fixed shelf). Supports the following full-high tape options: 00N8015, 00N8016, 00N7992, 00N7990.

Note: Additional tape attributes can be found in Appendix A: Tape Drive Attributes.

IBM XSERIES 440



xSeries 440 Sample Configurations

Note: The following sample configurations are for illustration only and may not be suitable for any specific customer installation. Contact your IBM Business Partner or IBM Marketing Representative for assistance with your specific configuration requirements.

Basic SCSI Configuration

Part Number	Description	Quantity
8687-1RX	xSeries 440 2x1.4GHz/512KB xeon, 2GB ECC, open, 24X (4U rack)	1
06P5754	18.2GB 10Krpm Ultra160 SCSI Hot-swap SL HDD	2
06P5736	ServeRAID-4Mx Ultra160 SCSI Controller	1 ¹
633147N	E54 Color Monitor 15in (350mm, 13.8in viewable image), stealth black	1
37L6861	APC Smart-UPS 5000RMB	1
External Storage		
35311RU	EXP300 Storage Expansion Unit	2
06P5754	18.2GB 10Krpm Ultra160 SCSI Hot-swap SL HDD	6 ²
Rack Options		
9306110	NetBAY11 Standard Rack Cabinet	1
28L3644	Space Saver II Keyboard	1
94G6670	Blank Filler Panel Kit	1

1. External connectors only can be used due to internal cabling restriction.

2. Six HDDs are used for RAID-5E protection in each EXP300. One HDD is identified as a hot-spare. Effective capacity is five HDDs in the storage enclosure (total of 91GB).

High-availability SCSI Storage Solution¹

Part Number	Description	Quantity
8687-2RX	xSeries 440 2x1.5GHz/512KB Xeon, 2GB ECC, open, 24X (4U rack)	1
32P8706	xSeries 1.5GHz/512KB L3 Cache with Xeon Processor MP	2 ¹
33L3324	512MB PC133 ECC SDRAM RDIMM	12 ²
06P5767	18.2GB 15Krpm Ultra160 SCSI Hot-swap SL HDD	2
06P5736	ServeRAID-4Mx Ultra160 SCSI Controller	2
22P6801	PRO/1000XT Server Adapter by Intel (copper) w/CD, manuals	2
37L6861	APC Smart-UPS 5000RMB	1
External Storage		
35311RU	EXP300 Storage Expansion Unit ³	4
06P5767	18.2GB 15Krpm Ultra160 SCSI Hot-swap SL HDD	52 ⁴
3551001	NetMEDIA Storage Expansion Unit EL	1
10L7113	NetMEDIA Systems Management Adapter	1
00N8016	100/200GB LTO Tape Drive	2
Rack Options		
9306420	NetBAY42 Standard Rack Cabinet	1
32P1031	NetBAY 1U Flat Panel Monitor Console Kit (w/ US Space Saver Keyboard)	1
94G6670	Blank Filler Panel Kit	1

1. Total of four processors.

2. Total memory of 8GB.

3. Cables for daisy-chaining EXP300s not included in this table.

4. Thirteen HDDs are used for RAID-5E protection in each EXP300 (bay six remains empty in twintail high-availability EXP300 configurations). One HDD is identified as a hot-spare. Effective capacity is 12 HDDs in each storage enclosure (total of 946.4GB).



Microsoft Exchange High-availability Fibre Channel Solution

Part Number	Description	Quantity
8687-3RX	xSeries 440 2x1.6GHz/1MB Xeon, 2GB ECC, open, 24X (4U rack)	1
19K4647	xSeries 1.6GHz/1MB L3 Cache Upgrade with Xeon Processor MP	6 ¹
32P8340	xSeries SMP Expansion Module	1
33L3324	512MB PC133 ECC SDRAM RDIMM	28 ²
06P5736	ServeRAID-4Mx Ultra160 SCSI Controller	1
06P5767	18.2GB 15Krpm Ultra 160 SCSI Hot-swap SL HDD	2 ³
22P6801	PRO/1000XT Server Adapter by Intel (copper) w/CD, manuals	1
19K1246	FASiT FC-2 Host Bus Adapter	2
17421RU	FASiT700 Storage Server	1 ⁴
37L6861	APC Smart-UPS 5000RMB	1
94G6676	APC Smart-UPS 3000RMB	1
External Storage		
35601RU	FASiT EXP500 Storage Expansion Unit	4
06P5707	Netfinity 18.2GB 15Krpm FC Hot-Swap HDD	40
3600109	3600 Series 900GB/1.8TB LTO Tape Autoloader	1
Rack Options		
9306420	NetBAY42 Standard Rack Cabinet	1
32P1031	NetBAY 1U Flat Panel Monitor Console Kit (w/ US Space Saver Keyboard)	1
94G6670	Blank Filler Panel Kit	1

1. Total of eight processors (four per SMP Expansion Module).
2. Total memory of 16GB.
3. Total of two 18.2GB internal HDDs for NOS mirroring attached to a ServeRAID adapter.
4. Fibre Channel cable, SFP Modules and FASiT700 Mini Hubs not included.

Refer to the IBM Datacenter Solutions section for xSeries 440 cluster solutions configured with Fibre Channel storage components and connections. Datacenter cluster solutions are also certified for Windows 2000 and NT 4.0 operating systems.



IBM RXE-100 Remote Expansion Enclosure

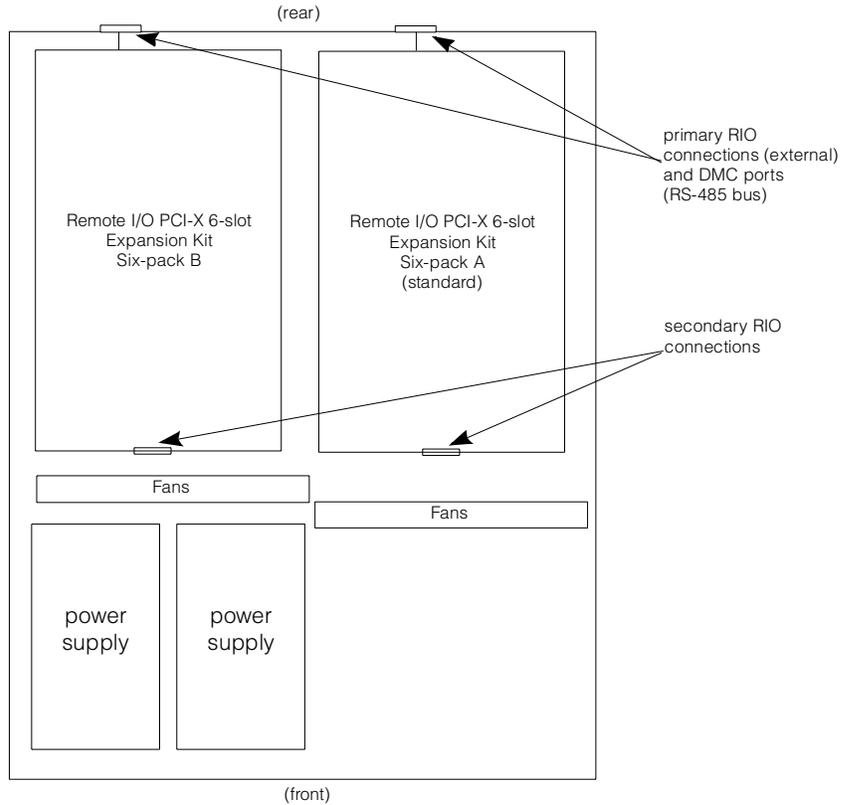
Part Number	Form Factor	Power Supply Quantity (Std/Max)	Hot-Swap (Power, Slots, HDD, Fans)	Redundancy (Optional, Standard)	System Management Controller	Standard Slots (Total/Avail)	Optional Slots (Total/Avail)
8684-1RX ¹	Rack (3U)	2/2	P, S, F	S - Fans S - Power ²	Y ³	6/6 ⁴	6/6 ⁵

- RXE-100 Remote Expansion Enclosure At-A-Glance**
- Housed in a 19in rack-mountable drawer. See Rack Cabinets and Options section for supported IBM racks. Ships with one 3.5m Remote I/O Cable Kit (P/N 31P6102) and one 3.5m Interconnect Management Cable Kit (P/N 31P6087). Eight-meter cables are available as options (P/N 31P6103, 31P6088).
 - N+1 power supply redundancy is provided standard. Two 370W Hot-Swap Redundant Power Supplies (P/N 31P6108) ship installed in the RXE-100.
 - RXE-100 management controller interfaces with Remote Supervisor Adapter standard in xSeries 360 using the standard 3.5m Interconnect Management Cable Kit (P/N 31P6087) or the 8m option (P/N 31P6088).
 - RXE-100 ships with six full-length, 64-bit PCI-X slots supporting three 133MHz adapters or six 100MHz adapters. Adapters rated at 33 or 66MHz restrict PCI buses in which they are installed to the frequency of the slowest adapter.
 - Support for additional six 64-bit slots available through installation of the optional Remote I/O PCI-X 6-slot Expansion Kit (P/N 31P5998). Remote I/O connection is cabled internally within the RXE-100 enclosure using the secondary connector on each PCI-X 6-slot Expansion Kit, i.e., only one connection between the server and RXE-100 is required. Although the six slots are hot-swap, the expansion kit itself is not hot-swap.

RXE-100 Remote Expansion Enclosure

P/N 8684-1RX

top view



- Rack-mounted 3U enclosure that fits standard IBM racks.
- Contains six active PCI-X adapter slots with support for six optional slots (6-slot expansion kits are not hot-swap).
- Supports three 133MHz or six 100MHz adapters (backward compatible to 33 or 66MHz adapters).
- Interfaces directly to the host server memory controller.
- Interfaces with Remote Supervisor Adapter in the host server (jumper cable provided with Remote I/O PCI-X 6-slot Expansion Kit to connect second six-pack to the system management bus).
- Hot-swap redundancy for fans and power supplies (two 370W power supplies and four cooling fans).

IBM RXE-100

RXE-100 Remote Expansion Enclosure External HDD Storage

Part Number	External Storage Expansion Units ¹	Form Factor
35311RU	EXP300 Storage Expansion Unit ²	Rack (3U)
35601RU	FASiT EXP500 Storage Expansion Unit ³	Rack (3U)
35421RU	FASiT200 Storage Server ^{4, 5}	Rack (3U)
35422RU	FASiT200 HA Storage Server ⁴	Rack (3U)
19K1121	FASiT200 Redundant RAID Controller	-



1. To configure an external SCSI storage device, select an optional SCSI controller then refer to Appendix D: Cables - Storage Units - Controllers to confirm the controller supports the desired External Storage Expansion Unit and to select a supported cable. For HDD or other expansion unit options, see the specific expansion unit section. For Fibre Channel storage devices, refer to the Fibre Channel Solutions Overview section.
2. EXP300 includes a single 2M Ultra2 SCSI cable and dual hot-swap 500W redundant power supplies, each with its own power cord.
3. FASiT EXP500 Storage Expansion Unit (P/N 35601RU) includes dual hot-swap 350W power supplies, each with its own power cord.
4. The FASiT200 includes two hot-swap, 350W auto-ranging redundant power supplies, each with its own power cord.
5. Can be upgraded to FASiT200 HA Storage Server through the addition of a FASiT200 Redundant RAID Controller (P/N 19K1121).

RXE-100 Remote Expansion Enclosure I/O Options

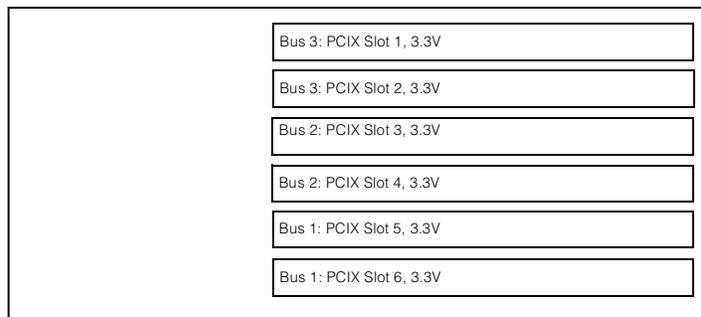
Part Number	Description	Adapter Length	PCI Support	Slots Supported ¹	Hot-Plug ²	PCI Voltage Key	MHz ³
Storage Controllers							
37L6889	ServeRAID-4H Ultra160 SCSI Controller ⁴	Full	64-bit	1 ... 6	X	Universal	33
06P5736	ServeRAID-4Mx Ultra160 SCSI Controller ⁵	Full	64-bit	1 ... 6	X	Universal	66
06P5740	ServeRAID-4Lx Ultra160 SCSI Controller ⁶	Half	64-bit	1 ... 6	X	Universal	66
19K4646	PCI Wide Ultra160 SCSI Adapter ⁷	Half	32-bit	1 ... 6	-	Universal	66
Fibre Storage Controllers and Options⁸							
00N6881	Netfinity FASiT Host Adapter	Half	64-bit	1 ... 6	X	Universal	66
19K1246	FASiT FC-2 Host Bus Adapter	Half	64-bit	1 ... 6	X	Universal	66
17421RU	FASiT700 Fibre Channel Storage Server	-	-	-	-	-	-
35521RU	FASiT500 Storage Server	-	-	-	-	-	-
35421RU	FASiT200 Storage Server	-	-	-	-	-	-
35422RU	FASiT200 HA Storage Server	-	-	-	-	-	-
35341RU	SAN Fibre Channel Managed Hub	-	-	-	-	-	-
2109S08	SAN Fibre Channel Switch, 8-Port	-	-	-	-	-	-
2109S16	SAN Fibre Channel Switch, 16-Port	-	-	-	-	-	-
2109F16	SAN Fibre Channel Switch, 16-Port (2Gb)	-	-	-	-	-	-
2108R3L	SAN Data Gateway Router Ultra SCSI LVD Port ⁹	-	-	-	-	-	-
Networking							
Ethernet							
09N9901	10/100 EtherLink Server Adapter by 3Com	Half	32-bit	1 ... 6	X	Universal	33
06P3601	10/100 Ethernet Server Adapter	Half	32-bit	1 ... 6	X	Universal	33
06P3701	Gigabit Ethernet SX Server Adapter (fiber)	Half	64-bit	1 ... 6	X	Universal	66
22P4901	10/100 Dual Port Server Adapter	Half	64-bit	1 ... 6	X	Universal	66
22P6801	PRO/1000XT Server Adapter by Intel (copper) w/CD, manuals	Half	64-bit	1 ... 6	X	Universal	133
Token Ring							
34L5001	16/4 Token-Ring PCI Management Adapter	Half	32-bit	1 ... 6	X	Universal	33
34L5201	High-Speed 100/16/4 Token-Ring PCI Management Adapter	Half	32-bit	1 ... 6	X	Universal	33
Associated Options							
31P5998	Remote I/O PCI-X 6-slot Expansion Kit ¹⁰	-	-	-	-	-	-
31P6088	8m Interconnect Management Cable Kit ¹¹	-	-	-	-	-	-
31P6103	8m Remote I/O Cable Kit ¹²	-	-	-	-	-	-
31P6087	3.5m Interconnect Management Cable Kit ¹³	-	-	-	-	-	-
31P6102	3.5m Remote I/O Cable Kit ¹³	-	-	-	-	-	-

1. Slots one through six are 64 bits wide configured on three buses with two slots each, supporting either one 133MHz or two 100MHz adapters in each bus. The slots are backward compatible for adapters that operate at 33 or 66MHz, which reduce the buses in which they are installed to the frequency of the slowest adapter.
2. All six slots are full-length Active PCI-X (hot-plug capable). For Network Operating System support, access www.pc.ibm.com/us/compat.
3. All slots support either 100MHz or 133MHz adapters (as well as 33MHz and 66MHz adapters). If an adapter rated at 133MHz is installed in either slot of any of the three buses, the other slot must remain vacant.
4. ServeRAID-4H Ultra160 SCSI Controller is powered by a 266MHz PowerPC 750 processor and provides 128MB of battery-backed ECC cache with two internal and four external Ultra160 connectors. External connections only can be used. External connectors are 0.8mm VHDCI.
5. ServeRAID-4Mx Ultra160 SCSI Controller is powered by a 100MHz Intel Zion GC80303 processor that provides 64MB of battery-backed ECC cache and two internal and two external Ultra160 connectors. External connections only can be used. External connectors are 0.8mm VHDCI.
6. ServeRAID-4Lx Ultra160 SCSI Controller is powered by a 100MHz Intel Zion GC80303 processor and provides a single channel, 32MB of ECC cache and one internal and one external Ultra160 connector. External connection only can be used. External connector is 0.8mm VHDCI.



7. PCI Wide Ultra160 SCSI Adapter (P/N 19K4646) provides a single channel with one internal connector, a five-drop multi-mode terminated LVD SCSI cable and one external 0.8mm VHDCI connector. External connection only can be utilized.
8. See Fibre Channel Solutions Overview section for additional configuration information.
9. The 2108R3L SAN Data Gateway Router Ultra SCSI LVD port provides one integrated short-wave optical port and two SCSI ports for tape storage connections (LVD, HVD and single-ended).
10. Installs into the RXE-100 to expand slot availability from six to 12. The expansion enclosure must be powered down to install this option. Cables internally through the secondary RIO connectors. The additional six slots are numbered one to six with the same attributes as the standard unit.
11. Allows the x360 remote management functionality to support the RXE-100. A 3.5m cable is standard for installations in the same rack. The 8m length is required when installing in a different rack.
12. Primary expansion cable connecting the expansion enclosure PCI slot capability to the system processor and memory components. A 3.5m cable is standard for installations in the same rack. The 8m length is required when installing in a different rack. Connects the RIO port on the back of the system to the primary RIO port on the back of the enclosure.
13. Ships standard with the RXE-100 Remote Expansion Enclosure.

Remote I/O PCI-X 6-Slot Expansion Kit (P/N 31P5998)



All slots are full-length, 64-bit, Active PCI-X.

RXE-100 Remote Expansion Enclosure Power

Part Number	Description
Power¹	
31P6108	370W Hot-Swap Redundant Power Supply
Uninterruptible Power Supply (UPS)²	
32P1020	APC 2U Smart-UPS 1400RMB
94G6676	APC Smart-UPS 3000RMB ³
37L6861	APC Smart-UPS 5000RMB ⁴

1. RXE-100 includes two 370W hot-swap power supplies, each with two 9ft power cords—one high voltage IEC 320-C13 to IEC 320-C14 and one low voltage IEC 320-C13 to NEMA 5-15P. N+1 power supply redundancy is standard for full configurations. A third power supply is not supported.
2. For runtimes and UPS attributes see Appendix C: UPS Runtime Estimate.
3. Height is 3U. See Rack Cabinets and Options section for supported IBM racks.
4. Height is 5U. See Rack Cabinets and Options section for supported IBM racks.

RXE-100 Remote Expansion Enclosure Tape Options

Part Number	Tape Drives	Bays Supported ¹	SCSI Interface (bit)	Form Factor	Termination Included	68/50-pin Converter Incl	Ext Tape Enclosures
00N8016	100/200GB LTO Tape Drive	-	16 Ultra2 LVD	133mm (5.25in) FH	Y ²	-	3551001 ³ 3503B 1X
00N8015	110/220GB Super DLT Internal SCSI Tape Drive	-	16 Ultra2 LVD	133mm (5.25in) FH	Y ²	-	3551001 ³ 3503B 1X
24P2396	100/200GB LTO Half-High Tape Drive	-	16 Ultra2 LVD	133mm (5.25in) HH	Y ²	-	3551001 ³



Tape Autoloaders							
3600109	3600 Series 900GB/1.8TB LTO Tape Autoloader ⁴	-	16 Ultra2 LVD	Tower or 6U Rack	Y	-	-
External Tape Libraries ⁵							
3570C2x	Magstar MP 3570 Tape Subsystem	-	HVD	6U Rack	Y	-	-
3600220	3600 Series 2/4TB LTO Tape Library (Tower)	-	16 Ultra2 LVD	Tower	Y	-	-
3600R20	3600 Series 2/4TB LTO Tape Library (Rack)	-	16 Ultra2 LVD	5U Rack	Y	-	-
3600LXU	3600 Series 2-Drive, 20-Cartridge Expander Module ⁶	-	16 Ultra2 LVD	5U Rack	Y	-	-
09N4048	3600 Series LTO Drive Upgrade Option ⁷	-	16 Ultra2 LVD	-	N	-	-
External Tape Enclosures							
3551001	NetMEDIA Storage Expansion Unit EL ⁸	-	16	Rack	Y	N	-
10L7113	NetMEDIA Systems Management Adapter ⁹	-	16 LVD	-	N	N	3551001
3503B1X	Full-High SCSI Tape Enclosure ¹⁰	-	16 Ultra2 LVD	Desktop or 3U Rack	Y	N	-

1. RXE-100 does not support internal tape drives. An external tape library or tape enclosure must be used. All tape drives and enclosures are supported by PCI Wide Ultra160 SCSI Adapter (P/N 19K4646) which has an external 0.8mm VHDCI connector. Select tape drive, enclosure and controller then use Appendix D: Cables - Storage Units - Controllers to select an appropriate external cable.

2. Termination requires installing the 42in single-drop, terminated LVD SCSI cable provided with the option or is provided in a NetMEDIA Storage Expansion Unit with the installation of NetMEDIA Systems Management Adapter (P/N 10L7113).

3. LVD support for LVD devices installed in a NetMEDIA Storage Expansion Unit EL (P/N 3551001) requires installation of NetMEDIA Systems Management Adapter (P/N 10L7113), which also provides termination, and replacement of the standard single-ended internal cable with the terminated single-drop LVD SCSI cable provided with this option. If the standard cables are used for attachment to LVD devices, single-ended SCSI rules and bus speeds apply.

4. If installed in a rack, a fixed shelf is required. Allow an additional 1U for the fixed shelf. One unit only per shelf is supported.

5. Tape library attributes and prerequisites are located in Appendix B: Tape Library Attributes.

6. Supported only with the 3600 Series LTO Tape Library (rack) (P/N 3600R20). Allow one additional EIA space when installing either one or two (maximum) units to accommodate a filler plate for cable routing. Up to two 3600 Series LTO Drive Upgrade Options can be installed in each module or the module can operate off the LTO drives installed in the LTO tape library.

7. Install in second drive bay of 3600 LTO Tape Libraries or in either of the two bays of 3600 Series 2-Drive 20-Cartridge Expander Module to increase performance. Includes an LTO (Ultraium) drive and a one-meter external LVD SCSI cable.

8. NetMEDIA Storage Expansion Unit EL (P/N 3551001) is a black 3U, 19in rack mountable tape enclosure which includes two full-high (FH) or four half-high (HH) extended length 133mm (5.25in) bays, two external 0.8mm VHDCI connectors and two internal four-drop single-ended terminated 16-bit SCSI cables for device attachment. Two power supplies and two power cords are also included. Tip: The front rail clips will need to be reversed and screwed in from behind to secure the unit in a 930842x rack.

9. NetMEDIA Systems Management Adapter (P/N 10L7113) may be installed in a 3551001 to provide repeater function, LVDS interface, aggregate cable lengths up to 12m when attached to an LVD SCSI controller, and auto-termination when the 3551001 is powered off. External connector is 0.8mm VHDCI.

10. Black desktop or 3U rack tape enclosure supports 133mm (5.25in) full-high LVD tape devices including DLT technology. Requires a fixed shelf if installed in a rack (allow additional 1U for fixed shelf). Supports the following full-high tape options: 00N8015, 00N8016, 00N7992, 00N7990.



IBM External Storage Expansion Unit Overview

Part Number	Subsystem Type	Total Bays	Hot-Swap Bays (total/avail)	Maximum Storage Capacity (GB)	Dimensions (W x D x H)	Form Factor	Max Cfg Wt	Power Supply
Ultra SCSI External Expansion At-A-Glance								
35311RU EXP300 ¹	Ultra160 LVDS	14	14/14 ²	10276	444mm x 519mm x 127.5mm (17.5in x 20.4in x 5in)	Rack Drawer (3U) ³	34.5kg (76.1lbs)	Redundant 500W
Fibre Channel External Expansion At-A-Glance								
35421RU FAST200	Fibre Channel	10	10/10	734	480mm x 575mm x 131.8mm (18.9in x 22.63in x 5.2in)	Rack Drawer (3U)	42.3kg (94lbs)	Redundant 350W
35422RU ⁴ FAST200 HA	Fibre Channel	10	10/10	734	480mm x 575mm x 131.8mm (18.9in x 22.63in x 5.2in)	Rack Drawer (3U)	42.3kg (94lbs)	Redundant 350W
35601RU FAST EXP500	Fibre Channel ⁵	10	10/10	734	447mm x 56mm x 128mm (17.6in x 22.2in x 5in)	Rack Drawer (3U)	36.1kg (79.6lbs)	Redundant 350W

1. To attach a SCSI storage enclosure to an xSeries server, an appropriate SCSI controller and external cable are required. See Appendix D: Cables - Storage Units - Controllers.
2. Supports slim-line drives only.
3. A rack-to-tower conversion kit option (P/N 09N7296) is available.
4. Identical to FAST200 (P/N 35421RU) with the addition of a FAST200 Redundant RAID Controller (P/N 19K1121).
5. Attachment to a FAST500 Storage Server (P/N 35521RU) is required. This expansion unit does not attach directly to an xSeries server. See FAST EXP500 section for more information.

IBM STORAGE
EXPANSION UNIT



IBM EXP300 (35311RU)

EXP300 Hard Disk Drive (HDD) Storage

Total Int Storage ¹	10,000rpm HDDs			15,000rpm HDDs	
	18.2GB (06P5754)	36.4GB (06P5755)	73.4GB (06P5756)	18.2GB (06P5767)	36.4GB (06P5768)
0GB	Standard in base model				
18.2GB	1	-	-	1	-
36.4GB	2	1	-	2	1
54.6GB	3	-	-	3	-
72.8GB	4	2	-	4	2
91GB	5	-	-	5	-
109.2GB	6	3	-	6	3
127.4GB	7	-	-	7	-
145.6GB	8	4	-	8	4
182GB	10	5	-	10	5
218.4GB	12	6	-	12	6
254.8GB	14	7	-	14	7
291.2GB	-	8	-	-	8
364.0GB	-	10	-	-	10
436.8GB	-	12	-	-	12
509.6GB	-	14	-	-	14
587.2GB	-	-	8	-	-
734GB	-	-	10	-	-
880.8GB	-	-	12	-	-
1027.6GB (max)	-	-	14	-	-

This table does not represent all possible HDD configurations.

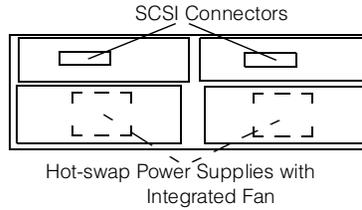
1. Select a total storage row then select the quantity of HDDs from a column corresponding to the HDD of choice. Total Internal Storage listed is within +/- 0.2GB unless otherwise noted.

SCSI ID	Form Factor	Height	Front Access	Usage	Part Number	Description	RPM	Height	Bays Supported ¹	Max Qty
0 ... 6	HS	SL	Yes	open	Ultra 160 HDDs					
8 ... 14	HS	SL	Yes	open	06P5754	18.2GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD	10000	SL	1 ... 14	14 ²
					06P5755	36.4GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD	10000	SL	1 ... 14	14 ²
					06P5756	73.4GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD	10000	SL	1 ... 14	14 ²
					06P5767	18.2GB 15Krpm Ultra160 SCSI Hot-Swap SL HDD	15000	SL	1 ... 14	14 ²
					06P5768	36.4GB 15Krpm Ultra160 SCSI Hot-Swap SL HDD	15000	SL	1 ... 14	14 ²
External Storage Expansion Units							Form Factor			
35311RU	EXP300 Storage Expansion Unit ³						Rack (3U)			
09N7296	EXP300 Rack-to-Tower Conversion Kit						-			

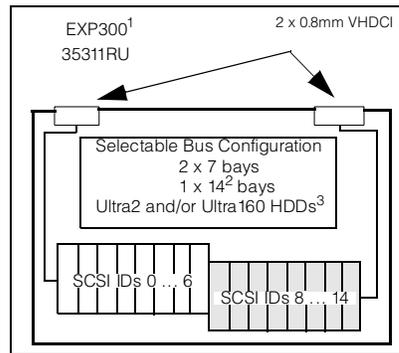
1. EXP300 Storage Expansion Unit ships with 14 slim-line hot-swap bays which can be configured as a single bus, two independent buses or a twintailed single bus.

2. Twintailing reduces the maximum number of HDDs on a single bus to 13.

3. EXP300 includes a single 2M Ultra2 SCSI cable and dual hot-swap 500W redundant power supplies, each with its own power cord.

EXP300 Storage Expansion Unit 35311RU


- Fourteen slim-high drive bays.
- Supports Ultra160 SCSI data transfer speeds - up to 160MB/s.
- Single or dual SCSI bus configurations.
- Dual hot-swap 500W redundant power supplies with integrated fan assemblies.
- Height is 3U (1U=1.75in or 44.45mm).
- Tower capability through optional Rack-to-Tower Conversion Kit.
- Requires Netfinity Enterprise Rack or Expansion Cabinet, IBM NetBAY Enterprise Rack or Expansion Cabinet, Netfinity Rack, Netfinity NetBAY22 or 19in EIA-D Industry-Standard Rack. Mounting rails are included with the unit.



1. Housed in a 19in rack mountable drawer and ships standard with redundant 500W hot-swap power supplies, two power cords and a single 2M Ultra2 SCSI cable capable of supporting Ultra160 speeds.
2. Twintailing reduces the maximum number of HDDs on a single bus to 13.
3. When combined with a ServeRAID-4x controller, Ultra2 and Ultra160 HDDs may be mixed on the same bus and operate at up to their maximum respective speeds.

Requires IBM NetBAY 42 Enterprise Rack or Expansion Cabinet (930842S, E), NetBAY 42 Standard Rack Cabinet or Expansion Cabinet (9306420, 1), NetBAY 25 (9306250), NetBAY 22 (9306200), NetBAY 3 (10L6912), NetBAY 3E (36L9701) or Rack-to-Tower Conversion Kit (09N7296).

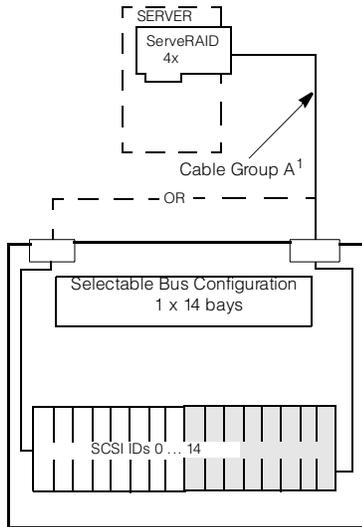
External Storage Expansion Units require storage controllers and external cables. Select a supported RAID controller from the system configurator and cables from Appendix D: Cables - Storage Units - Controllers.

Cables and Controllers:
See Appendix D: Cables - Storage Units - Controllers



EXP300 Sample Configurations

EXP300 One Independent SCSI Bus



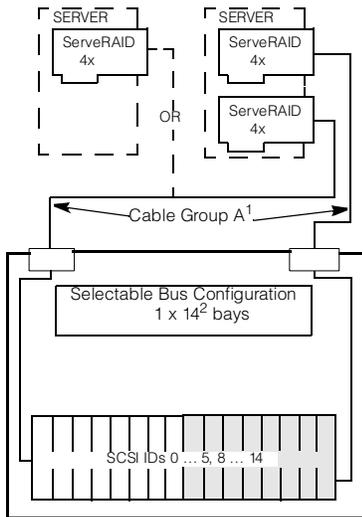
Order:

- 1 x 35311RU
- 1 x External Cable from Group A¹
- Up to 14 Ultra2 and/or Ultra160 HDDs

1. One 2M Ultra2 cable is included with each EXP300. If a longer cable is desired, select one from cable group A.

EXP300 One Independent Twintail SCSI Bus High Availability Configuration

To configure as one independent twintailed 13-bay SCSI bus, attach two external cables from two ServeRAID adapters, in the same or separate servers, to the two external ports of the EXP300. The EXP300 must be set for 1 x 14² bays.



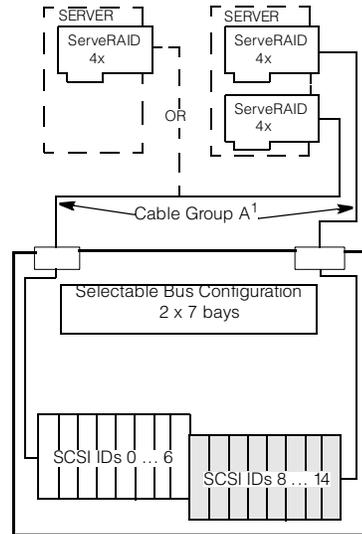
Order:

- 1 x 35311RU
- 2 x External Cables from Group A¹
- Up to 13 Ultra2 and/or Ultra160 HDDs

1. One 2M Ultra2 cable is included with each EXP300. If a longer cable is desired, select one from cable group A.
2. Twintailing reduces the maximum number of HDDs on a single bus to 13.

EXP300 Two Independent SCSI Buses

To configure as two independent seven-bay SCSI buses, attach two external cables from two ServeRAID adapters, in the same or separate servers, to the two external ports of the EXP300. The EXP300 must be set for 2 x 7 bays.



Order:

- 1 x 35311RU
- 2 x External Cables from Group A¹
- Up to 14 Ultra2 and/or Ultra160 HDDs

1. One 2M Ultra2 cable is included with each EXP300. If a longer cable is desired, select one from cable group A.



Fibre Channel Solutions Overview

Fibre Channel Solutions Overview At-A-Glance

Part Number	Description	Topology	Max Supported Storage	Host Partitions	Host Fabric Ports (std/max)	Max Redundant Host Connections	Drive Side Mini Hubs (std/max)	Redundant Drive Loops (std/max)	Form Factor
FAST Storage Servers									
35421RU	FAST200 Storage Server	Fibre-over-Fibre	734GB ¹	16	1/1	0	-	0	3U
35422RU	FAST200 HA Storage Server	Fibre-over-Fibre	4.4TB ²	16	2/2	1	-	1	3U
35521RU	FAST500 Storage Server	Fibre-over-Fibre	16.15TB ³	16	4/8	4	2/4	1/2	4U
17421RU	FAST700 Fibre Channel Storage Server	Fibre-over-Fibre	16.15TB ³	64	4/8	4	2/4	1/2	4U
Fibre Channel HDD Expansion Units									
35601RU	FAST EXP500	Fibre-over-Fibre	734GB	-	2/2	-	-	-	3U
1Gb Fibre Channel Fabric Components									
00N6881	FAST Host Adapter	-	-	-	-	-	-	-	-
00N6882	FAST500 Mini Hub	-	-	-	-	-	-	-	-
00N6883	FAST500 256MB Cache	-	-	-	-	-	-	-	-
19K1121	FAST200 Redundant RAID Controller	-	-	-	-	-	-	-	-
2108R3L	SAN Data Gateway Router UltraSCSI LVD Port	-	-	-	-	-	-	-	-
09N4047	Fibre Tape Automation Adapter	-	-	-	-	-	-	-	-
2109S08	SAN FC Switch, 8-Port	-	-	-	-	-	-	-	-
2109S16	SAN FC Switch, 16-Port	-	-	-	-	-	-	-	-
35341RU	SAN FC Managed Hub	-	-	-	-	-	-	-	-
03K9307	FC Long-wave GBIC	-	-	-	-	-	-	-	-
03K9308	FC Short-wave GBIC	-	-	-	-	-	-	-	-
03K9305	Netfinity Fibre Channel 25M Cable	-	-	-	-	-	-	-	-
03K9306	Netfinity Fibre Channel 5M Cable	-	-	-	-	-	-	-	-
36L9973	Netfinity Fibre Channel 1M Cable	-	-	-	-	-	-	-	-
2Gb Fibre Channel Fabric Components									
19K1246	FAST FC-2 Host Bus Adapter	-	-	-	-	-	-	-	-
19K1269	FAST700 Mini Hub	-	-	-	-	-	-	-	-
2109F16	SAN FC Switch, 16-Port (2Gb)	-	-	-	-	-	-	-	-
19K1271	Short-wave SFP Module	-	-	-	-	-	-	-	-
19K1272	Long-wave SFP Module	-	-	-	-	-	-	-	-
19K1247	1M LC-LC Fibre Channel Cable	-	-	-	-	-	-	-	-
19K1248	5M LC-LC Fibre Channel Cable	-	-	-	-	-	-	-	-
19K1249	25M LC-LC Fibre Channel Cable	-	-	-	-	-	-	-	-
19K1250	LC-SC Fibre Channel Adapter Cable ⁴	-	-	-	-	-	-	-	-
Fibre Channel HDDs									
19K0653	Netfinity 36.4GB 10K-4 FC Hot-swap HDD	-	-	-	-	-	-	-	-
19K0654	Netfinity 73.4GB 10K-4 FC Hot-swap HDD	-	-	-	-	-	-	-	-
06P5707	Netfinity 18.2GB 15Krpm FC Hot-swap HDD	-	-	-	-	-	-	-	-

1. Attaching expansion units to a FAST200 Storage Server is not recommended because a single point-of-failure occurs when external storage is connected through only one RAID controller. The maximum storage value is based on 10 internal 73.4GB internal FC HDDs.
 2. Based on a maximum of 60 73.4GB FC HDDs installed in the redundant storage loop that includes the FAST200 internal HDD bays and five FAST EXP500 expansion units.
 3. Based on a maximum of 220 73.4GB FC HDDs installed in a maximum of 22 FAST EXP500 expansion units. A maximum of 11 expansion units are supported in a redundant drive loop (cable pair). Four drive-side mini hubs are required to support two pairs of loops running in redundant mode.
 4. The LC-SC Fibre Channel Adapter Cable (P/N 19K1250) is designed to connect any 1Gb device or cable to any 2Gb device or cable. When 2Gb and 1Gb technology are combined in a configuration, the signal transfer automatically converts to the slower speed.

FIBRE ARRAY SOLUTIONS



IBM FAStT200 Storage Server (3542xRU)

FAStT200 (HA) Storage Expansion Unit

Total Internal Storage ¹	10,000RPM HDDs		15,000RPM HDDs
	36.4GB (19K0653)	73.4GB (19K0654)	18.2GB (06P5707)
0GB	Standard in base model		
18.2GB	-	-	1
36.4GB	1	-	2
54.6GB	-	-	3
72.8GB	2	-	4
73.4GB	-	1	-
91GB	-	-	5
109.2GB	3	-	6
145.6GB	4	-	8
146.8GB	-	2	-
182GB	5	-	10
218.4GB	6	-	-
220.2GB	-	3	-
254.8GB	7	-	-
291.2GB	8	-	-
293.6GB	-	4	-
327.6GB	9	-	-
364GB	10	-	-
367GB	-	5	-
440.4GB	-	6	-
513.8GB	-	7	-
587.2GB	-	8	-
660.6GB	-	9	-
734GB (max)	-	10	-

This table does not represent all valid HDD configurations.

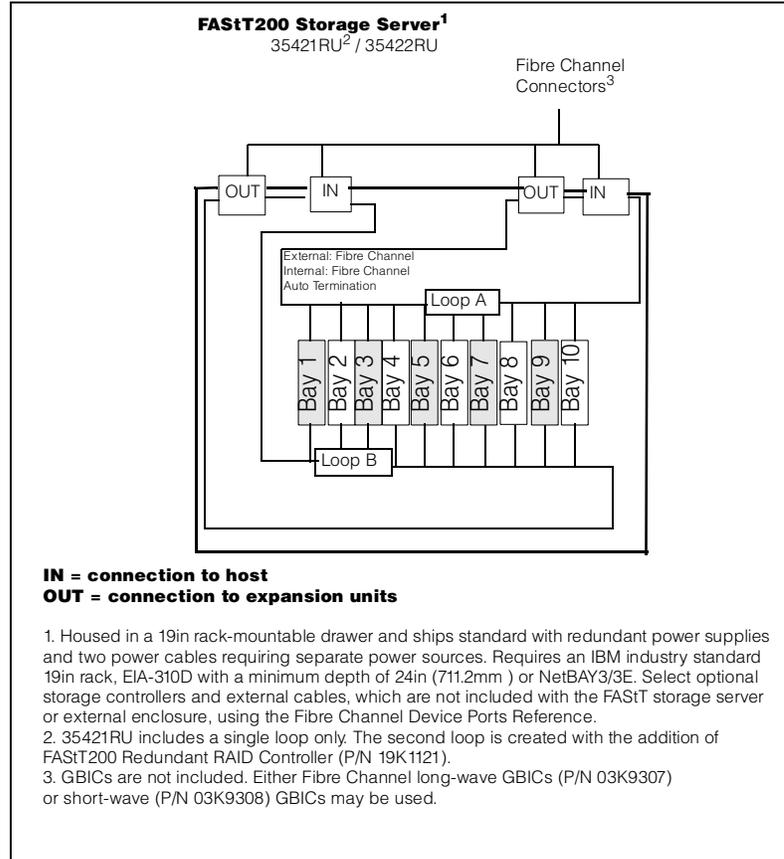
1. Select a total storage row and then select the quantity of HDDs from a column corresponding to the HDD of choice. Total Internal Storage listed is within +/- 0.2GB unless otherwise noted.

2. When referring to hard disk drive capacity, GB equals one billion bytes. Total user accessible capacity may vary depending on operating environments.

Part Number	Description	RPM	Height	Bays Supported	Max Qty Supported
19K0653	Netfinity 36.4GB 10K-4 FC Hot-Swap HDD	10,000	SL	1 ... 10	10
19K0654	Netfinity 73.4GB 10K-4 FC Hot-Swap HDD	10,000	HH	1 ... 10	10
06P5707	Netfinity 18.2GB 15Krpm FC Hot-Swap HDD	15,000	SL	1 ... 10	10
External Storage Expansion Units		Form Factor			
35421RU	FAStT200 Storage Server ^{1, 2}	Rack (3U)			
35422RU	FAStT200 HA Storage Server ¹	Rack (3U)			
19K1121	FAStT200 Redundant RAID Controller	-			

1. The FAStT200 includes two hot-swap, 350W auto-ranging redundant power supplies, each with its own power cord.

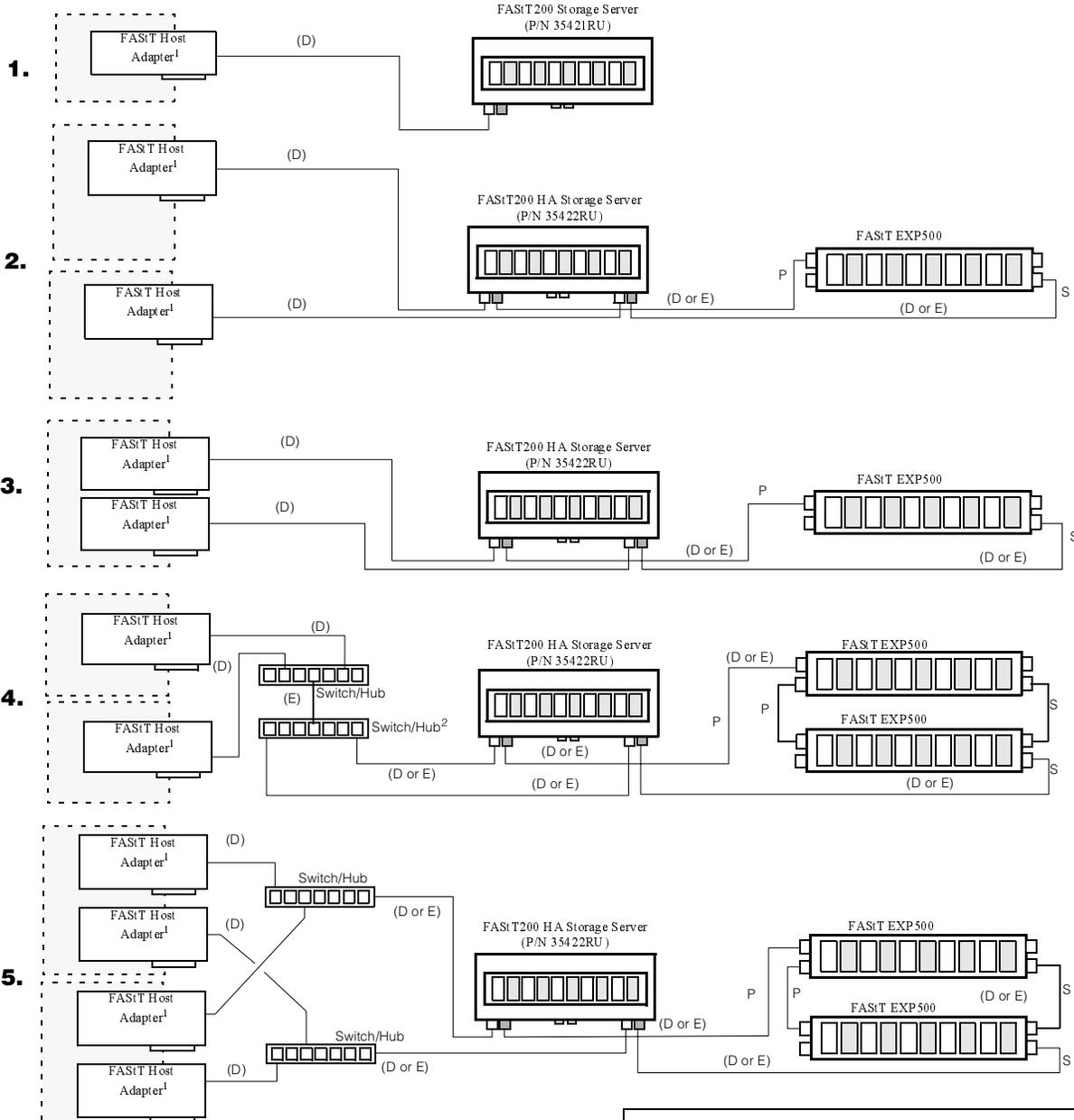
2. Can be upgraded to FAStT200 HA Storage Server through the addition of a FAStT200 Redundant RAID Controller (P/N 19K1121).





Fibre / Fibre Configuration Examples (FASiT200)

Note: The following sample configurations are for illustration only and may not be suitable for any specific customer installation. Contact your IBM Business Partner or IBM Marketing Representative for assistance with your specific configuration requirements.



1. FASiT Host Adapter (P/N 00N6881) supports short-wave connections only.
2. Buffering the long-wave optic cable expanse with a second switch or hub at the remote storage location is required to requalify the signal. A managed hub supports only one long-wave GBIC.
 - P = primary path, S = secondary (redundant) path
 - Shaded boxes represent separate hosts.
 - Cable groups are represented by letters in parenthesis.
 - Maximum of 60 external storage HDDs are supported for optimum performance (up to 10 in the storage server with the remainder in expansion units).
 - The number of servers that can be used in configurations with managed hubs or Fibre Channel switches are dependent on partitioning restrictions of the management system or cluster software.
- An optional short- or long-wave GBIC is required for all FASiT200 storage server and FASiT EXP500 storage connections. GBICs are not depicted in these diagrams. See device drawings at the end of this section for details.
- Other Fibre Channel devices may not require optional GBICs. For specific requirements, see the Fibre Device Ports Reference.

Cable Group D (short-wave Fibre Channel)
 36L9973 - Netfinity Fibre Channel 1M Cable
 03K9306 - Netfinity Fibre Channel 5M Cable
 03K9305 - Netfinity Fibre Channel 25M Cable
 Customer supplied short-wave cable of up to 500M (0.31 miles)

Cable Group E (long-wave Fibre Channel)
 Customer supplied long-wave cable of up to 10KM (6.2 miles)

GBIC
 03K9308 - Netfinity Fibre Channel Short-Wave GBIC
 03K9307 - Netfinity Fibre Channel Long-Wave GBIC



IBM FAStT EXP500 (35601RU)

FAStT EXP500 Storage Expansion Unit

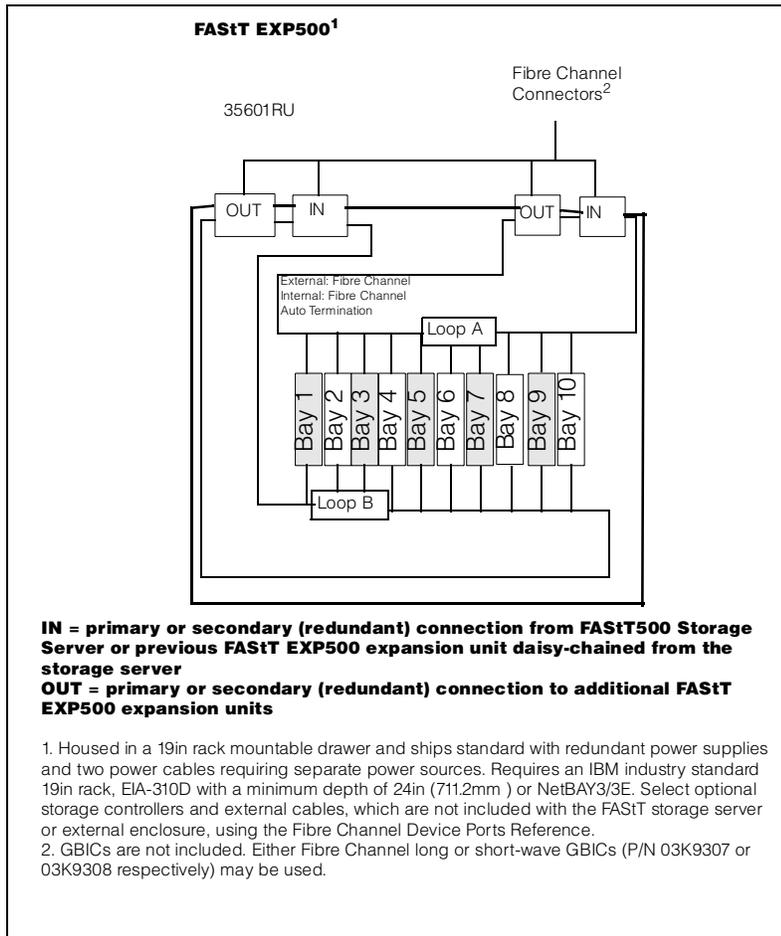
Total Internal Storage ¹	10,000RPM HDDs		15,000RPM HDDs
	36.4GB (19K0653)	73.4GB (19K0654)	18.2GB (06P5707)
0GB	Standard in base model		
18.2GB	-	-	1
36.4GB	1	-	2
54.6GB	-	-	3
72.8GB	2	-	4
73.4GB	-	1	-
91GB	-	-	5
109.2GB	3	-	6
145.6GB	4	-	8
146.8GB	-	2	-
182GB	5	-	10
218.4GB	6	-	-
220.2GB	-	3	-
254.8GB	7	-	-
291.2GB	8	-	-
293.6GB	-	4	-
327.6GB	9	-	-
364GB	10	-	-
367GB	-	5	-
440.4GB	-	6	-
513.8GB	-	7	-
587.2GB	-	8	-
660.6GB	-	9	-
734GB (max)	-	10	-

This table does not represent all valid HDD configurations.

1. Select a total storage row and then select the quantity of HDDs from a column corresponding to the HDD of choice. Total Internal Storage listed is within +/- 0.2GB unless otherwise noted.

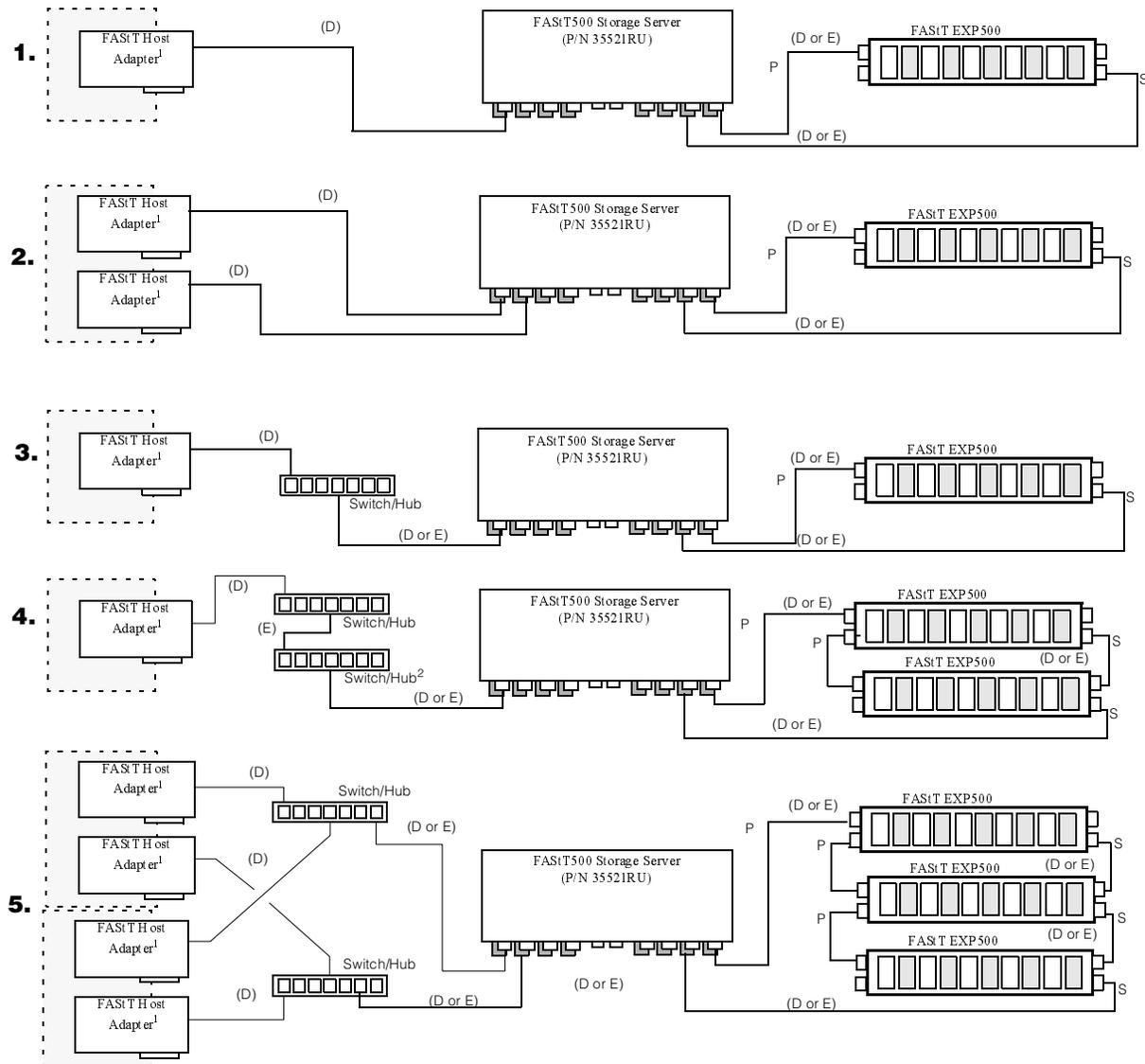
Part Number	Description	RPM	Height	Bays Supported	Max Qty Supported
19K0653	Netfinity 36.4GB 10K-4 FC Hot-Swap HDD	10,000	SL	1 ... 10	10
19K0654	Netfinity 73.4GB 10K-4 FC Hot-Swap HDD	10,000	HH	1 ... 10	10
06P5707	Netfinity 18.2GB 15Krpm FC Hot-Swap HDD	15,000	SL	1 ... 10	10
External Storage Expansion Units		Form Factor			
35601RU	FAStT EXP500 Storage Expansion Unit ¹	Rack (3U)			

1. The FASIT EXP500 includes two hot-swap, 350W auto-ranging redundant power supplies, each with its own power cord.



Fibre / Fibre Configuration Examples FASTT EXP500 with FASTT500 Storage Server

Note: The following sample configurations are for illustration only and may not be suitable for any specific customer installation. Contact your IBM Business Partner or IBM Marketing Representative for assistance with your specific configuration requirements.



1. FASTT Host Adapter (P/N 00N6881) supports shortwave connections only.
2. Buffering the long-wave optic cable expanse with a second switch or hub at the remote storage location is required to requalify the signal.
 - P = Primary path, S = Secondary/Redundant path
 - Shaded boxes represent separate hosts.
 - Cable groups are represented by letters in parenthesis.
 - Maximum of 220 external storage HDDs are supported through 11 enclosures in each cable pair.
 - The number of servers that can be used in configurations with managed hubs or Fibre Channel switches are dependent on partitioning restrictions of the management system or cluster software.
 - An optional short- or long-wave GBIC is required for all FASTT500 storage server and FASTT EXP500 storage connections. GBICs are not depicted in these diagrams. See device drawings at the end of this section for details.
 - Other Fibre Channel devices may not require optional GBICs. For specific requirements, see the Fibre Device Ports Reference.

Cable Group D (short-wave Fibre Channel)
 36L9973 - Netfinity Fibre Channel 1M Cable
 03K9306 - Netfinity Fibre Channel 5M Cable
 03K9305 - Netfinity Fibre Channel 25M Cable
 Customer supplied short-wave cable of up to 500M (0.31 miles)

Cable Group E (long-wave Fibre Channel)
 Customer supplied long-wave cable of up to 10KM (6.2 miles)

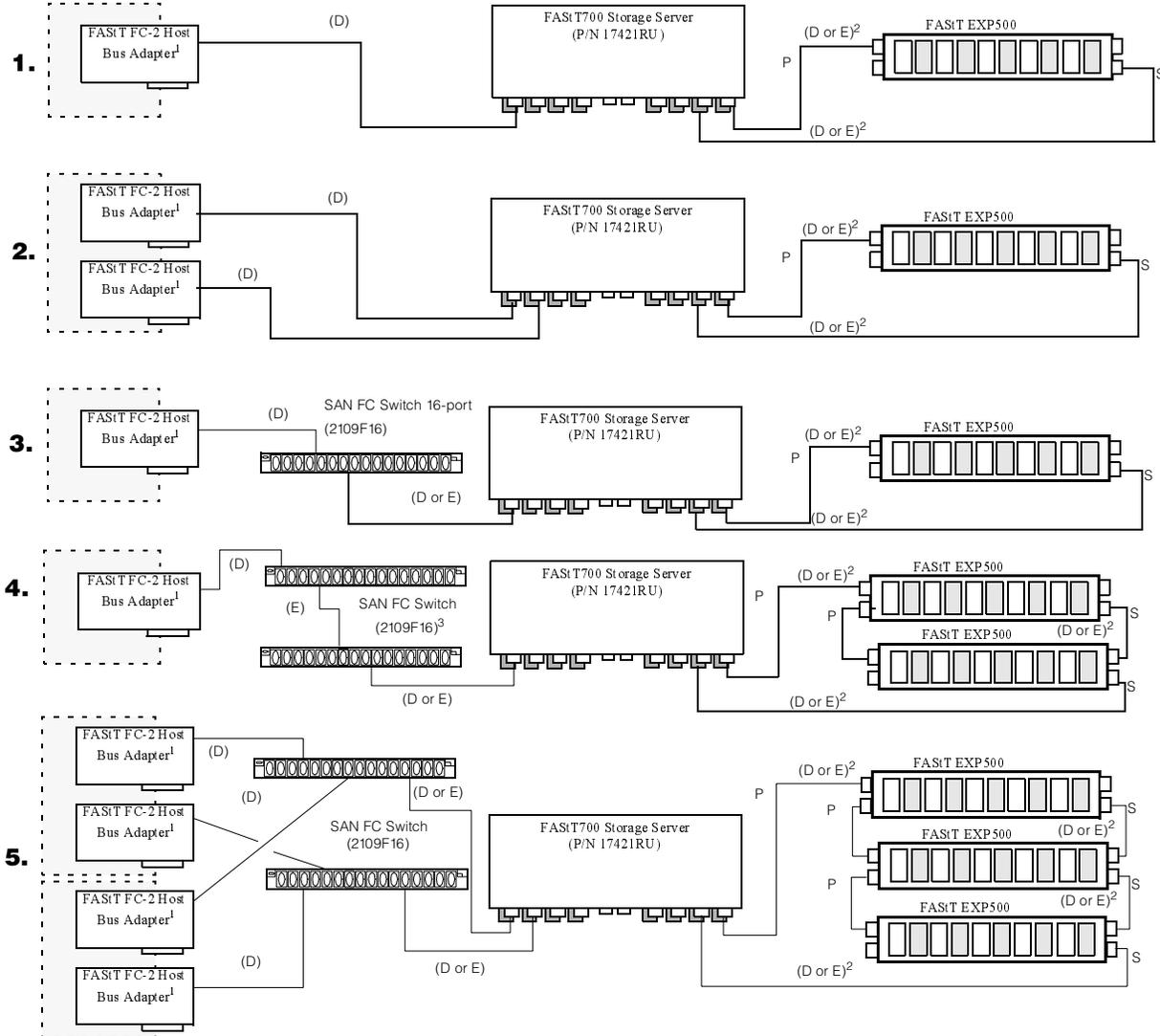
GBIC
 03K9308 - Netfinity Fibre Channel Short-wave GBIC
 03K9307 - Netfinity Fibre Channel Long-wave GBIC



Fibre / Fibre Configuration Examples

FAST EXP500 with FAST700 Fibre Channel Storage Server

Note: The following sample configurations are for illustration only and may not be suitable for any specific customer installation. Contact your IBM Business Partner or IBM Marketing Representative for assistance with your specific configuration requirements.



1. FAST FC-2 Host Bus Adapter (P/N 19K 1246) includes an integrated short-wave SFF Module, supporting short-wave connections only.
2. Fibre Channel connections to the FAST EXP500 require GBICs. LC-LC Fibre Channel cable does not connect directly into a GBIC. LC-SC Fibre Channel Adapter Cable (P/N 19K1250) is required. Use SC Fibre Channel cable for daisy-chaining FAST EXP500 units (see FAST500 Storage Server configuration for a list of SC cables).
3. Buffering the long-wave optic cable expanse with a second switch or hub at the remote storage location is required to requalify the signal.
 - P = Primary path, S = Secondary/Redundant path
 - Shaded boxes represent separate hosts.
 - Cable groups are represented by letters in parenthesis.
 - Maximum of 220 external storage HDDs are supported through a maximum of 11 enclosures in each channel pair (22 enclosures total).
 - The number of servers that can be used in configurations with managed hubs or Fibre Channel switches are dependent on partitioning restrictions of the management system or cluster software.
 - An optional short- or long-wave GBIC is required for all FAST500 EXP500 storage connections. FAST700 and 2Gb FC switch connections require SFP Modules. LC-SC FC Adapter Cables are required to connect LC-LC FC cables to GBICs in FAST EXP500 connections. GBICs, SFP Modules and adapter cables are not depicted in these diagrams. See device drawings at the end of this section for details.
 - For specific requirements concerning connections, refer to the Fibre Device Ports Reference or Fibre Interconnection Guidelines.

Cable Group D (short-wave Fibre Channel)
 19K1247 - 1M LC-LC Fibre Channel Cable
 19K1248 - 5M LC-LC Fibre Channel Cable
 19K1249 - 25M LC-LC Fibre Channel Cable
 Customer supplied short-wave cable of up to 500M (0.31 miles)

Cable Group E (long-wave Fibre Channel)
 Customer supplied long-wave cable of up to 10KM (6.2 miles)

GBIC/SFP Modules
 03K9308 - Netfinity Fibre Channel Short-wave GBIC
 03K9307 - Netfinity Fibre Channel Long-wave GBIC
 19K1271 - Short-wave SFP Module
 19K1272 - Long-wave SFP Module
 19K1250 - LC-SC Fibre Channel Adapter Cable

Fibre Interconnection Guidelines

Part Number	Description	00N6881 FAST Host Adapter	00N6882 FAST Mini Hub 1	19K1121 FastT200 Redun RAID Controller ¹	2109R3L SAN Data Gateway Router	2109S08 SAN FC Switch, 8-Port ¹	2109S16 SAN FC Switch, 16-Port ¹	35341RU SAN FC Managed Hub 1	35421RU FAST200 Storage Server ¹	35422RU FAST200 HA Storage Server ¹	35521RU FAST500 Storage Server ¹	35601RU FAST EXP500 ¹	09N4047 Fibre Tape Automation Adapter	2109F16 SAN Fibre Channel Switch, 16-port ²	19K1246 SAN Fibre Host Adapter	17421RU FAST700 FC Storage Server ²	19K1269 FAST700 Mini Hub ²	19K1250 LC-SC Fibre Channel Adapter Cable ³
00N6881	FAST Host Adapter	-	S	S	-	S	S	S	S	S	S	-	-	S ⁴	-	S ⁴	S ⁴	H
19K1246	FAST FC-2 Host Bus Adapter	-	S ⁵	S ⁵	-	S ⁵	S ⁵	-	S ⁵	S ⁵	S ⁵	-	-	S	-	S	S	H
2108R3L	SAN Data Gateway Router UltraSCSI LVD Port	-	-	-	-	S	S	S	-	-	-	-	-	S ⁴	-	-	-	H
2109S08	SAN FC Switch, 8-Port ¹	S	E	E	S	E	E	-	E	E	E	E	S	E ⁴	E ⁴	E ⁴	E ⁴	H
2109S16	SAN FC Switch, 16-Port ¹	S	E	E	S	E	E	-	E	E	E	E	S	E ⁴	E ⁴	E ⁴	E ⁴	H
2109F16	SAN Fibre Channel Switch, 16-Port ²	S	E ⁵	E ⁵	S ⁵	E ⁵	E ⁵	-	E ⁵	E ⁵	E ⁵	-	-	E	S	E	E	H
35341RU	SAN FC Managed Hub ¹	S	E	E	S	E	E	E	E	E	E	-	S	-	-	-	-	H
09N4047	Fibre Tape Automation Adapter	-	-	-	-	S	S	S	-	-	-	-	-	-	-	-	-	-
35421RU	FAST200 Storage Server ¹	S	-	H	-	E	E	E	-	-	-	E	-	E	S ⁴	-	-	H
35422RU	FAST200 HA Storage Server ¹	S	-	-	-	E	E	E	-	-	-	E	-	E	S ⁴	-	-	H
19K1121	FAST200 Redundant RAID Controller ¹	S	-	-	-	E	E	E	H	-	-	E	-	-	S ⁴	-	-	H
35521RU	FAST500 Storage Server ¹	-	H	-	-	E	E	E	-	-	-	E	-	-	S ⁴	-	-	H
00N6882	FAST500 Mini Hub ¹	-	E	E	-	E	E	-	-	-	H	E	-	-	S ⁴	-	-	H
35601RU	FAST EXP500 ¹	-	E	E	-	-	-	-	E	E	E	-	-	-	-	E ⁴	E ⁴	H
17421RU	FAST700 Fibre Channel Storage Server ²	S ⁵	-	-	-	E ⁵	E ⁵	-	-	-	-	E ⁵	-	E	S	-	H	H
19K1269	FAST700 Mini Hub ²	S ⁵	-	-	-	E ⁵	E ⁵	-	-	-	-	E ⁵	-	E	S	H	-	H
03K9307	FC Long-wave GBIC	-	H	H	-	H	H	H	H	H	H	H	-	-	-	-	-	H
03K9308	FC Short-wave GBIC	-	H	H	-	H	H	H	H	H	H	H	-	-	-	-	-	H
19K1250	LC-SC Fibre Channel Adapter Cable ³	H	H	H	H	H	H	H	H	H	H	H	-	H	H	H	H	-
19K1271	Short-wave SFP Module	-	-	-	-	-	-	-	-	-	-	-	-	H	-	H	H	H
19K1272	Long-wave SFP Module	-	-	-	-	-	-	-	-	-	-	-	-	H	-	H	H	H

S Short-wave connection only. See Fibre Device Ports Reference section for GBIC, SFP module or integrated optical port information.
E Either short-wave or long-wave connections allowed via the appropriate GBIC or SFP module. See Fibre Device Ports Reference section for GBIC, SFP module or integrated optical port information.
H Hardware connection: One of these devices installs directly into the other, e.g., the FAST500 Mini Hub (P/N 00N6882) installs directly into the FAST500 Storage Server (P/N 35521RU) to provide GBIC availability.

1. This device requires the use of GBICs. Purchase of GBICs may be needed in order to make connections to this device. See the Fibre Device Ports Reference section for GBIC or integrated optical port information.
2. This device requires a long- or short-wave SFP module. See Fibre Device Ports Reference for additional information.
3. The LC-SC Fibre Channel Adapter Cable (P/N 19K1250) is designed to connect any 1Gb device or cable to any 2Gb device or cable. When 2Gb and 1Gb technology are combined in a configuration, the signal transfer automatically converts to the slower speed.
4. When connected to 2Gb devices or cable, LC-SC Fibre Channel Adapter Cable (P/N 19K1250) is required.
5. When connected to 1Gb devices or cable, LC-SC Fibre Channel Adapter Cable (P/N 19K1250) is required.





Fibre Device Ports Reference

Part Number	Description	Total Connections Possible	Integrated Ports ⁴	Mini Hubs Possible	Mini Hubs Installed	GBIC or SFP Module Ports	GBICs or SFP Modules Included ⁴
00N6881	FAST Host Adapter	1	1	-	-	-	-
00N6882	FAST500 Mini Hub ¹	2	-	-	-	2	-
03K9307	FC Long-wave GBIC	1	-	-	-	-	-
03K9308	FC Short-wave GBIC	1	-	-	-	-	-
09N4047	Fibre Tape Automation Adapter ²	1	1	-	-	-	-
19K1121	FAST200 Redundant RAID Controller	2	-	-	-	2	-
2108R3L	San Data Gateway Router UltraSCSI LVD Port ³	1	1	-	-	-	-
2109S08	SAN FC Switch, 8-Port	8	-	-	-	8	4
2109S16	SAN FC Switch, 16-Port	16	-	-	-	16	4
2109F16	SAN FC Switch, 16-Port	16	-	-	-	16	8 ⁸
35341RU	SAN FC Managed Hub	8	7	-	-	1	-
35421RU	FAST200 Storage Server	2	-	-	-	2	-
35422RU	FAST200 HA Storage Server	4	-	-	-	4	-
35521RU	FAST500 Storage Server ⁵	12	-	8	4	12 ¹	-
35601RU	FAST EXP500	4	-	-	-	4	-
19K1246	FAST FC-2 Host Bus Adapter	1	1	-	-	-	-
17421RU	FAST700 FC Storage Server ⁶	12	-	8	4	12	-
19K1269	FAST700 Mini Hub ⁷	2	-	-	-	2	-
19K1250	LC-SC FC Adapter Cable ⁹	1	1	-	-	-	-
19K1271	Short-wave SFP Module	1	-	-	-	-	-
19K1272	Long-wave SFP Module	1	-	-	-	-	-

1. Each FAST500 Mini Hub provides two GBIC ports. The host-side mini hubs connect to one of two Fibre Channel controllers in the FAST500 Storage Server. The drive-side mini hubs each connect to both Fibre Channel controllers. Full redundancy requires connection to two drive-side and two host-side mini hubs. Drive-side mini hubs support connection to one port only.

2. This adapter installs in a 3600 Series Tape Library and attaches to a FAST Host Adapter or GBIC installed in a Fibre Channel Switch (P/N 2109S08, 16) or Managed Hub (P/N 35341RU) via a short-wave Fibre Channel cable (P/N 36L9973, 03K9306, 03K9305).

3. Provides one integrated short-wave optical port and two SCSI ports for tape storage connections (one LVD or HVD and one single-ended).

4. Standard GBICs, SFP Modules and integrated optical ports are short-wave.

5. FAST500 Storage Server supports up to eight nonredundant or four redundant host connections and two redundant storage drive loops.

6. FAST700 Storage Server supports up to eight nonredundant or four redundant host connections and two redundant storage drive loops.

7. Each FAST700 Mini Hub provides two SFP Module ports. The host-side mini hubs connect to one of two Fibre Channel controllers in the FAST700 Storage Server. The drive side mini hubs each connect to both Fibre Channel controllers. Full redundancy requires connection to two drive-side and two host-side mini hubs. Drive-side mini hubs support connection to one port only.

8. Eight short-wave SFP modules are standard. Either short-wave or long-wave modules can populate the other eight ports.

9. The LC-SC Fibre Channel Adapter Cable (P/N 19K1250) is designed to connect any 1Gb device or cable to any 2Gb device or cable. When 2Gb and 1Gb technology are combined in a configuration, the signal transfer automatically converts to the slower speed.

Supported Cable Groups	
Cable Group A (0.8mm to 0.8mm)	
03K9310	Netfinity 2M Ultra2 SCSI Cable
03K9311	Netfinity 4.2M Ultra2 SCSI Cable
37L7101	Netfinity 20M Ultra2 SCSI Cable
Cable Group D (Short-wave Fibre)	
36L9973	Netfinity Fibre Channel 1M Cable
03K9306	Netfinity Fibre Channel 5M Cable
03K9305	Netfinity Fibre Channel 25M Cable
19K1247	1M LC-LC Fibre Channel Cable
19K1248	5M LC-LC Fibre Channel Cable
19K1249	25M LC-LC Fibre Channel Cable
Customer supplied short-wave cable of up to 500M (0.31 miles)	
Cable Group E (Long-wave Fibre)	
Customer supplied long-wave cable of up to 10KM (6.2 miles)	
GBIC/SFP Modules	
03K9308	Netfinity Fibre Channel Short-wave GBIC
03K9307	Netfinity Fibre Channel Long-wave GBIC
19K1271	Short-wave SFP Module
19K1272	Long-wave SFP Module
19K1250	LC-SC Fibre Channel Adapter Cable

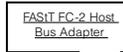


**FAST Host Adapter
00N6881**



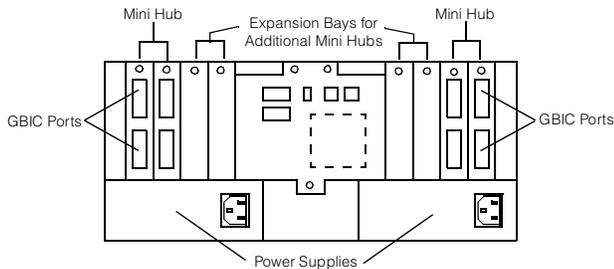
- PCI to FCAL 64/32-bit host adapter.
- Supported Attachments (use cable group D):
FAST500 Storage Server 35521RU.
- Integrated short-wave optical port. No GBICs required.
- Full Fibre Channel fabric support.

**FAST FC-2 Host Bus Adapter
19K1246**



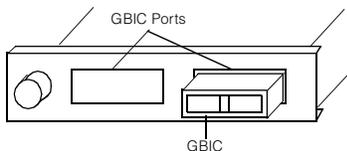
- PCI-X to FCAL 64-bit host adapter (100MHz).
- Supported Attachments (use LC-LC cable in group D):
FAST700 Storage Server 17421RU.
- Integrated short-wave optical port. No SFP Modules required.
- Full Fibre Channel fabric support.

**FAST500 Storage Server
35521RU**



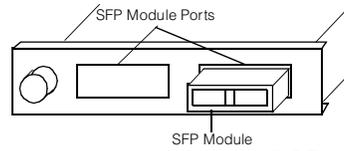
- Dual high-performance, RAID controller cards--supports up to 380MB/sec of throughput.
- Two 175W auto-ranging, hot-swap, redundant power supplies.
- Attach directly to FAST Host Adapter(s) (P/N 00N6881) with short-wave cables and GBICs or indirectly through SAN Fibre Channel Managed Hub (P/N 35341RU) or either the 8-port or 16-port Fibre Channel Switch (P/N 2109S08, 2109S16) using cables from cable group D or E with corresponding GBICs.
- Height is 4U (1U = 1.75in or 44.45mm)
- For optimum performance no more than two FAST500 Storage Servers (P/N 35521RU) should be attached to a single hub (P/N 35341RU)
- Includes four FAST500 Mini Hubs (P/N 00N6882), two for host and two for drive-side.
- FAST500 256MB Cache (P/N 00N6883) may be required for more complex installations.
- All connections to FAST500 Mini Hubs require the use of GBICs. GBICs are not included.

**FAST500 Mini Hub
00N6882**



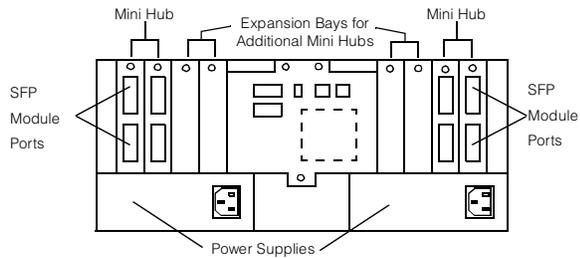
- Provides additional connections to the Netfinity FAST500 Storage Server--supports complex clustering or advanced storage applications.
- All connections to FAST500 Mini Hubs require the use of GBICs. GBICs are not included.

**FAST700 Mini Hub
19K1269**



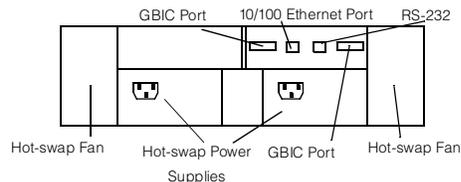
- Provides additional connections to the FAST700 Storage Server--supports complex clustering or advanced storage applications.
- All connections to FAST700 Mini Hubs require the use of SFP Modules, which are not included.

**FAST700 Storage Server
17421RU**

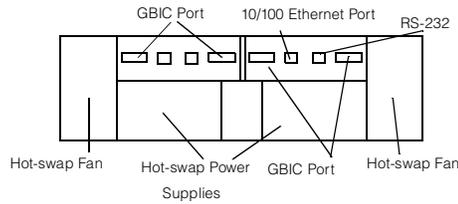


- Dual high-performance RAID controller cards--supports up to 390MB/s of throughput.
- Operates at either 1Gb or 2Gb (autosensing).
- Dual 175W auto-ranging, hot-swap, redundant power supplies.
- Attach directly to FAST FC-2 Host Bus Adapter(s) (P/N 19K1246) with short-wave cables and SFP Modules or indirectly through the SAN Fibre Channel Switch, 16-port (P/N 2109F16) using LC-LC cables from cable group D or E with corresponding SFP Modules.
- Height is 4U (1U = 1.75in or 44.45mm)
- For optimum performance no more than two FAST700 Storage Servers (P/N 17421RU) should be attached to a single Fibre Channel switch.
- Includes four FAST700 Mini Hubs (P/N 19K1269), two host-side and two storage drive-side.
- Each controller is equipped with 1GB of cache (2GB total).
- All connections to FAST700 Mini Hubs require the use of SFP Modules, which are not included.

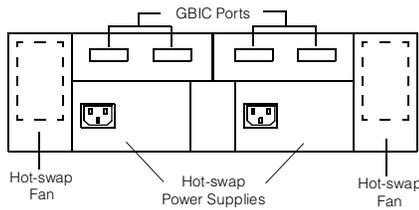
FAST200 Storage Server 35421RU



- Contains a single hot-plug, RAID controller which provides a single host Fibre Channel arbitrated loop and a single storage Fibre Channel arbitrated loop.
- Can be upgraded to a FAST200 HA Storage Server through the addition of a FAST200 Redundant RAID Controller (P/N 19K1121).
- Integrated 10/100Mbps Ethernet connector and RS-232 service support port.
- Performance optimized for 30 HDDs - supports optional FAST EXP500 Storage Expansion Units (P/N 35601RU).
- Two hot-swap 350W auto-ranging, redundant power supplies.
- Redundant fans: two hot-swap, dual-fan units.
- LED indicators on all critical components warn of faults, over-temperature, and other abnormalities.
- Ten drive bays--supports slim-line or half-high Fibre Channel hot-swap HDDs.
- Height is 3U (1U=1.75in or 44.45mm).
- Supports long- and short-wave connections. Requires optional GBICs for each connection. GBICs not included.

FAST200 HA Storage Server 35422RU


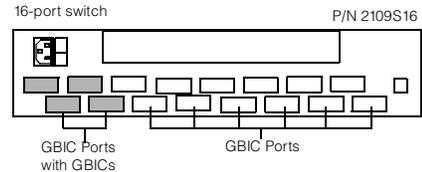
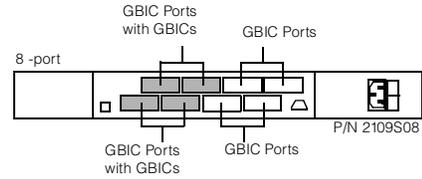
- Contains two hot-plug, RAID controllers. Each controller provides a single host Fibre Channel arbitrated loop and a single storage Fibre Channel arbitrated loop.
- Integrated 10/100Mbps Ethernet connector and RS-232 service support port.
- Performance optimized for 30 HDDs-- supports optional FAST EXP500 Storage Expansion Units (P/N 35601RU).
- Two hot-swap 350W auto-ranging, redundant power supplies.
- Redundant fans - two hot-swap, dual-fan units.
- LED indicators on all critical components warn of faults, over-temperature, and other abnormalities.
- Ten drive bays - supports slim-line or half-high Fibre Channel hot-swap HDDs.
- Height is 3U (1U=1.75in or 44.45mm).
- Supports long- and short-wave connections. Requires optional GBICs for each connection. GBICs not included.

FAST EXP500 Storage Expansion Unit 35601RU


- Two hot-swap, 350W auto-ranging, redundant power supplies.
- Redundant fans - two hot-swap, dual-fan units.
- LED indicators on all critical components warn of faults, over-temperature, and other abnormalities.
- Ten drive bays - supports slim-high or half-high Fibre Channel hot-swap HDDs.
- Height is 3U (1U = 1.75in or 44.45mm).
- Requires optional GBICs for each connection. GBICs not included.

LC-SC Fibre Channel Adapter Cable 19K1250

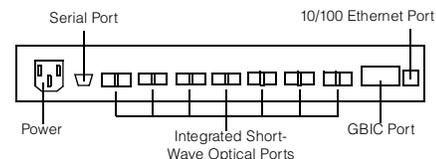

- Nine-inch adapter cable used to connect 1Gb cable or devices to 2Gb cable or devices.
- Remove the clip-on connector (B) at one end and plug into the FAST Host Adapter integrated GBIC (or any short-wave GBIC). Use the double-female 2Gb-2Gb open connector that ships with the FAST700 Storage Server to attach the male connector of LC-LC Fibre Channel cable to the male connector at the other end of the adapter cable (A).
- Use the 2Gb connector (A) to attach to an SFP or SFF Module, then remove the black caps from the clip-on connector and insert 1Gb cable.

SAN Fibre Channel Switch, 8 and 16 Ports 2109S08/S16


- Each port delivers up to 100MB/sec, full-duplex data transfer.
- Comes with four short-wave GBICs installed.
- Embedded Web browser configuration, management and service.
- Support for Public Fibre Channel Arbitrated Loops.
- Optional power supply (P/N 09L5403) available.
- The 8-port switch is 1U (1U=1.75in or 44.45mm) and the 16-port switch is 2U.

SAN Fibre Channel Switch, 16-Port 2109F16


- Provides 2Gb per second port-to-port throughput with autosensing capability for connecting to 1Gb per second host servers, storage and switches with full operability.
- Contained in a 1U mechanical requiring half the rack space of the 1Gb 16-port switch.
- Up to four Inter-Switch Links can be trucked for throughput of up to 8Gb per second.
- Includes a comprehensive set of management tools that support a Web browser interface.
- Eight short-wave SFP Modules (optical transceivers) are standard.
- Built-in redundancy with no single points of failure.
- Supports up to 384 ports in a single 42U rack (scalable to 293 switches maximum).
- Ships with one hot-swap 126W power supply. Redundant power supply (P/N 18P3576) is optional.

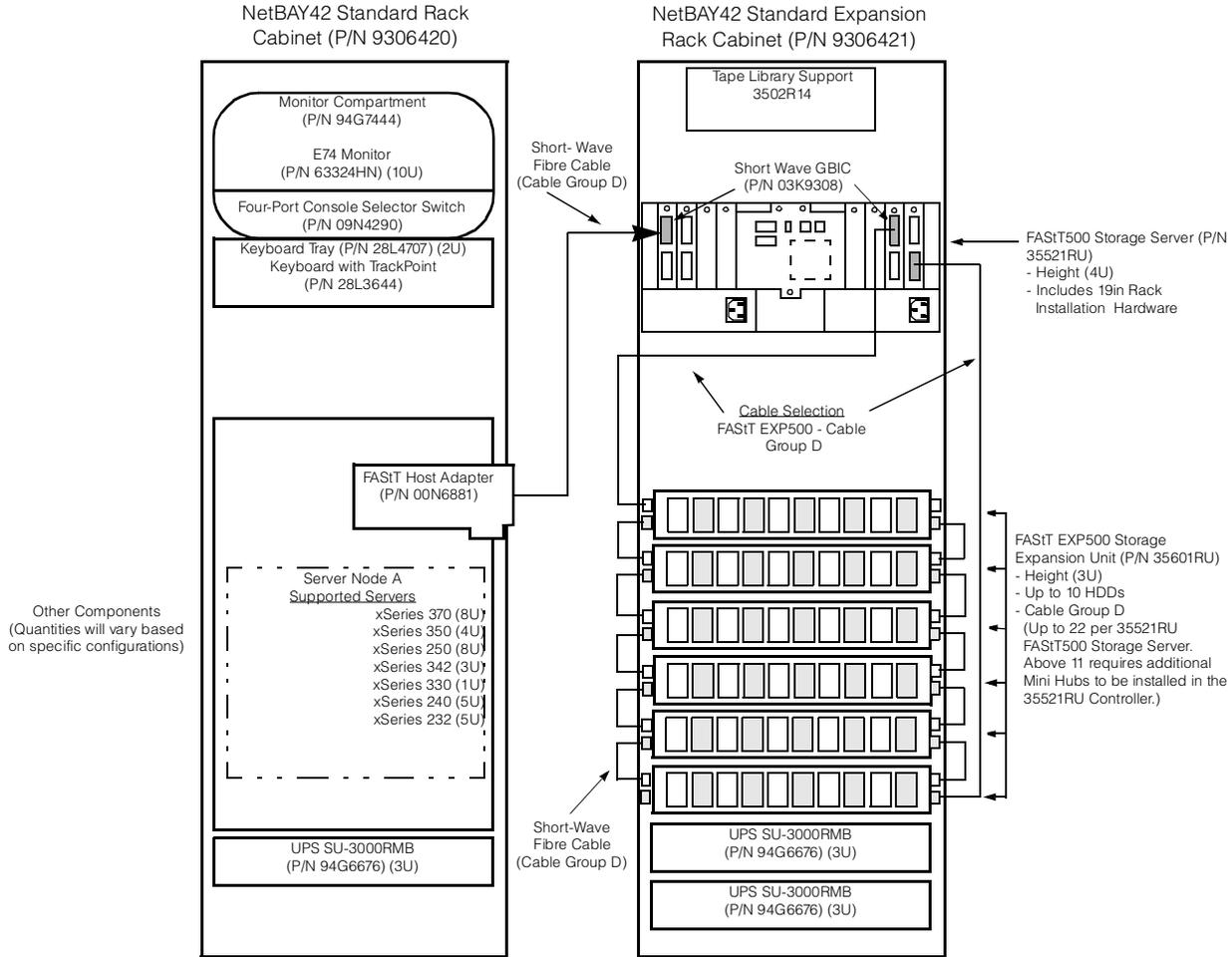
SAN Fibre Channel Managed Hub 35341RU


- High-speed performance utilizing nonblocking switch-based technology.
- Simultaneous 100MB/sec full duplex data transfers across all ports.
- Eight ports total, one that is configurable with either an optional short-wave or long-wave GBIC and seven integrated short-wave optical ports.
- Support for industry standard MIBs enabling standard SNMP management.
- Height is 1U (1U=1.75in or 44.45mm).



High-speed, single-node xSeries Fibre Channel storage configuration offering performance, bandwidth & capacity

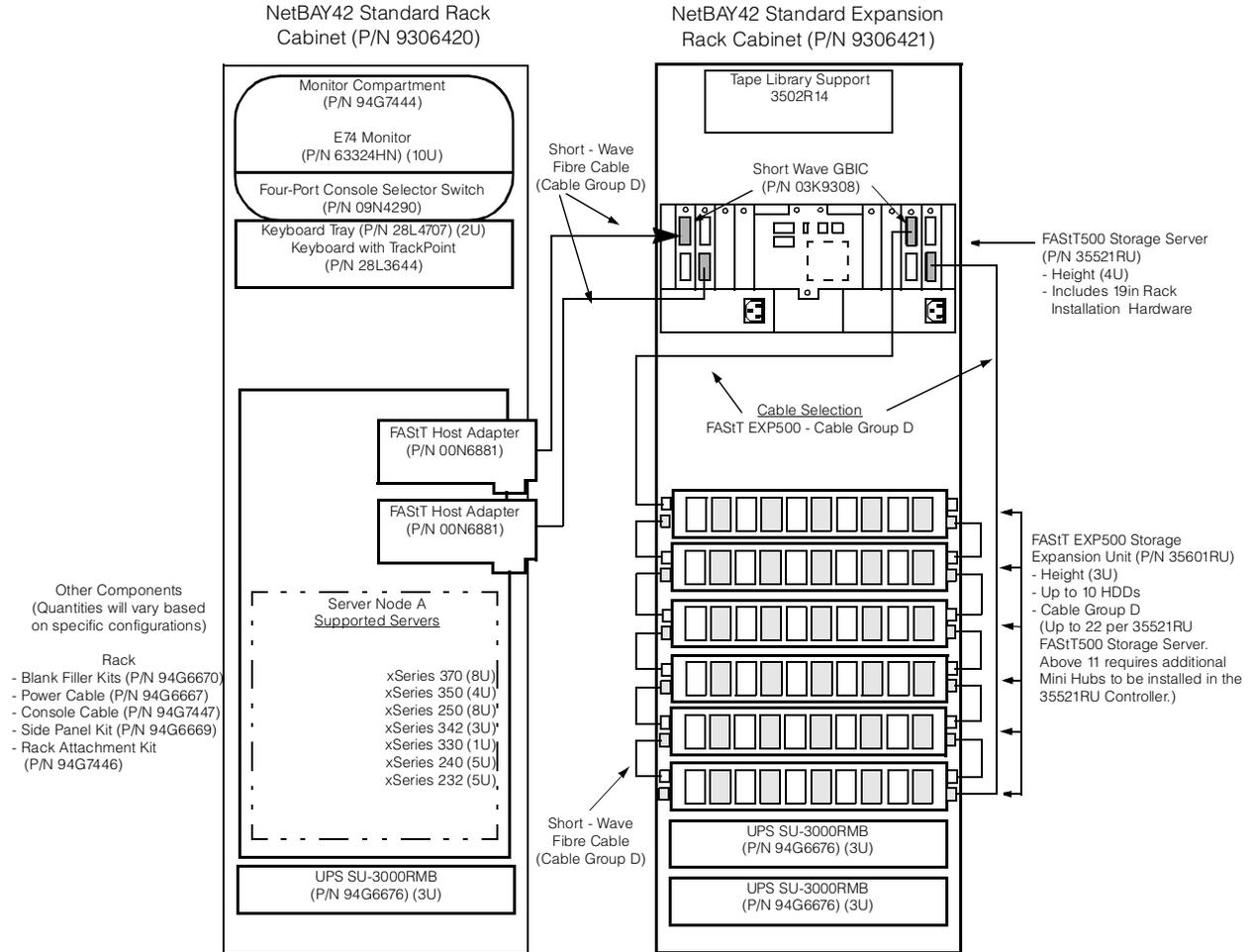
Note: The following sample configurations are for illustration only and may not be suitable for any specific customer installation. Contact your IBM Business Partner or IBM Marketing Representative for assistance with your specific configuration requirements



<p>Connector Types</p> <p>68-pin - High Density Connector</p> <p>0.8mm - Very High Density Connection Interface (VHDCI)</p> <p>Cable Group A (0.8mm to 0.8mm)</p> <p>03K9310 - Netfinity 2M Ultra2 SCSI Cable</p> <p>03K9311 - Netfinity 4.2M Ultra2 SCSI Cable</p> <p>37L7101 - Netfinity 20M Ultra2 SCSI Cable</p>	<p>Cable Group D (Short-Wave Fibre)</p> <p>36L9973 - Netfinity Fibre Channel 1M Cable</p> <p>03K9306 - Netfinity Fibre Channel 5M Cable</p> <p>03K9305 - Netfinity Fibre Channel 25M Cable</p> <p>Customer supplied short-wave cable of up to 500m (0.31 miles)</p> <p>Cable Group E (Long-Wave Fibre)</p> <p>Customer supplied long-wave cable of up to 10km (6.2 miles)</p> <p>GBIC</p> <p>03K9308 - Netfinity Fibre Channel Short-Wave GBIC</p> <p>03K9307 - Netfinity Fibre Channel Long-Wave GBIC</p>
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High-speed, single-node xSeries Fibre Channel storage configuration with Microsoft NT failover support and RAID redundancy for availability, performance and capacity

Note: The following sample configurations are for illustration only and may not be suitable for any specific customer installation. Contact your IBM Business Partner or IBM Marketing Representative for assistance with your specific configuration requirements



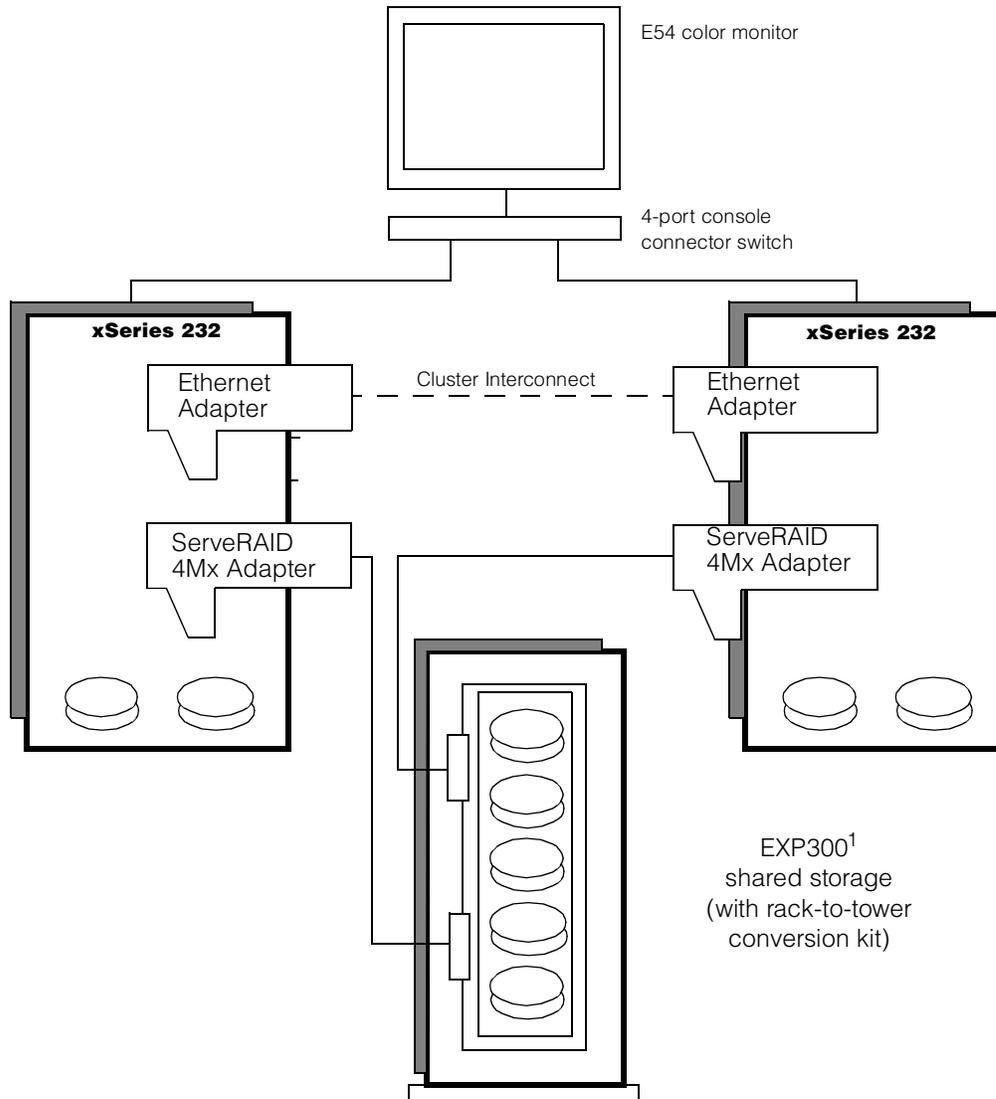
<p>Connector Types 68-pin - High Density Connector 0.8mm - Very High Density Connection Interface (VHDCI)</p>	<p>Cable Group D (Short-Wave Fibre) 36L9973 - Netfinity Fibre Channel 1M Cable 03K9306 - Netfinity Fibre Channel 5M Cable 03K9305 - Netfinity Fibre Channel 25M Cable Customer supplied short-wave cable of up to 500m (0.31 miles)</p>
<p>Cable Group A (0.8mm to 0.8mm) 03K9310 - Netfinity 2M Ultra2 SCSI Cable 03K9311 - Netfinity 4.2M Ultra2 SCSI Cable 37L7101 - Netfinity 20M Ultra2 SCSI Cable</p>	<p>Cable Group E (Long-Wave Fibre) Customer supplied long-wave cable of up to 10km (6.2 miles)</p>
	<p>GBIC 03K9308 - Netfinity Fibre Channel Short-Wave GBIC 03K9307 - Netfinity Fibre Channel Long-Wave GBIC</p>



High Availability Cluster Solutions

xSeries 232 High Availability Cluster

Contact your IBM Business Partner or marketing representative for assistance with your specific configuration. Refer to the Microsoft Web site for the latest information on xSeries cluster certification at www.microsoft.com/hcl.



1. Configured as a single independent twintail SCSI bus for high availability. Bay six must remain vacant due to a SCSI ID conflict.

This xSeries 232 cluster solution provides secure operation of business-critical applications. IBM gives you an easy transition with this complete, test-proven, high availability (HA) hardware and software configuration.

This tower solution leverages the latest xSeries 232 server platform with choices of Windows® network operating system software and cluster middleware. Features include the following:

- Scaled for business growth
- Cluster middleware and either Windows 2000 Advanced Server or NT 4.0 EE operating systems
- Test-proven high availability hardware and software for business-critical applications
- Flexibility to handle unique computing environments
- Fully redundant with failover protection and RAID-protected internal and external storage



xSeries 232 High Availability Cluster Configuration (tower)¹

Part Number	Description	Qty	Usage
Server node			
8668-54X	xSeries 232 1.4GHz/512KB, 256MB ECC, open, 48X	2	cluster nodes, onboard ethernet for public network access
06P5754	18.2GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD	4	2 per node attached to internal channel of ServeRAID-4Mx for NOS mirroring
06P5736	ServeRAID-4Mx Ultra160 SCSI Controller ²	2	1 per node for shared external storage and internal NOS mirroring
06P3601	10/100 Ethernet Server Adapter	2	clustering heartbeat between nodes
Storage subsystem			
35311RU	EXP300 Storage Expansion Unit	1	1 EXP300 per ServeRAID pair, maximum of 13 Ultra160 HDDs ³
09N7296	EXP300 Rack-to-Tower Conversion Kit	1	
06P5754	18.2GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD	5	RAID 5 shared storage in EXP300 ⁴
03K9310	Netfinity 2M Ultra2 SCSI Cable	1	server to EXP300 (EXP300 ships with one 2M cable)
Monitor / Console			
633147N	E54 Color Monitor 15in (350mm, 13.8in viewable image), stealth black	1	
28L3621	Preferred Keyboard (stealth black)	1	
09N4290	NetBAY 1x4 Console Switch	1	
94G7447	NetBAY Console Cable Set 12ft (3.66m)	1	1 console set per node
Cluster interconnect			
-	Customer-supplied Cat5 Ethernet crossover cable	1	Ethernet crossover for interconnection between clustered nodes
Recommended options			
48P7467	xSeries 1.4GHz/133MHz 512KB Cache Upgrade with Pentium III Processor	-	SMP for nodes. Must have an identical number of processors per node.
33L3320	128MB PC133 ECC SDRAM RDIMM ⁵	-	memory upgrade
06P5755	36.4GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD	-	RAID 5 shared storage in EXP300 ⁴
09N7585	Remote Supervisor Adapter	-	1 per cluster for remote system management
33L4618	PCI V90 56 Data/Fax Modem	-	communications
00N7990	40/80GB DLT Internal SCSI Tape Drive	-	tape back-up
94G3136	APC Smart-UPS 1400	1	UPS
Software⁶			<i>Select Windows NT 4.0EE or Windows 2000 Advanced Server</i>
	Microsoft Windows NT Server 4.0EE	-	NOS and Cluster Middleware (MSCS included with NOS)
	Windows 2000 Advanced Server	-	NOS and Cluster Middleware (MSCS included with NOS)

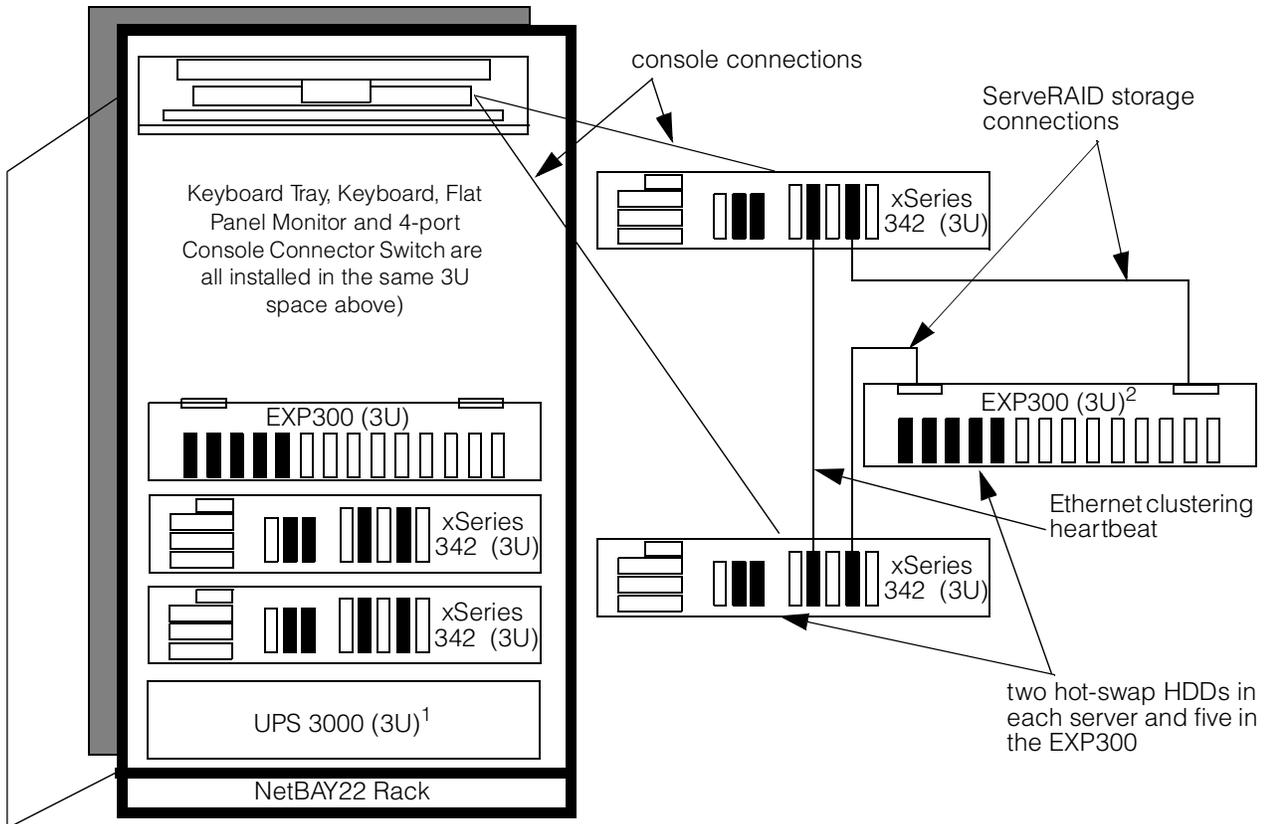
1. Contact your IBM Business Partner or marketing representative for assistance with your specific configuration requirements.
2. Clusters configured with ServeRAID adapters are limited to two nodes. Fibre Channel is required for cluster configurations with more than two nodes.
3. Twintailing the bus reduces maximum number of HDDs to 13. Bay six must remain empty. See External Storage Expansion (EXP300) section for additional information.
4. Two HDDs are reserved as mirrored Quorum HDDs using RAID 1, so only three of the five HDDs in the EXP300 in this configuration provide RAID 5 storage capacity.
5. Memory options must be added in pairs due to two-way interleaving.
6. Customer-supplied independently of IBM.

**HIGH AVAILABILITY
CLUSTER SOLUTIONS**



xSeries 342 High Availability Cluster

Contact your IBM Business Partner or marketing representative for assistance with your specific configuration. Refer to the Microsoft Web site for the latest information on xSeries cluster certification at www.microsoft.com/hcl.



1. Either a UPS 3000 or PDU can be installed. Power connections are not represented in this diagram.
2. Configured as a single independent twintail SCSI bus for high availability. Bay six must remain vacant due to a SCSI ID conflict.

This xSeries 342 cluster solution provides a secure operation of business-critical applications. IBM gives you an easy transition with this complete, test-proven, high availability (HA) hardware and software configuration.

These rack solutions leverage the latest xSeries 342 server platform with choices of Windows® network operating system software and cluster middleware. Features include the following:

- Scaled for business growth
- Cluster middleware and either Windows 2000 Advanced Server or NT 4.0 EE operating systems
- Test-proven high availability hardware and software for business-critical applications
- Flexibility to handle unique computing environments
- Fully redundant with failover protection and RAID-protected internal and external storage



xSeries 342 High Availability Cluster Configuration (rack)¹

Part Number	Description	Qty	Usage
Server node			
8669-5RX	xSeries 342 1.4GHz/512KB Pentium III, 256MB ECC, open, 24X	2	cluster nodes, onboard ethernet for public network access
06P5754	18.2GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD	4	2 per node attached to internal channel of ServeRAID-4Mx for NOS mirroring
06P5736	ServeRAID-4Mx Ultra160 SCSI Controller ²	2	1 per node for shared external storage and internal NOS mirroring
06P3601	10/100 Ethernet Server Adapter	2	clustering heartbeat between nodes
Storage Subsystem			
35311RU	EXP300 Storage Expansion Unit	1	1 EXP300 per ServeRAID pair, maximum of 13 Ultra160 HDDs ³
06P5754	18.2GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD	5	RAID 5 shared storage in EXP300 ⁴
03K9310	Netfinity 2M Ultra2 SCSI Cable	1	server to EXP300 (EXP300 ships with one 2M cable)
Rack, monitor, console			
9306200	Netfinity NetBAY22	1	22U rack
9511AG4	T540 Flat Panel Monitor	1	
28L4707	Netfinity Rack Keyboard Tray	1	
28L3644	Space Saver II Keyboard	1	
09N4290	NetBAY 1x4 Console Switch	1	
94G7447	NetBAY Console Cable Set 12ft (3.66m)	1	1 console set per node
94G6670	Blank Filler Panel Kit	1	
Cluster interconnect			
-	Customer-supplied Cat5 Ethernet crossover cable	1	Ethernet crossover for interconnection between clustered nodes
Recommended Options			
48P7467	xSeries 1.4GHz/133MHz 512KB Cache Upgrade with Pentium III Processor	-	SMP for nodes. Must have an identical number of processors per node.
33L3320	128MB PC133 ECC SDRAM RDIMM ⁵	-	memory upgrade
06P5755	36.4GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD	-	RAID 5 shared storage in EXP300 ⁴
09N7585	Remote Supervisor Adapter	-	1 per cluster for remote system management
33L4618	V.90 PCI Data/Fax Modem	-	communications
00N7990	40/80GB DLT Internal SCSI Tape Drive	-	tape back-up
94G6676	APC Smart-UPS 3000RMB	-	APC UPS rack
37L6866	NetBAY Rack Power Distribution Unit	-	
Software⁶			<i>Select Windows NT 4.0EE or Windows 2000 Advanced Server</i>
	Microsoft Windows NT Server 4.0EE	-	NOS and Cluster Middleware (MSCS included with NOS)
	Windows 2000 Advanced Server	-	NOS and Cluster Middleware (MSCS included with NOS)

**HIGH AVAILABILITY
CLUSTER SOLUTIONS**

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 6. Customer-supplied independently of IBM.



IBM Datacenter Solution Program

The IBM Datacenter Solution Program is a comprehensive set of product and service offerings intended to deliver true enterprise computing solutions based on the Microsoft® Windows® 2000 Datacenter Server operating system. The Windows 2000 Datacenter Server product runs on the new xSeries 440 rack-mounted server, which offers up to eight-way processing, up to 32GB of memory, Fibre Channel and SCSI storage, and six PCI slots. The Datacenter Solution can be ordered in one- and two-node configurations from the bundles shown here, and in three- and four-node configurations by ordering additional nodes. The bundles illustrated here are base configurations that can be expanded to meet your needs. The IBM Datacenter Solution includes Microsoft-certified hardware, the Windows Datacenter Server operating system preloaded, and a set of standard and optional services.

In addition to the information on the following pages, the IBM Datacenter Solution Program includes the following software and services. The services products must be ordered separately. A complete Solutions Assurance Review will be conducted by IBM or your IBM business partner to ensure that the configuration being ordered is complete.

Software

Microsoft Windows 2000 Datacenter Server, licensed for up to eight CPUs²
(Client Access Licenses to be purchased separately)
IBM Director 3.1
IBM Director Universal Management Services
APC UPS Software

Standard Services

Solutions Assurance Review³
Factory installation and software preload
Limited Warranty⁴ service with 24x7x same day response

IBM Support Services

On-site installation
Microsoft Authorized Premier Support (MAPS--base software support for Datacenter, where available)
Advanced Support for Mission Critical Systems (US)
Support Line (base software support outside the US and where MAPS is not available)
High Availability Services⁵ (including up to 99.99% availability guarantee in the US)
xSeries 99.9% High Availability Guarantee⁶ outside the US
Warranty upgrade (24x7x2 hour response)
Operational Support Services, e.g., electronic system management for xSeries, account advocate
Testing Services--proof of concept, assessment, design and planning
Business Continuity and Recovery Services
Custom services for unique requirements

1. Maximum memory may require replacement of standard memory with optional maximum memory module.

2. IBM makes no representations or warranties regarding non-IBM products or services. These products are offered and warranted by third parties.

3. IBM provides this service standard for all Datacenter sales direct through IBM. Business Partners will also perform this service but may choose to charge a fee.

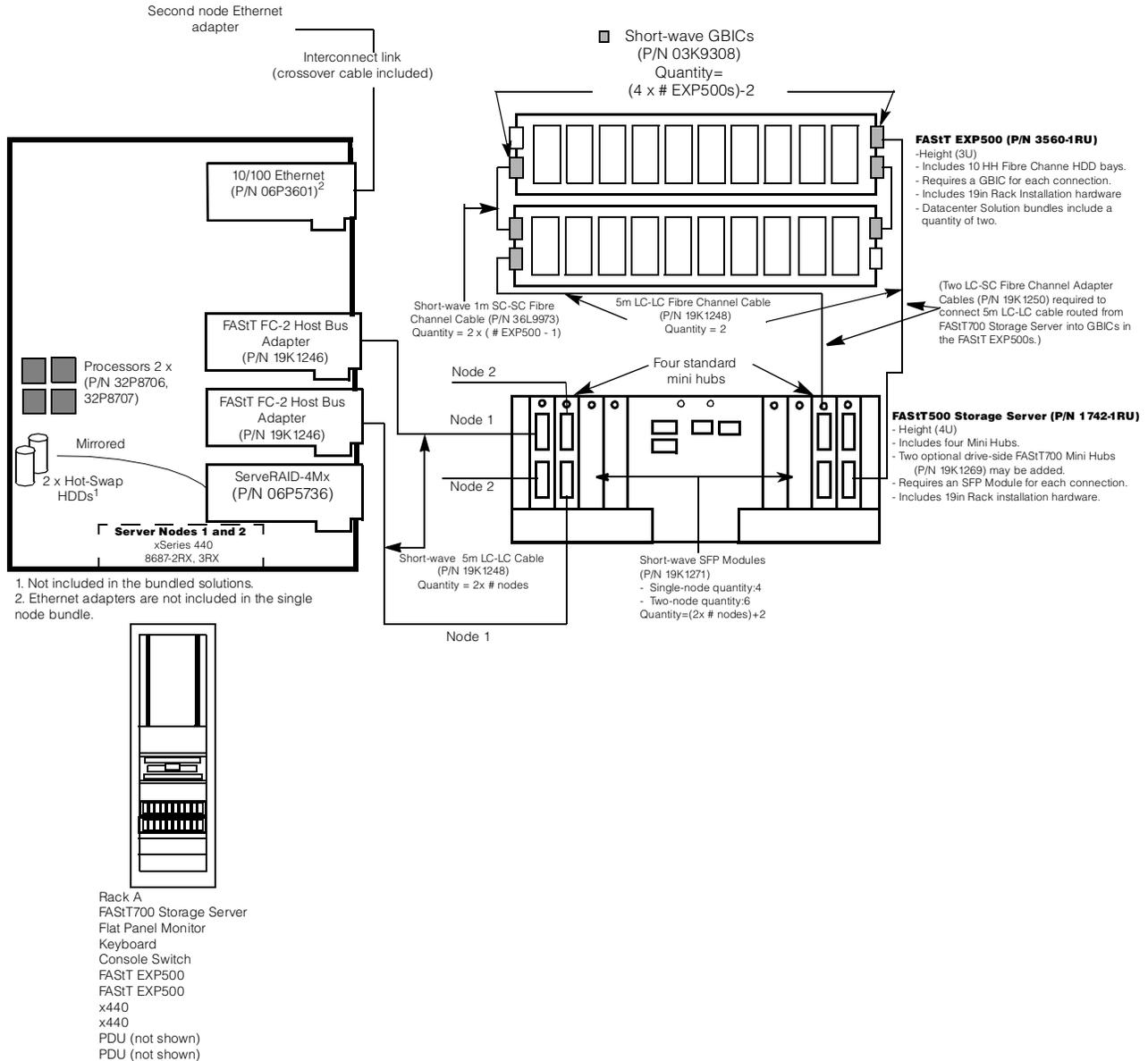
4. For information on IBM's Statement of Limited Warranty, call 1-800-772-2227 or contact your IBM representative or reseller. Copies are available upon request. International Warranty Service available in those countries where the particular product is sold by IBM or IBM Business Partners (registration required). With respect to on-site service, IBM sends a technician after attempting to resolve the problem remotely.

5. The High Availability Services for Business Critical Systems offering for an availability guarantee is an optional service and is only offered for eligible IBM e(logo)server xSeries environments at this time. IBM reserves the right to change the terms and conditions of the program at any time, without notice. For more details, refer to www-1.ibm.com/services/its/us/highavail2.html.

6. The xSeries 99.9% High Availability Guarantee program is an optional offering on eligible xSeries configurations. IBM reserves the right to change the terms and conditions of the program at any time, without notice. For more details, refer to www.pc.ibm.com/ww/eserver/xseries/999guarantee.html.

Datacenter Solutions

The product content described here is consistent worldwide; however, there may be some variance in IBM part numbers outside of the US and Canada. Contact your IBM Business Partner or IBM Marketing Representative for assistance with your specific configuration requirements.





IBM Datacenter Solution - Single Node

Bundle Components	IBM Datacenter Solution - Single Node includes the part numbers and quantities identified in this table. Required options must be purchased separately and are identified in the table labeled "Required Options." Additional options for IBM Datacenter Solutions are listed in the table labeled "Selectable Options." All final customer configurations and solutions require IBM Solution Assurance Approval.			Limited Warranty Service 24x7x4 hrs	Limited Warranty Service 24x7x2 hrs ¹
Part Number	Description	Qty	Usage	Part Number	Part Number
Server Node					
Select from two server models:					
8687-3RX	xSeries 440 2x1.6GHz/1MB Xeon, 1GB ECC, open, 24X	1 or		N/A	N/A
8687-2RX	xSeries 440 2x1.5GHz/512KB Xeon, 1GB ECC, open, 24X	1		N/A	N/A
Select from two processor upgrades:			Processor upgrades must match standard processor.		
32P8707	xSeries 1.6GHz 1MB L3 Cache with Xeon Processor MP	2 or	Total of 4 SMP processors per node	N/A	N/A
32P8706	xSeries 1.5GHz 512KB L3 Cache with Xeon Processor MP	2	Total of 4 SMP processors per node	N/A	N/A
06P5736	ServeRAID-4MX Ultra160 SCSI Controller	1	Provides NOS mirroring on internal HDDs	N/A	N/A
Software					
22P4745	OS Preload Kit / Ship Group	1		N/A	N/A
Services					
06P7505	Image Load Fee	1		N/A	N/A
06P7495	Option Install Fee	5	Quantity equals the number of options installed	N/A	N/A

1. This Service offering is not available in all countries and is limited to selected areas (see Fax #8146 on 1-800-IBM-4FAX).
 2. MHz/GHz only measure microprocessor internal clock speed; many factors affect application performance.

All final customer configurations and solutions require IBM Solution Assurance Approval.

IBM Datacenter Solution - Two Node

Bundle Components	IBM Datacenter Solution - Two Node includes the part numbers and quantities identified in this table. Required options must be purchased separately and are identified in the table labeled "Required Options." Additional options for IBM Datacenter Solutions are listed in the table labeled "Selectable Options." All final customer configurations and solutions require IBM Solution Assurance Approval.			Limited Warranty Service 24x7x4 hrs	Limited Warranty Service 24x7x2 hrs ¹	
Part Number	Description	Qty/ Node	Total Qty	Usage	Part Number	Part Number
Server Nodes 1 and 2						
Select from two server models²:						
8687-3RX	xSeries 440 2x1.6GHz/1MB Xeon, 1GB ECC, open, 24X	1	2 or		N/A	N/A
8687-2RX	xSeries 440 2x1.5GHz/512KB Xeon, 1GB ECC, open, 24X	1	2		N/A	N/A
Select from two processor upgrades:				Processor upgrades must match standard processor.		
32P8707	xSeries 1.6GHz 1MB L3 Cache with Xeon Processor MP	2	4 or	Total of 4 SMP processors per node	N/A	N/A
32P8706	xSeries 1.5GHz 512KB L3 Cache with Xeon Processor MP	2	4	Total of 4 SMP processors per node	N/A	N/A
06P5736	ServeRAID-4Mx Ultra160 SCSI Controller	1	2	Provides NOS mirroring on internal HDDs	N/A	N/A
19K1246	FASTt FC-2 Host Bus Adapter	2	4	Redundant paths to external storage subsystems	N/A	N/A
06P3601	10/100 Ethernet Server Adapter	1	2	Node to node interconnect	N/A	N/A
Storage Subsystems						
17421RU	FASTt700 Fibre Channel Storage Server	-	1		41L2768	41L2769
35601RU	FASTt EXP500 Storage Expansion Unit	-	2		41L2766	41L2767
Storage Cables						
Calculations assume no switches are installed						
19K1250	LC-SC Fibre Channel Adapter Cable	-	2	convert 1Gb signal to 2Gb	N/A	N/A
19K1248	5m LC-LC Fibre Channel Cable	-	6	Redundant Paths: nodes - storage server - FASTt EXP500	N/A	N/A
36L9973	Netfinity Fibre Channel 1m SC-SC Cable	-	2	Redundant Path:FASTt EXP500	N/A	N/A
03K9308	Netfinity Fibre Channel Short-wave GBIC	-	6	Redundant Paths: (4 x # EXP500s) - 2	N/A	N/A
19K1271	Short-wave SFP Module	-	6	Redundant paths: (2 x # nodes) + 2	N/A	N/A



Interconnect cable						
19K5788	25ft Ethernet crossover cable	-	1	Interconnects 2 nodes without an Ethernet switch	N/A	N/A
Other Non-Rack						
9511AG4	T540 Flat Panel Color Monitor 15in (381mm, 15in viewable image), stealth black	-	1		30L9183	N/A
28L3644	Space Saver II Keyboard	-	1		N/A	N/A
Rack and Related Components						
930842S	NetBAY42 Enterprise Rack Cabinet (ER)	-	1		41L2762	41L2763
94G6670	Blank Filler Panel Kit	-	2	Fills empty front panel space to control air flow	N/A	N/A
28L4707	Netfinity Rack Keyboard Tray	-	1	Supports Flat Panel Monitor with Kit 37L6888 and stowage of Keyboard 28L3644 in a ready-to-use position	N/A	N/A
37L6888	Netfinity Flat Panel Monitor Rack Mount Kit II	-	1	Required for installing flat panel monitor in keyboard tray 28L4707	N/A	N/A
09N4290	NetBAY 1x4 Console Switch	-	1	Attaches up to 4 nodes to a single monitor, keyboard and mouse	N/A	N/A
94G7447	NetBAY Console Cable Set 12ft (3.66m)	1	2	Attaches each node to a Console Server Selector Switch	N/A	N/A
94G7448	Power Cable Type C12 (3.7m, 12ft)	-	7	Provides IEC 320-C13 (Device) to IEC 320-C14 (Power Unit) power cord	N/A	N/A
Software						
22P4745	OS Preload Kit / Ship Group	1	2		N/A	N/A
Services						
06P7505	Image Load Fee	1	2		N/A	N/A
06P5756	Enterprise Rack Prep Fee	-	1	Quantity equals the number of racks	N/A	N/A
06P7515	Enterprise Rack Installation Fee	-	5	Quantity equals the number of major rack components installed	N/A	N/A
06P7495	Option Install Fee	8	16	Quantity equals the number of options installed	N/A	N/A

1. This Service offering is not available in all countries and is limited to selected areas (see Fax #8146 on 1-800-IBM-4FAX).
 2. IBM Datacenter Solutions support configurations using one or both available xSeries 370 server models.

All final customer configurations and solutions require IBM Solution Assurance Approval.

IBM Datacenter Solution - Required Options					
Required Options	Required Options provide alternative methods of meeting minimum memory and storage requirements. Customer requirements will vary; therefore, these options are configured and purchased separate from the base solution bundle. All final customer configurations and solutions require IBM Solution Assurance Approval.			Limited Warranty Service 24x7x4 hrs	Limited Warranty Service 24x7x2 hrs ¹
Part Number	Description	Qty/ Node	Usage	Part Number	Part Number
	Install two internal HDD options per node		Two HDDs must be installed in each node		
06P5755	36.4GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD	2	Internal HDDs for NOS installation	N/A	N/A
06P5768	36.4GB 15Krpm Ultra160 SCSI Hot-Swap SL HDD	2	Internal HDDs for NOS installation	N/A	N/A
06P5756	73.4GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD	2	Internal HDDs for NOS installation	N/A	N/A
	Select F/C HDD options (multiple of 2) per bundle		A minimum of 2 HDDs must be installed, one in each FAST500 Storage Expansion Unit. Additional HDDs must be installed in multiples of 2.		
06P5707	Netfinity 18.2GB 15Krpm FC Hot-Swap HDD		Install in FAST EXP500s	N/A	N/A
19K0653	36.4GB 10K-4 FC Hot-Swap HDD		Install in FAST EXP500s	N/A	N/A
19K0654	73.4GB 10K-4 FC Hot-Swap HDD		Install in FAST EXP500s	N/A	N/A
	Select one of the two Warranty Services per bundle				
24X7X4 option	Use the above applicable P/Ns with the right quantity				
24X7X2 option	Use the above applicable P/Ns with the right quantity				

1. This Service offering is not available in all countries and is limited to selected areas (see Fax #8146 on 1-800-IBM-4FAX).
 2. GB equals one billion bytes when referring to internal storage capacity; total user-accessible capacity may be less.

All final customer configurations and solutions require IBM Solution Assurance Approval.

DATACENTER SOLUTIONS



IBM Datacenter Solution - Selectable Options

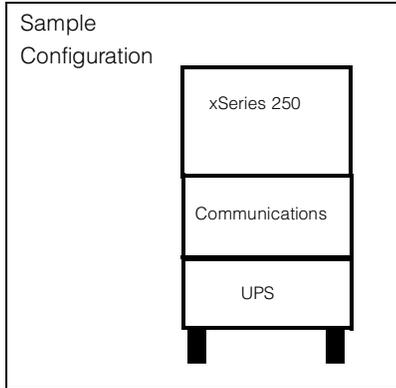
Selectable Options			Limited Warranty Service 24x7x4 hrs	Limited Warranty Service 24x7x2 hrs ¹	Enterprise Rack Assembly Fee
	Selectable options are not required but are compatible for use with IBM Datacenter bundles. All final customer configurations and solutions require IBM Solution Assurance Approval.				
Part Number	Description	Usage	Part Number	Part Number	Part Number
	Additional node:				
	Datacenter Server Bundle-additional node	Preloaded xSeries 440 2RX or 3RX for nodes 3 and 4.	N/A	N/A	N/A
22P4745	OS Preload Kit/Ship Group (English)		N/A	N/A	N/A
	Processor upgrades:				
32P8706 ²	xSeries 1.5GHz 512KB L3 Cache with Xeon Processor MP	Either two or four processors supported.	N/A	N/A	N/A
32P8707 ²	xSeries 1.6GHz 1MB L3 Cache with Xeon Processor MP	Either two or four processors supported.	N/A	N/A	N/A
	4-way to 8-way upgrade kits:				
32P8340	xSeries SMP Expansion Module		N/A	N/A	N/A
36L9503	SMP Expansion Module with Four 1.5GHz Xeon MP Processors		N/A	N/A	N/A
36L9504	SMP Expansion Module with Four 1.6GHz Xeon MP Processors		N/A	N/A	N/A
	Memory options:				
		RDIMMs must be added in matched groups of four within each node.			
33L3324	512MB PC133 ECC SDRAM RDIMM	Select a quantity of 4 + 4N per node.	N/A	N/A	N/A
33L3326	1GB PC133 ECC SDRAM RDIMM	Select a quantity of 4 + 4N per node.	N/A	N/A	N/A
	External Fibre Channel storage:				
19K1246	FASiT FC-2 Host Bus Adapter		N/A	N/A	N/A
17421RU	FASiT700 Fibre Channel Storage Server		41L2768	41L2769	21P3342
35601RU	FASiT500 Storage Expansion Unit		41L2766	41L2767	21P3342
	Cables, connectors and switches:				
36L9973	Netfinity Fibre Channel 1m Cable		N/A	N/A	N/A
19K1250	LC-SC Fibre Channel Adapter Cable	connects 1Gb Fibre to 2Gb	N/A	N/A	N/A
19K1247	1m LC-LC Fibre Channel Cable		N/A	N/A	N/A
19K1248	5m LC-LC Fibre Channel Cable		N/A	N/A	N/A
19K1249	25m LC-LC Fibre Channel Cable		N/A	N/A	N/A
03K9308	Netfinity Fibre Channel Short-wave GBIC		N/A	N/A	N/A
19K1271	Short-wave SFP Module		N/A	N/A	N/A
2109F16	SAN Fibre Channel Switch, 16-port		N/A	N/A	N/A
18P3576	Additional Power Supply for 2109F16		Standard	N/A	21P3342
2109S08	SAN Fibre Channel Switch, 8-port		Standard	N/A	21P3342
09L5403	SAN Switch Redundant Power Supply		N/A	N/A	N/A
	I/O-related:				
06P5736	ServeRAID-4Mx Ultra160 SCSI Controller		N/A	N/A	N/A
06P3601	10/100 Ethernet Server Adapter		N/A	N/A	N/A
06P3701	Gigabit Ethernet SX Server Adapter (fiber)		N/A	N/A	N/A
31L3820	Fast Ethernet on STP Adapter 2.5m Cable	Attachment from ethernet adapter to ethernet switch	N/A	N/A	N/A
8684-1RX	RXE-100 Remote Expansion Enclosure		N/A	N/A	N/A
	Rack-related:				
930842S	NetBAY42 Enterprise Rack Cabinet (ER)		41L2762	41L2763	21P3341
930842E	NetBAY42 Enterprise Expansion Rack Cabinet (EX)		41L2762	41L2763	21P3341
09N4290	NetBAY 1x4 Console Switch		N/A	N/A	N/A
94G7447	NetBAY Console Cable Set 12ft (3.66m)		N/A	N/A	N/A
37L6866	NetBAY Rack Power Distribution Unit		N/A	N/A	N/A
94G6666	100-120V Power Distribution Unit		N/A	N/A	N/A
37L6861	APC Smart-UPS 5000RMB		N/A	N/A	21P3342
06P3882 ³	Cisco CAT2912 12-port Ethernet Switch/Enterprise Edition	Used for interconnect of heartbeat	N/A	N/A	21P3342
19K5788 ³	25ft Ethernet Crossover Cable	Interconnects 2 nodes without an Ethernet switch	N/A	N/A	N/A
3600R20 ⁴	3600 Series 2/4TB LTO Tape Library (Rack)		N/A	N/A	N/A
	Fees:				
06P7495	Option Install Fee	Quantity equals the number of options installed.	N/A	N/A	N/A
33P2690	Subscription Fee (annual)		N/A	N/A	N/A



1. This Service offering is not available in all countries and is limited to selected areas (see Fax #8146 on 1-800-IBM-4FAX). All final customer configurations and solutions require IBM Solution Assurance Approval.
2. Processor upgrade speed and cache must match the standard processor installed in each node.
3. There may be some variance in IBM part numbers outside of the US and Canada.
4. LTO tape libraries are not certified but will be supported in Datacenter configurations, subject to Solutions Assurance approval.

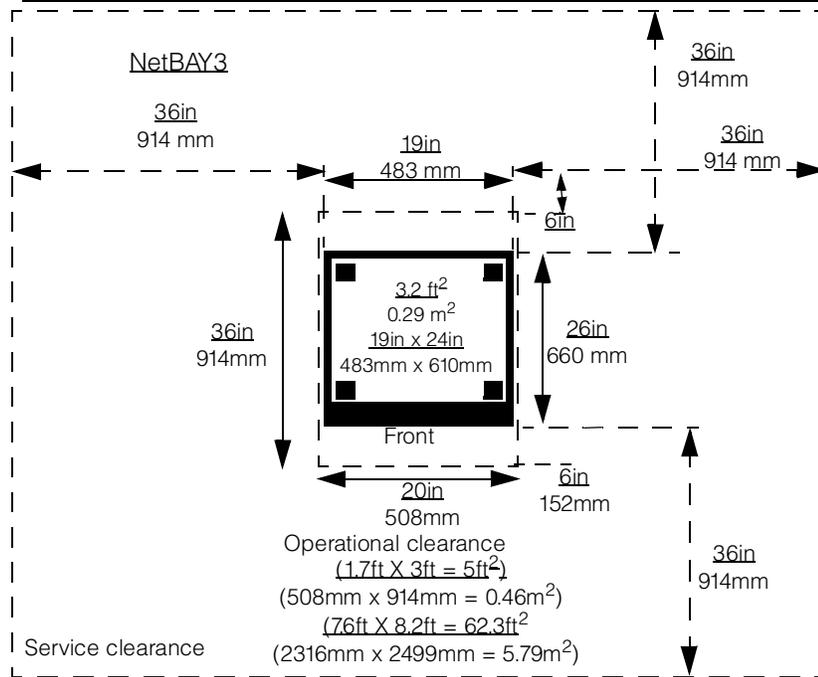


IBM NetBAY3/NetBAY3E™ Stackable Enclosures



Installation Guidelines:

- 1) Locate power units with line cords in the bottom enclosure.
- 2) Install components starting from the bottom; start with the heaviest device.
- 3) If nothing is installed in the enclosure, attach the rear blank panel for stability.



Supported Devices	NetBAY3	NetBAY3E	Size (U)	Max/Enclosure	Max/Stack
Servers					
xSeries 250	X	-	n/a	n/a	1
xSeries 370 ¹	-	X	n/a	n/a	1
Expansion²					
Netfinity EXP300	X	X	3	1	3
FASiT200 Storage Server	X	X	3	1	1
FASiT200 HA Storage Server	X	X	3	1	1
FASiT EXP500 ³	X	X	3	1	2
Tape Units²					
NetIMEDIA 3551001	X	X	3	1	3
Power²					
APC Smart-UPS 1400RMB	X	X	3	1	1
APC Smart-UPS 3000RMB	X	X	3	1	1
100-120V PDU	X	X	1	1	1
NetBAY Server Dual Cord PDU	X	X	1	1	1
NetBAY Rack PDU	X	X	1	2	2
Communications²					
8230 T-R Controlled Access Unit	X	X	2	1	3
8235 Dial-in Access to LAN	X	X	1	3	9
8285 ATM Switch	X	X	3	1	3

1. xSeries 370 systems are rack-mountable and ship without a keyboard. In order to be utilized with a NetBAY3 (or in any tower configuration), optional Rack-to-Tower Kit (P/N 28L4705) must be installed.
 2. NetBAY3 and NetBAY3E do not contain a top cover and require a supported server as the top component in a stack.
 3. FASiT EXP500 requires a FASiT200 or FASiT200 HA Storage Server in a NetBAY3 or NetBAY3E configuration.

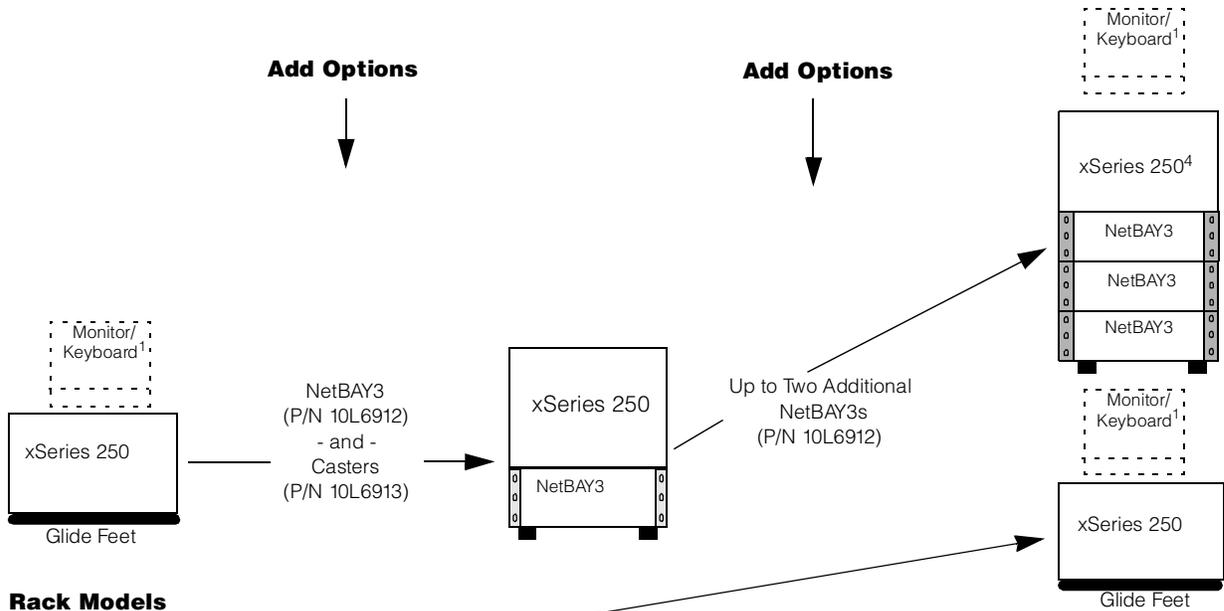


IBM NetBAY3/3E Stackable Enclosure

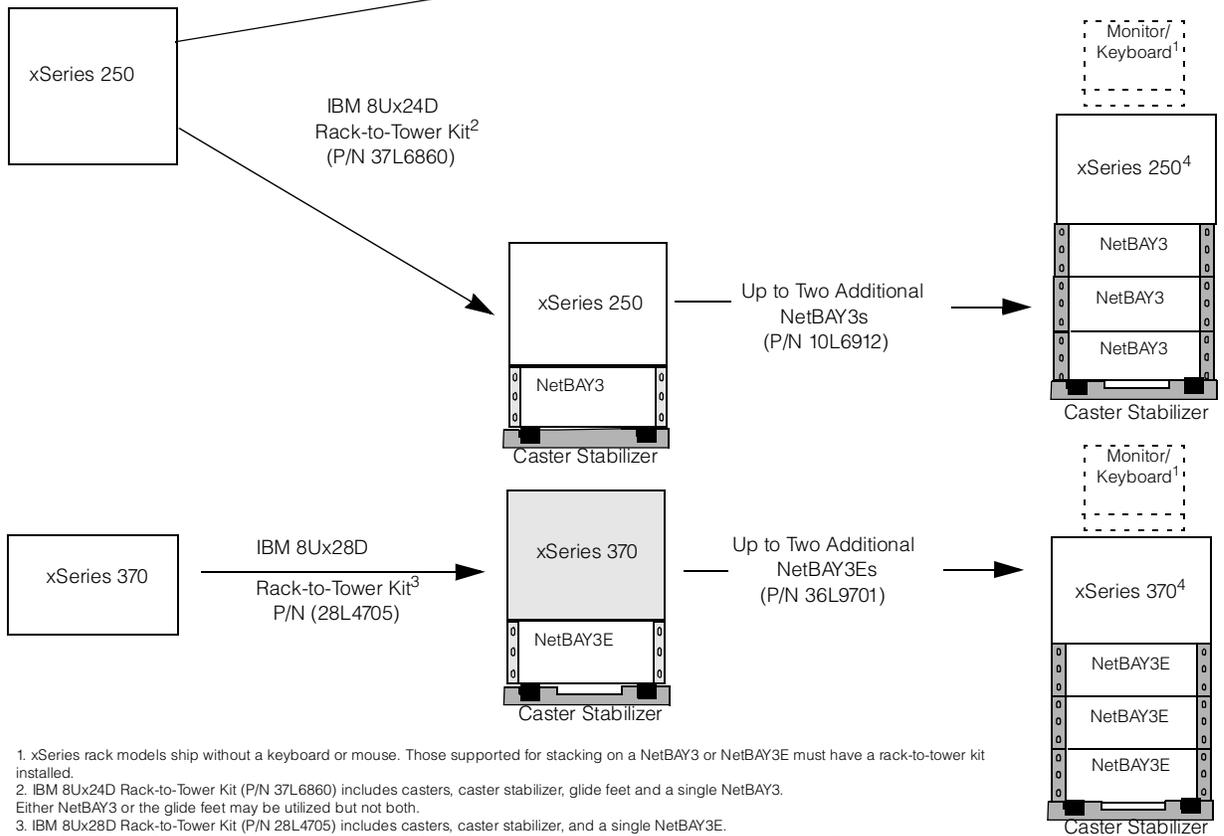
Tower Models

Single NetBay and Casters

Max Configurations



Rack Models

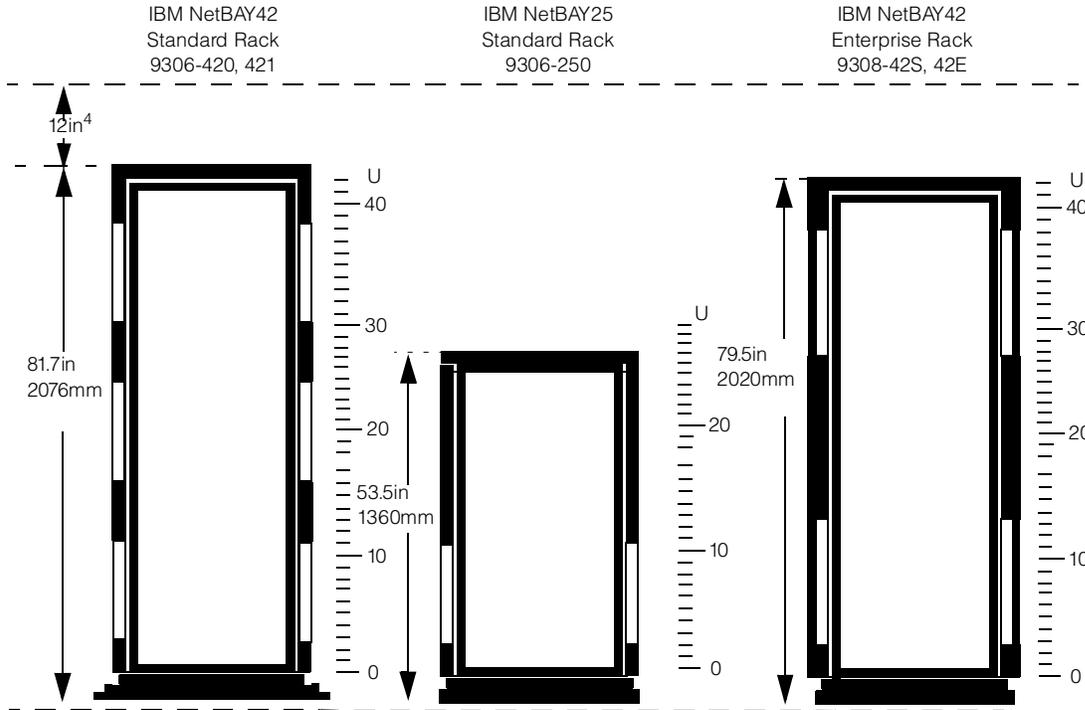


1. xSeries rack models ship without a keyboard or mouse. Those supported for stacking on a NetBAY3 or NetBAY3E must have a rack-to-tower kit installed.
2. IBM 8Ux24D Rack-to-Tower Kit (P/N 37L6860) includes casters, caster stabilizer, glide feet and a single NetBAY3. Either NetBAY3 or the glide feet may be utilized but not both.
3. IBM 8Ux28D Rack-to-Tower Kit (P/N 28L4705) includes casters, caster stabilizer, and a single NetBAY3E.
4. xSeries 250 and xSeries 370 are not supported for installation with three empty NetBAY enclosures without a caster stabilizer.

IBM NETBAY3 STACKABLE ENCLOSURE



Rack Cabinets and Options



	IBM NetBAY42 Standard Rack		IBM NetBAY25 Standard Rack³	IBM NetBAY42 Enterprise Rack	
Machine Type / Model	9306420	9306421	9306250	930842S	930842E
EIA Capacity ¹	42U	42U	25U	42U	42U
Sidewall Compartments	6	6	2	4	4
Front Stabilizers	Std	Std	Std	Std	Std
Side Stabilizers	Std	Std	NR	NR	NR
Casters	Std	Std	Std	Std	Std
Leveling Feet	Std	Std	Std	Std	Std
Side Covers	Std	NR	Std	Std	NR
Rack Attachment Kit ²	NR	Std	NA	NR	Std
Glass Front Door	NA	NA	NA	NA	NA
Perforated Front Door	Std	Std	Std	Std	Std
Empty Weight (kg/lb)	117 / 258	92 / 202	80 / 177	261 / 575	234 / 516
Max Load (kg/lb)	646 / 1424	646 / 1424	385 / 849	667 / 1470	667 / 1470
Total Weight (kg/lb)	763 / 1682	738 / 1626	465 / 1026	928 / 2045	901 / 1986
Shippable Loaded ⁵	No	No	Yes	Yes	Yes

NR - Not Required

NA - Not Available

1U=1.75in (44.5mm)

1. Conforms to EIA 310 - D Standard 19in rack specification for a Type A cabinet with universal hole spacing.

2. Required to attach racks together to make a suite.

3. Display and keyboard may be placed on top of the NetBAY25.

4. Minimum clearance to the ceiling.

5. 'Shippable loaded' means the cabinet is capable of being transported with equipment installed. Required packaging including a heavy duty pallet with ramp is provided.



Server System Rack and Stack Alternatives														
Servers	Conversion Kits						Stacks		Standard Racks ¹			Enterprise Racks ¹		
	09N4300 4Ux20D Tower-to-Rack Kit	37L6858 5Ux24D Tower-to-Rack Kit	21P9593 5Ux24D Tower-to-Rack Kit II	37L6859 8Ux24D Tower-to-Rack Kit	37L6860 8Ux24D Rack-to-Tower Kit ²	28L4705 8Ux28D Rack-to-Tower Kit ³	10L6912 NetBAY3 Stackable Enclosure	36L9701 NetBAY3E Stackable Enclosure	9306-110 NetBAY11	9306-250 NetBAY25SR	9306-420 NetBAY42SR	9306-421 NetBAY 42SX	9308-42S NetBAY42ER	9308-42E NetBAY42EX
xSeries 200 ⁴	X								X	X	X	X	X	X
xSeries 220 ⁴	X								X	X	X	X	X	X
xSeries 232			X						X	X	X	X	X	X
xSeries 240		X							X	X	X	X	X	X
xSeries 250				X	X		X ⁵		X	X	X	X	X	X
xSeries 300 ⁶								X ⁷	X	X	X	X	X	X
xSeries 330 ⁶								X ⁷	X	X	X	X	X	X
xSeries 342									X	X	X	X	X	X
xSeries 350									X	X	X	X	X	X
xSeries 370 ⁸						X	X ⁵		X	X	X	X	X	X
xSeries 380									X	X	X	X	X	X
xSeries 440									X	X	X	X	X	X

1. See the first page of Rack Cabinets and Options section for additional information concerning IBM rack-supported devices.
2. Includes one NetBAY3 stackable enclosure with casters. See IBM NetBAY3/NetBAY3E Stackable Enclosures section for supported devices.
3. Includes one NetBAY3E stackable enclosure with casters. See IBM NetBAY3/NetBAY3E Stackable Enclosures section for supported devices.
4. Rack installation requires appropriate Conversion Kit.
5. A maximum of three NetBAY3 or NetBAY3E enclosures may be stacked beneath a supported system unit. NetBAY3 and NetBAY3E enclosures are shipped separately and not while attached to the server system unit.
6. Blank filler panels (P/N 94G6670) should be placed on the front of any unused rack space to aid proper airflow through the x300 and x330 system units. If non-IBM racks are used, assure that both the front and rear doors offer a minimum of 45% open area uniformly distributed and in line with the installed servers. A clearance of at least 51mm (2in) must be maintained between the front door and the system unit's front bezel. The rear door must maintain the same or greater clearance. Nonrack or NetBAY3 installations are not supported.
7. Up to three xSeries 300s or 330s may be installed inside a NetBAY3E stackable enclosure when a supported server is installed at the top of the enclosure.
8. Stand-alone tower installation requires appropriate Conversion Kit.



IBM Rack-Mounted Units											
Description	Machine Type / Model	Size (U) ⁴	Depth (in) ⁵	Approx Weight (lbs)	Power (Watts) Typical/Max (All cords to same source)	Number of P/S and Line Cords Typical/Max	Standard Power Cords ⁷				
							6ft NEMA 5-15P P/N 6952301	9ft NEMA 5-15P P/N 6952300	9ft NEMA 6-15P P/N 1838574	9ft IEC 320-C14 P/N 36L8886	14ft IEC 320-C14 P/N 36L8861
Server System Units											
x200 ¹	8478	4	20	42	245/350	1/1	1				
x220 ¹	8645	4	20	42	245/350	1/1	1				
x232	8668	5	25	76	385/550	1/1 ^b	1				
x232 w/Pwr Conversion ^b	8668	5	25	80	420/600	2/3 ^b	2/3				
x240	8664	5	24	80	315/450	2/3	2				
x250	8665	8	24	123	350/475	2/4	2				
x300 ²	8672	1	25	29	140/200	1/1	1		1		
x330 ²	8654/8674	1	25	29	140/200	1/1	1		1		
x342	8669	3	26	62	262/375	1/2	1		1		
x350	8682	4	28	76	365/525	1/3	1		1		
x360 (2RX, 3RX)	8686	3	28	62	520/740	2/3	2		2		
x360 (1RX)	8686	3	28	58	260/740	1/3	1		1		
x370 ³	8681	8	28	160	1015/1450	3/3	3	3	3		
x380	8683	7	29	150	1400/2000	2/2					2
x440 ⁸	8687	4	28	120	800/950	2/2		2	2		
I/O Units											
RXE-100	86841RU	3	26	56	260/370	2/2	2		2		
Storage Units											
EXP300	35311RU	3	21	90	285/360	2/2	2				
FAST200	35421RU	3	22	56	275/390	2/2	2				
FAST200HA	35422RU	3	22	56	275/390	2/2	2				
FAST500	35521RU	4	24	76	140/200	2/2	2				
FAST700	17421RU	4	24	85	140/200	2/2	2				
FAST EXP500	35601RU	3	22	61	245/350	2/2	2				
FC Switch 8-port	2109S08	1	17	17	-/200	1/2	1				
FC Switch 16-port	2109S16	2	17	28	-/200	1/2	1				
FC Switch 16-port	2109F16	1	25	28	-/200	1/2			1		
Tape Units											
NetMEDIA	3551001	3	19	37	130/185	2/2	2				
DLT Library	3502R14	4	20	70	-/135	1/1	1				
LTO Tape Library	3600R20	5	27	84	500/700	1/1	1				
LTO Expander Module	3600LXU	5	27	77	599/700	1/1	1				
Other Options											
Console Switch 1x4	09N4290	1	8	5	-/100	1/1	1			1	
Console Switch 2x8	09N4291	1	8	6	-/100	1/1	1			1	
Flat Panel Console w/ SpaceSaver Keyboard	32P1031	1	24	28	-/100	1/1	1			1	
Flat Panel Console w/o keyboard	32P1032	1	24	26	-/100	1/1				1	

1. Requires 4Ux20D Tower-to-Rack Kit (P/N 09N4300) to mount server unit into an EIA rack cabinet.
 2. To provide adequate cooling, blank filler panel kit (P/N 94G6670) should be placed on the front of any unused rack space. If non-IBM racks are to be used, assure that both front and rear doors offer a minimum of 48% open area uniformly distributed and in line with installed servers. A clearance of 51 to 64mm (2 to 2.5in) must be maintained between the front of the door and the system unit's front bezel. The rear door must maintain the same or greater clearance. Nonrack or NetBAY3 installations are not supported.
 3. x370 requires installation of extension kit (P/N 36L9703 or 36L9702) when installed in a 9306-900, 910 or 9306-200, respectively, for proper rear door clearance.
 4. 1U = 1.75in (44.45mm).



5. The Rack Extension Kits (P/N 36L9703 or 36L9702) add eight inches to the rear of a 9306-900, 910 or 9306-200 for cable management and are recommended for systems greater than 24 inches in depth.
6. One 385W power supply standard on base models, two 250W power supplies on redundant models. xSeries Hot-Swap Power Conversion Kit (P/N 24P3513) supports one to three hot-swap power supplies. Base models require removing the standard power supply and adding the conversion kit with 250W power supply. Redundant models do not require adding the conversion kit.
7. Optional rack power cords: P/N 94G6667 - 14ft NEMA 5-15P; P/N 94G7448 - 14ft IEC 320-C14.
8. Internal power supply logic limits low voltage (100-127VAC) to 550w per power supply. Thus, configurations requiring more power are not redundant for low voltage installations, e.g., configurations with more than two processors.

General rack placement rules and other information:

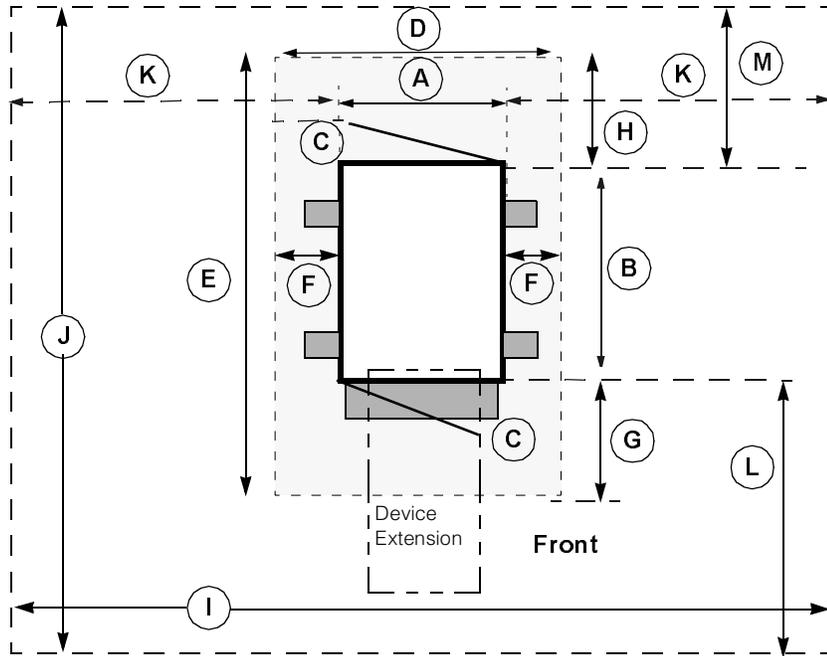
- Locate heaviest components at the bottom of the rack (i.e., UPS, then servers or storage, etc.).
- Do not extend more than one component on side rails at a time.
- Maximum of three UPSs (including no more than two APC 5000 UPSs) per rack.
- Utilize sidewall compartments for mounting PDUs and console switches prior to using EIA space.
- When mounting components in a rack, consider user and service requirements.
- When selecting length of power, console and storage cables, consider extension of cable management arms and overall cable routing.
- BTUs = Watts x 3.41.

Power Supply Options						
Power Supply	Part Number	Usable with	Standard Power Cords			
			6ft NEMA 5-15P P/N 6952301	9ft NEMA 5-15P P/N 6952300	6ft NEMA 6-15P P/N 1838576	9ft IEC 320-C14 P/N 36L8886
110w	09L5403	2109		1		
126w	18P3576	2109				1
250w	33L3760	x232, x240, x250	1			
270w	37L6880	x342, x350		1		1
370w	31P6108	x360, RXE-100		1		1

Rack Options		
Part Number	Description	Information
28L4707	Netfinity Rack Keyboard Tray	Supports keyboards in racks, also used with Flat Panel Monitor Rack Mount Kit II
28L3644	Space Saver II Keyboard	1U, includes TrackPoint IV, requires Rack Keyboard Tray (P/N 28L4707)
94G7444	Monitor Compartment	
633147N	E54 Color Monitor	9U, requires Monitor Compartment (P/N 94G7444)
63324HN	E74 Color Monitor	10U, requires Monitor Compartment (P/N 94G7444)
37L6888	Flat Panel Monitor Rack Mount Kit II	Requires Rack Keyboard Tray (P/N 28L4707)
9511AG4	T540 Flat Panel Color Monitor 15in	3U, requires Flat Panel Monitor Rack Mount Kit II (P/N 37L6888)
32P1031	NetBAY 1U Flat Panel Monitor Console Kit with SpaceSaver Keyboard (US)	1U, built-in 15in Flat Panel Monitor (15in viewable image), includes SpaceSaver Keyboard - US English (P/N 28L3644)
32P1032	NetBAY 1U Flat Panel Monitor Console Kit without keyboard	1U, built-in 15in Flat Panel Monitor (15in viewable image), space for SpaceSaver Keyboard
09N4290	NetBAY 1 x 4 Console Switch	1U, mounts in sidewall compartments, EIA space or Monitor Compartment; supports one to four servers, one console
09N4291	NetBAY 2 x 8 Console Switch	1U, mounts in sidewall compartments, EIA space or Monitor Compartment; supports one to eight servers, two consoles (only one console when installed in the Monitor Compartment)
09N4293	Console Cable Set - 7ft	Connects servers to console switch
94G7447	Console Cable Set - 12ft	Connects servers to console switch
94G6666	100-120V Power Distribution Unit	1U, 100-120V, 12A, mounts in sidewall compartment or EIA space, eight NEMA 5-15R outlets, requires one L5-15R wall receptacle
37L6866	NetBAY Rack PDU (US)	1U, 100-240V, 15A, mounts in sidewall compartment or EIA space, seven IEC 320-C13 outlets, requires one NEMA L5-20R or L6-20R wall receptacle
37L6865	NetBAY Server Dual-cord PDU (US)	1U, 100-240V, 15/10A, mounts in sidewall compartment or EIA space, four IEC 320-C13 outlets, requires two NEMA L5-20R or L6-20R wall receptacles
37L6883	NetBAY 100-127V Single-phase Front-end PDU (US)	1U, 100-127V, shared 30A, mounts in sidewall compartment, three IEC 320-C19 outlets, requires one NEMA L5-30R wall receptacle
37L6884	NetBAY 200-240V Single-phase Front-end PDU (US)	1U, 200-240V, shared 20A, mounts in sidewall compartment, three IEC 320-C19 outlets, requires one NEMA L6-30R wall receptacle
37L6886	NetBAY 3-phase Front-end PDU (US)	1U, 380-415V, shared 30A, mounts in sidewall compartment, three IEC 320-C19 outlets, requires one NEMA L21-30R wall receptacle
32P1020	APC 2U Smart-UPS 1400RMB	2U, 120V, 10A, six NEMA 5-15R outlets, requires one NEMA L5-15R wall receptacle
94G6676	APC Smart-UPS 3000RMB	3U, 120V, 23A, eight NEMA 5-15R outlets, requires one NEMA L5-30R wall receptacle

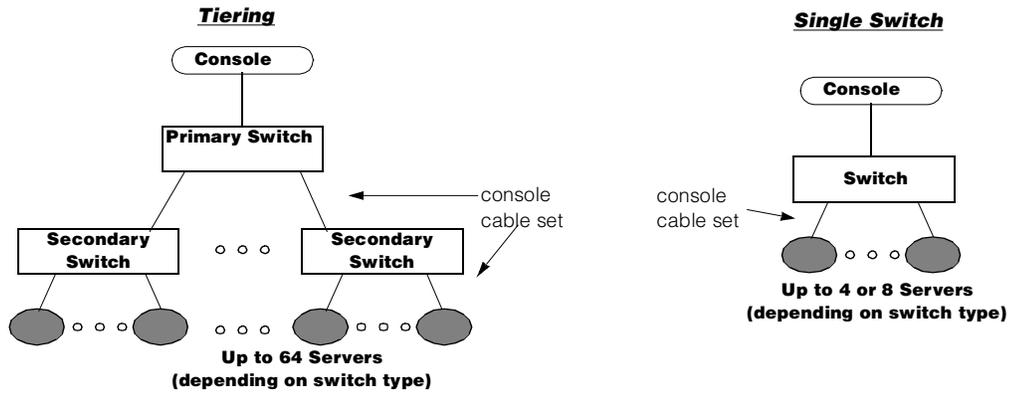


Rack Options		
Part Number	Description	Information
37L6861	APC Smart-UPS 5000RMB	5U, 208V, 18A, eight IEC 320-C13 outlets, two IEC 320-C19 outlets, requires one NEMA L6-30R wall receptacle; ships standard with two IEC 320-C19 to C20 cables to support PDUs
94G6670	Blank Filler Panel Kit	Consists of one 5U, one 3U, and two 1U blank filler panels
94G7442	Fixed Shelf	Supports up to 100lbs
94G6667	Rack Power Cord -Type A14	IEC 320-C13 to NEMA 5-15P (14ft)
94G7448	Rack Power Cord -Type C12	IEC 320-C13 to IEC 320-C14 (14ft)

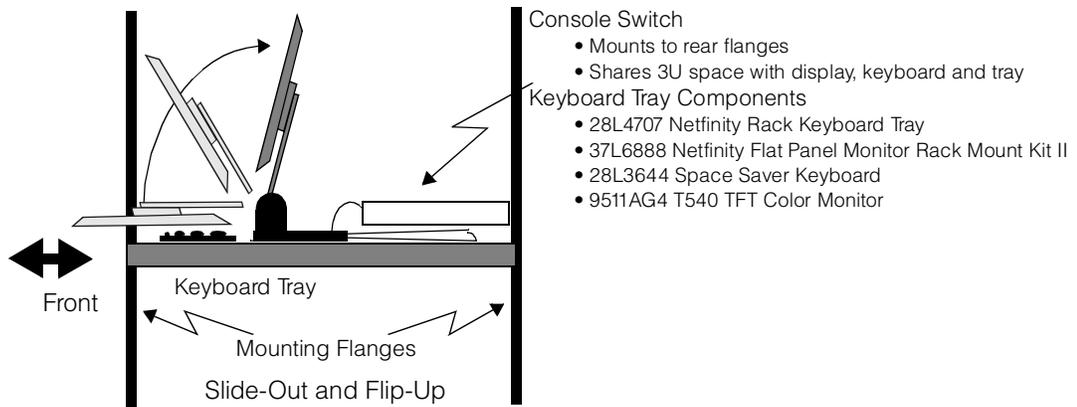


	9306-xxx (inches)	9308-xxx (inches)	Description
Box Footprint			
A	23.6	25.5	Width of rack
B	39.4	43.5	Depth of rack (not including front stabilizer)
C	24	26	Front and rear door clearance
Operational Clearance			
D	27.6	29.5	Width of Operational Clearance area
E	93.4	110	Depth of Operational Clearance area
F	2	2	Left/Right sides of rack to Operational Clearance area
G	30	36	Front of rack to Operational Clearance area
H	24	26	Rear of rack to Operational Clearance area
Service Clearance			
I	95.6	97.5	Width of Service Clearance area
J	129.4	133.5	Depth of Service Clearance area
K	36	36	Left/Right sides of rack to Service Clearance area
L	60	60	Front of rack to Service Clearance area
M	30	30	Rear of rack to Service Clearance area

Switch Arrangements



Keyboard/Pointer/Monitor & Switch ... all in 3U

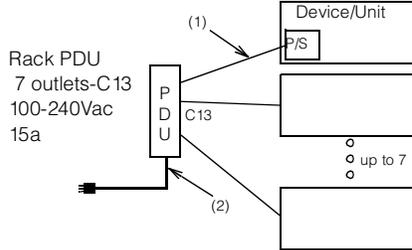




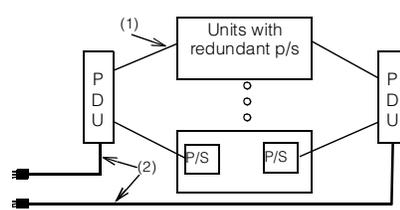
NetBAY Rack Power Configurator

Possible Power Configurations:

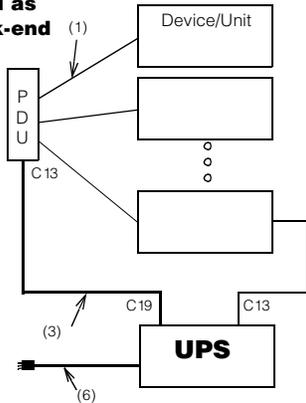
Single Rack PDU



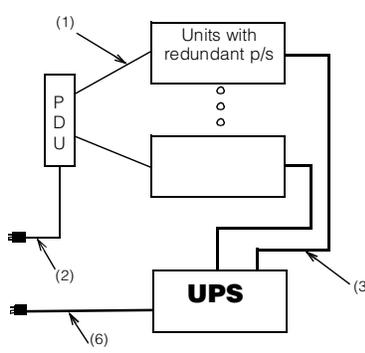
Redundant Power Distribution



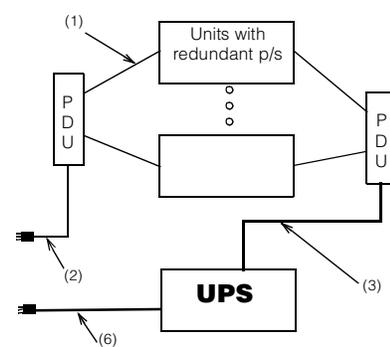
PDU used as UPS back-end



Redundant Power Distribution with PDU and UPS



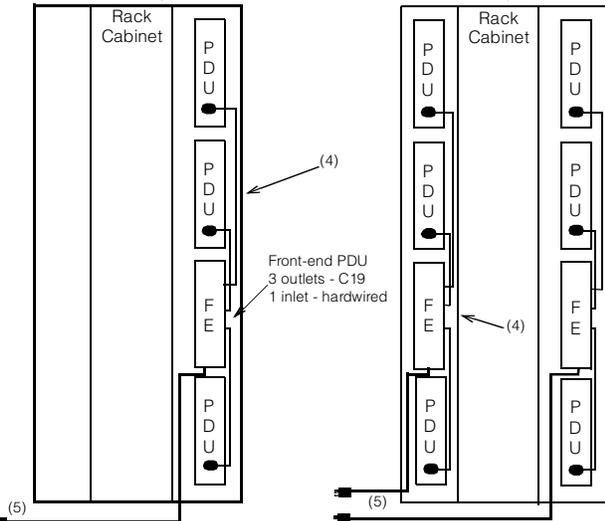
Redundant Power Distribution with PDU and UPS with PDU



Typical Rack Power Configurations:

Simple -- three Rack PDUs and one Front-end PDU (single circuit, 21 outlets)

Redundant -- six Rack PDUs and two Front-end PDUs (dual circuit, 42 outlets)



Rack Rules:

Total PDUs (LV PDUs, HV PDUs, Rack PDUs, Server PDUs, FE PDUs) = 8
 Total Server PDUs = 3
 Total Front-end PDUs = 2

Outlets:

Outlets	C19	C13
Rack PDU	0	7
Server PDU	0	4
Front-end PDU	3	0

NOTES:

- Each device/unit usually comes with a power cord. The PDU requires the power cord to have an IEC 320-C14 plug. Order P/N 94G7448 (14ft) if appropriate cord is not provided by the device/unit.
- Each PDU and UPS comes with a country-specific power cord.
- Internal rack power cable provided with APC SmartUPS 5000 UPS.
- Internal rack power cable provided with Front-end PDU.
- Line cord provided with Front-end PDU.
- UPS comes with a country-specific power cord or a terminal block.
- Customer responsible to provide a dedicated circuit for each line cord protected with an appropriate circuit breaker.
- P/S = Power Supply.

Outlets	US models			EMEA models	
	C19	C13	NEMA	C19	C13
APC 1400RMB	0	0	6	0	4
APC 3000RMB	0	0	8	1	8
APC 5000RMB	2	8	0	2	8



Country-Specific Considerations: USA, Canada, parts of Latin America, Taiwan

Power Cables:

- 1. Device to Rack PDU power cable**
IEC C13 to C14, 10/15a cable
typical: P/N 36L8886 (2.8m)
requirement: C14 plug, long enough to reach available option: 94G7448 (14ft)
- 2. Rack PDU to wall line cord**
IEC C19 to country-specific connector, 16/20a, 14ft (4.3m)
- 3. Rack PDU to UPS power cable**
IEC C19 to C20, 16/20a
P/N 00N7700 (2m)
provided with P/N 37L6861 (APC SU-5000RMB)
- 4. Rack PDU to Front-end PDU power cable**
IEC C19 to C20, 16/20a
P/N 00N7698 (1m)
provided with the Front-end PDUs
- 5. FE PDU to wall line cord**
special to country-specific connector, 30a, 8.2ft (2.5m)

(2) Line Cords: Rack PDU

Part Number	Plug Type	Source Circuit (single phase 50/60Hz)	PDU Output (single phase 50/60Hz)
37L6866	NEMA L5-20P	100-127Vac, 20a	seven 100-127Vac, shared 15a
	NEMA L6-20P	200-240Vac, 20a	seven 200-240Vac, shared 15a

(2) Line Cords: Type W PDU

Part Number	Plug Type	Source Circuit (50/60Hz)	PDU Output (single phase 50/60Hz)
37L6883	NEMA L5-30P	100-127Vac, 30a, single-phase	three 100-127Vac, 20a each, shared 30a
37L6884	NEMA L6-30P	200-240Vac, 30a, single phase line-to-line with ground	three 200-240Vac, shared 20a
37L6886	NEMA L21-30P	200-250Vac, 30a, three-phase Y-connection with neutral	three 100-127Vac (115-145), 20a each

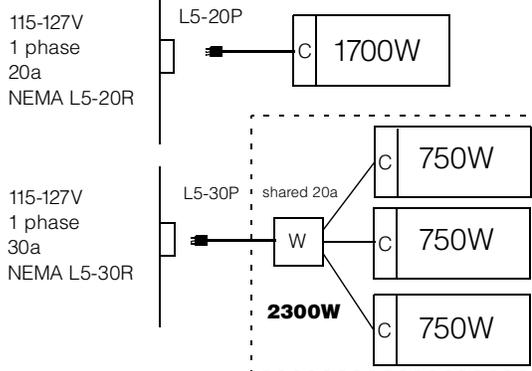
NETBAY RACK POWER CONFIGURATOR

Power Load Capacity -- xSeries / Netfinity Rack Systems

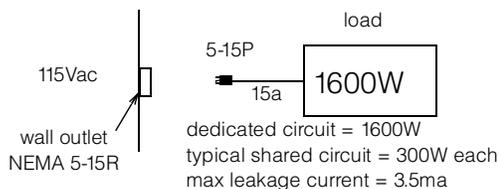
NOTE:

C = Rack PDU has a 15a circuit breaker
W = FE PDU has a 20a fuse
dedicated circuit
leakage current > 3.5ma

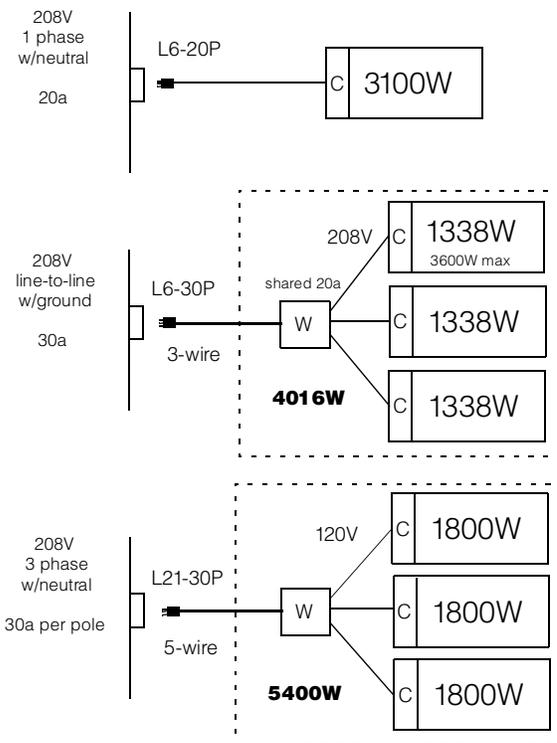
Low Voltage



Typical Office



High Voltage





Country-Specific Considerations: Europe, Mid-East, Africa, Asia Pacific, parts of Latin America

Power Cables:

- 1. Device to Rack PDU power cable**
IEC C13 to C14, 10/15a cable
typical: P/N 36L8886 (2.8m)
requirement: C14 plug, long enough to reach
available option: 94G7448 (14ft)
- 2. Rack PDU to wall line cord**
IEC C19 to country-specific connector,
16/20a, 14ft (4.3m)
- 3. Rack PDU to UPS power cable**
IEC C19 to C20, 16/20a
P/N 00N7700 (2m)
provided with P/N 37L6861 (APC SU-5000RMB)
- 4. Rack PDU to Front-end PDU power cable**
IEC C19 to C20, 16/20a
P/N 00N7698 (1m)
provided with the Front-end PDUs
- 5. Front-end PDU to wall line cord**
special to country-specific connector,
30/32a, 8.2ft (2.5m)

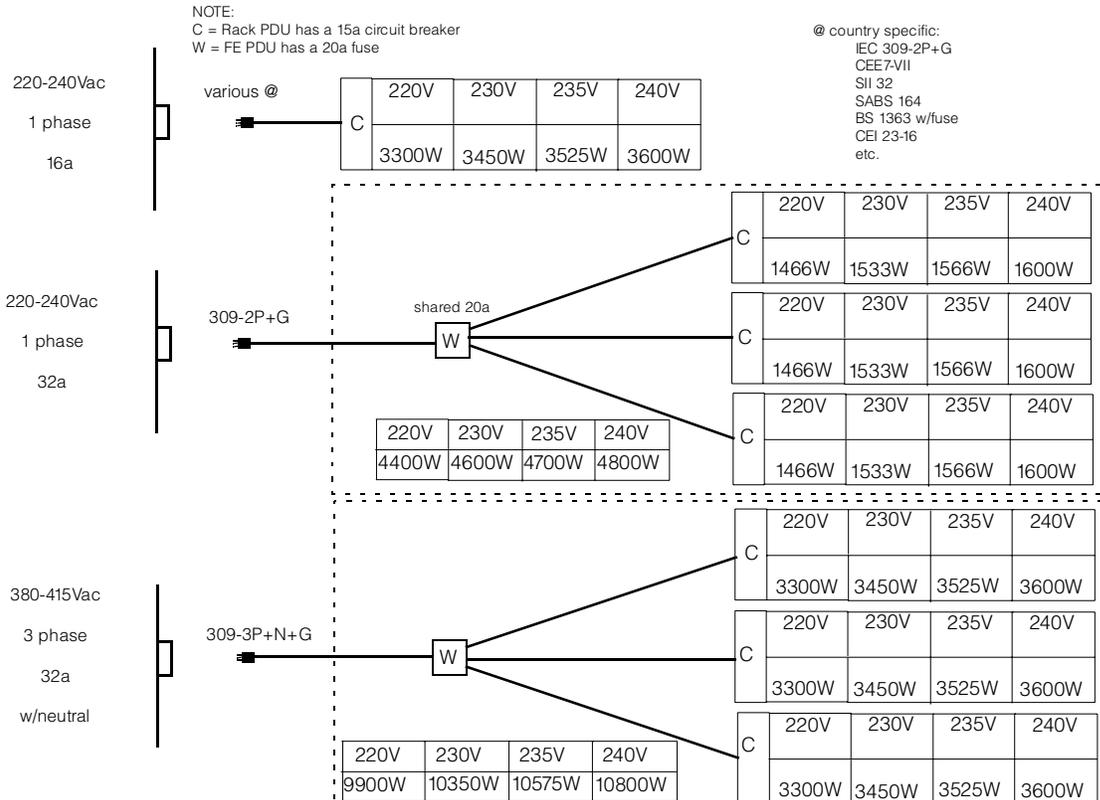
(2) Line Cords: Rack PDUs

Part Number	Plug Type	Source Circuit (single phase 50/60Hz)	PDU Output (single phase 50/60Hz)
37L6866	NEMA L5-20P	100-127Vac, 20a	seven 100-127Vac, shared 15a
	NEMA L6-20P	200-240Vac, 20a	
37L6868	CEE7-VII	220-240Vac, 16a	seven 200-240Vac, shared 15a
37L6870	IEC 309-2P+Gnd	220-240Vac, 16a	
37L6872	SII 32	220-240Vac, 16a	
37L6874	CEI 23-16	220-240Vac, 16a	
37L6876	SABS 164	220-240Vac, 16a	
06P6028	BS 1363/A	220-240Vac, 13a	
37L6864	country-specific line cord provided by IBM	country specific	country specific

(5) Line Cords: Front-end PDUs

Part Number	Plug Type	Source Circuit (50/60Hz)	PDU Output (single phase 50/60Hz)
37L6883	NEMA L5-30P	100-127Vac, 30a, single-phase	three 100-127Vac, 20a each, shared 30a
37L6884	NEMA L6-30P	200-240Vac, 30a, single phase line-to-line with ground	three 200-240Vac, shared 20a
37L6886	NEMA L21-30P	200-250Vac, 30a, three-phase Y-connection with neutral	three 100-127Vac (115-145), 20a each
37L6885	IEC 309-2P+Gnd	220-240Vac, 32a, single-phase	three 220-240Vac, 16a each, shared 32a
37L6887	IEC 309-3P+N+Gnd	380-415Vac, 32a, three-phase Y-connection with neutral	three 220-240Vac, 16a each

Power Load Capacity -- xSeries / Netfinity Rack Systems



Country-Specific Considerations: Japan

Power Cables:

- 1. Device to Rack PDU power cable**
IEC C13 to C14, 10/15a cable typical: P/N 36L8886 (2.8m)
requirement: C14 plug, long enough to reach available option: 94G7448 (14ft)
- 2. Rack PDU to wall line cord**
IEC C19 to country-specific connector, 16/20a, 14ft (4.3m)
- 3. Rack PDU to UPS power cable**
IEC C19 to C20, 16/20a
P/N 00N7700 (2m)
provided with P/N 37L6861 (APC SU-5000RMB)
- 4. Rack PDU to Front-end PDU power cable**
IEC C19 to C20, 16/20a
P/N 00N7698 (1m)
provided with the Front-end PDUs
- 5. Front-end PDU to wall line cord**
special to country-specific connector, 30/32a, 8.2ft (2.5m)

(2) Line Cords: Rack PDUs

Part Number	Plug Type	Source Circuit (single phase 50/60Hz)	PDU Output (single phase 50/60Hz)
37L6866	NEMA L5-20P	100Vac, 20a	seven 100Vac, shared 15a
	NEMA L6-20P	200Vac, 20a	seven 200Vac, shared 15a

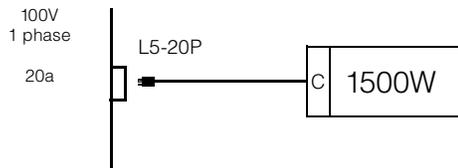
(5) Line Cords: Front-end PDUs

Part Number	Plug Type	Source Circuit (50/60Hz)	PDU Output (single phase 50/60Hz)
37L6883	NEMA L5-30P	100-127Vac, 30a, single-phase	three 100-127Vac, 20a each, shared 30a
37L6884	NEMA L6-30P	200-240Vac, 30a, single phase line-to-line with ground	three 200-240Vac, shared 20a
37L6886	NEMA L21-30P	200-250Vac, 30a, three-phase Y-connection with neutral	three 100-127Vac (115-145), 20a each
37L6885	IEC 309-2P+Gnd	220-240Vac, 32a, single-phase	three 220-240Vac, 16a each, shared 32a
37L6887	IEC 309-3P+N+Gnd	380-415Vac, 32a, three-phase Y-connection with neutral	three 220-240Vac, 16a each

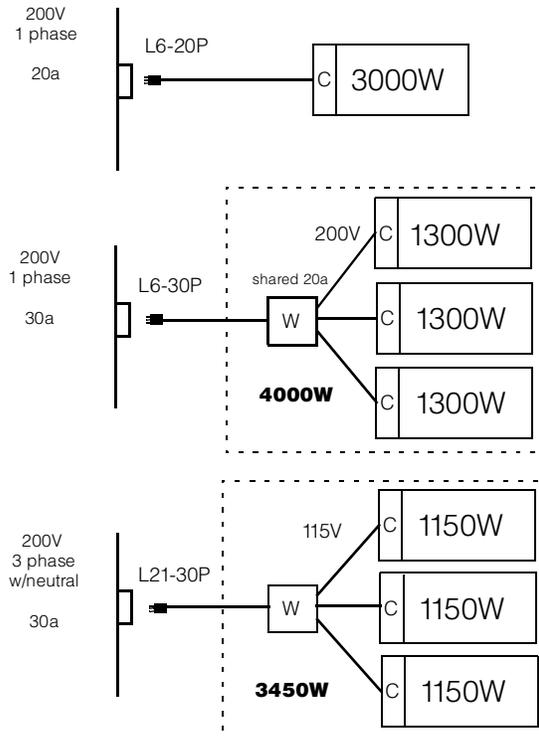
Power Load Capacity -- xSeries / Netfinity Rack Systems

NOTE:
C = Rack PDU has a 15a circuit breaker
W = FE PDU has a 20a fuse

Low Voltage



High Voltage



NETBAY RACK POWER CONFIGURATOR



Appendix A: Tape Drive Attributes

LEGEND:
 HH: Half-High - approx height of 1.6in
 SL: Slim-Line - approx height of 1in
 FH: Full-High

Part Number	Description	SCSI Interface (bit)	Form Factor	Max. storage-Native/Compr ²	MB/sec - Native/Compr ²	Termination Incl	68/50-pin Converter Incl	Internal Cables	Data/Cleaning Cartridges Included	Ext Tape Enclosures ⁷
Tape Drives										
20L0549	10/20GB TR5 Internal IDE Tape Drive	-	89mm (3.5in) SL or 133mm (5.25in) HH	10/20	1/2	-	-	-	1/0	-
09N4041	12/24GB DDS/3 4mm Internal SCSI Tape Drive	8	89mm (3.5in) HH or 133mm (5.25in) HH	12/24	1.1/2.2	Y	Y	-	1/1	3510020, 3551001
00N7991	20/40GB DDS/4 4mm Internal Tape Drive	16 Ultra2 LVD	89mm (3.5in) HH or 133mm (5.25in) HH	20/40	2.75/5.5	Y ¹³	-	-	1/1	3510020 ⁴ , 3551001 ³
09N4042	10/20GB NS Internal SCSI Tape Drive	8	89mm (3.5in) SL or 133mm (5.25in) HH	10/20	1/2	Y	Y	-	1/0	3510020, 3551001
09N4040	20/40GB DLT Internal SCSI Tape Drive	8	133mm (5.25in) FH	20/40	1.5/3	N ¹⁴	Y	-	1/1	3551001
00N7990	40/80GB DLT Internal SCSI Tape Drive	16 Ultra2 LVD	133mm (5.25in) FH	40/80	6/10	Y ¹³	-	-	1/1	3503B1X, 3551001 ³
00N8016	100/200GB LTO Tape Drive	16 Ultra2 LVD	133mm (5.25in) FH	100/200	15/30	Y ¹³	-	-	1/1	3551001 ³ , 3503B1X
24P2396	100/200GB LTO Half-High Tape Drive	16 Ultra2 LVD	133mm (5.25in) HH	100/200	8/16	Y ¹³	-	-	1/1	3551001 ³
00N8015	110/220GB Super DLT Internal SCSI Tape Drive	16 Ultra2 LVD	133mm (5.25in) FH	110/220	11/22	Y ¹³	-	-	1/1	3551001 ³ , 3503B1X
24P2398	40/80GB Half-High DLT/VS Internal SCSI Tape Drive	16 Ultra2 LVD	133mm (5.25in) HH	40/80	3/6	Y ¹³	-	-	1/1	3551001 ³
Associated Options										
00N7956	68-pin External Multimode LVD/SE SCSI Terminator	16 LVD/SE	Ext	-	-	Y	N	-	-	3510020
36L9636	Netfinity Two-Drop Internal SCSI Cable ⁵	16	Int	-	-	Y	N	16-bit, 2-drop	-	-
10K2340	Media Bay Tray and LVD Cable Kit ⁶	16 LVD	Int	-	-	Y	N	16-bit 2-drop	-	3551001
Tape Autoloaders										
3502108	DLT Tape Autoloader	16	Desktop	280/560	5/10	Y	-	-	1/1	-
00N7992	120/240GB DDS/4 Tape Autoloader	16 Ultra2 LVD	133mm (5.25in) FH	120/240	3/6	Y ¹³	-	-	5/1	3551001, 3503B1X
3600109	3600 Series 900GB/1.8TB LTO Tape Autoloader ⁷	16 Ultra2 LVD	Tower or 6U Rack	900/1.8TB	15/30	Y	-	-	1/1	-
External Tape Enclosures										
3510020	External Half High SCSI Storage Enclosure ⁸	8, 16	Desktop	-	-	N	N	8-bit or 16-bit	-	-
3551001	NetMEDIA Storage Expansion Unit EL ⁹	16	Rack	-	-	Y	N	2 x 16-bit, 4-drop	-	-
10L7113	NetMEDIA Systems Management Adapter ¹⁰	16	-	-	-	N	N	-	-	3551001
3503B1X	Full-High SCSI Tape Enclosure ¹¹	16 Ultra2 LVD	Desktop or 3U Rack	-	-	Y	N	16-bit	-	-
External Tape Libraries¹²										
3502x14	DLT Tape Library	16	Desktop or Rack	490/980	5/10	Y	-	-	1/1	-
3570C2x	Magstar MP 3570 Tape Subsystem	HVD	6U Rack	100/300	2.2/6 or 7/15	Y	-	-	1/1	-
3600xxx	3600 Series LTO Tape Libraries and Expander Module	16 Ultra2 LVD	Tower or Rack	2TB/4TB	15/30	Y	-	-	1/1	-



1. To determine cable requirements, note the tape drive's SCSI interface, the appropriate SCSI controller from the system configurator section and the desired enclosure then refer to Appendix D: Cables - Storage Units - Controllers. For installation of an internal tape drive into a server, see the appropriate system section.
2. Data compression typically provides a 2X improvement in capacity and transfer rate, but since data compression is affected by many factors, actual improvements may be more or less than 2X.
3. LVD support for LVD devices installed in a NetMEDIA Storage Expansion Unit EL (P/N 3551001) requires replacement of the standard single-ended internal cables with one or more (depending on configuration) cables from Media Bay Tray and LVD Cable Kit (P/N 10K2340), which contains a single two-drop multi-mode terminated cable. The following tape options no longer require this additional cable because they now include a standard single-drop, terminated LVD SCSI cable: 00N7990, 00N7991, 00N7992, 00N8015, 00N8016, 24P2396, 24P2398. If the standard single-ended cables in the NetMEDIA enclosure are used for attachment to LVD devices, single-ended SCSI rules and bus speeds apply.
4. Requires 68-pin External Multimode LVD/SE SCSI Terminator (P/N 00N7956).
5. Netfinity Two-Drop Internal SCSI Cable (P/N 36L9636) is a single-ended wide two-drop terminated cable.
6. Media Bay Tray and LVD Cable Kit (P/N 10K2340) includes an internal two-drop multi-mode terminated LVD SCSI cable.
7. If installed in a rack, a fixed shelf is required. Allow an additional 1U for the fixed shelf. One unit only per shelf is supported.
8. Black desktop 133mm (5.25in) half-high (HH) tape enclosure. Connector is configurable as 50-pin Centronix or 68-pin high density. Requires either tape drive self-termination or 68-pin External Multimode LVD/SE SCSI Terminator (P/N 00N7956).
9. NetMEDIA Storage Expansion Unit EL (P/N 3551001) is a black 3U, 19in rack or NetBAY3/3E mountable tape enclosure which includes two full high (FH) or four half-high (HH) extended length 5.25" bays, two external 0.8mm VHDCI connectors and two internal four-drop single-ended terminated 16-bit SCSI cables for device attachment. Two power supplies and two power cords are also included. Tip: The front rail clips will need to be reversed and screwed in from behind to secure the unit in a 930842x rack.
10. NetMEDIA Systems Management Adapter (P/N 10L7113) may be installed in a 3551001 to provide repeater function, LVDS interface, aggregate cable lengths up to 12M when attached to an LVD SCSI controller, and auto-termination when the 3551001 is powered off. External connector is 0.8mm VHDCI.
11. Black desktop or 3U rack tape enclosure supports 133mm (5.25in) full-high LVD tape devices including DLT technology. Requires a fixed shelf if installed in a rack (allow additional 1U for fixed shelf). Replaces 3503B0X Tape Enclosure. Supports the following full-high tape options: 00N8015, 00N8016, 00N7992, 00N7990.
12. Tape library attributes and prerequisites are located in Appendix B: Tape Library Attributes.
13. Termination requires installing the 42in single-drop, terminated LVD SCSI cable provided with the option or is provided in a NetMEDIA Storage Expansion Unit with the installation of NetMEDIA Systems Management Adapter (P/N 10L7113).
14. Termination requires installation using the two-drop multimode terminated LVD SCSI cable included with the Media Bay Tray and LVD Cable Kit (P/N 10K2340) or is provided in a NetMEDIA Storage Expansion Unit with the installation of NetMEDIA Systems Management Adapter (P/N 10L7113).

Note: Tape support varies by system depending on internal bay availability, SCSI cabling type, number of cable drops, existence of a RAID controller and availability of a suitable external enclosure. The following general rules should be followed.

- a) Tapes are not supported for attachment to RAID controllers.
- b) Single-ended (non-LVD) devices may be attached to internal multi-mode terminated cables. The entire SCSI bus will be limited to single-ended operation with a maximum bus speed of Ultra-SCSI.
- c) LVD devices attached to single-ended terminated cables will operate in single-ended mode with a maximum bus speed of Ultra-SCSI.

Internal SCSI Cables and Optional SCSI Adapters

Most systems support the following SCSI adapters for use with tape. Consult the I/O Options table in the system sections for specific system support. Where tapes are supported internal to the system, the cables which ship with the adapters are supported for tape attachment. Some restrictions may apply based on cable and tape type which are explained in the note above.

Part Number	Description	Cable Description	External Connector
02K3454	PCI Fast/Wide Ultra SCSI Adapter	Four-drop, single-ended terminated, 16-bit	68-pin high density
19K4646	PCI Wide Ultra160 SCSI Adapter	Five-drop, multi-mode terminated	0.8mm VHDCI
36L9636	Netfinity Two-Drop Internal SCSI Cable	Two-drop, single-ended terminated, 16-bit	-
10K2340	Media Bay Tray and LVD Cable Kit	Two-drop, multi-mode terminated	-



Appendix B: Tape Library Attributes

SCSI Interface and Cable Legend

M: Male - External
 68: 16-bit, 68-pin High Density connector
 08: 16-bit, 68-pin Very High Density Connection Interface (VHDCI) 0.8mm connector
 SE: Single-ended SCSI
 HVD: High Voltage Differential SCSI
 LVD: Low Voltage Differential SCSI

Part Number	Description	SCSI Interface	Form Factor	Terminator Included	Ext Cables Incl (length)	SCSI Controllers Incl	Data Cartridges Incl	Cleaning Cartridges - std/max	Cartridge Maggs std/max	Qty of drives - std/max	Max storage-Native/Compressed	MB/sec - Native/Compr.1
DLT Tape Libraries												
3502314	DLT Tape Library - Tower	SE	Desktop	Y	M68-M68 (3M)	Y	1/14	1	2/2	1/3	490GB/980GB	5/10
3502R14	DLT Tape Library - Rack ²	SE	4U Rack	Y	M68-M68 (3M)	Y	1/14	1	2/2	1/3	490GB/980GB	5/10
33L4979	DLT Library Drive Upgrade ³	SE	-	N	Jumper	N	-	-	-	-	-	5/10
3600 Series Tape Libraries												
3600220	3600 Series 2/4TB LTO Tape Library (Tower)	LVD	Tower	Y	M68-M0.8 (2M)	N	1/20	1	4/4	1/2	2TB/4TB	15/30
3600R20	3600 Series 2/4TB LTO Tape Library (Rack)	LVD	5U Rack	Y	M68-M0.8 (2M)	N	1/20	1	4/4	1/2	2TB/4TB ⁸	15/30
3600LXU	3600 Series 2-Drive, 20-Cartridge Expander Module ⁴	LVD	5U Rack	Y	M68-M0.8 (2M)	N	0/20	1	4/4	0/2	2TB/4TB	15/30
3600109	3600 Series 900GB/1.8TB LTO Tape Autoloader ⁵	LVD	Tower or 6U Rack	Y	M68-M0.8 (2M)	N	1/9	1	1/1	1/1	900GB/1.8TB	15/30
09N4048	3600 Series LTO Drive Upgrade Option ⁶	LVD	-	N	Jumper (1m)	N	-	-	-	-	-	15/30
09N4047	Fibre Tape Automation Adapter ⁷	LVD	-	-	M68-M0.8 (2 x 18in)	-	-	-	-	-	-	-
Magstar Tape Systems												
3570C21	Magstar MP 3570 Tape Subsystem ⁹	HVD	6U Rack	Y	(4.5M)	Y	1/20	1	2/2	1/2	100GB/300GB	7/15
3570C22	Magstar MP 3570 Tape Subsystem ⁹	HVD	6U Rack	Y	(4.5M)	Y	1/20	1	2/2	2/2 ¹⁴	100GB/300GB	7/15
08L6517	3570 Adapter Card Kit ¹⁰	HVD	-	Y	(4.5M)	Y	-	-	-	-	-	-
08L6480	Second "C" Drive for C21 ¹¹	HVD	-	-	-	N	-	-	-	-	-	7/15
Magstar MP Media¹²												
05H2462	Magstar MP Fast Access Linear Tape Cartridge, B-format ¹³	-	-	-	-	-	-	-	-	-	-	-
05H2463	Magstar MP Cleaning Cartridge	-	-	-	-	-	-	-	-	-	-	-
08L6187	Magstar MP Fast Access Linear Tape Cartridge, C-format	-	-	-	-	-	-	-	-	-	-	-

1. Transfer rates are for single SCSI channel configurations. Tape libraries utilizing split library or dual host configurations may obtain higher rates. Data compression typically provides a 2X improvement in capacity and transfer rate, but since data compression is affected by many factors, actual improvements may be more or less than 2X.
 2. Includes Fixed Shelf (P/N 94G7442) for installation in an IBM rack or NetBAY22.
 3. Upgrade 33L4979 is an additional drive for 3502x14 DLT Tape Libraries. Up to two drive upgrades may be installed for a maximum of three drives per 3502x14.
 4. Supported only with the 3600 Series LTO Tape Library (rack) (P/N3600R20). Allow one additional EIA space when installing either one or two (maximum) units to accommodate a filler plate for cable routing. Up to two 3600 Series LTO Drive Upgrade Options can be installed in each module or the module can operate off the LTO drives installed in the LTO tape library.
 5. If installed in a rack, a fixed shelf is required. Allow an additional 1U for the fixed shelf. Only one unit is supported per shelf.
 6. Install in second drive bay of 3600 Series LTO Tape Libraries or in either of the two bays of 3600 Series 2-drive, 20-cartridge Expander Module to increase performance. Includes an LTO (Ultraium) drive and a one-meter external LVD SCSI cable.
 7. This adapter installs in a 3600 Series Tape Library or Expander Module. It includes a Fibre Channel-to-SCSI bridge that serves as a router to provide direct attachment to a Fibre Channel host adapter or GBIC installed in a Fibre Channel Switch (P/N 2109S08, 16) or Managed Hub (P/N 35341RU) via a short-wave Fibre Channel cable (P/N 36L9973, 03K9306, 03K9305). Two 18in LVD cables with a 68-pin male connector on one end and a male 0.8mm VHDCI connector on the other are included with the option. The 68-pin connector attaches to either the standard or optional LTO tape drive in the Tape Library or Expander Module and the 0.8mm VHDCI connector attaches to one of two connectors on the adapter. Each adapter supports up to two LTO drives in a single 3600 layer (3600R20 or 3600LXU) using one SCSI connector and cable for each drive.
 8. Maximum configuration includes two 3600 Series 2-Drive, 20-Cartridge Expander Modules (P/N 3600LXU), which combine with a 3600 Series Tape Library to provide a total of 6TB of native storage capacity and 12TB compressed.
 9. Includes rack mounting hardware and two power cords (120V and 250V). Models B22 and C22 include an additional two power cords.
 10. Required for Dual Host or Split Library configurations with 3570B2x or 3570C2x containing two drives.
 11. Required for either dual host or split library operation. Should be installed by qualified service personnel.
 12. Magstar MP Media can be ordered by calling 888-IBM-MEDIA or 888-426-6334 in the US, Canada, or Puerto Rico.
 13. B-format tape cartridges can be used in either Magstar MP 3570 Model B or C tape drives.
 14. The two tape drives are daisy-chained on the same SCSI bus with an included 0.5m SCSI cable. Dual Host and Split Library configurations require 3570 Adapter Card Kit (P/N 08L6517).





Appendix C: UPS Runtime Estimate (minutes)

Servers	# Pwr Cords Std/Max	Watts Load Max/Typ ¹
xSeries 200 ²	1/1	350/245
xSeries 220 ²	1/1	350/245
xSeries 232 (one 385W power supply) ²	1/1	400/280
xSeries 232 (two 250W power supplies) ²	2/3	450/315
xSeries 240 ²	2/3	450/315
xSeries 250 ²	2/4	475/350
xSeries 300 ²	1/1	200/140
xSeries 330 ²	1/1	200/140
xSeries 342 ²	1/2	390/270
xSeries 350 ²	1/3	525/365
xSeries 360 ²	2/3	740/520
xSeries 370 ²	3/3	1450/1015
xSeries 380 ²	2/2	2000/1400
xSeries 440 ²	2/2	950/950
Other Devices		
FAST1500 Storage Server (3552) ²	2/2	200/140
FAST EXP500 Storage Expansion Unit (3560) ²	2/2	350/245
FAST200 Storage Server (35421RU) ²	2/2	390/275
FAST200 HA Storage Server (35422RU) ²	2/2	390/275
FAST700 Storage Server (17421RU) ²	2/2	390/275
EXP300 Storage Expansion Unit (3531) ²	2/2	360/285
SAN Fibre Channel Switch, 8-port (2109S08)	1/2	200/n/a
SAN Fibre Channel Switch, 16-port (2109S16)	1/2	200/n/a
SAN Fibre Channel Switch, 16-port (2109F16)	1/2	200/n/a
SAN Data Gateway Router UltraScsi LVD Port (2108R3L)	1/1	90/n/a
DLT Tape Autoloader and Library (3502)	1/1	135/n/a
Magstar MP 3570 Tape Subsystem (C2x)	1/1	200/140
NetMEDIA Storage Expansion Unit EL (3551)	2/2	185/130

1. This table represents general guidelines for selecting the appropriate UPS based on minimum and typical runtime estimates. A 'maximum configuration' load will result in 'minimum' UPS runtime. 'Typical' loads are based on a production system running at approximately 70% of maximum capacity. The 'typical' loads represent a more likely configuration and is a more likely estimate of runtime. Customer environments are unique and are unlikely to be precisely represented by any of the specific entries in the table.

2. Power-Factor Corrected (PFC) power supply.

	Tower					Rack Mounted			
INT'L P/N	SU-700iNET 94G4073	SU-1000iNET 94G4074	SU-1400iNET 94G4075	SU-2200iNET 94G4076	SU-1400RMB 94G6675	2U SU-1400RMB 32P1022 ⁶	SU-3000RMB 94G6677	SU-5000RMB 37L6862	
US P/N	SU-700NET 94G3134	SU-1000NET 94G3135	SU-1400NET 94G3136	Not Available	SU-1400RMB 94G6674	2U SU-1400RMB 32P1020	SU-3000RMB 94G6676	SU-5000RMB 37L6861	

UPS Attributes									
Communications Links to Servers		1	1	1	1	1	1	3	3
Color		black	black	black	white	black	black	black	black
EIA Height		-	-	-	-	3U	2U	3U	5U
Int'l Models									
50 or 60Hz, single phase, VAC: ^{2,3}		220-240(xxx)							
10-Amp, IEC 320-C13 (Device) receptacles		4	4	4	8	4	4	8	8
16-Amp, IEC 320-C19 (PDU 94G7450) receptacles		-	-	-	1	-	-	1	2
Line Cord Receptacle (IEC 320-)		C14	C14	C20	C20	C14	C14	C20	TB ⁵
US Models									
50 or 60Hz, single phase, VAC: ²		120 (120)	120 (120)	120 (120)	-	120 (120)	120 (120)	120 (120)	200-220 (208)
Receptacles (NEMA 5-15R)		4	6	6	-	6	6	8	-
10-Amp, IEC 320-C13 (Device) receptacles		-	-	-	-	-	-	-	8
16-Amp, IEC 320-C19 (PDU 94G7450) receptacles		-	-	-	-	-	-	-	2 ⁴



Line Cord Length, NEMA Plug		6ft, 5-15P	6ft, 5-15P	6ft, 5-15P	-	6ft, L5-15P	6ft, L5-15P	6ft, L5-30P	8ft, L6-30P
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1. Data provided by APC.
2. How-to-Read example for 200-240(208): Input VAC is 200-240 as is the UPS output when electric service is active. When electric service is interrupted and the UPS is on battery the UPS output is 208 VAC.
3. Battery output may be set to 220, 225, 230, or 240 VAC.
4. Two PDU jumper cables ship with the UPS for attachment from the IEC 320-C19 receptacles to Power Distribution Units (PDUs) with C20 inlets.
5. SU-5000RMiB (P/N 37L6862) contains a Terminal Block (TB) for direct attachment to an electrical source by qualified personnel.
6. Two IEC power cables are provided to attach devices to the UPS outlets. They are 1.8m long with IEC 320-C13 / C14 connectors.

Total Configuration Runtime Estimator (Time in minutes) ¹								
Tower					Rack Mount			
Int'l Part Number	SU-700iNET 94G4073	SU-1000iNET 94G4074	SU-1400iNET 94G4075	SU-2200iNET 94G4076	SU-1400RMiB 94G6675	2U SU-1400RMiB 32P1022	SU-3000RMiB 94G6677	SU-5000RMiB 37L6862
United States Part Number	SU-700NET 94G3134	SU-1000NET 94G3135	SU-1400NET 94G3136	Not Available	SU-1400RMB 94G6674	2U SU-1400RMB 32P1020	SU-3000RMB 94G6676	SU-5000RMB 37L6861
Total Load (Watts)	Runtime Minutes	Runtime Minutes	Runtime Minutes	Runtime Minutes	Runtime Minutes	Runtime Minutes	Runtime Minutes	Runtime Minutes
200	22	38	62	130	45	45	104	240
250	17	28	43	104	34	34	84	200
300	12	22	34	85	25	25	70	166
350	9	18	29	71	22	22	58	145
400	7	14	23	65	18	18	52	125
450	5	12	20	52	15	15	45	110
500	-	11	18	43	13	13	38	97
550	-	9	16	38	11	11	35	87
600	-	8	13	34	10	10	31	76
650	-	7	12	31	9	9	29	68
700	-	6	11	28	8	8	26	63
750	-	-	10	25	8	8	24	59
800	-	-	9	23	7	7	22	55
850	-	-	8	21	7	7	20	51
900	-	-	7	19	6	6	18	47
950	-	-	6	18	5	5	17	43
1000	-	-	-	17	-	-	16	39
1100	-	-	-	15	-	-	14	34
1200	-	-	-	13	-	-	12	31
1300	-	-	-	11	-	-	10	28
1400	-	-	-	9	-	-	9	25
1500	-	-	-	9	-	-	8	22
1600	-	-	-	8	-	-	8	20
1700	-	-	-	-	-	-	7	18
1800	-	-	-	-	-	-	-	17
1900	-	-	-	-	-	-	-	14
2000	-	-	-	-	-	-	-	12
2100	-	-	-	-	-	-	-	11
2200	-	-	-	-	-	-	-	11
2300	-	-	-	-	-	-	-	10
2400	-	-	-	-	-	-	-	10
2500	-	-	-	-	-	-	-	9
2600	-	-	-	-	-	-	-	9
2700	-	-	-	-	-	-	-	8
2800	-	-	-	-	-	-	-	8

1. Data provided by APC.

Steps:

1. Identify the devices contained in the configuration.
2. Sum the load (watts) of all devices in the configuration. Use either Maximum Load for minimum runtime or Typical Load for typical runtime.
3. Find the Total Configuration Load in the table above.
4. Select the most appropriate UPS model to achieve the desired runtime.

NOTE: If the Total Configuration Load is greater than the entries above, split the load across two or more UPS units.

UPS RUNTIME

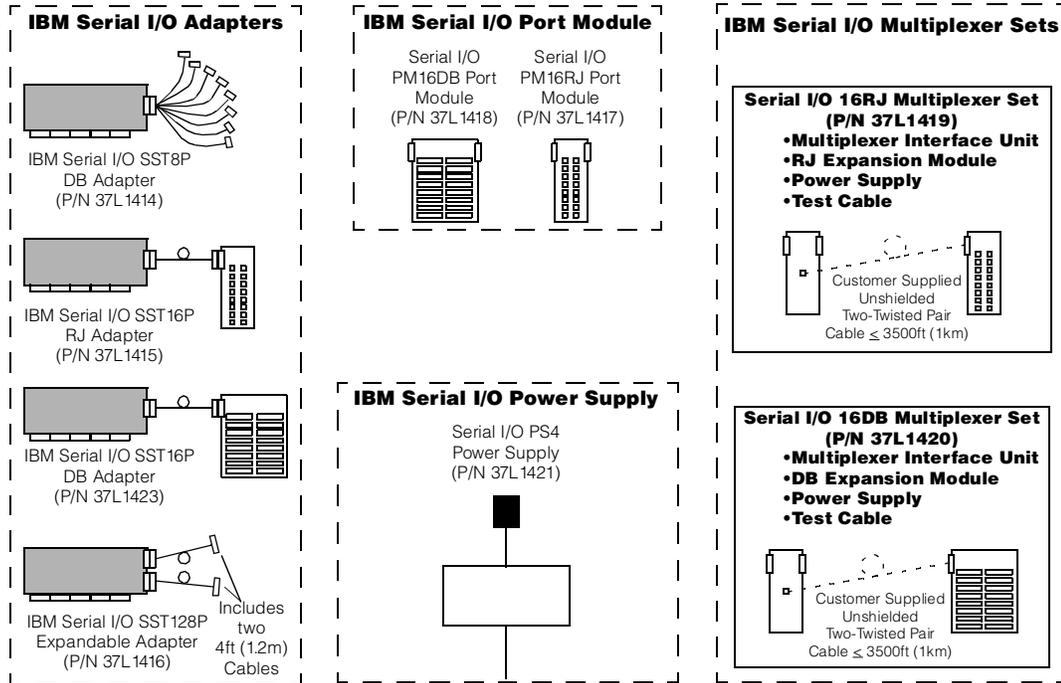


Appendix D: SCSI Cables - Storage Units - Controllers

F: Female - External M: Male - External I: Internal 68: 16-bit, 68-pin High Density connector 50: 8-bit, 50-pin Centronix Connector 0.8: 16-bit, 68-pin Very High Density Connection Interface (VHDCI) 0.8mm connector 16: 16-bit, 68-pin connector 8: 8-bit, 50-pin connector						Instructions: Identify Desired Controller Row and Storage Unit Column. The intersection of row and column contains the cable group letter which supports the connection. Go to the cable group under the corresponding storage unit for specific support. Read all Notes for row, column, and any cable group footnotes.					
						Storage Unit		35311RU	3510020	3503B1X	3551001
Max MB/sec. ¹						160	-	-	-	-	30
LVDS						X	-	X	-	-	X
Connector Type						F0.8	F68 or F50	F68	F0.8	F0.8	F68
Description	Part Number	Max/Channel (MB/sec) ¹	LVDS	Connector Type/Max	Note #	2, 3	4, 6	4	2, 4	2, 4, 7	2, 3, 5
RAID Storage Controllers											
ServeRAID-4H Ultra160 SCSI Controller	37L6889	160	X	F0.8/4	9	A	-	-	-	-	-
ServeRAID-4Mx Ultra160 SCSI Adapter	06P5736	160	X	F0.8/2	9	A	-	-	-	-	-
ServeRAID-4Lx Ultra160 SCSI Adapter II	06P5740	160	X	F0.8/1	9	A	-	-	-	-	-
Ultra160 SCSI Controllers											
PCI Wide Ultra160 SCSI Adapter	19K4646	160	X	F0.8/1	-	-	B	B	A	A	B
xSeries 350	Onboard	160	X	F0.8/1	-	-	B	B	A	A	B
xSeries 360	Onboard	160	X	F0.8/1	-	-	-	B	A	A	B
xSeries 380	Onboard	160	X	F0.8/1	-	-	-	-	-	-	-
Ultra2 SCSI Controllers											
xSeries 240	Onboard	80	X	F0.8/1	-	-	B	B	A	A	B
xSeries 250	Onboard	80	X	F0.8/1	-	-	B	B	A	A	B
xSeries 370	Onboard	80	X	F0.8/1	-	-	B	B	A	A	B
Ultra SCSI Controllers											
PCI Fast/Wide Ultra SCSI Adapter	02K3454	40	-	F68/1	8	-	C	-	B	B	-
No Onboard External Port¹²											
xSeries 200	Onboard	-	-	n/a	-	-	-	-	-	-	-
xSeries 220	Onboard	-	-	n/a	-	-	-	-	-	-	-
xSeries 300	Onboard	-	-	n/a	-	-	-	-	-	-	-
xSeries 330	Onboard	-	-	n/a	-	-	-	-	-	-	-
xSeries 342	Onboard	-	-	n/a	-	-	-	-	-	-	-
xSeries 232	Onboard	-	-	n/a	-	-	-	-	-	-	-
Cable Group A (M0.8-M0.8)											
Netfinity 2M Ultra2 SCSI Cable	03K9310	-	X	M0.8-M0.8	10	X ¹¹	-	-	X	X	-
Netfinity 4.2M Ultra2 SCSI Cable	03K9311	-	X	M0.8-M0.8	10	X	-	-	X	X	-
Netfinity 20M Ultra2 SCSI Cable	37L7101	-	X	M0.8-M0.8	8	X	-	-	-	-	-
Cable Group B (M68-M0.8)											
2M External 0.8mm SCSI Cable	01K8027	-	-	M68-M0.8	-	-	X	X	X	X	X ⁵
Cable Group C (M68-M68)											
PC Server F/W to F/W External SCSI Cable - 1m	70G9857	-	-	M68-M68	13	-	X	-	-	-	-
Cable Group G (Other)											
68-pin External Multimode LVD/SE SCSI Terminator	00N7956	-	-	M68	-	-	X	-	-	-	-

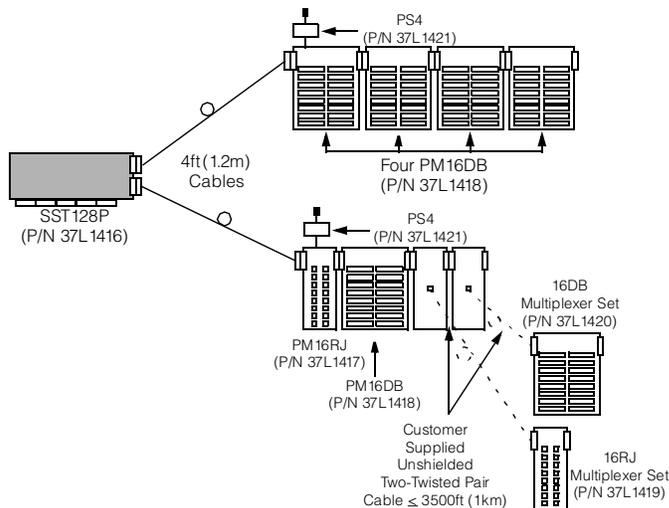
- Maximum supported speeds may be limited by installation of lower speed devices, controllers or cable lengths greater than two meters.
- Rack installation cable management requires devices to have a minimum cable length of two meters. Cable length requirements will vary based on placement within a single or multiple rack suite.
- Maximum speeds may be limited by the installed devices or SCSI controller.
- Daisy chaining tape enclosures is not supported at this time.
- The 3600 Series (rack or tower) Tape Libraries support up to two Expander Modules (P/N 3600LXU). 3600 Series Tape Libraries and Expander Modules are shipped with a 2m external SCSI cable (P/N 01K8027), with a 68-pin high density connector at one end and an 0.8mm VHDCI connector at the other end.
- Requires 68-pin External Multimode LVD/SE SCSI Terminator (P/N 00N7956).
- NetMEDIA Systems Management Adapter (P/N 10L7113) may be installed in a 3551001 to provide repeater function, LVDS interface, aggregate cable lengths up to 12 meters when attached to an LVD SCSI controller, and auto-termination when the 3551001 is powered off. External connector is 0.8mm VHDCI.
- Cable lengths exceeding 4.3 meters are NOT supported for attachment to non-LVD controllers.
- Maximum speeds may be limited by the enclosure or its installed devices.
- Supports attachment to Ultra2 or single-ended SCSI controllers with operational speeds of up to Ultra2. Controller, storage unit, cable length or storage device limitations may apply (see Max MB/sec row and column above).
- EXP300 (P/N 35311RU) includes a single 2M Ultra2 SCSI cable similar to Netfinity 2M Ultra2 SCSI Cable (P/N 03K9310).
- No external SCSI port is available on these systems. A supported optional controller must be installed. See the systems section to determine which controllers and external storage units are supported then refer back to this table for cable requirements using the controller row.
- Not supported for use in a rack. Rack installations require a minimum cable length of two meters.

Appendix E: IBM Serial I/O



IBM SERIAL I/O

Sample Configurations



37L1414	Serial I/O SST8P DB Adapter ^{1,6}
37L1415	Serial I/O SST16P RJ Adapter ^{2,6}
37L1423	Serial I/O SST16P DB Adapter ^{3,6}
37L1416	Serial I/O SST128P Expandable Adapter ^{4,6}
37L1417	Serial I/O PM16RJ Port Module ⁵
37L1418	Serial I/O PM16DB Port Module ⁵
37L1419	Serial I/O 16RJ Multiplexer Set ^{5,7}
37L1420	Serial I/O 16DB Multiplexer Set ^{5,7}
37L1421	Serial I/O PS4 Power Supply ⁵

- Intelligent serial I/O interface card providing eight DB-25 RS232 serial connections using an octopus cable. Support for all ports at 921.6Kbps simultaneously.
- Intelligent serial I/O interface card providing sixteen RJ-45 RS232 serial connections in a breakout box. Support for all ports at 115.2Kbps simultaneously.
- Intelligent serial I/O interface card providing sixteen DB-25 RS232 serial connections in a breakout box. Support for all ports at 115.2Kbps simultaneously.
- Intelligent interface card providing up to 128 RS232 serial connections (DB25 or RJ45) configured in 16-port increments utilizing any combination of Port Modules and Multiplexer Sets. Includes two 4ft (1.2m) bus cables. Each 4ft cable supports attachment of one to four Port Modules and/or Multiplexer Interface Units for a total of eight per adapter. The first Port Module or Multiplexer Set attached to a cable requires a Serial I/O PS4 Power Supply (P/N 37L1421). Support for all ports at 115.2Kbps simultaneously.
- Port Modules and Multiplexer Sets attach directly to one of the two standard 4ft (1.2m) bus cables of the Serial I/O SST128P Expandable Adapter (P/N 37L1416) or directly to one or more Port Modules or Multiplexer Sets already attached to one of the cables. A maximum of four Port Modules or Multiplexer Sets may be attached to a single cable. The first Port Module or Multiplexer Set attached to a cable requires a Serial I/O PS4 Power Supply (P/N 37L1421).
- Serial I/O Adapters are 32-bit PCI half length cards. A maximum of four Serial I/O adapters (in any combination) may be installed in a single host system.
- Requires a customer supplied Unshielded Two-Twisted Pair (Category 3 minimum) cable with a maximum length of 3,500ft (1Km).

System	IDE Connections				SCSI Connections										Media	Int RAID	
	1	CD-ROM	1-drop ³	-	1	U160	N	1	A	I	68-pin	1 NH/S SCSI HDD or open bay ⁵	2-drop	Y			1 NH/S HDD
x300 SCSI	1	CD-ROM	1-drop ³	-	1	U160	N	1	A	I	68-pin	1 NH/S SCSI HDD or open bay ⁵	2-drop	Y	1 NH/S HDD	-	Y
x330 IDE	1	CD-ROM	1-drop ³	-	-	-	-	-	-	-	-	-	-	-	-	-	N/A ¹⁶
	2	IDE HDD	2-drop	1 IDE HDD	-	-	-	-	-	-	-	-	-	-	-	-	-
x330 NH/S SCSI	1	CD-ROM	1-drop ³	-	1	U160	Y	1	A	I	68-pin	1 NH/S SCSI HDD	2-drop	Y	1 NH/S HDD	-	Y
x330 H/S SCSI	1	CD-ROM	1-drop ³	-	1	U160	Y	1	A	I	68-pin	H/S backplane	1-drop	N ⁸	-	-	Y
x342	1	CD-ROM	1-drop ⁴	-	1	U160	Y	2	A	I	68-pin	H/S backplane	1-drop	N ⁹	-	-	Y ¹⁸
	-	-	-	-	-	-	-	-	B	I	68-pin	media bays ⁷	2-drop	Y	2 HH or 1 FH tape	10K2340 ¹⁵	-
x350	1	CD-ROM	2-drop	-	1	U160	Y	2	A	I	68-pin	H/S backplane	1-drop	N ⁹	-	-	Y
	-	-	-	-	-	-	-	-	B	E	0.8mm VHDCI	ext SCSI device ²⁰	1-drop	N	-	-	-
x360	1	CD-ROM	1-drop ²²	-	1	U160	Y	1	A	I	Integrated	H/S backplane ²³	-	-	-	-	Y ²⁴
x370	1	CD-ROM	2-drop	-	1	U2	Y	2	A	I	68-pin	H/S backplane	1-drop	N ⁹	-	-	Y
	-	-	-	-	-	-	-	-	B	E	0.8mm VHDCI	ext SCSI device	-	-	-	-	-
x380	1	CD-ROM	1-drop	-	1	U160	Y	2	A	I	68-pin	H/S backplane	1-drop	N ⁹	-	-	Y
	2	LS-120	1-drop	-	-	-	-	-	B	E	0.8mm VHDCI	ext SCSI device	-	-	-	-	-
x440	1	CD-ROM	n/a ²⁹	-	1	U160	Y	2	A	I	68-pin	H/S backplane	1-drop	N ⁹	-	-	Y ²⁶
	2	FDD	n/a ²⁵	-	-	-	-	-	B	E	0.8mm VHDCI	ext SCSI device	-	-	-	-	-

1. IDE controllers have two channels, generally with one connector per channel. Standard IDE cables include two drops. Some IDE devices, e.g., a slim-line CD-ROM, use a single-drop ribbon cable, which is soldered to a backplane instead of using a connector at the device end of the cable.

2. The term drop refers to a device connector on a cable. The connector that attaches to the controller is not counted as a drop.

3. The cable is connected at one end to one of the channels (connectors) of the IDE controller, and at the other end it is soldered to a dedicated backplane.

4. The single-device cable is soldered to the CD-ROM backplane. In order to install one or two optional optical devices in vacant media bays, the two-drop cable included with the optional devices is connected to one connector of the IDE controller and one of the two drops connects to an optional device. The standard CD-ROM cannot be used when an optional device is installed in one or both media bays. A single optional device is configured as primary, and when two optional devices are installed, one must be configured as primary and the other as secondary (master and slave).

5. US models ship open bay. NH/S indicates nonhot-swap.

6. xSeries 250 includes a split backplane with five HDD bays each. Read the SCSI Cabling section in the x250 section for additional information.

7. Supports 3-Pack Ultra160 Hot-swap Expansion Kit (P/N 33L5050) that allows converting the two media bays to three hot-swap bays. Through the use of a repeater card provided with the option, the expansion backplane can be cabled as an extension of the standard backplane, or the expansion backplane can be cabled as an independent bus attached to either a separate channel of the storage controller to which the standard backplane is attached or to a different controller. If tape drives are installed in one or both media bays, an additional supported terminated SCSI cable is required.

8. Termination is provided by the hot-swap backplane.

9. An IDE tape drive uses an IDE cable attached to an IDE connector. Attaching a SCSI tape drive to the same SCSI bus as the HDDs may reduce performance. If the SCSI tape drive is an 8-bit device, the entire SCSI bus is limited to the speed of the tape drive. Slim-line tape drives may be supported in bay four.

10. Attaching a SCSI tape drive to the same SCSI bus as the HDDs may reduce performance. If the SCSI tape drive is an 8-bit device, the entire SCSI bus is limited to the speed of the tape drive.

Slim-line tape drives may be supported in bay four. (see the system Tape Options section).

11. An additional cable to connect SCSI devices installable in internal removable media bays to the standard SCSI storage controller may be required when the standard SCSI cable is used to connect an optional RAID adapter. The necessary cable is provided in the option specified in this column, or if one of the following tape drives is the media device being connected, a 42in terminated SCSI cable is now provided (as of March 1, 2002) with the tape option: 00N7990, 00N7991, 00N7992, 00N8015, 00N8016, 24P2396, 24P2398.

12. If installing an IDE tape drive, the standard IDE cable is used (maximum number of IDE optical drives or HDDs is reduced by one because only two IDE connectors are provided on each of the two IDE cables). If installing an internal SCSI device, a supported SCSI storage controller is required. The single-channel Ultra 160 SCSI adapter (P/N 19K4646) includes a 16-bit five-drop terminated multimode SCSI cable and a 0.8mm VHDCI external connector. The PCI Fast/Wide Ultra SCSI Adapter (P/N 02K3454) is also single-channel and includes a 16-bit four-drop terminated single-ended SCSI cable and a 68-pin external connector.



13. If installing an IDE tape drive, the second connector of the standard IDE cable can be used. If installing a SCSI device, one connector of the five-drop SCSI cable can be used, which may adversely affect performance for the entire SCSI bus. Installing the tape drive on an independent bus requires an optional controller (P/N 19K4646).
14. Half-high SCSI devices installed in the media bay (bay two) require an additional storage controller. A five-drop terminated multimode cable is provided with the single-channel Ultra160 SCSI adapter (P/N 19K4646).
15. Media bay attachment requires a supported cable such as the two-drop terminated LVD cable provided in the Media Bay Tray and LVD Cable Kit (P/N 102340). If one of the following tape drives is the media device being connected, a 42in terminated SCSI cable is now provided (as of March 1, 2002) with the tape option: 00N7990, 00N7991, 00N7992, 00N8015, 00N8016, 24P2396, 24P2398.
16. IDE models use the IDE RAID adapter (P/N 24P2585), which includes two 18in cables for connecting one IDE HDD to each of the two channels.
17. In nonhot-swap models, SCSI RAID adapters are connected to one end of the standard two-drop (x300) or five-drop (x200, x220 nonhot-swap) SCSI cable. When the standard cable is used to attach to the RAID adapter, media bay attachment to the standard SCSI controller for SCSI devices in the x200 and nonhot-swap models of the x220 require the two-drop terminated LVD cable provided in the Media Bay Tray and LVD Cable Kit (P/N 10K2340) unless one of the following tape drives is the media device being connected, which now includes a 42in terminated SCSI cable as of March 1, 2002: 00N7990, 00N7991, 00N7992, 00N8015, 00N8016, 24P2396, 24P2398.
18. SCSI RAID adapters are generally connected to the hot-swap backplane using the standard cable that connects the integrated storage controller. When the standard cable is used for RAID attachment, media bay attachment requires another supported cable, e.g., the two-drop terminated LVD cable provided in the Media Bay Tray and LVD Cable Kit (P/N 10K2340), unless one of the following tape drives is the media device being connected, which now includes a 42in terminated SCSI cable as of March 1, 2002: 00N7990, 00N7991, 00N7992, 00N8015, 00N8016, 24P2396, 24P2398.
19. Attachment of SCSI devices in either (or both) of the two available media bays requires a supported optional SCSI storage controller (P/N 19K4646) in non-RAID configurations. Two half-high or one full-high device may be installed. A two-drop SCSI cable is included with the server, which can be used to attach one or two internal tape options to the integrated controller when a ServeRAID adapter is used to support the hot-swap backplane.
20. The external connector is enabled by using the included cable to connect to channel B of the integrated controller. This channel can alternatively be used to connect to the optional hot-swap backplane included with the 3-Pack Ultra160 Hot-swap Expansion Kit (P/N 33L5050), which creates an independent bus for the additional three HDDs. Through the use of a repeater card provided with the option, the expansion backplane can be cabled as an extension of the standard backplane.
21. Attachment of tape or optical drives to RAID adapters is not supported.
22. The standard slim-line CD-ROM docks directly into a media interposer card that is routed through the lightpath card before terminating at the planar.
23. The hot-swap backplane is connected to the integrated controller through a SCSI bus integrated into the system planar.
24. Internal RAID configurations are supported by connecting an internal connector on the RAID controller to a connector on the planar located between slot one and the memory card using a dedicated RAID cable provided with the system. (Route cable underneath PCI adapters.) Note: If the hot-swap backplane is attached to a RAID adapter, a full-length adapter cannot be installed in slot one.
25. xSeries 440 ships with a slim-line UltraBay 2000 CD-ROM installed in bay 4 (lower right of four bays) and an UltraBay 2000 floppy disk drive (FDD) installed in bay three. An optional UltraBay 2000 CD-RW and high-density FDD are available. FDDs can be installed in bay three only, but optical devices can be installed in either bay. If only one optical device is installed, it must be located in bay four. If two are installed, the standard FDD is removed and the second device is installed in bay three configured as slave.
26. If a RAID adapter is attached to the hot-swap backplane, the standard SCSI cable is removed and a longer cable shipped with the system is connected to one of the internal connectors of the RAID adapter and to the hot-swap backplane connector.

For additional information, refer to the Internal SCSI Cabling and Tape Options sections for each system or to Appendix D: SCSI Cables - Storage Units - Controllers.







Appendix G: System Management Overview

IBM system management solutions allow you to run your business-critical applications using innovative hardware technology that prevents most outages and recovers rapidly from the few that do occur. This technology makes xSeries simpler to service and easier to manage.

This section shows the available range of standard and optional system management processors and describes the features and configuration process for each. This section further demonstrates how these service processors can be interconnected to form a communication network for alerting and monitoring a wide range of system functions and hardware conditions.

Key to abbreviations	
ASMP	Advanced System Management Processor
ISMP	Integrated System Management Processor
ASMA	Advanced System Management PCI Adapter (P/N 01K7209)
RSA	Remote Supervisor Adapter (P/N 09N7585)
ASMIC	Advanced System Management Interconnect Cable Kit (P/N 03K9309)

General Notes:

All descriptions of features and compatibility of ISMP described here require the use of firmware version 2 or newer. As of 01/01/02, all ISMPs ship standard with firmware version 2. Firmware updates may be found on the IBM Web site at the URL www.pc.ibm.com/qtechinfo/MIGR-4WEP53.html.

An advanced system management interconnect network is configured with at least one focal point (generally an ASMA or RSA in a server) that provides Ethernet LAN and serial connections for management and alerting, which are shared between all the members of an interconnect network.

Up to 24 ISMPs and/or RSAs may be interconnected in a single ASM interconnect network (including standard and optional processors).

Up to 12 ASMPs and/or ASMA may be interconnected in a single ASM interconnect network (including standard and optional processors). Up to 12 additional ISMPs and/or RSAs may be added to an ASM interconnect network containing 12 or less ASMPs and/or ASMA.

An ASM interconnect network may contain an aggregate connection length of no more than 91.4m (300ft).

A customer-supplied Cat5 Ethernet cable is required for each interconnection.

Connecting servers that do not have two external RS-485 ports as an ASM interconnect network requires Advanced System Management Interconnect Cable Kit (P/N 03K9309). RSA and ASMA do not include this option when shipped standard with a system.



System Management support by server

xSeries Server	Onboard		PCI Adapter		Cabling
	ASMP ¹¹	ISMP ¹¹	ASMA ^{13, 14, 20}	RSA ^{15, 16, 20}	ASMIC ¹⁸
x200 ²⁶	-	-		-	-
x220	-	-		optional ⁴	-
x230	standard ^{8, 10}	-	optional ^{9, 10}	-	optional ¹⁷
x232	-	standard ^{1, 12}	-	optional ^{5, 21}	-
x240	standard ^{8, 10}	-	optional ^{9, 10}	-	optional ¹⁷
x250	standard ^{1, 12}	-	optional ^{6, 22}	-	-
x300 ²⁶	-	-		-	-
x330	standard ^{1, 12}	-	optional ^{6, 22, 23}	optional ^{7, 24, 25}	-
x340	standard ^{8, 10}	-	optional ^{9, 10}	-	optional ¹⁷
x342	-	standard ^{1, 12}	-	optional ^{5, 21}	-
x350	standard ^{1, 12}	-	optional ^{6, 22}	-	-
x360	-	-	-	standard ³	optional ¹⁹
x370	-	-	standard ²	-	optional ¹⁹

1. This configuration is shown in interconnect scenario 1, appearing later in this section.
2. This configuration is shown in interconnect scenario 2, appearing later in this section.
3. This configuration is shown in interconnect scenario 3, appearing later in this section.
4. This configuration is shown in interconnect scenario 4, appearing later in this section.
5. This configuration is shown in interconnect scenario 5, appearing later in this section.
6. This configuration is shown in interconnect scenario 6, appearing later in this section.
7. This configuration is shown in interconnect scenario 7, appearing later in this section.
8. This configuration is shown in interconnect scenario 8, appearing later in this section.
9. This configuration is shown in interconnect scenario 9, appearing later in this section.
10. Connecting xSeries 230, 240 or 340 servers in an ASM interconnect network requires Advanced System Management Interconnect Cable Kit (P/N 03K9309).
11. This service processor is integrated into the system planar (onboard).
12. The system includes two external integrated RS-485 ports located on the rear of the chassis, which precludes the requirement for the ASMIC kit option.
13. This adapter cannot be the remote management focal point in an interconnect network containing an RSA. The ASMA PCI adapter is only used as the focal point when an RSA is not present (or not functioning) in the network. This is because the RSA is backwards-compatible with the ASMA, but the ASMA is not forwards-compatible with the RSA. The focal point must be the latest generation of service processor connected within the network.
14. Advanced System Management PCI Adapter (P/N 01K7209) includes the following: adapter card, dual serial cable, ASM interconnect dual pigtail cable, ASM interconnect single pigtail cable, internal ASM interconnect knockout cable, AC adapter and power cord, power cable with C13 connector for UPS attachment, and 1ft Cat5 cable. When ASMA is supplied standard (e.g., with xSeries 370), the optional ASM Interconnect Cable Kit (P/N 03K9309) is required in order to enable ASM interconnect.
15. RSA provides ASM Web interface using HTTP protocol; SNMP, DNS, PPP and DHCP network support; E-mail alerting; full remote graphical console redirection; "blue screen" error information capture for Windows NT and 2000; and network flashing of host firmware for system BIOS and Advanced System Management firmware.
16. Remote Supervisor Adapter (P/N 09N7585) includes the following: adapter card, 20-pin ribbon power cable, AC power adapter, power cable, power cable for UPS attachment, single pigtail cable, RS-485 terminator and 1ft Cat5 cable. When RSA is shipped standard (e.g., with xSeries 360), optional ASM Interconnect Cable Kit (P/N 03K9309) is required to enable ASM interconnect.
17. Advanced System Management Interconnect Cable Kit is not required for servers with built-in RS-485 interconnect ports or for servers with optional Advanced Systems Management PCI Adapter (P/N 01K7209) or Remote Supervisor Adapter (P/N 09N7585).
18. Advanced Systems Management Interconnect Cable Kit (P/N 03K9309) includes an internal ASM interconnect knockout cable, an ASM interconnect single pigtail cable and RS-485 terminator.
19. Required to connect the standard adapter to other servers in an interconnect network.
20. Adds alternate Ethernet LAN and serial connections for support when the operating system is not available.
21. When RSA is installed in an xSeries 232 or 342, the onboard service processor is disabled.
22. When ASMA is installed in this system, the optional adapter serves only as an Ethernet and interconnect gateway. The onboard ASM processor will provide all service processor data.
23. Supported only in the 8654 models of x330 systems.
24. When installing in xSeries 330 machine type 8654 models, do not use the 20-pin cable provided with the option. Connect to the external AC power supply that is provided with the option. When installing in xSeries 330 machine type 8674 models, install the 20-pin cable to provide the adapter with power. The AC power supply then becomes optional and provides redundant power to the adapter.
25. When RSA is installed in this system, the optional adapter serves only as an Ethernet and interconnect gateway. The onboard ASM processor will provide all service processor data.
26. These xSeries servers support system management via IBM Director only, without ASM interconnect support.



System Management Comparison

Feature/Function	Onboard		PCI Adapter	
	ASMP	ISMP ¹	ASMA ²	RSA ^{2, 3, 4}
Monitoring & Alerting				
Automatic server shutdown/restart	yes	yes	yes	yes
Environmental monitors (temperature, voltage)	yes	yes	yes	yes
Interface with Light Path Diagnostics	yes	yes	yes	yes ⁵
PFA on system components (fans, power supplies, memory, etc.)	yes	yes ⁶	yes	yes
Post, loader, OS timeouts	yes	yes	yes	yes
Alert Mechanisms				
Pager (numeric/alphanumeric) ⁷	yes	no	yes	yes
Director via LAN	yes	yes ⁹	yes	yes
Director via serial ⁸	yes	no	yes	yes
E-mail	no	no	no	yes
Generate SNMP traps	yes ⁹	yes ⁹	yes	yes
Management				
Remote BIOS and SP firmware update ¹⁰	yes	no	yes	yes ¹¹
Remote GUI-mode control	no	no	no	yes ^{5, 12}
Remote text-mode control	yes	no	no	yes
Remote POST and diagnostics ¹⁰	yes	no	yes	yes ^{13, 14}
View status logs	yes	no	yes	yes
View vital product data	yes	no	yes	yes
Capture Windows blue screens	no	no	no	yes ¹²
View SP configuration	no	no	yes	yes
Set SP configuration	no	no	no	yes ¹¹
Save and restore SP configuration	no	no	no	yes ¹²
Restart SP	no	no	yes	yes
Connectivity & Cabling				
IBM Director ¹⁵	yes	yes	yes	yes
ANSI terminal ⁸	yes	no	yes	yes
Telnet	yes ¹⁶	no	yes	yes
Web interface	yes ¹⁶	no	yes	yes
10/100 Ethernet	yes ¹⁷	no	yes	yes
DHCP	no	no	no	yes
DNS	no	no	no	yes
PPP ⁷	no	no	no	yes
Dedicated serial port	yes	no	dual ¹⁸	yes
Shared serial port	yes	no	dual ¹⁸	no
Redundant external power	no	no	yes	yes

1. This table is correct only for ISMP firmware v2 or newer. Systems shipped after 01/01/02 include v2 firmware. Firmware updates are available on the Web at the URL www.pc.ibm.com/qtechinfo/MIGR-4WEP.html.

2. When either RSA or ASMA are integrated as a standard adapter in an xSeries server (e.g., x360 or x370), the two interconnect cables, external power supply and power cords provided with the optional packages are not included.

3. When an optional RSA (P/N 09N7585) is installed in a system with standard ISMP, the optional adapter disables the onboard service processor and assumes all system management functionality.

4. When an optional RSA (P/N 09N7585) is installed in a system with standard ASMP the optional adapter serves only as an Ethernet and interconnect gateway. The onboard ASMP provides all service processor data.

5. Not available when RSA is added as an option to systems with standard ASMP (e.g., x330).

6. Performs monitoring capability only. Automatic alerting available through IBM Director only.

7. Requires customer-supplied external modem.

8. Requires customer-supplied external modem or null-modem cable.

9. The specified alerting mechanisms may be configured, but sending such alerts to their destination requires connection through an RSA or ASMA either within the local machine or via the interconnect network.

10. Requires an out-of-band connection such as serial, Ethernet or ASM interconnect network (out-of-band connections bypass the NOS and are established even when the NOS is not functioning).

11. Only available through the Web interface, over an Ethernet or through a PPP connection.

12. Only available through the Web interface, Telnet or an Ethernet connection.

13. Not available via interconnect network.

14. Not available on systems in which an optional RSA is the only installed adapter (e.g., x220).

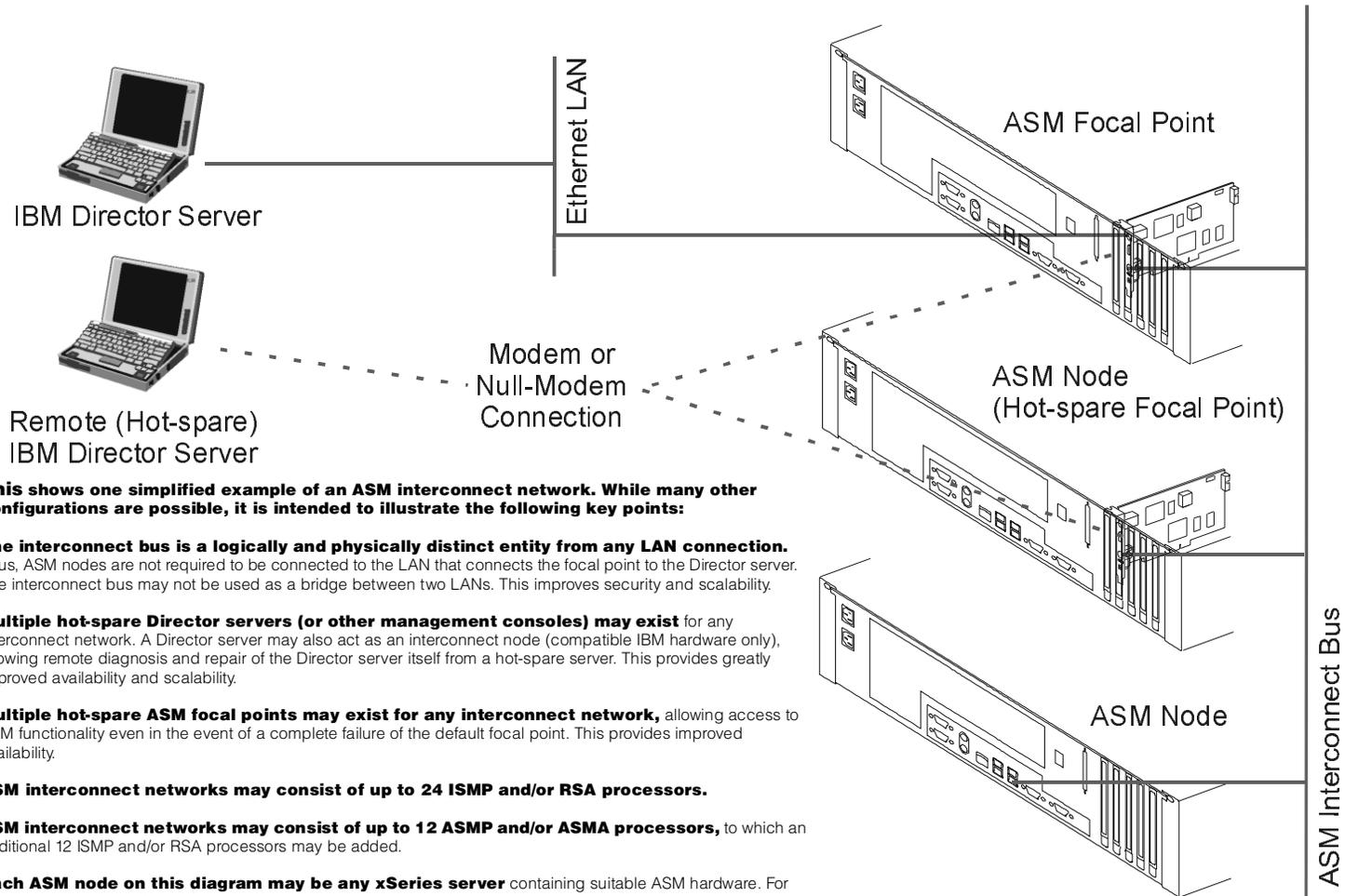
15. Connection to IBM Director allows use of all management and alerting functionality (except "save and restore configuration file") via an active in-band, out-of-band or interconnect network connection.

16. Connection using Telnet, Web interface or Ethernet is available via an RSA or ASMA through the interconnect network.

17. Requires interconnection of onboard processor to optional ASMA or RSA using an ASM Interconnect Cable Kit (P/N 03K9309).

18. Requires the use of the included serial port splitter cable.

Sample ASM Interconnect Network Schematic



This shows one simplified example of an ASM interconnect network. While many other configurations are possible, it is intended to illustrate the following key points:

The interconnect bus is a logically and physically distinct entity from any LAN connection. Thus, ASM nodes are not required to be connected to the LAN that connects the focal point to the Director server. The interconnect bus may not be used as a bridge between two LANs. This improves security and scalability.

Multiple hot-spare Director servers (or other management consoles) may exist for any interconnect network. A Director server may also act as an interconnect node (compatible IBM hardware only), allowing remote diagnosis and repair of the Director server itself from a hot-spare server. This provides greatly improved availability and scalability.

Multiple hot-spare ASM focal points may exist for any interconnect network, allowing access to ASM functionality even in the event of a complete failure of the default focal point. This provides improved availability.

ASM interconnect networks may consist of up to 24 ISMP and/or RSA processors.

ASM interconnect networks may consist of up to 12 ASMP and/or ASMA processors, to which an additional 12 ISMP and/or RSA processors may be added.

Each ASM node on this diagram may be any xSeries server containing suitable ASM hardware. For more information about cabling and configuration issues relating to each server, see the scenarios in this appendix.

For more detailed information on specific system management capabilities and configurations, see the cabling scenarios and service processor comparison tables in this appendix.



1. Server with ASMP or ISMP and two integrated RS-485 ASM interconnect ports on the rear of the chassis

Key Features:

Allows standard system management functionality, including remote flash update of BIOS and adapter microcode, remote hardware diagnostics, and monitoring and alerting of critical voltage and temperature thresholds.

Remote BIOS update only available on ASMP.

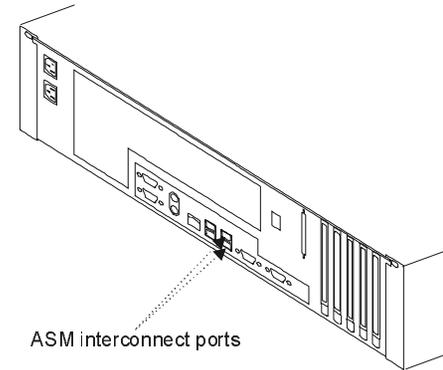
Only includes ISMP with firmware v2 or later.

Servers:

xSeries 232, 250, 330, 342, 350

Instructions:

1. Attach customer-supplied Cat5 cables (for connection to one or two other ASM interconnect nodes) to the integrated RS-485 ASM interconnect ports at the rear of the server. Unused RS-485 ASM ports must be terminated with the supplied RS-485 terminator.



2. Server with standard ASMA

Key Features:

xSeries 370 ships standard with ASMA, which provides all basic system management functionality including remote management via Telnet or a Web interface.

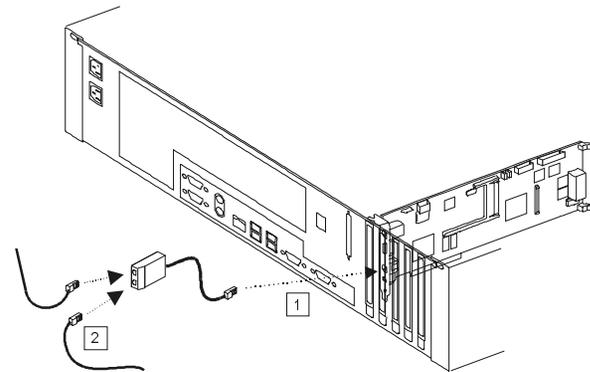
Requires purchase of ASM Interconnect Cable Kit (P/N 03K9309).

Servers:

xSeries 370

Instructions:

1. Insert pigtail cable into RS-485 ASM interconnect port on adapter panel.
2. Attach customer-supplied Cat5 cables (for connection to one or two other ASM interconnect nodes) to the integrated RS-485 ASM interconnect ports of the pigtail adapter. Unused RS-485 ASM ports must be terminated with the supplied RS-485 terminator.



3. Server with standard RSA

Key Features:

xSeries 360 ships standard with RSA, which provides the latest generation of system management functionality. In addition to standard system management capabilities, RSA adds advanced features such as full remote operation of server NOS, advanced Ethernet features and system management access even in the event of a complete server NOS failure.

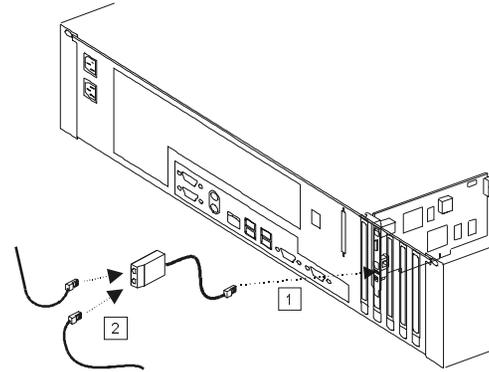
Requires purchase of ASM Interconnect Cable Kit (P/N 03K9309).

Servers:

xSeries 360

Instructions:

1. Insert pigtail cable into RS-485 ASM interconnect port on rear of adapter.
2. Attach customer-supplied Cat5 cables (for connection to one or two other ASM interconnect nodes) to the RS-485 ASM interconnect ports of the pigtail adapter. Unused RS-485 ASM ports must be terminated with the supplied RS-485 terminator.



4. Server with no standard service processor and optional RSA

Key Features:

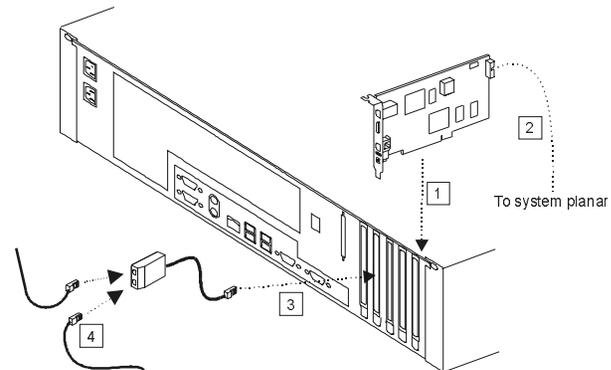
xSeries 220 ships standard without system management capability. To enable system management, an optional Remote Supervisor Adapter (P/N 09N7585) is required.

Servers:

xSeries 220

Instructions:

1. Insert RSA into PCI slot on system planar (see system I/O section for slot restrictions).
2. Connect 20-pin RSA planar hook-up cable between system planar and connector on RSA adapter.
3. Insert pigtail cable into RS-485 ASM interconnect port on adapter panel.
4. Attach customer-supplied Cat5 cables (for connection to one or two other ASM interconnect nodes) to the RS-485 ASM interconnect ports of the pigtail adapter. Unused RS-485 ASM ports must be terminated with the supplied RS-485 terminator.



5. Server with ISMP plus optional RSA

Key Features:

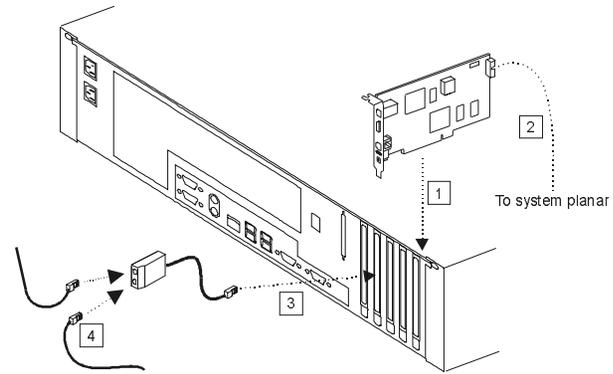
Adding an RSA to a server containing an ISMP disables the ISMP. The RSA takes over the system management role, providing a full complement of latest generation system management functionality.
Only applicable to ISMP with firmware v2 or later.

Servers:

xSeries 232, 342

Instructions:

1. Insert RSA into PCI connector on System Planar (see system I/O section for slot restrictions).
2. Connect 20-pin RSA planar hook-up cable between system planar and connector on RSA adapter.
3. Insert pigtail cable into RS-485 ASM interconnect port on adapter panel.
4. Attach customer-supplied Cat5 cables (for connection to one or two other ASM interconnect nodes) to the RS-485 ASM interconnect ports of the pigtail adapter. Unused RS-485 ASM ports must be terminated with the supplied RS-485 terminator.



6. Server with standard ASMP and two integrated RS-485 ASM interconnect ports on the rear of the server chassis, into which an ASMA is installed

Key Features:

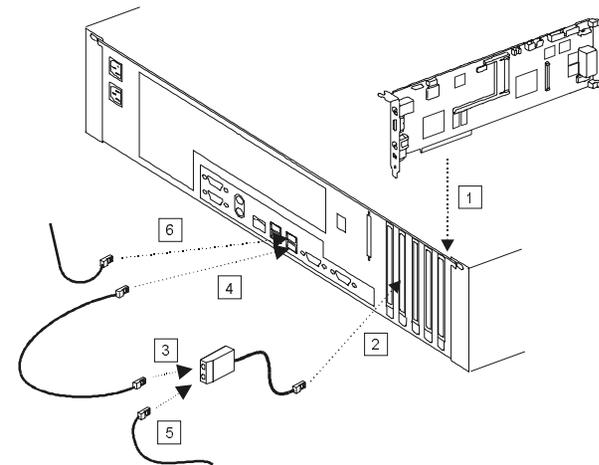
Adding an ASMA to a server containing an ASMP enables the ASMP to access the additional communication methods available on ASMA hardware. The ASMP retains full control of the system management role, with the ASMA acting as a gateway between system management and Ethernet. Requires purchase of optional ASM PCI Adapter (P/N 01K7209).

Servers:

xSeries 250, 330 (8654-xxx models only), 350

Instructions:

1. Install ASMA into PCI slot on system planar (see system I/O section for slot restrictions).
2. Plug the pigtail adapter into the RS-485 interconnect port of the ASMA.
3. Attach one end of the 1ft Cat5 cable (included with the ASMA option) to one of the RS-485 interconnect ports of the pigtail cable.
4. Attach the other end of the included 1ft Cat5 cable to one of the RS-485 interconnect ports built into the chassis.
5. Attach the customer-supplied Cat5 ASM interconnect cable into the other RS-485 ASM interconnect port of the pigtail cable.
6. If interconnection to a second ASM interconnect node is required, plug a second ASM interconnect cable into the available integrated RS-485 ASM interconnect port at the rear of the chassis. Otherwise, the second RS-485 port should be terminated using the supplied RS-485 terminator.



7. Server with standard ASMP and two integrated RS-485 ASM interconnect ports on the rear of the server chassis, into which an RSA is installed

Key Features:

Adding an RSA to a server containing an ASMP enables the ASMP to access the additional communication methods available on RSA hardware. The ASMP retains full control of the system management role, with the RSA acting as a gateway between system management and Ethernet.

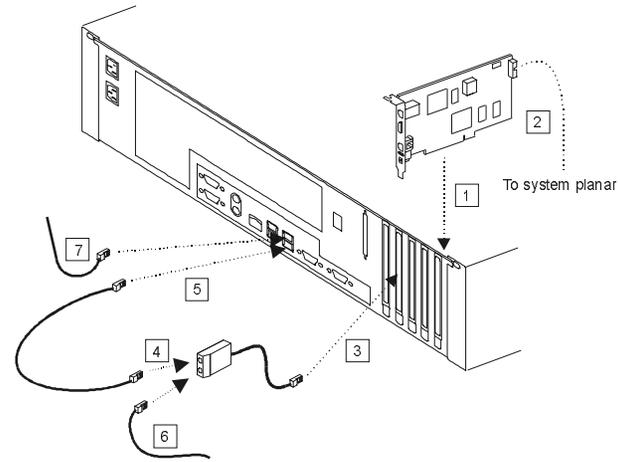
Requires purchase of optional Remote Supervisor Adapter (P/N 09N7585).

Servers:

xSeries 330 (except 8654-xxx models)

Instructions:

1. Connect the RSA in a compatible PCI slot on the planar.
2. Connect 20-pin RSA planar hook-up cable between system planar and connector on RSA adapter (not required for machine type 8675 models).
3. Plug the pigtail adapter into the RS-485 interconnect port of the RSA.
4. Attach one end of the 1ft Cat5 cable (included with the RSA option) to one of the RS-485 interconnect ports of the pigtail cable.
5. Attach the other end of the included 1ft Cat5 cable to one of the RS-485 interconnect ports built into the chassis.
6. Plug one ASM interconnect cable into the available RS-485 ASM interconnect port of the pigtail cable.
7. If interconnection to a second ASM interconnect node is required, plug a second ASM interconnect cable into the available integrated RS-485 ASM interconnect port at the rear of the chassis. Otherwise, the second RS-485 port should be terminated using the supplied RS-485 terminator.



8. Server with ASMP and no standard RS-485 ports

Key Features:

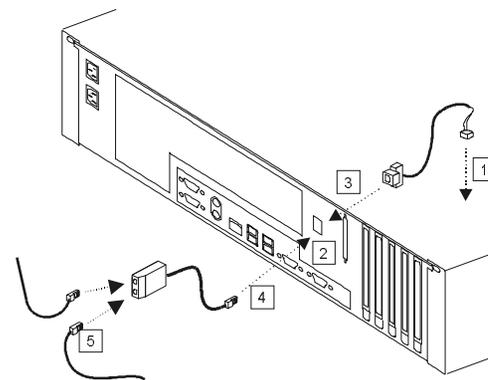
Enables basic ASM functionality for certain legacy systems
Requires purchase of ASM Interconnect Cable Kit (P/N 03K9309).

Servers:

xSeries 230, 240, 340

Instructions:

1. Connect interconnect knockout cable to the ASMP connector on the system planar.
2. Create knockout space on rear of system chassis.
3. Fix knockout fitting into place.
4. Plug single pigtail cable into knockout cable port.
5. Attach customer-supplied Cat5 cables (for connection to one or two other ASM interconnect nodes) to the RS-485 ASM interconnect ports of the pigtail adapter. Unused RS-485 ASM ports must be terminated with the supplied RS-485 terminator.



9. Server with ASMP and no standard RS-485 ports into which an optional ASMA is installed

Key Features:

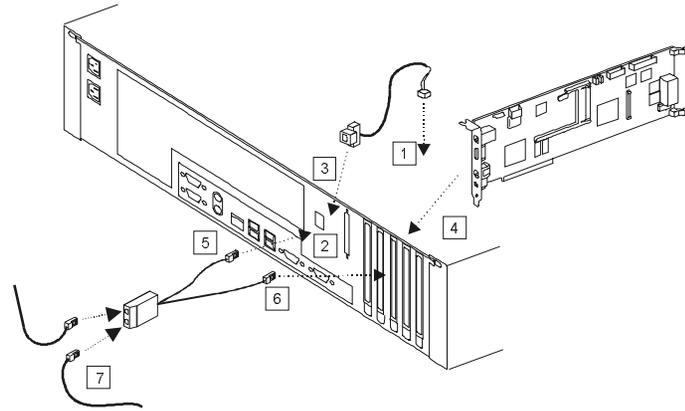
Enables basic ASM functionality with improved connectivity for certain legacy systems.

Servers:

xSeries 230, 240, 340

Instructions:

1. Connect interconnect knockout cable to the ASMP connector on the system planar.
2. Create knockout space on rear of system chassis.
3. Fix knockout fitting into place.
4. Insert ASMA into PCI slot on system planar.
5. Plug one pigtail cable into knockout cable port.
6. Plug other pigtail cable into the RS-485 interconnect port of ASMA.
7. Attach customer-supplied Cat5 cables (for connection to one or two other ASM interconnect nodes) to the RS-485 ASM interconnect ports of the pigtail adapter. Unused RS-485 ASM ports must be terminated with the supplied RS-485 terminator.





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