October 2, 2001

IBM

United States

configuration and options guide

eserver **xSeries servers**

IntelliStation workstations

Storage enclosures

Fibre Channel solutions

Options

IBM Server Proven

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

Table of Contents

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		
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	ibm_netfinity_rack_configurator@vnet.ibm.com	E-mail
PCSales Guide/Configurator and WorkPad Pricer (Updated weekly or biweekly)		
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 2
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 2
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
OrderBUILDER[1] (updated weekly)		
Business Partners	Marketing Essentials in ePartner	See footnote 2
IBM Employees	Marketing Essentials in PartnerInfo	By Brand category --> IBM Netfinity or By Brand category --> PC Configurator
Feedback	laconfig@us.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 2
IBM Employees	Marketing Essentials in PartnerInfo	By Brand category --> IBM Netfinity or By Brand category --> PC Configurator

1. OrderBUILDER has features that are unique to a geographical region and should be downloaded from a source intended for use in that region.
2. 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.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.

See Next Page for United States and Additional URLs

United States

Audience	Where to go	How to get
IBM xSeries Configuration and Options Guide		
Customers	www.pc.ibm.com/us/eserver/xseries/library	Select "Configuration Tools"
Business Partners	www.pc.ibm.com/partner/us/	Select Marketing --> 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
OrderBUILDER[1] (updated bi-weekly)		
Customers	www.pc.ibm.com/us/orderbuilder	
Business Partners	www.pc.ibm.com/partner/us	Select Sales Tools, then OrderBUILDER. User ID and Password required.
IBM Employees	PC Marketing Essentials (US) on Lotus Notes database D04DB014	Main menu --> Configurators
Feedback	pcconfig@us.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

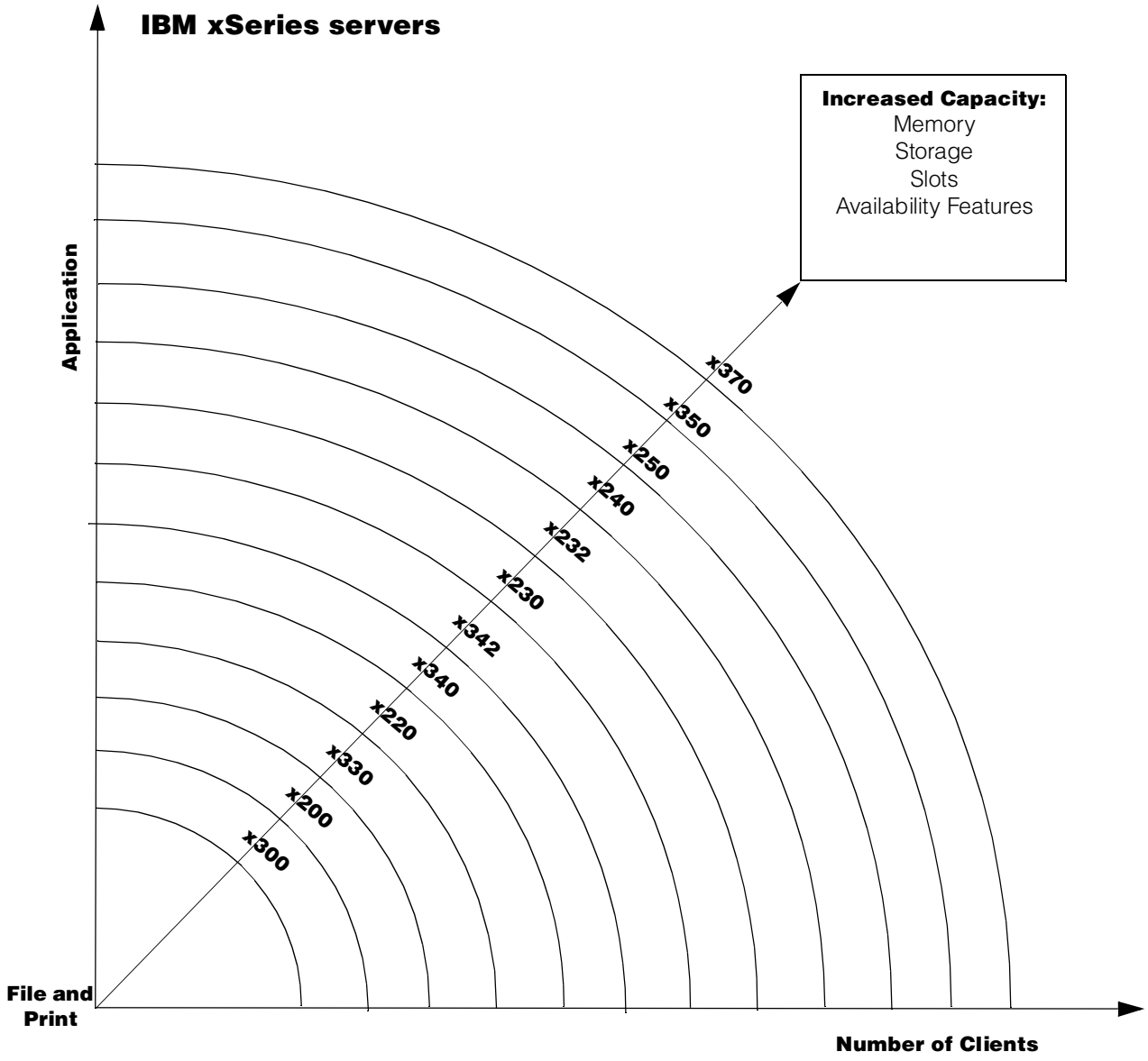
Audience	Where to go	How to get
Technical spec sheets (PSREF)	www.ibm.com/us/eserver/xseries/library	Select "Technical spec sheets (PSREF)"
IBM Datacenter Solutions	www.developer.ibm.com/xseries/index.html	Under "News" select "Solutions Library." Under "Most Popular Solutions" select "Windows 2000 Datacenter Server"
Clustering (US, LA)	www.pc.ibm.com/ww/eserver/xseries/clustering/index.html	Select desired category or Server
Clustering (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 3.0 or 4.0	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.

1. OrderBUILDER has features that are unique to a geographical region and should be downloaded from a source intended for use in that region.

The use of this information or the implementation of any of these techniques is a customer responsibility and depends on the customer's ability to evaluate and integrate them into the customer's operational environment. While each item may have been reviewed by IBM for accuracy in a specific situation, there is no guarantee that the same or similar results will be obtained elsewhere. Customers attempting to adapt these techniques to their own environments do so at their own risk.

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 **Compaq**: ProLiant 8000, ML750 **Dell**: No Offering **HP**: NetServer LH 6000, LT6000R	**IBM**: xSeries 370 **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 **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 230, 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 340, 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

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/ww/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 1.26GHz/512KB**	**xSeries 300 Uni-Pentium III 1GHz/256KB**	**xSeries 330 Dual Pentium III 1.26GHz/512KB**
DB Transaction Processing Select, Update and Delete; Does not include image or Decision Support	**# Users**	**1500**	**1970**	**1500**	**2110**
	# Processors	1	2	1	2
	Memory	1.5GB	2GB	1.5GB	2GB
	# Hard Disk Drives	12 to 18	40 to 50	12 to 20	36 to 48
	# RAID Adapters	≥1	≥2	1	≥2
	# Network Connections	1	1	1	1
File and Print Application is stored locally. (For server stored applications - cut number of users in half).	**# Users**	**800**	**1000**	**800**	**2100**
	# Processors	1	2	1	2
	Memory	1. 5GB	2GB	1.5GB	2GB
	# Hard Disk Drives	5 to 10	4 to 8	5 to 10	20 to 30
	# RAID Adapters	≥1	1	1	1 to 2
	# 100Mbps Ethernet Connections	≥2	2	2	4
Lotus® Notes® 10% Power Users 40% Mail 50% Mail & DB	**# Users**	**900**	**1180**	**900**	**1950**
	# Processors	1	1	1	2
	Memory	1.5GB	2GB	1.5GB	2GB
	# Hard Disk Drives	5 to 10	10 to15	5 to 10	20 to 30
	# RAID Adapters	≥1	1	1	1 to 2
	# Network Connections	≥1	≥2	≥2	≥2
Microsoft® Exchange Server 2000 100% Med Usersl 30MB Mailbox	**# Users**	**1600**	**3750**	**1600**	**5000**
	# Processors	1	2	1	2
	Memory	1GB	1GB	1GB	2GB
	# Hard Disk Drives	9	10	10 to 14	10
	# RAID Adapters	1	≥1	1	1
	# Network Connections	≥1	≥1	≥2	≥2
SAP 3-Tier Distributed Ver 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**	**160**
	# Processors	1	1	1	2
	Memory	1GB	1GB	1GB	1GB
	# Hard Disk Drives	12	12	12	12 to 24
	# RAID Adapters	≥1	≥1	≥1	≥1
	# Network Connections	1	1	1	1
High Availability Features	Hot-Swap HDD Bays	-	-	-	X
	Hot-Plug PCI Slots	-	-	-	-
	Hot-Swap Power	-	-	-	-
	Hot-Swap Fans	-	-	-	-
	RAID	Opt	Opt	Opt	Opt
	Clustering Support	-	-	-	-
	Sys Mgt Processor	-	Opt	-	-
Other Distinquishing Features	Max # Processors	1	2	1	2
	Max Memory	1.5GB	4GB	1.5GB	4GB
	Max Int Storage	293.6GB[2]	293.6GB	72.8GB	146.8GB
	Max Int Storage with Int Tape Drive	293.6GB	293.6GB	-	-
	Available PCI Slots	5	5	1	2
	19in Rack Models	-	-	X	X
	NetBAY3x Support	-	-	-	-

IBM xSeries Selection Guide

Application/ Expectation of Maximum # of Users		xSeries 340 Dual Pentium III 1GHz/ 256KB	xSeries 342 Dual Pentium III 1.26GHz/ 512KB	xSeries 230 Dual Pentium III 1GHz/ 256KB	xSeries 232 Dual Pentium III 1.26GHz/ 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 370 Eight-Way Pentium III Xeon 900MHz/ 2MB
DB Transaction Processing Select, Update and Delete; Does not include image or Decision Support	**# Users**	**2530**	**3570**	**2530**	**3570**	**2530**	**7030**	**7030**	**11300**
	# Processors	2	2	2	2	2	4	4	8
	Memory	4GB	4GB	4GB	4GB	4GB	4GB	4GB	4GB
	# Hard Disk Drives	30 to 50	50 to 70	30 to 50	50 to 70	30 to 50	80 to 140	80 to 140	180 to 250
	# RAID Adapters	≥2	≥2	≥4	≥2	≥4	≥4	≥4	≥5 or Fibre
	# Network Connections	1 to 2	1 to 2	1 to 2	1 to 2	1 to 2	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**	**2100**	**2300**	**2100**	**2300**	**2100**	**5000**	**5000**	**6000**
	# Processors	2	2	2	2	2	2	2	3 to 4
	Memory	2GB	2GB	2GB	2GB	2GB	2 to 4GB	2 to 4GB	4GB
	# Hard Disk Drives	20 to 30	20 to 30	20 to 30	20 to 30	20 to 30	50 to 90	50 to 90	75 to 150
	# RAID Adapters	1 to 2	1 to 2	1 to 2	1 to 2	1 to 2	≥4	≥4	≥4 or Fibre
	# 100Mbps Ethernet Connections	4	4 or 1Gb	4	4 or 1Gb	4	8	8	10
Lotus Notes 10% Power Users 40% Mail 50% Mail & DB	**# Users**	**2200**	**3100**	**2200**	**3100**	**2200**	**4615**	**4615**	**7335**
	# Processors	2	2	2	2	2	4	4	8
	Memory	2 to 3GB	3GB	2 to 3GB	3GB	2 to 3GB	3GB	3GB	4GB
	# Hard Disk Drives	20 to 30	20 to 30	20 to 30	20 to 30	20 to 30	20 to 30	20 to 30	30 to 40
	# RAID Adapters	1 to 2	1 to 2	1 to 2	1 to 2	1 to 2	2 to 3	2 to 3	≥3
	# Network Connections	≥2	≥3	≥2	≥3	≥2	≥3	≥3	≥4
Microsoft Exchange Server2000 100% Med Users 30MB Mailbox	**# Users**	**4500**	**5250**	**4000**	**5250**	**4250**	**7250**	**8000**	**9000**
	# Processors	2	2	2	2	2	4	4	8
	Memory	2GB	4GB	2GB	4GB	2GB	≥3GB	3GB	4GB
	# Hard Disk Drives	9	6	12	9	12	30 to 40	30	40 to 50
	# RAID Adapters	1	1	1	1	2	≥2	2	≥3
	# Network Connections	≥1	≥1	≥1	≥1	≥1	≥2	≥2	≥2
SAP 3-Tier Distributed Ver 4.x Processing Sales and Distribution Application (Minimum of 16-20 Servers)	**# Users**	**-**	**-**	**2790**	**-**	**2800**	**4000**	**4000**	**6400**
	# Processors	-	-	2	-	2	4	4	8
	Memory	-	-	1 to 2GB	-	1 to 2GB	≥4GB	≥4GB	≥4GB
	# Hard Disk Drives	-	-	24 to 36	-	24 to 36	48 to 60	48 to 60	48 to 60
	# RAID Adapters	-	-	≥2	-	≥2	≥3	≥3	≥3
	# Network Connections	-		1	-	1	1	1	1
SAP Central Version 4.x Processing Sales and Distribution Application (One Server)	**# Users**	**160**	**-**	**162**	**-**	**180**	**300**	**300**	**480**
	# Processors	2	-	2	-	2	4	4	8
	Memory	1GB	-	1 to 2GB	-	1 to 2GB	≥2GB	≥2GB	≥4GB
	# Hard Disk Drives	12 to 24	-	12 to 24	-	12 to 24	24 to 36	24 to 36	24 to 36
	# RAID Adapters	≥1	-	≥1	-	≥1	≥2	≥2	≥2
	# Network Connections	1	-	1	-	1	1	1	1
High Availability Features	Hot-Swap HDD Bays	X	X	X	X	X	X	X	X
	Hot-Plug PCI Slots	-	-	-	-	X	X	X	X
	Hot-Swap Power	X	X	Opt	X	X	X	X	X
	Hot-Swap Fans	X	X	-	-	X	X	X	X
	RAID	Opt	Opt	Opt	Opt	Opt	Opt	Opt	Opt
	Clustering Support	X	X	X	X	X	X	X	X
	Sys Mgt Processor	X	X	X	X	X	X	X	X
Other Distinquishing Features	Max # Processors	2	2	2	2	2	4	4	8
	Max Memory	4GB	4GB	4GB	4GB	4GB	16GB	16GB	32GB
	Max Int Storage	440.4GB	440.4GB	440.4GB	660.6GB	440.4GB	734GB	440.4GB	146.8GB
	Max Int Storage with Int Tape Drive	220.2GB	220.2GB	440.4GB	660.6GB	440.4GB	734GB	-	-
	Available PCI Slots	5	5	5	5	5	6	6	12
	19in Rack Models	X	X	X	X	X	X	X	X
	NetBAY3x Support	-	-	-	-	-	X	-	X[3]

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 (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													
6850-10U[1]	1.5GHz	1/2	256	256MB/4GB	Matrox Millennium G450	Tower	10/100	IDE[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	IDE[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	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	IDE[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	Fire GL4	Tower	10/100	U160[3]	3/1	18.2GB/ 440.4GB[5]	48X-20X	9/6	6/4

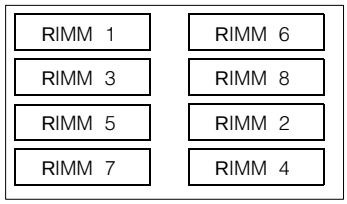
1. IntelliStation M Pro ships with a keyboard and mouse. See "Power, Monitors and Accessories" for a list of compatible monitors. Tower models are rack-mountable using an optional tower-to-rack conversion kit, or they can be turned on the side and installed as desktop units capable of supporting the weight of a monitor.
2. Intel Xeon™ processor with advanced transfer ECC L2 cache and 4 X 100MHz Front Side Bus (FSB).
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 and an integrated Ultra160 SCSI controller with one internal and one external port. Both ports are 68-pin, 16-bit Ultra160 (LVD) connectors. The external port supports external Ultra160 SCSI storage devices and the internal port supports up to six SCSI HDDs in SCSI models. Mixing of IDE and SCSI HDDs is not supported.
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. 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 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

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 Hard Disk Drive (HDD) Storage

SCSI Models				
Total Int Storage[1]	10,000RPM HDDs			15,000RPM HDDs
	18.2GB 00N8208	36.4GB 00N8209	73.4GB 06P5752	18.2GB 19K0658
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	-	-
145.6GB	3	2	-	-
163.8GB	2	3	-	-
182GB	1	4	-	-
200.2GB	-	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 Storage[1]	**7200RPM EIDE HDDs[2]**	
	40GB (P/N 22P7157)	**60GB (P/N 09N4207)**
40GB	Std on EIDE models	-
80GB	1	-
100GB	-	1
120GB	2	-
160GB	3	-
220GB[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.

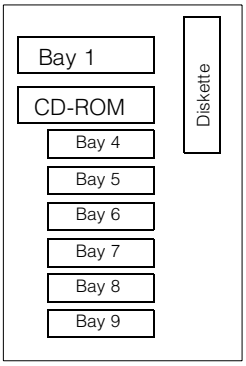
1. Select a total storage row then add the quantity of HDDs to the standard HDD.
2. Supports a maximum of four IDE devices including CD-ROM drives, HDDs and IDE tape drives.
3. Requires replacing the standard HDD.
4. Requires replacing the standard HDD and disconnecting the CD-ROM.

Bay	Form Factor	Height	Front Access	Usage
1	133mm (5.25in)	HH	Yes	open[1]
2	133mm (5.25in)	HH	Yes	CD-ROM
3	89mm (3.5in)	SL	Yes	Diskette
4 … 8	89mm (3.5in)	SL	Yes	open[2]
9	89mm (3.5in)	SL	Yes	Std HDD[3]

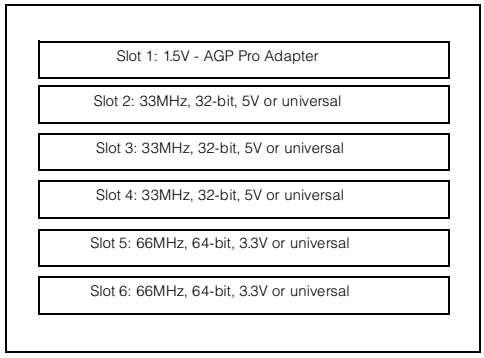
1. Supports removable media devices only. Hard disk drives are not supported.
2. Maximum of six SCSI HDDs supported in SCSI models and a maximum of three IDE HDDs supported without disconnecting the CD-ROM drive in IDE models.
3. The standard IDE HDD is installed in bay five in IDE models.

Part Number	Description	RPM	Height	Bays Supported[3]	Max Qty
IDE HDD[1, 2]					
22P7157	40GB 7200rpm ATA-100 (EIDE) HDD	7200	SL	4 … 9	4
09N4207	60GB 7200rpm ATA-100 (EIDE) HDD	7200	SL	4 … 9	4
Ultra160 HDDs[2, 4]					
00N8208	18.2GB 10,000rpm Ultra160 SCSI HDD	10000	SL	4 … 9	6
00N8209	36.4GB 10,000rpm Ultra160 SCSI HDD	10000	SL	4 … 9	6
19K0658	18.2GB 15,000rpm Ultra160 SCSI HDD	15000	SL	4 … 9	6
06P5752	73.4GB 10Krpm Ultra160 SCSI SL HDD	10000	SL	4 … 9	6
Optical Devices					
10K3785	12X-8X-32X Black Internal CD-RW Drive[5]	-			
22P6950	16X Max RAM-Read DVD-ROM Drive[5]	-			
10K3561	9.4/4.7GB IDE DVD-RAM Drive, stealth black[5]	-			
10K3782	48X-20X IDE CD-ROM[5]	-			

1. IDE models support a maximum of four IDE devices including CD-ROM drives, IDE hard disk drives and IDE tape drives.
2. Mixing of IDE and SCSI hard disk drives is not supported.
3. Standard HDD installed in bay nine for SCSI models and bay five for IDE models.
4. SCSI models support a maximum of six SCSI HDDs.
5. 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.



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 Controllers[4]			
19K4646	PCI Wide Ultra160 SCSI Adapter[5]	Half	32-bit	2 … 6
37L6091	ServeRAID-4L Ultra160 SCSI Controller[6]	Full	64-bit	2 … 6
06P5740	ServeRAID-4Lx Ultra160 SCSI Controller[7]	Half	64-bit	2 … 6
24P2585	IDE 100 RAID Controller by AMI[8]	Half	32-bit	2 … 6
	Networking[9]			
	Ethernet[10]			
09N3601	10/100 EtherLink PCI Management Adapter by 3Com	Half	32-bit	2 … 6
19K4401	Netfinity Gigabit Ethernet Adapter (copper)	Half	64-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
	Communications[11]			
19K4162	V.90 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 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, slot two is not available to install another adapter.
4. IntelliStation M Pro 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-4L Ultra160 SCSI Controller is powered by a 100MHz Intel i960 processor and provides a single channel, 16MB of ECC cache and either one internal or one external Ultra160 connection. External connector is 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. 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.
9. Wake on LAN® is not supported through the PCI networking adapters.
10. The integrated full duplex 10/100 Intel-based Ethernet controller supports Wake on LAN.
11. M Pro includes two USB ports, two high-speed serial/asynchronous ports (NS16550A software compatible) and one bidirectional parallel port supporting devices using EPP/ECP protocols.

IntelliStation M Pro Power, Monitors & Accessories

Part Number	Description
	Power
	IntelliStation M Pro Xeon includes a 480W 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
655263N	P260 Color Monitor 21in (503mm, 19.8in viewable image), stealth black
6657HG2	T750 Hybrid Flat Panel Color Monitor 17in (433mm, 17in viewable image), stealth black
9497AG1	T86A TFT LCD Color Monitor 18.1in (460mm, 18.1in 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
9497DG0	T86D Flat Panel TFT Monitor 18in (460mm, 18.1in viewable image), stealth black[1]
9493AG1	T56 Flat Panel TFT Monitor 15in (383.5mm, 15.1in viewable image), stealth black
65494AN	G96 Color Monitor 19in (454mm, 17.9in viewable image), stealth black
6639U3N	P77 Color Monitor 17in (406mm, 16in viewable image), stealth black
	Conversion Kits
10L7006	Netfinity 5000 Tower-to-Rack Conversion Kit
	Keyboard and Mouse[2]
22P5185	Rapid Access III USB Keyboard, stealth black
22P5170	Wireless Keyboard and Mouse
33L3252	SpaceBall 3D Input Device
33L3247	3-Button ScrollPoint Pro Slate Blue Mouse

1. Supported only with models containing either NVIDIA Quadro2 Pro or Fire GL4 video adapters.
2. IntelliStation M Pro ships standard with an IBM 104-key keyboard and three-button mouse.

IntelliStation M Pro 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 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

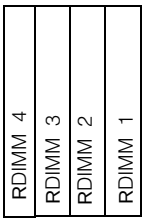
1. Housed in a 19in rack-mountable drawer. Ships standard with a keyboard and mouse. See Rack Cabinets and Options section for supported IBM racks. Refer to xSeries 330 information.
2. Intel Pentium III processor with advanced transfer L2 cache and 133MHz Front-side Bus (FSB).
3. Variable read rate. 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] or	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

SCSI Models				
Total Int Storage[1]	10,000RPM HDDs			15,000RPM HDDs
	18.2GB 00N8208	36.4GB 00N8209	73.4GB 06P5752	18.2GB 19K0658
18.2GB	(Standard on SCSI models)			
36.4GB	1	-	-	1
54.6GB	-	1	-	-
72.8GB[2]	-	2	-	-
91.6GB	-	-	1	-
146.8GB (max)[2]	-	-	2	-

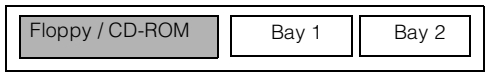
This table does not represent all possible HDD configurations.

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
20.4GB	(Std 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 both 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
1[1]	89mm (3.5in)	SL	Yes	HDD[2]
2	89mm (3.5in)	SL	Yes	Open

1. Boot drive should be located in bay one.
2. Fixed disk and IDE models ship with one standard HDD.

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
Nonhot-swap Ultra160 HDDs[2]					
00N8208	18.2GB 10,000rpm Ultra160 SCSI HDD	10000	SL	1, 2	2
00N8209	36.4GB 10,000rpm Ultra160 SCSI HDD	10000	SL	1, 2	2
19K0658	18.2GB 15,000rpm Ultra160 SCSI HDD	15000	SL	1, 2	2
06P5752	73.4GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD	10000	SL	1, 2	2

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
	Power[1]
	Uninterruptible Power Supply (UPS)[2]
94G6674	APC Smart-UPS 1400RMB[3]
94G6676	APC Smart-UPS 3000RMB[3]
37L6861	APC Smart-UPS 5000RMB[4]
	Monitors[5, 6]
66274AN	G78 Color Monitor 17in (406.4mm, 16in viewable image), stealth black[7]
655063N	P76 Color Monitor 17in (407mm, 16in viewable image), stealth black
655163N	P96 Color Monitor 19in (456mm, 17.9in viewable image), stealth black
65494AN	G96 Color Monitor 19in (454mm, 17.9in viewable image), stealth black
655263N	P260 Color Monitor 21in (503mm, 19.8in 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
9497AG1	T86A TFT LCD Color Monitor 18.1in (460mm, 18.1in viewable image), stealth black

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. All monitors listed except G78 (P/N 66274AN) are supported only for desktop installation.
7. Installation within a rack requires optional Monitor Compartment (P/N 94G7444).

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]
01K1260	TrackPoint IV 104-key Black Keyboard[6]
28L3673	Sleek 2-button Stealth Black Mouse

1. InstalliStation R Prois 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, 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. 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 waranted 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.

IntelliStation Z Pro

Part Number	Processor Speed (MHz)[2]	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)
IntelliStation Z Pro At-A-Glance													
6894-10X[1]	800	2/2	2MB	2GB/16GB	Matrox Millennium G450	Tower	10/100	D,U160[3]	4/2	18.2GB/ 182GB	12X-8X-32X[4]	9/7	8/6
6894-12X[1]	800	2/2	2MB	2GB/16GB	NVIDIA Quadro2 Pro	Tower	10/100	D,U160[3]	4/2	36.4GB/ 182GB	12X-8X-32X[4]	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 to check on the 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. Intel Itanium™ processor with advanced transfer ECC L3 cache and 2 x 133MHz FSB.
3. 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.
4. Variable read rate. Actual playback speed will vary and is often less than the maximum possible.

IntelliStation Z Pro Memory

Memory Card A (top of card)

Bank 1- J4A1	Bank 1- J9A1
Bank 1- J4B1	Bank 1- J9B1
Bank 3- J4B2	Bank 3- J9B2
Bank 3- J4B3	Bank 3- J9B3

Memory Card B (top of card)

Bank 2- J4A1	Bank 2- J9A1
Bank 2- J4B1	Bank 2- J9B1
Bank 4- J4B2	Bank 4- J9B2
Bank 4- J4B3	Bank 4- J9B3

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.

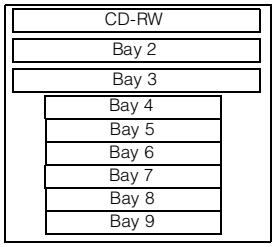
1. Select a total storage row and then add HDDs from both columns. Total Internal Storage is within +/- 0.2GB unless otherwise noted.
2. Standard on model 10X.
3. Standard on model 12X.
4. This HDD configuration requires replacement of the standard HDD on model 10X.

Bay	Form Factor	Height	Front Access	Usage
1	133mm (5.25in)	HH	Yes	IDE CD-RW
2	133mm (5.25in)	HH	Yes	open[1]
3	133mm (5.25in)	HH	Yes	open[1]
4 … 8	89mm (3.5in)	SL	Yes	open
9	89mm (3.5in)	SL	Yes	Std HDD

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

Part Number	Description	RPM	Height	Bays Supported	Max Qty
Non-Hot-Swap Ultra 160 HDDs					
00N8208	18.2GB 10,000rpm Ultra160 SCSI HDD	10000	SL	4 … 9[1]	5[2]
00N8209	36.4GB 10,000rpm Ultra160 SCSI HDD	10000	SL	4 … 9[1]	5[2]
Optical Devices					
10K3785	12X-8X-32X Black Internal CD-RW Drive	-			

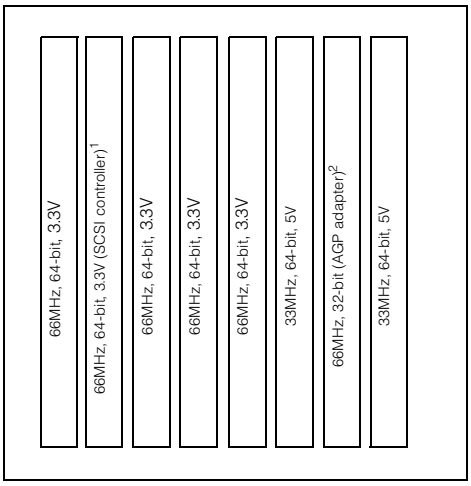
1. The standard HDD is installed in bay nine.
2. The five-drop cable allows installation of a maximum of five HDDs.



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
Networking				
Ethernet				
19K4401	Netfinity Gigabit Ethernet Adapter (copper)	Half	64-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. 33MHz adapters will reduce 66MHz buses to 33MHz.



All slots are full-length.

1. Dual channel Ultra160 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
655263N	P260 Color Monitor 21in (503mm, 19.8in viewable image), stealth black
6657HG2	T750 Hybrid Flat Panel Color Monitor 17in (433mm, 17in viewable image), stealth black
9497AG1	T86A TFT LCD Color Monitor 18.1in (460mm, 18.1in viewable image), stealth black
	Keyboard and Mouse
	IntelliStation Z Pro ships standard with an IBM 104-key keyboard and three-button mouse.

IBM xSeries 130/135

Part Number	Processor Speed (MHz)[2]	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)[3]	Bays (Total/Avail)	Slots (Total/Avail)
xSeries 130 At-A-Glance																
8654-1YX[1, 4]	800	1/2	256	256MB(R) / 2GB	Rack (1U)	1/1	H	-	Y	2 x 10/100	U160	-	9.1/72.8GB	24X-10X	4/1	2/2
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																
8654-1XX[1, 5]	800	1/2	256	256MB(R) / 2GB	Rack (1U)	1/1	H	-	N	2 x 10/100	U160	-	9.1/72.8GB	24X-10X	4/1	2/2
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

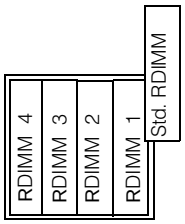
1. Housed in a 19in rack-mountable drawer and ships standard without a keyboard or mouse. See Rack Cabinets and Options section for supported IBM racks.
2. Intel Pentium III processor with advanced transfer L2 cache and 133MHz Front-Side Bus (FSB). Models 1YX, 1XX, 25X and 24X do not provide SMP support.
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.

Models 1YX, 1XX, 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 1YX, 1XX, 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

DIMM Socket 1
DIMM Socket 2
DIMM Socket 3

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**		
	9.1GB (P/N 37L7204)	**18.2GB (P/N 37L7205)**	**36.4GB (P/N 37L7206)**
9.1GB[2]	1	-	-
18.2GB[3]	-	1	-
27.3GB	1	1	-
36.4GB	-	2	-
45.5GB	1	-	1
54.6GB	-	1	1
72.8GB max[4]	-	-	2

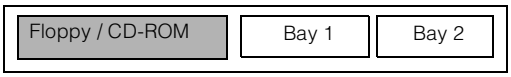
This table does not represent all possible HDD configurations.

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. A 9.1GB 10,000rpm HDD is standard in models 8654-1YX, 1XX.
3. An 18.2GB 10,000rpm HDD is standard in models 8654-5CX, 5DX.
4. Requires removal of the standard HDD. Boot CD with software preload is shipped with the system.

SCSI Models				
Bay	**Form Factor**	**Height**	**Front Access**	**Usage**
1[1]	HS	SL	Yes	HDD
2	HS	SL	Yes	Open

1. Boot drive should be located in bay 1.

SCSI Models					
Part Number	**Description**	**RPM**	**Height**	**Bays Supported**	**Max Qty**
	Ultra160 Hard Disk Drives (HDD)				
37L7204	9.1GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	10000	SL	1 … 2	2
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



IDE Models		
Total Int Storage[1]	**7200RPM IDE HDDs[2]**	
	20.4GB 19K4461	**40GB 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.

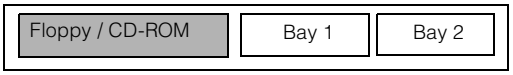
1. Select a total storage row then add the quantity of HDDs from all columns to the standard HDD.
2. The xSeries 130/135 dual integrated EIDE controllers support a maximum of three IDE devices per machine including one CD-ROM and two IDE HDDs.
3. Requires removal of the standard 20.4GB IDE HDD. Boot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

IDE Models				
Bay	**Form Factor**	**Height**	**Front Access**	**Usage**
1[1]	89mm (3.5in)	SL	Yes	HDD
2	89mm (3.5in)	SL	Yes	Open

1. Boot drive should be located in bay 1.

IDE Models					
Part Number	**Description**	**RPM**	**Height**	**Bays Supported**	**Max Qty**
IDE HDDs[1]					
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

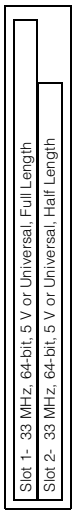
1. Mixing of IDE and SCSI hard disk drives is not supported.



xSeries 130 / 135 I/O Options

Part Number	Description	Adapter Length	PCI Support	Slots Supported[2]
Networking[1]				
19K4401	Netfinity Gigabit Ethernet Adapter (copper)[3]	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.
3. Not supported on models 8654-1YX, 1XX.



xSeries 130 / 135 Power, Monitors & Accessories

Part Number	Description
	Power[1]
	Uninterruptible Power Supply (UPS)[2]
94G6674	APC Smart-UPS 1400RMB[3]
94G6676	APC Smart-UPS 3000RMB[3]
37L6861	APC Smart-UPS 5000RMB[4]
	Monitors[5]
06P4792	Cable Chain Technology Cable Kit[6]
6331N2N	E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black[7]
63324HN	E74 Color Monitor 17in (406mm, 16in Viewable Image Size), stealth black[7]
66274AN	G78 Color Monitor 17in (406.4mm, 16in Viewable Image Size), 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 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. The xSeries 130 / 135 uses an SVGA controller (S-3 Savage4 chipset) with 8MB of video memory.
6. A Cable Chain Technology (C2T) Cable Kit (P/N 06P4792) is available for models 1YX, 1XX, 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 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 connecting two xSeries systems together (models 1YX and 1XX) or for extending the distance requirement 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 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 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 NetBAY[1]
	Refer to the Rack Cabinets and Options section for information concerning IBM racks and rack-supported devices.
	Keyboard and Mouse[2]
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 Cable Chain Technology (C2T) Cable Kit (P/N 06P4792) is available for models 1YX, 1XX, 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 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 connecting two xSeries systems together (models 1YX and 1XX) or for extending the distance requirement 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 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 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 220 ICA

Part Number	Processor Speed (MHz)[1]	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)[3]	Bays (Total/Avail)	Slots (Total/Avail)
xSeries 220 ICA At-A-Glance																
8645-34X[4, 5]	866	1/2	256	256MB(R)/4GB	Tower	1/1	-	-	-	10/100	U160[2]	4/2	18.2GB/ 145.6GB	48X-20X	7/4	5/5

1. Intel Pentium III processor with advanced transfer L2 cache and 133MHz FSB.
2. xSeries 220 Internet Caching Appliance (ICA) has an integrated Ultra160 SCSI Controller with a single internal channel and includes a five-drop, multi-mode terminated LVD SCSI cable.
3. Variable read rate. Actual playback speed will vary and is often less than the maximum possible.
4. Tower-tier ICA forward proxy software preload designed for small offices with up to 50 users.
5. This appliance is preconfigured and optimized to support specific Internet applications per the Volera Excelerator V2.0 Internet Caching software licensing structure. Performance can be enhanced by installing additional memory, 15Krpm HDD storage, gigabit Ethernet adapters and additional or faster processors (impact of processor speed less significant than other options).

xSeries 220 ICA Processors

Part Number	Processor Upgrades	Processor Speed Upgrade[1]
10K3819	Netfinity 933MHz with 133MHz FSB and 256KB Advanced Transfer Cache Pentium III Upgrade Processor	34X

1. Requires removal of the standard processor. A maximum of two processors may be installed. Optimal performance is achieved with the standard processor, i.e., upgrading the processor does not necessarily increase performance. 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 ICA Memory

RDIMM Socket
RDIMM Socket
RDIMM Socket
RDIMM Socket

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

Adding memory options will require additional Volera licenses.

Total System Memory[1]	Quantity of RDIMMs Added			
256MB (std)	128MB (10K0018)	256MB (10K0020)	512MB (10K0022)	1GB (33L3326)
384MB	1	-	-	-
512MB	-	1	-	-
640MB	1	1	-	-
768MB	2	1	-	-
1024MB	-	3	-	-
1280MB	-	-	2	-
1536MB	-	1	2	-
1792MB	-	-	3	-
2048MB[2]	-	-	4	-
2560MB[2]	-	-	3	1
3072MB[2]	-	-	2	2
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 Model 256MB), 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.

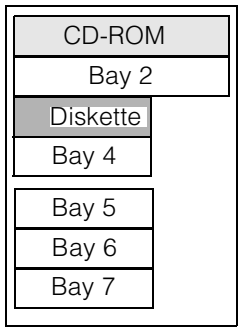
xSeries 220 ICA Hard Disk Drive (HDD) Storage

Total Internal Storage[1]	10,000RPM HDDs			15,000RPM HDDs
	9.1GB 00N8207	18.2GB 00N8208	36.4GB 00N8209	18.2GB 19K0658
18.2GB	-	1[2]	-	-
27.3GB	1	1	-	-
36.4GB	-	2	-	2
54.6GB	-	3	-	3
72.8GB	-	2	1	4
91GB	-	1	2	-
109.2GB	-	2	2	-
127.4GB	-	1	3	-
145.6GB[3]	-	-	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. Total Internal Storage listed is within +/- 0.2 GB unless otherwise noted.
2. xSeries 220 ICA ships standard with one 18.2GB 10,000rpm nonhot-swap HDD.
3. Requires removal of the standard 18.2GB 10,000rpm HDD. Boot CD with software preload is shipped with the system.

Part Number	Description	RPM	Height	Nonhot-swap Models	
				Bays Supported	Maximum Quantity
	Nonhot-swap Ultra160 Hard Disk Drives (HDD)[1]				
00N8207	9.1GB 10,000rpm Ultra160 SCSI HDD	10000	SL	4 … 7	4
00N8208	18.2GB 10,000rpm Ultra160 SCSI HDD	10000	SL	4 … 7	4
00N8209	36.4GB 10,000rpm Ultra160 SCSI HDD	10000	SL	4 … 7	4
19K0658	18.2GB 15,000rpm Ulltra160 SCSI HDD	15000	SL	4 … 7	4

Note: Assuming adequate network bandwidth, adding HDD options has the greatest impact on forward proxy performance.
1. Nonhot-swap HDDs are supported in bays 4 … 7 of nonhot-swap models.



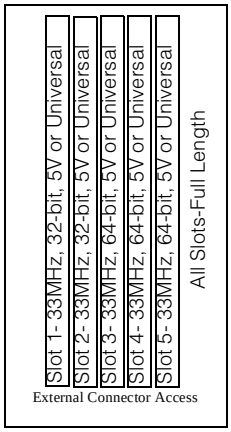
Bay	Form Factor	Height	Front Access	Usage
1	133mm (5.25in)	HH	yes	IDE CD-ROM
2	133mm (5.25in)	HH	yes	open[1]
3	89mm (3.5in)	SL	yes	Floppy
4	89mm (3.5in)	SL	yes	open
5	89mm (3.5in)	SL	yes	18.2GB HDD
6 … 7	89mm (3.5in)	SL	yes	open

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

xSeries 220 ICA I/O Options

Part Number	Description	Adapter Length	PCI Support	Slots Supported[1]
	Storage Controllers[2]			
19K4646	PCI Wide Ultra160 SCSI Adapter[3]	Half	32-bit	1 … 5
02K3454	PCI Fast/Wide Ultra SCSI Adapter[7]	Half	32-bit	1 … 5
	Networking[4]			
	Ethernet[5]			
09N9901	10/100 EtherLink Server Adapter by 3Com	Half	32-bit	1 … 5
19K4401	Netfinity Gigabit Ethernet Adapter (copper)	Half	32/64-bit	1 … 5
06P3601	10/100 Ethernet Server Adapter[6]	Half	32-bit	1 … 5
06P3701	Gigabit Ethernet SX Server Adapter (fiber)	Half	32/64-bit	1 … 5
	Token Ring			
34L0701	Token-Ring 16/4 PCI Adapter 2 with Wake on LAN[6]	Half	32-bit	1 … 5
34L5001	16/4 Token-Ring PCI Management Adapter[6]	Half	32-bit	1 … 5
34L5201	High-Speed 100/16/4 Token-Ring PCI Management Adapter[6]	Half	32-bit	1 … 5
	Systems Management			
09N7585	Remote Supervisor Adapter	Half	32-bit	2

-



1. The xSeries 220 ICA has five full-length, 33MHz PCI expansion slots, three 64-bit and two 32-bit.
2. xSeries 220 ICA has an integrated Ultra160 SCSI Controller with a single internal channel and includes a five-drop, multi-mode terminated LVD SCSI cable.
3. PCI Wide Ultra160 SCSI Adapter (P/N 19K4646) provides a single channel with one internal connector and a five-drop multi-mode terminated LVD SCSI cable and one external connector with a 0.8mm VHDCI connector. Only one of the two connectors may be utilized.
4. The xSeries 220 includes an integrated full-duplex, 10/100Mbps Ethernet controller.
5. 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 two Intel-based optional Ethernet adapters (P/N 06P3601, 06P3701).
6. The Wake on LAN® feature of this adapter is supported only in slot one.
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.

xSeries 220 ICA Power, Monitors & Accessories

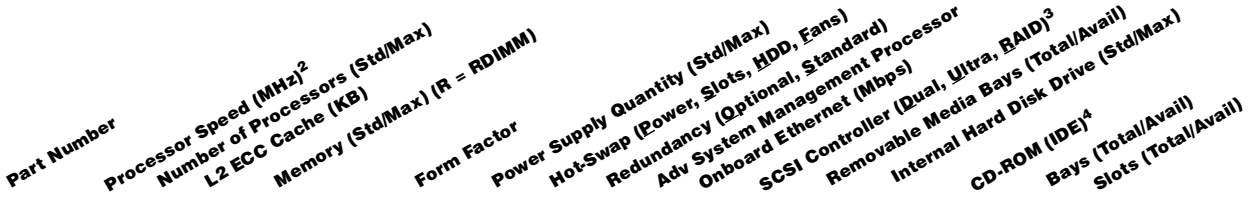
Part Number	Description
	Power[1]
	Uninterruptible Power Supply (UPS)[2]
94G3134	APC Smart-UPS 700
94G3135	APC Smart-UPS 1000
94G3136	APC Smart-UPS 1400
94G6674	APC Smart-UPS 1400RMB[3]
94G6676	APC Smart-UPS 3000RMB[3]
37L6861	APC Smart-UPS 5000RMB[4]
	Monitors[5]
6331N2N	E54 Color Monitor 15in (350mm, 13.8in viewable image size), 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]

1. The xSeries 220 ICA 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 ICA 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.

Part Number	Description
	Conversion Kits
09N4300	4Ux20D Tower-to-Rack Kit
	Rack and NetBAY[1]
	Refer to the Rack Cabinets and Options section for information concerning IBM racks and rack-supported devices.
	Keyboard and Mouse[2]
28L3644	Space Saver II Keyboard[3, 4]
01K1260	TrackPoint IV 104-key Black Keyboard[4, 5]
28L3621	Preferred Keyboard (stealth black)[5]
28L3673	Sleek 2-button Stealth Black Mouse

1 Rack installation of an xSeries 220 ICA 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 ICA 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 or Netfinity 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.

IBM xSeries 330 ICA



xSeries 330 ICA At-A-Glance

8654-37X[1, 5]	866	1/2	256	384MB(R)/4GB	Rack (1U)	1/1	H	-	Y	2 x 10/100	U160	-	36.4GB/72.8GB	24X-10X	4/0	2/2
8654-38X[1, 6]	866	1/2	256	1GB(R)/4GB	Rack (1U)	1/1	H	-	Y	2 x 10/100	U160	-	18.2GB/72.8GB	24X-10X	4/1	2/2

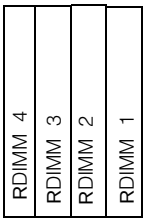
1. Housed in a 19in rack-mountable drawer and ships standard without a keyboard or mouse. See Rack Cabinets and Options section for supported IBM racks.These appliances are preconfigured and optimized to support specific Internet applications per the Volera Excelerator V2.0 Internet Caching software licensing structure. Performance can be enhanced by installing additional memory, 15Krpm HDD storage, gigabit Ethernet adapters and additional or faster processors (impact of processor speed less significant than other options).
2. Intel Pentium III processor with advanced transfer L2 cache and 133MHz FSB.
3. xSeries 330 ICA has an integrated single-channel Ultra160 SCSI Controller.
4. Variable read rate. Actual playback speed will vary and is often less than the maximum possible.
5. Workgroup-tier ICA forward proxy software preload designed for departments ranging up to 250 users.
6. Workgroup-tier ICA reverse proxy software preload designed for small- to mid-range applications handling up to 3,500 requests per second.

xSeries 330 ICA Processors

Part Number	Processor Upgrades	Processor Speed Upgrade[1]
10K0052	933MHz Upgrade with 133MHz FSB and 256KB Advanced Transfer Cache Pentium III Processor	37X, 38X
10K0053	1GHz Upgrade with 133MHz FSB and 256KB Advanced Transfer Cache Pentium III Processor	37X, 38X

1. Requires removal of the standard processor. A maximum of two processors may be installed. Optimal performance is achieved with the standard processor, i.e., upgrading the processor does not necessarily increase performance. 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 ICA Memory



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

Memory amount has the greatest impact on reverse proxy performance.
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			
	128MB (10K0018)	256MB (10K0020)	512MB (10K0022)	1GB (33L3326)
384MB[2]	1	1	-	-
512MB	2	1	-	-
640MB	3	1	-	-
768MB	2	2	-	-
1152MB	1	2	1	-
1024MB[3]	-	-	2	-
1408MB	1	1	2	-
2304MB[4]	-	1	2	1
2432MB[5]	1	1	-	2
3072MB[4]	-	-	2	2
4096MB (max)[6]	-	-	-	4

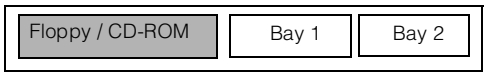
This table does not represent all possible memory configurations. Memory modules may vary in price per MB. Selection of smaller RDIMMs may provide a more cost-effective alternative to using larger RDIMMs.
1. Network operating systems may limit the maximum amount of addressable memory. See operating system specifications for further information.
2. Model 37X ships standard with this memory amount and configuration.
3. Model 38X ships standard with this memory amount and configuration. Model 37X would require removing the standard RDIMMs for this configuration.
4. Model 37X requires removing one or both standard RDIMMs for this configuration.
5. Model 38X requires removing the standard RDIMMs for this configuration.
6. Requires removal of standard memory.

xSeries 330 ICA Hard Disk Drive (HDD) Storage

SCSI Models					
Total Int Storage[1]	**10,000RPM HDDs**			**15,000RPM HDDs**	
	9.1GB (37L7204)	**18.2GB (37L7205)**	**36.4GB (37L7206)**	**9.1GB (19K0655)**	**18.2GB (19K0656)**
18.2GB[2]	-	1	-	-	-
27.3GB	1	1	-	1	1
36.4GB[3]	-	2	-	-	2
54.6GB	-	1	1	-	-
72.8GB[4] (max)	-	-	2	-	-

Assuming adequate network bandwidth, HDD storage typically has the greatest impact on forward proxy performance.
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. Total Internal Storage listed is within +/- 0.2GB unless otherwise noted.
2. Model 38X ships standard with one 18.2GB 10,000rpm HDD.
3. Model 37X ships standard with two 18.2GB 10,000rpm HDDs.
4. Requires removal of the standard 18.2GB 10,000rpm HDD. Boot CD with software preload is shipped with the system.



Bay	Form Factor	Height	Front Access	Usage
1[1]	HS or 89mm (3.5in)	SL	Yes	18.2GB HDD
2	HS or 89mm (3.5in)	SL	Yes	Open[2]

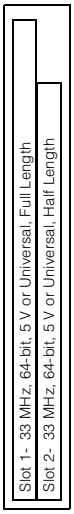
1. Boot drive should be located in bay 1.
2. Some models include two standard HDDs.

Part Number	Description	RPM	Height	Bays Supported	Max Qty
Hot-swap Utra160 HDDs					
37L7204	9.1GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	10000	SL	1 … 2	2
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
19K0655	9.1GB 15Krpm Ultra160 SCSI Hot-Swap HDD	15000	SL	1 … 2	2
19K0656	18.2GB 15Krpm Ultra160 SCSI Hot-Swap HDD	15000	SL	1 … 2	2

xSeries 330 ICA I/O Options

Part Number	Description	Adapter Length	PCI Support	Slots Supported[2]
	Storage Controllers[1]			
19K4646	PCI Wide Ultra160 SCSI Adapter[3]	Half	32-bit	1, 2
02K3454	PCI Fast/Wide Ultra SCSI Adapter[4]	Half	32-bit	1, 2
	Networking[5]			
	Ethernet[6]			
19K4401	Netfinity Gigabit Ethernet Adapter (copper)	Half	64-bit	1, 2
06P3601	10/100 Ethernet Server Adapter[7]	Half	32-bit	1, 2
06P3701	Gigabit Ethernet SX Server Adapter (fiber)	Half	64-bit	1, 2
	Token Ring			
34L5001	16/4 Token-Ring PCI Management Adapter[7]	Half	32-bit	1, 2
34L5201	High-Speed 100/16/4 Token-Ring PCI Management Adapter[7]	Half	32-bit	1, 2

1. xSeries 330 ICA has an integrated single-channel Ultra160 SCSI Controller.
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.
3. PCI Wide Ultra160 SCSI Adapter (P/N 19K4646) provides a single channel with one internal connector and one external 0.8mm VHDCI connector. Support for external SCSI devices only. A five-drop terminated LVD SCSI cable is included but not supported for use in this server.
4. 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.
5. xSeries 330 ICA includes dual full-duplex, 10/100Mbps Ethernet controllers.
6. 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 two Intel-based optional Ethernet adapters (P/N 06P3601, 06P3701).
7. The Wake on LAN function of this option is not supported by this server.



Exterior Connector Access

xSeries 330 ICA Power, Monitors & Accessories

Part Number	Description
	Power[1]
	Uninterruptible Power Supply (UPS)[2]
94G6674	APC Smart-UPS 1400RMB[3]
94G6676	APC Smart-UPS 3000RMB[3]
	Monitors[4]
06P4792	Cable Chain Technology Cable Kit[5]
6331N2N	E54 Color Monitor 15in (350mm, 13.8in viewable image size), 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]

1. The xSeries 330 ICA 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. xSeries 330 ICA uses an SVGA controller (S-3 Savage4 chipset) with 8MB of video memory.
5. A Cable Chain Technology (C2T) 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 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 Kit.
6. Installation within a rack requires optional Monitor Compartment (P/N94G7444).
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.

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]
06P4792	Cable Chain Technology Cable Kit[4]
28L3644	Space Saver II Keyboard[5, 6]
28L3621	Preferred Keyboard (stealth black)[7]
28L3673	Sleek 2-button Stealth Black Mouse

1. xSeries 330 ICA 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 required 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 ICA supports rack configurations only and ships without a keyboard or mouse.
4. A Cable Chain Technology (C2T) 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 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 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 or Netfinity 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.

IBM xSeries 340 ICA

Part Number	Processor Speed (MHz)[2]	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)[4]	Removable Media Bays (Total/Avail)[5]	Internal Hard Disk Drive (Std/Max)	CD-ROM (IDE)[7]	Bays (Total/Avail)	Slots (Total/Avail)
xSeries 340 ICA At-A-Glance																
8656-45X[1, 8]	866	1/2	256	768MB(R)/4GB	Rack (3U)	1/2	P, H, F	O - Power[3] S - Fans	Y	10/100	D,U160	4/2[5]	54.6GB/109.2GB	24X-10X	7/2	5/5
8656-46X[1, 9]	866	1/2	256	1.5GB(R)/4GB	Rack (3U)	2/2	P, H, F	S - Power S - Fans	Y	10/100	D,U160	4/0[5]	109.2GB/218.4GB[6]	24X-10X	8/0[6]	5/5
8656-47X[1, 10]	866	1/2	256	4GB(R)/4GB	Rack (3U)	1/2	P, H, F	O - Power[3] S - Fans	Y	10/100	D,U160	4/2[5]	54.6GB/109.2GB	24X-10X	7/2	5/5

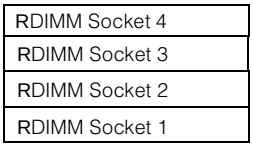
1. Housed in a 19in rack-mountable drawer and ships standard without a keyboard or mouse. See Rack Cabinets and Options section for supported IBM racks.These appliances are preconfigured and optimized to support specific Internet applications per the Volera Excelerator V2.0 Internet Caching software licensing structure. Performance can be enhanced by installing additional memory, 15Krpm HDD storage, gigabit Ethernet adapters and additional or faster processors (impact of processor speed less significant than other options).
2. Intel Pentium III processor with advanced transfer L2 cache and 133MHz FSB.
3. Power supply redundancy requires installation of optional 270W Hot-Swap Redundant Power Supply (P/N 37L6880).
4. xSeries 340 ICA includes a dual-port, dual-channel Ultra160 SCSI controller for internal use only. No standard external port is available. Due to xSeries 340 ICA's low profile, some adapters with connectors on the top edge may not have sufficient clearance to attach a cable.
5. xSeries 340 ICA 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. Some models ship standard with the 3-Pack Expansion Kit already installed.
6. Requires installation of optional IBM 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. Department-tier ICA forward proxy software preload designed for enterprises with up to 500 users.
9. Enterprise-tier ICA forward proxy software preload designed for ISPs and large enterprises with up to 1,000 users.
10. Enterprise-tier ICA reverse proxy software preload designed for commercial or large-site operations handling up to 20,000 requests per second.

xSeries 340 ICA Processors

Part Number	Processor Upgrades	Processor Speed Upgrade[1]
19K4631	Netfinity 933MHz 133MHz FSB/256KB Upgrade with Pentium III Processor	4xX
19K4640	1GHz Upgrade with 133MHz FSB and 256KB Advanced Transfer Cache Pentium III Processor	4xX

1. Requires removal of the standard processor. A maximum of two processors may be installed. Optimal performance is achieved with the standard processor, i.e., upgrading the processor does not necessarily increase performance. 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 340 ICA Memory



Recommended order of installation:
Slot 1-2-3-4

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

Memory amount has the greatest impact on reverse proxy performance.
1. The recommended order of installation is in sequence from Socket 1 to Socket 4. Memory size is not a factor.

Total Memory[1]	Quantity of RDIMMs Added			
	128MB (10K0018)	256MB (10K0020)	512MB (10K0022)	1GB (33L3326)
768MB[2]		1	1	-
896MB	1	1	1	-
1536MB[3]	-	-	1	1
1920MB	1	1	1	1
2176MB	-	2	1	1
2432MB	-	1	2	1
2816MB	-	1	1	2
3072MB[4]	-	-	2	2
3584MB[4]	-	-	1	3
4096MB (max)[5]	-	-	-	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. Model 45X ships standard with this memory amount and configuration.
3. Model 46X ships standard with this memory amount and configuration. Not applicable to Model 45X.
4. Model 45X requires removal of one standard RDIMM to support this configuration.
5. Requires removal of standard memory for models 45X and 46X. Standard for model 47X..

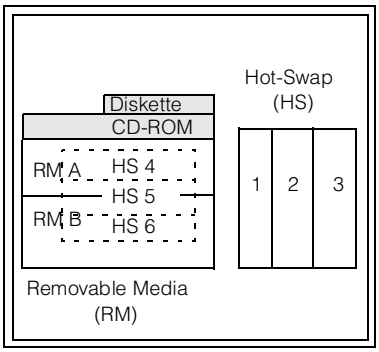
xSeries 340 ICA Hard Disk Drive (HDD) Storage

Total Int Storage[1]	10,000RPM HDDs			15,000RPM HDDs	
	9.1GB (37L7204)	18.2GB (37L7205)	36.4GB (37L7206)	9.1GB (19K0655)	18.2GB (19K0656)
54.6GB[2]	-	3	-	-	-
91GB[3]	-	1	2	-	-
109.2GB[4]	-	6	-	-	6
145.6GB[3]	-	4	2	-	-
182GB[3]	-	2	4	-	-
200.2GB[3]	-	1	5	-	-
218.4GB[5] (max)	-	-	6	-	-

Assuming adequate network bandwidth, HDD storage typically has the greatest impact on forward proxy performance.
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. Total Internal Storage listed is within +/- 0.2GB unless otherwise noted.
2. Model 45X and 47X ship standard with three 18.2GB 10,000rpm HDDs.
3. Requires removal of one or more standard HDDs.
4. Model 46X ships standard with six 18.2GB 10,000rpm HDDs and IBM 3-Pack Ultra160 Hot-Swap Expansion Kit installed.
5. Maximum internal storage of 218.4GB can only be achieved by removing all six standard HDDs. Boot CD with software preload is shipped with the system.

Bay	Form Factor	Height	Front Access	Usage
-	89mm (3.5in)	-	Yes	Diskette
-	133mm (5.25in)	-	Yes	IDE CD-ROM
1 … 3	HS	SL	Yes	HDD
A, B	133mm (5.25in)	HH[1]	Yes	HDD
4 … 6[2]	HS	SL	Yes	HDD

1 By installing xSeries 3-Pack Ultra160 Hot-Swap Expansion Kit (P/N 33L5050), bays A and B are converted into three SL hot-swap bays 4 … 6.
2. Some models ship with six 18.2GB HDDs.

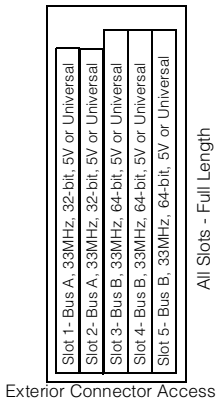


Part Number	Description	RPM	Height	Bays Supported[1]	Max Qty[1]
	Ultra160 HDDs				
37L7204	9.1GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	10000	SL	1 … 6	6
37L7205	18.2GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	10000	SL	1 … 6	6
37L7206	36.4GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	10000	SL	1 … 6	6
19K0655	9.1GB 15Krpm Ultra160 SCSI Hot-Swap HDD	15000	SL	1 … 6	6
19K0656	18.2GB 15Krpm Ultra160 SCSI Hot-Swap HDD	15000	SL	1 … 6	6
	Associated Options				
33L5050	IBM 3-Pack Ultra160 Hot-Swap Expansion Kit[2]	-	3 x SL	4 … 6	-

1. xSeries 340 ICA ships with Bays 1 … 3 enabled for Models 45X and 47X. Model 46X is shipped with six bays enabled, which includes installation of IBM 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 supported by the same SCSI channel as the standard backplane through the use of an included repeater card.

xSeries 340 ICA I/O Options

Part Number	Description	Adapter Length	PCI Support	Slots Supported[2]
	Storage Controllers[1]			
19K4646	PCI Wide Ultra160 SCSI Adapter[3]	Half	32-bit	1 … 5
02K3454	PCI Fast/Wide Ultra SCSI Adapter[4]	Half	32-bit	1 … 5
	Networking[5]			
	Ethernet[6]			
19K4401	Netfinity Gigabit Ethernet Adapter (copper)	Half	64-bit	1 … 5
06P3601	10/100 Ethernet Server Adapter[7]	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
	Token Ring[7]			
34L0701	Token-Ring 16/4 PCIAdapter 2 with Wake on LAN[7]	Half	32-bit	1 … 5
34L5001	16/4 Token-Ring PCI Management Adapter[7]	Half	32-bit	1 … 5
34L5201	High-Speed 100/16/4 Token-Ring PCI Management Adapter[7]	Half	32-bit	1 … 5



1. xSeries 340 ICA includes a dual-port, dual-channel Ultra160 SCSI controller for internal use only. No standard external port is available. See "Internal SCSI Cabling" in xSeries 340 section for cabling alternatives. Due to xSeries 340 ICA's low profile, some adapters with connectors on the top edge may not have sufficient clearance to attach a cable.
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.
3. 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.
4. 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.
5. xSeries 340 ICA includes a full-duplex, 10/100Mbps Ethernet PCI controller.
6. 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. Two of the optional PCI Ethernet adapters listed are Intel-based (P/N 06P3601, 06P3701).
7. The Wake on LAN function of this option is not supported by this server.

xSeries 340 ICA Power, Monitors & Accessories

Part Number	Description
Power[1]	
37L6880	270W Hot-Swap Redundant Power Supply
Uninterruptible Power Supply (UPS)[2]	
94G6674	APC Smart-UPS 1400RMB[3]
94G6676	APC Smart-UPS 3000RMB[3]
37L6861	APC Smart-UPS 5000RMB[4]
Monitors[5]	
6331N2N	E54 Color Monitor 15in (350mm, 13.8in viewable image size), 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]

1. xSeries 340 ICA 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 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 340 ICA 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.

Part Number	Description
Rack and NetBAY[1]	
	Refer to the Rack Cabinets and Options section for information concerning IBM racks and rack-supported devices.
Keyboard and Mouse[2]	
28L3644	Space Saver II Keyboard[3, 5]
28L3621	Preferred Keyboard (stealth black)[4]
28L3673	Sleek 2-Button Stealth Black Mouse

1. xSeries 340 ICA is housed in a 19in rack-mountable drawer and requires one of the racks listed in the Rack Cabinets and Options section.
2. xSeries 340 ICA 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 or Netfinity systems.

IBM xSeries 200

Part Number	Processor Speed (MHz)	Number of Processors (Std/Max)	L2 ECC Cache (KB)	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)	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																
8478-20X[1]	733[4]	1/1	128	128MB/1.5GB	Tower	1/1	-	-	-	10/100	U160[6]	4/2	0/293.6GB	48X-20X	7/5	5/4
8478-21X[1]	733[4]	1/1	128	64MB/1.5GB	Tower	1/1	-	-	-	10/100	IDE	4/2	20.4/90GB[7, 8]	48X-20X	7/4	5/5
8478-22X[1, 9]	733[4]	1/1	128	64MB/1.5GB	Tower	1/1	-	-	-	10/100	IDE	4/1	20.4/60GB[7, 8]	48X-20X	7/3[9]	5/5
8478-23X[1, 10]	733[4]	1/1	128	128MB/1.5GB	Tower	1/1	-	-	-	10/100	U160[6]	4/2	18.2/293.6GB[7]	48X-20X	7/4	5/4
8478-30X[2]	800[4]	1/1	128	128MB/1.5GB	Tower	1/1	-	-	-	10/100	U160[6]	4/2	0/293.6GB	48X-20X	7/5	5/4
8478-31X[2]	800[4]	1/1	128	64MB/1.5GB	Tower	1/1	-	-	-	10/100	IDE	4/2	20.4/90GB[7, 8]	48X-20X	7/4	5/5
8478-33X[2, 10]	800[4]	1/1	128	128MB/1.5GB	Tower	1/1	-	-	-	10/100	U160[6]	4/2	18.2/293.6GB[7]	48X-20X	7/4	5/4
8478-60X[3]	933[4]	1/1	256	128MB/1.5GB	Tower	1/1	-	-	-	10/100	U160[6]	4/2	0/293.6GB	48X-20X	7/5	5/4
8478-61X[3]	933[4]	1/1	256	64MB/1.5GB	Tower	1/1	-	-	-	10/100	IDE	4/2	20.4/90GB[7, 8]	48X-20X	7/4	5/5
8478-62X[3, 10]	933[4]	1/1	256	128MB/1.5GB	Tower	1/1	-	-	-	10/100	U160[6]	4/2	18.2/293.6GB[7]	48X-20X	7/4	5/4
8478-70X[3]	1GHz[4]	1/1	256	128MB/1.5GB	Tower	1/1	-	-	-	10/100	U160[6]	4/2	0/293.6GB	48X-20X	7/5	5/4
8478-71X[3]	1GHz[4]	1/1	256	64MB/1.5GB	Tower	1/1	-	-	-	10/100	IDE	4/2	20.4/90GB[7, 8]	48X-20X	7/4	5/5
8478-72X[3, 10]	1GHz[4]	1/1	256	128MB/1.5GB	Tower	1/1	-	-	-	10/100	U160[6]	4/2	18.2/293.6GB[7]	48X-20X	7/4	5/4
8479-10X[2]	850[5]	1/1	128	128MB/1.5GB	Tower	1/1	-	-	-	10/100	U160[6]	4/2	0/293.6GB	48X-20X	7/5	5/4
8479-11X[2]	850[5]	1/1	128	128MB/1.5GB	Tower	1/1	-	-	-	10/100	IDE	4/2	20.4/180GB[7, 8]	48X-20X	7/4	5/5
8479-13X[2, 10]	850[5]	1/1	128	128MB/1.5GB	Tower	1/1	-	-	-	10/100	U160[6]	4/1	18.2/293.6GB[7]	48X-20X	7/4	5/4
8479-40X[3]	1GHz[5]	1/1	256	128MB/1.5GB	Tower	1/1	-	-	-	10/100	U160[6]	4/2	0/293.6GB	48X-20X	7/5	5/4
8479-41X[3]	1GHz[5]	1/1	256	128MB/1.5GB	Tower	1/1	-	-	-	10/100	IDE	4/2	20.4/180GB[7, 8]	48X-20X	7/4	5/5
8479-42X[3, 10]	1GHz[5]	1/1	256	128MB/1.5GB	Tower	1/1	-	-	-	10/100	U160[6]	4/2	18.2/293.6GB[7]	48X-20X	7/4	5/4
8479-50X[3]	1.13GHz[5]	1/1	512	128MB/1.5GB	Tower	1/1	-	-	-	10/100	U160[6]	4/2	0/293.6GB	48X-20X	7/5	5/4
8479-51X[3]	1.13GHz[5]	1/1	512	128MB/1.5GB	Tower	1/1	-	-	-	10/100	IDE	4/2	20.4/180GB[7, 8]	48X-20X	7/4	5/5
8479-52X[3, 10]	1.13GHz[5]	1/1	512	128MB/1.5GB	Tower	1/1	-	-	-	10/100	U160[6]	4/2	18.2/293.6GB[7]	48X-20X	7/4	5/4
8479-60X[3]	1.26GHz[5]	1/1	512	128MB/1.5GB	Tower	1/1	-	-	-	10/100	U160[6]	4/2	0/293.6GB	48X-20X	7/5	5/4
8479-61X[3]	1.26GHz[5]	1/1	512	128MB/1.5GB	Tower	1/1	-	-	-	10/100	IDE	4/2	20.4/180GB[7, 8]	48X-20X	7/4	5/5
8479-62X[3, 10]	1.26GHz[5]	1/1	512	128MB/1.5GB	Tower	1/1	-	-	-	10/100	U160[6]	4/2	18.2/293.6GB[7]	48X-20X	7/4	5/4
8481-11X[2, 11]	850[5]	1/1	128	128MB/1.5GB	Tower	1/1	-	-	-	10/100	IDE	4/2	20.4/180GB[7, 8]	48X-20X	7/4	5/5
8481-21X[3, 11]	1GHz[5]	1/1	256	128MB/1.5GB	Tower	1/1	-	-	-	10/100	IDE	4/2	20.4/180GB[7, 8]	48X-20X	7/4	5/5

1. Intel® Celeron™ processor with 66MHz FSB.
2. Intel Celeron processor with 100MHz FSB.
3. Intel Pentium III processor with advanced transfer L2 cache and 133MHz FSB.
4. This processor is not compatible with machine types 8479 and 8481 models.
5. This processor is not compatible with machine type 8478 models.
6. Includes a single-channel, 32-bit Ultra160 SCSI PCI storage adapter installed in slot three.
7. Maximum capacity assumes replacement of standard hard disk drives with the largest supported IBM hard disk drive.
8. Machine type 8478 models support a 30GB IDE HDD. Machine type models 8479 and 8481 support 40GB and 60GB IDE HDDs.
9. This model is configured with an IBM 10/20GB TR5 Internal IDE Tape Drive (P/N 20L0549).
10. Not available in the United States.
11. This model features a one-year on-site limited warranty instead of a three-year parts, one-year on-site limited warranty.

xSeries 200 Processors

Part Number	Processor Upgrades	Processor Speed Upgrade[1]
10K3819	Netfinity 933MHz with 133MHz FSB and 256KB Advanced Transfer Cache Pentium III Upgrade Processor	8478-2xX, 3xX
10K0051	xSeries 1GHz Upgrade with 133MHz FSB 256KB Advanced Transfer Cache Pentium III Processor	8478-2xX, 3xX, 6xX
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
33L3079[1]	64MB 133MHz ECC SDRAM Unbuffered DIMM Memory
33L3081	128MB 133MHz ECC SDRAM Unbuffered DIMM Memory
33L3083	256MB 133MHz ECC SDRAM Unbuffered DIMM Memory
33L3085	512MB 133MHz ECC SDRAM Unbuffered DIMM Memory

1. Supported only in machine type 8478 models.

Total System Memory (Standard Models)[1]		DIMMs			
64MB (1 x 64)	128MB (1 x 128)	64MB (33L3079)[3]	128MB (33L3081)	256MB (33L3083)	512MB (33L3085)
128MB	192MB	1			
192MB	256MB	2 or	1		
320MB	384MB	-	2 or	1	
384MB[2]	-		3		
576MB	640MB			2 or	1
768MB[2]	768MB[2]			3	
1088MB	1152MB				2
1536MB (max)[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 from the appropriate column (standard 64MB or 128MB), 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.
3. Not supported on machine type 8479 models.

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.

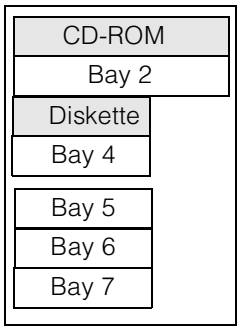
Other Configuration Alternatives
In the case where a RAID controller is used to support internal drives in a xSeries 200, the standard cable is moved from the standard PCI storage controller to the RAID adapter. To connect a tape drive to the onboard or other supported SCSI controller, use the 16-bit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

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

xSeries 200 Hard Disk Drive (HDD)

Total Internal Storage[1]	10,000RPM SCSI HDDs				15,000RPM SCSI HDDs
	9.1GB 00N8207	18.2GB 00N8208	36.4GB 00N8209	73.4GB 06P5752	18.2GB 19K0658
0GB	Standard on some base models[2]				
9.1GB	1	-	-	-	-
18.2GB	2	1	-	-	1
27.3GB	3	-	-	-	-
36.4GB	4	2	1	-	2
54.6GB	-	3	-	-	3
72.8GB	-	4	2	-	4
109.2GB	-	-	3	-	-
145.6GB	-	-	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 8478-23X, 33X, 62X, 72X and 8479-13X, 42X, 52X, 62X ship standard with one 18.2GB HDD.



Total Internal Storage[1]	7200RPM IDE HDDs[2, 3]			
	20.4GB (P/N 19K4461)	30GB (P/N 00N8203)	40GB (P/N 22P7157)[4]	60GB (P/N 09N4207)[4]
20.4GB	Std on EIDE models	-	-	
40.8GB	1	-	-	-
50.4GB	-	1	-	-
60.4GB[4]	-	-	1	-
61.2GB	2	-	-	-
80.4GB	-	2	-	-
100.4GB[4]	-	-	2	-
120GB[5]	-	-	3	-
140.4GB[4]	-	-	-	2
200.4GB[5]	-	-	-	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. Model 8478-22X, which includes an IBM 10/20GB TR5 Internal IDE Tape Drive (P/N 20L0549), does not support configurations with more than two IDE HDDs.
4. Not supported for machine type 8478 models.
5. Requires removal of the standard HDD (machine 8479 and 8481 models only).

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

1. Supports removable media devices only. Hard disk drives are not supported.
2. An IDE tape drive is standard in model 8478-22X.

Part Number	Description	RPM	Height	Bays Supported	Max Qty[3]
IDE HDDs[1, 2]					
19K4461	20.4GB 7200rpm ATA-100 (EIDE) HDD	7200	SL	4 … 7	3
00N8203[5]	30GB 7200rpm ATA-100 (EIDE) HDD	7200	SL	4 … 7	3
22P7157[4]	40GB 7200rpm ATA-100 (EIDE) HDD	7200	SL	4 … 7	3
09N4207[4]	60GB 7200rpm ATA-100 (EIDE) HDD	7200	SL	4 … 7	3
Ultra160 HDDs[2]					
00N8207	9.1GB 10,000rpm Ultra160 SCSI HDD	10000	SL	4 … 7	4
00N8208	18.2GB 10,000rpm Ultra160 SCSI HDD	10000	SL	4 … 7	4
00N8209	36.4GB 10,000rpm Ultra160 SCSI HDD	10000	SL	4 … 7	4
19K0658	18.2GB 15,000rpm Ultra160 SCSI HDD	15000	SL	4 … 7	4
06P5752	73.4GB 10Krpm Ultra160 SCSI SL HDD	10000	SL	4 … 7	4

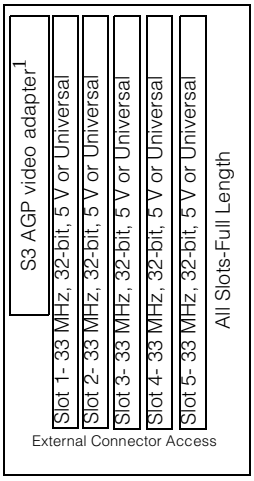
	Optical Devices	Bays Supported
10K3785[4]	12X-8X-32X Black Internal CD-RW Drive[6]	1, 2
22P6950[4]	16X Max RAM-Read DVD-ROM Drive[6, 7]	1, 2
10K3561[4]	9.4/4.7GB IDE DVD-RAM Drive, stealth black[6, 7]	1, 2

	External Storage Expansion Units[8]	Form Factor
35311RU	EXP300 Storage Expansion Unit[9]	Rack (3U)
09N7296	EXP300 Rack-to-Tower Conversion Kit	-

1.The xSeries 200 EIDE controllers support a maximum of four IDE devices per machine including CD-ROM drives, HDDs and IDE tape drives.
2. Mixing of internal IDE and SCSI HDDs is not supported.
3. Limited to two drives in model 8478-22X due to installed tape drive option.
4. Not supported in machine type 8478 models.
5. Not supported in machine type 8479 or 8481 models
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 (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.
7. Audio not supported for DVD-ROM drives. The drive operates in video mode only.
8. 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.
9. 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]			
37L6091	ServeRAID-4L Ultra160 SCSI Controller[6]	Full	64-bit	2 … 5
37L6080	ServeRAID-4M Ultra160 SCSI Controller[7]	Full	64-bit	2 … 5
06P5736	ServeRAID-4Mx Ultra160 SCSI Controller[8]	Full	64-bit	2 … 5
06P5740	ServeRAID-4Lx Ultra160 SCSI Controller[9]	Half	64-bit	2 … 5
19K4646	PCI Wide Ultra160 SCSI Adapter[10]	Half	32-bit	2 … 5
02K3454	PCI Fast/Wide Ultra SCSI Adapter[11]	Half	32-bit	2 … 5
24P2585	IDE 100 RAID Controller by AMI[12]	Half	32-bit	2 … 5
	Networking[13]			
	Ethernet[14]			
09N9901	10/100 EtherLink Server Adapter by 3Com[15]	Half	32-bit	1 … 5
19K4401	Netfinity Gigabit Ethernet Adapter (copper)[18]	Half	64-bit	1 … 5
06P3601	10/100 Ethernet Server Adapter[15]	Half	32-bit	1 … 5
06P3701	Gigabit Ethernet SX Server Adapter (fiber)[18]	Half	64-bit	1 … 5
22P4901	10/100 Dual Port Server Adapter[15]	Half	64-bit	1 … 5
	Token Ring			
34L0701	Token-Ring 16/4 PCI Adapter 2 with Wake on LAN[15, 18]	Half	32-bit	1 … 5
34L5001	16/4 Token-Ring PCI Management Adapter[15]	Half	32-bit	1 … 5
34L5201	High-Speed 100/16/4 Token-Ring PCI Management Adapter[15]	Half	32-bit	1 … 5
	Communications[16]			
33L4618	V.90 PCI Data/Fax Modem	Half	32-bit	2 … 5
37L14xx	Serial I/O SST 8, 16 and 128 Port Adapters[17]	Half	32-bit	2 … 5



1. xSeries 200 ships standard with the S3 AGP video adapter. Alternate video adapters are not supported.

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. The xSeries 200 has five full-length, 33MHz PCI expansion slots. The number of available slots is model specific.
3. The Ultra160 SCSI controller shipped standard in SCSI models is installed in slot three.
4. 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
5. Storage controllers are supported in slots two through five only. Slots two and four and slots three and five are paired so that they support only the same type of adapter, e.g., if a storage controller is installed in slot two, installing only another storage controller in slot four is recommended. Thus, a networking adapter should not be installed in slot four when a storage controller is installed in slot two. (Slot one is next to the AGP video adapter, and slot five is the farthest from the processors.)
6. ServeRAID-4L Ultra160 SCSI Controller is powered by a 100MHz Intel i960 processor and provides a single channel, 16MB of ECC cache and either one internal or one external Ultra160 connection. External connector is 0.8mm VHDCI.
7. ServeRAID-4M Ultra160 SCSI Controller is powered by a 100MHz Intel i960 processor and provides two channels, 64MB of battery-backed ECC cache and two external 0.8mm VHDCI Ultra160 connectors.
8. 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.
9. 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 connectior is 0.8mm VHDCI.
10. 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.
11. 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.
12. 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.
13. xSeries 200 includes an integrated full-duplex, 10/100Mbps Ethernet controller. Networking adapters are supported in slots one through five. Slots two and four and slots three and five are paired so that they support only the same type of adapter, e.g., if a networking adapter is installed in slot three, only another networking adapter should be installed in slot five. Thus, a storage controller should not be installed in slot five when a networking adapter is installed in slot three.
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 three Intel-based optional Ethernet adapters (P/N 06P3601, 06P3701, 22P4901).
15. Wake on LAN™ is supported for this option when installed in slots one through five (refer to limitation explained in the footnotes associated with the Storage Controllers and Networking headings in the table).
16. 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.
17. See Appendix E for details on Serial I/O options and configuration limitations.
18. Not supported on machine type 8479 models.

xSeries 200 Power, Monitors & Accessories

Part Number	Description
	Power[1]
	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]
94G6674	APC Smart-UPS 1400RMB[3]
94G6676	APC Smart-UPS 3000RMB[3]
37L6861	APC Smart-UPS 5000RMB[4]
	Monitors[5]
6331N2N	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]

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 machine type 8478 models contain an S3 Savage-4 LT video adapter. Machine type 8479 and 8481 models contain an ATI Savage-4 LT video adapter. Both adapters include 8MB of memory and are 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.

Part Number	Description
	Conversion Kits
09N4300	4Ux20D Tower-to-Rack Kit
	Rack and NetBAY[1]
	Refer to the Rack Cabinets and Options section for information concerning IBM racks and rack-supported devices.
	Keyboard and Mouse[2]
28L3644	Space Saver II Keyboard[3, 4]
01K1260	TrackPoint IV 104-key Black Keyboard[4, 5]
28L3621	Preferred Keyboard (stealth black)[5]
10K3849	106-key Preferred USB Keyboard with 2-port USB Hub (stealth black)[5]
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 or Netfinity 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 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	-	-	-
09N4040	20/40GB DLT Internal SCSI Tape Drive[11]	-	8	133mm (5.25in) FH	N	Y	3551001
09N4041	12/24GB DDS/3 4mm Internal SCSI Tape Drive[3, 4, 5]	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, 5]	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[4, 5]	2	16 Ultra2 LVD	89mm (3.5in) HH or 133mm (5.25in) HH	N	-	3510020[6], 3551001[7]
00N8016	100/200GB LTO Tape Drive[11]	-	16 Ultra2 LVD	133mm (5.25in) FH	N	-	3551001[7]
24P2398	40/80GB Half-High DLTVS Internal SCSI Tape Drive[4, 5]	2	16 Ultra2 LVD	133mm (5.25in) HH	N	-	3551001[7]
	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[4, 7]	-	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.

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.
2. SCSI models include a two-drop EIDE cable for attachment to the CD-ROM and an IDE tape drive. Model 8478-22X includes 10/20GB TR5 Internal IDE Tape Drive (P/N 20L0549).
3. 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.
4. RAID configurations (SCSI models only) 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) in order to connect tape drives to the standard PCI storage controller.
5. SCSI tape drives installed in EIDE models require optional PCI Wide Ultra160 SCSI Adapter (P/N 19K4646) which includes a five-drop multi-mode LVD SCSI cable.
6. Requires 68-pin External Multimode LVD/SE SCSI Terminator (P/N 00N7956).
7. 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 LVD cable. If the standard cables are used for attachment to LVD devices, single-ended SCSI rules and bus speeds apply.
8. 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).
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 68-pin high density 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 12 meters when attached to an LVD SCSI controller, and auto-termination when the 3551001 is powered off. External connector is 0.8mm VHDCI.
11. Not supported in machine type 8479 models.

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

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
8478-22X	xSeries 200 733MHz/128KB Celeron, 64MB ECC, 20.4GB IDE, Tape, 48X	1
33L3081	128MB 133Mhz ECC SDRAM DIMM Memory	1[1]
19K4461	20.4GB 7200rpm ATA/100 (EIDE) HDD	1[2]
6331N2N	E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black	1
94G3134	APC Smart-UPS 700	1

1. For a total of 192MB 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 is mind, the xSeries 200 was selected to provide an affordable price point for the growing Internet server market with an Intel Celeron processor, 192MB 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
8478-70X	x200 Pentium III 866/256, 128MB, Ultra160, Open, 48X	1
33L3081	xSeries 200 1GHz/256KB Pentium III, 128MB ECC, OPEN, 48X	1[1]
00N8208	18.2GB 10,000RPM Ultra160 SCSI HDD	3[2]
00N7991	20/40GB DDS/4 4mm Internal Tape Drive	1
6331N2N	E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), 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
00N8207	9.1GB 10,000rpm Ultra160 SCSI HDD	3[2]
10K2340	Media Bay Tray and LVD Cable Kit[3]	1
09N4042	10/20GB NS Internal SCSI Tape Drive	1
6331N2N	E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), 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 18.2GB.
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[6]	Processor Speed[2]	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)[5]	Bays (Total/Avail)	Slots (Total/Avail)
xSeries 220 At-A-Glance																	
8645-41X	25-Oct	933MHz[3]	1/2	256	128MB(R)/4GB	Tower	1/1	-	-	-	10/100	U160	4/2	0/293.6GB	48X-20X	7/5	5/5
8645-42X	25-Oct	933MHz[3]	1/2	256	128MB(R)/4GB	Tower	1/1	-	-	-	10/100	U160	4/2	18.2/293.6GB	48X-20X	7/4	5/5
8645-4AX	25-Oct	933MHz[3]	1/2	256	128MB(R)/4GB	Tower	1/1	H	-	-	10/100	U160	4/2	0/293.6GB	48X-20X	7/5	5/5
8645-51X	-	1GHz[3]	1/2	256	128MB(R)/4GB	Tower	1/1	-	-	-	10/100	U160	4/2	0/293.6GB	48X-20X	7/5	5/5
8645-52X	-	1GHz[3]	1/2	256	128MB(R)/4GB	Tower	1/1	-	-	-	10/100	U160	4/2	18.2/293.6GB	48X-20X	7/4	5/5
8645-5AX	-	1GHz[3]	1/2	256	128MB(R)/4GB	Tower	1/1	H	-	-	10/100	U160	4/2	0/293.6GB	48X-20X	7/5	5/5
8646-21X	-	1GHz[4]	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]	-	1GHz[4]	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	-	1GHz[4]	1/2	256	256MB(R)/4GB	Tower	1/1	H	-	-	10/100	U160	4/2	0/293.6GB	48X-20X	7/5	5/5
8646-31X	-	1.13GHz[4]	1/2	512	128MB(R)/4GB	Tower	1/1	-	-	-	10/100	U160	4/2	0/293.6GB	48X-20X	7/5	5/5
8646-32X[1]	-	1.13GHz[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
8646-3AX	-	1.13GHz[4]	1/2	512	256MB(R)/4GB	Tower	1/1	H	-	-	10/100	U160	4/2	0/293.6GB	48X-20X	7/5	5/5
8646-41X	-	1.26GHz[4]	1/2	512	128MB(R)/4GB	Tower	1/1	-	-	-	10/100	U160	4/2	0/293.6GB	48X-20X	7/5	5/5
8646-42X[1]	-	1.26GHz[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
8646-4AX	-	1.26GHz[4]	1/2	512	256MB(R)/4GB	Tower	1/1	H	-	-	10/100	U160	4/2	0/293.6GB	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. Not compatible with machine type 8646 models.
4. Not compatible with machine type 8645 models.
5. Variable read rate. Actual playback speed will vary and is often less than the maximum possible.
6. 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]
10K3819	Netfinity 933MHz with 133MHz FSB and 256KB Advanced Transfer Cache Pentium III Upgrade Processor	8645-4xX	-
10K0051	xSeries 1GHz Upgrade with 133MHz FSB 256KB Advanced Transfer Cache Pentium III Processor	8645-5xX	8645-4xX
32P0650	xSeries 1GHz/133MHz 256KB Cache Upgrade with Pentium III Processor	8646-2xX	-
32P0651	xSeries 1.13GHz/133MHz 512KB Cache Upgrade with Pentium III Processor SVR	8646-3xX	8646-2xX
32P0652	xSeries 1.26GHz/133MHz 512KB Cache Upgrade with Pentium III Processor SVR	8646-4xX	8646-2xX, 3xX

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 first drop is designed to support a SCSI device in the 3.5-inch nonhot-swap bay, while the second drop is connected to the hot-swap SCSI backplane.The SCSI backplane provides termination for the SCSI bus.

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

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

xSeries 220 Hard Disk Drive (HDD) and External Storage

Total Internal Storage[1]	10,000RPM HDDs				15,000RPM HDDs	
	9.1GB (00N8207 or 37L7204)[2]	18.2GB (00N8208 or 37L7205)[2]	36.4GB (00N8209 or 37L7206)[2]	73.4GB (06P5752 or 06P5756)[2]	9.1GB 19K0655[4]	18.2GB 19K0658 or 19K0656[2]
0GB	Standard on some models[5]					
9.1GB	1	-	-	-	1	-
18.2GB	2	1	-	-	2	1
27.3GB	3	-	-	-	3	-
36.4GB	4[3]	2	1	-	-	2
45.5GB	-	-	-	-	-	-
54.6GB	-	3	-	-	-	3
72.8GB	-	4[3]	2	-	-	4
91GB	-	-	-	-	-	-
109.2GB	-	-	3	-	-	-
145.6GB	-	-	4[3]	-	-	-
146.8GB	-	-	-	2	-	-
220.2GB	-	-	-	3	-	-
293.6GB (max)	-	-	-	4[3]	-	-

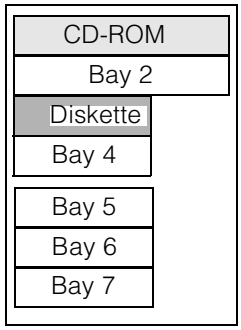
This table does not represent all possible HDD configurations.
1. Select a total storage row then select the quantity of HDDs from a column corresponding to the HDD of choice. Total Internal Storage listed is within +/- 0.2 GB unless otherwise noted.
2. Both hot-swap and nonhot-swap HDDs are listed. Select the appropriate part number for the model of xSeries 220 being configured.
3. A maximum of three hot-swap drives may be installed in hot-swap models. This configuration requires installation of a nonhot-swap HDD in Bay 4.
4. Hot-Swap models only.
5. Models 8645-42X, 52X and 8646-22X, 32X, 42X ship standard with an 18.2GB Ultra160 SCSI HDD.

Part Number	Description	RPM	Height	Hot-swap Models		Nonhot-swap Models	
				Bays Supported	Maximum Quantity	Bays Supported	Maximum Quantity
	Nonhot-swap Ultra160 Hard Disk Drives (HDD)[1]						
00N8207	9.1GB 10,000rpm Ultra160 SCSI HDD	10000	SL	4	1	4 … 7	4
00N8208	18.2GB 10,000rpm Ultra160 SCSI HDD	10000	SL	4	1	4 … 7	4
00N8209	36.4GB 10,000rpm Ultra160 SCSI HDD	10000	SL	4	1	4 … 7	4
19K0658	18.2GB 15,000rpm Ulltra160 SCSI HDD	15000	SL	4	1	4 … 7	4
06P5752	73.4GB 10Krpm Ultra160 SCSI SL HDD	10000	SL	4	1	4 … 7	4
	Hot-swap Ultra160 HDDs[2]						
37L7204	9.1GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	10000	SL	5 … 7	3	-	-
37L7205	18.2GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	10000	SL	5 … 7	3	-	-
37L7206	36.4GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	10000	SL	5 … 7	3	-	-
19K0655	9.1GB 15K-rpm Ultra160 SCSI Hot-Swap HDD	15000	SL	5 … 7	3	-	-
19K0656	18.2GB 15K-rpm Ultra160 SCSI Hot-Swap HDD	15000	SL	5 … 7	3	-	-
06P5756	73.4GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD	10000	SL	5 … 7	3	-	-

	Optical Devices	Bays Supported
10K3785	12X-8X-32X Black Internal CD-RW Drive[3]	1, 2
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	-

1. Nonhot-swap HDDs are supported in bays 4 … 7 of nonhot-swap models and in bay four of hot-swap models.
2. Hot-swap HDDs are supported in bays 5 … 7 of hot-swap models. Bay four supports nonhot-swap HDDs only.
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. This option is supported for machine type 8646 models only.

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.



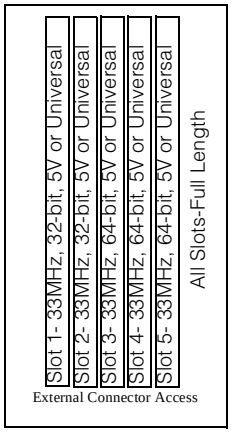
Bay	Form Factor	Height	Front Access	Usage
1	133mm (5.25in)	HH	yes	IDE CD-ROM
2	133mm (5.25in)	HH	yes	open[1]
3	89mm (3.5in)	SL	yes	Floppy
4	89mm (3.5in)	SL	yes	open
5 … 7	89mm (3.5in)	SL[2]	yes	open

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

xSeries 220 I/O Options

Part Number	Description	Adapter Length	PCI Support[1]	Slots Supported[2]
	Storage Controllers[3]			
37L6091	ServeRAID-4L Ultra160 SCSI Controller[4]	Full	64-bit	1, 2, 3, 5
37L6080	ServeRAID-4M Ultra160 SCSI Controller[5]	Full	64-bit	1, 2, 3, 5
06P5736	ServeRAID-4Mx Ultra160 SCSI Controller[6]	Full	64-bit	1, 2, 3, 5
06P5740	ServeRAID-4Lx Ultra160 SCSI Controller[7]	Half	64-bit	1, 2, 3, 5
19K4646	PCI Wide Ultra160 SCSI Adapter[8]	Half	32-bit	1 … 5
02K3454	PCI Fast/Wide Ultra SCSI Adapter[9]	Half	32-bit	1 … 5
	Networking[10]			
	Ethernet[11]			
09N9901	10/100 EtherLink Server Adapter by 3Com[12]	Half	32-bit	1 … 5
19K4401	Netfinity Gigabit Ethernet Adapter (copper)	Half	64-bit	1 … 5
06P3601	10/100 Ethernet Server Adapter[12]	Half	32-bit	1 … 5
06P3701	Gigabit Ethernet SX Server Adapter (fiber)	Half	64-bit	1 … 5
22P4901	10/100 Dual Port Server Adapter[12]	Half	64-bit	1 … 5
	Token Ring			
34L5001	16/4 Token-Ring PCI Management Adapter[12]	Half	32-bit	1 … 5
34L5201	High-Speed 100/16/4 Token-Ring PCI Management Adapter[12]	Half	32-bit	1 … 5
	Communications[13]			
33L4618	V.90 PCI Data/Fax Modem	Half	32-bit	1 … 5
37L14xx	Serial I/O SST 8, 16 and 128 Port Adapters[14]	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. 33MHz adapters will reduce 66MHz buses to 33MHz.
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 and includes a five-drop, multi-mode terminated LVD SCSI cable.
4. ServeRAID-4L Ultra160 SCSI Controller is powered by a 100MHz Intel i960 processor and provides a single channel, 16MB of ECC cache and either one internal or one external Ultra160 connection. External connector is 0.8mm VHDCI.
5. ServeRAID-4M Ultra160 SCSI Controller is powered by a 100MHz Intel i960 processor and provides two channels, 64MB of battery-backed ECC cache and two external 0.8mm VHDCI Ultra160 connectors.
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. Only one of the two connectors may be utilized.
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. The xSeries 220 includes an integrated full-duplex, 10/100Mbps Ethernet 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 three Intel-based optional Ethernet adapters (P/N 06P3601, 06P3701, 22P4901).
12. The Wake on LAN feature of this adapter is supported only in slot one.
13. 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.
14. See Appendix E for details on Serial I/O Options and configuration limitations.

xSeries 220 Power, Monitors & Accessories

Part Number	Description
	Power[1]
	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]
94G6674	APC Smart-UPS 1400RMB[3]
94G6676	APC Smart-UPS 3000RMB[3]
37L6861	APC Smart-UPS 5000RMB[4]
	Monitors[5]
6331N2N	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]

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.

Part Number	Description
	Conversion Kits
09N4300	4Ux20D Tower-to-Rack Kit
	Rack and NetBAY[1]
	Refer to the Rack Cabinets and Options section for information concerning IBM racks and rack-supported devices.
	Keyboard and Mouse[2]
28L3644	Space Saver II Keyboard[3, 4]
01K1260	TrackPoint IV 104-key Black Keyboard[4, 5]
28L3621	Preferred Keyboard (stealth black)[5]
10K3849	106-key Preferred USB Keyboard with 2-port USB Hub (stealth black)[5]
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 or Netfinity 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 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[3]	2	16 Ultra2 LVD	89mm (3.5in) HH or 133mm (5.25in) HH	N	-	3510020[4], 3551001[5]
00N8016	100/200GB LTO Tape Drive[10]	-	16 Ultra2 LVD	133mm (5.25in) FH	N	-	3551001[5]
24P2398	40/80GB Half-High DLTVS Internal SCSI Tape Drive[3]	2	16 Ultra2 LVD	133mm (5.25in) HH	N	-	3551001[5]
	Tape Autoloaders						
00N7992	120/240GB DDS/4 Tape Autoloader	-	16 Ultra2 LVD	133mm (5.25in) FH	N	-	3551001[5]
	External Tape Libraries[6]						
3570C2x	Magstar MP 3570 Tape Subsystem	-	HVD	6U Rack	Y	-	-
	External Tape Enclosures						
3510020	External Half High SCSI Storage Enclosure[7]	-	8, 16	Desktop	N	N	-
3551001	NetMEDIA Storage Expansion Unit EL[8]	-	16	Rack	Y	N	-
10L7113	NetMEDIA Systems Management Adapter[9]	-	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, 5]	-	16 LVD	Internal	Y	N	3551001

Note: All models include an Ultra160 SCSI controller. Nonhot-swap models include a five-drop multi-mode terminated LVD SCSI cable. Hot-swap models include a two-drop nonterminated cable. Single-ended devices attached to this cable will limit the entire SCSI bus 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 multi-mode terminated LVD SCSI cable and an external 0.8-mm VHDCI connector.

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.
2. 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.
3. 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.
4. Requires 68-pin External Multimode LVD/SE SCSI Terminator (P/N 00N7956)
5. 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. If the standard cables are used for attachment to LVD devices, single-ended SCSI rules and bus speeds apply.
6. Tape library attributes and prerequisites are located in Appendix B: Tape Library Attributes.
7. 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).
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 68-pin high density 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. Not supported for machine type 8646 models.

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
8645-5AX	xSeries 220 1GHz/256KB, 128MB ECC, Open Hot-Swap, 48X	1
10K0018	128MB PC133 ECC SDRAM RDIMM	1[1]
37L7205	18.2GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	2[2]
00N7991	20/40GB DDS/4 4mm Internal Tape Drive	1
6331N2N	E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black	1
94G3134	APC Smart-UPS 700	1

1. For a total of 256MB 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 is mind, the xSeries 220 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. 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]
00N8208	18.2GB 10,000rpm Ultra160 SCSI HDD	3[2]
00N7991	20/40GB DDS/4 4mm Internal Tape Drive	1
6331N2N	E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), 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, 128MB 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 Ultra160 SCSI Controller	1
37L7205	18.2GB 10K-4 Ultra160 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
6331N2N	E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), 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 220 was selected to provide an affordable price point for an application server with two-way Pentium III processing, 384MB 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 230

Part Number	Processor Speed[5]	Number of Processors (Std/Max)	L2 ECC Cache (KB)	Memory (Std/Max) (R = RDIMM)[2]	Form Factor	Power Supply Quantity (Std/Max)	Hot-Swap (Power, Slots, HDD, Fans)	Redundancy (Optional, Standard)[3]	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 230 At-A-Glance																
8658-61Y	1GHz	1/2	256	128MB(R)/ 4GB	Tower	1/3	O - Power S - HDD	O - Power	Y	10/100	D,U160	4/2	0/ 440.4GB	40X-17X	10/8	5/5
8658-6RY[1]	1GHz	1/2	256	128MB(R)/ 4GB	Rack (5U)	1/3	O - Power S - HDD	O - Power	Y	10/100	D,U160	4/2	0/ 440.4GB	40X-17X	10/8	5/5

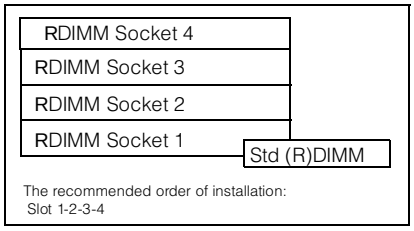
1. Housed in a 19in rack-mountable drawer and ships standard without a keyboard or mouse. See Rack Cabinets and Options section for supported IBM racks.
2. High-speed, 133MHz SDRAM.
3. Up to two additional 250W Hot-Swap Redundant Power Supplies (P/N 33L3760) and a single Hot-Swap Power Supply Expansion Kit (P/N 37L6881) are required for power supply redundancy. See xSeries 230 Power, Monitor & Accessories for additional information.
4. Variable read rate. Actual playback speed will vary and is often less than the maximum possible.
5. Intel Pentium III processor with advanced transfer L2 cache and 133MHz FSB.

xSeries 230 Processors

Part Number	Processor Upgrades	SMP Support[1]	Processor Speed Upgrade[2]
19K4631	Netfinity 933MHz 133MHz FSB/256KB Upgrade with Pentium III Processor	5xY	-
19K4640	1GHz Upgrade with 133MHz FSB and 256KB Advanced Transfer Cache Pentium III Processor	6xY	5xY

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" and then "BIOS".

xSeries 230 Memory



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. The recommended order of installation is in sequence from Socket 1 to Socket 4. Memory size is not a factor.

Total Memory[1]	Quantity of RDIMMs Added			
128MB (1 x 128) Models	**128MB (10K0018)**	**256MB (10K0020)**	**512MB (10K0022)**	**1GB (33L3326)**
256MB	1	-	-	-
384MB	2 or	1	-	-
512MB	3	-	-	-
640MB	-	2 or	1	-
896MB	-	3	-	-
1024MB	-	4[2]	-	-
1152MB	-	-	2 or	1
1664MB	-	-	3	-
2048MB	-	-	4[2]	-
2176MB	-	-	-	2
3200MB	-	-	-	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.

xSeries 230 Internal SCSI Cabling

The xSeries 230 contains a DASD backplane supporting six hot-swap, SCA-2 compliant drive bays. The backplane is connected to channel A of 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 to a supported RAID adapter rather than the integrated SCSI controller. No external SCSI port is included.

A two-drop, 16-bit LVD SCSI cable with integrated terminator is also included with the Netfinity Hot-Swap Power Supply Expansion Kit (P/N 37L6881).This cable is included in the expansion kit because installation of SCSI devices in bays A and B may require additional power. The two-drop cable supports up to two internal devices in these bays. This cable can be attached to channel B of the integrated dual-channel Ultra160 SCSI controller or to a supported SCSI adapter.

xSeries 230 Hard Disk Drive (HDD) Storage

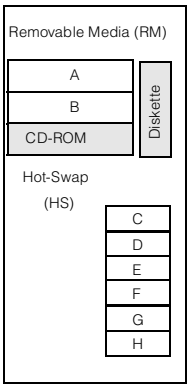
Total Int Storage[1]	10,000RPM HDDs				15,000RPM HDDs	
	9.1GB (37L7204)	18.2GB (37L7205)	36.4GB (37L7206)	73.4GB (06P5756)	9.1GB (19K0655)	18.2GB (19K0656)
0GB	Standard on base models					
9.1GB	1	-	-	-	1	-
18.2GB	2	1	-	-	2	1
27.3GB	3	-	-	-	3	-
36.4GB	4	2	1	-	4	2
45.5GB	5	-	-	-	5	-
54.6GB	6	3	-	-	6	3
72.8GB	-	4	2	-	-	4
91GB	-	5	-	-	-	5
109.2GB	-	6	3	-	-	6
145.6GB	-	-	4	-	-	-
182GB	-	-	5	-	-	-
218.4GB	-	-	6	-	-	-
220.2GB	-	-	-	3	-	-
293.6GB	-	-	-	4	-	-
367GB	-	-	-	5	-	-
440.4GB (max)	-	-	-	6	-	-

This table does not represent all possible HDD configurations. Nonhot-swap HDDs installed in removable media bays are not included in this table.
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.

Bay	Form Factor	Height	Front Access	Usage
A	133mm (5.25in)	HH[1]	Yes	Open
B	133mm (5.25in)	HH[1]	Yes	Open
-	133mm (5.25in)	SL	Yes	IDE CD-ROM
-	89mm (3.5in)	SL	Yes	Diskette
C … H	HS	SL	Yes	Open

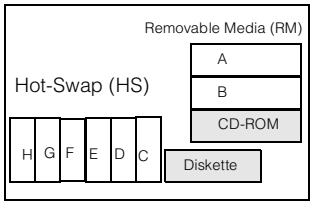
1. Two half-high (HH) bays can be combined to support a single full-high (FH) device. Installation of devices in Bays A or B may require Netfinity Hot-Swap Power Supply Expansion Kit (P/N 37L6881) and at least one Netfinity 250W Hot-Swap Redundant Power Supply (P/N 33L3760). One or more optional power supplies are recommended for configurations exceeding four SL hot-swap hard disk drives and two PCI adapters.

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



Part Number	Description	RPM	Height	Bays Supported	Max Qty
Hot-Swap Ultra160 HDDs					
37L7204	9.1GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	10000	SL	C … H	6
37L7205	18.2GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	10000	SL	C … H	6
37L7206	36.4GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	10000	SL	C … H	6
19K0655	9.1GB 15Krpm Ultra160 SCSI Hot-Swap HDD	15000	SL	C … H	6
19K0656	18.2GB 15Krpm Ultra160 SCSI Hot-Swap HDD	15000	SL	C … H	6
06P5756	73.4GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD	10000	SL	C … H	6

External Storage Expansion Units[1]		Form Factor
35311RU	EXP300 Storage Expansion Unit[2]	Rack (3U)
09N7296	EXP300 Rack-to-Tower Conversion Kit	-
35601RU	FAStT EXP500 Storage Expansion Unit[3]	Rack (3U)
35421RU	FAStT200 Storage Server[4, 5]	Rack (3U)
35422RU	FAStT200 HA Storage Server[4]	Rack (3U)
19K1121	FAStT200 Redundant RAID Controller	-

1. 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.
2. EXP300 includes a single 2M Ultra2 SCSI cable and dual hot-swap 500W redundant power supplies, each with its own power cord.
3. FAStT EXP500 Storage Expansion Unit (P/N 35601RU) includes dual hot-swap 350W power supplies, each with its own power cord.
4. The FAStT200 includes two hot-swap, 350W auto-ranging redundant power supplies, each with its own power cord.
5. Can be upgraded to FAStT200 HA Storage Server through the addition of a FAStT200 Redundant RAID Controller (P/N 19K1121).

xSeries 230 I/O Options

Part Number	Description	Adapter Length	PCI Support[22]	Slots Supported
	Storage Controllers[1]			
37L6091	ServeRAID-4L Ultra160 SCSI Controller[2]	Full	64-bit	1 … 5
37L6080	ServeRAID-4M Ultra160 SCSI Controller[3]	Full	64-bit	1 … 5
37L6889	ServeRAID-4H Ultra160 SCSI Controller[4]	Full	64-bit	1 … 5
06P5736	ServeRAID-4Mx Ultra160 SCSI Controller[5]	Full	64-bit	1 … 5
06P5740	ServeRAID-4Lx Ultra160 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[23]	Half	32-bit	1 … 5
	Fibre Storage Controllers and Options[8]			
00N6881	Netfinity FAStT Host Adapter	Half	64-bit	1 …5
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	-	-	-
2108R3L	SAN Data Gateway Router Ultra SCSI LVD Port[9]	-	-	-
	Networking[10]			
	Ethernet[11]			
19K4401	Netfinity Gigabit Ethernet Adapter (copper)	Half	64-bit	1 … 5
06P3601	10/100 Ethernet Server Adapter[12]	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[12]	Half	32-bit	1 … 5
22P4901	10/100 Dual Port Server Adapter[12]	Half	64-bit	1 … 5
	Token Ring			
34L0701	Token-Ring 16/4 PCI Adapter 2 with Wake on LAN[12]	Half	32-bit	1 … 5
34L5201	High-Speed 100/16/4 Token-Ring PCI Management Adapter[12]	Half	32-bit	1 … 5
	Communications[13]			
33L4618	V.90 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[16]			
01K7209	Netfinity Advanced System Management PCI Adapter[17]	Full	32-bit	1 … 5 [18]
03K9309	Netfinity Advanced System Management Interconnect Cable Kit[19]	-	-	-
	Host Attach			
9086001	Netfinity ESCON Adapter[20]	Full	32-bit	1 … 5[21]

1. xSeries 230 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.
2. ServeRAID-4L Ultra160 SCSI Controller is powered by a 100MHz Intel i960 processor and provides a single channel, 16MB of ECC cache and either one internal or one external Ultra160 connection. External connector is 0.8mm VHDCI.
3. ServeRAID-4M Ultra160 SCSI Controller is powered by a 100MHz Intel i960 processor and provides two channels, 64MB of battery-backed ECC cache and two internal and two external Ultra160 connectors (only two connectors may be utilized). External connectors are 0.8mm 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 up to four external Ultra160 connectors (only 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 connectior 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. 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 230 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 AMD-based. Three of the optional PCI Ethernet adapters listed are Intel-based (P/N 06P3601, 06P3701, 22P4901).
12. The Wake on LAN function of this option is not supported by this server.
13. xSeries 230 includes two USB ports, two serial and one parallel port.
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. The Netfinity Advanced Systems Management Processor and Interconnect Bus integrated into xSeries 230 works with Netfinity Director to provide significant system management function. When used with optional Netfinity Advanced System Management PCI Adapter (P/N 01K7209) and Netfinity Advanced System Management Interconnect Cable Kit (P/N 03K9309) additional management and control of up to 12 service processors from a remote console through a single modem or LAN connection is possible.
17. Includes PCI adapter, Netfinity Advanced System Management Interconnect Cable Kit components and 56W AC adapter, which requires a separate power source. Provides an integrated 10/100 Ethernet port and a PCMCIA slot to support optional Netfinity Advanced System Management Token-Ring Connection (P/N 36L9654).
18. A maximum quantity of one is supported.
19. Required for all xSeries servers containing a standard Advanced System Management Processor that are to be interconnected for system management support through a LAN or modem connection. Optional Netfinity Advanced System Management PCI Adapter (P/N 01K7209) includes the contents of this option. Up to 12 service processors may be interconnected (including standard and optional processors) with an aggregate connection length of no more than 91.4m (300ft). A customer-supplied Ethernet cable is required for each interconnection.
20. Provides an ESCON MIC and a DB9 Serial Port. Cables are not included but are available through S/390 channels. Contact your IBM representative for additional information.
21. A maximum of two 9086001 adapters (installed in nonadjacent slots) are supported in a single server.
22. 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.
23. 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.

xSeries 230 Power, Monitors & Accessories

Part Number	Description
	Power
33L3760	250W Hot-Swap Redundant Power Supply[2]
37L6881	Hot-Swap Power Supply Expansion Kit[3]
	Uninterruptible Power Supply (UPS)[4]
94G3135	APC Smart-UPS 1000
94G3136	APC Smart-UPS 1400
94G6674	APC Smart-UPS 1400RMB[5]
94G6676	APC Smart-UPS 3000RMB[5]
37L6861	APC Smart-UPS 5000RMB[6]
	Monitors[7]
6331N2N	E54 Color Monitor 15in (350mm, 13.8in viewable image size), 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]

1. xSeries 230 includes a single 250W, hot-swap 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 may be achieved with the addition of optional 250W Hot-Swap Redundant Supply (P/N 33L3760). Hot-Swap Power Supply Upgrade Kit (P/N 37L6881) is required when optional power supplies are to be added. Redundancy for configurations of greater than 250W requires installation of a second optional supply. Additional power may be required when installing a SCSI device in bay A or B. One or more additional power supplies are recommended for configurations exceeding four SL hot-swap hard disk drives and two PCI adapters. 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. Hot-Swap Power Supply Expansion Kit (P/N 37L6881) must be installed prior to adding optional power supplies.
3. Hot-Swap Power Supply Expansion Kit (P/N 37L6881) includes a hot-swap power backplane, terminated two-drop LVD SCSI cable, and mounting brackets for DLT tape drives. Required when installing a second power supply or devices in the 133mm (5.25in) HH bays.
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 230 uses an SVGA controller (S3 Savage4 chipset) with 8MB of video memory.
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.

Part Number	Description
Conversion Kits	
37L6858	5Ux24D Tower-to-Rack Kit
Rack and NetBAY[1]	
	Refer to the Rack Cabinets and Options section for information concerning IBM racks and rack-supported devices.
Keyboard and Mouse[2]	
28L3644	Space Saver II Keyboard[3, 5]
01K1260	TrackPoint IV 104-Key Black Keyboard[4, 5]
28L3621	Preferred Keyboard (stealth black)[4]
28L3673	Sleek 2-Button Stealth Black Mouse

1. xSeries 230 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 or Netfinity systems.

xSeries 230 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]	A, B	16 Ultra2 LVD	89mm (3.5in) HH or 133mm (5.25in) HH	N	-	3510020[4], 3551001[3]
09N4040	20/40GB DLT Internal SCSI Tape Drive[1]	A+B	8	133mm (5.25in) FH	N	Y	3503B0X[4], 3551001
00N7990	40/80GB DLT Internal SCSI Tape Drive[1]	A+B	16 Ultra2 LVD	133mm (5.25in) FH	N	-	3503B0X[4], 3551001[3]
00N8017	60/120GB 8mm M2 SCSI Tape Drive[1]	A, B	16 Ultra2 LVD	133mm (5.25in) HH	N	-	3510020[4], 3551001[3]
00N8016	100/200GB LTO Tape Drive[1]	A+B	16 Ultra2 LVD	133mm (5.25in) FH	N	-	3551001[3]
00N8015	110/220GB Super DLT Internal SCSI Tape Drive[1]	A+B	16 Ultra2 LVD	133mm (5.25in) FH	N	-	3551001[3]
24P2396	100/200GB LTO Half-High Tape Drive[1]	A, B	16 Ultra2 LVD	133mm (5.25in) HH	N	-	3551001[3]
24P2398	40/80GB Half-High DLTVS Internal SCSI Tape Drive[1]	A, B	16 Ultra2 LVD	133mm (5.25in) HH	N	-	3551001[3]
Tape Autoloaders							
3502108	DLT Tape Autoloader	-	16	Desktop	Y	-	-
00N7992	120/240GB DDS/4 Tape Autoloader[1]	A+B	16 Ultra2 LVD	133mm (5.25in) FH	N	N	3551001[3]
3600109	3600 Series 900GB/1.8TB LTO Tape Autoloader[2]	-	16 Ultra2 LVD	Tower or 6U Rack	Y	-	-
External Tape Libraries[5]							
3502x14	DLT Tape Library	-	16	Desktop or 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	-	-
09N4048	3600 Series LTO Drive Upgrade Option[6]	-	16 Ultra2 LVD	-	N	-	-
External Tape Enclosures							
3510020	External Half High SCSI Storage Enclosure[7]	-	8/16	Desktop	N	N	-
3551001	NetMEDIA Storage Expansion Unit EL[8]	-	16	Rack	Y	N	-
10L7113	NetMEDIA Systems Management Adapter[9]	-	16 LVD	-	N	N	3551001
Associated Options							
00N7956	68-pin External Multimode LVD/SE SCSI Terminator	-	16 LVD/SE	Ext	Y	N	3510020, 3503B0X
10K2340	Media BayTray and LVD Cable Kit[1, 3]	-	16 LVD	Int	Y	N	3551001
37L6881	Netfinity Hot-Swap Power Supply Expansion Kit[10]	-	16 LVD	Int	Y	N	-
33L3760	250W Hot-Swap Redundant Power Supply	-	-	-	-	-	-

Note: Additional power may be required when installing a SCSI device in bay A or B. Configurations exceeding four SL hot-swap hard disk drives and two PCI adapters are recommended to include both Hot-Swap Power Supply Expansion Kit (P/N 37L6881) and at least one optional 250W Hot-Swap Redundant Power Supply (P/N 33L3760). An optional SCSI cable is required for attachment of media bay devices to 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. Internal tape drives require the two-drop multi-mode terminated LVD SCSI cable included with either Media Bay Tray and LVD Cable Kit (P/N 10K2340) or Hot-Swap Power Supply Expansion Kit (P/N 37L6881).
2. 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.
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. 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. 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.
7. 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).
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 68-pin high density 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. Hot-Swap Power Supply Expansion Kit (P/N 37L6881) includes a hot-swap power backplane and two-drop multi-mode terminated LVD SCSI cable. Required when installing a second power supply.

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

xSeries 230 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
8658-61Y	xSeries 230 1GHz/256KB, 128MB(R) ECC, Open, 40X	1
10K0018	128MB PC133 ECC SDRAM RDIMM	1[1]
06P5740	ServeRAID-4Lx Ultra160 SCSI Controller	1
37L7204	9.1GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	4[2]
00N8017	60/120GB 8mm M2 SCSI Tape Drive	1
6331N2N	E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black	1
94G3135	APC Smart-UPS 1000	1
37L6881	Hot-Swap Power Supply Expansion Kit	1
33L3760	250W Hot-Swap Redundant Power Supply	1

1. For a total of 256MB 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 18.2GB.

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 xSeries 230 was selected to provide an affordable price point for the growing Internet server market, 256MB of system memory (expandable to 4GB, and 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.

File and Print Server

Part Number	Description	Quantity
8658-61Y	xSeries 230 1GHz/256KB, 128MB ECC, OPEN, 40X, PCI	1
10K0018	128MB PC133 ECC SDRAM RDIMM	1[1]
06P5740	ServeRAID-4Lx Ultra160 SCSI Controller	1
37L7204	9.1GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	5[2]
00N8017	60/120GB 8mm M2 SCSI Tape Drive	1
6331N2N	E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black	1
94G3135	APC Smart-UPS 1000	1
37L6881	Hot-Swap Power Supply Expansion Kit	1
33L3760	250W Hot-Swap Redundant Power Supply	1

1. For a total of 256MB 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 27.3GB.

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 230 with 256MB of memory (expandable to 4GB) and 27.3GB of RAID-protected 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.

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

Rack-Mounted Application Server

Part Number	Description	Quantity
8658-6RY	xSeries 230 1GHz/256KB, 128MB(R) ECC, Open, 40X (Rack 5U)	1
19K4640	1GHz Upgrade with 133MHz FSB and 256KB Advanced Transfer Cache Pentium III Processor	1
10K0020	256MB PC133 ECC SDRAM RDIMM	1[1]
06P5736	ServeRAID-4Mx Ultra160 SCSI Controller	1
37L7204	9.1GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	5[2]
00N8017	60/120GB 8mm M2 SCSI Tape Drive	1
6331N2N	E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black	1
94G6674	APC Smart-UPS 1400RMB	1
33L3760	250W Hot-Swap Redundant Power Supply	1
37L6881	Hot-Swap Power Supply Expansion Kit	1
	Industry Standard 19in Rack, EIA-310D, min depth of 28in (711mm)	
9306200	Netfinity NetBAY22	1
28L3644	Space Saver II Keyboard	1
94G6670	Blank Filler Panel Kit	2

1. For a total of 384MB of system memory.
2. Five HDDs are used for RAID 5 protection. Effective capacity is four HDDs or 36.4GB.

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 230 was selected to provide an affordable price point for an application server with two-way Pentium III processing, 384MB 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.

xSeries 230 High Availability Cluster (P/N 25P1821 and 25P1822)[1]

(Refer to High Availability and Scalable Cluster Solutions section)

1. P/N 25P1821 includes Windows NT EE as the operating system for this integrated tower solution. P/N 25P1822 uses Windows 2000 Advanced Server.

IBM xSeries 232

Part Number	Processor Speed (GHz)[2]	Number of Processors (Std/Max)	L2 ECC Cache (KB)	Memory (Std/Max) (RDIMM)[3]	Form Factor	Power Supply Quantity (Std/Max)	Hot-Swap (Power, Slots, HDD, Fans)	Redundancy (Optional, Standard)	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	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]	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
8668-41X	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

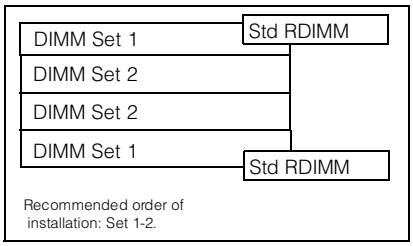
1. Housed in a 19in rack-mountable drawer and ships standard without a keyboard or mouse. See Rack Cabinets and Options section for supported IBM racks.
2. Intel Pentium III processor with advanced transfer L2 cache and 133MHz FSB.
3. High-speed, 133MHz SDRAM.
4. Power supply redundancy requires removal 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 Ultra160 Hot-Swap Expansion Kit (P/N 33L5050), which converts the two available removable media bays to three SL hot-swap HDD bays.

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	1xX	-
24P3512	xSeries 1.13GHz/133MHz, 512KB Cache Upgrade with Pentium III Processor SVR	2xX	1xX
25P2600	xSeries 1.26GHz/133MHz, 512KB Cache Upgrade with Pentium III Processor	4xX	1xX, 2xX

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, install memory options in pairs beginning with set 1.

Total Memory[1]	Quantity of RDIMMs Added			
256MB (2 x 128) Models	128MB (33L3320)	256MB (33L3322)	512MB (33L3324)	1GB (33L3326)
512MB	2	-	-	-
768MB	-	2	-	-
1024MB[2]	-	4	-	-
1280MB	-	-	2	-
1152MB[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 to 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. 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. It can also be used to attach to a supported SCSI adapter if the integrated Ultra160 SCSI controller is utilized for the hot-swap bays. The 48x-20x IDE CD-ROM is cabled directly to the IDE port. To attach external SCSI devices, a supported SCSI adapter is required.

xSeries 232 Hard Disk Drive (HDD) Storage

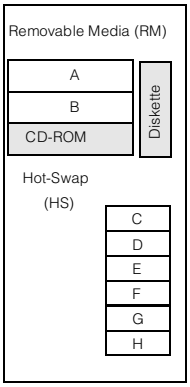
Total Int Storage[1]	10,000RPM HDDs				15,000RPM HDDs	
	9.1GB 37L7204	18.2GB 37L7205	36.4GB 37L7206	73.4GB 06P5756	9.1GB 19K0655	18.2GB 19K0656
0GB	Standard on base models					
9.1GB	1	-	-	-	1	-
18.2GB	2	1	-	-	2	1
27.3GB	3	-	-	-	3	-
36.4GB	4	2	1	-	4	2
45.5GB	5	-	-	-	5	-
54.6GB	6	3	-	-	6	3
72.8GB	-	4	2	-	-	4
91GB	-	5	-	-	-	5
109.2GB	-	6	3	-	-	6
145.6GB	-	-	4	-	-	-
182GB	-	-	5	-	-	-
218.4GB	-	-	6	-	-	-
327.6GB[2]	-	-	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
A[1]	133mm (5.25in)	HH[2]	Yes	Open
B[1]	133mm (5.25in)	HH[2]	Yes	Open
-	133mm (5.25in)	HH	Yes	IDE CD-ROM
-	89mm (3.5in)	SL	Yes	Diskette
C … H	HS	SL	Yes	Open

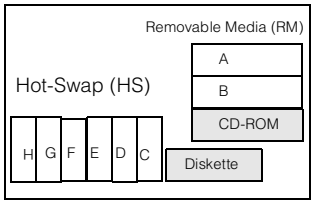
1. Bays A and B can be converted to three hot-swap HDDs using the optional 3-Pack Ultra160 Hot-Swap Expansion Kit (P/N 33L5050).
2. Two half-high (HH) bays can be combined to support a single full-high (FH) device.

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

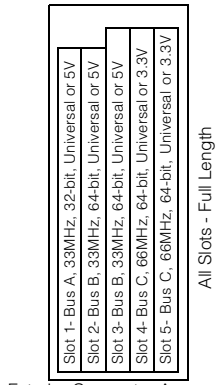


Part Number	Description	RPM	Height	Bays Supported	Max Qty[1]
Hot-Swap Ultra160 HDDs					
37L7204	9.1GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	10000	SL	C … H	6
37L7205	18.2GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	10000	SL	C … H	6
37L7206	36.4GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	10000	SL	C … H	6
19K0655	9.1GB 15Krpm Ultra160 SCSI Hot-Swap HDD	15000	SL	C … H	6
19K0656	18.2GB 15Krpm Ultra160 SCSI Hot-Swap HDD	15000	SL	C … H	6
06P5756	73.4GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD	10000	SL	C … H	6
Associated Options					
33L3760	250W Hot-Swap Redundant Power Supply	-			
24P3513	xSeries Hot-Swap Power Conversion Kit[2]	-			
33L5050	IBM 3-Pack Ultra160 Hot-Swap Expansion Kit[3]	-			
Optical Devices					
10K3785	12X-8X-32X Black Internal CD-RW Drive[4]	-			
External Storage Expansion Units[5]		**Form Factor**			
35311RU	EXP300 Storage Expansion Unit[6]	Rack (3U)			
09N7296	EXP300 Rack-to-Tower Conversion Kit	-			
35601RU	FAStT EXP500 Storage Expansion Unit[7]	Rack (3U)			
35421RU	FAStT200 Storage Server[8, 9]	Rack (3U)			
35422RU	FAStT200 HA Storage Server[8]	Rack (3U)			
19K1121	FAStT200 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 Ultra160 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. 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. FAStT EXP500 Storage Expansion Unit (P/N 35601RU) includes dual hot-swap 350W power supplies, each with its own power cord.
8. The FAStT200 includes two hot-swap, 350W auto-ranging redundant power supplies, each with its own power cord.
9. Can be upgraded to FAStT200 HA Storage Server through the addition of a FAStT200 Redundant RAID Controller (P/N 19K1121).

xSeries 232 I/O Options

Part Number	Description	Adapter Length	PCI Support[1]	Slots Supported[1]
	Storage Controllers[2]			
37L6091	ServeRAID-4L Ultra160 SCSI Controller[3]	Full	64-bit	1 … 5
37L6080	ServeRAID-4M Ultra160 SCSI Controller[4]	Full	64-bit	2 … 5
37L6889	ServeRAID-4H Ultra160 SCSI Controller[5]	Full	64-bit	2 … 5
06P5736	ServeRAID-4Mx Ultra160 SCSI Controller[6]	Full	64-bit	2 … 5
06P5740	ServeRAID-4Lx Ultra160 SCSI Controller[7]	Half	64-bit	1 … 5
19K4646	PCI Wide Ultra160 SCSI Adapter[8]	Half	32-bit	1 … 5
02K3454	PCI Fast/Wide Ultra SCSI Adapter[19]	Half	32-bit	1 … 5
	Fibre Storage Controllers and Options[9]			
00N6881	Netfinity FAStT Host Adapter	Half	64-bit	1 …5
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	-	-	-
2108R3L	SAN Data Gateway Router Ultra SCSI LVD Port[10]	-	-	-
	Networking[11]			
	Ethernet[12, 13]			
19K4401	Netfinity Gigabit Ethernet Adapter (copper)	Half	64-bit	1 … 5
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
	Token Ring[13]			
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
	Communications[14]			
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
	Systems Management			
09N7585	Remote Supervisor Adapter	Half	32-bit	1
	Host Attach			
9086001	Netfinity ESCON Adapter[17]	Full	32-bit	1 … 5[18]



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.
2. xSeries 232 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.
3. ServeRAID-4L Ultra160 SCSI Controller is powered by a 100MHz Intel i960 processor and provides a single channel, 16MB of ECC cache and either one internal or one external Ultra160 connection. External connector is 0.8mm VHDCI.
4. ServeRAID-4M Ultra160 SCSI Controller is powered by a 100MHz Intel i960 processor and provides two channels, 64MB of battery-backed ECC cache with two internal and two external Ultra160 connectors (only two connectors may be utilized). External connectors are 0.8mm VHDCI .
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. Only one of the two connectors may be utilized.

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 232 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 three Intel-based optional Ethernet adapters (P/N 06P3601, 06P3701, 22P4901).
13. 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.
14. xSeries 232 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. Provides an ESCON MIC and a DB9 Serial Port. Cables are not included but are available through S/390 channels. Contact your IBM representative for additional information.
18. A maximum of two 9086001 adapters (installed in nonadjacent slots) are supported in a single server.
19. 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.

xSeries 232 Power, Monitors & Accessories

Part Number	Description
	Power[1]
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
94G6674	APC Smart-UPS 1400RMB[5]
94G6676	APC Smart-UPS 3000RMB[5]
37L6861	APC Smart-UPS 5000RMB[6]
	Monitors[7]
6331N2N	E54 Color Monitor 15in (350mm, 13.8in viewable image size), 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]

1. xSeries 232 base models 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 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.

Part Number	Description
	Conversion Kits
21P9593	5Ux24D Tower-to-Rack Kit II
	Rack and NetBAY[1]
	Refer to the Rack Cabinets and Options section for information concerning IBM racks and rack-supported devices.
	Keyboard and Mouse[2]
28L3644	Space Saver II Keyboard[3, 5]
01K1260	TrackPoint IV 104-Key Black Keyboard[4, 5]
28L3621	Preferred Keyboard (stealth black)[4]
10K3849	106-key Preferred USB Keyboard with 2-port USB Hub (stealth black)[4]
22P5150	TrackPoint USB Space Saver Keyboard[3, 5]
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 or Netfinity systems.

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[1]	A, B	16 Ultra2 LVD	89mm (3.5in) HH or 133mm (5.25in) HH	N	-	3510020[3], 3551001[2]
09N4040	20/40GB DLT Internal SCSI Tape Drive[1]	A+B	8	133mm (5.25in) FH	N	Y	3551001[3]
00N7990	40/80GB DLT Internal SCSI Tape Drive[1]	A+B	16 Ultra2 LVD	133mm (5.25in) FH	N	-	3551001[2]
00N8015	110/220GB Super DLT Internal SCSI Tape Drive[1]	A+B	16 Ultra2 LVD	133mm (5.25in) FH	N	-	3551001[2]
00N8016	100/200GB LTO Tape Drive[1]	A+B	16 Ultra2 LVD	133mm (5.25in) FH	N	-	3551001[2]
00N8017	60/120GB 8mm M2 SCSI Tape Drive[1]	A, B	16 Ultra2 LVD	133mm (5.25in) HH	N	-	3510020[3] 3551001[2]
24P2396	100/200GB LTO Half-High Tape Drive[1]	A, B	16 Ultra2 LVD	133mm (5.25in) HH	N	-	3551001[2]
	Tape Autoloaders						
00N7992	120/240GB DDS/4 Tape Autoloader[1]	A+B	16 Ultra2 LVD	133mm (5.25in) FH	N	-	3551001[2]
3502108	DLT Tape Autoloader	-	16	Desktop	Y	-	-
	External Tape Libraries[4]						
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[5]	-	8, 16	Desktop	N	N	-
3551001	NetMEDIA Storage Expansion Unit EL[6]	-	16	Rack	Y	N	-
10L7113	NetMEDIA Systems Management Adapter[7]	-	16 LVD	-	N	N	3551001
	Associated Options						
10K2340	Media BayTray and LVD Cable Kit[1, 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[8]	-	-	-	-	-	-
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. Internal tape drives require the two-drop multi-mode terminated LVD SCSI cable included with the Media Bay Tray and LVD Cable Kit (P/N 10K2340).
2. 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. If the standard cables are used for attachment to LVD devices, single-ended SCSI rules and bus speeds apply.
3. Requires 68-pin External Multimode LVD/SE SCSI terminator (P/N 00N7956).
4. Tape library attributes and prerequisites are located in Appendix B: Tape Library Attributes.
5. 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).
6. 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.
7. 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.
8. 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
8668-11X	xSeries 232 1GHz/256KB Pentium III, 256MB ECC, Open, 48X	1
33L3320	128MB PC133 ECC SDRAM RDIMM	2[1]
06P5740	ServeRAID-4Lx Ultra160 SCSI Controller	1
37L7206	36.4GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	4[2]
00N8017	60/120GB 8mm M2 SCSI Tape Drive	1
10K2340	Media Bay Tray and LVD Cable Kit	1
6331N2N	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
37L7205	18,2GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	5[2]
00N8017	60/120GB 8mm M2 SCSI Tape Drive	1
10K2340	Media Bay Tray and LVD Cable Kit	1
6331N2N	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	1

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
37L7205	18.2GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	5[2]
00N8017	60/120GB 8mm M2 SCSI Tape Drive	1
10K2340	Media Bay Tray and LVD Cable Kit	1
6331N2N	E54 Color Monitor 15in (350mm, 13.8in viewable image), stealth black	1
94G6674	APC 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	Processor Speed[2]	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	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]	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

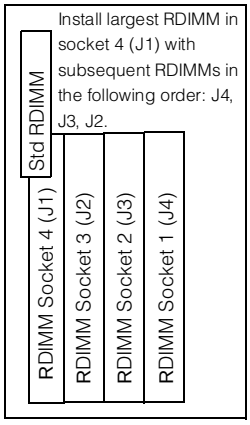
1. Housed in a 19in rack-mountable drawer and ships standard without a keyboard or mouse. See Rack Cabinets and Options section for supported IBM racks.
2. Intel Pentium III processor with advanced transfer L2 cache and 133MHz FSB.
3. High-speed 133MHz SDRAM.
4. Robust configurations may require optional 250W Hot-Swap Redundant Power Supply (P/N 33L3760) for redundancy. See "Power" under "Power, Monitor & Accessories" for additional information.
5. Variable read rate. Actual playback speed will vary and is often less than the maximum possible.

xSeries 240 Processors

Part Number	Processor Upgrades	SMP Support[1]	Processor Speed Upgrade[2]
19K4631	Netfinity 933MHz 133MHz FSB/256KB Upgrade with Pentium III Processor	7xY	-
19K4640	1GHz Upgrade with 133MHz FSB and 256KB Advanced Transfer Cache Pentium III Processor	8xY	7xY

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" and then "BIOS".

xSeries 240 Memory



Total Memory[1]	Quantity of RDIMMs Added			
256MB (1 x 256) Models	**128MB (33L3058)**	**256MB (33L3060)**	**512MB (33L3062)**	**1GB (33L3064)**
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.
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]
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.

xSeries 240 Hard Disk Drive (HDD) and External Storage

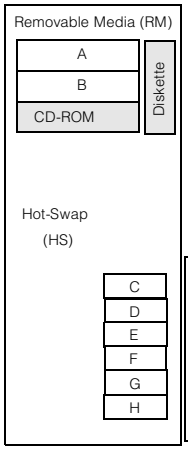
Total Int Storage[1]	10,000RPM HDDs				15,000RPM HDDs	
	9.1GB 37L7204[2]	18.2GB 37L7205[2]	36.4GB 37L7206[2]	73.4GB 06P5756[2]	9.1GB 19K0655[2]	18.2GB 19K0656[2]
0GB	Standard on base models					
9.1GB	1	-	-	-	1	-
18.2GB	2	1	-	-	2	1
27.3GB	3	-	-	-	3	-
36.4GB	4	2	1	-	4	2
45.5GB	5	-	-	-	5	-
54.6GB	6	3	-	-	6	3
72.8GB	-	4	2	-	-	4
91GB	-	5	-	-	-	5
109.2GB	-	6	3	-	-	6
145.6GB	-	-	4	-	-	-
182GB	-	-	5	-	-	-
218.4GB	-	-	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 all columns in an RPM range.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.

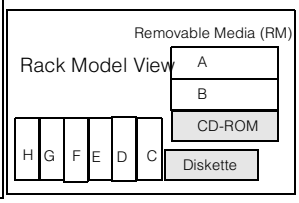
Bay	Form Factor	Height	Front Access	Usage
A	133mm (5.25in)	HH[1]	Yes	Open
B	133mm (5.25in)	HH[1]	Yes	Open
-	133mm (5.25in)	HH	Yes	IDE CD-ROM
-	89mm (3.5in)	SL	Yes	Diskette
C … H	HS	SL	Yes	Open

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.



P / N	Description	RPM	Height	Bays Supported	Max Qty
	Ultra160 Hard Disk Drives (HDD)[1]				
37L7204	9.1GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	10000	SL	C … H	6
37L7205	18.2GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	10000	SL	C … H	6
37L7206	36.4GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	10000	SL	C … H	6
19K0655	9.1GB 15Krpm Ultra160 SCSI Hot-Swap HDD	15000	SL	C … H	6
19K0656	18.2GB 15Krpm Ultra160 SCSI Hot-Swap HDD	15000	SL	C … H	6
06P5756	73.4GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD	10000	SL	C … H	6

	Ext Storage Expansion Units[2]	Form Factor
35311RU	EXP300 Storage Expansion Unit[3]	Rack (3U)
09N7296	EXP300 Rack-to-Tower Conversion Kit	-
35601RU	FAStT EXP500 Storage Expansion Unit[4]	Rack (3U)
35421RU	FAStT200 Storage Server[5, 6]	Rack (3U)
35422RU	FAStT200 HA Storage Server[5]	Rack (3U)
19K1121	FAStT200 Redundant RAID Controller	-

1. xSeries 240 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. FAStT EXP500 Storage Expansion Unit (P/N 35601RU) includes dual hot-swap 350W power supplies, each with its own power cord.
5. The FAStT200 includes two hot-swap, 350W auto-ranging redundant power supplies, each with its own power cord.
6. Can be upgraded to FAStT200 HA Storage Server through the addition of a FAStT200 Redundant RAID Controller (P/N 19K1121).

xSeries 240 I/O Options

Part Number	Description	Adapter Length	PCI Support[23]	Slots Supported[23]	Hot-Plug[2]
	Storage Controllers[1]				
37L6091	ServeRAID-4L Ultra160 SCSI Controller[3]	Full	64-bit	1 … 5	X
37L6080	ServeRAID-4M Ultra160 SCSI Controller[4]	Full	64-bit	1 … 5	X
37L6889	ServeRAID-4H Ultra160 SCSI Controller[5]	Full	64-bit	1 … 5	X
06P5736	ServeRAID-4Mx Ultra160 SCSI Controller[6]	Full	64-bit	1 … 5	X
06P5740	ServeRAID-4Lx Ultra160 SCSI Controller[7]	Half	64-bit	1 … 5	X
19K4646	PCI Wide Ultra160 SCSI Adapter[8]	Half	32-bit	1 … 5	-
02K3454	PCI Fast/Wide Ultra SCSI Adapter[24]	Half	32-bit	1 … 5	-
	Fibre Storage Controllers and Options[9]				
00N6881	Netfinity FAStT Host Adapter	Half	64-bit	1 … 5	X
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	-	-	-	-
2108R3L	SAN Data Gateway Router UltraSCSI LVD Port[10]	-	-	-	-
	Networking[11]				
	Ethernet[12]				
09N9901	10/100 EtherLink Server Adapter by 3Com[13]	Half	32-bit	1 … 5	X
19K4401	Netfinity Gigabit Ethernet Adapter (copper)	Half	64-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
	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
	Communications[14]				
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 Management[17]				
01K7209	Netfinity Advanced System Management PCI Adapter[18]	Full	32-bit	1 … 5[19]	-
03K9309	Netfinity Advanced System Management Interconnect Cable Kit[20]	-	-	-	-
	Host Attach				
9086001	Netfinity ESCON Adapter[21]	Full	32-bit	1 … 5[22]	-

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. 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.
3. ServeRAID-4L Ultra160 SCSI Controller is powered by a 100MHz Intel i960 processor and provides a single channel, 16MB of ECC cache and either one internal or one external Ultra160 connection. External connectors are 0.8mm VHDCI.
4. ServeRAID-4M Ultra160 SCSI Controller is powered by a 100MHz Intel i960 processor and provides two channels, 64MB of battery-backed ECC cache and two internal and two external Ultra160 connectors (only two connectors may be utilized). External connectors are 0.8mm VHDCI.
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 connectior 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. Only one of the two connectors may be utilized.
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. Three of the optional PCI Ethernet adapters listed are Intel-based (P/N 06P3601, 06P3701, 22P4901).
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 NS16550A 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 Netfinity Advanced Systems Management Processor and Interconnect Bus integrated into xSeries 240 works with Netfinity Director to provide significant system management function. When used with optional Netfinity Advanced System Management PCI Adapter (P/N 01K7209) and Netfinity Advanced System Management Interconnect Cable Kit (P/N 03K9309), additional management and control of up to 12 service processors from a remote console through a single modem or LAN connection is possible.
18. Includes PCI adapter, Netfinity Advanced System Management Interconnect Cable Kit components and 56W AC adapter that requires a separate power source. Provides an integrated 10/100 Ethernet port and PCMCIA slot to support optional Netfinity Advanced System Management Token-Ring Connection (P/N 36L9654).
19. A maximum quantity of one is supported.
20. Required for all xSeries servers containing a standard Advanced System Management Processor that are to be interconnected for system management support through a LAN or modem connection. Optional Netfinity Advanced System Management PCI Adapter (P/N 01K7209) includes the contents of this option. Up to 12 service processors may be interconnected (including standard and optional processors) with an aggregate connection length of no more than 91.4m (300ft). A customer-supplied Ethernet cable is required for each interconnection.
21. Provides an ESCON MIC and DB9 Serial Port. Cables are not included but are available through S/390 channels. Contact your IBM representative for additional information.
22. A maximum of two 9086001 adapters (installed in nonadjacent slots) are supported in a single server.
23. 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.
24. 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.

xSeries 240 Power, Monitors & Accessories

Part Number	Description
	Power[1]
33L3760	250W Hot-Swap Redundant Power Supply
	Uninterruptible Power Supply (UPS)[2]
94G3135	APC Smart-UPS 1000
94G3136	APC Smart-UPS 1400
94G6674	APC Smart-UPS 1400RMB[3]
94G6676	APC Smart-UPS 3000RMB[3]
37L6861	APC Smart-UPS 5000RMB[4]
	Monitors[5]
6331N2N	E54 Color Monitor 15in (350mm, 13.8in viewable image size), 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]

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.

Part Number	Description
Conversion Kits	
37L6858	5Ux24D Tower-to-Rack Kit
Rack and NetBAY[1]	
	Refer to the Rack Cabinets and Options section for information concerning IBM racks and rack-supported devices.
Keyboard and Mouse[2]	
28L3644	Space Saver II Keyboard[3, 5]
01K1260	TrackPoint IV 104-Key Black Keyboard[4,5]
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 or Netfinity 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	N	-	3510020[5], 3551001[4]
09N4040	20/40GB DLT Internal SCSI Tape Drive[1]	A+B	8	133mm (5.25in) FH	N	Y	3503B0X[5], 3551001
00N7990	40/80GB DLT Internal SCSI Tape Drive[2]	A+B	16 Ultra2 LVD	133mm (5.25in) FH	N	-	3503B0X[5], 3551001[4]
00N8017	60/120GB 8mm M2 SCSI Tape Drive[2]	A, B	16 Ultra2 LVD	133mm (5.25in) HH	N	-	3510020[5], 3551001[4]
00N8016	100/200GB LTO Tape Drive[2]	A+B	16 Ultra2 LVD	133mm (5.25in) FH	N	-	3551001[4]
00N8015	110/220GB Super DLT Internal SCSI Tape Drive[2]	A+B	16 Ultra2 LVD	133mm (5.25in) FH	N	-	3551001[4]
24P2396	100/200GB LTO Half-High Tape Drive[2]	A, B	16 Ultra2 LVD	133mm (5.25in) HH	N	-	3551001[4]
24P2398	40/80GB Half-High DLTVS Internal SCSI Tape Drive[2]	A, B	16 Ultra2 LVD	133mm (5.25in) HH	N	-	3551001[4]
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	N	-	3551001[4]
3600109	3600 Series 900GB/1.8TB LTO Tape Autoloader[3]	-	16 Ultra2 LVD	Tower or 6U Rack	Y	-	-

	External Tape Libraries[6]						
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	-	-
09N4048	3600 Series LTO Drive Upgrade Option[7]	-	16 Ultra2 LVD	-	N	-	-
	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	Ext	Y	N	3510020, 3503B0X
10K2340	Media BayTray and LVD Cable Kit[2, 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. If LVD support is required, an optional LVD cable must be ordered. An external Ultra2 SCSI port is available with a 0.8mm VHDCI connector. 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.

1. Requires PCI Wide Ultra160 SCSI Adapter (P/N 19K4646), which contains a five-drop multi-mode terminated LVD SCSI cable, when the onboard Ultra2 SCSI controller is connected to the backplane.
2. 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, the two-drop multi-mode terminated LVD SCSI cable included in the Media Bay Tray and LVD Cable Kit is required to support LVD mode. Connecting an LVD tape device to the single-ended terminated cable shipped with the server limits the tape device to single-ended SCSI rules.
3. 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.
4. 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. If the standard cables are used for attachment to LVD devices, single-ended SCSI rules and bus speeds apply.
5. Requires 68-pin External Multimode LVD/SE SCSI terminator (P/N 00N7956).
6. Tape library attributes and prerequisites are located in Appendix B: Tape Library Attributes.
7. 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.
8. 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).
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 68-pin high density 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.

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
37L7204	9.1GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	2	9.1GB mirrored for NOS
37L7205	18.2GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	4[1]	-
00N8017	60/120GB 8mm M2 SCSI Tape 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
6331N2N	E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black	1	-
94G3135	APC Smart-UPS 1000	1	-

1. Four HDDs are used for RAID 5 protection. Effective capacity is three HDDs or 54.6GB.

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	-
37L7204	9.1GB 10K-4 Ultra2 SCSI Hot-Swap SL HDD	6[1]	-
00N8017	60/120GB 8mm M2 SCSI Tape Drive	1	-
10K2340	Media Bay Tray and LVD Cable Kit	1	-
37L6889	ServeRAID-4H Ultra160 SCSI Controller	1	RAID 5 array, with hot-spare
33L3760	250W Hot-Swap Redundant Power Supply	1	Full power redundancy
6331N2N	E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), 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 36.4GB.

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 40GB 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 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 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

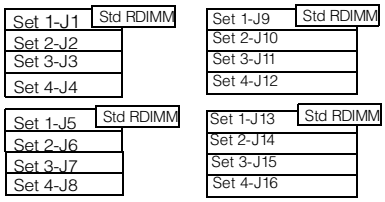
1. Housed in a 19in rack-mountable drawer and ships standard without a keyboard or mouse. See Rack Cabinets and Options section for supported IBM racks.
2. Intel Pentium III Xeon processor with integrated full-speed ECC L2 cache and 100MHz access to memory and I/O buses.
3. Advanced Chipkill ECC memory 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	61Y, 6RY	-
10K2332	Netfinity 700MHz/2MB Upgrade II with Pentium III Xeon Processor	71Y, 7RY	6xY
19K4635	xSeries 250 900MHz/2MB Upgrade with Pentium III Xeon Processor	81Y, 8RY	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)
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. 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).

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, 16-bit LVD SCSI cable 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.

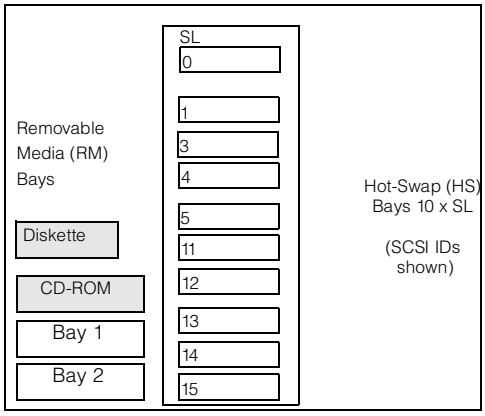
xSeries 250 Hard Disk Drive (HDD) Storage

Total Int Storage[1]	10,000RPM HDDs				15,000RPM HDDs	
	9.1GB 37L7204[2]	18.2GB 37L7205[2]	36.4GB 37L7206[2]	73.4GB 06P5756[2]	9.1GB 19K0655[2]	18.2GB 19K0656[2]
0GB	Standard on base models					
9.1GB	1	-	-	-	1	-
18.2GB	2	1	-	-	2	1
27.3GB	3	-	-	-	3	-
36.4GB	4	2	1	-	4	2
45.5GB	5	-	-	-	5	-
54.6GB	6	3	-	-	6	3
63.7GB	7	-	-	-	7	-
72.8GB	8	4	2	-	8	4
81.9GB	9	-	-	-	9	-
91GB	10	5	-	-	10	5
109.2GB	-	6	3	-	-	6
127.4GB	-	7	-	-	-	7
145.6GB	-	8	4	-	-	8
163.8GB	-	9	-	-	-	9
182GB	-	10	5	-	-	10
218.4GB	-	-	6	-	-	-
254.8GB	-	-	7	-	-	-
291.2GB	-	-	8	-	-	-
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 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
-	89mm (3.5in)	SL	Yes	Diskette
-	133mm (5.25in)	HH	Yes	IDE CD-ROM
RM 1	133mm (5.25in)	HH[1]	Yes	Open
RM 2	133mm (5.25in)	HH[1]	Yes	Open
1 … 10	HS	SL	Yes	Open
NB3[2]	19in Rack	3U	Yes	Open

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.



Netfinity NetBAY3 (NB3)
(Optional on Tower Configurations)

Bus A includes the top five bays supported by the standard integrated Ultra2 SCSI controller connected by a standard 16-bit LVDS cable. Bus B includes the lower five bays. For clarity, the SCSI IDs are identified.

Part Number	Description	RPM	Height	Bays Supported	Max Qty
Ultra160 HDDs[1]					
37L7204	9.1GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	10000	SL	See diagram	10
37L7205	18.2GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	10000	SL	See diagram	10
37L7206	36.4GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	10000	SL	See diagram	10
19K0655	9.1GB 15Krpm Ultra160 SCSI Hot-Swap HDD	15000	SL	See diagram	10
19K0656	18.2GB 15Krpm Ultra160 SCSI Hot-Swap HDD	15000	SL	See diagram	10
06P5756	73.4GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD	10000	SL	See diagram	10
Associated Options					
37L7086	xSeries Ultra160 SCSI Repeater Card[2]	-	-	-	1

	External Storage Expansion Units[3]	Form Factor
35311RU	EXP300 Storage Expansion Unit[4]	Rack (3U)
09N7296	EXP300 Rack-to-Tower Conversion Kit	-
35601RU	FAStT EXP500 Storage Expansion Unit[5]	Rack (3U)
35421RU	FAStT200 Storage Server[6, 7]	Rack (3U)
35422RU	FAStT200 HA Storage Server[6]	Rack (3U)
19K1121	FAStT200 Redundant RAID Controller	-

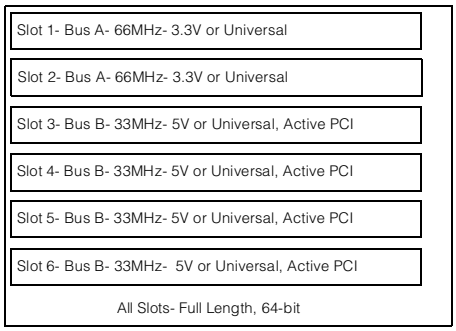
1. xSeries 250 contains an Ultra2 hot-swap, split backplane which supports Ultra160 HDDs at Ultra2 bus speeds when connected to the standard integrated storage controller. Ultra160 bus speeds are supported with the addition of an optional Ultra160 storage controller.
2. xSeries Ultra160 SCSI Repeater 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. FAStT EXP500 Storage Expansion Unit (P/N 35601RU) includes dual hot-swap 350W power supplies, each with its own power cord.
6.The FAStT200 includes two hot-swap, 350W auto-ranging redundant power supplies, each with its own power cord.
7. Can be upgraded to FAStT200 HA Storage Server through the addition of a FAStT200 Redundant RAID Controller (P/N 19K1121).

xSeries 250 I/O Options

Part Number	Description	Adapter Length	PCI Support[1]	Slots Supported[1]	Hot-Plug[2]	PCI Voltage Key	MHz
	Storage Controllers[3]						
37L6080	ServeRAID-4M Ultra160 SCSI Controller[4]	Full	64-bit	1 … 6	X	Universal	33
37L6091	ServeRAID-4L Ultra160 SCSI Controller[5]	Full	64-bit	1 … 6	X	Universal	33
37L6889	ServeRAID-4H Ultra160 SCSI Controller[6]	Full	64-bit	1 … 6	X	Universal	33
06P5736	ServeRAID-4Mx Ultra160 SCSI Controller[7]	Full	64-bit	1 … 6	X	Universal	66
06P5740	ServeRAID-4Lx Ultra160 SCSI Controller[8]	Half	64-bit	1 … 6	X	Universal	66
19K4646	PCI Wide Ultra160 SCSI Adapter[9]	Half	32-bit	1 … 6	-	Universal	66
02K3454	PCI Fast/Wide Ultra SCSI Adapter[24]	Half	32-bit	3 … 6	-	5	33
	Fiber Storage Controllers and Options[10]						
00N6881	Netfinity FAStT Host Adapter	Half	64-bit	1 … 6	X	Universal	66
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	-	-	-	-	-	-
2108R3L	SAN Data Gateway Router Ultra SCSI LVD Port[11]	-	-	-	-	-	-
	Networking[12]						
	Ethernet[13]						
09N9901	10/100 EtherLink Server Adapter by 3Com[14]	Half	32-bit	1 … 6	X	Universal	33
19K4401	Netfinity Gigabit Ethernet Adapter (copper)	Half	64-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
	Token Ring						
34L0701	Token-Ring 16/4 PCI Adapter 2 with Wake on LAN[14]	Half	32-bit	1 … 6	X	Universal	33
34L5001	16/4 Token-Ring PCI Management Adapter[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
	Communications[15]						
33L4618	V.90 PCI Data/Fax Modem[16]	Half	32-bit	3 … 6	-	5	33
37L14xx	Serial I/O SST 8, 16, and 128 port adapters[17]	Half	32-bit	3 … 6	-	5	33
	Systems Management[18]						
01K7209	Netfinity Advanced System Management PCI Adapter[19]	Full	32-bit	3 … 6[21]	-	5	33
03K9309	Netfinity Advanced System Management Interconnect Cable Kit[20]	-	-	-	-	-	-
	Host Attach						
9086001	Netfinity ESCON Adapter[22]	Full	32-bit	3 … 6[23]	-	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.
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-4M Ultra160 SCSI Controller is powered by a 100MHz Intel i960 processor and provides two channels, 64MB of battery-backed ECC cache and two internal and two external Ultra160 connectors (only two connectors may be utilized). External connectors are 0.8mm VHDCI.
5. ServeRAID-4L Ultra160 SCSI Controller is powered by a 100MHz Intel i960 processor and provides a single channel, 16MB of ECC cache and either one internal or one external Ultra160 connection. External connector is 0.8mm VHDCI.
6. 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.
7. 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.
8. 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 connectior is 0.8mm VHDCI.
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 250 includes a full-duplex, 10/100Mbps Ethernet PCI 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. Three of the optional PCI Ethernet adapters listed are Intel-based (P/N 06P3601, 06P3701, 22P4901).
14. The Wake-on LAN function of this option is not supported by this server.

15. 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/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.
18. The Netfinity Advanced Systems Management Processor and Interconnect Bus integrated into xSeries 250 works with Netfinity Director to provide significant system management function. When used with optional Netfinity Advanced System Management PCI Adapter (P/N 01K7209) and Netfinity Advanced System Management Interconnect Cable Kit (P/N 03K9309) additional management and control of up to 12 service processors from a remote console through a single modem or LAN connection is possible.
19. Includes PCI adapter, Netfinity Advanced System Management Interconnect Cable Kit components and 56W AC adapter which requires a separate power source. Provides an integrated 10/100 Ethernet port and PCMCIA slot to support optional Netfinity Advanced System Management Token-Ring Connection (P/N 36L9654).
20. Required for all xSeries servers containing a standard Advanced System Management Processor that are to be interconnected for system management support through a LAN or modem connection. Up to 12 service processors may be interconnected (including standard and optional processors) with an aggregate connection length of no more than 91.4m (300ft). A customer-supplied Ethernet cable is required for each interconnection.
21. A maximum quantity of one is supported.
22. Provides an ESCON MIC and a DB9 Serial Port. Cables are not included but are available through S/390 channels. Contact your IBM representative for additional information.
23. A maximum of two 9086001 adapters (installed in nonadjacent slots) are supported in a single server.
24. 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.



xSeries 250 Power, Monitors & Accessories

Part Number	Description
	Power[1]
33L3760	250W Hot-Swap Redundant Power Supply
	Uninterruptible Power Supply (UPS)[2]
94G3135	APC Smart-UPS 1000
94G3136	APC Smart-UPS 1400
94G6674	APC Smart-UPS 1400RMB[3]
94G6676	APC Smart-UPS 3000RMB[3]
37L6861	APC Smart-UPS 5000RMB[4]
	Monitors[5]
6331N2N	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]
65494AN	G96 Color Monitor 19in (454mm, 17.9in viewable image), stealth black[9]
655163N	P96 Color Monitor 19in (456mm, 17.9in viewable image), stealth black[9]
655263N	P260 Color Monitor 21in (503mm, 19.8in viewable image), stealth black[9]
9519AG1	T85A Flat Panel Color Monitor (459mm, 18.1in viewable image), stealth black[9]

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.

Part Number	Description
Conversion Kits	
37L6860	8Ux24D Rack-to-Tower Kit[1]
37L6859	8Ux24D Tower-to-Rack Kit
Rack and NetBAY[2]	
	Refer to the Rack Cabinets and Options section for information concerning IBM racks and rack-supported devices.
Keyboard and Mouse[3]	
28L3644	Space Saver II Keyboard[4, 6]
01K1260	TrackPoint IV 104-Key Black Keyboard[5, 6]
28L3621	Preferred Keyboard (stealth black)[5]
10K3849	106-key Preferred USB Keyboard with 2-port USB Hub (stealth black)[5]
22P5150	TrackPoint USB Space Saver Keyboard[4, 6]
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 or Netfinity systems.

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	N	-	3510020[2], 3551001[1]
00N7990	40/80GB DLT Internal SCSI Tape Drive	1+2	16 Ultra2 LVD	133mm (5.25in) FH	N	-	3503B0X[2], 3551001[1]
00N8017	60/120GB 8mm M2 SCSI Tape Drive	1, 2	16 Ultra2 LVD	133mm (5.25in) HH	N	-	3510020[2], 3551001[1]
00N8015	110/220GB Super DLT Internal SCSI Tape Drive	1+2	16 Ultra2 LVD	133mm (5.25in) FH	N	-	3551001[1]
09N4040	20/40GB DLT Internal SCSI Tape Drive	1+2	8	133mm (5.25in) FH	N	Y	3503B0X[2] 3551001
00N8016	100/200GB LTO Tape Drive	1+2	16 Ultra2 LVD	133mm (5.25in) FH	N	-	3551001[1]
24P2396	100/200GB LTO Half-High Tape Drive	1, 2	16 Ultra2 LVD	133mm (5.25in) HH	N	-	3551001[1]
	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	N	-	3551001[1]
3600109	3600 Series 900GB/1.8TB LTO Tape Autoloader[3]	-	16 Ultra2 LVD	Tower or 6U Rack	Y	-	-
	External Tape Libraries[4]						
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	-	-
09N4048	3600 Series LTO Drive Upgrade Option[5]	-	16 Ultra2 LVD	-	N	-	-
	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						
00N7956	68-pin External Multimode LVD/SE SCSI Terminator	-	16 LVD/SE	Ext	Y	N	3510020, 3503B0X
10K2340	Media BayTray and LVD Cable Kit[1]	-	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.

1. 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. If the standard cables are used for attachment to LVD devices, single-ended SCSI rules and bus speeds apply.
2. Requires 68-pin External Multimode LVD/SE SCSI terminator (P/N 00N7956).
3. 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.
4. Tape library attributes and prerequisites are located in Appendix B: Tape Library Attributes.
5. 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.
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 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 68-pin high density 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.

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

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	-
33L3117	Netfinity 512MB, 100MHz ECC SDRAM RDIMM	4	4GB 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
37L7204	9.1GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	2	9.1GB mirrored for NOS
37L7205	18.2GB 10K-4 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	-
94G6674	APC Smart-UPS 1400RMB	1	-
External Storage			
35311RU	EXP300 Storage Expansion Unit	1	Includes 2M Ultra2 cable
37L7206	36.4GB 10K-4 Wide 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
37L7204	9.1GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	2	9.1GB mirrored for NOS
37L7205	18.2GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	8[1]	109GB 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	-
94G6674	APC 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	NetBAYConsole 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 109.2GB.

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
37L7204	9.1GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	2	9.1GB mirrored for NOS
37L7205	18.2GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	8[1]	109GB 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 109.2GB

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)
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	-	0/72.8GB	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/80GB	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/72.8GB	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/80GB	24X-10X	4/1	2/2
8672-81X[1]	1GHz[3]	1/1	256	256MB/1.5GB	Rack (1U)	1/1	-	-	N	2 x 10/100	U160	-	0/72.8GB	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/80GB	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/72.8GB	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.

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, Ultra160 SCSI adapter. A two-drop, 16-bit LVD SCSI cable is attached to the internal connector of this adapter to support the standard Ultra160 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.

xSeries 300 Hard Disk Drive (HDD) Storage

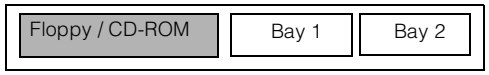
Total Internal Storage[1]	10,000RPM SCSI HDDs			15,000RPM SCSI HDDs
	9.1GB (00N8207)	18.2GB (00N8208)	36.4GB (00N8209)	18.2GB (19K0658)
0GB	Standard on some base models			
18.2GB	-	(Std on some models)	-	1
27.3GB	1	1	-	-
36.4GB	-	2	-	2
54.6GB	-	1	1	-
72.8GB	-	-	2	-

This table does not represent all possible HDD configurations.
1. Select a total storage row then add the quantity of HDDs from all columns in an RPM range. Total Internal Storage listed is within +/- 0.2GB unless otherwise noted.

Total Internal Storage[1]	7200RPM EIDE HDDs[2]	
	20.4GB (P/N 19K4461)	40GB (P/N 22P7157)
20.4GB	(Std 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 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.



Bay	Form Factor	Height	Front Access	Usage
1[1]	89mm (3.5in)	SL	Yes	HDD[2]
2	89mm (3.5in)	SL	Yes	Open

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

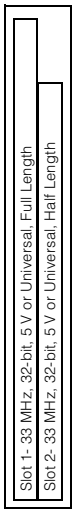
Part Number	Description	RPM	Height	Bays Supported	Max Qty
IDE HDDs[1, 2]					
19K4461	20.4GB 7200rpm ATA-100 (EIDE) HDD	7200	SL	1, 2	2
22P7157	40GB 7200rpm ATA-100 (EIDE) HDD	7200	SL	1, 2	2
Ultra160 HDDs[2]					
00N8207	9.1GB 10,000rpm Ultra160 SCSI HDD	10000	SL	1, 2	2
00N8208	18.2GB 10,000rpm Ultra160 SCSI HDD	10000	SL	1, 2	2
00N8209	36.4GB 10,000rpm Ultra160 SCSI HDD	10000	SL	1, 2	2
19K0658	18.2GB 15,000rpm Ultra160 SCSI HDD	15000	SL	1, 2	2

External Storage Expansion Units[3]		Form Factor
35311RU	Netfinity EXP300 Storage Expansion Unit[4]	Rack (3U)
35601RU	Netfinity FAStT EXP500 Storage Expansion Unit[5]	Rack (3U)
35421RU	FAStT200 Storage Server[6, 7]	Rack (3U)
35422RU	FAStT200 HA Storage Server[6]	Rack (3U)
19K1121	FAStT200 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. FAStT EXP500 Storage Expansion Unit (P/N 35601RU) includes dual hot-swap 350W power supplies, each with its own power cord.
6. The FAStT200 includes two hot-swap, 350W auto-ranging redundant power supplies, each with its own power cord.
7. Can be upgraded to FAStT200 HA Storage Server through the addition of a FAStT200 Redundant RAID Controller (P/N 19K1121).

xSeries 300 I/O Options

Part Number	Description	Adapter Length	PCI Support[3]	Slots Supported[2, 3]
	Storage Controllers[1, 18]			
37L6091	ServeRAID-4L Ultra160 SCSI Controller[4]	Full	64-bit	1
37L6080	ServeRAID-4M Ultra160 SCSI Controller[5]	Full	64-bit	1
37L6889	ServeRAID-4H Ultra160 SCSI Controller[6]	Full	64-bit	1
06P5736	ServeRAID-4Mx Ultra160 SCSI Controller[7]	Full	64-bit	1
06P5740	ServeRAID-4Lx Ultra160 SCSI Controller[8]	Half	64-bit	1, 2
19K4646	PCI Wide Ultra160 SCSI Adapter[9]	Half	32-bit	1, 2
02K3454	PCI Fast/Wide Ultra SCSI Adapter[10]	Half	32-bit	1, 2
24P2585	IDE 100 RAID Controller by AMI[11]	Half	32-bit	1
	Fibre Storage Controllers and Options[12]			
00N6881	Netfinity FAStT Host Adapter	Half	64-bit	1, 2
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	-	-	-
2108R3L	SAN Data Gateway Router Ultra SCSI LVD Port[13]	-	-	-
	Networking[14]			
	Ethernet[15]			
09N9901	10/100 EtherLink Server Adapter by 3Com[16]	Half	32-bit	1, 2
06P3601	10/100 Ethernet Server Adapter[16]	Half	32-bit	1, 2
22P4901	10/100 Dual Port Server Adapter[16]	Half	64-bit	1, 2
	Token Ring			
34L5001	16/4 Token-Ring PCI Management Adapter[16]	Half	32-bit	1, 2
34L5201	High-Speed 100/16/4 Token-Ring PCI Management Adapter[16]	Half	32-bit	1, 2
	Communications[17]			
33L4618	V.90 PCI Data/Fax Modem	Half	32-bit	1, 2



Exterior Connector Access

1. xSeries 300 has dual inegrated 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. 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.
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.
4. ServeRAID-4L Ultra160 SCSI Controller is powered by a 100MHz Intel i960 processor and provides a single channel, 16MB of ECC cache and either one internal or one external Ultra160 connection. External connector is 0.8mm VHDCI.
5. ServeRAID-4M Ultra160 SCSI Controller is powered by a 100MHz Intel i960 processor and provides two channels, 64MB of battery-backed ECC cache and two external 0.8mm VHDCI Ultra160 connectors.
6. 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 IPSSEND is installed.
7. 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.
8. 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.
9. 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.
10. 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.
11. 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.
12. See the Fibre Channel Solutions Overview section for additional configuration information.
13. 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).
14. xSeries 300 includes dual full-duplex, 10/100Mbps Ethernet controllers.
15. 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).
16. Wake on LAN function provided with this networking adapter is supported by this server.
17. xSeries 300 includes two USB ports and a high speed serial/asynchronous port (NS16550A compatible).
18. When storage controllers are installed in both PCI slots, the integrated storage controller must remain disconnected, 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.

xSeries 300 Power, Monitors & Accessories

Part Number	Description
	Power[1, 2]
	Uninterruptible Power Supply (UPS)[3]
94G6674	APC Smart-UPS 1400RMB[4]
94G6676	APC Smart-UPS 3000RMB[4]
37L6861	APC Smart-UPS 5000RMB[5]
	Monitors[6]
6331N2N	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. 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.

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]
28L3644	Space Saver II Keyboard[4, 5]
28L3621	Preferred Keyboard (stealth black)[6]
01K1260	TrackPoint IV 104-key Black Keyboard[5, 6]
10K3849	106-key Preferred USB Keyboard with 2-port USB Hub (stealth black)[6]
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 or Netfinity 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 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	N	-	3551001[2]
24P2396	100/200GB LTO Half-High Tape Drive	-	16 Ultra2 LVD	133mm (5.25in) HH	N	-	3551001[2]
	External Tape Libraries[3]						
3570C2x	Magstar MP 3570 Tape Subsystem	-	HVD	6U Rack	Y	-	-
	External Tape Enclosures						
3551001	NetMEDIA Storage Expansion Unit EL[4]	-	16	Rack	Y	N	-
10L7113	NetMEDIA Systems Management Adapter[5]	-	16 LVD	-	N	N	3551001
	Associated Options						
10K2340	Media BayTray and LVD Cable Kit[2]	-	16 LVD	Int	Y	N	3551001

1. xSeries 300 does not support internal tape drives and does not include an external SCSI connector. An external tape or internal tape 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. 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. If the standard cables are used for attachment to LVD devices, single-ended SCSI rules and bus speeds apply.
3. Tape library attributes and prerequisites are located in Appendix B: Tape Library Attributes.
4. 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 68-pin high density 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.
5. 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 Server[1]

Part Number	Description	Quantity
8672-81X	xSeries 300 1GHz/256KB Pentium III, 256MB ECC, Open, 24X	1
00N8208	18.2GB 10,000rpm Ultra160 SCSI HDD	2[2]
9511AG4	T540 Flat Panel Color Monitor 15in (381mm, 15in viewable image), stealth black	1
28L3644	Space Saver II Keyboard	1
94G6674	APC 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 is 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 Server[1]

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]
00N8209	36.4GB 10,000rpm Ultra160 SCSI HDD	2[3]
9511AG4	T540 Flat Panel Color Monitor 15in (381mm, 15in viewable image), stealth black	1
28L3644	Space Saver II Keyboard	1
94G6674	APC 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 Platform[1]

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]
19K0658	18.2GB 15,000rpm Ultra160 SCSI HDD	2[3]
9511AG4	T540 Flat Panel Color Monitor 15in (381mm, 15in viewable image), stealth black	1
28L3644	Space Saver II Keyboard	1
94G6674	APC 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	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)[5]	Bays (Total/Avail)	Slots (Total/Avail)
xSeries 330 At-A-Glance																
8654-41Y[1]	933MHz[2]	1/2	256	256MB(R) /4GB	Rack (1U)	1/1	H	-	Y	2 x 10/ 100	U160	-	0/146.8GB	24X-10X	4/2	2/2
8654-51Y[1]	1GHz[2]	1/2	256	256MB(R) /4GB	Rack (1U)	1/1	H	-	Y	2 x 10/ 100	U160	-	0/146.8GB	24X-10X	4/2	2/2
8674-11X[1]	1.13GHz[3]	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]	1.13GHz[3]	1/2	512	256MB(R) /4GB	Rack (1U)	1/1	-	-	Y	2 x 10/ 100	IDE	-	20.4GB/ 80GB	24X-10X	4/1	2/2
8674-13X[1]	1.13GHz[3]	1/2	512	256MB(R) /4GB	Rack (1U)	1/1	-	-	Y	2 x 10/ 100	U160	-	18.2GB/ 146.8GB[4]	24X-10X	4/1	2/2
8674-31X[1]	1.26GHz[3]	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]	1.26GHz[3]	1/2	512	256MB(R) /4GB	Rack (1U)	1/1	-	-	Y	2 x 10/ 100	IDE	-	20.4GB/ 80GB	24X-10X	4/1	2/2
8674-33X[1]	1.26GHz[3]	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
8674-3AX[1, 6]	1.26GHz[3]	1/2	512	256MB(R) /4GB	Rack (1U)	DC	H	-	Y	2 x 10/ 100	U160	-	0/146.8GB[4]	24X-10X	4/2	2/2

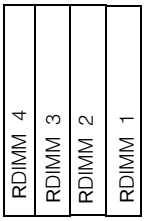
1. Housed in a 19in rack-mountable drawer and ships standard without a keyboard or mouse. See Rack Cabinets and Options section for supported IBM racks.
2. Intel Pentium III processor with advanced transfer L2 cache and 133MHz FSB. Not compatible with 1.13GHz and 1.26GHz upgrades.
3. Intel Pentium III processor with 133MHz FSB and 512KB advanced transfer cache. Compatible only with machine type 8674 models.
4. This model does not support hot-swap HDDs.
5. Variable read rate. Actual playback speed will vary and is often less than the maximum possible.
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.

xSeries 330 Processors

Part Number	Processor Upgrades	SMP Support[1]	Processor Speed Upgrade[2]
10K0052	933MHz Upgrade with 133MHz FSB and 256KB Advanced Transfer Cache Pentium III Processor	41Y	-
10K0053	1GHz Upgrade with 133MHz FSB and 256KB Advanced Transfer Cache Pentium III Processor	51Y	41Y
25P2835	xSeries 1.13GHz Upgrade with 133MHz FSB and 512KB Advanced Transfer Cache Pentium III Processor	11 … 13X	-
25P2836	xSeries 1.26GHz/133MHz, 512KB Cache Upgrade with Pentium III Processor	3xX	11 … 13X

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 330 Memory



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	-	-	-	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.

xSeries 330 Internal SCSI Cabling

xSeries 330 contains 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.

xSeries 330 Hard Disk Drive (HDD) Storage

SCSI Models						
Total Int Storage[1]	10,000RPM HDDs				15,000RPM HDDs	
	9.1GB (37L7204, 00N8207)	18.2GB (37L7205, 00N8208)	36.4GB (37L7206, 00N8209)	73.4GB (06P5752, 06P5756)	9.1GB (19K0655)	18.2GB (19K0656, 19K0658)
0GB	Standard on some base models					
9.1GB	1	-	-	-	1	-
18.2GB[2]	-	1[2]	-	-	2	-
36.4GB	-	-	1	-	-	2
72.8GB	-	-	2	-	-	-
73.4GB	-	-	-	1	-	-
146.8GB (max)[3]	-	-	-	2	-	-

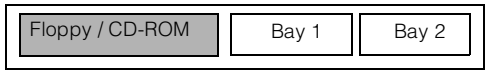
This table does not represent all possible HDD configurations.

1. Select a total storage row then add the quantity of HDDs from all columns within an RPM range. Total Internal Storage listed is within +/- 0.2GB unless otherwise noted.
2. Some SCSI models support only nonhot-swap HDDs. Model 8674-13X ships standard with one 18.2GB fixed disk HDD (P/N 00N8208).
3. Requires replacing standard HDD in nonhot-swap SCSI models.

IDE Models		
Total Internal Storage[1]	**7200RPM HDDs[2]**	
	20.4GB (P/N 19K4461)	**40GB (P/N 22P7157)**
20.4GB	(Std 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 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.



Bay	Form Factor	Height	Front Access	Usage
1[1]	HS or 89mm (3.5in)[2]	SL	Yes	Open[3]
2	HS or 89mm (3.5in)[2]	SL	Yes	Open[3]

1. Boot drive should be located in bay 1.
2. x330 now includes IDE, fixed disk and hot-swap models.
3. Fixed disk and IDE models ship with one standard HDD.

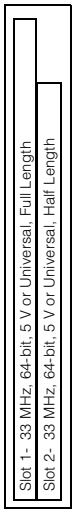
Part Number	Description	RPM	Height	Bays Supported	Max Qty
	IDE HDDs[1, 2]				
19K4461	20.4GB 7200rpm ATA-100 (EIDE) HDD	7200	SL	1 … 2	2
22P7157	40GB 7200rpm ATA-100 (EIDE) HDD	7200	SL	1 … 2	2
	Nonhot-swap Ultra160 HDDs[2, 3]				
00N8207	9.1GB 10,000rpm Ultra160 SCSI HDD	10000	SL	1 … 2	2
00N8208	18.2GB 10,000rpm Ultra160 SCSI HDD	10000	SL	1 … 2	2
00N8209	36.4GB 10,000rpm Ultra160 SCSI HDD	10000	SL	1 … 2	2
19K0658	18.2GB 15,000rpm Ultra160 SCSI HDD	15000	SL	1 … 2	2
06P5752	73.4GB 10Krpm Ultra160 SCSI SL HDD	10000	SL	1 … 2	2
	Hot-swap Ultra 160HDDs[4]				
37L7204	9.1GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	10000	SL	1 … 2	2
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
19K0655	9.1GB 15Krpm Ultra160 SCSI Hot-Swap HDD	15000	SL	1 … 2	2
19K0656	18.2GB 15Krpm Ultra160 SCSI Hot-Swap HDD	15000	SL	1 … 2	2
06P5756	73.4GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD	10000	SL	1 … 2	2

	External Storage Expansion Units[5]	Form Factor
35311RU	Netfinity EXP300 Storage Expansion Unit[6]	Rack (3U)
35601RU	Netfinity FAStT EXP500 Storage Expansion Unit[7]	Rack (3U)
35421RU	FAStT200 Storage Server[8, 9]	Rack (3U)
35422RU	FAStT200 HA Storage Server[8]	Rack (3U)
19K1121	FAStT200 Redundant RAID Controller	-

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. FAStT EXP500 Storage Expansion Unit (P/N 35601RU) includes dual hot-swap 350W power supplies, each with its own power cord.
8. The FAStT200 includes two hot-swap, 350W auto-ranging redundant power supplies, each with its own power cord.
9. Can be upgraded to FAStT200 HA Storage Server through the addition of a FAStT200 Redundant RAID Controller (P/N 19K1121).

xSeries 330 I/O Options

Part Number	Description	Adapter Length	PCI Support[2]	Slots Supported[2]
	Storage Controllers[1, 19]			
37L6091	ServeRAID-4L Ultra160 SCSI Controller[3]	Full	64-bit	1
37L6080	ServeRAID-4M Ultra160 SCSI Controller[4]	Full	64-bit	1
37L6889	ServeRAID-4H Ultra160 SCSI Controller[5]	Full	64-bit	1
06P5736	ServeRAID-4Mx Ultra160 SCSI Controller[6]	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 Options[11]			
00N6881	Netfinity FAStT Host Adapter	Half	64-bit	1, 2
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	-	-	-
2108R3L	SAN Data Gateway Router Ultra SCSI LVD Port[12]	-	-	-
	Networking[13]			
	Ethernet[14]			
19K4401	Netfinity Gigabit Ethernet Adapter (copper)	Half	64-bit	1, 2
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
06P3701	Gigabit Ethernet SX Server Adapter (fiber)	Half	64-bit	1, 2
22P4901	10/100 Dual Port Server Adapter[15]	Half	64-bit	1, 2
	Token Ring			
34L0701	Token-Ring 16/4 PCI Adapter2 with Wake on LAN[15]	Half	32-bit	1, 2
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
	Communications[16]			
33L4618	V.90 PCI Data/Fax Modem	Half	32-bit	1, 2
37L14xx	Serial I/O SST 8, 16 and 128 port adapters[17]	Half	32-bit	1, 2
	Systems Management[18]			
01K7209	Netfinity Advanced System Management PCI Adapter	Full	32-bit	1
03K9309	Netfinity Advanced System Management Interconnect Cable Kit	-	-	-
09N7585	Remote Supervisor Adapter	Half	32-bit	1



Exterior Connector Access

1. xSeries 330 has an integrated single channel Ultra160 SCSI Controller.
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.
3. ServeRAID-4L Ultra160 SCSI Controller is powered by a 100MHz Intel i960 processor and provides a single channel, 16MB of ECC cache and either one internal or one external Ultra160 connection. External connector is 0.8mm VHDCI.
4. ServeRAID-4M Ultra160 SCSI Controller is powered by a 100MHz Intel i960 processor and provides two channels, 64MB of battery-backed ECC cache and two external 0.8mm VHDCI Ultra160 connectors.
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.

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 330 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 three Intel-based optional Ethernet adapters (P/N 06P3601, 06P3701, 22P4901).
15. The Wake on LAN function of this option is not supported by models with machine type 8654. Models with machine type 8674 support Wake on LAN.
16. xSeries 330 includes two USB ports and a high speed serial/asynchronous port (NS16550A compatible).
17. See Appendix E for details on Serial I/O Options and configuration limitations.
18. xSeries 330 has a single integrated system management port and a single RS485 port.
19. When storage controllers are installed in both PCI slots, the integrated storage controller must remain disconnected, 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.

xSeries 330 Power, Monitors & Accessories

Part Number	Description
	Power[1, 2]
	Uninterruptible Power Supply (UPS)[3]
94G6674	APC Smart-UPS 1400RMB[4]
94G6676	APC Smart-UPS 3000RMB[4]
37L6861	APC Smart-UPS 5000RMB[5]
	Monitors[6]
06P4792	Cable Chain Technology Cable Kit[7]
6331N2N	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]
655163N	P96 Color Monitor 19in (454mm, 17.9in viewable image), stealth black[10]
6652U3N	P275 Color Monitor 21in (503mm, 19.8in viewable image), stealth black[10]
6657HG2	T750 Hybrid Flat Panel Color Monitor 17in (433mm, 17in viewable image), stealth black[10]
6658HG2	T84H TFT LCD Color Monitor 18.1in (460mm, 18.1in viewable image), stealth black[10]
9497AG1	T86A TFT LCD Color Monitor 18.1in (460mm, 18.1in viewable image), stealth black[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 C14 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 Cable Chain Technology (C2T) 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 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 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. Not supported for rack installations.

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]
06P4792	Cable Chain Technology Cable Kit[4]
28L3644	Space Saver II Keyboard[5, 6]
01K1260	TrackPoint iV 104-key Black Keyboard[6, 7]
28L3621	Preferred Keyboard (stealth black)[7]
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 Cable Chain Technology (C2T) 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 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 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 or Netfinity 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.

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	N	-	3551001[2]
09N4040	20/40GB DLT Internal SCSI Tape Drive	-	8	133mm (5.25in) FH	N	Y	3551001 3503B0X[3]
00N7990	40/80GB DLT Internal SCSI Tape Drive	-	16 Ultra2 LVD	133mm (5.25in) FH	N	-	3551001[2] 3503B0X[3]
00N8017	60/120GB 8mm M2 SCSI Tape Drive	-	16 Ultra2 LVD	133mm (5.25in) HH	N	-	3551001[2]
00N8016	100/200GB LTO Tape Drive	-	16 Ultra2 LVD	133mm (5.25in) FH	N	-	3551001[2]
24P2396	100/200GB LTO Half-High Tape Drive	-	16 Ultra2 LVD	133mm (5.25in) HH	N	-	3551001[2]
24P2398	40/80GB Half-High DLTVS Internal SCSI Tape Drive	-	16 Ultra2 LVD	133mm (5.25in) HH	N	-	3551001[2]

Tape Autoloaders							
00N7992	120/240GB DDS/4 Tape Autoloader	-	16 Ultra2 LVD	133mm (5.25in) FH	N	-	3551001[2]
3600109	3600 Series 900GB/1.8TB LTO Tape Autoloader[4]	-	16 Ultra2 LVD	Tower or 6U Rack	Y	-	-
External Tape Libraries[5]							
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	-	-
09N4048	3600 Series LTO Drive Upgrade Option[6]	-	16 Ultra2 LVD	-	N	-	-
External Tape Enclosures							
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	3503B0X

1. xSeries 330 does not support internal tape drives and does not include an external SCSI connector. An external tape or internal tape 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. 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. If the standard cables are used for attachment to LVD devices, single-ended SCSI rules and bus speeds apply.
3. Requires 68-pin External Multimode LVD/SE SCSI Terminator (P/N 00N7956).
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. 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.
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 68-pin high density 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.

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 Server[1]

Part Number	Description	Quantity
8654-41Y	xSeries 330 933MHz/256KB, 256MB ECC, Open, 24X	1
37L7205	18.2GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	2[2]
06P4792	Cable Chain Technology Cable Kit	1[3]
6331N2N	E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black	1
28L3644	Space Saver II Keyboard	1
94G6674	APC 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 is 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 Server[1]

Part Number	Description	Quantity
8654-51Y	xSeries 330 1GHz/256KB, 256MB ECC, Open, 24X	1
10K0018	128MB PC133 ECC SDRAM RDIMM	1[2]
37L7206	36.4GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	2[3]
06P4792	Cable Chain Technology Cable Kit	1[4]
6331N2N	E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black	1
28L3644	Space Saver II Keyboard	1
94G6674	APC 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 Server[1]

Part Number	Description	Quantity
8674-11X	xSeries 330 1.13GHz/512KB Pentium III, 256MB ECC, Open Hot-Swap, 24X	1
25P2835	1.13GHz Upgrade with 133MHz FSB and 256KB Advanced Transfer Cache Pentium III Processor	1
10K0020	256MB PC133 ECC SDRAM RDIMM	1[2]
37L7205	18.2GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	2[3]
06P4792	Cable Chain Technology Cable Kit	1[4]
6331N2N	E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black	1
28L3644	Space Saver II Keyboard	1
94G6674	APC 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 340

Part Number	Processor Speed[2]	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)[6]	Bays (Total/Avail)	Slots (Total/Avail)
8656-6RY[1]	1GHz	1/2	256	128MB(R)/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

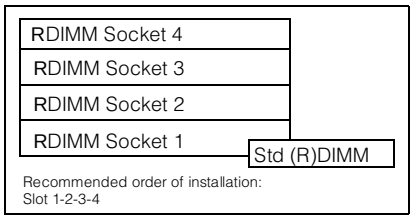
1. Housed in a 19in rack-mountable drawer and ships standard without a keyboard or mouse. See Rack Cabinets and Options section for supported IBM racks.
2. Intel Pentium III processor with advanced transfer L2 cache and 133MHz FSB.
3. Power supply redundancy requires installation of optional 270W Hot-Swap Redundant Power Supply (P/N 37L6880).
4. xSeries 340 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.
5. Assumes installation of optional IBM 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.
6. Variable read rate. Actual playback speed will vary and is often less than the maximum possible.

xSeries 340 Processors

Part Number	Processor Upgrades	SMP Support[1]	Processor Speed Upgrade[2]
19K4631	Netfinity 933MHz 133MHz FSB/256KB Upgrade with Pentium III Processor	5RY	-
19K4640	1GHz Upgrade with 133MHz FSB and 256KB Advanced Transfer Cache Pentium III Processor	6RY	5RY

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 340 Memory



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. The recommended order of installation is in sequence from Socket 1 to Socket 4. Memory size is not a factor.

Total Memory[1]	Quantity of RDIMMs Added			
128MB (1 x 128) Models	128MB (10K0018)	256MB (10K0020)	512MB (10K0022)	1GB (33L3326)
256MB	1	-	-	-
384MB	2 or	1	-	-
512MB	3	-	-	-
640MB	-	2 or	1	-
896MB	-	3	-	-
1024MB	-	4[2]	-	-
1152MB	-	-	2 or	1
1664MB	-	-	3	-
2048MB	-	-	4[2]	-
2176MB	-	-	-	2
3200MB	-	-	-	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.

xSeries 340 Internal SCSI Cabling

The xSeries 340 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 Ultra160 SCSI controller through a 16-bit LVD SCSI cable. A single-drop 16-bit SCSI cable is included with the server for attachment from the second internal Ultra160 connector to a removable media bay device. If an LVD attachment is required or more than one media bay device is required, a terminated two-drop 16-bit LVD SCSI cable available in the Media Bay Tray and LVD Conversion Kit (P/N 10K2340) must be ordered. No external SCSI port is included.

If optional 3-Pack Ultra160 Hot-Swap Expansion Kit (P/N 33L5050) is installed in the removable media bays, four cabling options are possible. Included with this option is a 16-bit LVD SCSI cable, identical to the one used for attachment of the standard hot-swap backplane, which can be used to attach the optional 3-Pack Ultra160 Hot-Swap backplane directly to the second onboard SCSI connector or that of an optional RAID adapter. Alternatively, a repeater card and cable are included which may be used to link the standard hot-swap backplane and optional hot-swap backplane together while utilizing the standard SCSI cable for attachment of the repeater card to one of the onboard SCSI connectors or that of an optional RAID adapter.

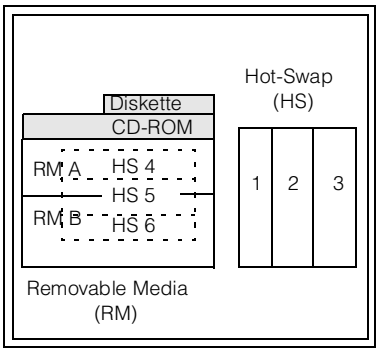
xSeries 340 Hard Disk Drive (HDD) and External Storage

Total Int Storage[1]	10,000RPM HDDs				15,000RPM HDDs	
	9.1GB (37L7204)	18.2GB (37L7205)	36.4GB (37L7206)	73.4GB (06P5756)	9.1GB (19K0655)	18.2GB (19K0656)
0GB	Standard on base models					
9.1GB	1	-	-	-	1	-
18.2GB	2	1	-	-	2	1
27.3GB	3	-	-	-	3	-
36.4GB	4[2]	2	1	-	4[2]	2
45.5GB	5[2]	-	-	-	5[2]	-
54.6GB	6[2]	3	-	-	6[2]	3
72.8GB	-	4[2]	2	-	-	4[2]
91GB	-	5[2]	-	-	-	5[2]
109.2GB	-	6[2]	3	-	-	6[2]
145.6GB	-	-	4[2]	-	-	-
182GB	-	-	5[2]	-	-	-
218.4GB	-	-	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 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
-	89mm (3.5in)	-	Yes	Diskette
-	133mm (5.25in)	-	Yes	IDE CD-ROM
1 … 3	HS	SL	Yes	Open
A, B	133mm (5.25in)	HH[1]	Yes	Open
4 … 6[2]	HS	SL	Yes	Open

1 Two half-high (HH) bays can be combined to support a single full-high (FH) device. By installing xSeries 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 xSeries 3-Pack Ultra160 Hot-Swap Expansion Kit (P/N 33L5050) is required.

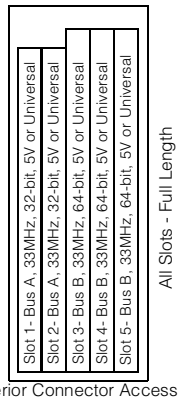


Part Number	Description	RPM	Height	Bays Supported[1]	Max Qty[1]
	Ultra160 HDDs				
37L7204	9.1GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	10000	SL	1 … 6	6
37L7205	18.2GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	10000	SL	1 … 6	6
37L7206	36.4GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	10000	SL	1 … 6	6
19K0655	9.1GB 15Krpm Ultra160 SCSI Hot-Swap HDD	15000	SL	1 … 6	6
19K0656	18.2GB 15Krpm Ultra160 SCSI Hot-Swap HDD	15000	SL	1 … 6	6
06P5756	73.4GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD	10000	SL	1 … 6	6
	Associated Options				
33L5050	IBM 3-Pack Ultra160 Hot-Swap Expansion Kit[2]	-	3 x SL	4 … 6	-
	External Storage Expansion Units[3]	**Form Factor**			
35311RU	EXP300 Storage Expansion Unit[4]	Rack (3U)			
35601RU	FAStT EXP500 Storage Expansion Unit[5]	Rack (3U)			
35421RU	FAStT200 Storage Server[6, 7]	Rack (3U)			
35422RU	FAStT200 HA Storage Server[6]	Rack (3U)			
19K1121	FAStT200 Redundant RAID Controller	-			

1. xSeries 340 ships with Bays 1 … 3 enabled. To enable installation of greater than three HDDs requires IBM 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. 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. FAStT EXP500 Storage Expansion Unit (P/N 35601RU) includes dual hot-swap 350W power supplies, each with its own power cord.
6. The FAStT200 includes two hot-swap, 350W auto-ranging redundant power supplies, each with its own power cord.
7. Can be upgraded to FAStT200 HA Storage Server through the addition of a FAStT200 Redundant RAID Controller (P/N 19K1121).

xSeries 340 I/O Options

Part Number	Description	Adapter Length	PCI Support[23]	Slots Supported[23]
	Storage Controllers[1]			
37L6091	ServeRAID-4L Ultra160 SCSI Controller[2]	Full	64-bit	1 … 5
37L6080	ServeRAID-4M Ultra160 SCSI Controller[3]	Full	64-bit	1 … 5
37L6889	ServeRAID-4H Ultra160 SCSI Controller[4]	Full	64-bit	1 … 5
06P5736	ServeRAID-4Mx Ultra160 SCSI Controller[5]	Full	64-bit	1 … 5
06P5740	ServeRAID-4Lx Ultra160 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 Options[9]			
00N6881	Netfinity FAStT Host Adapter	Half	64-bit	1 … 5
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	-	-	-
2108R3L	SAN Data Gateway Router Ultra SCSI LVD Port[10]	-	-	-
	Networking[11]			
	Ethernet[12]			
19K4401	Netfinity Gigabit Ethernet Adapter (copper)	Half	64-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
09N9901	10/100 EtherLink Server Adapter by 3Com[13]	Half	32-bit	1 … 5
22P4901	10/100 Dual Port Server Adapter[13]	Half	64-bit	1 … 5
	Token Ring			
34L0701	Token-Ring 16/4 PCIAdapter 2 with Wake on LAN[13]	Half	32-bit	1 … 5
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
	Communications[14]			
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
	Systems Management[17]			
01K7209	Netfinity Advanced System Management PCI Adapter[18]	Full	32-bit	1 … 5[19]
03K9309	Netfinity Advanced System Management Interconnect Cable Kit[20]	-	-	-
	Host Attach			
9086001	Netfinity ESCON™ Adapter[21]	Full	32-bit	1 … 5[22]



1. xSeries 340 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 / Netfinity 4500R's 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.
2. ServeRAID-4L Ultra160 SCSI Controller is powered by a 100MHz Intel i960 processor and provides a single channel, 16MB of ECC cache and either one internal or one external Ultra160 connection. External connector is 0.8mm VHDCI.
3. ServeRAID-4M Ultra160 SCSI Controller is powered by a 100MHz Intel i960 processor and provides two channels, 64MB of battery-backed ECC cache and two external 0.8mm VHDCI Ultra160 connectors.
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 Ultra160 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 340 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. Three of the optional PCI Ethernet adapters listed are Intel-based (P/N 06P3601, 06P3701, 22P4901).
13. The Wake on LAN function of this option is not supported by this server.
14. xSeries 340 includes two USB ports, two serial and one parallel port.
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 Netfinity Advanced Systems Management Processor and Interconnect Bus integrated into xSeries 340 works with Netfinity Director to provide significant system management function. When used with optional Netfinity Advanced System Management PCI Adapter (P/n 01K7209) and Netfinity Advanced System Management Interconnect Cable Kit (P/N 03K9309) additional management and control of up to 12 service processors from a remote console through a single modem or LAN connection is possible.
18. Includes PCI adapter, Netfinity Advanced System Management Interconnect Cable Kit components and 56-watt AC adapter, which requires a separate power source. Provides an integrated 10/100 Ethernet port and a PCMCIA slot to support optional Netfinity Advanced System Management Token-Ring Connection (P/N 36L9654).
19. A maximum quantity of one is supported.
20. Required for all xSeries servers containing a standard Advanced System Management Processor that are to be interconnected for system management support through a LAN or modem connection. Optional Netfinity Advanced System Management PCI Adapter (P/N 01K7209) includes the contents of this option. Up to 12 service processors may be interconnected (including standard and optional processors) with an aggregate connection length of no more than 91.4m (300ft). A customer-supplied Ethernet cable is required for each interconnection..
21. Provides an ESCON MIC and a DB9 Serial Port. Cables are not included but are available through S/390 channels. Contact your IBM representative for additional information.
22. A maximum of two 9086001 adapters (installed in nonadjacent slots) are supported in a single server.
23. 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.

xSeries 340 Power, Monitors & Accessories

Part Number	Description
	Power[1]
37L6880	270W Hot-Swap Redundant Power Supply
	Uninterruptible Power Supply (UPS)[2]
94G6674	APC Smart-UPS 1400RMB[3]
94G6676	APC Smart-UPS 3000RMB[3]
37L6861	APC Smart-UPS 5000RMB[4]
	Monitors[5]
6331N2N	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]

1. xSeries 340 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 340 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.

Part Number	Description
	Rack and NetBAY[1]
	Refer to the Rack Cabinets and Options section for information concerning IBM racks and rack-supported devices.
	Keyboard and Mouse[2]
28L3644	Space Saver II Keyboard[3, 5]
01K1260	TrackPoint IV 104-Key Black Keyboard[4, 5]
28L3621	Preferred Keyboard (stealth black)[4]
28L3673	Sleek 2-Button Stealth Black Mouse

1. xSeries 340 is housed in a 19in rack-mountable drawer and requires one of the racks listed in the Rack Cabinets and Options section.
2. xSeries 340 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 or Netfinity systems.

xSeries 340 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[2]	A, B	16 Ultra2 LVD	89mm (3.5in) HH or 133mm (5.25in) HH	N[4]	-	3551001[1]
09N4040	20/40GB DLT Internal SCSI Tape Drive	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	N[4]	-	3551001[1]
00N8017	60/120GB 8mm M2 SCSI Tape Drive[2]	A, B	16 Ultra2 LVD	133mm (5.25in) HH	N[4]	-	3551001[1]
00N8016	100/200GB LTO Tape Drive[2]	A+B	16 Ultra2 LVD	133mm (5.25in) FH	N[4]	-	3551001[1]
00N8015	110/220GB Super DLT Internal SCSI Tape Drive[2]	A+B	16 Ultra2 LVD	133mm (5.25in) FH	N[4]	-	3551001[1]
24P2396	100/200GB LTO Half-High Tape Drive[2]	A, B	16 Ultra2 LVD	133mm (5.25in) HH	N[4]	-	3551001[1]
24P2398	40/80GB Half-High DLTVS Internal SCSI Tape Drive[2]	A, B	16 Ultra2 LVD	133mm (5.25in) HH	N[4]	-	3551001[1]
	Tape Autoloaders						
00N7992	120/240GB DDS/4 Tape Autoloader[2]	A+B	16 Ultra2 LVD	133mm (5.25in) FH	N[4]	-	3551001[1]
3600109	3600 Series 900GB/1.8TB LTO Tape Autoloader[3]	-	16 Ultra2 LVD	Tower or 6U Rack	Y	-	-
	External Tape Libraries[5]						
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	-	-
09N4048	3600 Series LTO Drive Upgrade Option[6]	-	16 Ultra2 LVD	-	N	-	-
	External Tape Enclosures						
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[1, 2]	-	16 LVD	Int	Y	N	3551001

Note: xSeries 340 includes a single drop, 16-bit, single-ended, nonterminated SCSI cable for attachment of a device in Bay A or B to the second integrated Ultra160 SCSI channel or supported adapter. 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. 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. If the standard cables are used for attachment to LVD devices, single-ended SCSI rules and bus speeds apply.
2. LVD support for LVD devices requires installation of the 16-bit multi-mode terminated, two-drop, LVD SCSI cable included with optional Media Bay Tray and LVD Cable Kit (P/N 10K2340).
3. 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.
4. Termination requires installation of the multi-mode terminated, two-drop, LVD SCSI cable included with optional Media Bay Tray and LVD Cable Kit (P/N 10K2340).
5. Tape library attributes and prerequisites are located in Appendix B: Tape Library Attributes.
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 (Ultrium) drive and a one-meter external LVD SCSI cable.
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 68-pin high density 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.

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

xSeries 340 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
8656-6RY	xSeries 340 1GHz/256KB, 128MB(R) ECC, Open, 24X (Rack 3U)	1
10K0018	128MB PC133 ECC SDRAM RDIMM	1[1]
06P5736	ServeRAID-4Mx Ultra160 SCSI Controller	1
37L7204	9.1GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	3[2]
00N8017	60/120GB 8mm M2 SCSI Tape Drive	1
10K2340	Media Bay Tray and LVD Cable Kit	1
6331N2N	E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black	1
94G6674	APC Smart-UPS 1400RMB	1
37L6880	270W Hot-Swap Redundant Power Supply	1
Industry Standard 19in Rack, EIA-310D, min depth of 28in (711mm)		
9306200	Netfinity NetBAY22	1
28L3644	Space Saver II Keyboard	1
94G6670	Blank Filler Panel Kit	2

1. For a total of 256MB of system memory.
2. Three HDDs are used for RAID 5 protection. Effective capacity is two HDDs or 18.2GB.

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 xSeries 340 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 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
8656-6RY	xSeries 340 Pentium III 1GHz/256KB L2, 128MB ECC, OPEN, 24X (Rack 3U)	1
19K4640	1GHz Upgrade with 133MHz FSB and 256KB Advanced Transfer Cache Pentium III Processor	1
10K0020	256MB PC133 ECC SDRAM RDIMM	1[1]
06P5736	ServeRAID-4Mx Ultra160 SCSI Controller	1
37L7205	18.2GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	3[2]
00N8017	60/120GB 8mm M2 SCSI Tape Drive	1
10K2340	Media Bay Tray and LVD Cable Kit	1
6331N2N	E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black	1
37L6880	Netfinity 270W Hot-Swap Redundant Power Supply	1
94G6674	APC Smart-UPS 1400RMB	1
Industry Standard 19in Rack, EIA-310D, min depth of 28in (711mm)		
9306200	Netfinity NetBAY22	1
28L3644	Space Saver II Keyboard	1
94G6670	Blank Filler Panel Kit	2

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.

An application server is designed to handle a high workload while providing application serving requirements for users. With this in mind, the xSeries 340 was selected to provide an affordable price point for an application server with two-way Pentium III processing, 384MB 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.

xSeries 340 High Availability Cluster (P/N 25P1823 and 25P1824)[1]

(Refer to High Availability and Scalable Cluster Solutions section)

1. P/N 25P1823 includes Windows NT EE as the operating system for this integrated rack solution. P/N 25P1824 uses Windows 2000 Advanced Server.

IBM xSeries 342

Part Number	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)	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]	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

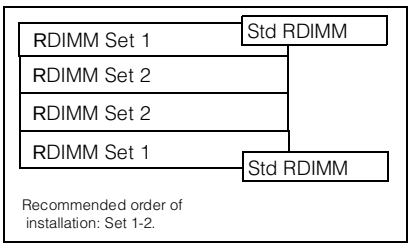
1. Housed in a 19in rack-mountable drawer and ships standard without a keyboard or mouse. See Rack Cabinets and Options section for supported IBM racks.
2. Intel Pentium III processor with advanced transfer L2 cache and 133MHz FSB.
3. Power supply redundancy requires installation of optional 270W Hot-Swap Redundant Power Supply (P/N 37L6880).
4. 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.
5. 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.
6. Variable read rate. Actual playback speed will vary and is often less than the maximum possible.

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	-
24P3512	xSeries 1.13GHz/133MHz 512KB Cache Upgrade with Pentium III Processor SVR	2RX	1RX
25P2600	xSeries 1.26GHz/133MHz, 512KB Cache Upgrade with Pentium III Processor	4RX	1RX, 2RX

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 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	-	-
1024MB[2]	-	4	-	-
1280MB	-	-	2	-
1152MB[2]	-	-	4	-
2.25GB	-	-	-	2
4GB (max)[2]	-	-	-	4

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, install memory options in pairs beginning with set 1.

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.

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 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. A full-high (FH) DLT tape back-up can be supported by connecting the single drop SCSI cable included with the server to the open connector of the integrated Ultra160 controller. If two 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. In configurations where external SCSI device attachment is required, a supported SCSI adapter must be installed.

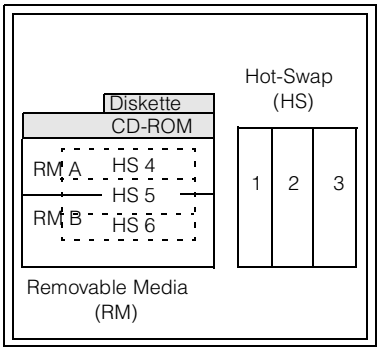
xSeries 342 Hard Disk Drive (HDD) Storage

Total Int Storage[1]	10,000RPM HDDs				15,000RPM HDDs	
	9.1GB 37L7204	18.2GB 37L7205	36.4GB 37L7206	73.4GB 06P5756	9.1GB 19K0655	18.2GB 19K0656
0GB	Standard on base models					
9.1GB	1	-	-	-	1	-
18.2GB	2	1	-	-	2	1
27.3GB	3	-	-	-	3	-
36.4GB	4[2]	2	1	-	4[2]	2
45.5GB	5[2]	-	-	-	5[2]	-
54.6GB	6[2]	3	-	-	6[2]	3
72.8GB	-	4[2]	2	-	-	4[2]
91GB	-	5[2]	-	-	-	5[2]
109.2GB	-	6[2]	3	-	-	6[2]
145.6GB	-	-	4[2]	-	-	-
182GB	-	-	5[2]	-	-	-
218.4GB	-	-	6[2]	-	-	-
220.2GB	-	-	-	3	-	-
293.6GB	-	-	-	4[2]	-	-
367GB	-	-	-	5[2]	-	-
440.6GB (max)	-	-	-	6[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. Requires IBM 3-Pack Ultra160 Hot-Swap Expansion Kit (P/N 33L5050).

Bay	Form Factor	Height	Front Access	Usage
-	89mm (3.5in)	-	Yes	Diskette
-	133mm (5.25in)	-	Yes	IDE CD-ROM
1 … 3	HS	SL	Yes	Open
A, B	133mm (5.25in)	HH[1]	Yes	Open
4 … 6[2]	HS	SL	Yes	Open

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.

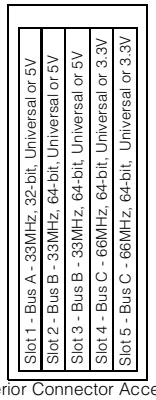


Part Number	Description	RPM	Height	Bays Supported[1]	Max Qty
	Ultra160 HDDs				
37L7204	9.1GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	10000	SL	1 … 6	6[1]
37L7205	18.2GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	10000	SL	1 … 6	6[1]
37L7206	36.4GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	10000	SL	1 … 6	6[1]
19K0655	9.1GB 15Krpm Ultra160 SCSI Hot-Swap HDD	15000	SL	1 … 6	6[1]
19K0656	18.2GB 15Krpm Ultra160 SCSI Hot-Swap HDD	15000	SL	1 … 6	6[1]
06P5756	73.4GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD	10000	SL	1 … 6	6[1]
	Associated Options				
33L5050	IBM 3-Pack Ultra160 Hot-Swap Expansion Kit[2]	-	3 x SL	4 … 6	-
	Optical Devices				
10K3785	12x-8x-32x Black Internal CD-RW Drive[3]	-			
	External Storage Expansion Units[4]	**Form Factor**			
35311RU	EXP300 Storage Expansion Unit[5]	Rack (3U)			
35601RU	FAS6T EXP500 Storage Expansion Unit[6]	Rack (3U)			
35421RU	FAStT200 Storage Server[7, 8]	Rack (3U)			
35422RU	FAStT200 HA Storage Server[7]	Rack (3U)			
19K1121	FAStT200 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. 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.
5. EXP300 includes a single 2M Ultra2 SCSI cable and dual hot-swap 500W redundant power supplies, each with its own power cord.
6. FAStT EXP500 Storage Expansion Unit (P/N 35601RU) includes dual hot-swap 350W power supplies, each with its own power cord.
7. The FAStT200 includes two hot-swap, 350W auto-ranging redundant power supplies, each with its own power cord.
8. Can be upgraded to FAStT200 HA Storage Server through the addition of a FAStT200 Redundant RAID Controller (P/N 19K1121).

xSeries 342 I/O Options

Part Number	Description	Adapter Length	PCI Support[1]	Slots Supported[1, 2]
	Storage Controllers[3]			
37L6091	ServeRAID-4L Ultra160 SCSI Controller[4]	Full	64-bit	1 … 5
37L6080	ServeRAID-4M Ultra160 SCSI Controller[5]	Full	64-bit	2 … 5
37L6889	ServeRAID-4H Ultra160 SCSI Controller[6]	Full	64-bit	2 … 5
06P5736	ServeRAID-4Mx Ultra160 SCSI Controller[7]	Full	64-bit	2 … 5
06P5740	ServeRAID-4Lx Ultra160 SCSI Controller[8]	Half	64-bit	1 … 5
19K4646	PCI Wide Ultra160 SCSI Adapter[9]	Half	32-bit	1 … 5
02K3454	PCI Fast/Wide Ultra SCSI Adapter[10]	Half	32-bit	1 … 5
	Fibre Storage Controllers and Options[11]			
00N6881	Netfinity FAStT Host Adapter	Half	64-bit	1 … 5
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	-	-	-
2108R3L	SAN Data Gateway Router Ultra SCSI LVD Port[12]	-	-	-
	Networking[13]			
	Ethernet[14]			
19K4401	Netfinity Gigabit Ethernet Adapter (copper)	Half	64-bit	1 … 5
06P3601	10/100 Ethernet Server Adapter[15]	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[15]	Half	32-bit	1 … 5
22P4901	IBM 10/100 Dual Port Server Adapter[15]	Half	64-bit	1 … 5
	Token Ring			
34L5201	High-Speed 100/16/4 Token-Ring PCI Management Adapter[15]	Half	32-bit	1 … 5
34L5001	16/4 Token-Ring PCI Management Adapter[15]	Half	32-bit	1 … 5
	Communications[16]			
33L4618	V.90 PCI Data/Fax Modem[17]	Half	32-bit	1 … 5
37L14xx	Serial I/O SST 8, 16 and 128 port adapters[18]	Half	32-bit	1 … 5
	Systems Management			
09N7585	Remote Supervisor Adapter	Half	32-bit	1
	Host Attach			
9086001	Netfinity ESCON™ Adapter[19]	Full	32-bit	1 … 5[20]



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.
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-4L Ultra160 SCSI Controller is powered by a 100MHz Intel i960 processor and provides a single channel, 16MB of ECC cache and either one internal or one external Ultra160 connection. External connector is 0.8mm VHDCI.
5. ServeRAID-4M Ultra160 SCSI Controller is powered by a 100MHz Intel i960 processor and provides two channels, 64MB of battery-backed ECC cache and two external 0.8mm VHDCI Ultra160 connectors.
6. 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 Ultra160 0.8mm VHDCI connectors are available.
7. 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.
8. 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.
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. 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.
11. See 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 342 includes a full-duplex, 10/100Mbps Ethernet PCI controller.
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 three Intel-based optional Ethernet adapters (P/N 06P3601, 06P3701, 22P4901).
15. 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.
16. xSeries 342 includes two USB ports and two serial ports.
17. Due to homologation variances, modem availability may differ by country.
18. See Appendix E for details on Serial I/O options and configuration limitations.
19. Provides an ESCON MIC and a DB9 Serial Port. Cables are not included but are available through S/390 channels. Contact your IBM representative for additional information.
20. A maximum of two 9086001 adapters (installed in nonadjacent slots) are supported in a single server.

xSeries 342 Power, Monitors & Accessories

Part Number	Description
	Power[1]
37L6880	270W Hot-Swap Redundant Power Supply
	Uninterruptible Power Supply (UPS)[2]
94G6674	APC Smart-UPS 1400RMB[3]
94G6676	APC Smart-UPS 3000RMB[3]
37L6861	APC Smart-UPS 5000RMB[4]
	Monitors[5]
6331N2N	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]

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.

Part Number	Description
	Rack and NetBAY[1]
	Refer to the Rack Cabinets and Options section for information concerning IBM racks and rack-supported devices.
	Keyboard and Mouse[2]
28L3644	Space Saver II Keyboard[3, 5]
01K1260	TrackPoint IV 104-Key Black Keyboard[4, 5]
28L3621	Preferred Keyboard (stealth black)[4]
10K3849	106-key Preferred USB Keyboard with 2-port USB Hub (stealth black)[4]
22P5150	TrackPoint USB Space Saver Keyboard[3, 5]
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 or Netfinity systems.

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[1]	A, B	16 Ultra2 LVD	89mm (3.5in) HH or 133mm (5.25in) HH	N[2]	-	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[1]	A+B	16 Ultra2 LVD	133mm (5.25in) FH	N[2]	-	3551001[4]
00N8015	110/220GB Super DLT Internal SCSI Tape Drive[1]	A+B	16 Ultra2 LVD	133mm (5.25in) FH	N[2]	-	3551001[4]
00N8016	100/200GB LTO Tape Drive[1]	A+B	16 Ultra2 LVD	133mm (5.25in) FH	N[2]	-	3551001[4]
00N8017	60/120GB 8mm M2 SCSI Tape Drive[1]	A, B	16 Ultra2 LVD	133mm (5.25in) HH	N[2]	-	3551001[4] 3510020[3]
24P2396	100/200GB LTO Half-High Tape Drive[1]	A, B	16 Ultra2 LVD	133mm (5.25in) HH	N[2]	-	3551001[4]
	Tape Autoloaders						
00N7992	120/240GB DDS/4 Tape Autoloader[1]	A+B	16 Ultra2 LVD	133mm (5.25in) FH	N[2]	-	3551001[4]
3502108	DLT Tape Autoloader	-	16	Desktop	Y	-	-
	External Tape Libraries[5]						
3502R14	DLT Tape Library	-	16	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[1, 4]	-	16 LVD	Int	Y	N	3551001
00N7956	68-pin External Multimode LVD/SE SCSI Terminator	-	16 LVD/SE	Ext	y	N	3510020

Note: xSeries 342 includes a single drop, 16-bit, single-ended, nonterminated SCSI cable for attachment of a device in Bay A or B to the second integrated Ultra160 SCSI channel or supported adapter. 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. LVD support for LVD devices requires installation of the 16-bit multi-mode terminated, two-drop, LVD SCSI cable included with optional Media Bay Tray and LVD Cable Kit (P/N 10K2340).
2. Termination requires installation of the multi-mode terminated, two-drop, LVD SCSI cable included with optional Media Bay Tray and LVD Cable Kit (P/N 10K2340).
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 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. If the standard cables are used for attachment to LVD devices, single-ended SCSI rules and bus speeds apply.
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 68-pin high density 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.

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
8669-1RX	xSeries 342 1GHz/256KB Pentium III, 256MB ECC, Open, 24X (3U Rack)	1
33L3320	128MB PC133 ECC SDRAM RDIMM	2[1]
06P5736	ServeRAID-4Mx Ultra160 SCSI Controller	1
37L7204	9.1GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	3[2]
00N8017	60/120GB 8mm M2 SCSI Tape Drive	1
10K2340	Media Bay Tray and LVD Cable Kit	1
6331N2N	E54 Color Monitor 15in (350mm, 13.8in viewable image), stealth black	1
94G6674	APC 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 18.2GB.

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	xSeries1.13GHz/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
37L7205	18.2GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	3[2]
00N8017	60/120GB 8mm M2 SCSI Tape Drive	1
10K2340	Media Bay Tray and LVD Cable Kit	1
6331N2N	E54 Color Monitor 15in (350mm, 13.8in viewable image), stealth black	1
37L6880	270W Hot-Swap Redundant Power Supply	1
94G6674	APC 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

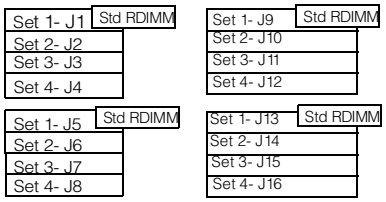
1. Housed in a 19in rack-mountable drawer and ships standard without a keyboard or mouse. See Rack Cabinets and Options section for supported IBM racks.
2. Installation of this model is recommended only to support attachment to iSeries systems. Contains an updated system board designed specifically to support the Integrated xSeries Adapter (IXA) for iSeries option.
3. Intel Pentium III Xeon processor with integrated full speed ECC L2 cache and 100MHz access to memory and I/O buses.
4. Advanced Chipkill ECC memory corrects two-, three-, and four-bit memory errors.
5. 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.
6. Variable read rate. Actual playback speed will vary and is often less than the maximum possible.
7. 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.
8. 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	4RY, 4AX	-
00N7944	Netfinity 700MHz/2MB Upgrade with Pentium III Xeon Processor	5RY, 5AX	4RY, 4AX
19K4633	900MHz/2MB Upgrade with Pentium III Xeon Processor	6RY	4xx, 5xx

1. 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.
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" 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)	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.

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

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.

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.

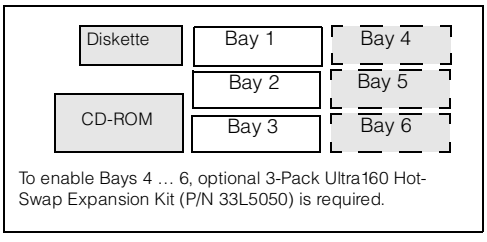
xSeries 350 Hard Disk Drive (HDD) Storage

Total Int Storage[1]	10,000RPM HDDs				15,000RPM HDDs	
	9.1GB (37L7204)	18.2GB (37L7205)	36.4GB (37L7206)	73.4GB (06P5756)	9.1GB (19K0655)	18.2GB (19K0656)
0GB	Standard on base models					
9.1GB	1	-	-		1	-
18.2GB	2	1	-		2	1
27.3GB	3	-	-		3	-
36.4GB	4[2]	2	1		4[2]	2
45.5GB	5[2]	-	-		5[2]	-
54.6GB	6[2]	3	-		6[2]	3
72.8GB	-	4[2]	2		-	4[2]
91GB	-	5[2]	-		-	5[2]
109.2GB	-	6[2]	3		-	6[2]
145.6GB	-	-	4[2]		-	-
182GB	-	-	5[2]		-	-
218.4GB	-	-	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 Ultra160 Hot-Swap Expansion Kit (P/N 33L5050).

Bay	Form Factor	Height	Front Access	Usage
-	89mm (3.5in)	SL	Yes	Diskette
-	133mm (5.25in)	HH	Yes	IDE CD-ROM
1 … 3	HS	SL	Yes	Open
4 … 6[1]	HS	SL	Yes	Open

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



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

Part Number	Description	RPM	Height	Bays Supported[1]	Max Qty[1]
Ultra160 Hard Disk Drives (HDD)					
37L7204	9.1GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	10000	SL	1 … 6	6
37L7205	18.2GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	10000	SL	1 … 6	6
37L7206	36.4GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	10000	SL	1 … 6	6
19K0655	9.1GB 15Krpm Ultra160 SCSI Hot-Swap HDD	15000	SL	1 … 6	6
19K0656	18.2GB 15Krpm Ultra160 SCSI Hot-Swap HDD	15000	SL	1 … 6	6
06P5756	73.4GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD	10000	SL	1 … 6	6
Associated Options					
33L5050	IBM 3-Pack Ultra160 Hot-Swap Expansion Kit[2]	-	3 x SL	4 … 6	-
	External Storage Expansion Units[3]	**Form Factor**			
35311RU	EXP300 Storage Expansion Unit[4]	Rack (3U)			
35601RU	FAStT EXP500 Storage Expansion Unit[5]	Rack (3U)			
35421RU	FAStT200 Storage Server[6, 7]	Rack (3U)			
35422RU	FAStT200 HA Storage Server[6]	Rack (3U)			
19K1121	FAStT200 Redundant RAID Controller	-			

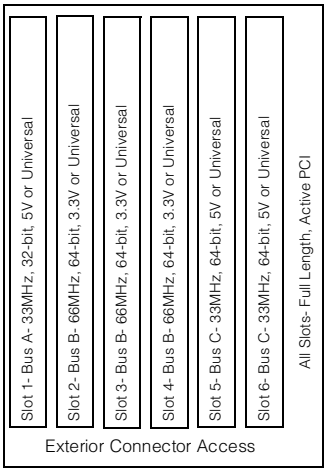
1. xSeries 350 ships with bays 1 … 3 enabled. To enable installation of greater than three HDDs requires IBM 3-Pack Ultra160 Hot-Swap Expansion Kit (P/N 33L5050).
2. IBM 3-Pack Ultra160 Hot-Swap Expansion Kit (P/N 33L5050) includes a hot-swap backplane and associated components that allow two ways to 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.
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 redundant power supplies, each with its own power cord.
5. FAStT EXP500 Storage Expansion Unit (P/N 35601RU) includes dual hot-swap 350W power supplies, each with its own power cord.
6. The FAStT200 includes two hot-swap, 350W auto-ranging redundant power supplies, each with its own power cord.
7. Can be upgraded to FAStT200 HA Storage Server through the addition of a FAStT200 Redundant RAID Controller (P/N 19K1121).

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 Controllers[4]						
37L6091	ServeRAID-4L Ultra160 SCSI Controller[5]	Full	64-bit	1 … 6	X	Universal	33
37L6080	ServeRAID-4M Ultra160 SCSI Controller[6]	Full	64-bit	1 … 6	X	Universal	33
37L6889	ServeRAID-4H Ultra160 SCSI Controller[7]	Full	64-bit	1 … 6	X	Universal	33
06P5736	ServeRAID-4Mx Ultra160 SCSI Controller[8]	Full	64-bit	1 … 6	X	Universal	66
06P5740	ServeRAID-4Lx Ultra160 SCSI Controller[9]	Half	64-bit	1 … 6	X	Universal	66
02K3454	PCI Fast/Wide Ultra SCSI Adapter[23]	Half	32-bit	1, 5, 6	-	5	33
19K4646	PCI Wide Ultra160 SCSI Adapter[10]	Half	32-bit	1 … 6	-	Universal	66
	Fiber Storage Controllers and Options[11]						
00N6881	Netfinity FAStT Host Adapter	Half	64-bit	1 … 6	X	Universal	66
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	-	-	-	-	-	-
2108R3L	SAN Data Gateway Router Ultra SCSI LVD Port[12]	-	-	-	-	-	-
	Networking[13]						
	Ethernet[14]						
09N9901	Netfinity 10/100 EtherLink Server Adapter by 3Com[15]	Half	32-bit	1 … 6	X	Universal	33
19K4401	Netfinity Gigabit Ethernet Adapter (copper)	Half	64-bit	1 … 6	X	Universal	33
06P3601	10/100 Ethernet Server Adapter[15]	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[15]	Half	64-bit	1 … 6	X	Universal	66
	Token Ring						
34L0701	Token-Ring 16/4 PCI Adapter 2 with Wake on LAN[15]	Half	32-bit	1 … 6	X	Universal	33
34L5201	High-Speed 100/16/4 Token-Ring PCI Management Adapter[15]	Half	32-bit	1 … 6	X	Universal	33
	Communications[16]						
33L4618	V.90 PCI Data/Fax Modem[17]	Half	32-bit	1, 5, 6	-	5	33

37L14xx	Serial I/O SST 8, 16, and 128 port adapters[18]	Half	32-bit	1, 5, 6[18]	-	5	33
Systems Management[19]							
01K7209	Netfinity Advanced System Management PCI Adapter[20]	Full	32-bit	1, 5, 6[21]	-	5	33
03K9309	Netfinity Advanced System Management Interconnect Cable Kit[22]	-	-	-	-	-	-

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. 33MHz adapters will reduce the speed in 66MHz buses to 33MHz.
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.
5. ServeRAID-4L Ultra160 SCSI controller is powered by a 100MHz Intel i960 processor and provides a single channel, 16MB of ECC cache and either one internal or one external Ultra160 connection. External connector is 0.8mm VHDCI.
6. ServeRAID-4M Ultra160 SCSI controller is powered by a 100MHz Intel i960 processor and provides two channels, 64MB of battery-backed ECC cache and two internal and two external Ultra160 connectors (only two connectors may be utilized). External connectors are 0.8mm VHDCI.
7. 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.
8. 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.
9. 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.
10. 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.
11. See 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 350 has an integrated 10/100 PCI Ethernet Controller.
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 AMD-based. Three of the optional PCI Ethernet adapters listed are Intel-based (P/N 06P3601, 06P3701, 22P4901).
15. The Wake on LAN function of this option is not supported by this server.
16. xSeries 350 includes two USB ports, two serial and one parallel port.
17. Due to homologation variances, modem availability may differ by country.
18. 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.
19. The Netfinity Advanced Systems Management Processor and Interconnect Bus integrated into xSeries 350 works with Netfinity Director to provide significant system management function. When used with optional Netfinity Advanced System Management PCI Adapter (P/N 01K7209) and Netfinity Advanced System Management Interconnect Cable Kit (P/N 03K9309) additional management and control of up to 12 service processors from a remote console through a single modem or LAN connection is possible.
20. Includes PCI adapter, Netfinity Advanced System Management Interconnect Cable Kit components and 56W AC adapter which requires a separate power source. Provides an integrated 10/100 Ethernet port and PCMCIA slot to support optional Netfinity Advanced System Management Token-Ring Connection (P/N 36L9654).
21. A maximum quantity of one is supported.
22. Required for all xSeries servers containing a standard Advanced System Management Processor that are to be interconnected for system management support through a LAN or modem connection. Optional Netfinity Advanced System Management PCI Adapter (P/N 01K7209) includes the contents of this option. Up to 12 service processors may be interconnected (including standard and optional processors) with an aggregate connection length of no more than 91.4m (300ft). A customer-supplied Ethernet cable is required for each interconnection.
23. 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.



Part Number	Description
	Power[1]
37L6880	270W Hot-Swap Redundant Power Supply[2]
	Uninterruptible Power Supply (UPS)[3]
94G6674	APC Smart-UPS 1400RMB[4]
94G6676	APC Smart-UPS 3000RMB[4]
37L6861	APC Smart-UPS 5000RMB[5]
	Monitors[6]
6331N2N	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. xSeries 350 systems include a single 270W, hot-swap power supply and two 9ft power cords, one high voltage IEC 320-C13 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
	Nonredundant
1	Up to two processors
	Up to three PCI adapters
	Up to three HDDs
	Up to eight memory RDIMMs

2. 270W Hot-Swap Redundant Power Supply (P/N 37L6880) includes a single low voltage 9ft power cord.
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 350 uses an SVGA controller (S3 Savage4 chipset) with 8MB of video memory.
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.

Part Number	Description
	Rack and NetBAY[1]
	Refer to the Rack Cabinets and Options section for information concerning IBM racks and rack-supported devices.
	Keyboard and Mouse[2]
28L3644	Space Saver II Keyboard[3, 4]
01K1260	TrackPoint IV 104-Key Black Keyboard[4, 5]
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 or Netfinity 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	N	-	3551001[2]
09N4040	20/40GB DLT Internal SCSI Tape Drive	-	8	133mm (5.25in) FH	N	Y	3551001
00N7990	40/80GB DLT Internal SCSI Tape Drive	-	16 Ultra2 LVD	133mm (5.25in) FH	N	-	3551001[2]
00N8017	60/120GB 8mm M2 SCSI Tape Drive	-	16 Ultra2 LVD	133mm (5.25in) HH	N	-	3551001[2]
00N8016	100/200GB LTO Tape Drive	-	16 Ultra2 LVD	133mm (5.25in) FH	N	-	3551001[2]
00N8015	110/220GB Super DLT Internal SCSI Tape Drive	-	16 Ultra2 LVD	133mm (5.25in) FH	N	-	3551001[2]
24P2396	100/200GB LTO Half-High Tape Drive	-	16 Ultra2 LVD	133mm (5.25in) HH	N	-	3551001[2]
	Tape Autoloaders						
00N7992	120/240GB DDS/4 Tape Autoloader	-	16 Ultra2 LVD	133mm (5.25in) FH	N	-	3551001[2]
3600109	3600 Series 900GB/1.8TB LTO Tape Autoloader[3]	-	16 Ultra2 LVD	Tower or 6U Rack	Y	-	-
	External Tape Libraries[4]						
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[5]	-	16 Ultra2 LVD	5U Rack	Y	-	-
09N4048	3600 Series LTO Drive Upgrade Option[6]	-	16 Ultra2 LVD	-	N	-	-
	External Tape Enclosures						
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

1. IBM xSeries 350 does not support internal tape drives. An external tape 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. 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. If the standard cables are used for attachment to LVD devices, single-ended SCSI rules and bus speeds apply.
3. 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.
4. Tape library attributes and prerequisites are located in Appendix B: Tape Library Attributes.
5. 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.
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 (Ultrium) drive and a one-meter external LVD SCSI cable.
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 68-pin high density 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.

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

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
37L7204	Netfinity 9.1GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	4[1]
00N8017	60/120GB 8mm M2 SCSI Tape Drive	1
10K2340	Media Bay Tray and LVD Cable Kit	1
3551001	NetMEDIA Storage Expansion Unit EL	1
03K9310	2M External Ultra2 SCSI Cable	1
6331N2N	E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black	1
94G6674	APC Smart-UPS 1400RMB	1
Industry Standard 19in Rack, EIA-310D, min depth of 28in (711mm)		
9306200	Netfinity NetBAY22	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 18.2GB.

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
37L7206	36.4GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	4[2]
06P5736	ServeRAID-4Mx Ultra160 SCSI Controller	1
00N7990	40/80GB DLT Internal SCSI Tape Drive	1
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
6331N2N	E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black	1
94G6674	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)		
9306200	Netfinity NetBAY22™	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

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 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 Processor[3]	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 systems 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 eigth processors require this option. See "Processor Upgrade Requirements" for more information on when this option is required.

Processor Upgrade Requirements[1, 2]

	Upgrade To			
Upgrade From	≤ 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).

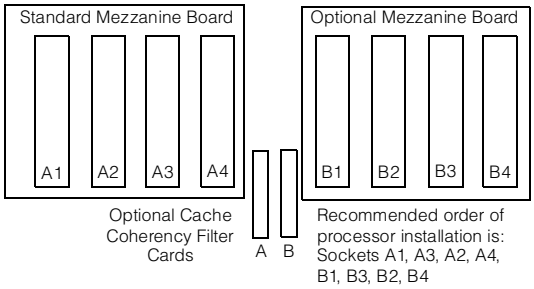
xSeries 370 ships with a single mezzanine board containing four Pentium III Xeon processor sockets with terminators in the unoccupied sockets. An additional mezzanine board may be added, expanding the number of processor sockets to eight. The two mezzanine boards are then linked through two cache coherency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

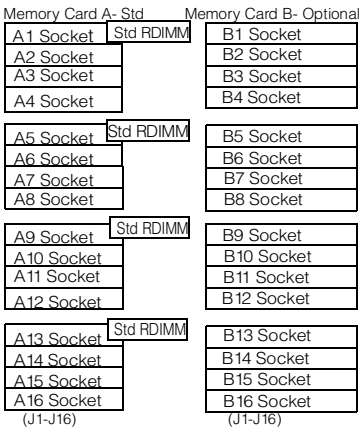
Netfinity Mezzanine Expansion Kit (P/N 10K2337)
- One Processor Mezzanine Board
- Supports cache coherency filters from the following options:
  - P/N 10K2335
  - P/N 28L4730
  - P/N 28L4727
- Supports 700MHz and above processors only
- Required when upgrading models 8681-4RY … 6RY to 700MHz or above
- 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				
512MB (4 x 128)	**128MB (20L0245)**	**256MB (20L0247)**	**512MB (20L0249, 33L3149[7])**	**1GB (33L3056)**
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[4] 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[4] 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



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

14848	-	-	28[2] or	14[4]
15488	-	-	-	15[6]
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[5]
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.
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. Models with 4 x 128 RDIMMs standard require Netfinity 8500R Memory Expansion Card (P/N 28L4454) for installation of greater than 16 RDIMMs.
5. Requires removal of all but two of the standard RDIMMs.
6. Requires removal of all but one of the standard RDIMMs.
7. When P/N 33L3149 is installed in servers that have been upgraded with an optional memory card, RDIMMs must match in slot pairs from one card to another (size, capacity and type).

Part Number	Memory Description[1]
20L0245	Netfinity 128MB SDRAM ECC RDIMM II
20L0247	Netfinity 256MB SDRAM ECC RDIMM II
20L0249	Netfinity 512MB 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. For memory installation of greater than 16GB, Netfinity 8500R Memory Expansion Card (P/N 28L4454) is required. Installation of memory on 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.
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.

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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 or half-high HDDs. The backplane is connected to the internal 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).

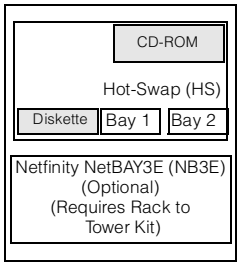
xSeries 370 Hard Disk Drive (HDD) Storage

Total Internal Storage[1]	10,000RPM HDDs				15,000RPM HDDs	
	9.1GB 37L7204[2]	18.2GB 37L7205[2]	36.4GB 37L7206[2]	73.4GB 06P5756[2]	9.1GB 19K0655[2]	18.2GB 19K0656[2]
0GB	Standard on base models					
9.1GB	1	-	-		1	-
18.2GB	2	1	-		2	1
36.4GB	-	2	1		-	2
72.8GB	-	-	2		-	-
73.4GB	-	-	-	1	-	-
146.8GB	-	-	-	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 HDDs[1]				
37L7204	9.1GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	10000	SL	1, 2	2
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
19K0655	9.1GB 15Krpm Ultra160 SCSI Hot-Swap HDD	15000	SL	1, 2	2
19K0656	18.2GB 15Krpm Ultra160 SCSI Hot-Swap HDD	15000	SL	1, 2	2
06P5756	73.4GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD	10000	SL	1, 2	2

	External Storage Expansion Units[2]	Form Factor
35311RU	EXP300 Storage Expansion Unit[3]	Rack (3U)
09N7296	EXP300 Rack-to-Tower Conversion Kit	-
35601RU	FAStT EXP500 Storage Expansion Unit[4]	Rack (3U)
35421RU	FAStT200 Storage Server[5, 6]	Rack (3U)
35422RU	FAStT200 HA Storage Server[5]	Rack (3U)
19K1121	FAStT200 Redundant RAID Controller	-

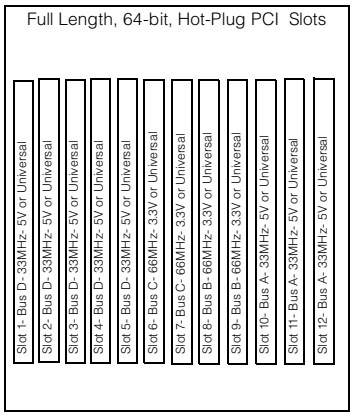
1. xSeries 370 contains an Ultra2 hot-swap backplane which limits Ultra160 HDDs to Ultra2 bus speeds.
2. Not supported by the onboard external SCSI port. To configure one of the SCSI storage devices listed here, select an optional SCSI controller then refer to Appendix D: Cables - Storage Units - Controllers 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. FAStT EXP500 Storage Expansion Unit (P/N 35601RU) includes dual hot-swap 350W power supplies, each with its own power cord.
5. The FAStT200 includes two hot-swap, 350W auto-ranging redundant power supplies, each with its own power cord.
6. Can be upgraded to FAStT200 HA Storage Server through the addition of a FAStT200 Redundant RAID Controller (P/N 19K1121).

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 Controllers[4]						
37L6091	ServeRAID-4L Ultra160 SCSI Controller[5]	Full	64-bit	1 … 12	X	Universal	33
37L6080	ServeRAID-4M Ultra160 SCSI Controller[6]	Full	64-bit	1 … 12	X	Universal	33
37L6889	ServeRAID-4H Ultra160 SCSI Controller[7]	Full	64-bit	1 … 12	X	Universal	33
06P5736	ServeRAID-4Mx Ultra160 SCSI Controller[8]	Full	64-bit	1 … 12	X	Universal	66
06P5740	ServeRAID-4Lx Ultra160 SCSI Controller[9]	Half	64-bit	1 … 12	X	Universal	66
19K4646	PCI Wide Ultra160 SCSI Adapter[10]	Half	32-bit	1 … 12	-	Universal	66
02K3454	PCI Fast/Wide Ultra SCSI Adapter[24]	Half	32-bit	1 … 5, 10 … 12	-	5	33
	Fibre Storage Controllers and Options[11]						
00N6881	Netfinity FAStT Host Adapter	Half	64-bit	1 … 12	X	Universal	66
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	-	-	-	-	-	-
2108R3L	SAN Data Gateway Router Ultra SCSI LVD Port[12]	-	-	-	-	-	-
	Networking[13]						
	Ethernet[14]						
09N9901	10/100 EtherLink Server Adapter by 3Com[15]	Half	32-bit	1 … 12	X	Universal	33
19K4401	Netfinity Gigabit Ethernet Adapter (copper)	Half	64-bit	1 … 12	X	Universal	33
06P3601	10/100 Ethernet Server Adapter[15]	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[15]	Half	64-bit	1 … 12	X	Universal	66
	Token Ring						
34L0701	Token-Ring 16/4 PCI Adapter 2 with Wake on LAN[15]	Half	32-bit	1 … 12	X	Universal	33
34L5001	16/4 Token-Ring PCI Management Adapter[15]	Half	32-bit	1 … 12	X	Universal	33
34L5201	High-Speed 100/16/4 Token-Ring PCI Management Adapter[15]	Half	32-bit	1 … 12	X	Universal	33
	Communications[16]						
33L4618	V.90 PCI Data/Fax Modem[17]	Half	32-bit	1 … 5, 10 … 12	-	5	33
37L14xx	Serial I/O SST 8, 16 and 128 Port Adapters[18]	Half	32-bit	(1 … 5, 10 … 12)[18]	-	5	33
	Systems Management[19]						
03K9309	Netfinity Advanced System Management Interconnect Cable Kit[20]	-	-	-	-	-	-
02K6545	UltraSlim 56W AC Adapter[21]	-	-	-	-	-	-
	Host Attach						
9086001	Netfinity ESCON Adapter[22]	Full	32-bit	(1 … 5, 10 … 12)[23]	-	5	33

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.
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-4L Ultra160 SCSI Controller is powered by a 100MHz Intel i960 processor and provides a single channel, 16MB of ECC cache and either one internal or one external Ultra160 connection. External connector is 0.8mm VHDCI.
6. ServeRAID-4M Ultra160 SCSI Controller is powered by a 100MHz Intel i960 processor and provides two channels, 64MB of battery-backed ECC cache and two internal and two external Ultra160 connectors (only two connectors may be utilized). External connectors are 0.8mm VHDCI.
7. 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.
8. 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.
9. 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 connectior is 0.8mm VHDCI.
10. 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.

11. See 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 370 does not include an onboard network controller.
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 three Intel-based optional Ethernet adapters (P/N 06P3601, 06P3601, 22P4901) provide compatible intermediate drivers for failover support.
15. The Wake on LAN function of this option is not supported by this server.
16. 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.
17. Due to homologation variances, modem availability may differ by country.
18. 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.
19. xSeries 370 ships standard with a Netfinity 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.
20. Required for all xSeries servers containing a standard Advanced System Management Processor that are to be interconnected for system management support through a LAN or modem connection. Up to 12 service processors may be interconnected (including standard and optional processors) with an aggregate connection length of no more than 91.4m (300ft). A customer-supplied Ethernet cable is required for each interconnection.
21. Although the xSeries 370 integrated Netfinity System Management PCI Adapter is powered continuously through the redundant power supply subsystem, an even higher level of availability is offered with the addition of UltraSlim 56W AC Adapter by allowing an independent power source or connection to a separate optional UPS.
22. Provides an ESCON MIC and DB9 Serial Port. Cables are not included but are available through S/390 channels. Contact your IBM representative for additional information.
23. A maximum of two 9086001 adapters (installed in nonadjacent slots) are supported in a single server. Where possible, install in a minimally loaded bus.
24. 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.



xSeries 370 Power, Monitors & Accessories

Part Number	Description
	Power[1]
	Uninterruptible Power Supply (UPS)[2]
94G6676	APC Smart-UPS 3000RMB[3]
37L6861	APC Smart-UPS 5000RMB[4]
	Monitors[5]
6331N2N	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]

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.

Part Number	Description
Conversion Kits	
28L4705	8Ux28D Rack-to-Tower Kit[1]
Rack and NetBAY[2]	
	Refer to the Rack Cabinets and Options section for information concerning IBM racks and rack-supported devices.
Keyboard and Mouse[3]	
28L3644	Space Saver II Keyboard[4, 5]
01K1260	TrackPoint IV 104-Key Black Keyboard[5, 6]
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 or Netfinity sy.stems.
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	N	-	3510020[2], 3551001[1]
09N4040	20/40GB DLT Internal SCSI Tape Drive	-	8	133mm (5.25in) FH	N	Y	3503B0X[2], 3551001
00N7990	40/80GB DLT Internal SCSI Tape Drive	-	16 Ultra2 LVD	133mm (5.25in) FH	N	-	3503B0X[2], 3551001[1]
00N8017	60/120GB 8mm M2 SCSI Tape Drive	-	16 Ultra2 LVD	133mm (5.25in) HH	N	-	3510020[2], 3551001[1]
00N8016	100/200GB LTO Tape Drive	-	16 Ultra2 LVD	133mm (5.25in) FH	N	-	3551001[1]
00N8015	110/220GB Super DLT Internal SCSI Tape Drive	-	16 Ultra2 LVD	133mm (5.25in) FH	N	-	3551001[1]
24P2396	100/200GB LTO Half-High Tape Drive	-	16 Ultra2 LVD	133mm (5.25in) HH	N	-	3551001[1]
Tape Autoloaders							
3502108	DLT Tape Autoloader	-	16	Desktop	Y	-	-
00N7992	120/240GB DDS/4 Tape Autoloader	-	16 Ultra2 LVD	133mm (5.25in) FH	N	-	3551001[1]
3600109	3600 Series 900GB/1.8TB LTO Tape Autoloader[3]	-	16 Ultra2 LVD	Tower or 6U Rack	Y	-	-
External Tape Libraries[4]							
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[5]	-	16 Ultra2 LVD	5U Rack	Y	-	-
09N4048	3600 Series LTO Drive Upgrade Option[6]	-	16 Ultra2 LVD	-	N	-	-
External Tape Enclosures							
3510020	External Half High SCSI Storage Enclosure[7]	-	8, 16	Desktop	N	N	-
3551001	NetMEDIA Storage Expansion Unit EL[8]	-	16	Rack	Y	N	-
10L7113	NetMEDIA Systems Management Adapter[9]	-	16 LVD	-	N	N	3551001
Associated Options							
00N7956	68-pin External Multimode LVD/SE SCSI Terminator	-	16 LVD/SE	Ext	Y	N	3510020, 3503B0X
10K2340	Media BayTray and LVD Cable Kit[1]	-	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 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. 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. If the standard cables are used for attachment to LVD devices, single-ended SCSI rules and bus speeds apply.
2. Requires 68-pin External Multimode LVD/SE SCSI terminator (P/N 00N7956).
3. 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.
4. Tape library attributes and prerequisites are located in Appendix B: Tape Library Attributes.
5. 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.
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 (Ultrium) drive and a one-meter external LVD SCSI cable.
7. 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).
8. 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 68-pin high density 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.

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, PCI (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
37L7204	9.1GB 10K-4 Ultra160 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	-
6331N2N	E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), 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 Drive 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
37L7204	9.1GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	6	RAID 5 with Hot-Spare in EXP300
	Rack Options		
9306200	Netfinity NetBAY22	1	Monitor and keyboard mount on top
36L9702	NetBAY22 Rack Extension Kit	1	Required for rear door closure
94G6667	Power Cable - Type A14 (4)	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
8681-1RX	xSeries 370 700MHz/1MB, 512MB ECC, OPEN, 48X, PCI (Rack 8U)	1	Power redundancy standard
10K2330	Netfinity 8500R 700MHz/1MB 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
20L0249	Netfinity 512MB SDRAM ECC RDIMM II	3	Total of 2GB of memory
28L4454	Netfinity 8500R Memory Expansion Card	1	Enables cache line interleaving
37L7204	9.1GB 10K-4 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
6331N2N	E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), 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
37L7205	18.2GB 10K-4 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

Refer to the IBM Datacenter Solutions section for xSeries 370 cluster solutions configured with Fibre Channel storage components and connections. Datacenter solutions are also certified for Windows 2000 and Windows NT 4.0 operating systems.

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)
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	Y	10/100	D, U160[7]	2/0	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	Y	10/100	D, U160[7]	2/0	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	Y	10/100	D, U160[7]	2/0	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	Y	10/100	D, U160[7]	2/0	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 to check on the availability of operating systems and applications.

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. This model includes the installation CD for Microsoft Windows Advanced Server Limited Edition for 64-bit systems.
3. Intel Itanium 64-bit processor with integrated full-speed ECC L3 cache and 2 X 133MHz FSB.
4. 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.
5. The integrated 10/100 Ethernet adapter is Intel-based.
6. Variable read rate. Actual playback speed will vary and is often less than the maximum possible.
7. xSeries 380 includes an integrated dual-channel Ultra160 storage controller with one internal connector and one external 0.8mm VHDCI port.

xSeries 380 Processors

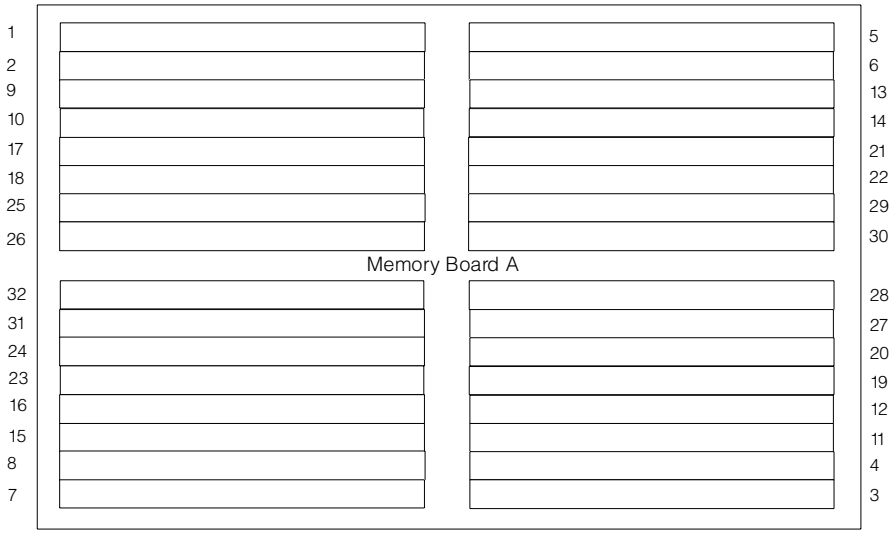
Part Number	Processor Upgrades[1]	SMP Support[1]	Processor Speed Upgrade[2]
10K3815	xSeries 380 733MHz/2MB Cache Upgrade with Itanium Processor	1RX, 3RX	-
10K0050	xSeries 380 800MHz/4MB Cache Upgrade with Itanium Processor	2RX, 4RX	1RX, 3RX

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 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.

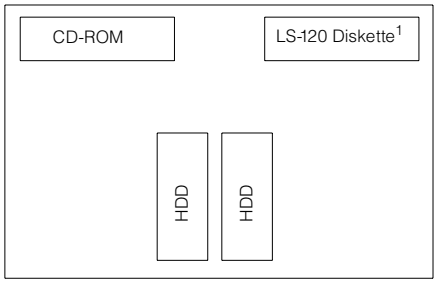
xSeries 380 Hard Disk Drive (HDD) Storage

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	FAStT EXP500 Storage Expansion Unit[3]	Rack (3U)
35421RU	FAStT200 Storage Server[4, 5]	Rack (3U)
35422RU	FAStT200 HA Storage Server[4]	Rack (3U)
19K1121	FAStT200 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. Scroll to the bottom of the page, click on IBM ServerProven Program Participants, then select AMI. MegaRAID 1600 is supported in this system. IBM makes no representations or warrantees with respect to non-IBM products. These products are offered and warranted by third parties, not IBM.
3. FAStT EXP500 Storage Expansion Unit (P/N 35601RU) includes dual hot-swap 350W power supplies, each with its own power cord.
4. The FAStT200 includes two hot-swap, 350W auto-ranging redundant power supplies, each with its own power cord.
5. Can be upgraded to FAStT200 HA Storage Server through the addition of a FAStT200 Redundant RAID Controller (P/N 19K1121).

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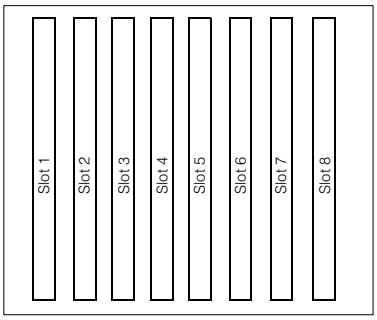
xSeries 380 I/O Options

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 Options[6]						
00N6881	Netfinity FAStT Host Adapter	Half	64-bit	1 … 8	X	Universal	66
35521RU	FAStT500 Storage Server	-	-	-	-	-	-
35421RU	FAStT200 Storage Server	-	-	-	-	-	-
35422RU	FAStT200 HA Storage Server	-	-	-	-	-	-
	Networking[7]						
	Ethernet[8]						
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

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 optional PCI SCSI controller.
2. 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. Scroll to the bottom of the page, click on IBM ServerProven Program Participants, then select AMI. MegaRAID 1600 is supported in this system. IBM makes no representations or warrantees with respect to non-IBM products. These products are offered and warranted by third parties, not IBM.
3. 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.
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. 33MHz adapters will reduce 66MHz buses to 33MHz.
5. All eight slots are hot-plug capable. For Network Operating System support, access www.pc.ibm.com/us/compat.
6. See Fibre Channel Solutions Overview section for additional configuration information.
7. 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 two Intel-based optional Ethernet adapters (P/N 06P3601, 06P3701) provide compatible intermediate drivers for failover support.
8. xSeries 380 includes an integrated 10/100 Intel-based Ethernet adapter that supports Wake on Lan.
9. The Wake on LAN function of this option is not supported by this server.



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

xSeries 380 Power, Monitors & Accessories

Part Number	Description
	Power[1]
94G6676	APC Smart-UPS 3000RMB[2]
37L6861	APC Smart-UPS 5000RMB[3]
	Monitors[4]
63324HN	E74 Color Monitor 17in (406mm, 16in viewable image), stealth black[5]

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

Part Number	Description
	Rack and NetBAY[1]
	Refer to the Rack Cabinets and Options section for information concerning IBM racks and rack-supported devices.
	Keyboard and Mouse[2]
28L3644	Space Saver II Keyboard[3, 4]
22P5150	TrackPoint USB Space Saver Keyboard[3, 4]
33L3244	Sleek USB Mouse (stealth black)
28L3673	Sleek 2-Button Stealth Black Mouse

1. xSeries 380 is housed in a 19in rack-mountable drawer. For selection of a supported rack, refer to the Rack Cabinets and Options section.
2. xSeries 380 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 or Netfinity sy.stems.

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]	1027.6	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[4] FAStT200	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 FAStT200 HA[5]	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 FAStT EXP500	Fibre Channel[6]	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. To attach a Fibre Channel storage enclosure to an xSeries server, a FAStT Host Adapter (P/N 00N6881) and short-wave Fibre Channel cable are required.
5. Identical to FAStT200 (P/N 35421RU) with the addition of a FAStT200 Redundant RAID Controller (P/N 19K1121).
6. Attachment to a FAStT500 Storage Server (P/N 35521RU) is required. This expansion unit does not attach directly to an xSeries server. See FAStT EXP500 section for more information.

IBM EXP300 (35311RU)

EXP300 Hard Disk Drive (HDD) Storage

Total Int Storage[1]	10,000RPM HDDs				15,000RPM HDDs	
	9.1GB (37L7204)	18.2GB (37L7205)	36.4GB (37L7206)	73.4GB (06P5756)	9.1GB (19K0655)	18.2GB (19K0656)
0GB	-	-	-	-	-	-
18.2GB	2	1	-	-	2	1
36.4GB	4	2	1	-	4	2
54.6GB	6	3	-	-	6	3
72.8GB	8	4	2	-	8	4
91GB	10	5	-	-	10	5
109.2GB	12	6	3	-	12	6
127.4GB	14	7	-	-	14	7
145.6GB	-	8	4	-	-	8
182GB	-	10	5	-	-	10
218.4GB	-	12	6	-	-	12
254.8GB	-	14	7	-	-	14
291.2GB	-	-	8	-	-	-
364.0GB	-	-	10	-	-	-
436.8GB	-	-	12	-	-	-
509.6GB	-	-	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
0 … 6	HS	SL	Yes	open
8 … 14	HS	SL	Yes	open

Maximum MB/s	
Cable Length (Meters)[1]	Ultra160 Controller
2	160
4.2	160

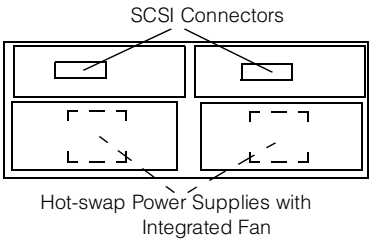
1. The EXP300 ships with a single Ultra2 SCSI cable similar to Netfinity 2M Ultra2 SCSI Cable (P/N 03K9310).

Part Number	Description	RPM	Height	Bays Supported[1]	Max Qty
	Ultra 160 HDDs[2]				
37L7204	9.1GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	10000	SL	1 … 14	14[3]
37L7205	18.2GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	10000	SL	1 … 14	14[3]
37L7206	36.4GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	10000	SL	1 … 14	14[3]
19K0655	9.1GB 15Krpm Ultra160 SCSI Hot-Swap HDD	15000	SL	1 … 14	14[3]
19K0656	18.2GB 15Krpm Ultra160 SCSI Hot-Swap HDD	15000	SL	1 … 14	14[3]
06P5756	73.4GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD	10000	SL	1 … 14	14[3]

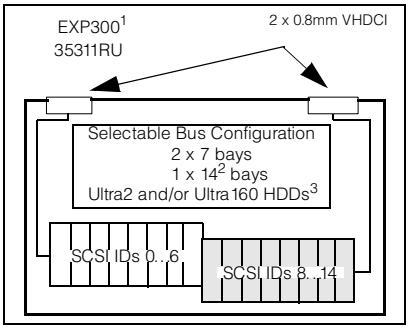
Part Number	External Storage Expansion Units	Form Factor
35311RU	EXP300 Storage Expansion Unit[4]	Rack (3U)
09N7296	EXP300 Rack-to-Tower Conversion Kit	-

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. 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.
3. Twintailing reduces the maximum number of HDDs on a single bus to 13.
4. 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.

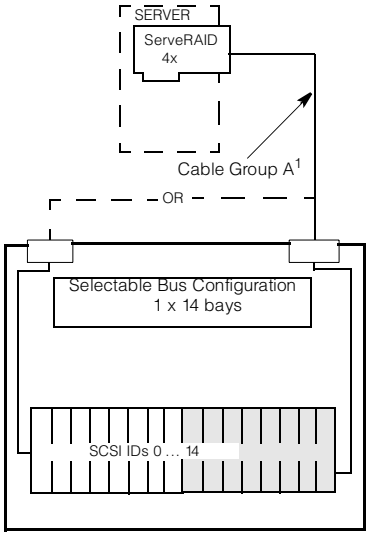


1. Housed in a 19in rack mountable drawer and ships standard with redundant 500W hot-swap power supplies, two power cords and a single 2M Ultra2 SCSI cable capable of supporting Ultra160 speeds.
2. Twintailing reduces the maximum number of HDDs on a single bus to 13.
3. When combined with a ServeRAID-4x controller, Ultra2 and Ultra160 HDDs may be mixed on the same bus and operate at up to their maximum respective speeds.

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 One Independent SCSI Bus

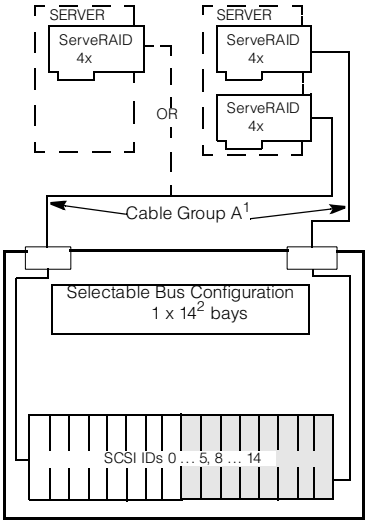


Order:
- 1 x 35311RU
- 1 x External Cable from Group A[1]
- Up to 14 Ultra2 and/or Ultra160 HDDs
-

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 14[2] bays.

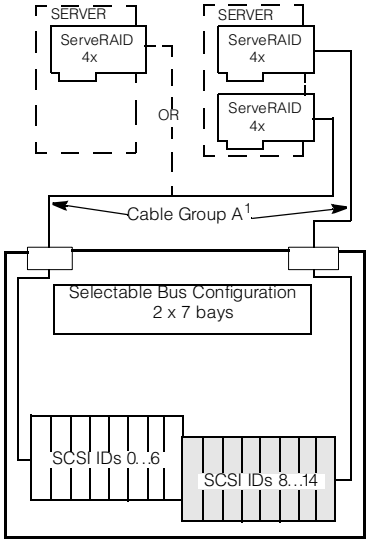


Order:
- 1 x 35311RU
- 2 x External Cables from Group A[1]
- Up to 13 Ultra2 and/or Ultra160 HDDs

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 A[1]
- 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 Host Fabric Ports (nonred/red)	Drive Loop Ports (std/max)	Max Drive Loop Ports (nonred/red)	Form Factor
FAStT Storage Servers									
35421RU	FAStT200 Storage Server	Fibre-over-Fibre	734GB[1]	16	1/1	1/0	1/1	1/0	3U
35422RU	FAStT200 HA Storage Server	Fibre-over-Fibre	4.4TB[2]	16	2/2	2/1	2/2	2/1	3U
35521RU	FAStT500 Storage Server	Fibre-over-Fibre	16.15TB[3]	16	4/8	8/4	4/8	8/4	4U
Fibre Channel HDD Expansion Units									
35601RU	FAStT EXP500	Fibre-over-Fibre	734GB	-	2/2	2/2	2/2	2/2	3U
Fibre Channel Fabric Components									
00N6881	FAStT Host Adapter	Fibre-over-SCSI	-	-	-	-	-	-	-
00N6882	FAStT500 Mini Hub	Fibre-over-Fibre	-	-	-	-	-	-	-
09N4047	Fibre Tape Automation Adapter	Fibre-over-SCSI	-	-	-	-	-	-	-
19K1121	FAStT200 Redundant RAID Controller	Fibre-over-Fibre	-	-	-	-	-	-	
2108R3L	SAN Data Gateway Router UltraSCSI LVD Port	Fibre-over-SCSI	-	-	-	-	-	-	-
2109S08	SAN FC Switch, 8-Port	Fibre-over-Fibre	-	-	-	-	-	-	-
2109S16	SAN FC Switch, 16-Port	Fibre-over-Fibre	-	-	-	-	-	-	-
2109F16	SAN FC Switch, 16-Port	Fibre-over-Fibre	-	-	-	-	-	-	-
35341RU	SAN FC Managed Hub	Fibre-over-Fibre	-	-	-	-	-	-	-
03K9307	FC Long-Wave GBIC	Fibre-over-Fibre	-	-	-	-	-	-	-
03K9308	FC Short-Wave GBIC	Fibre-over-Fibre	-	-	-	-	-	-	-
03K9305	Netfinity Fibre Channel 25M Cable	Fibre-over-Fibre	-	-	-	-	-	-	-
03K9306	Netfinity Fibre Channel 5M Cable	Fibre-over-Fibre	-	-	-	-	-	-	-
36L9973	Netfinity Fibre Channel 1M Cable	Fibre-over-Fibre	-	-	-	-	-	-	-
19K0652	Netfinity 18.2GB 10K-4 FC Hot-Swap HDD	Fibre-over-Fibre	-	-	-	-	-	-	-
19K0653	Netfinity 36.4GB 10K-4 FC Hot-Swap HDD	Fibre-over-Fibre	-	-	-	-	-	-	-
19K0654	Netfinity 73.4GB 10K-4 FC Hot-Swap HDD	Fibre-over-Fibre	-	-	-	-	-	-	-
06P5707	Netfinity 18.2GB 10K-4 FC Hot-Swap HDD	Fibre-over-Fibre	-	-	-	-	-	-	-

1. Attaching expansion units to a FAStT200 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 FAStT200 internal HDD bays along with FAStT EXP500 expansion units.
3. Based on a maximum of 220 73.4GB FC HDDs installed in a maximum of 11 FAStT EXP500 expansion units per cable pair (drive loop).

IBM FAStT200 Storage Server (3542xRU)

FAStT200 (HA) Storage Expansion Unit

Total Internal Storage[1]	10,000RPM HDDs			15,000RPM HDDs
	18.2GB[2] (19K0652)	36.4GB (19K0653)	73.4GB (19K0654)	18.2GB (06P5707)
0GB	Standard on base models			
18.2GB	1	-	-	1
36.4GB	2	1	-	2
54.6GB	3	-	-	3
72.8GB	4	2	-	4
73.4GB	-	-	1	-
91GB	5	-	-	5
109.2GB	6	3	-	6
145.6GB	8	4	-	8
146.8GB	-	-	2	-
182GB	10	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	-

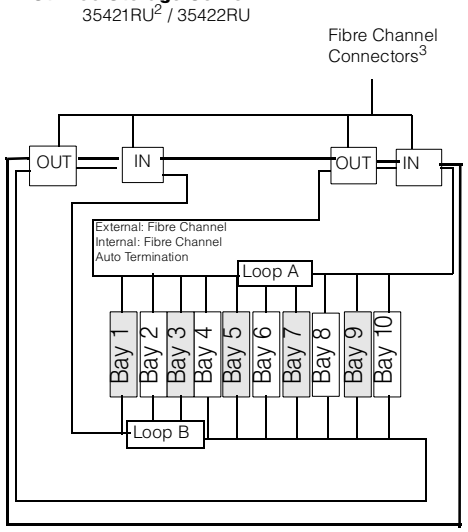
This table does not represent all valid HDD configurations.
1. Select a total storage row and then select the quantity of HDDs from a column corresponding to the HDD of choice. Total Internal Storage listed is within +/- 0.2GB unless otherwise noted.
2. When referring to hard disk drive capacity, GB equals one billion bytes. Total user accessible capacity may vary depending on operating environments.

Part Number	Description	RPM	Height	Bays Supported	Max Qty Supported
19K0652	Netfinity 18.2GB 10K-4 FC Hot-Swap HDD	10,000	SL	1 … 10	10
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 15K-rpm 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).

FAStT200 Storage Server[1]
35421RU[2] / 35422RU

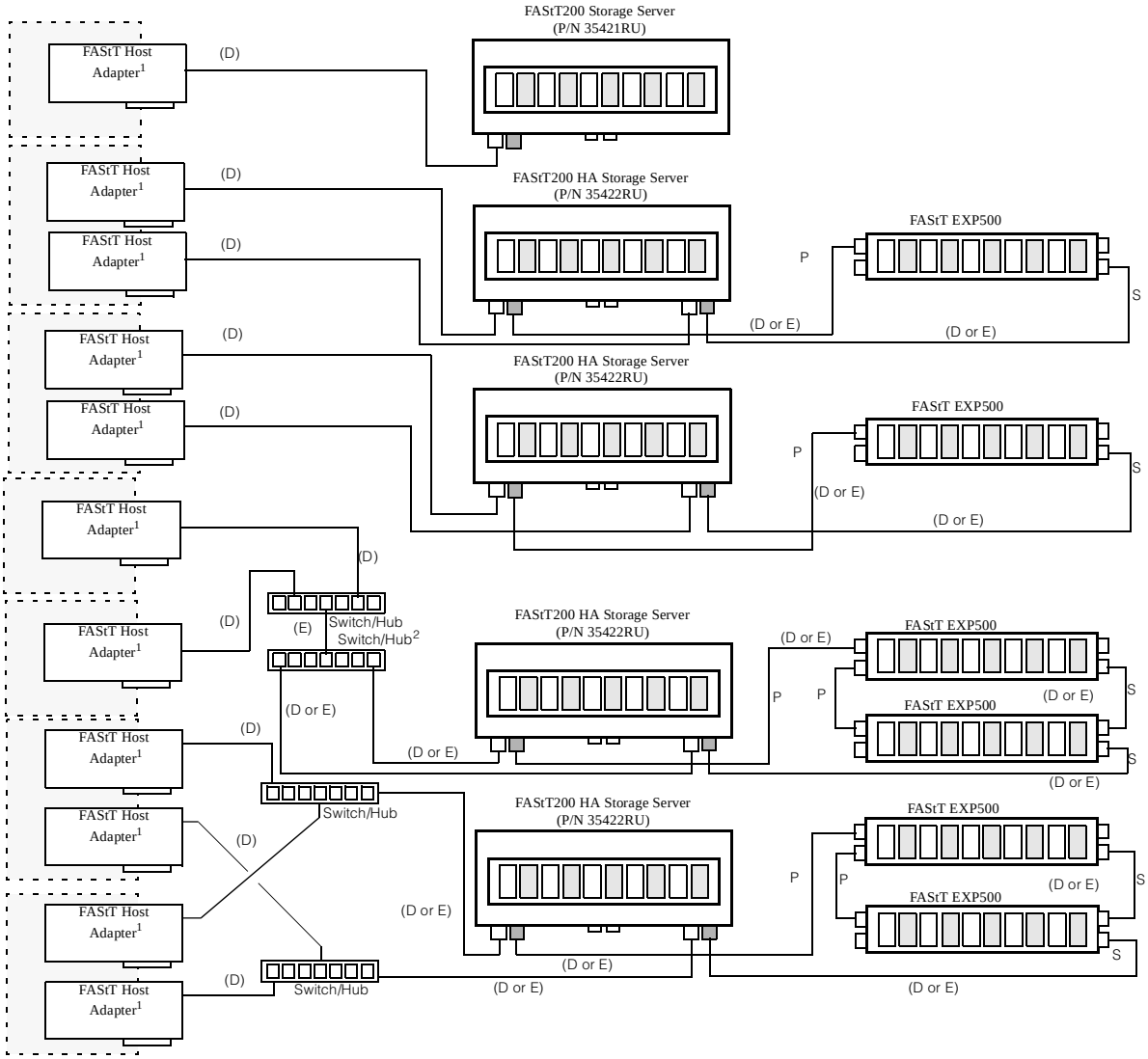


IN = connection to host
OUT = connection to expansion units

1. Housed in a 19in rack-mountable drawer and ships standard with redundant power supplies and two power cables requiring separate power sources. Requires an IBM industry standard 19in rack, EIA-310D with a minimum depth of 24in (711.2mm) or NetBAY3/3E. Select optional storage controllers and external cables, which are not included with the FAStT storage server or external enclosure, using the Fibre Channel Device Ports Reference.
2. 35421RU includes a single loop only. The second loop is created with the addition of FAStT200 Redundant RAID Controller (P/N 19K1121).
3. GBICs are not included. Either Fibre Channel long-wave GBICs (P/N 03K9307) or short-wave (P/N 03K9308) GBICs may be used.

Fibre / Fibre Configuration Examples (FAStT200)

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 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 30 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 FAStT200 storage server and FAStT EXP500 storage connections. GBICs are not depicted in these diagrams.
- 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

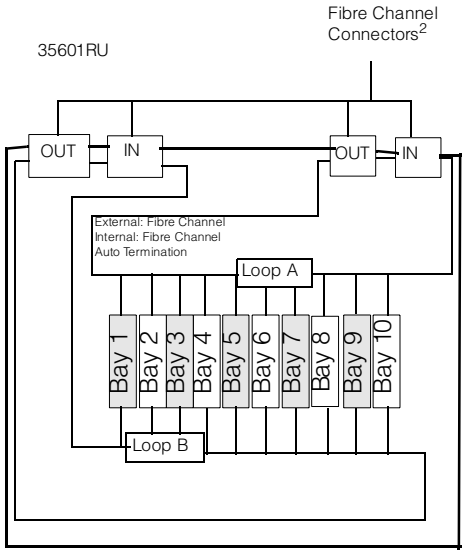
Total Internal Storage[1]	10,000RPM HDDs			15,000RPM HDDs
	18.2GB (19K0652)	36.4GB (19K0653)	73.4GB (19K0654)	18.2GB (06P5707)
0GB	Standard on base models			
18.2GB	1	-	-	1
36.4GB	2	1	-	2
54.6GB	3	-	-	3
72.8GB	4	2	-	4
73.4GB	-	-	1	-
91GB	5	-	-	5
109.2GB	6	3	-	6
145.6GB	8	4	-	8
146.8GB	-	-	2	-
182GB	10	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
19K0652	Netfinity 18.2GB 10K-4 FC Hot-Swap HDD	10,000	SL	1 … 10	10
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 15K-rpm 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 FAStT EXP500 ncludes two hot-swap, 350W auto-ranging redundant power supplies, each with its own power cord.

FAStT EXP500[1]

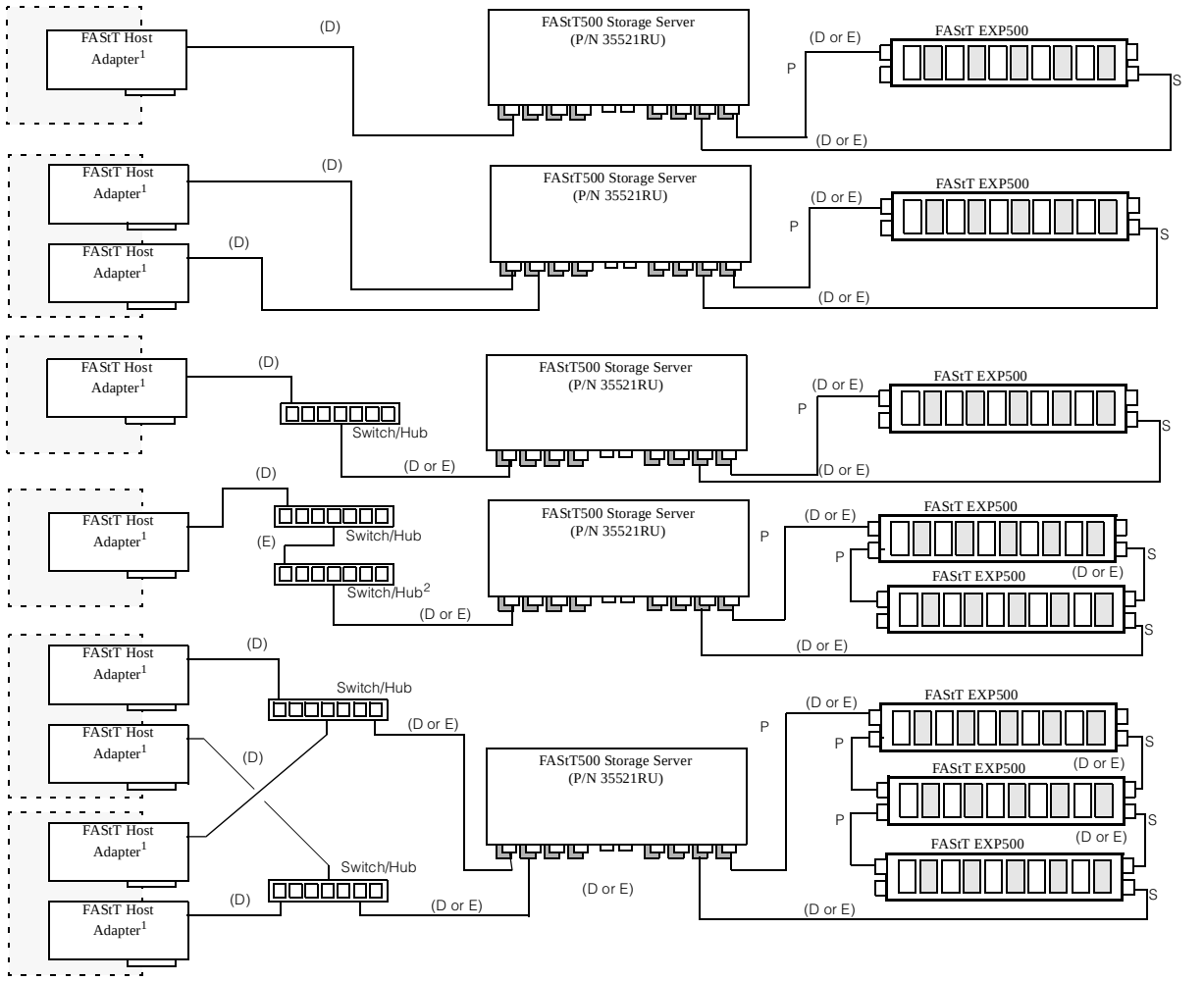


IN = primary or secondary (redundant) connection from FAStT500 Storage Server or previous FAStT EXP500 expansion unit daisy-chained from the storage server
OUT = primary or secondary (redundant) connection to additional FAStT EXP500 expansion units

1. Housed in a 19in rack mountable drawer and ships standard with redundant power supplies and two power cables requiring separate power sources. Requires an IBM industry standard 19in rack, EIA-310D with a minimum depth of 24in (711.2mm) or NetBAY3/3E. Select optional storage controllers and external cables, which are not included with the FAStT storage server or external enclosure, using the Fibre Channel Device Ports Reference.
2. GBICs are not included. Either Fibre Channel long or short-wave GBICs (P/N 03K9307 or 03K9308 respectively) may be used.

Fibre / Fibre Configuration Examples (FAStT500)

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.
- Other Fibre Channel devices may not require optional GBICs. For specific requirements, see the Fibre Device Ports Reference.

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)

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 Interconnection Guidelines

Part Number	Description	00N6881 FAStT Host Adapter	00N6882 FAStT Mini Hub [1]	19K1121 FastT200 Redun Raid Controller [1]	2108R3L 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 FAStT200 Storage Server [1]	35422RU FAStT200 HA Storage Server [1]	35521RU FAStT500 Storage Server [1]	35601RU FAStT EXP500 [1]	09N4047 Fibre Tape Automation Adapter
00N6881	FAStT Host Adapter	-	-	S	S	S	S	S	S	S	S	-	S
00N6882	FAStT500 Mini Hub	-	E	E	-	E	E	-	-	-	H	E	-
19K1121	FAStT200 Redundant RAID Controller	S	-	-	-	E	E	E	H	-	-	-	-
2108R3L	SAN Data Gateway Router UltraSCSI LVD Port	S	-	-	-	S	S	S	-	-	-	-	-
2109S08	SAN FC Switch, 8-Port	S	E	E	S	E	E	-	E	E	E	E	S
2109S16	SAN FC Switch, 16-Port	S	E	E	S	E	E	-	E	E	E	E	S
35341RU	SAN FC Managed Hub	S	E	E	S	-	-	E	E	E	E	-	S
09N4047	Fibre Tape Automation Adapter	S	-	-	-	S	S	S	-	-	-	-	-
35421RU	FAStT200 Storage Server	S	-	H	-	E	E	E	-	-	-	E	-
35422RU	FAStT200 HA Storage Server	S	-	-	-	E	E	E	-	-	-	E	-
35521RU	FAStT500 Storage Server	-	H	-	-	E	E	E	-	-	-	E	-
35601RU	FAStT EXP500	-	E	E	-	-	-	-	E	E	E	E	-
03K9307	FC Long-Wave GBIC	-	H	H	-	H	H	H	H	H	H	H	-
03K9308	FC Short-Wave GBIC	-	H	H	-	H	H	H	H	H	H	H	-

S Short-wave connection only. See Fibre Device Ports Reference section for GBIC/Integrated port information.
E Either short-wave or long-wave connections allowed via the appropriate GBIC. See Fibre Device Ports Reference section for GBIC/Integrated port information.
H Hardware connection: One of these devices installs directly into the other, i.e., the FAStT500 Mini Hub (P/N 00N6882) installs directly into the FAStT500 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/Integrated port information.

For the latest product & technical information, refer to the Information Sources on pages 2 and 3.

Fibre Device Ports Reference

Part Number	Description	Total Connections Possible	Integrated Ports[4]	Mini Hubs Possible	Mini Hubs Installed	GBIC Ports	GBICs Included[4]
00N6881	FAStT Host Adapter	1	1	-	-	-	-
00N6882	FAStT500 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	FAStT200 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
35341RU	SAN FC Managed Hub	8	7	-	-	1	-
35421RU	FAStT200 Storage Server	2	-	-	-	2	-
35422RU	FAStT200 HA Storage Server	4	-	-	-	4	-
35521RU	FAStT500 Storage Server	16[5]	-	8	4	16[1]	-
35601RU	FAStT EXP500	4	-	-	-	4	-

1. Each FAStT500 Mini Hub provides two GBIC ports.
2. This adapter installs in a 3600 Series Tape Library and attaches to a FAStT 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 and integrated optical ports are short-wave.
5. FAStT500 Storage Server supports up to eight nonredundant or four redundant host connections and up to eight nonredundant or four redundant storage connections.

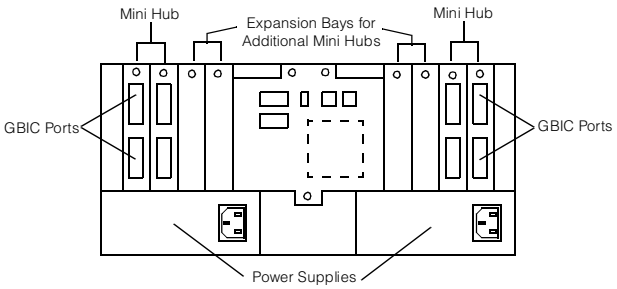
Supported Cable Groups	
Cable Group A (0.8mm to 0.8mm)	
03K9310	Netfinity 2M Ultra2 SCSI Cable
03K9311	Netfinity 4.2M Ultra2 SCSI Cable
37L7101	Netfinity 20M Ultra2 SCSI Cable
Cable Group D (Short-Wave Fibre)	
36L9973	Netfinity Fibre Channel 1M Cable
03K9306	Netfinity Fibre Channel 5M Cable
03K9305	Netfinity Fibre Channel 25M Cable
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	
03K9308	Netfinity Fibre Channel Short-Wave GBIC[1]
03K9307	Netfinity Fibre Channel Long-Wave GBIC

1. Four Netfinity Fibre Channel Short-Wave GBIC's (P/N 03K9308) are included with SAN Fibre Channel Switches (P/Ns 2109S08 and 2109S16).

Netfinity FAStT Host Adapter 00N6881

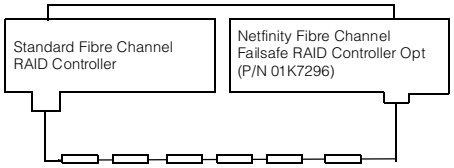
- PCI to FCAL 64/32-bit host adapter.
- Supported Attachments (use cable group D):
  FAStT500 Storage Server
- Integrated short-wave optical port. No GBICs required.
- Full Fibre Channel Fabric support.

FAStT500 Storage Server 35521RU



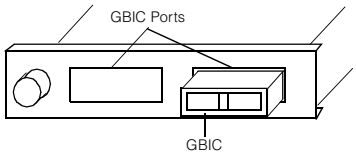
- Dual high-performance, RAID controller cards-supports up to 100MB/sec data transfer rate per controller.
- Two 175W auto-ranging, hot-swap, redundant power supplies.
- Attach directly to FAStT Host Adapter(s) (P/N 00N6881) with short-wave cables and GBICs or indirectly through SAN Fibre Channel Managed Hub (P/N 35341RU) using cables from cable group D or E with corresponding GBICs.
- Height is 4U (1U = 1.75in or 44.45mm)
- Requires Netfinity Enterprise Rack or Expansion Cabinet, Netfinity Rack, Netfinity NetBAY22 or 19-inch EIA-D Industry-Standard Rack. Mounting rails are included with the controller.
- For optimum performance no more than two FAStT500 Storage Servers (P/N 35521RU) should be attached to a single hub (P/N 35341RU)
- Includes four FAStT500 Mini Hubs (P/N 00N6882), two for host and two for storage.
- FAStT500 256MB Cache (P/N 00N6883) expansion is required in installations where a large number of devices are supported.
- All connections to FAStT500 Mini Hubs require the use of GBICs. GBICs not included.

Netfinity Fibre Channel RAID Controller (35261RU)



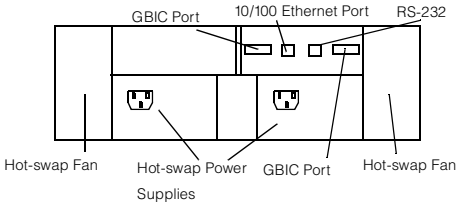
- Contains a single integrated short-wave optical port (use cable group D) and six female 0.8mm Very High Density Connection Interface (VHDCI) SCSI connectors.
- Hot-Swap Redundant Fans and Power Supplies.
- Optional Netfinity Fibre Channel Failsafe RAID Controller (P/N 01K7296) provides a redundant RAID controller and second Short-Wave Fibre Connection (use cable group D).
- Attach directly to FAStT Host Adapter(s) (P/N 00N6881) or indirectly through SAN Fibre Channel Managed Hub (P/N 35341RU) using cables from cable group D.
- Height is 4U (1U = 1.75in or 44.45mm).
- Requires Netfinity Enterprise Rack or Expansion Cabinet, Netfinity Rack, Netfinity NetBAY22 or 19in EIA-D Industry-Standard Rack. Mounting rails are included with the controller.
- For optimum performance no more than two RAID controller units (P/N 35261RU) should be attached to a single hub.

Netfinity FAStT500 Mini Hub 00N6882



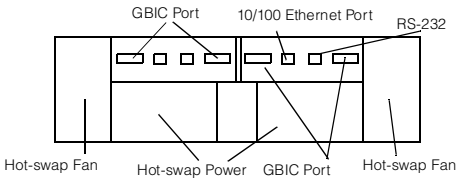
- Provides additional connections to the Netfinity FAStT500 Storage Server - supports complex clustering or advanced storage applications.
- All connections to FAStT500 Mini Hubs require the use of GBICs. GBICs are not included.

FAStT200 Storage Server 35421RU



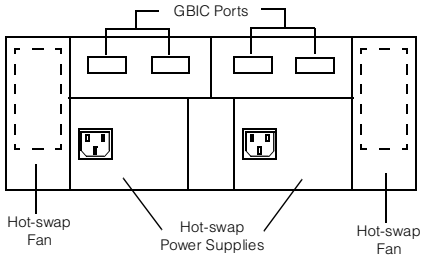
- Contains a single hot-plug, RAID controller which provides a single host Fibre Channel arbitrated loop and a single storage Fibre Channel arbitrated loop.
- Can be upgraded to a FAStT200 HA Storage Server through the addition of a FAStT200 Redundant RAID Controller (P/N 19K1121).
- Integrated 10/100Mbps Ethernet connector and RS-232 service support port.
- Performance optimized for 30 HDDs - supports optional FAStT 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-high or half-high Fibre Channel hot-swap HDDs.
- Height is 3U (1U=1.75in or 44.45mm.
- Requires Netfinity Enterprise Rack or Expansion Cabinet, Netfinity Rack, Netfinity NetBAY22 or 19in EIA-D industry standard rack. Mounting rails are included with the controller.
- Supports long- and short-wave connections. Requires optional GBICs for each connection. GBICs not included.

FAStT200 HA Storage Server 35422RU



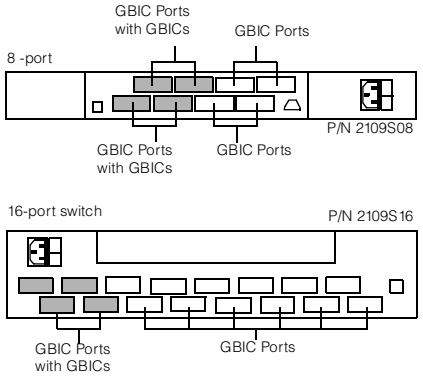
- Contains two hot-plug, RAID controllers. Each controller provides a single host Fibre Channel arbitrated loop and a single storage Fibre Channel arbitrated loop.
- Integrated 10/100Mbps Ethernet connector and RS-232 service support port.
- Performance optimized for 30 HDDs-- supports optional FAStT 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-high or half-high Fibre Channel hot-swap HDDs.
- Height is 3U (1U=1.75in or 44.45mm).
- Requires Netfinity Enterprise Rack or Expansion Cabinet, Netfinity Rack, Netfinity NetBAY22 or 19in EIA-D industry standard rack. Mounting rails are included with the controller.
- Supports long- and short-wave connections. Requires optional GBICs for each connection. GBICs not included.

FAStT EXP500 Storage Expansion Unit 35601RU



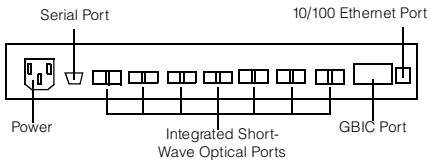
- Two hot-swap, 350W auto-ranging, redundant power supplies.
- Redundant fans - two hot-swap, dual-fan units.
- LED indicators on all critical components warn of faults, over-temperature, and other abnormalities.
- Ten drive bays - supports slim-high or half-high Fibre Channel hot-swap HDDs.
- Height is 3U (1U = 1.75in or 44.45mm).
- Requires Netfinity Enterprise Rack or Expansion Cabinet, Netfinity Rack, Netfinity NetBAY22 or 19in EIA-D Industry-Standard Rack. Mounting rails are included with the controller.
- Requires optional GBICs for each connection. GBICs not included.

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) high and the 16-port switch is 2U (1U=1.75in or 44.45mm) high.

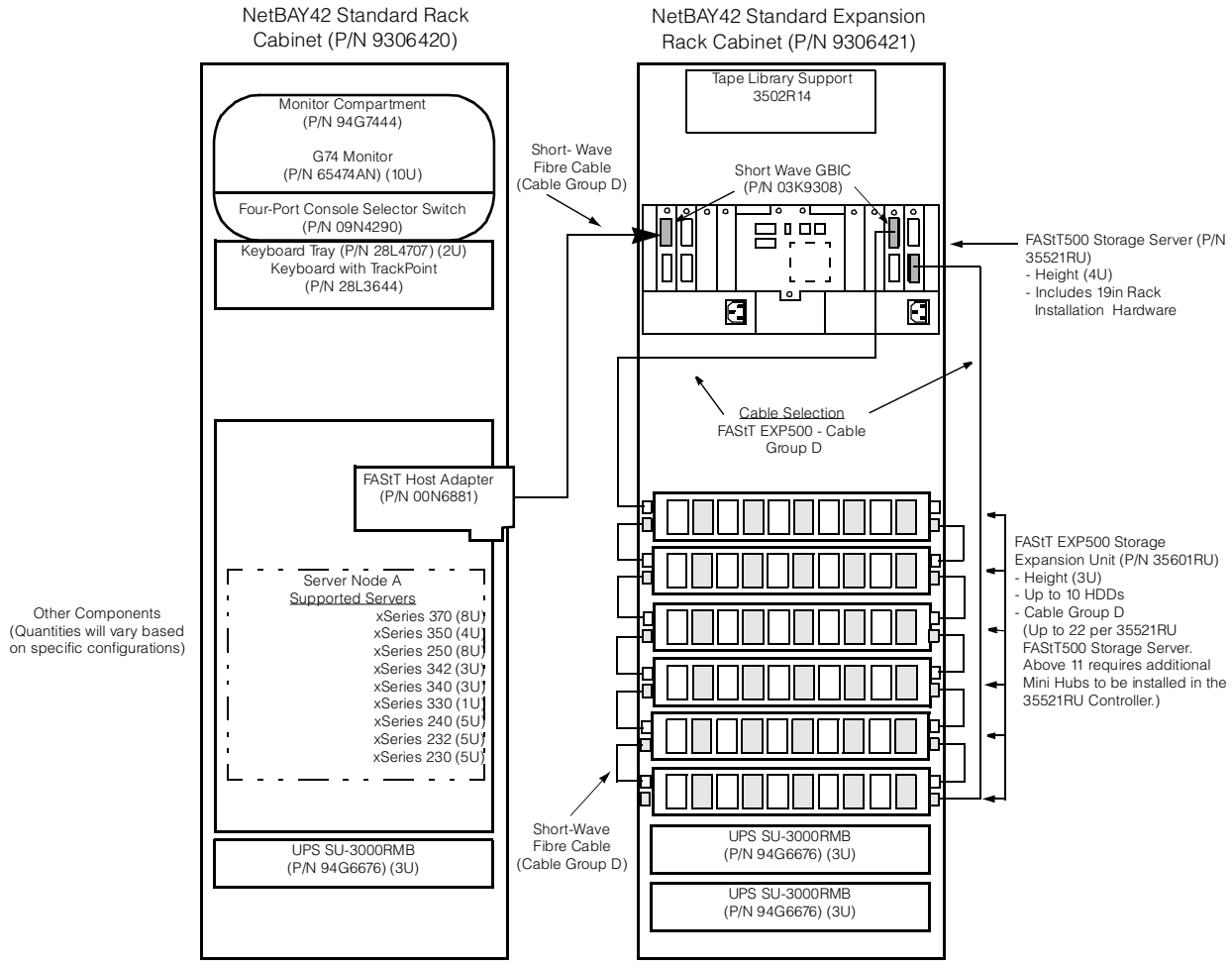
SAN Fibre Channel Managed Hub 35341RU



- 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.

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



Connector Types
68-pin - High Density Connector
0.8mm - Very High Density Connection Interface (VHDCI)

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

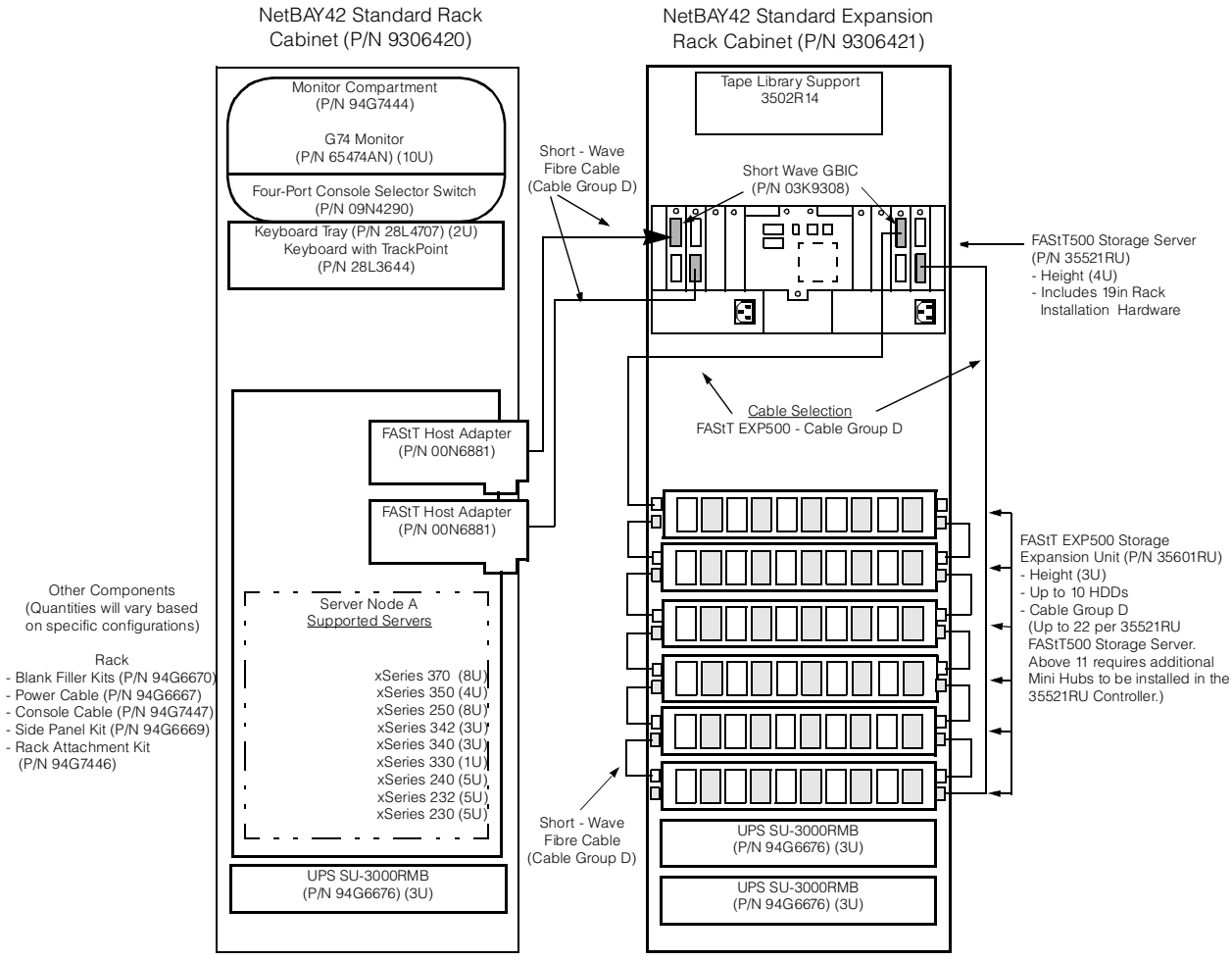
Cable Group D (Short-Wave Fibre)
36L9973 - Netfinity Fibre Channel 1M Cable
03K9306 - Netfinity Fibre Channel 5M Cable
03K9305 - Netfinity Fibre Channel 25M Cable
Customer supplied short-wave cable of up to 500m (0.31 miles)

Cable Group E (Long-Wave Fibre)
Customer supplied long-wave cable of up to 10km (6.2 miles)

GBIC
03K9308 - Netfinity Fibre Channel Short-Wave GBIC
03K9307 - Netfinity Fibre Channel Long-Wave GBIC

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



Connector Types
68-pin - High Density Connector
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Cable Group A (0.8mm to 0.8mm)
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03K9311 - Netfinity 4.2M Ultra2 SCSI Cable
37L7101 - Netfinity 20M Ultra2 SCSI Cable

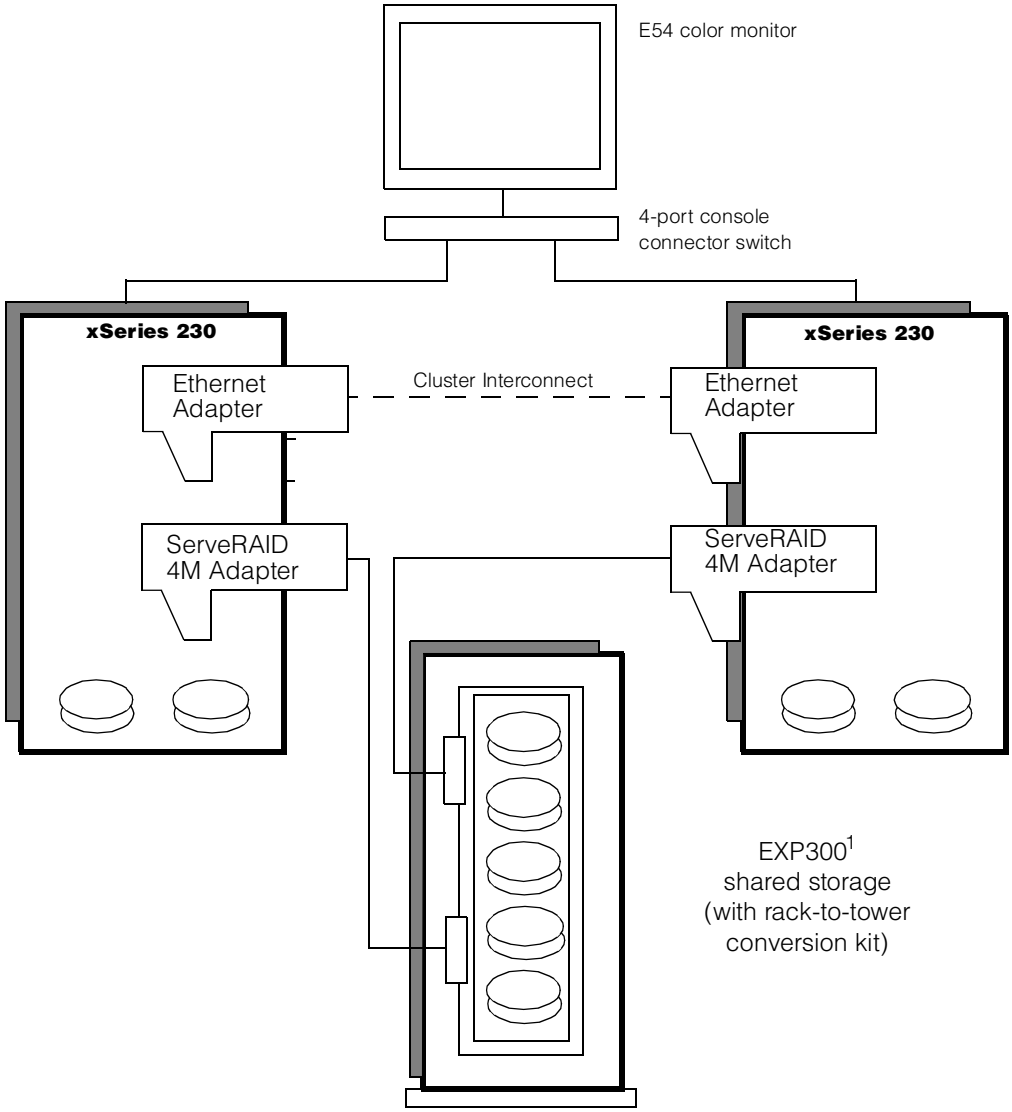
Cable Group D (Short-Wave Fibre)
36L9973 - Netfinity Fibre Channel 1M Cable
03K9306 - Netfinity Fibre Channel 5M Cable
03K9305 - Netfinity Fibre Channel 25M Cable
Customer supplied short-wave cable of up to 500m (0.31 miles)

Cable Group E (Long-Wave Fibre)
Customer supplied long-wave cable of up to 10km (6.2 miles)

GBIC
03K9308 - Netfinity Fibre Channel Short-Wave GBIC
03K9307 - Netfinity Fibre Channel Long-Wave GBIC

High Availability and Scalable Cluster Solutions

xSeries 230 High Availability Cluster



1. Configured as a single independent twintail SCSI bus for high availability.

New xSeries 230 cluster solution starts up quick and smart with 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 tower solutions leverage the latest xSeries 230 server platform with choices of Windows® network operating system software and preloaded cluster middleware. Features include the following:
- Prepackaged for single part number ordering and customer cost savings
- Scaled for business growth
- Ready-to-run with cluster middleware and either Windows 2000 Advanced Server or Windows NT 4.0 EE operating systems preloaded
- 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

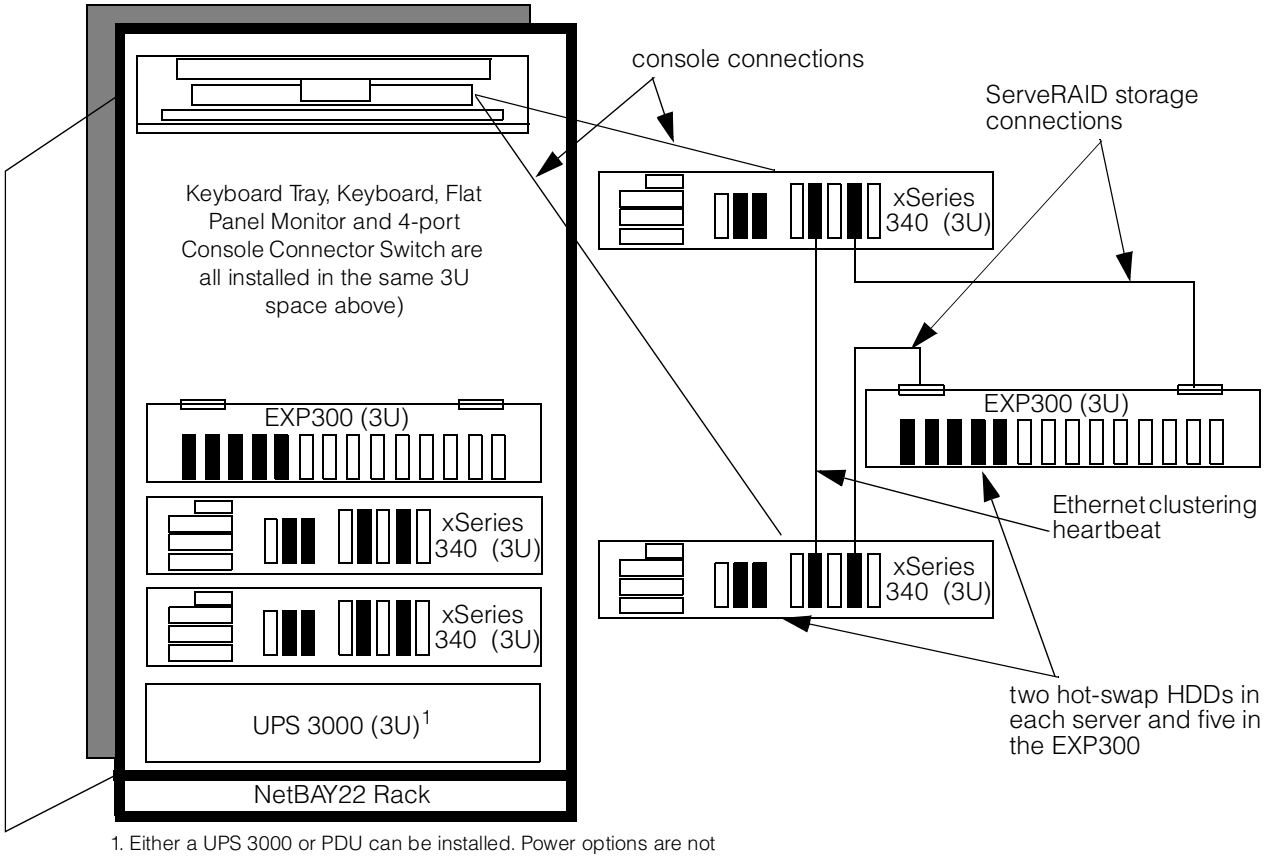
North America order numbers: x230 HA Cluster - NT (P/N 25P1821), x230 HA Cluster - Windows 2000 (P/N 25P1822)

xSeries 230 High Availability Cluster
(P/N 25P1821 and 25P1822)[1]

Part Number	Server Nodes	Qty	Usage
865861Y	xSeries 230, 1GHz, 128MB RAM	2	cluster nodes, onboard ethernet for public network access
37L7204	IBM 9.1GB 10K-4 Ultra160 SCSI Hot-swap SL HDD	4	2 per node attached to integrated Ultra160 SCSI Controller
37L6080	IBM ServeRAID-4M Ultra160 SCSI Controller	2	1 per node for shared storage controller
06P3601	10/100 Ethernet Server Adapter	2	Clustering Heartbeat
	Storage Subsystem		
35311RU	IBM EXP300 External Storage Enclosure	1	1 EXP300 per ServeRAID pair, max of 14 Ultra160 HDDs
09N7296	Netfinity EXP300 Rack-to-Tower Conversion Kit	1	convert standard rack-mount device to tower
37L7205	IBM 18.2GB 10K-4 Ultra160 SCSI Hot-swap HDD	5	RAID 5 shared storage in EXP300
03K9310	Netfinity 2M Ultra2 SCSI Cable	1	server to EXP300 (EXP300 ships with one 2M cable)
	Cluster Interconnect		
19K5788	Ethernet Cluster Interconnect Cable	1	Ethernet Crossover for interconnection between clustered nodes
	Monitor / Console		
6331N2N	E54 Color Monitor - 15in (13.7in viewable image size)	1	
09N4290	Netfinity Console Server Selector Switch (4-port)	1	
09N4293	7ft Console Cable Set	2	1 console set per node
2446177	Solution Integration Charge	2	
06P4610	Cluster Bundle Publications Pack for xSeries 230	1	
	Preloaded Software (specify option)		Select Windows NT 4.0EE or Windows 2000 Advanced Server
01N0985	Microsoft Windows NT Server 4.0EE with MSCS	1	NOS and Cluster Middleware preloaded
01N0986	Windows 2000 Advanced Server	1	NOS and Cluster Middleware preloaded
	Recommended Options		
19K4640	xSeries 1GHz/256KB Upgrade with Pentium III Processor	2	SMP for nodes
33L3123	IBM 128MB 133MHz SDRAM ECC RDIMM II	2	Memory upgrade
37L7205	IBM 18.2GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	9	RAID 5 shared storage in EXP300
01K7209	Netfinity Advanced Systems Management PCI Adapter	1	1 per cluster
03K9309	Netfinity Advanced Systems Management Interconnect	1	1 included with PCI adapter, 1 option required for second system
33L4618	PCI V90 56 Data/Fax Modem	2	communications (1 per node)
00N7990	40/80GB Internal DLT Tape Drive	1	tape back-up
94G3136	APC Smart-UPS 1400	1	

1. P/N 25P1821 includes Windows NT EE as the operating system for this integrated tower solution. P/N 25P1822 uses Windows 2000 Advanced Server.

xSeries 340 High Availability Cluster



1. Either a UPS 3000 or PDU can be installed. Power options are not shipped standard with the cluster bundle. Power connections are not represented in this diagram.

New xSeries 340 cluster solution starts up quick and smart with 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 340 server platform with choices of Windows® network operating system software and preloaded cluster middleware. Features include the following:

- Prepackaged for single part number ordering and customer cost savings
- Scaled for business growth
- Ready-to-run with cluster middleware and either Windows 2000 Advanced Server or Windows NT 4.0 EE operating systems preloaded
- 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

North America order numbers: x340 HA Cluster - NT (P/N 25P1823), x340 HA Cluster - Windows 2000 (P/N 25P1824)

xSeries 340 High Availability Cluster
(P/N 25P1823 and 25P1824)[1]

Part Number	Server Nodes	Qty	Usage
86566RY	xSeries 340, 1GHz, 128MB RAM	2	cluster nodes, onboard ethernet for public network access
37L7204	IBM 9.1GB 10K-4 Ultra160 SCSI Hot-swap SL HDD	4	2 per node attached to integrated Ultra160 SCSI Controller
37L6080	IBM ServeRAID-4M Ultra160 SCSI Controller	2	1 per node for shared storage controller
06P3601	10/100 Ethernet Server Adapter	2	Clustering Heartbeat
	Storage Subsystem		
35311RU	IBM EXP300 External Storage Enclosure	1	1 EXP300 per ServeRAID pair, max of 14 Ultra160 HDDs
37L7205	IBM 18.2GB 10K-4 Ultra160 SCSI Hot-swap SL HDD	5	RAID 5 shared storage in EXP300
03K9310	Netfinity 2M Ultra2 SCSI Cable	1	server to EXP300 (EXP300 ships with one 2M cable)
	Rack, Monitor, Console		
9306200	NetBAY22 Rack	1	22U rack cabinet
9511AG4	T540 Flat Panel Monitor	1	
37L6888	Flat Panel Monitor Rack Kit	1	
28L4707	Netfinity Rack Keyboard Tray	1	
28L3644	Space Saver Keyboard	1	
09N4290	Netfinity Console Server Selector Switch (4-port)	1	
09N4293	7ft Console Cable Set	2	1 console set per node
94G6670	Blank Filler Panel Kit	1	
2446177	Solution Integration Charge	2	
06P4610	Cluster Bundle Publications Pack for xSeries 230	1	
	Cluster Interconnect		
19K5788	Ethernet Cluster Interconnect Cable	1	Ethernet Crossover for interconnection between clustered nodes
	Preloaded Software (specify option)		Select Windows NT 4.0EE or Windows 2000 Advanced Server
01N0985	Microsoft Windows NT Server 4.0EE with MSCS	1	NOS and Cluster Middleware preloaded
01N0986	Windows 2000 Advanced Server	1	NOS and Cluster Middleware preloaded
	Recommended Options		
19K4640	xSeries 1GHz/256KB Upgrade with Pentium III Processor	2	SMP for nodes
33L3123	IBM 128MB 133MHz SDRAM ECC RDIMM II	2	Memory upgrade
37L7205	IBM 18.2GB 10K-4 Ultra160 SCSI Hot-swap SL HDD	9	RAID 5 shared storage in EXP300
01K7209	Netfinity Advanced Systems Management PCI Adapter	1	1 per cluster
03K9309	Netfinity Advanced Systems Management Interconnect	1	1 included with PCI adapter, 1 option required for second system
33L4618	PCI V90 56 Data/Fax Modem	2	communications (1 per node)
00N7990	40/80GB Internal DLT Tape Drive	1	tape back-up
94G6676	APC Smart-UPS 3000RMB	1	
37L6866	NetBAY Rack PDU	2	

1. P/N 25P1823 includes Windows NT EE as the operating system for this integrated rack solution. P/N 25P1824 uses Windows 2000 Advanced Server.

IBM Datacenter Solutions

IBM's new 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 370 rack-mounted server, which offers up to 8-way processing, up to 32GB of memory[1], Fibre Channel and SCSI storage, and 12 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 not only Microsoft-certified hardware, but also the Windows Datacenter Server operating system preloaded and a set of required services. In addition, a wide variety of optional services are available from IBM to meet your specifications.

In addition to the information on the following pages, the IBM Datacenter Solution Program includes the following software and required services. The services products must be ordered separately. A complete Solutions Assurance review will be conducted by IBM to ensure that the configuration being ordered is complete.

Software

Microsoft Windows 2000 Datacenter Server, licensed for up to 8 CPU's[2]
(Client Access Licenses to be purchased separately)
IBM Director 2.2
IBM Director Universal Management Services
APC UPS Software

Required IBM Services

Limited Warranty[3] service upgrade (24x7x4 hour response)
Factory installation and on-site setup
Advanced Support for Mission Critical Systems

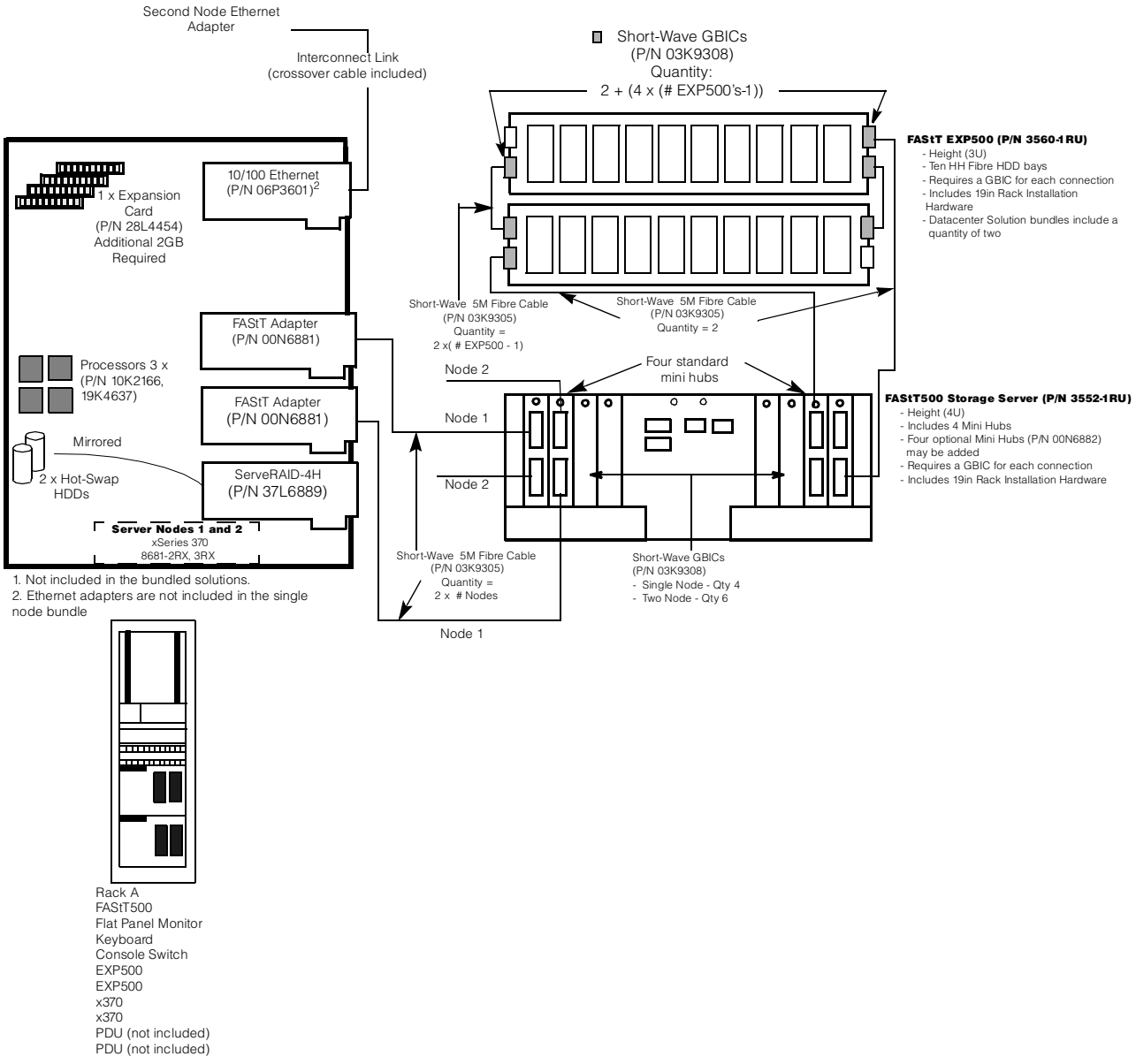
Optional IBM Services

High Availability Services[4] (including up to 99.99% availability guarantee in the US)
xSeries 99.9% High Availability Guarantee[5] outside of the US
Warranty service upgrade (24x7x2 hour response)
Operational Support Services--electronic systems management, account advocate, and more
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. For information on IBM's Statement of Limited Warranty, please 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 onsite service, IBM sends a technician after attempting to resolve the problem remotely.
4. The High Availability Services for Business Critical Systems offering for an availability guarantee is an optional service and is only offered for eligible 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.
5. 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 (P/N 21P9961)

Bundle (P/N 21P9961) Components	IBM Datacenter Solution - Single Node (P/N 21P9961) 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:				
8681-3RX	xSeries 370 900MHz[2]/2MB, 512MB ECC, OPEN, 48X, PCI (Rack 8U)	1 or		41L2742	41L2743
8681-2RX	xSeries 370 700MHz/2MB, 512MB ECC, OPEN, 48X, PCI (Rack 8U)	1		41L2742	41L2743
	Select from two processor upgrades:		**Processor upgrades must match standard processor.**		
19K4637	xSeries 370 900MHz/2MB Upgrade with Pentium® III Xeon™ Processor	3 or	Total of 4 SMP processors per node	N/A	N/A
10K2166	Netfinity® 8500R 700MHz/2MB Upgrade with Pentium III Xeon Processor	3	Total of 4 SMP processors per node	N/A	N/A
28L4454	Netfinity 8500R Memory Expansion Card	1	Enables cache line interleaving and requires installation of matched RDIMM pairs	N/A	N/A
37L6889	ServeRAID™-4H Ultra160 SCSI Controller	1	Provides NOS mirroring on internal HDDs	N/A	N/A
00N6881	Netfinity FAStT Host Adapter	2	Redundant paths to external storage subsystems	N/A	N/A
	Storage Subsystems				
35521RU	FAStT500 Storage Server	1	Provides for redundant paths from the server to the storage unit	41L2768	41L2769
35601RU	FAStT EXP500 Storage Expansion Unit	2	HDDs should be added in matched pairs	41L2766	41L2767
	Storage Cables		Calculations assume no switches are installed		
03K9306	Netfinity Fibre Channel 5M Cable	6	Redundant Paths: Nodes - Storage Server - EXP500	N/A	N/A
03K9308	Netfinity Fibre Channel Short-Wave GBIC	10	Redundant Paths: (2 x # Nodes + 4) +4 x (# EXP500's - 1)	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	3	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	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
	Publications and Software				
22P4745	OS Preload Kit / Ship Group	1		N/A	N/A
	Services				
06P7505	Image Load Fee	1		N/A	N/A
06P7514	Enterprise Rack Prep Fee	1		N/A	N/A
06P7515	Enterprise Rack Installation Fee	4	Quantity equals the number of major rack components installed.	N/A	N/A
06P7495	Option Install Fee	7	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 measures 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 (P/N 21P9962)

Bundle (P/N 21P9962) Components	IBM Datacenter Solution - Two Node (P/N 21P9962) 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 models[2]:					
8681-3RX	xSeries 370 900MHz/2MB, 512MB ECC, OPEN, 48X, PCI (Rack 8U)	1	2 or		41L2742	41L2743
8681-2RX	xSeries 370 700MHz/2MB, 512MB ECC, OPEN, 48X, PCI (Rack 8U)	1	2		41L2742	41L2743
	Select from two processor upgrades:			**Processor upgrades must match standard processor.**		
19K4637	xSeries 370 900MHz/2MB Upgrade with Pentium III Xeon Processor	3	6 or	Total of 4 SMP processors per node	N/A	N/A
10K2166	Netfinity 8500R 700MHz/2MB Upgrade with Pentium III Xeon Processor	3	6	Total of 4 SMP processors per node	N/A	N/A
28L4454	Netfinity 8500R Memory Expansion Card	1	2	Enables cache line interleaving and requires installation of matched RDIMM pairs	N/A	N/A
37L6889	ServeRAID-4H Ultra160 SCSI Controller	1	2	Provides NOS mirroring on internal HDDs	N/A	N/A
00N6881	Netfinity FAStT Host Adapter	2	4	Redundant paths to external storage subsystems	N/A	N/A
	Storage Subsystems					
35521RU	FAStT500 Storage Server	-	1		41L2768	41L2769
35601RU	FAStT EXP500 Storage Expansion Unit	-	2		41L2766	41L2767
	Storage Cables			Calculations assume no switches are installed		
03K9306	Netfinity Fibre Channel 5M Cable	-	8	Redundant Paths: Nodes - Storage Server - EXP500	N/A	N/A
03K9308	Netfinity Fibre Channel Short-Wave GBIC	-	12	Redundant Paths: (2 x # Nodes + 4) +4 x (# EXP500's - 1)	N/A	N/A
	Interconnect Components					
19K5788	25ft Ethernet Crossover Cable	-	1	Interconnects 2 nodes without an Ethernet switch	N/A	N/A
06P3601	10/100 Ethernet Server Adapter	1	2	Node to node interconnect	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
	Publications and Software					
22P4745	OS Preload Kit / Ship Group	1	2		N/A	N/A
	Services					
06P7505	Image Load Fee	1	2		N/A	N/A
06P7514	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**
Select one of the three memory options per node.		RDIMMs must be added in matched pairs within each node. A minimum of 2GB must be added to each bundled node.			
33L3056	Netfinity 1GB SDRAM ECC RDIM II	2 + 2N	Minimum of 2	N/A	N/A
20L0249	Netfinity 512MB SDRAM ECC RDIMM II	4 + 2N	Minimum of 4	N/A	N/A
33L3149	512MB 100MHz ECC SDRAM RDIMM	4 + 2N	Minimum of 4	N/A	N/A
Install two internal HDD options per node.			Two HDDs must be installed in each node		
37L7206	36.4GB 10K-4 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 FAStT500 Storage Expansion Unit. Additional HDDs must be installed in multiples of 2.			
06P5707	Netfinity 18.2GB 15Krpm FC Hot-Swap HDD		Install in EXP500s	N/A	N/A
19K0652	18.2GB 10K-4 FC Hot-Swap HDD		Install in EXP500s	N/A	N/A
19K0653	36.4GB 10K-4 FC Hot-Swap HDD		Install in EXP500s	N/A	N/A
19K0654	73.4GB 10K-4 FC Hot-Swap HDD		Install in EXP500s	N/A	N/A
Select one of the two Warrany 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.

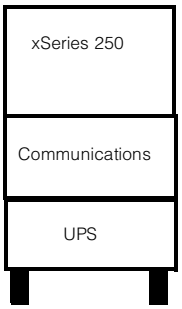
IBM Datacenter Solution - Selectable Options

Selectable Options	Selectable options are not required but are compatible for use with IBM Datacenter bundles. A comprehensive list of supported options can be found at www.developer.ibm.com/welcome/netfinity, under 'NEWS' select 'Solutions Library,' perform a search for 'Microsoft,' click on 'Windows 2000 Datacenter Server.' All final customer configurations and solutions require IBM Solution Assurance Approval.		Limited Warranty Service 24x7x4 hrs	Limited Warranty Service 24x7x2 hrs[1]	Enterprise Rack Assembly Fee
Part Number	**Description**	**Usage**	**Part Number**	**Part Number**	**Part Number**
21P9960[2]	Datacenter Server Bundle-Additional node	Preloaded xSeries 370 2RX or 3RX for nodes 3 and 4.	41L2742	41L2743	21P3342
19K4637[3]	xSeries 370 900MHz/2MB Upgrade with Pentium III Xeon Processor	xSeries 370 supports up to 8 SMP processors. Installation of 5 or more requires Filter and Expansion Kits (P/N 10K2335 and 10K2337)	N/A	N/A	N/A
10K2166[3]	Netfinity 8500R 700MHz/2MB Upgrade with Pentium III Xeon Processor	xSeries 370 supports up to 8 SMP processors. Installation of 5 or more requires Filter and Expansion Kits (P/N 10K2335 and 10K2337)	N/A	N/A	N/A
10K2337	Netfinity Mezzanine Expansion Kit	Required for installation of processors 5 through 8. Requires Filter (P/N 10K2335)			
10K2335	Netfinity 4X Accelerator Filter	Required when installing Mezzanine Expansion Kit (P/N 10K2337)			
00N6881	Netfinity FAStT Host Adapter		N/A	N/A	N/A
35521RU	FAStT500 Storage Server		41L2768	41L2769	21P3342
35601RU	FAStT500 Storage Expansion Unit		41L2766	41L2767	21P3342
36L9973	Netfinity Fibre Channel 1M Cable		N/A	N/A	N/A
03K9306	Netfinity Fibre Channel 5M Cable		N/A	N/A	N/A
03K9308	Netfinity Fibre Channel Short-Wave GBIC		N/A	N/A	N/A
2109S08	SAN Fibre Channel Switch, 8-port		Standard	N/A	21P3342
09L5403	SAN Switch Redundant Power Supply		N/A	N/A	N/A
2108R3L	SAN Data Gateway Router UltraSCSI LVD Port		N/A	N/A	21P3342
37L6889	ServeRAID-4H Ultra160 SCSI Controller		N/A	N/A	N/A
06P3601	10/100 Ethernet Server Adapter		N/A	N/A	N/A
34L0701	Token-Ring 16/4 PCI Adapter 2 with Wake on LAN		N/A	N/A	N/A
06P3701	Gigabit Ethernet SX Server Adapter (fiber)				
31L3820	Fast Ethernet on STP Adapter 2.5m Cable	Attachment from ethernet adapter to ethernet switch	N/A	N/A	N/A
34L0301	Netfinity Gigabit Ethernet SX Adapter		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
930842S	NetBAY42 Enterprise Rack Cabinet (ER)		41L2762	41L2763	21P3341
930842E	NetBAY42 Enterprise Expansion Rack Cabinet (EX)		41L2762	41L2763	21P3341
94G7448	Power Cable Type C12 (3.7m, 12ft)	Provides IEC 320-C13 (Device) to IEC 320-C14 (Power Unit) power cord	N/A	N/A	N/A
37L6865	NetBAY Server Dual Cord Power Distribution Unit		N/A	N/A	N/A
37L6866	NetBAY Rack Power Distribution Unit		N/A	N/A	N/A
37L6883	NetBAY Single Phase Front-End Power Distribution Unit with 120V line cord		N/A	N/A	N/A
37L6884	NetBAY Single Phase Front-End Power Distribution Unit with 208V line cord		N/A	N/A	N/A
37L6886	NetBAY Three Phase Front-End Power Distribution Unit with 208V line cord		N/A	N/A	N/A
37L6861	APC Smart-UPS 5000RMB		N/A	N/A	21P3342
3502R14	DLT Tape Library - Rack (includes SCSI Adapter)		41L2747	N/A	21P3342
06P3882[4]	Cisco CAT2912 12-port Ethernet Switch/Enterprise Edition	Used for interconnect of heartbeat	N/A	N/A	21P3342
19K5788[4]	25ft Ethernet Crossover Cable	Interconnects 2 nodes without an ethernet switch	N/A	N/A	N/A
06P7495	Option Install Fee	Quantity equals the number of options installed.	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. Memory from the Required Options table must be ordered. Additional hardware may also be required, such as an ethernet switch and cables.
3. Processor upgrade speed and cache must match the standard processor installed in each node.
4. There may be some variance in IBM part numbers outside of the US and Canada.

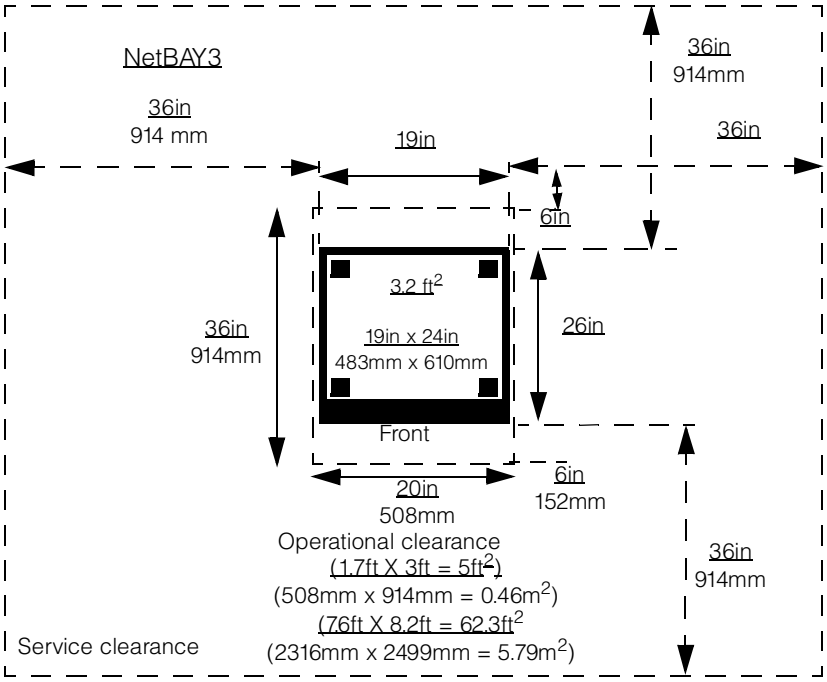
IBM NetBAY3/NetBAY3E™ Stackable Enclosures

Sample Configuration



Installation Guidelines:

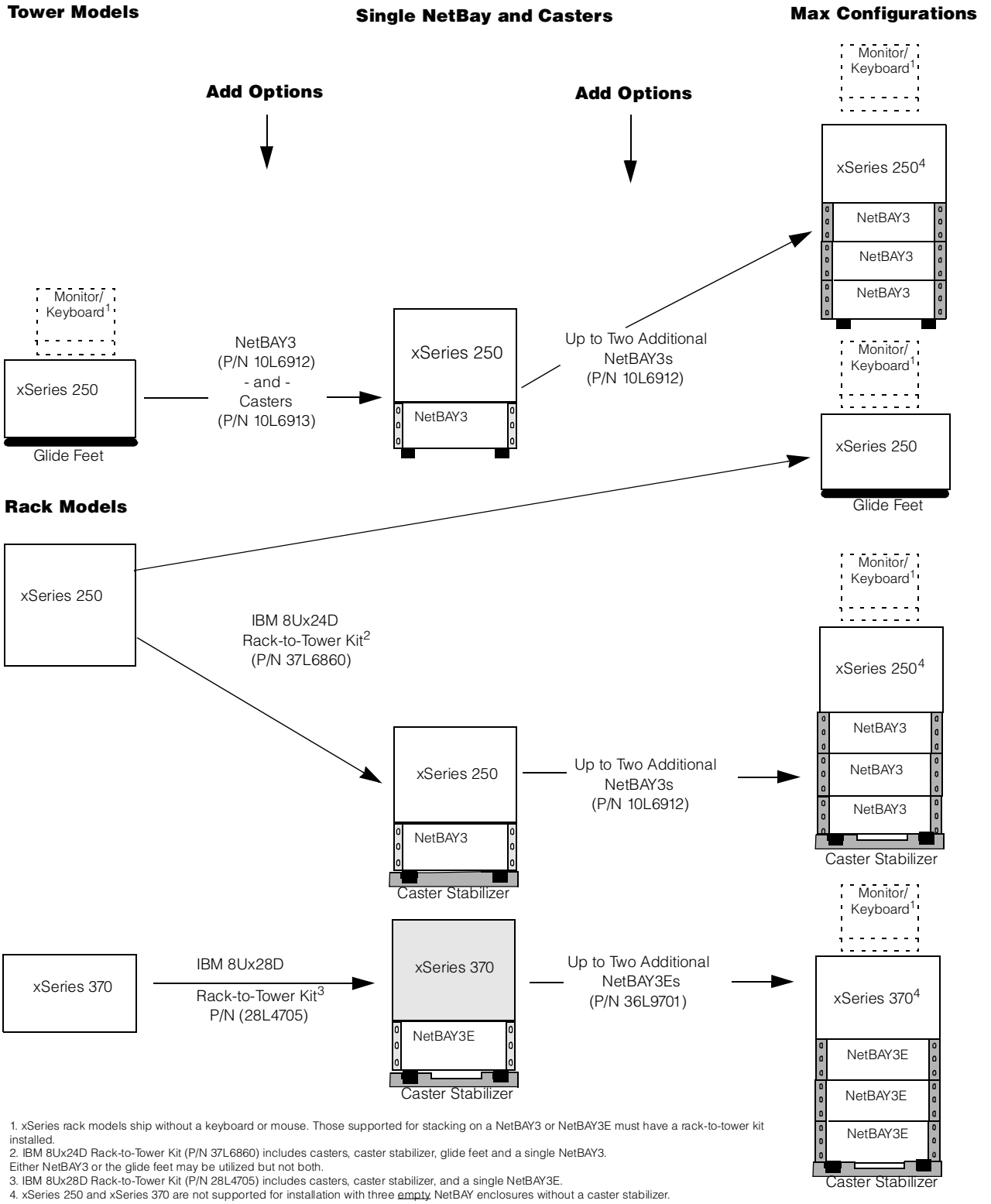
1) Locate power units with line cords in the bottom enclosure.
2) Install components starting from the bottom; start with the heaviest device.
3) If nothing is installed in the enclosure, attach the rear blank panel for stability.



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
Expansion[2]					
Netfinity EXP300	X	X	3	1	3
FAStT200 Storage Server	X	X	3	1	1
FAStT200 HA Storage Server	X	X	3	1	1
FAStT EXP500[3]	X	X	3	1	2
Tape Units[2]					
NetMEDIA 3551001	X	X	3	1	3
Power[2]					
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
Communications[2]					
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

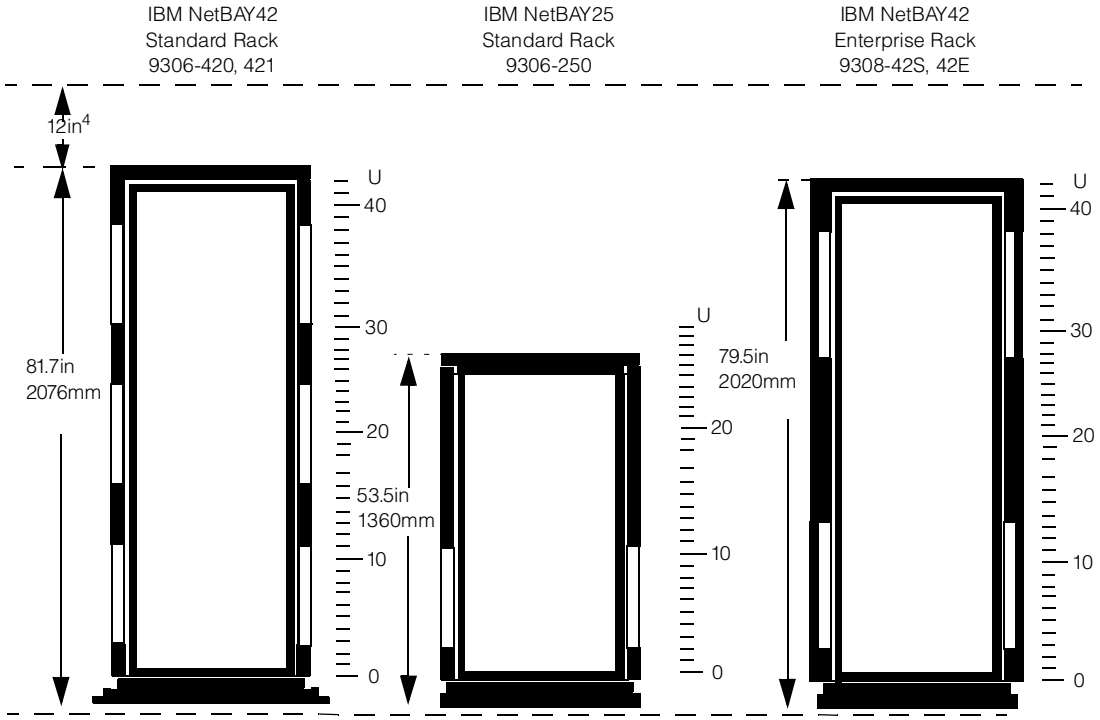
1. xSeries 370 systems are rack-mountable and ship without a keyboard. In order to be utilized with a NetBAY3 (or in any tower configuration), optional Rack-to-Tower Kit (P/N 28L4705) must be installed.
2. NetBAY3 and NetBAY3E do not contain a top cover and require a supported server as the top component in a stack.
3. FAStT EXP500 requires a FAStT200 or FAStT200 HA Storage Server in a NetBAY3 or NetBAY3E configuration.

IBM NetBAY3/3E Stackable Enclosure



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.

Rack Cabinets and Options



	IBM NetBAY42 Standard Rack		IBM NetBAY25 Standard Rack[3]	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
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
Rack Attachment Kit[2]	NR	Std	NA	NR	Std

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.

	Server System Rack and Stack Alternatives												
	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	9306-250 NetBAY25SR	9306-420 NetBAY42SR	9306-421 NetBAY 42SX	9308-42S NetBAY42ER	9308-42E NetBAY42EX
Servers													
xSeries 200[4]	X								X	X	X	X	X
xSeries 220[4]	X								X	X	X	X	X
xSeries 230		X							X	X	X	X	X
xSeries 232			X						X	X	X	X	X
xSeries 240		X							X	X	X	X	X
xSeries 250				X	X		X[5]		X	X	X	X	X
xSeries 300[6]								X[7]	X	X	X	X	X
xSeries 330[6]								X[7]	X	X	X	X	X
xSeries 340									X	X	X	X	X
xSeries 342									X	X	X	X	X
xSeries 350									X	X	X	X	X
xSeries 370[8]						X		X[5]	X	X	X	X	X
xSeries 380									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.

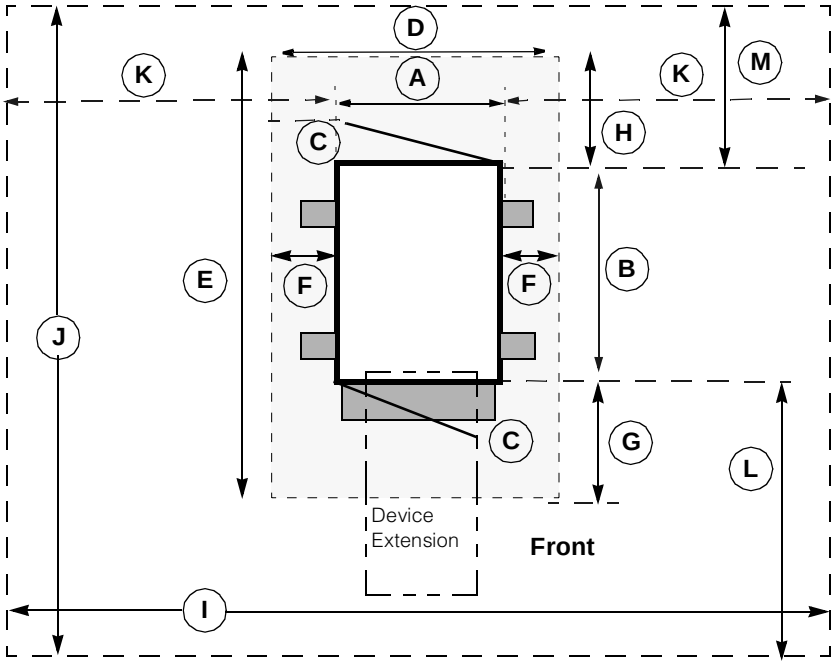
IBM Rack-Mounted Units												
						Standard Power Cords[7]						
Description	**Machine Type / Model**	**Size (U)[4]**	**Approx Weight (lbs)**	**Power (Watts) Typical/Max (All cords to same source)**	**Number of P/S and Line Cords Typical/Max**	**6ft NEMA 5-15P P/N 6952301**	**9ft NEMA 5-15P P/N 6952300**	**14ft NEMA 5-15P P/N 13F9961**	**9ft NEMA 6-15P P/N 1838574**	**9ft IEC 320-C14 P/N 36L8886**	**14ft IEC 320-C14 P/N 36L8861**	**8ft IEC 320-C20 P/N00N7701**
Server System Units												
x200[1]	8478	4	42	245/350	1/1	1						
x220[1]	8645	4	42	245/350	1/1	1						
x230	8658	5	79	250/357	1/1	1						
x230 w/Pwr Upgrade[5]	8658	5	79	315/450	1/3[5]	1						
x232	8668	5	76	385/550	1/1[6]	1						
x232 w/Pwr Conversion[6]	8668	5	80	420/600	2/3[6]	2/3						
x240	8664	5	80	315/450	2/3	2						
x250	8665	8	123	350/475	2/4		2					
x300[2]	8672	1	29	140/200	1/1		1			1		
x330[2]	8654/8674	1	29	140/200	1/1		1			1		
x340	8656	3	61	270/415	1/2		1			1		
x342	8669	3	62	262/375	1/2		1			1		
x350	8682	4	76	365/525	1/3		1			1		
x370[3]	8681	8	160	1015/1450	3/3		3		3	3		
x380	8683	7	150	1400/2000	2/2							2
Storage Units												
EXP300	35311RU	3	90	285/360	2/2		2					
FAStT200	35421RU	3	56	275/390	2/2		2					
FAStT200HA	35422RU	3	56	275/390	2/2		2					
FAStT500 RAID Controller	35521RU	4	76	140/200	2/2		2					
FAStT EXP500 Storage Unit	35601RU	3	61	245/350	2/2		2					
FC Switch 8-port	2109S08	1	17	-/200	1/2		1					
FC Switch 16-port	2109S16	2	28	-/200	1/2		1					
Tape Units												
NetMEDIA	3551001	3	37	130/185	2/2	2						
DLT Library	3502R14	4	70	-/135	1/1	1						
Magstar 1 drive	3570C21	6	64	140/200	1/1			1			1	
Magstar 2 drives	3570C22	6	64	140/200	2/2			2			2	

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. One power supply standard; the Hot-Swap Power Supply Upgrade Kit (P/N 37L6881) allows one to three hot swap power supplies.
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.

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.

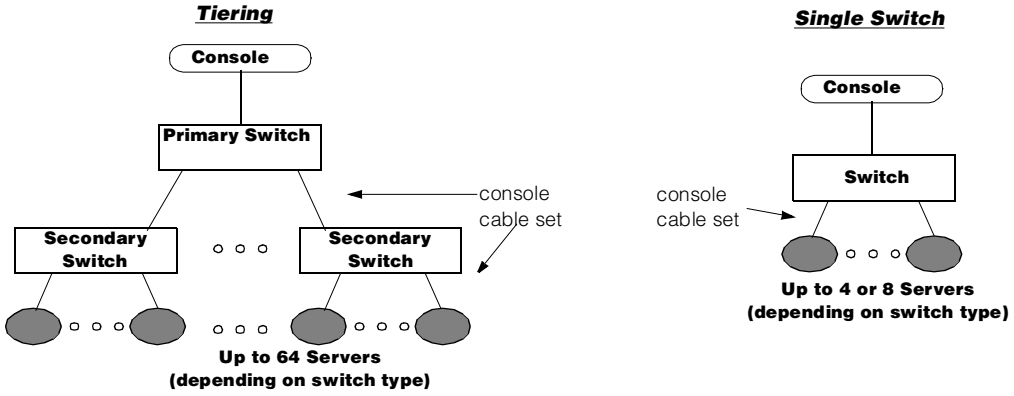
Power Supply Options						
			Standard Power Cords			
Power Supply	Part Number	Usable with	6ft NEMA 5-15P P/N 6952301	9ft NEMA 5-15P P/N 6952300	6ft NEMA 6-15P P/N 1838576	9ft IEC 320-C14 P/N 36L8886
110W	09L5403	2109		1		
250W	33L3760	x230, x232. x240, x250	1			
270W	37L6880	x340, x342, x350		1		1

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
01K1260	TrackPoint IV 104-key Black Keyboard	1U, includes TrackPoint IV, requires Rack Keyboard Tray (P/N 28L4707)
28L3644	Space Saver II Keyboard	1U, includes TrackPoint IV, requires Rack Keyboard Tray (P/N 28L4707)
94G7444	Monitor Compartment	
6331N2N	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)
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
94G6674	APC Smart-UPS 1400RMB	3U, 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
37L6861	APC Smart-UPS 5000RMB	5U, 208V, 22A, eight IEC 320-C13 outlets, two IEC 320-C19 outlets, reqires one NEMA L6-30R wall receptacle; ships standard with two IEC 320-C19 to C20 cables to support PDUs.
94G7446	Rack Attachment Kit	Used to attach 9306-900, 910 racks to make a suite
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)

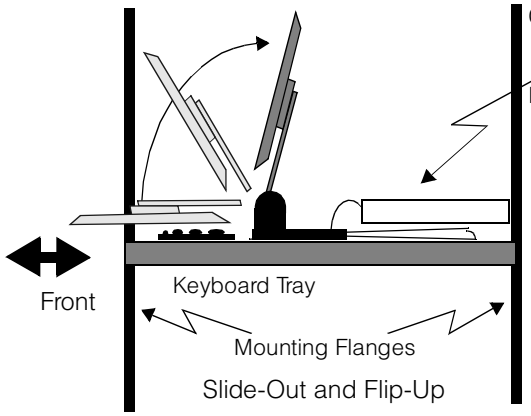


	9306-xxx (inches)	9308-xxx (inches)	Description
Box Footprint			
A	23.6	25.5	Width of rack
B	39.4	43.5	Depth of rack (not including front stabilizer)
C	24	26	Front and rear door clearance
Operational Clearance			
D	27.6	29.5	Width of Operational Clearance area
E	93.4	110	Depth of Operational Clearance 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



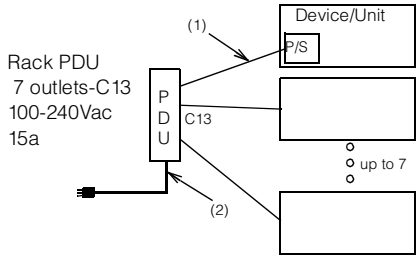
Console Switch
- Mounts to rear flanges
- Shares 3U space with display, keyboard and tray

Keyboard Tray Components
- 28L4707 Netfinity Rack Keyboard Tray
- 37L6888 Netfinity Flat Panel Monitor Rack Mount Kit II
- 28L3644 Space Saver Keyboard
- 9511AG1 T54A TFT Color Monitor

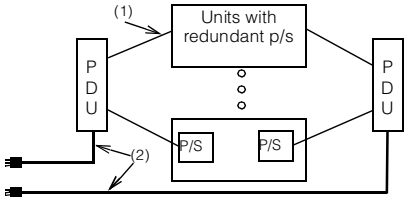
NetBAY Rack Power Configurator

Possible Power Configurations:

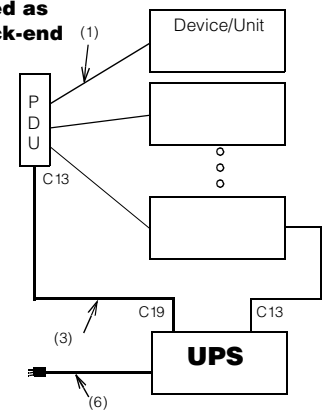
Single Rack PDU



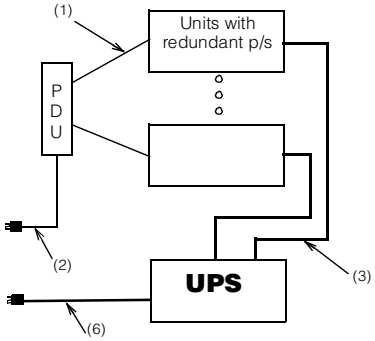
Redundant Power Distribution



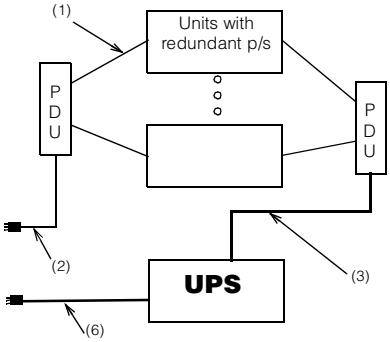
PDU used as UPS back-end



Redundant Power Distribution with PDU and UPS



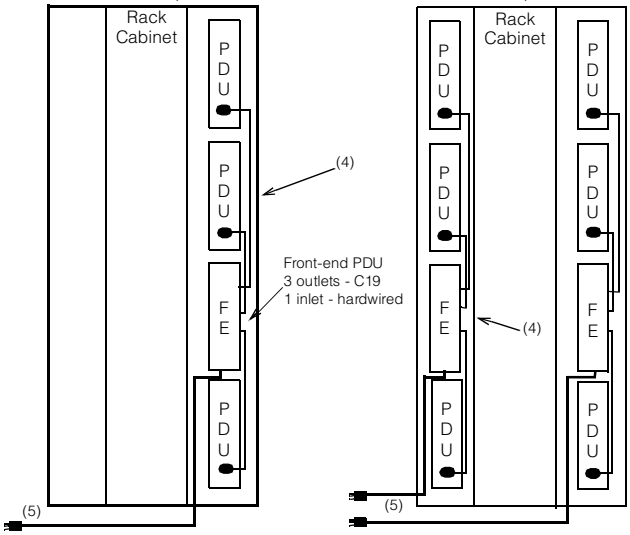
Redundant Power Distribution with PDU and UPS with PDU



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:
1. 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.
2. Each PDU and UPS comes with a country-specific power cord.
3. Internal rack power cable provided with APC SmartUPS 5000 UPS.
4. Internal rack power cable provided with Front-end PDU.
5. Line cord provided with Front-end PDU.
6. UPS comes with a country-specific power cord or a terminal block.
7. Customer responsible to provide a dedicated circuit for each line cord protected with an appropriate circuit breaker.
8. P/S = Power Supply.

	US models			EMEA models	
Outlets	**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 → (2) Line Cords: Rack PDU
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 → (2) Line Cords: Type W PDU
special to country-specific connector, 30a,
8.2ft (2.5m)

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

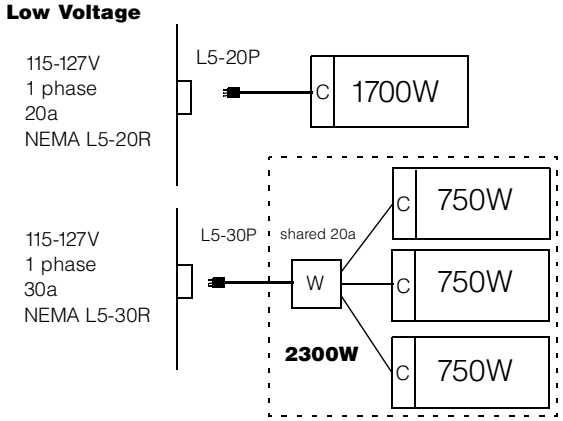
Part Number	Plug Type	Source Circuit (50/60Hz)	PDU Output (single phase 50/60Hz)
37L6883	NEMA L5-30P	100-127Vac, 30a, single-phase	three 100-127Vac, 20a each, shared 30a
37L6884	NEMA L6-30P	200-240Vac, 30a, single phase line-to-line with ground	three 200-240Vac, shared 20a
37L6886	NEMA L21-30P	200-250Vac, 30a, three-phase Y-connection with neutral	three 100-127Vac (115-145), 20a each

Power Load Capacity -- xSeries / Netfinity Rack Systems

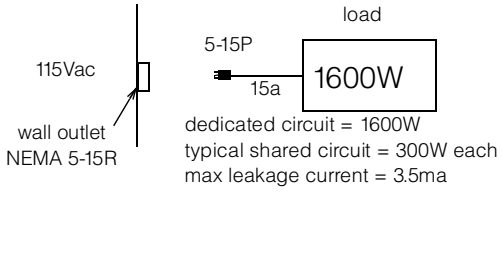
NOTE:

C: = Rack PDU has a 15a circuit breaker
W = FE PDU has a 20a fuse
dedicated circuit
leakage current > 3.5ma

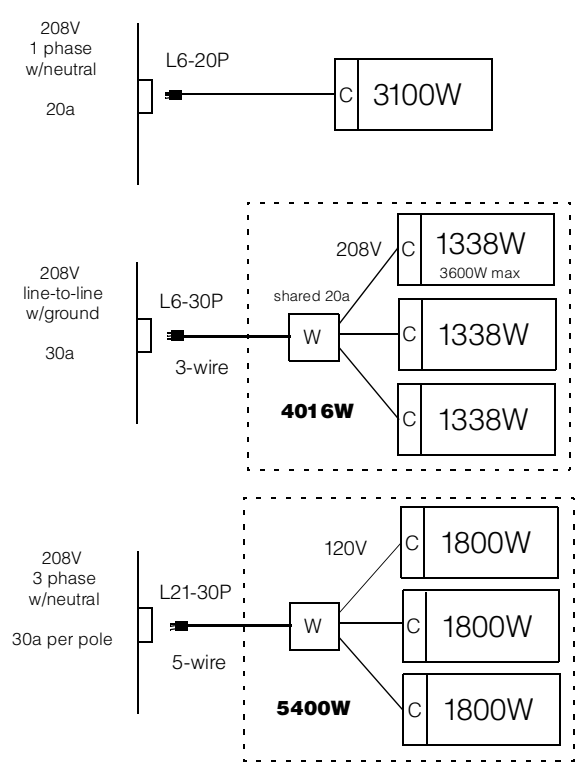
Low Voltage



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)

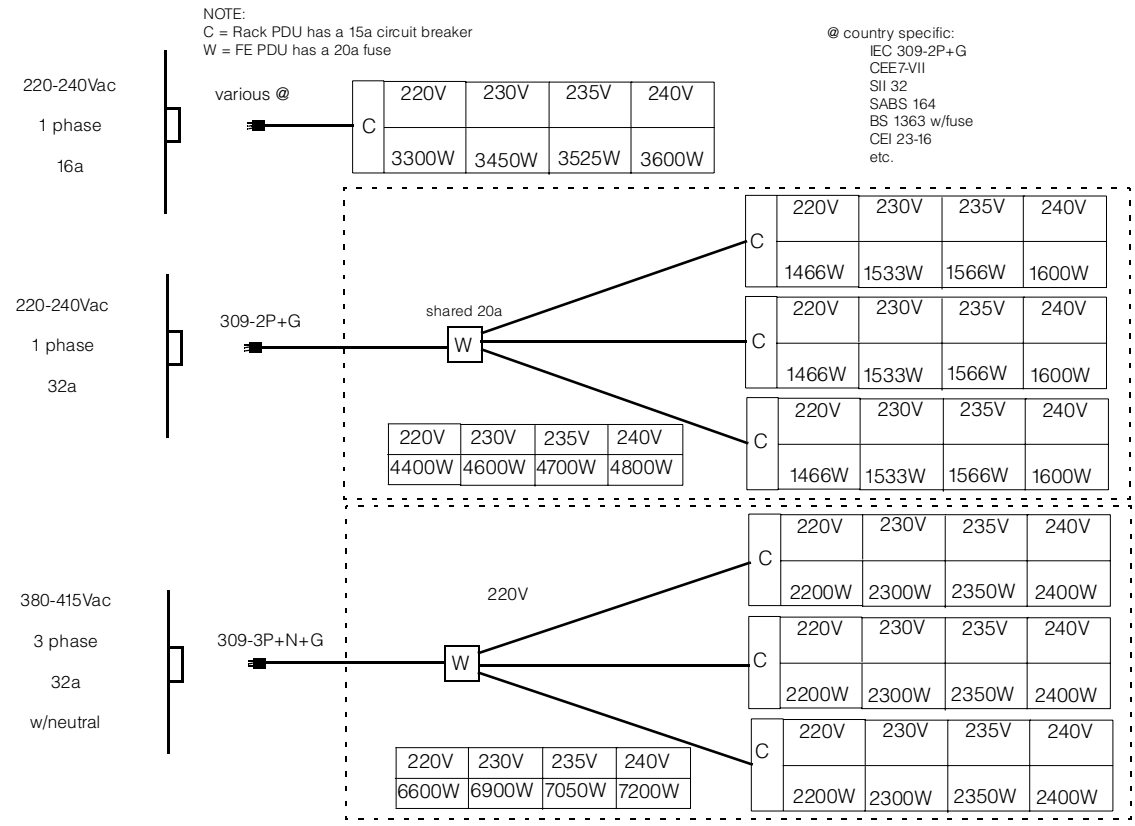
(2) Line Cords: Rack PDUs

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	seven 200-240Vac, shared 15a
37L6868	CEE7-VII	220-240Vac, 16a	
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

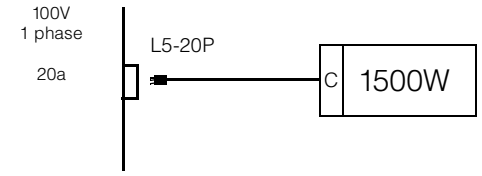
(5) Line Cords: Front-end PDUs

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

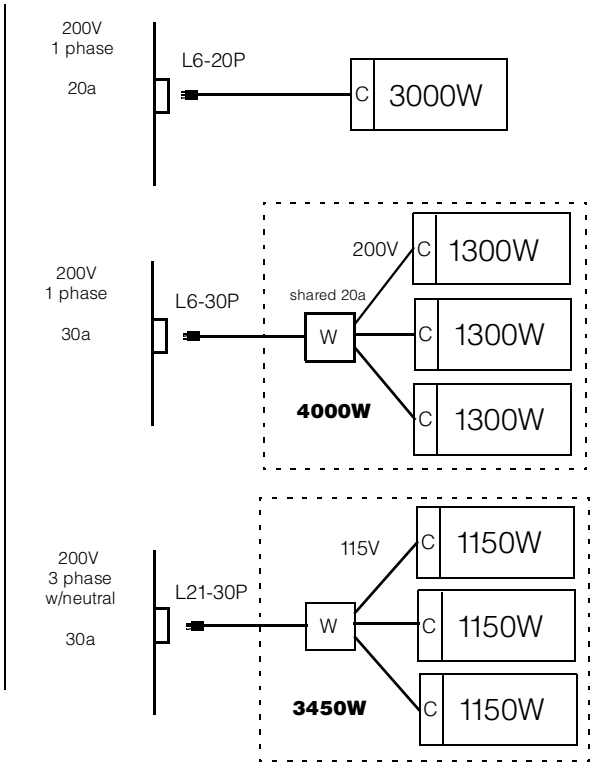
Power Load Capacity -- xSeries / Netfinity Rack Systems

NOTE:
C = Rack PDU has a 15a circuit breaker
W = FE PDU has a 20a fuse

Low Voltage



High Voltage



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 GB-Native/Compr[2]	MB/sec - Native/compr[2]	Termination Incl	68/50-pin Converter Incl	Internal Cables	Data/Cleaning Cartridges Included	Ext Tape Enclosures[1]
	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	N	-	-	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	Y	-	1/1	3503BOX[4], 3551001
00N7990	40/80GB DLT Internal SCSI Tape Drive	16 Ultra2 LVD	133mm (5.25in) FH	40/80	6/10	N	-	-	1/1	3503B0X[4], 3551001[3]
00N8017	60/120GB 8mm M2 SCSI Tape Drive	16 Ultra2 LVD	133mm (5.25in) HH	60/120	12/24	N	-	-	1[13]	3551001[3], 3510020[4]
00N8016	100/200GB LTO Tape Drive	16 Ultra2 LVD	133mm (5.25in) FH	100/200	15/30	N	-	-	1/1	3551001[3]
24P2396	100/200GB LTO Half-High Tape Drive	16 Ultra2 LVD	133mm (5.25in) HH	100/200	8/16	N	-	-	1/1	3551001[3]
00N8015	110/220GB Super DLT Internal SCSI Tape Drive	16 Ultra2 LVD	133mm (5.25in) FH	110/220	11/22	N	-	-	1/1	3551001[3]
24P2398	40/80GB Half-High DLTVS Internal SCSI Tape Drive	16 Ultra2 LVD	133mm (5.25in) HH	40/80	3/6	N	-	-	1/1	3551001[3]
	Associated Options									
00N7956	68-pin External Multimode LVD/SE SCSI Terminator	16 LVD/SE	Ext	-	-	Y	N	-	-	3510020, 3503B0X
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	N	-	-	5/1	3551001
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 Libraries[12]									
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. 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. 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.
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. A combination data/clean cartridge cleans the drive each time the data cartridge is used.

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
0.8: 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 std/max	Cleaning Cartridges std	Cartridge Mags std/max	Qty of drives - std/max	Max GB-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	490/980	5/10
3502R14	DLT Tape Library - Rack[2]	SE	4U Rack	Y	M68-M68 (3M)	Y	1/14	1	2/2	1/3	490/980	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	1/60	1	4/4	1/6[8]	6TB/12TB[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	900/1.8TB	15/30
09N4048	3600 Series LTO Drive Upgrade Option[6]	LVD	-	N	Jumper	N	-	-	-	-	-	15/30
09N4047	Fibre Tape Automation Adapter[7]	LVD	-	-	M68-M08 (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	100/300	7/15
3570C22	Magstar MP 3570 Tape Subsystem[9]	HVD	6U Rack	Y	(4.5M)	Y	1/20	1	2/2	2/2[14]	100/300	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 Media[12]												
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 (Ultrium) drive and a one-meter external LVD SCSI cable.
7. This adapter installs in a 3600 Series Tape Library and attaches to a FAStT 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).
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 230[2]	1/3	450/315
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 340[2]	1/2	390/270
xSeries 342[2]	1/2	390/270
xSeries 350[2]	1/3	525/365
xSeries 370[2]	3/3	1450/1015
Other Devices		
FAStT500 Storage Server (3552)[2]	2/2	200/140
FAStT EXP500 Storage Expansion Unit (3560)[2]	2/2	350/245
FAStT200 Storage Server (35421RU)[2]	2/2	390/275
FAStT200 HA Storage Server (35422RU)[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 Data Gateway Router (Diff.) (2108R3D)	1/1	90/n/a
SAN Data Gateway Router (SE) (2108R3S)	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-1400RMiB 94G6675**	**SU-3000RMiB 94G6677**	**SU-5000RMiB 37L6862**
	US P/N	**SU-700NET 94G3134**	**SU-1000NET 94G3135**	**SU-1400NET 94G3136**	**Not Available**	**SU-1400RMB 94G6674**	**SU-3000RMB 94G6676**	**SU-5000RMB 37L6861**
UPS Attributes								
Communications Links to Servers		1	1	1	1	1	3	3
Color		black	black	black	white	black	black	black
EIA Height		-	-	-	-	3U	3U	5U
International Models								
50 or 60Hz, single phase, VAC:		220-240 (208)[2]	220-240 (208)[2]	220-240 (208)[2]	220-240 (208)[2]	220-240 (208)[2]	220-240 (208)[2]	220-240 (xxx)[2, 3]
10-Amp, IEC 320-C13 (Device) receptacles		4	4	4	8	4	8	8
16-Amp, IEC 320-C19 (PDU 94G7450) receptacles		-	-	-	1	-	1	2
Line Cord Receptacle (IEC 320-)		C14	C14	C20	C20	C14	C20	TB[5]
US Models								
50 or 60Hz, single phase, VAC:		120 (120)[2]	120 (120)[2]	120 (120)[2]	-	120 (120)[2]	120 (120)[2]	200-220 (208)[2]
Receptacles (NEMA 5-15R)		4	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, L5-30P	8ft, L6-30P

1. Data provided by APC.
2. How-to-Read example for 220-240(208): Input VAC is 220-240 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 (PDU) (P/N 94G7450).
5. SU-5000RMiB (P/N 37L6862) contains a Terminal Block (TB) for direct attachment to an electrical source by qualified personnel.

	Total Configuration Runtime Estimator (Time in minutes)[1]						
	Tower				**Rack Mount**		
International Part Number	**SU-700iNET 94G4073**	**SU-1000iNET 94G4074**	**SU-1400iNET 94G4075**	**SU-2200iNET 94G4076**	**SU-1400RMiB 94G6675**	**SU-3000RMiB 94G6677**	**SU-5000RMiB 37L6862**
United States Part Number	**SU-700NET 94G3134**	**SU-1000NET 94G3135**	**SU-1400NET 94G3136**	**Not Available**	**SU-1400RMB 94G6674**	**SU-3000RMB 94G6676**	**SU-5000RMB 37L6861**
Total Load (Watts)	**Runtime Minutes**	**Runtime Minutes**	**Runtime Minutes**	**Runtime Minutes**	**Runtime Minutes**	**Runtime Minutes**	**Runtime Minutes**
200	22	38	62	130	45	104	240
250	17	28	43	104	34	84	200
300	12	22	34	85	25	70	166
350	9	18	29	71	22	58	145
400	7	14	23	65	18	52	125
450	5	12	20	52	15	45	110
500	-	11	18	43	13	38	97
550	-	9	16	38	11	35	87
600	-	8	13	34	10	31	76
650	-	7	12	31	9	29	68
700	-	6	11	28	8	26	63
750	-	-	10	25	8	24	59
800	-	-	9	23	7	22	55
850	-	-	8	21	7	20	51
900	-	-	7	19	6	18	47
950	-	-	6	18	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.

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

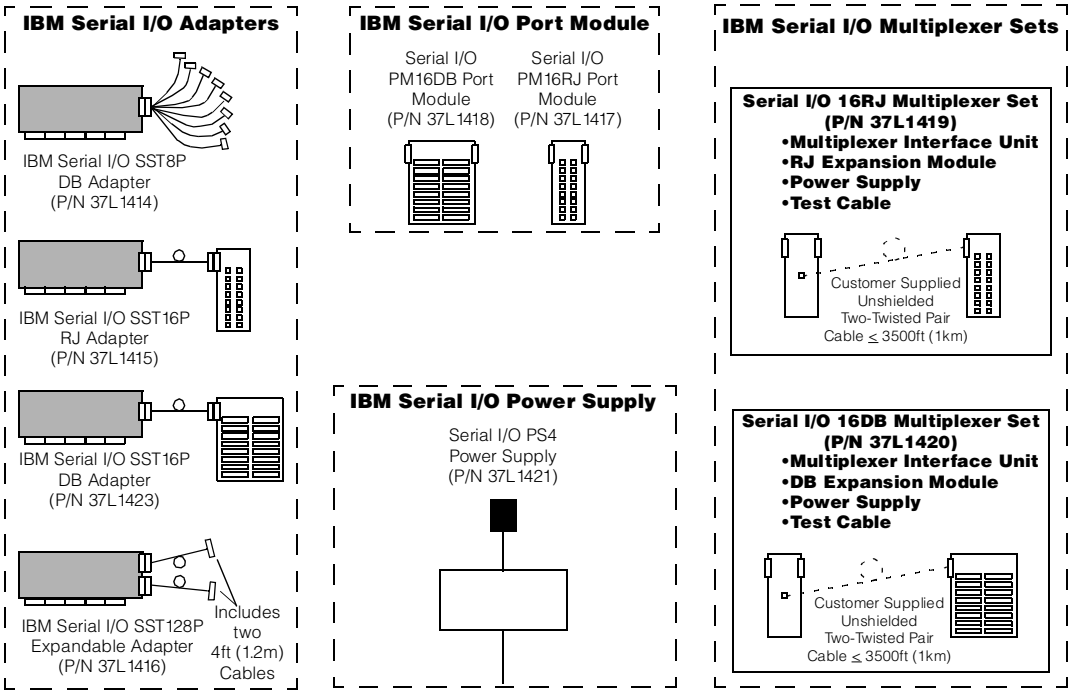
Instructions: Identify Desired Controller Row and Storage Unit Column. The intersection of row and column contains the cable group letter which supports the connection. Go to the cable group under the corresponding storage unit for specific support. Read all Notes for row, column, and any cable group footnotes.

Storage Unit	35311RU	3510020	3503B1X	3551001	Adapter 10L7113	3600x20
Max MB/sec.[1]	160	-	-	-	-	30
LVDS	X	-	X	-	-	X
Connector Type	F0.8	F68 or F50	F68	F0.8	F0.8	F68

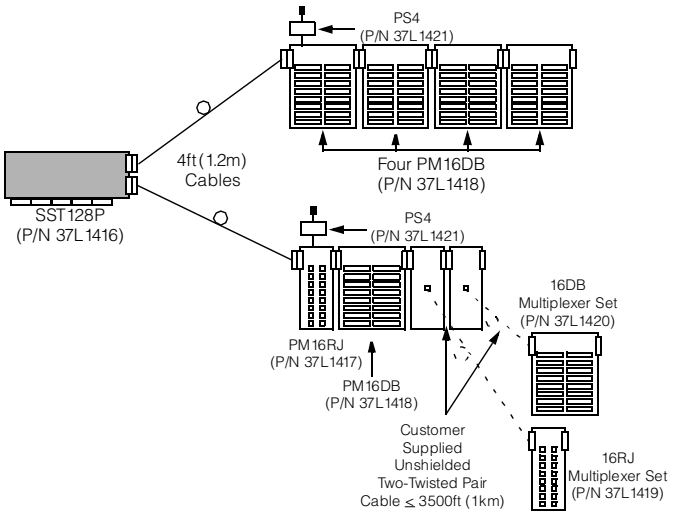
Description	Part Number	Max/ Channel (MB/sec)[1]	LVDS	Connector Type/ Max	Note #	2, 3	4	4	2, 4	2, 4, 7	2, 3, 5
RAID Storage Controllers											
ServeRAID-4H Ultra160 SCSI Controller	37L6889	160	X	F0.8/4	9	A	-	-	-	-	-
ServeRAID-4Mx Ultra160 SCSI Adapter	06P5736	160	X	F0.8/2	9	A	-	-	-	-	-
ServeRAID-4Lx 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	A	A	B
xSeries 350	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	-	-	C	C	B	B	-
No Onboard External Port[12]											
xSeries 200	Onboard	-	-	n/a		-	-	-	-	-	-
xSeries 220	Onboard	-	-	n/a		-	-	-	-	-	-
xSeries 300	Onboard	-	-	n/a		-	-	-	-	-	-
xSeries 330	Onboard	-	-	n/a		-	-	-	-	-	-
xSeries 340	Onboard	-	-	n/a		-	-	-	-	-	-
xSeries 342	Onboard	-	-	n/a		-	-	-	-	-	-
xSeries 230	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	X	-	-	-
Cable Group G (Other)											
68-pin External Multimode LVD/SE SCSI Terminator	00N7956	-	-	M68		-	X	-	-	-	-

1. Maximum supported speeds may be limited by installation of lower speed devices, controllers or cable lengths greater than two meters.
2. 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.
3. Maximum speeds may be limited by the installed devices or SCSI controller.
4. Daisy chaining tape enclosures is not supported at this time.
5. The 3600 Series Tape Libraries (rack or tower) support up to two Expander Modules (P/N 3600LXU). 3600 Series Tape Libraries and Expander Module are shipped with a 2M M68-M0.8 external SCSI Cable (P/N 01K8027).
6. Requires 68-pin External Multimode LVD/SE SCSI Terminator (P/N 00N7956).
7. 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.
8. Cable lengths exceeding 4.3 meters are NOT supported for attachment to non-Ultra2 or Ultra160 controllers.
9. Maximum speeds may be limited by the enclosure or its installed devices.
10. 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).
11. EXP300 (P/N 35311RU) includes a single 2M Ultra2 SCSI cable similar to Netfinity 2M Ultra2 SCSI Cable (P/N 03K9310).
12. 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.
13. Not supported for use in a rack. Rack installations require a minimum cable length of two meters.

Appendix E: 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]

1. 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.
2. 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.
3. 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.
4. 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.
5. 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).
6. 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.
7. Requires a customer supplied Unshielded Two-Twisted Pair (Category 3 minimum) cable with a maximum length of 3,500ft (1Km).

Important Notes

IBM reserves the right to change product specifications and to discontinue marketing products without notice.
*MHz only measures microprocessor internal clock speed, not application performance. Many factors affect application performance.
**When referring to storage capacity, GB stands for 1,000,000,000 bytes. Total user-accessible capacity may be less.
***The quotation function within OrderBUILDER allows reseller specific pricing to be included.
****Tape Drives which utilize data compression technology have storage capacity that will vary depending upon whether the drive is operating in native mode (without compression) or compressed mode. Actual storage capacity will vary based upon many factors and may be less than the maximum possible.
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