



xSeries Reference (xREF)

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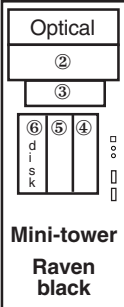
IBM @server™
IntelliStation™ / xSeries™ / BladeCenter™

January 21, 2005

xref@us.ibm.com



		Bugfix	Ports	no serial or parallel ports	one serial / no parallel ports
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IBM® Type-model	Processor	GHz	Memory	Disk and rpm	Disk controllers	Optical	Graphics adapter and memory	Slots x bays	FireWire	Preload ¹⁷	Available date
6224-10U	1xOpteron™ 244	2.44	1.81GB	80.0GB ² SATA 7.2K	SATA,EIDE	CD	Quadro4 280NVS 64MB	6x6	1394	XP Pro	May 2004
6224-20U	1xOpteron 246	2.0	1GB	80.0GB SATA 7.2K	SATA,EIDE	CD	Quadro4 280NVS 64MB	6x6	1394	XP Pro	May 2004
6224-30U	1xOpteron 248	2.2	1GB	80.0GB SATA 7.2K	SATA,EIDE	CD-RW	Quadro4 280NVS 64MB	6x6	1394	XP Pro	May 2004
6224-33U	1xOpteron 248	2.2	1GB	36.4GB U320 10K	Ultra320,EIDE	CD-RW	Quadro FX 1100 128MB	6x6	1394	XP Pro	May 2004
6224-35U	1xOpteron 248	2.2	1GB	36.4GB U320 10K	Ultra320,EIDE	Combo	Quadro FX 3000 256MB	6x6	1394	XP Pro	May 2004
6224-37U	1xOpteron 248	2.2	2GB	36.4GB U320 10K	Ultra320,EIDE	CD-RW	Quadro4 280NVS 64MB	6x6	1394	RHEL3-WS	May 2004
6224-38U	1xOpteron 248	2.2	1GB	36.4GB U320 10K	Ultra320,EIDE	Combo	Quadro FX 1100 128MB	6x6	1394	RHEL3-WS	May 2004
6224-39U	1xOpteron 248	2.2	2GB	36.4GB U320 10K	Ultra320,EIDE	Combo	Quadro FX 3000 256MB	6x6	1394	RHEL3-WS	May 2004
Processor	1 x AMD® Opteron 244, 246 or 248 (1.8, 2.0 or 2.2 GHz)										
L2 cache	1MB standard and maximum / at processor speed										
Processor upgrade	2-way SMP / up to two Opteron Processors (same speed/cache size)										
Implementation	Systemboard contains one AMD Socket 940 micro PGA ZIF socket, four DIMM slots, six slots (five PCI-X (one with ServeRAID 6i Plus support), one 8X AGP), and integrated SATA, SCSI, IEEE 1394a, USB 2.0, AC-97 and ethernet. Additional four DIMM slots and one CPU socket are provided with purchase of optional second CPU										
Memory - std / max	1GB or 2GB std / 16GB ¹³ max / two slots used / two slots available / four additional slots available with optional second CPU /										
Memory - features	PC3200 400MHz registered 184-pin ECC CL3 DDR-SDRAM DIMMs / four DIMM slots on systemboard / DIMMs must be installed in matched pairs [a bank] / 2-way memory interleave / dual channel / Error Checking and Correcting (ECC) via 16-bit Checksum Chipkill™ (corrects 1, 2, 3, or 4-bit errors on same chip and detects 2- through 8-bit errors contained in two chips)										
Graphics controller	(see IntelliStation Graphics sheet for full graphics specifications)										
(one of following)	<ul style="list-style-type: none"> • NVIDIA™ Quadro4 280NVS • NVIDIA Quadro FX 1100 • NVIDIA Quadro FX 3000 										
IDE disk controller	Enhanced IDE busmaster / ATA-133 / integrated in I/O Hub / two connectors on planar										
SATA disk controller	Silicon Image 3512A / dual channel SATA-150 controller (150MB/sec) / on planar / Host RAID 0 (striping) or 1 (mirroring) supported										
SCSI disk controller	Adaptec® AIC7902W / dual channel Ultra320 SCSI controller (LVD 320MB/sec) / on planar / 64-bit 100MHz PCI-X / Host RAID 0 (striping) or 1 (mirroring) supported										
SCSI channels and cables	Two 16-bit channels (one internal and one external) / <i>Internal channel:</i> one 4-drop 16-bit 68-pin LVD SCSI cable from systemboard to internal disks bays; <i>External channel:</i> Optionally available 1-drop 16-bit 68-pin LVD SCSI cable from systemboard to rear external 68-pin connector (cable available as option part number 24P7929) or 1-drop U320 External SCSI Interface Kit (VHCDI) (option part number 24P7973)										
Cables	One SATA cable, one 2-drop EIDE cable (to optical) and one SCSI cable (listed above)										
Disk - features	<i>Some:</i> 80.0GB SATA-150 / 7200 rpm / 9.0 ms seek; <i>Some:</i> 36.4GB Ultra320 SCSI / 10K rpm / 4.7 ms; <i>All:</i> S.M.A.R.T. ⁵										
Rack support	4U ⁴ rack mount support via tower-to-rack kit option (part number 09N4300)										
Chipset	Dual AMD 8131 chipset / AMD 8151 for AGP 8X slot / AMD 8111 I/O Hub / Four 64-bit PCI-X buses (Bus A for slot 1, Bus B for slot 2, Bus C for slot 3 and Bus 4 for slots 5 and 6), PCI 2.2 bus (one slot), ATA-133 EIDE, USB / NS PC87363 Super I/O										
Gigabit ethernet	One gigabit 10/100/1000 ethernet controller / Broadcom BCM5703ci / full gigabit ethernet MAC and PHY layer functions / chip on planar / PCI-X 64-bit 100MHz / full duplex / Wake on LAN® / Alert Standard Format 1.03 / one rear RJ-45 port										
Optical drives	One of the following: 48X-20X ⁶ CD-ROM, 48X/24X/48X/16X Max ^{6,19} CD-RW/DVD-ROM Combo or 48X/24X/48X Max ⁶ CD-RW										
IEEE 1394(FireWire)	Integrated IEEE 1394a, 400Mbps, 6-pin port on rear, 4-pin port on front										
Audio	Audio AC '97 v2.2 interface via 8111 (ALC655) / internal speaker (use of audio line out requires powered speakers)										
Rear ports	Three USB (Ver 2.0), two 9-pin serial, parallel, keyboard, mouse, ethernet, audio line in/out, mic in / 6-pin IEEE 1394a										
Front ports	Two USB (Ver 2.0), audio line out (stereo), mic in / 4-pin IEEE 1394a										
Systems mgmt	Autonomous monitoring and alerting of thermal, fans, and voltage faults										
Keyboard / mouse	IBM 104-key keyboard (6-pin PS/2) / IBM three button mouse (6-pin PS/2 conn)										
Cooling fans	Three variable speed fans (power supply, two in rear) / one fan per CPU / not redundant or hot-swap										
Power supply	530 watts / universal / auto sensing / built-in overload and surge protection										
	<p>Bay ① 5.25", HH 1.6", access, optical</p> <p>Bay ② 5.25", HH 1.6", access, open</p> <p>Bay ③ 3.5", SL 1", access, open</p> <p>Bay ④ 3.5", SL 1", no access, open</p> <p>Bay ⑤ 3.5", SL 1", no access, open</p> <p>Bay ⑥ 3.5", SL 1", no access, disk</p> <p>Slot 1: fullsize, 64-bit 100MHz, PCI-X 1.0</p> <p>Slot 2: 2/3 size, 64-bit 133MHz, PCI-X 1.0</p> <p>Slot 3: fullsize, 64-bit 100MHz, PCI-X 1.0*</p> <p>Slot 4: fullsize, AGP 8X (1.5v) - used by std AGP graphics adapter</p> <p>Slot 5: fullsize, 64-bit 100MHz, PCI-X 1.0</p> <p>Slot 6: fullsize, 64-bit 100MHz, PCI-X 1.0</p> <p>* Extended slot</p>										
	<ul style="list-style-type: none"> ➤ Metal cage for disk bays 4,5,6 rotates out of chassis ➤ Two front stabilizing feet ➤ Handle grip on top ➤ H 17.375" x W 6.5" x D 19.375" ➤ H 441mm x W 165mm x D 492mm ➤ 36 lb to 45.8 lb (16.3kg to 20.8kg) 										
	<ul style="list-style-type: none"> • <i>Maximum internal disk capacity¹³:</i> SCSI: 584GB (4 disks x 146GB) SATA: 320GB (2 disks x 160GB) • Removable left side panel • BIOS Setup Utility via F1 at startup • Adaptec Configuration Utility near startup by pressing CTRL+A • Product Recovery Program via F11 at startup • Adv Config Power Interface (ACPI) 2.0 • DMI 2.2-compliant 										
	<p>Preload with Redhat Enterprise Linux 3 WS (64-bit) or Windows XP Professional (32-bit)¹⁷</p> <ul style="list-style-type: none"> ➤ Device Drivers CD ➤ IBM IntelliStation Documentation CD • Disk-to-Disk Recovery (in service partition) 										
	<p>Opteron model 244 (1.8GHz) Proc Upgrade 13N0740</p> <p>Opteron model 246 (2.0GHz) Proc Upgrade 13N0741</p> <p>Opteron model 248 (2.2GHz) Proc Upgrade 13N0742</p> <p>2x512MB PC3200 CL3 ECC DDR-SDRAM DIMM 73P3233</p> <p>2x1GB PC3200 CL3 ECC DDR-SDRAM DIMM 73P3234</p> <p>2x2GB PC3200 CL3 ECC DDR-SDRAM DIMM 73P3235</p> <p>IBM 36.4GB 10K rpm Ultra320 SCSI HDD 32P0723</p> <p>IBM 73.4GB 10K rpm Ultra320 SCSI HDD 32P0724</p> <p>IBM 146GB 10K rpm Ultra320 SCSI HDD 32P0725</p> <p>IBM 80GB 7.2K rpm SATA-150 HDD 09N4253</p> <p>IBM 160GB 7.2K rpm SATA-150 HDD 09N4254</p> <p>IBM ThinkVision L200P 20.1inLCD Black A/D 6736-HB0</p> <p>IBM T221 22.2inLCD Black Digital 9503-DG3</p> <p>IBM 4Ux20D Tower-to-Rack Conversion Kit 09N4300</p> <p>Other options at ibm.com/pc/us/accessories</p>										
	<p>SECURITY</p> <ul style="list-style-type: none"> • U-bolt anchoring feature (U-bolt is optional; supports optional padlock) • Security slot (for attachment of optional cable lock such as Kensington cable lock) • Cover key lock • Cover tamper detect switch • Secure fixed DASD • Power-on password • Administrator password • Boot sequence control • Boot without keyboard or mouse • Diskette boot inhibit • Disable mouse • Diskette, disk, serial port, parallel port I/O control • VPD stored in EEPROM • Write protection control for EEPROM • IBM Security Solutions 										
	<p>LIMITED WARRANTY³</p> <ul style="list-style-type: none"> ➤ 3 year parts and labor ➤ International Warranty Service³ ➤ On site, 8 am through 5 pm, Mon through Fri excluding holidays, next business day response time ➤ On site warranty service upgrade options⁷ available as ServicePac options at http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf ➤ 24x7¹⁴ toll-free support for warranty issues during the warranty period¹ 										

See footnotes for important warranty information
US models announced Mar 16, 2004

IBM® Type-GAV	Processor	GHz	Memory	Disk and rpm	Disk controllers	Optical	Graphics adapter and memory	Slots x bays	FireWire	Preload ¹⁷	Available date
6224-40U	1xOpteron™ 250	2.42	2GB	80.0GB ² SATA 7.2K	SATA,EIDE	CD-RW	Quadro™ NVS 280 64MB	6x6	1394	XP Pro	Dec 2004
6224-42U	1xOpteron 250	2.4	2GB	80.0GB SATA 7.2K	SATA,EIDE	CD-RW	Quadro FX1100 128MB	6x6	1394	XP Pro	Dec 2004
6224-43U	2xOpteron 250	2.4	2GB	80.0GB SATA 7.2K	SATA,EIDE	Combo	Quadro FX 4000 256MB	6x6	1394	XP Pro	Dec 2004
6224-45U	1xOpteron 250	2.4	2GB	36.4GB U320 15K	Ultra320,EIDE	CD-RW	Quadro NVS 280 64MB	6x6	1394	RH3.0	Dec 2004
6224-46U	1xOpteron 250	2.4	2GB	36.4GB U320 15K	Ultra320,EIDE	Combo	Quadro FX 1100 128MB	6x6	1394	RH3.0	Dec 2004
6224-48U	2xOpteron 250	2.4	2GB	80.0GB SATA 7.2K	SATA,EIDE	CD-RW	Quadro FX 1100 128MB	6x6	1394	RH3.0	Dec 2004
6224-49U	2xOpteron 250	2.4	2GB	36.4GB U320 15K	Ultra320,EIDE	Combo	Quadro FX 4000 256MB	6x6	1394	RH3.0	Dec 2004

Processor **1 x AMD® Opteron 250 (2.4 GHz)**
 L2 cache **1MB** standard and maximum / at processor speed
 Processor upgrade **2-way SMP** / up to two Opteron Processors (same speed/cache size)
 Implementation Systemboard contains one AMD Socket 940 micro PGA ZIF socket, four DIMM slots, six slots (five PCI-X: one with ServeRAID 6i Plus support; one AGP 8X), and integrated SATA, SCSI, IEEE 1394a, USB 2.0, AC-97 and Ethernet. Additional four DIMM slots and one CPU socket are provided with purchase of optional second CPU

Memory - std / max **2GB** std / 16GB¹³ max / two slots used / two slots available / four additional slots available with optional second CPU
 Memory - features **PC3200** (512MB, 1GB) or **PC2700** (2GB) 400MHz registered 184-pin ECC CL3 DDR-SDRAM DIMMs / four DIMM slots on systemboard / DIMMs must be installed in matched pairs [a bank] / 2-way memory interleave / dual channel / **ECC**

(see IntelliStation Graphics sheet for full graphics specifications)
 Graphics controller (one of following) **• NVIDIA™ Quadro NVS 280 AGP 8X**
• NVIDIA Quadro FX 1100 AGP 8X
• NVIDIA Quadro FX 4000 AGP 8X

IDE disk controller Enhanced IDE busmaster / ATA-133 / integrated in I/O Hub / two connectors on planar
 SATA disk controller **Silicon Image 3512A / dual channel SATA-150 controller** (150MB/sec) / on planar / HostRAID 0 (striping) or 1 (mirroring) supported
 SCSI disk controller **Adaptec® AIC7902W / dual channel Ultra320 SCSI controller** (LVD 320MB/sec) / on planar / 64-bit 100MHz PCI-X
 SCSI channels and cables Two 16-bit channels (one internal and one external) / *Internal channel:* one 4-drop 16-bit 68-pin LVD SCSI cable from systemboard to internal disks bays; *External channel:* Optionally available 1-drop 16-bit 68-pin LVD SCSI cable from systemboard to rear external 68-pin connector (cable available as option part number 24P7929) or 1-drop U320 External SCSI Interface Kit (VHCDI) (option part number 24P7973)

Cables One SATA cable, one 2-drop EIDE cable (to optical) and one SCSI cable (listed above)
 Disk - features *Some:* 80.0GB SATA-150 / 7200 rpm / 9.0 ms seek; *Some:* 36.4GB Ultra320 SCSI / 15K rpm / 3.6 ms; *All:* S.M.A.R.T.⁵

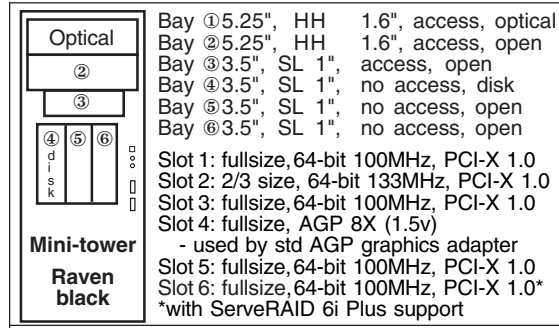
Mechanical Chipset 6 x 6 Mini-tower with 4U⁴ rack mount support via tower-to-rack kit option (part number 09N4300)
Dual AMD 8131 chipset / AMD 8151 for AGP 8X slot / AMD 8111 I/O Hub / Four 64-bit PCI-X buses (Bus A for slot 1, Bus B for slot 2, Bus C for slot 3 and Bus 4 for slots 5 and 6), ATA-133 EIDE, USB / NS PC87363 Super I/O

Gigabit Ethernet One Gigabit 10/100/1000 Ethernet controller / Broadcom BCM5703ci / full Gigabit Ethernet MAC and PHY layer functions / chip on planar / PCI-X 64-bit 100MHz / full duplex / Wake on LAN® / Alert Standard Format 1.03 / one rear RJ-45 port
 Optical drives One of the following: 48X/24X/48X/16X Max^{6,19} CD-RW/DVD-ROM Combo, 48X/24X/48X Max⁶ CD-RW or IBM Multi-Burner Plus DVD/CD RW

IEEE 1394 (FireWire) Integrated IEEE 1394a, 400Mbps, 6-pin port on rear, 4-pin port on front
 Audio Audio AC '97 v.2.2 interface via 8111 (ALC655) / internal speaker (use of audio line out requires powered speakers)
 Rear ports Three USB (Ver 2.0), two 9-pin serial, parallel, keyboard, mouse, Ethernet, audio line in/out, mic in / 6-pin IEEE 1394a
 Front ports Two USB (Ver 2.0), audio line out (stereo), mic in / 4-pin IEEE 1394a
 Systems mgmt Automatic monitoring and alerting of thermal, fans, and voltage faults

Keyboard / mouse IBM 104-key keyboard (6-pin PS/2)/IBM 3-button optical mouse (6-pin PS/2 conn)
 Cooling fans Three variable speed fans (power supply, two in rear) / one fan per CPU / not redundant or hot-swap
 Power supply 530 watts / universal / auto sensing / built-in overload and surge protection

- SECURITY**
- U-bolt anchoring feature (U-bolt is optional; supports optional padlock)
 - Security slot (for attachment of optional cable lock such as Kensington cable lock)
 - Cover key lock
 - Cover tamper detect switch
 - Secure fixed DASD
 - Power-on password
 - Administrator password
 - Boot sequence control
 - Boot without keyboard or mouse
 - Diskette boot inhibit
 - Disable mouse
 - Diskette, disk, serial port, parallel port I/O control
 - VPD stored in EEPROM
 - Write protection control for EEPROM
 - IBM Security Solutions



- Metal cage for disk bays 4,5,6 rotates out of chassis
- Two front stabilizing feet
- Handle grip on top
- H 17.25" x W 6.5" x D 19.0"
- H 438mm x W 165mm x D 483mm
- 36 lb to 45.8 lb (16.3kg to 20.8kg)

- *Maximum internal disk capacity¹³:*
SCSI: 584GB (4 disks x 146GB)
SATA: 320GB (2 disks x 160GB; 640GB w/ 4 disks, requires ServeRAID-7t))
- Removable left side panel
- BIOS Setup Utility via F1 at startup
- Adaptec Configuration Utility near startup by pressing CTRL+A
- Product Recovery Program via F11 at startup
- Adv Config Power Interface (ACPI) 2.0
- DMI 2.2-compliant

2x512MB PC3200 CL3 ECC DDR-SDRAM DIMM	73P3233
2x1GB PC3200 CL3 ECC DDR-SDRAM DIMM	73P3234
1x2GB PC2700 CL3 ECC DDR-SDRAM DIMM	22P9270
IBM ServeRAID-7t SATA controller	71P8648
IBM ServeRAID-6i+ SCSI controller	13N2190
IBM 36.4GB 10K rpm Ultra320 SCSI HDD	32P0723
IBM 73.4GB 10K rpm Ultra320 SCSI HDD	32P0724
IBM 146GB 10K rpm Ultra320 SCSI HDD	32P0725
IBM 80GB 7.2K rpm SATA-150 HDD	09N4253
IBM 160GB 7.2K rpm SATA-150 HDD	09N4254
IBM ThinkVision L200P 20.1in LCD Black A/D	6736-HB0
IBM T221 22.2in LCD Business Black Digital	9503-DG5
IBM 4Ux20D Tower-to-Rack Conversion Kit	09N4300
Other options at ibm.com/pc/us/accessories	

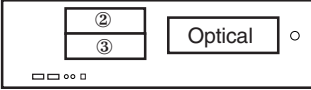
- Preload with Redhat® Enterprise Linux® 3 WS (64-bit) or Windows® XP Professional (32-bit)¹⁷**
- Device Drivers CD
 - IBM IntelliStation Documentation CD
 - Disk-to-Disk Recovery (in service partition)

- LIMITED WARRANTY³**
- 3 year parts and labor
 - International Warranty Service³
 - On site, 8 am through 5 pm, Mon through Fri excluding holidays, next business day response time
 - On site warranty service upgrade options⁷ available as ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
 - 24x7¹⁴ toll-free support for warranty issues during the warranty period¹

See footnotes for important warranty information

IBM® Type-model	Processor	FSB MHz	Memory	Disk and rpm	Disk controllers	Optical	Graphics adapter and memory	Slots x Firewire F/R	USB/F/R	Preload ¹⁷	Available date
6220-20U	Pentium®4 2.8	800	256MB	40.0GB ² EIDE 7.2K	EIDE	CD-ROM	Quadro4™ 280NVS 64MB	4x3	0/0/2/4	XP Pro	Aug 2003
6220-24U	Pentium 4 2.8	800	512MB	80.0GB SATA 7.2K	EIDE	CD-ROM	Quadro4 580XGL 64MB	4x3	0/0/2/4	XP Pro	Aug 2003
6220-40U	Pentium 4 3.2	800	256MB	40.0GB EIDE 7.2K	EIDE	CD-ROM	Quadro4 280NVS 64MB	4x3	0/0/2/4	XP Pro	Aug 2003
6220-44U	Pentium 4 3.2	800	512MB	80.0GB SATA 7.2K	EIDE	CD-ROM	Quadro4 580XGL 64MB	4x3	0/0/2/4	XP Pro	Aug 2003

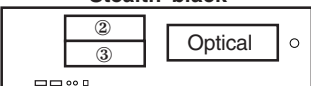
Processor	Intel® Pentium 4 at 2.8 or 3.2GHz with 800MHz frontside bus (FSB) / All support Hyper-Threading technology
Proc. Upg/L2 cache Implementation	No SMP Support / 512KB std and max / at processor speed Motherboard contains one mPGA478B socket (processor/L2 cache in FC-PGA2), four DIMM sockets, one 8X AGP slot, ethernet controller, five total PCI slots (two PCI slots on extender board, some have SCSI controller)
Memory - std / max Memory - features	256MB or 512MB std / 4GB ¹³ max / one slot used / three slots available / PC2700 333MHz unbuffered 184-pin ECC CL2.5 DDR-SDRAM UDIMMs / four DIMM gold-connector slots on systemboard / DIMMs must be installed in matched pairs [a bank] / 2-way memory interleave / dual channel / Error Checking and Correcting (ECC) DIMMs and memory controller
Graphics controller (one of following)	• NVIDIA Quadro4™ 280NVS (entry 3D) / (see IntelliStation Graphics sheet for specs) • NVIDIA Quadro4 580XGL (entry 3D)
IDE disk controller	Four Ultra ATA ports / ATA-100 / integrated in I/O Controller Hub 5 / four 40-pin connectors on planar
Cables	Two Serial ATA ports / ATA-150 / integrated in I/O Controller Hub 5 / two 7-pin connectors on planar
Disk - features	EIDE models: Two EIDE cables (one 2-drop cable to CD-ROM, one 2-drop 40-pin EIDE cable or 7-pin SATA cable) Some: EIDE ATA-100 or SATA ATA-150 / 7200 rpm / 9.0 ms seek; All: S.M.A.R.T. ⁵
Rack support	Not available
Chipset	Intel 875P chipset / 82875P MCH (Memory Controller Hub) for AGP 8X slot and ICH5 / I/O Controller Hub (ICH5) for PCI 2.2 bus (four slots and one Mini-PCI slot), ethernet, ATA-100 EIDE, USB, Low Pin Count Interface / SMC 47M102 Super I/O off LPC
Gigabit ethernet	One gigabit 10/100/1000 ethernet controller / Intel Kenai II CSA / full gigabit ethernet MAC and PHY layer functions / chip on planar / PCI 2.2 32-bit 33MHz / full duplex / Wake on LAN® / Alert Standard Format 1.0
Diskette drive	None (USB floppy optional)
Optical drive	Ultra ATA / 48X/20X Max ⁶ CD-ROM
IEEE 1394 (FireWire)	Not enabled (purchase of 3rd party mini-PCI card will enable ports)
Audio	Soft audio AC '97 v2.2 interface via ICH4 (AD1885) / internal speaker (use of audio line out requires powered speakers)
Rear ports	Four USB (Ver 2.0), two 9-pin serial, parallel, keyboard, mouse, ethernet, audio line in, audio line out, mic in / 6-pin 1394
Front ports	Two USB (Ver 2.0), audio line out (stereo), mic in / 4-pin 1394 FireWire
Systems mgmt	Monitoring and alerting of thermal, fans, and voltage faults / Winbond® W83791D
Keyboard / mouse	IBM 104-key keyboard (6-pin PS/2) / IBM three button mouse (6-pin PS/2 conn)
Cooling fans	Two or three variable speed fans (pwr supply, rear, processor) / not redundant or hot-swap / third fan operates based on heat
Power supply	200 watts / universal / auto sensing / built-in overload and surge protection

<p>Desktop Stealth black</p>  <p>Bay ① 5.25", HH 1.6", access, optical Bay ② 3.5", SL 1", no access, disk Bay ③ 3.5", SL 1", no access, open</p> <p>Slot 1: Half-height, 32-bit 33MHz, PCI 2.2 (5v) Slot 2: Half-height, 32-bit 33MHz, PCI 2.2 (5v) Slot 3: Half-height, 32-bit 33MHz, PCI 2.2 (5v) Slot 4: short, AGP 8X (1.5v) - used by std AGP graphics adapter</p>	<p>Weight and Dimensions</p> <ul style="list-style-type: none"> ◇ H 4.1" x W 14.2" x D 16.2" ◇ H 104mm x W 360mm x D 412mm ◇ 20.0 lb to 22.0 lb (9.07kg to 9.98kg) 	<p>SECURITY</p> <ul style="list-style-type: none"> • U-bolt anchoring feature (U-bolt is optional; supports optional padlock) • Security slot (for attachment of optional cable lock such as Kensington cable lock) • Side cover key lock • Cover tamper detect switch • Secure fixed DASD • Power-on password • Administrator password • Keyboard/mouse password • Boot sequence control • Boot without keyboard or mouse • Diskette boot inhibit and write-protect • Disable mouse • Diskette, disk, serial port, parallel port I/O control • Secure access openings • VPD stored in EEPROM • Write protection control for EEPROM • IBM Security Solutions 																						
	<p>Options and Accessories</p> <table border="0"> <tr><td>256MB PC2700 CL2.5 ECC DDR-SDRAM</td><td>06P4053</td></tr> <tr><td>512MB PC2700 CL2.5 ECC DDR-SDRAM</td><td>06P4054</td></tr> <tr><td>1GB PC2700 CL2.5 ECC DDR-SDRAM</td><td>06P4055</td></tr> <tr><td>IBM USB Portable Diskette Drive</td><td>05K9276</td></tr> <tr><td>IBM 40GB 7.2K-rpm EIDE ATA-100 HDD</td><td>22P7157</td></tr> <tr><td>IBM 80GB 7.2K-rpm EIDE ATA-100 HDD</td><td>09N4226</td></tr> <tr><td>IBM 120GB 7.2K-rpm EIDE ATA-100 HDD</td><td>09N4231</td></tr> <tr><td>IBM 80GB S-ATA 7.2K-RPM HDD</td><td>09N4253</td></tr> <tr><td>IBM 160GB S-ATA 7.2K-RPM HDD</td><td>09N4254</td></tr> <tr><td>IBM ThinkVision L200P 20.1inLCD Black A/D</td><td>6736-HB0</td></tr> <tr><td>IBM T221 22.2inLCD Black Digital</td><td>9503-DG3</td></tr> </table> <p>Other options at ibm.com/pc/us/accessories</p>		256MB PC2700 CL2.5 ECC DDR-SDRAM	06P4053	512MB PC2700 CL2.5 ECC DDR-SDRAM	06P4054	1GB PC2700 CL2.5 ECC DDR-SDRAM	06P4055	IBM USB Portable Diskette Drive	05K9276	IBM 40GB 7.2K-rpm EIDE ATA-100 HDD	22P7157	IBM 80GB 7.2K-rpm EIDE ATA-100 HDD	09N4226	IBM 120GB 7.2K-rpm EIDE ATA-100 HDD	09N4231	IBM 80GB S-ATA 7.2K-RPM HDD	09N4253	IBM 160GB S-ATA 7.2K-RPM HDD	09N4254	IBM ThinkVision L200P 20.1inLCD Black A/D	6736-HB0	IBM T221 22.2inLCD Black Digital	9503-DG3
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See footnotes for important warranty information
US models announced July 29, 2003

IBM® Type-model	Processor	GHz ¹	L2 Cache	FSB MHz	Memory	Disk and rpm	Optical	Graphics adapter and memory	Slots x Firewire F/R bays USB/F/R	Preload ¹⁷	Available date
6220-50U	Pentium 4	3.4	512KB	800	256MB	40.0GB EIDE 7.2K	CD-ROM	Quadro4 280NVS 64MB	4x3 0/0/2/4	XP Pro	Apr 2004
6220-54U	Pentium 4	3.4	512KB	800	512MB	80.0GB SATA 7.2K	CD-ROM	Quadro4 580XGL 64MB	4x3 0/0/2/4	XP Pro	Apr 2004
6220-71U	Pentium 4	3.4	1MB	800	512MB	80.0GB SATA 7.2K	CD-ROM	Quadro4 280NVS 64MB	4x3 0/0/2/4	RHEL3-WS	May 2004
6220-74U	Pentium 4	3.4	1MB	800	512MB	80.0GB SATA 7.2K	CD-ROM	Quadro4 580XGL 64MB	4x3 0/0/2/4	XP Pro	May 2004

Processor	Intel® Pentium 4 at 3.4GHz with 800MHz frontside bus (FSB) / All support Hyper-Threading technology
Proc. Upg/L2 cache Implementation	No SMP Support / 512KB or 1MB std and max / at processor speed Motherboard contains one mPGA478B socket (processor/L2 cache in FC-PGA2), four DIMM sockets, one 8X AGP slot, ethernet controller, five total PCI slots (two PCI slots on extender board, some have SCSI controller)
Memory - std / max Memory - features	256MB or 512MB std / 4GB ¹³ max / one slot used / three slots available / PC2700 (50U) or PC3200 (54U, 7xU) unbuffered 184-pin ECC CL2.5 (50U) or CL3 (54U, 7xU) DDR-SDRAM UDIMMs / four DIMM slots on systemboard / DIMMs must be installed in matched pairs / 2-way memory interleave / dual channel / Error Checking and Correcting (ECC) DIMMs and memory controller
Graphics controller (one of following)	<ul style="list-style-type: none"> • NVIDIA Quadro4™ 280NVS (entry 3D) / (see IntelliStation Graphics sheet for specs) • NVIDIA Quadro4 580XGL (entry 3D)
IDE disk controller	Four Ultra ATA ports / ATA-100 / integrated in I/O Controller Hub 5 / four 40-pin connectors on planar Two Serial ATA ports / ATA-150 / integrated in I/O Controller Hub 5 / two 7-pin connectors on planar
Cables	<i>EIDE models:</i> Two EIDE cables (one 2-drop cable to CD-ROM, one 2-drop 40-pin EIDE cable or 7-pin SATA cable)
Disk - features	<i>Some:</i> EIDE ATA-100 or SATA ATA-150 / 7200 rpm / 9.0 ms seek; <i>All:</i> S.M.A.R.T. ⁵
Rack support	Not available
Chipset	Intel 875P chipset / 82875P MCH (Memory Controller Hub) for AGP 8X slot and ICH5 / I/O Controller Hub (ICH5) for PCI 2.2 bus (four slots and one Mini-PCI slot), ethernet, ATA-100 EIDE, USB, Low Pin Count Interface / SMC 47M102 Super I/O off LPC
Gigabit ethernet	One gigabit 10/100/1000 ethernet controller / Intel Kenai II CSA / full gigabit ethernet MAC and PHY layer functions / chip on planar / PCI 2.2 32-bit 33MHz / full duplex / Wake on LAN® / Alert Standard Format 1.0
Diskette drive	None (USB floppy optional)
Optical drive	Ultra ATA / 48X/20X Max ⁶ CD-ROM
IEEE 1394 (FireWire)	Not enabled / available via CTO
Audio	Soft audio AC '97 v2.2 interface via ICH4 (AD1885) / internal speaker (use of audio line out requires powered speakers)
Rear ports	Four USB (Ver 2.0), two 9-pin serial, parallel, keyboard, mouse, ethernet, audio line in, audio line out, mic in / 6-pin 1394
Front ports	Two USB (Ver 2.0), audio line out (stereo), mic in / 4-pin 1394 FireWire
Systems mgmt	Monitoring and alerting of thermal, fans, and voltage faults / Winbond® W83791D
Keyboard / mouse	IBM 104-key keyboard (6-pin PS/2) / IBM three button mouse (6-pin PS/2 conn)
Cooling fans	Two or three variable speed fans (pwr supply, rear, processor) / not redundant or hot-swap / third fan operates based on heat
Power supply	200 watts / universal / auto sensing / built-in overload and surge protection

<p>Desktop</p> <p>Stealth black</p>  <p>Bay ① 5.25", HH 1.6", access, optical Bay ② 3.5", SL 1", no access, disk Bay ③ 3.5", SL 1", no access, open</p> <p>Slot 1: Half-height, 32-bit 33MHz, PCI 2.2 (5v) Slot 2: Half-height, 32-bit 33MHz, PCI 2.2 (5v) Slot 3: Half-height, 32-bit 33MHz, PCI 2.2 (5v) Slot 4: short, AGP 8X (1.5v), low-profile - used by std AGP graphics adapter</p> <p>Options and Accessories</p> <table border="0"> <tr><td>256MB PC3200 CL3 ECC DDR-SDRAM</td><td>06P4049</td></tr> <tr><td>512MB PC3200 CL3 ECC DDR-SDRAM</td><td>06P4050</td></tr> <tr><td>1GB PC3200 CL3 ECC DDR-SDRAM</td><td>06P4051</td></tr> <tr><td>256MB PC2700 CL2.5 ECC DDR-SDRAM</td><td>06P4053</td></tr> <tr><td>512MB PC2700 CL2.5 ECC DDR-SDRAM</td><td>06P4054</td></tr> <tr><td>1GB PC2700 CL2.5 ECC DDR-SDRAM</td><td>06P4055</td></tr> <tr><td>IBM USB Portable Diskette Drive</td><td>05K9276</td></tr> <tr><td>IBM 40GB 7.2K-rpm EIDE ATA-100 HDD</td><td>22P7157</td></tr> <tr><td>IBM 80GB 7.2K-rpm EIDE ATA-100 HDD</td><td>09N4226</td></tr> <tr><td>IBM 120GB 7.2K-rpm EIDE ATA-100 HDD</td><td>09N4231</td></tr> <tr><td>IBM 80GB S-ATA 7.2K-RPM HDD</td><td>09N4253</td></tr> <tr><td>IBM 160GB S-ATA 7.2K-RPM HDD</td><td>09N4254</td></tr> <tr><td>IBM ThinkVision L200P 20.1inLCD Black A/D</td><td>6736-HB0</td></tr> <tr><td>IBM T221 22.2inLCD Black Digital</td><td>9503-DG3</td></tr> </table> <p>Other options at ibm.com/pc/us/accessories</p>	256MB PC3200 CL3 ECC DDR-SDRAM	06P4049	512MB PC3200 CL3 ECC DDR-SDRAM	06P4050	1GB PC3200 CL3 ECC DDR-SDRAM	06P4051	256MB PC2700 CL2.5 ECC DDR-SDRAM	06P4053	512MB PC2700 CL2.5 ECC DDR-SDRAM	06P4054	1GB PC2700 CL2.5 ECC DDR-SDRAM	06P4055	IBM USB Portable Diskette Drive	05K9276	IBM 40GB 7.2K-rpm EIDE ATA-100 HDD	22P7157	IBM 80GB 7.2K-rpm EIDE ATA-100 HDD	09N4226	IBM 120GB 7.2K-rpm EIDE ATA-100 HDD	09N4231	IBM 80GB S-ATA 7.2K-RPM HDD	09N4253	IBM 160GB S-ATA 7.2K-RPM HDD	09N4254	IBM ThinkVision L200P 20.1inLCD Black A/D	6736-HB0	IBM T221 22.2inLCD Black Digital	9503-DG3	<p>Weight and Dimensions</p> <ul style="list-style-type: none"> ◇ H 4.1" x W 14.2" x D 16.2" ◇ H 104mm x W 360mm x D 412mm ◇ 20.0 lb to 22.0 lb (9.07kg to 9.98kg) <ul style="list-style-type: none"> • <i>Maximum internal disk capacity¹³:</i> <i>EIDE:</i> 240GB (2 disks x 120GB) <i>SATA:</i> 320GB (2 disks x 160GB) • Removable left side panel • Configuration/Setup Utility: F1 at startup • Product Recovery Program: F11 at startup • Network Boot: F12 at startup • Adv Config Power Interface (ACPI) 1.0a • DMI 2.2-compliant <p>Preload with</p> <p>Red Hat Enterprise Linux 3 WS (32-bit) or Windows XP Professional (32-bit)¹⁷</p> <ul style="list-style-type: none"> ◇ Microsoft® Windows® XP Professional - Free license for Lotus® SmartSuite® - Free license for Lotus Notes® Client ◇ Device Drivers CD ◇ IBM IntelliStation Documentation CD ◇ Disk-to-Disk Recovery (in service partition) <p>Red Hat Enterprise Linux 3 WS ◇ Device Drivers CD</p>	<p>SECURITY</p> <ul style="list-style-type: none"> • U-bolt anchoring feature (U-bolt is optional; supports optional padlock) • Security slot (for attachment of optional cable lock such as Kensington cable lock) • Side cover key lock • Cover tamper detect switch • Secure fixed DASD • Power-on password • Administrator password • Keyboard/mouse password • Boot sequence control • Boot without keyboard or mouse • Diskette boot inhibit and write-protect • Disable mouse • Diskette, disk, serial port, parallel port I/O control • Secure access openings • VPD stored in EEPROM • Write protection control for EEPROM • IBM Security Solutions <p>LIMITED WARRANTY³</p> <ul style="list-style-type: none"> ⇐ 3 year parts and labor ⇐ International Warranty Service³ ⇐ On site, 8 am through 5 pm, Mon through Fri excluding holidays, next business day response time ⇐ On site warranty service upgrade options⁷ available as ServicePac options at http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf ⇐ 24x7¹⁴ toll-free support for warranty issues during the warranty period³
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1GB PC3200 CL3 ECC DDR-SDRAM	06P4051																													
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See footnotes for important warranty information
US models announced March 16, 2004 (50U, 54U) and May 18, 2004 (71U, 74U)

IBM® Type-GAV-model	Processor & GHz ¹	L2	Memory	Disk & rpm	Disk controllers	Optical	Graphics adapter and memory	FireWire	Slots x bays	Preload ¹⁷	Available date
6225-10y-10U	Pentium®4 3.4GHz	1MB	512MB	40GB 7.2K	SATA	CD-ROM	Quadro® NVS 280 64MB	1394	4x5	XP Pro	Dec 2004
6225-11y-11U	Pentium 4 3.4GHz	1MB	512MB	73GB 10K	Ultra320	CD-ROM	ATI FireGL™ V3100 128MB	1394	4x5	XP Pro	Dec 2004
6225-20y-20U	Pentium 4 3.6GHz	1MB	512MB	80GB 7.2K	SATA	CD-RW	ATI FireGL V3100 128MB	1394	4x5	XP Pro	Dec 2004
6225-22y-22U	Pentium 4 3.6GHz	1MB	512MB	80GB 7.2K	SATA	CD-RW	Quadro FX 1300 128MB	1394	4x5	XP Pro	Dec 2004
6225-23y-23U	Pentium 4 3.6GHz	1MB	512MB	73GB 10K	Ultra320	CD-RW	Quadro FX 3400 256MB	1394	4x5	XP Pro	Dec 2004
6225-25y-25U	Pentium 4 3.6GHz	1MB	1GB	73GB 10K	Ultra320	CD-RW	Quadro FX 3400 256MB	1394	4x5	XP Pro	Dec 2004
6225-26y-26U	Pentium 4 3.6GHz	1MB	512MB	80GB 7.2K	SATA	CD-RW	Quadro NVS 280 64MB	1394	4x5	RH 3	Dec 2004
6225-32y-32U	Pentium 4 3.8GHz	1MB	512MB	80GB 7.2K	SATA	CD-RW	Quadro FX 1300 128MB	1394	4x5	XP Pro	Jan 2004
6225-35y-35U	Pentium 4 3.8GHz	1MB	1GB	73GB 10K	Ultra320	CD-RW	Quadro FX 3400 256MB	1394	4x5	XP Pro	Jan 2004
6225-36y-36U	Pentium 4 3.8GHz	1MB	512MB	80GB 7.2K	SATA	CD-RW	Quadro NVS 280 64MB	1394	4x5	RH 3	Jan 2004

Positioning Processor L2 cache Processor upgrade Implementation
Powerful uni-processor workstation with Intel® Extended Memory 64 Technology
1 Intel Pentium 4 at 3.4, 3.6GHz & 3.8GHz with 800MHz frontside bus (FSB) & Extended Memory 64 Technology (EM64T) 1MB standard and maximum / at processor speed
Single Processor, no upgrade
 Systemboard contains one Intel 604-pin micro-PGA2 ZIF socket, four DIMM slots, four slots (one PCI Express x16, PCI Express x1, 2 PCI), and integrated SATA and Gigabit Ethernet

Memory - std / max **512MB** or **1GB** std / 4GB^{13,21} max / two slots used / two slots available / **PC3200 400MHz** registered ECC DDR2-SDRAM DIMMs / four DIMM gold-connector slots on systemboard

Graphics controller (see IntelliStation Graphics sheet for full graphics specifications) (one of following)
 • **NVIDIA Quadro NVS 280 2D 64MB PCI Express x16**
 • **ATI FireGL V3100 3D 128MB PCI Express x16**
 • **NVIDIA Quadro FX 1300 3D 128MB PCI Express x16**
 • **NVIDIA Quadro FX 3400 3D 256MB PCI Express x16**

SATA controller SCSI controller
 SATA-150 controller (1.5GB/sec) / integrated in ICH6R / two connectors on planar / **SCSI models: PCI-X Ultra320 / single channel Ultra320 SCSI controller (LVD 320MB/sec) / 64-bit 100MHz PCI-X / mini-PCI adapter**
 SCSI channels and cables One 16-bit channel (one internal or external) / *Internal channel:* one 4-drop 16-bit 68-pin LVD SCSI cable from systemboard to internal disks bays
 Ports/Cables *All models:* Four SATA ports on planar *SCSI models:* One SCSI cable (listed above), *ALL:* one 2-drop EIDE cable (to optical)
 Disk - features *Some:* 40 & 80GB / SATA-150 / 7200 rpm / 9.0 ms seek; *Some:* 73.0GB Ultra320 SCSI / 10K rpm / 4.7 ms; *All:* S.M.A.R.T.⁵

Mechanical Chipset
 4 x 5 Mini-tower with no rack support
Intel 925X chipset / 925X MCH (Memory Controller Hub) for PCI Express x16 (video), Broadcom, ICH6R / ICH6R for two 32-bit/33MHz PCI slots (slots 2 & 3), 1394a, SATA, 4x USB (2.0), Low Pin Count Interface / NS PC87366 Super I/O off LPC interface

Gigabit Ethernet One Gigabit 10/100/1000 Ethernet controller / Broadcom BCM5721 / full Gigabit Ethernet MAC and PHY layer functions / chip on planar / PCI-X 64-bit 100MHz / full duplex / Wake on LAN® / Alert Standard Format 2.0 / one rear RJ-45 port
 Diskette / Optical drives *Diskette:* none *Optical:* One of the following: 48X-20X® CD-ROM, 48X/32X/48X Max® CD-RW or IBM Multi-Burner Plus DVD/CD RW
 IEEE 1394 (FireWire) FireWire on planar / 1394a, 400Mbps, 6-pin port on rear, 4-pin port on front
 Audio AC - 97 Audio, ADI1981B via ICH6r / internal speaker (use of audio line out requires powered speakers)
 Rear ports Six USB (Ver 2.0), two 9-pin serial, parallel, keyboard, mouse, Ethernet, audio line in, audio line out, mic in / 6-pin 1394a
 Front ports Two USB (Ver 2.0), audio line out (stereo), mic in / 4-pin 1394
 Systems mgmt Monitoring and alerting of thermal, fans, and voltage faults / Winbond® W791D

Keyboard / mouse IBM 104-key keyboard (6-pin PS/2) / IBM 3-button optical mouse (6-pin PS/2 conn)
 Cooling fans Two variable speed fans (1 Front, 1 PS) / not redundant or hot-swap
 Power supply 400 watts / universal / auto sensing / built-in overload and surge protection

SECURITY

- Security slot (for attachment of optional cable lock e.g. Kensington cable lock)
- Cover lockable with padlock or laptop cable
- Cover tamper detect switch
- Secure fixed DASD
- Power-on password
- Administrator password
- Boot sequence control
- Boot without keyboard or mouse
- Diskette boot inhibit and write-protect
- Disable mouse
- Diskette, disk, serial port, parallel port I/O control
- Secure access openings
- VPD stored in EEPROM
- Write protection control for EEPROM
- IBM Security Solutions

LIMITED WARRANTY³

- ↔ 3 year parts and labor
- ↔ International Warranty Service³
- ↔ On site, 8 am through 5 pm, Mon through Fri excluding holidays, next business day response time
- ↔ On site warranty service upgrade options⁷ available as ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- ↔ 24x7¹⁴ toll-free support for warranty issues during the warranty period¹

<p>Bay ① 5.25", HH 1.6", access, optical Bay ② 5.25", HH 1.6", access, open Bay ③ 3.5", SL 1", access, open Bay ④ 3.5", SL 1", access, open Bay ⑤ 3.5", SL 1", no access, disk</p> <p>Slot 1: fullsize, PCI Express x1 Slot 2: fullsize, PCI Express x16 (video) Slot 3: fullsize, 32-bit 33MHz, PCI (5v) Slot 4: fullsize, 32-bit 33MHz, PCI (5v)</p>	<ul style="list-style-type: none"> ↔ Two front stabilizing feet ↔ Handle grip on top ↔ H 19.4" x W 6.9" x D 17.7" ↔ H 492mm x W 175mm x D 450mm ↔ 23 lb to 30 lb (10.5kg to 13.5kg) <ul style="list-style-type: none"> • <i>Maximum internal disk capacity¹³:</i> SCSI: 438GB (3 disks x 146GB) SATA: 750GB (3 disks x 250GB) • Removable left side panel • BIOS Setup Utility via F1 at startup • Adaptec Configuration Utility near startup by pressing CTRL+C • Product Recovery Program via F11 at startup • Adv Config Power Interface (ACPI) 1.0a • DMI 2.2-compliant <p>Preload with Windows XP Professional¹⁷ Microsoft® Windows® XP Professional - Free license for Lotus® SmartSuite® - Free license for Lotus Notes® Client ↔ Device Drivers and IBM Enhanced Diagnostics CD ↔ IBM IntelliStation Documentation CD • Disk-to-Disk Recovery (in service partition)</p>
512MB PC3200 CL3 ECC DDR2-SDRAM 73P3524 1GB PC3200 CL3 ECC DDR2-SDRAM 73P3525 2GB PC3200 CL3 ECC DDR2-SDRAM 74P3526 ServeRAID-7i SATA Controller 71P8651 IBM 73.4GB 10K rpm Ultra320 SCSI HDD 32P0724 IBM 146GB 10K rpm Ultra320 SCSI HDD 32P0725 IBM 160GB 7.2K rpm SATA-150 HDD 09N4254 IBM ThinkVision L200P 20.1in LCD Black A/D 6736-HB0 IBM T221 22.2in LCD Business Black Digital 9503-DG5 Other options at ibm.com/pc/us/accessories	

See footnotes for important warranty information
 • New models announced December 2004

IBM® Type-model	Processor	FSB MHz	Memory	Disk and rpm	Disk controllers	Optical	Graphics adapter and memory	Slots x bays	FireWire	Preload ¹⁷	Available date
6230-20U	Pentium®4 2.8	800	256MB	40.0GB ²	EIDE 7.2KEIDE	CD	Quadro4™ 280NVS 64MB	6x7		XP Pro	Aug 2003
6230-25U	Pentium 4 2.8	800	512MB	36.4GB U320 10K	Ultra320, EIDE	CD	Quadro4 580XGL 64MB	6x7		XP Pro	Aug 2003
6230-27U	Pentium 4 2.8	800	512MB	40.0GB EIDE 7.2KEIDE		CD-RW	Quadro4 980XGL 128MB	6x7	1394	XP Pro	Aug 2003
6230-34U	Pentium 4 3.0	800	512MB	40.0GB EIDE 7.2KEIDE		CD-RW	Quadro4 580XGL 64MB	6x7		XP Pro	Aug 2003
6230-36U	Pentium 4 3.0	800	1GB	36.4GB U320 10K	Ultra320, EIDE	CD-RW	Quadro FX 1000 128MB	6x7	1394	XP Pro	Aug 2003
6230-38U	Pentium 4 3.0	800	512MB	36.4GB U320 10K	Ultra320, EIDE	CD-RW	Quadro4 980XGL 128MB	6x7	1394	XP Pro	Aug 2003
6230-39U	Pentium 4 3.0	800	1GB	36.4GB U320 10K	Ultra320, EIDE	CD-RW	Quadro FX 3000 256MB	6x7	1394	XP Pro	Aug 2003
6230-41U	Pentium 4 3.2	800	512GB	80.0GB SATA 7.2KEIDE		CD	Quadro4 280NVS 64MB	6x7	1394	XP Pro	Aug 2003
6230-46U	Pentium 4 3.2	800	1GB	80.0GB SATA 7.2KEIDE		CD-RW	Quadro FX 1000 128MB	6x7	1394	XP Pro	Aug 2003
6230-49U	Pentium 4 3.2	800	1GB	36.4GB U320 10K	Ultra320, EIDE	CD-RW	Quadro FX 3000 256MB	6x7	1394	XP Pro	Aug 2003
↗ 6230-2PU	Pentium 4 2.8	800	256MB	None	EIDE	None	Quadro4 280NVS 64MB	6x7		DOS2K	Aug 2003
↗ 6230-3PU	Pentium 4 3.0	800	256MB	None	EIDE	None	Quadro4 280NVS 64MB	6x7		DOS2K	Aug 2003
↗ 6230-4PU	Pentium 4 3.2	800	256MB	None	EIDE	None	Quadro4 280NVS 64MB	6x7		DOS2K	Aug 2003

Processor **Intel® Pentium 4 at 2.8, 3.0 or 3.2GHz with 800MHz frontside bus (FSB)** / all support Hyper-Threading technology
 Proc. Upg/L2 cache **No SMP Support / 512KB** std and max / at processor speed
 Implementation Motherboard contains one mPGA478B socket (processor/L2 cache in FC-PGA2), four DIMM sockets, one 8X AGP slot, ethernet controller, five total PCI slots (two PCI slots on extender board, some have SCSI controller)

Memory - std / max **256MB to 1GB** std / 4GB¹³ max / one or two slots used / two or three slots available / **PC2700** 333MHz unbuffered 184-pin ECC
 Memory - features **CL2.5** DDR-SDRAM UDIMMs / four DIMM gold-conductor slots on systemboard / DIMMs must be installed in matched pairs [a bank] / 2-way memory interleave / dual channel / **Error Checking and Correcting (ECC)** DIMMs and memory controller

Graphics controller (one of following) • **NVIDIA Quadro4™ 280NVS** (advanced 2D) / (see IntelliStation Graphics sheet for specs)
 • **NVIDIA Quadro4 580XGL** (entry 3D)
 • **NVIDIA Quadro4 980XGL** (advanced 3D)
 • **NVIDIA Quadro FX 1000** (advanced 3D)
 • **NVIDIA Quadro FX 3000** (extreme 3D)

IDE disk controller Four Ultra ATA ports / ATA-100 / integrated in I/O Controller Hub 5 / four 40-pin connectors on planar
 Two Serial ATA ports / ATA-150 / integrated in I/O Controller Hub 5 / two 7-pin connectors on planar

SCSI disk controller **SCSI models: Adaptec® AIC-7901** / single channel **Ultra320 SCSI controller** (LVD 320MB/sec) / on extender board / 32-bit 33MHz PCI 2.2 / one 68-pin internal connector on extender board / no external SCSI connector / one 16-bit channel (internal only)

Cables **EIDE models:** Two EIDE cables (one 2-drop cable to CD-ROM, one 2-drop 40-pin EIDE cable or 7-pin SATA cable)
SCSI models: One 4-drop 16-bit 68-pin LVD SCSI cable from extender to int disks bays, one 2-drop EIDE cable (to optical)

Disk - features **Some:** EIDE ATA-100 or SATA ATA-150 / 7200 rpm / 9.0 ms seek; **Some:** Ultra320 SCSI / 10K rpm / 4.7 ms; **All:** S.M.A.R.T.⁵

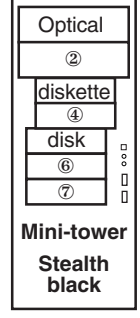
Rack support **4U¹⁷** rack mount support via tower-to-rack kit option
 Chipset **Intel 875P chipset** / 82875P MCH (Memory Controller Hub) for AGP 8X slot and ICH5 / I/O Controller Hub (ICH5) for PCI 2.2 bus (six slots and one Mini-PCI slot), SCSI (some models), ethernet, ATA-100 EIDE, USB, Low Pin Count Interface / SMC 47M102 Super I/O off LPC

Gigabit ethernet One gigabit 10/100/1000 ethernet controller / Intel Kenai II CSA / full gigabit ethernet MAC and PHY layer functions / chip on planar / PCI 2.2 32-bit 33MHz / full duplex / Wake on LAN®

Diskette drive 3.5" 1.44MB diskette drive
 Optical drive **One of following:** 48X/24X/48X Max^{6,19} CD-RW, or 48X/20X Max⁶ CD-ROM

IEEE 1394 (FireWire) **Some:** FireWire controller on planar / 1394A, 400Mbps, 6-pin port on rear, 4-pin port on front
 Audio Soft audio AC '97 v2.2 interface via ICH5 / internal speaker (use of audio line out requires powered speakers)
 Rear ports Four USB (Ver 2.0), two 9-pin serial, parallel, keyboard, mouse, ethernet, audio line in, audio line out, mic in / **some:** 6-pin 1394
 Front ports Two USB (Ver 2.0), audio line out (stereo), mic in / **some:** 4-pin 1394 FireWire
 Systems mgmt Monitoring and alerting of thermal, fans, and voltage faults / Winbond® W83791D

Keyboard / mouse IBM 104-key keyboard (6-pin PS/2) / IBM three button mouse (6-pin PS/2 conn)
 Cooling fans Three variable speed fans (pwr supply, rear, processor) / not redundant or hot-swap
 Power supply 340 watts / universal / auto sensing / built-in overload and surge protection



Bay ① 5.25", HH 1.6", access, optical
 Bay ② 5.25", HH 1.6", access, open
 Bay ③ 3.5", SL 1", access, diskette
 Bay ④ 3.5", SL 1", access, open
 Bay ⑤ 3.5", SL 1", no access, disk
 Bay ⑥ 3.5", SL 1", no access, open
 Bay ⑦ 3.5", SL 1", no access, open
 - N/A on models with FX 1000/3000

Slot 1: fullsize, 32-bit 33MHz, PCI 2.2 (5v)
 Slot 2: fullsize, 32-bit 33MHz, PCI 2.2 (5v)
 Slot 3: fullsize, 32-bit 33MHz, PCI 2.2 (5v)
 Slot 4: fullsize, 32-bit 33MHz, PCI 2.2 (5v)
 Slot 5: fullsize, 32-bit 33MHz, PCI 2.2 (5v)
 Slot 6: fullsize, AGP 8X (1.5v)
 - used by std AGP graphics adapter
 Slot : Mini PCI type III - FireWire (some)

✦ Metal cage for disk bays 5, 6, and 7 rotates out of chassis
 ✦ Two front stabilizing feet
 ✦ Handle grip on top
 ✦ H 17.375" x W 6.5" x D 19.0"
 ✦ H 441mm x W 165mm x D 483mm
 ✦ 36 lb to 42 lb (16.3kg to 19.1kg)

• **Maximum internal disk capacity¹³:**
SCSI: 587.2GB (4 disks x 146.8GB)
EIDE: 360GB (3 disks x 120GB)
SATA: 320GB (2 disks x 160GB)
 • Removable left side panel
 • Configuration/Setup Utility: F1 at startup
 • Product Recovery Program: F11 at startup
 • SCSI Select Utility: CTRL+A at startup
 • Network Boot: F12 at startup
 • Adv Config Power Interface (ACPI) 1.0a
 • DMI 2.2-compliant

Preload with Windows XP Professional¹⁷
 Microsoft® Windows® XP Professional
 - Free license for Lotus® SmartSuite®
 - Free license for Lotus Notes® Client
 ✦ Device Drivers CD
 ✦ IBM IntelliStation Documentation CD
 ✦ Disk-to-Disk Recovery (in service partition)

SECURITY

- U-bolt anchoring feature (U-bolt is optional; supports optional padlock)
- Security slot (for attachment of optional cable lock such as Kensington cable lock)
- Side cover key lock
- Cover tamper detect switch
- Secure fixed DASD
- Power-on password
- Administrator password
- Keyboard/mouse password
- Boot sequence control
- Boot without keyboard or mouse
- Diskette boot inhibit and write-protect
- Disable mouse
- Diskette, disk, serial port, parallel port I/O control
- Secure access openings
- VPD stored in EEPROM
- Write protection control for EEPROM
- IBM Security Solutions

LIMITED WARRANTY³

- ↔ **3 year parts and labor**
- ↔ **International Warranty Service³**
- ↔ **On site, 8 am through 5 pm, Mon through Fri excluding holidays, next business day response time**
- ↔ **On site warranty service upgrade options⁷ available as ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>**
- ↔ **24x7¹⁴ toll-free support for warranty issues during the warranty period³**

256MB PC2700 CL2.5 ECC DDR-SDRAM	06P4053
512MB PC2700 CL2.5 ECC DDR-SDRAM	06P4054
1GB PC2700 CL2.5 ECC DDR-SDRAM	06P4055
IBM 36.4GB 10K rpm Ultra320 SCSI HDD	32P0723
IBM 73.4GB 10K rpm Ultra320 SCSI HDD	32P0724
IBM 80GB 7.2K-rpm EIDE ATA-100 HDD	09N4226
IBM 120GB 7.2K-rpm EIDE ATA-100 HDD	09N4231
IBM 80GB S-ATA 7.2K-RPM HDD	09N4253
IBM 160GB S-ATA 7.2K-RPM HDD	09N4254
IBM 4Ux20D Tower-to-Rack Conversion Kit	09N4300
IBM ThinkVision L200P 20.1inLCD Black A/D	6736-HB0
IBM T221 22.2inLCD Black Digital	9503-DG5

Other options at ibm.com/pc/us/accessories

See footnotes for important warranty information (6230) © IBM Corp. July 2003
 US models announced July 29, 2003

↗ The following models are available through **ibm.com** only and must be configured with additional hardware and software before purchase.

IBM® Type-model	Processor	GHz ¹	FSB MHz	Memory	Disk and rpm	Disk controllers	Optical	Graphics adapter and memory	Slots x bays	FireWire	Preload ¹⁷	Available date
6230-51U	Pentium 4	3.4	800	512MB	80.0GB SATA 7.2K	SATA,EIDE	CD-RW	Quadro4 280NVS 64MB	6x7	1394	XP Pro	Apr 2004
6230-52U	Pentium 4	3.4	800	512MB	80.0GB SATA 7.2K	SATA,EIDE	CD-RW	Quadro FX 500 128MB	6x7		XP Pro	Apr 2004
6230-55U	Pentium 4	3.4	800	1GB	36.4GB U320 10K	Ultra320, EIDE	CD-RW	Quadro FX 1100 128MB	6x7	1394	DOS2K	Apr 2004
6230-56U	Pentium 4	3.4	800	1GB	36.4GB U320 10K	Ultra320, EIDE	CD-RW	Quadro FX 1100 128MB	6x7	1394	XP Pro	Apr 2004
6230-58U	Pentium 4	3.4	800	512MB	36.4GB U320 10K	Ultra320, EIDE	CD-RW	Quadro4 980XGL 128MB	6x7	1394	XP Pro	Apr 2004
6230-59U	Pentium 4	3.4	800	1GB	36.4GB U320 10K	Ultra320, EIDE	CD-RW	Quadro FX 3000 256MB	6x7	1394	XP Pro	Apr 2004
6230-61U	Pentium 4	3.2	800	512MB	80.0GB SATA 7.2K	SATA,EIDE	CD-RW	Quadro4 280NVS 64MB	6x7		XP Pro	May 2004
6230-65U	Pentium 4	3.2	800	1GB	160GB SATA 7.2K	SATA,EIDE	CD-RW	Quadro FX 1100 128MB	6x7		XP Pro	May 2004
6230-72U	Pentium 4	3.4	800	512MB	80.0GB SATA 7.2K	SATA,EIDE	CD-RW	Quadro FX 500 128MB	6x7		XP Pro	May 2004
6230-75U	Pentium 4	3.4	800	1GB	36.4GB U320 10K	Ultra320, EIDE	CD-RW	Quadro FX 1100 128MB	6x7	1394	RHEL3	May 2004
6230-78U	Pentium 4	3.4	800	1GB	36.4GB U320 10K	Ultra320, EIDE	CD-RW	Quadro4 980XGL 128MB	6x7	1394	XP Pro	May 2004

Processor **Intel® Pentium 4 at 3.4GHz with 800MHz frontside bus (FSB)** / supports Hyper-Threading technology
 Proc. Upg/L2 cache **No SMP Support / 512KB (5xU) or 1MB (6xU, 7xU)** std and max / at processor speed
 Implementation Motherboard contains one mPGA478B socket (processor/L2 cache in FC-PGA2), four DIMM sockets, one 8X AGP slot, ethernet controller, five total PCI slots (two PCI slots on extender board, some have SCSI controller)

Memory - std / max **512MB to 1GB** std / 4GB¹³ max / one or two slots used / two or three slots available / **PC3200** 400MHz unbuffered 184-pin ECC CL3
 Memory - features DDR-SDRAM UDIMMs / four DIMM gold-connector slots on systemboard / DIMMs must be installed in matched pairs [a bank] / 2-way memory interleave / dual channel / **Error Checking and Correcting (ECC)** DIMMs and memory controller

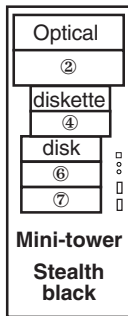
Graphics controller **• NVIDIA Quadro4™ 280NVS (advanced 2D) / (see IntelliStation Graphics sheet for specs)**
 (one of following)
• NVIDIA Quadro4 980XGL (advanced 3D)
• NVIDIA Quadro FX 500 (entry 3D)
• NVIDIA Quadro FX 1100 (advanced 3D)
• NVIDIA Quadro FX 3000 (extreme 3D)

IDE disk controller Four Ultra ATA ports / ATA-100 / integrated in I/O Controller Hub 5 / four 40-pin connectors on planar
 Two Serial ATA ports / ATA-150 / integrated in I/O Controller Hub 5 / two 7-pin connectors on planar
 SCSI disk controller **SCSI models: Adaptec® AIC-7901 / single channel Ultra320 SCSI controller (LVD 320MB/sec) / on extender board / 32-bit 33MHz PCI 2.2 / one 68-pin internal connector on extender board / no external SCSI connector / one 16-bit channel (internal only)**
 Cables **EIDE models:** Two EIDE cables (one 2-drop cable to CD-ROM, one 2-drop 40-pin EIDE cable or 7-pin SATA cable)
SCSI models: One 4-drop 16-bit 68-pin LVD SCSI cable from extender to int disks bays, one 2-drop EIDE cable (to optical)
 Disk - features **Some:** EIDE ATA-100 or SATA ATA-150 / 7200 rpm / 9.0 ms seek; **Some:** Ultra320 SCSI / 10K rpm / 4.7 ms; **All:** S.M.A.R.T.⁵

Rack support **4U¹⁷ rack mount support via tower-to-rack kit option**
 Chipset **Intel® 875P chipset / 82875P MCH (Memory Controller Hub) for AGP 8X slot and ICH5 / I/O Controller Hub (ICH5) for PCI 2.2 bus (six slots and one Mini-PCI slot), SCSI (some models), ethernet, ATA-100 EIDE, USB, Low Pin Count Interface / SMC 47M102 Super I/O off LPC**

Gigabit ethernet One gigabit 10/100/1000 ethernet controller / Intel Kenai II CSA / full gigabit ethernet MAC and PHY layer functions / chip on planar / PCI 2.2 32-bit 33MHz / full duplex / Wake on LAN®
 Diskette drive 3.5" 1.44MB diskette drive
 Optical drive **One of following: 48X/24X/48X Max^{6,19} CD-RW, or 48X/20X Max⁶ CD-ROM**
 IEEE 1394 (FireWire) **Some:** FireWire controller on planar / 1394A, 400Mbps, 6-pin port on rear, 4-pin port on front. CTO availability for 1394 on all models.
 Audio Soft audio AC '97 v2.2 interface via ICH5 / internal speaker (use of audio line out requires powered speakers)
 Rear ports Four USB (Ver 2.0), two 9-pin serial, parallel, keyboard, mouse, ethernet, audio line in, audio line out, mic in / **some:** 6-pin 1394
 Front ports Two USB (Ver 2.0), audio line out (stereo), mic in / **some:** 4-pin 1394 FireWire
 Systems mgmt Monitoring and alerting of thermal, fans, and voltage faults / Winbond® W83791D

Keyboard / mouse IBM 104-key keyboard (6-pin PS/2) / IBM three button mouse (6-pin PS/2 conn)
 Cooling fans Three variable speed fans (pwr supply, rear, processor) / not redundant or hot-swap
 Power supply 340 watts / universal / auto sensing / built-in overload and surge protection



Bay ① 5.25", HH 1.6", access, optical
 Bay ② 5.25", HH 1.6", access, open
 Bay ③ 3.5", SL 1", access, diskette
 Bay ④ 3.5", SL 1", access, open
 Bay ⑤ 3.5", SL 1", no access, disk
 Bay ⑥ 3.5", SL 1", no access, open
 Bay ⑦ 3.5", SL 1", no access, open
 - N/A on models with FX 1100/3000

Slot 1: fullsize, 32-bit 33MHz, PCI 2.2 (5v)
 Slot 2: fullsize, 32-bit 33MHz, PCI 2.2 (5v)
 Slot 3: fullsize, 32-bit 33MHz, PCI 2.2 (5v)
 Slot 4: fullsize, 32-bit 33MHz, PCI 2.2 (5v)
 Slot 5: fullsize, 32-bit 33MHz, PCI 2.2 (5v)
 Slot 6: fullsize, AGP 8X (1.5v)
 - used by std AGP graphics adapter
 Slot : Mini PCI type III - FireWire (some)

➤ Metal cage for disk bays 5, 6, and 7 rotates out of chassis
 ➤ Two front stabilizing feet
 ➤ Handle grip on top
 ➤ H 17.375" x W 6.5" x D 19.0"
 ➤ H 441mm x W 165mm x D 483mm
 ➤ 36 lb to 42 lb (16.3kg to 19.1kg)

• **Maximum internal disk capacity¹³:**
SCSI: 587.2GB (4 disks x 146.8GB)
EIDE: 360GB (3 disks x 120GB)
SATA: 320GB (2 disks x 160GB)
 • Removable left side panel
 • Configuration/Setup Utility: F1 at startup
 • Product Recovery Program: F11 at startup
 • SCSISelect Utility: CTRL+A at startup
 • Network Boot: F12 at startup
 • Adv Config Power Interface (ACPI) 1.0a
 • DMI 2.2-compliant

Preloads

Microsoft® Windows® XP Professional¹⁷
 - Free license for Lotus® SmartSuite®
 - Free license for Lotus Notes® Client
 ➤ Device Drivers CD
 ➤ IBM IntelliStation Documentation CD
 • Disk-to-Disk Recovery (in service partition)
 Red Hat Enterprise Linux 3 WS
 ➤ Device Drivers CD

SECURITY

- U-bolt anchoring feature (U-bolt is optional; supports optional padlock)
- Security slot (for attachment of optional cable lock such as Kensington cable lock)
- Side cover key lock
- Cover tamper detect switch
- Secure fixed DASD
- Power-on password
- Administrator password
- Keyboard/mouse password
- Boot sequence control
- Boot without keyboard or mouse
- Diskette boot inhibit and write-protect
- Disable mouse
- Diskette, disk, serial port, parallel port I/O control
- Secure access openings
- VPD stored in EEPROM
- Write protection control for EEPROM
- IBM Security Solutions

LIMITED WARRANTY³

- 3 year parts and labor
- International Warranty Service³
- On site, 8 am through 5 pm, Mon through Fri excluding holidays, next business day response time
- On site warranty service upgrade options⁷ available as ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- 24x7¹⁴ toll-free support for warranty issues during the warranty period³

256MB PC3200 CL3 ECC DDR-SDRAM	06P4049
512MB PC3200 CL3 ECC DDR-SDRAM	06P4050
1GB PC3200 CL3 ECC DDR-SDRAM	06P4051
IBM 36.4GB 10K rpm Ultra320 SCSI HDD	32P0723
IBM 73.4GB 10K rpm Ultra320 SCSI HDD	32P0724
IBM 80GB 7.2K-rpm EIDE ATA-100 HDD	09N4226
IBM 120GB 7.2K-rpm EIDE ATA-100 HDD	09N4231
IBM 80GB S-ATA 7.2K-RPM HDD	09N4253
IBM 160GB S-ATA 7.2K-RPM HDD	09N4254
IBM 4Ux20D Tower-to-Rack Conversion Kit	09N4300
IBM ThinkVision L200P 20.1inLCD Black A/D	6736-HB0
IBM T221 22.2inLCD Black Digital	9503-DG5

Other options at ibm.com/pc/us/accessories

See footnotes for important warranty information
 US models announced March 16, 2004 (5xU) and May 18, 2004 (6xU, 7xU)

IBM® Type-model	Processor	FSB GHz ¹	FSB MHz	Memory	Disk and rpm	Disk controllers	Optical	Graphics adapter and memory	Slots x bays	FireWire	Preload ¹⁷	Available date
6221-10U	1 x Xeon™	2.4	533	512MB	40.0GB ² EIDE	7.2K Ultra320, EIDE	CD	Millennium G450 DVI-I	32MBx6		XP Pro	Dec 2002
6221-22U	1 x Xeon	2.67	533	512MB	40.0GB EIDE	7.2K Ultra320, EIDE	CD	Quadro4 280NVS	64MB	6x6	XP Pro	Dec 2002
6221-29U	2 x Xeon	2.67	533	512MB	36.4GB U320	10K Ultra320, EIDE	Combo	Quadro4 280NVS	64MB	6x6 1394	XP Pro	Dec 2002
6221-33U	1 x Xeon	2.8B	533	512MB	36.4GB U320	10K Ultra320, EIDE	CD	Quadro4 280NVS	64MB	6x6	XP Pro	Dec 2002
6221-36U	1 x Xeon	2.8B	533	1GB	36.4GB U320	10K Ultra320, EIDE	CD-RW	Quadro4 980XGL	128MB	6x6 1394	XP Pro	Dec 2002
6221-37U	1 x Xeon	2.8B	533	1GB	36.4GB U320	10K Ultra320, EIDE	Combo	Wildcat 4™	7110 256MB	6x6 1394	XP Pro	Dec 2002
Processor	1 or 2 x Intel® Xeon at 2.4, 2.67, or 2.8B GHz with 533MHz frontside bus (FSB)											
L2 cache	512KB std and max / at processor speed											
Processor upgrade Implementation	2-way SMP / up to two Xeon Processors (same speed/cache size) Systemboard contains two Intel 604-pin micro-PGA2 ZIF sockets, four DIMM slots, seven slots (one PCI 2.2, four PCI-X, one Mini PCI, one AGP), and integrated SCSI and ethernet											
Memory - std / max	512MB or 1GB std / 8GB ¹³ max / two slots used / two slots available / PC2100 266MHz registered 184-pin ECC DDR-SDRAM DIMMs / four DIMM gold-connector slots on systemboard / DIMMs must be installed in matched pairs [a bank] / 2-way memory interleave / dual channel / Error Checking and Correcting (ECC) via 16-bit Checksum Chipkill™ (corrects 1, 2, 3, or 4-bit errors on same chip and detects 2- through 8-bit errors contained in two chips)											
Memory - features												
Graphics controller (one of following)	<ul style="list-style-type: none"> • Matrox® Millennium G450 DVI-I (entry 2D) / AGP 4X adapter / MGA G450F GPU / 32MB 150MHz DDR-SDRAM / dual RAMDAC [360/232MHz] / dual head support / one DVI-I connector (ships with one cable with two DB-15 analog conns) • NVIDIA™ Quadro4 280NVS (high-perf 2D) / AGP 8X adapter / NV18LT 275MHz GPU / 64MB 200MHz DDR-SDRAM / dual 350MHz RAMDACs / dual head: 2048x1536x16M each monitor / LFH60 connector for std cable with two DB-15 analog • NVIDIA Quadro4 980XGL (advanced 3D) / AGP 8X adapter / 128MB 325MHz DDR-SDRAM / dual 350MHz RAMDACs / dual head: 2048x1536x16M each monitor / two DVI-I connectors (ships with two DVI-I to DB-15 dongles) • 3DLabs Wildcat4™ 7110 (extreme 3D) / AGP 8X Pro 50 adapter / 256MB total DDR-SDRAM (128MB frame buffer, 128MB texture buffer) / dual RAMDAC [320/280MHz] / dual head support (up to two digital or analog monitors) / two DVI-I connectors (ships with two DVI-I to analog DB-15 adapters for analog monitor attachment) 											
IDE disk controller	Enhanced IDE busmaster / ATA-100 / integrated in I/O Controller Hub 4 / two connectors on planar											
SCSI disk controller	LSI Logic® 53C1030 / dual channel Ultra320 SCSI controller (LVD 320MB/sec) / on planar / 64-bit 100MHz PCI-X / supports RAID-1 mirroring (Embedded Mirroring)											
SCSI channels and cables	Two 16-bit channels (one internal and one external) / Internal channel: one 3-drop 16-bit 68-pin LVD SCSI cable from systemboard to internal disks bays; External channel: Models 29U/37U have one 1-drop 16-bit 68-pin LVD SCSI cable from systemboard to rear external 68-pin connector (cable available as option part number 24P7929)											
Cables	EIDE models: Two EIDE cables (one 2-drop cable to CD-ROM, one 2-drop cable to EIDE disk) SCSI models: One or two SCSI cables (listed above), one 2-drop EIDE cable (to optical)											
Disk - features	Some: 40.0GB EIDE / ATA-100 / 7200 rpm / 9.0 ms seek; Some: 36.4GB Ultra320 SCSI / 10K rpm / 4.7 ms; All: S.M.A.R.T. ⁵											
Rack support	4U ⁴ rack mount support via tower-to-rack kit option											
Chipset	Intel E7505 chipset / E7505 MCH (Memory Controller Hub) for AGP 8X slot, P64H2, ICH4 / P64H2 for two PCI-X buses (Bus A for slots 2 and 3 and ethernet controller; Bus B for slots 4 and 5 and SCSI controller) / I/O Controller Hub (ICH4) for PCI 2.2 bus (one slot and one Mini PCI slot), ATA-100 EIDE, USB, Low Pin Count Interface / NS PC87366 Super I/O off LPC interface											
Gigabit ethernet	One gigabit 10/100/1000 ethernet controller / Broadcom BCM5703i / full gigabit ethernet MAC and PHY layer functions / chip on planar / PCI-X 64-bit 100MHz / full duplex / Wake on LAN® / Alert Standard Format 1.0 / one rear RJ-45 port											
Diskette drive	3.5" 1.44MB diskette drive											
Optical drive	One of following: 48X-20X ⁶ CD-ROM, 32X/10X/40X/16X Max ^{6,19} CD-RW/DVD-ROM Combo, or 40X/24X/40X Max ⁶ CD-RW											
IEEE 1394 (FireWire)	Some: FireWire controller in Mini PCI slot / 1394A, 400Mbps, 6-pin port on rear, 4-pin port on front, no cables included											
Audio	Soft audio AC '97 v2.2 interface via ICH4 (AD1885) / internal speaker (use of audio line out requires powered speakers)											
Rear ports	Two USB (Ver 2.0), two 9-pin serial, parallel, keyboard, mouse, ethernet, audio line in, audio line out, mic in / some: 6-pin 1394											
Front ports	Two USB (Ver 2.0), audio line out (stereo), mic in / some: 4-pin 1394 FireWire											
Systems mgmt	Monitoring and alerting of thermal, fans, and voltage faults / Winbond® W791D											
Keyboard / mouse	IBM 104-key keyboard (6-pin PS/2) / IBM three button mouse (6-pin PS/2 conn)											
Cooling fans	Three variable speed fans (power supply, two in rear) / not redundant or hot-swap											
Power supply	425 watts / universal / auto sensing / built-in overload and surge protection											
	<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;">  <p>Bay ① 5.25", HH 1.6", access, optical</p> <p>Bay ② 5.25", HH 1.6", access, open</p> <p>Bay ③ 3.5", SL 1", access, diskette</p> <p>Bay ④ 3.5", SL 1", no access, disk</p> <p>Bay ⑤ 3.5", SL 1", no access, open</p> <p>Bay ⑥ 3.5", SL 1", no access, open</p> <p>Slot 1: fullsize, 32-bit 33MHz, PCI 2.2 (5v) - N/A on models with Wildcat4 7110 vid</p> <p>Slot 2: fullsize, 64-bit 100MHz, PCI-X 1.0</p> <p>Slot 3: fullsize, 64-bit 100MHz, PCI-X 1.0</p> <p>Slot 4: fullsize, 64-bit 100MHz, PCI-X 1.0*</p> <p>Slot 5: fullsize, 64-bit 100MHz, PCI-X 1.0</p> <p>Slot 6: Mini PCI type III - FireWire (some)</p> <p>Slot: fullsize, AGP 8X (1.5v) - used by std AGP graphics adapter * Extended slot</p> </div> <div style="width: 45%;"> <ul style="list-style-type: none"> ➤ Metal cage for disk bays 4,5,6 rotates out of chassis ➤ Two front stabilizing feet ➤ Handle grip on top ➤ H 17.375" x W 6.5" x D 19.375" ➤ H 44.1mm x W 165mm x D 492mm ➤ 36 lb to 45.8 lb (16.3kg to 20.8kg) • Maximum internal disk capacity¹³: SCSI: 438GB (3 disks x 146GB) EIDE: 240GB (2 disks x 120GB) • Removable left side panel • BIOS Setup Utility via F1 at startup • LSI Configuration Utility near startup by pressing CTRL+C • Product Recovery Program via F11 at startup • Adv Config Power Interface (ACPI) 1.0a • DMI 2.2-compliant <p>Preload with Windows XP Professional¹⁷</p> <p>Microsoft® Windows® XP Professional</p> <ul style="list-style-type: none"> - Free license for Lotus® SmartSuite® - Free license for Lotus Notes® Client ➤ Device Drivers and IBM Enhanced Diagnostics CD ➤ IBM IntelliStation Documentation CD • Disk-to-Disk Recovery (in service partition) </div> </div>											
	<p style="text-align: center;">SECURITY</p> <ul style="list-style-type: none"> • U-bolt anchoring feature (U-bolt is optional; supports optional padlock) • Security slot (for attachment of optional cable lock such as Kensington cable lock) • Cover key lock • Cover tamper detect switch • Secure fixed DASD • Power-on password • Administrator password • Keyboard/mouse password • Boot sequence control • Boot without keyboard or mouse • Diskette boot inhibit and write-protect • Disable mouse • Diskette, disk, serial port, parallel port I/O control • Secure access openings • VPD stored in EEPROM • Write protection control for EEPROM • IBM Security Solutions 											
	<p style="text-align: center;">LIMITED WARRANTY³</p> <ul style="list-style-type: none"> ➤ 3 year parts and labor ➤ International Warranty Service³ ➤ On site, 8 am through 5 pm, Mon through Fri excluding holidays, next business day response time ➤ On site warranty service upgrade options⁷ available as ServicePac options at http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf ➤ 24x7¹⁴ toll-free support for warranty issues during the warranty period¹ 											
Xeon 2.4GHz/512KB L2 Cache Proc Upgrade	24P7468											
Xeon 2.67GHz/512KB L2 Cache Proc Upgrade	59P5109											
Xeon 2.8GHz/512KB L2 Cache Proc Upgrade	59P5110											
256MB PC2100 CL2.5 ECC DDR-SDRAM x4	33L5037											
512MB PC2100 CL2.5 ECC DDR-SDRAM x4	33L5038											
1GB PC2100 CL2.5 ECC DDR-SDRAM DIMM	33L5039											
2GB PC2100 CL2.5 ECC DDR-SDRAM DIMM	33L5040											
IBM 73.4GB 15K rpm Ultra320 SCSI HDD	32P0733											
IBM 146GB 10K rpm Ultra320 SCSI HDD	32P0725											
IBM 120GB 7.2K rpm ATA-100 EIDE HDD	09N4231											
IBM 4Ux20D Tower-to-Rack Conversion Kit	09N4300											
Other options at ibm.com/pc/us/accessories												

See footnotes for important warranty information
US models announced November 19, 2002

⚡ US model 36U withdrawn effective March 25, 2003; models 29U and 37U withdrawn effective April 25, 2003; others withdrawn effective December 29, 2003

IBM® Type-model	Processor	FSB GHz ¹	FSB MHz	Memory	Disk and rpm	Disk controllers	Optical	Graphics adapter and memory	Slots x bays	FireWire	Preload ¹⁷	Available date
6221-38U 1 x Xeon™	2.8B533	3.06	533	1GB	36.4GB ² U320 10K Ultra320,	EIDE	CD-RW	Quadro4 980XGL 128MB	6x6	1394	XP Pro	Apr 2003
6221-40U 1 x Xeon	3.06 533	3.06	533	512MB	40.0GB EIDE 7.2K Ultra320,	EIDE	CD	Millennium G450 DVI-I 32MB6x6	6x6	1394	XP Pro	Apr 2003
6221-42U 1 x Xeon	3.06 533	3.06	533	512MB	40.0GB EIDE 7.2K Ultra320,	EIDE	CD	Quadro4 280NVS 64MB	6x6	1394	XP Pro	Apr 2003
6221-46U 1 x Xeon	3.06 533	3.06	533	1GB	36.4GB U320 10K Ultra320,	EIDE	Combo	Quadro4 980XGL 128MB	6x6	1394	XP Pro	Apr 2003
6221-47U 1 x Xeon	3.06 533	3.06	533	1GB	36.4GB U320 10K Ultra320,	EIDE	CD-RW	Wildcat4 7110 256MB	6x6	1394	XP Pro	Apr 2003
6221-48U 1 x Xeon	3.06 533	3.06	533	1GB	36.4GB U320 10K Ultra320,	EIDE	Combo	Quadro FX 1000 128MB	6x6	1394	XP Pro	Apr 2003
6221-49U 2 x Xeon	3.06 533	3.06	533	1GB	36.4GB U320 10K Ultra320,	EIDE	DVD	Quadro4 280NVS 64MB	6x6	1394	XP Pro	Apr 2003
⊕ 6221-4PU 1 x Xeon	3.06 533	3.06	533	512MB	(none) open-bay	Ultra320,	EIDE	None	6x6	1394	DOS lic	Apr 2003
Processor	1 or 2 x Intel® Xeon at 2.8B or 3.06 GHz with 533MHz frontside bus (FSB)											
L2 cache	512KB std and max / at processor speed											
Processor upgrade	2-way SMP / up to two Xeon Processors (same speed/cache size)											
Implementation	Systemboard contains two Intel 604-pin micro-PGA2 ZIF sockets, four DIMM slots, seven slots (one PCI 2.2, four PCI-X, one Mini PCI, one 8X AGP), and integrated SCSI and ethernet											
Memory - std / max	512MB or 1GB std / 8GB ¹³ max / two slots used / two slots available / PC2100 266MHz registered 184-pin ECC DDR-SDRAM DIMMs / four DIMM gold-connector slots on systemboard / DIMMs must be installed in matched pairs [a bank] / 2-way memory interleave / dual channel / Error Checking and Correcting (ECC) via 16-bit Checksum Chipkill™ (corrects 1, 2, 3, or 4-bit errors on same chip and detects 2- through 8-bit errors contained in two chips)											
Memory - features												
Graphics controller (one of following)	<ul style="list-style-type: none"> • Matrox® Millennium G450 DVI-I (entry 2D) (see 6221-November 2002 sheet for specs) • NVIDIA™ Quadro4 280NVS (high performance 2D) (see 6221-November 2002 sheet for specs) • NVIDIA Quadro4 980XGL (advanced 3D) / AGP 8X adapter / 128MB 325MHz DDR-SDRAM / dual 350MHz RAMDACs / dual head: 2048x1536x16M each monitor / two DVI-I connectors (ships with two DVI-I to DB-15 dongles) • 3DLabs Wildcat4™ 7110 (extreme 3D) / AGP 8X adapter / 256MB total DDR-SDRAM (128MB frame buffer, 128MB texture buffer) / dual RAMDAC [320/280MHz] / dual head support (up to two digital or analog monitors) / two DVI-I connectors (ships with two DVI-I to analog DB-15 adapters for analog monitor attachment) • NVIDIA Quadro FX 1000 (advanced 3D) / AGP 8X adapter / 128MB 800MHz DDR-SDRAM / dual 400MHz RAMDACs / dual head: 2048x1536x16M each monitor / two DVI-I connectors (ships with two DVI-I to DB-15 dongles) 											
IDE disk controller	Enhanced IDE busmaster / ATA-100 / integrated in I/O Controller Hub 4 / two connectors on planar											
SCSI disk controller	LSI Logic® 53C1030 / dual channel Ultra320 SCSI controller (LVD 320MB/sec) / on planar / 64-bit 100MHz PCI-X / supports RAID-1 mirroring (Embedded Mirroring)											
SCSI channels and cables	Two 16-bit channels (one internal and one external) / Internal channel: one 3-drop 16-bit 68-pin LVD SCSI cable from systemboard to internal disks bays; External channel: Models 29U/37U have one 1-drop 16-bit 68-pin LVD SCSI cable from systemboard to rear external 68-pin connector (cable available as option part number 24P7929)											
Cables	EIDE models: Two EIDE cables (one 2-drop cable to CD-ROM, one 2-drop cable to EIDE disk) SCSI models: One or two SCSI cables (listed above), one 2-drop EIDE cable (to optical) Some: 40.0GB EIDE / ATA-100 / 7200 rpm / 9.0 ms seek; Some: 36.4GB Ultra320 SCSI / 10K rpm / 4.7 ms; All: S.M.A.R.T. ⁵											
Disk - features												
Rack support	4U ⁴ rack mount support via tower-to-rack kit option											
Chipset	Intel E7505 chipset / E7505 MCH (Memory Controller Hub) for AGP 8X slot, P64H2, ICH4 / P64H2 for two 64-bit PCI-X buses (Bus A for slots 2 and 3 and ethernet controller; Bus B for slots 4 and 5 and SCSI controller) / I/O Controller Hub (ICH4) for PCI 2.2 bus (one slot and one Mini PCI slot), ATA-100 EIDE, USB, Low Pin Count Interface / NS PC87366 Super I/O off LPC interface											
Gigabit ethernet	One gigabit 10/100/1000 ethernet controller / Broadcom BCM5703i / full gigabit ethernet MAC and PHY layer functions / chip on planar / PCI-X 64-bit 100MHz / full duplex / Wake on LAN® / Alert Standard Format 1.0 / one rear RJ-45 port											
Diskette / Optical drives	3.5" 1.44MB diskette drive and one of the following: 48X-20X ⁶ CD-ROM, 48X/24X/48X/16X Max ^{6,19} CD-RW/DVD-ROM Combo, 48X/24X/48X Max ⁶ CD-RW or 16X Max ⁶ DVD-ROM											
IEEE 1394(FireWire)	Some: FireWire controller in Mini PCI slot / 1394A, 400Mbps, 6-pin port on rear, 4-pin port on front											
Audio	Soft audio AC '97 v2.2 interface via ICH4 (AD1885) / internal speaker (use of audio line out requires powered speakers)											
Rear ports	Two USB (Ver 2.0), two 9-pin serial, parallel, keyboard, mouse, ethernet, audio line in, audio line out, mic in / some: 6-pin 1394											
Front ports	Two USB (Ver 2.0), audio line out (stereo), mic in / some: 4-pin 1394 FireWire											
Systems mgmt	Monitoring and alerting of thermal, fans, and voltage faults / Winbond® W791D											
Keyboard / mouse	IBM 104-key keyboard (6-pin PS/2) / IBM three button mouse (6-pin PS/2 conn)											
Cooling fans	Three variable speed fans (power supply, two in rear) / not redundant or hot-swap											
Power supply	425 watts / universal / auto sensing / built-in overload and surge protection											
	 <p>Bay ① 5.25", HH 1.6", access, optical</p> <p>Bay ② 5.25", HH 1.6", access, open</p> <p>Bay ③ 3.5", SL 1", access, diskette</p> <p>Bay ④ 3.5", SL 1", no access, disk</p> <p>Bay ⑤ 3.5", SL 1", no access, open</p> <p>Bay ⑥ 3.5", SL 1", no access, open</p> <p>Slot 1: fullsize, 32-bit 33MHz, PCI 2.2 (5v) - N/A on models with Wildcat4 7110 vid</p> <p>Slot 2: fullsize, 64-bit 100MHz, PCI-X 1.0</p> <p>Slot 3: fullsize, 64-bit 100MHz, PCI-X 1.0</p> <p>Slot 4: fullsize, 64-bit 100MHz, PCI-X 1.0*</p> <p>Slot 5: fullsize, 64-bit 100MHz, PCI-X 1.0</p> <p>Slot 6: Mini PCI type III - FireWire (some)</p> <p>Slot: fullsize, AGP 8X (1.5v)</p> <p>* used by std AGP graphics adapter</p> <p>* Extended slot</p>											
	<ul style="list-style-type: none"> ➤ Metal cage for disk bays 4,5,6 rotates out of chassis ➤ Two front stabilizing feet ➤ Handle grip on top ➤ H 17.375" x W 6.5" x D 19.375" ➤ H 441mm x W 165mm x D 492mm ➤ 36 lb to 45.8 lb (16.3kg to 20.8kg) • Maximum internal disk capacity¹³: SCSI: 438GB (3 disks x 146GB) EIDE: 240GB (2 disks x 120GB) • Removable left side panel • BIOS Setup Utility via F1 at startup • LSI Configuration Utility near startup by pressing CTRL+C • Product Recovery Program via F11 at startup • Adv Config Power Interface (ACPI) 1.0a • DMI 2.2-compliant 											
	<p>• U-bolt anchoring feature (U-bolt is optional; supports optional padlock)</p> <p>• Security slot (for attachment of optional cable lock such as Kensington cable lock)</p> <p>• Cover key lock</p> <p>• Cover tamper detect switch</p> <p>• Secure fixed DASD</p> <p>• Power-on password</p> <p>• Administrator password</p> <p>• Keyboard/mouse password</p> <p>• Boot sequence control</p> <p>• Boot without keyboard or mouse</p> <p>• Diskette boot inhibit and write-protect</p> <p>• Disable mouse</p> <p>• Diskette, disk, serial port, parallel port I/O control</p> <p>• Secure access openings</p> <p>• VPD stored in EEPROM</p> <p>• Write protection control for EEPROM</p> <p>• IBM Security Solutions</p>											
	<p>• 3 year parts and labor</p> <p>• International Warranty Service³</p> <p>• On site, 8 am through 5 pm, Mon through Fri excluding holidays, next business day response time</p> <p>• On site warranty service upgrade options⁷ available as ServicePac options at http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf</p> <p>• 24x7¹⁴ toll-free support for warranty issues during the warranty period¹</p>											
Xeon 2.8BGHz/512KB L2 Cache Proc Upgrade	59P5110											
Xeon 3.06GHz/512KB L2 Cache Proc Upgrade	24P8123											
512MB PC2100 CL2.5 ECC DDR-SDRAM x4	33L5038											
1GB PC2100 CL2.5 ECC DDR-SDRAM DIMM	33L5039											
2GB PC2100 CL2.5 ECC DDR-SDRAM DIMM	33L5040											
IBM 73.4GB 15K rpm Ultra320 SCSI HDD	32P0733											
IBM 146GB 10K rpm Ultra320 SCSI HDD	32P0725											
IBM 120GB 7.2K rpm ATA-100 EIDE HDD	09N4231											
IBM ThinkVision L20P 20.1inLCD Black A/D	6736-HB01											
IBM T221 22.2inLCD Black Digital	9503-DG3											
IBM 4Ux20D Tower-to-Rack Conversion Kit	09N4300											
Other options at ibm.com/pc/us/accessories												
	<p>Microsoft® Windows® XP Professional - Free license for Lotus® SmartSuite® - Free license for Lotus Notes® Client</p> <p>➤ Device Drivers and IBM Enhanced Diagnostics CD</p> <p>➤ IBM IntelliStation Documentation CD</p> <p>• Disk-to-Disk Recovery (in service partition)</p>											

See footnotes for important warranty information
US models announced March 18, 2002

⊕ US model available only through ibm.com and must be configured with additional hardware and software before purchase

IBM® Type-model	Processor	GHz ¹	FSB MHz	Memory	Disk and rpm	Disk controllers	Optical	Graphics adapter and memory	Slots x bays	FireWire	Preload ¹⁷	Available date
6221-52U	1 x Xeon™	3.2	533	512MB	40.0GB ² EIDE 7.2K	Ultra320,EIDE	CD	Quadro4 280NVS 64MB	6x6	1394	XP Pro	Oct 2003
6221-53U	1 x Xeon	3.2	533	512MB	40.0GB EIDE 7.2K	Ultra320,EIDE	CD-RW	Quadro4 980XGL 128MB	6x6	1394	XP Pro	Oct 2003
6221-56U	1 x Xeon	3.2	533	512MB	36.4GB U320 10K	Ultra320,EIDE	CD-RW	Quadro4 980XGL 128MB	6x6	1394	XP Pro	Oct 2003
6221-57U	1 x Xeon	3.2	533	1GB	36.4GB U320 10K	Ultra320,EIDE	Combo	Quadro FX 1000 128MB	6x6	1394	XP Pro	Oct 2003
6221-58U	2 x Xeon	3.2	533	1GB	40.0GB EIDE 7.2K	Ultra320,EIDE	Combo	Quadro FX 1000 128MB	6x6	1394	XP Pro	Oct 2003
6221-59U	1 x Xeon	3.2	533	1GB	36.4GB U320 10K	Ultra320,EIDE	Combo	Quadro FX 3000 256MB	6x6	1394	XP Pro	Oct 2003
⌘ 6221-5PU	1 x Xeon	3.2	533	512MB	(none) open-bay	Ultra320,EIDE	None	Quadro4 280NVS 64MB	6x6	1394	DOS lic	Oct 2003

Processor	1 or 2 x Intel® Xeon at 3.2 GHz with 533MHz frontside bus (FSB)											
L2 cache	512KB standard and maximum / at processor speed											
L3 cache	1MB standard and maximum / at processor speed											
Processor upgrade	2-way SMP / up to two Xeon Processors (same speed/cache size)											
Implementation	Systemboard contains two Intel 604-pin micro-PGA2 ZIF sockets, four DIMM slots, seven slots (one PCI 2.2, four PCI-X, one Mini PCI, one 8X AGP), and integrated SCSI and ethernet											
Memory - std / max	512MB or 1GB std / 8GB ¹³ max / two slots used / two slots available / PC2100 266MHz registered 184-pin ECC DDR-SDRAM DIMMs / four DIMM gold-connector slots on systemboard / DIMMs must be installed in matched pairs [a bank] /											
Memory - features	2-way memory interleave / dual channel / Error Checking and Correcting (ECC) via 16-bit Checksum Chipkill™ (corrects 1, 2, 3, or 4-bit errors on same chip and detects 2- through 8-bit errors contained in two chips)											
Graphics controller	(see IntelliStation Graphics sheet for full graphics specifications)											
(one of following)	<ul style="list-style-type: none"> • NVIDIA™ Quadro4 280NVS • NVIDIA Quadro4 980XGL • NVIDIA Quadro FX 1000 • NVIDIA Quadro FX 3000 											
IDE disk controller	Enhanced IDE busmaster / ATA-100 / integrated in I/O Controller Hub 4 / two connectors on planar											
SCSI disk controller	LSI Logic® 53C1030 / dual channel Ultra320 SCSI controller (LVD 320MB/sec) / on planar / 64-bit 100MHz PCI-X / supports RAID-1 mirroring (Embedded Mirroring)											
SCSI channels and cables	Two 16-bit channels (one internal and one external) / <i>Internal channel:</i> one 3-drop 16-bit 68-pin LVD SCSI cable from systemboard to internal disks bays; <i>External channel:</i> Models 29U/37U have one 1-drop 16-bit 68-pin LVD SCSI cable from systemboard to rear external 68-pin connector (cable available as option part number 24P7929)											
Cables	<i>EIDE models:</i> Two EIDE cables (one 2-drop cable to CD-ROM, one 2-drop cable to EIDE disk)											
Disk - features	<i>SCSI models:</i> One or two SCSI cables (listed above), one 2-drop EIDE cable (to optical)											
Rack support	4U⁴ rack mount support via tower-to-rack kit option											
Chipset	Intel E7505 chipset / E7505 MCH (Memory Controller Hub) for AGP 8X slot, P64H2, ICH4 / P64H2 for two 64-bit PCI-X buses (Bus A for slots 2 and 3 and ethernet controller; Bus B for slots 4 and 5 and SCSI controller) / I/O Controller Hub (ICH4) for PCI 2.2 bus (one slot and one Mini PCI slot), ATA-100 EIDE, USB, Low Pin Count Interface / NS PC87366 Super I/O off LPC interface											
Gigabit ethernet	One gigabit 10/100/1000 ethernet controller / Broadcom BCM5703i / full gigabit ethernet MAC and PHY layer functions / chip on planar / PCI-X 64-bit 100MHz / full duplex / Wake on LAN® / Alert Standard Format 1.0 / one rear RJ-45 port											
Diskette / Optical drives	3.5" 1.44MB diskette drive and one of the following: 48X-20X ⁶ CD-ROM, 48X/24X/48X/16X Max ^{6,19} CD-RW/DVD-ROM Combo or 48X/24X/48X Max ⁶ CD-RW											
IEEE 1394(FireWire)	FireWire controller in Mini PCI slot / 1394A, 400Mbps, 6-pin port on rear, 4-pin port on front											
Audio	Soft audio AC '97 v2.2 interface via ICH4 (AD1885) / internal speaker (use of audio line out requires powered speakers)											
Rear ports	Two USB (Ver 2.0), two 9-pin serial, parallel, keyboard, mouse, ethernet, audio line in, audio line out, mic in / 6-pin 1394											
Front ports	Two USB (Ver 2.0), audio line out (stereo), mic in / 4-pin 1394											
Systems mgmt	Monitoring and alerting of thermal, fans, and voltage faults / Winbond® W791D											
Keyboard / mouse	IBM 104-key keyboard (6-pin PS/2) / IBM three button mouse (6-pin PS/2 conn)											
Cooling fans	Three variable speed fans (power supply, two in rear) / not redundant or hot-swap											
Power supply	425 watts / universal / auto sensing / built-in overload and surge protection											

- SECURITY**
- U-bolt anchoring feature (U-bolt is optional; supports optional padlock)
 - Security slot (for attachment of optional cable lock such as Kensington cable lock)
 - Cover key lock
 - Cover tamper detect switch
 - Secure fixed DASD
 - Power-on password
 - Administrator password
 - Keyboard/mouse password
 - Boot sequence control
 - Boot without keyboard or mouse
 - Diskette boot inhibit and write-protect
 - Disable mouse
 - Diskette, disk, serial port, parallel port I/O control
 - Secure access openings
 - VPD stored in EEPROM
 - Write protection control for EEPROM
 - IBM Security Solutions

	<p>Bay ① 5.25", HH 1.6", access, optical</p> <p>Bay ② 5.25", HH 1.6", access, open</p> <p>Bay ③ 3.5", SL 1", access, diskette</p> <p>Bay ④ 3.5", SL 1", no access, disk</p> <p>Bay ⑤ 3.5", SL 1", no access, open</p> <p>Bay ⑥ 3.5", SL 1", no access, open</p> <p>Slot 1: fullsize, 32-bit 33MHz, PCI 2.2 (5v)</p> <p>Slot 2: fullsize, 64-bit 100MHz, PCI-X 1.0</p> <p>Slot 3: fullsize, 64-bit 100MHz, PCI-X 1.0</p> <p>Slot 4: fullsize, 64-bit 100MHz, PCI-X 1.0*</p> <p>Slot 5: fullsize, 64-bit 100MHz, PCI-X 1.0</p> <p>Slot 6: Mini PCI type III - FireWire</p> <p>Slot: fullsize, AGP 8X (1.5v)</p> <p>- used by std AGP graphics adapter</p> <p>* Extended slot</p>	<ul style="list-style-type: none"> ➤ Metal cage for disk bays 4,5,6 rotates out of chassis ➤ Two front stabilizing feet ➤ Handle grip on top ➤ H 17.375" x W 6.5" x D 19.375" ➤ H 441mm x W 165mm x D 492mm ➤ 36 lb to 45.8 lb (16.3kg to 20.8kg) <ul style="list-style-type: none"> • <i>Maximum internal disk capacity¹³:</i> • <i>SCSI:</i> 438GB (3 disks x 146GB) • <i>EIDE:</i> 240GB (2 disks x 120GB) • Removable left side panel • BIOS Setup Utility via F1 at startup • LSI Configuration Utility near startup by pressing CTRL+C • Product Recovery Program via F11 at startup • Adv Config Power Interface (ACPI) 1.0a • DMI 2.2-compliant
<p>Xeon 3.2GHz/1MB L3 Cache Proc Upgrade 13N0691</p> <p>512MB PC2100 CL2.5 ECC DDR-SDRAM x4 33L5038</p> <p>1GB PC2100 CL2.5 ECC DDR-SDRAM DIMM 33L5039</p> <p>2GB PC2100 CL2.5 ECC DDR-SDRAM DIMM 33L5040</p> <p>IBM 36.4GB 10K rpm Ultra320 SCSI HDD 32P0723</p> <p>IBM 73.4GB 10K rpm Ultra320 SCSI HDD 32P0724</p> <p>IBM 146GB 10K rpm Ultra320 SCSI HDD 32P0725</p> <p>IBM 120GB 7.2K rpm ATA-100 EIDE HDD 09N4231</p> <p>IBM ThinkVision L200P 20.1inLCD Black A/D 6736-HB30</p> <p>IBM T221 22.2inLCD Black Digital 9503-DG3</p> <p>IBM 4Ux20D Tower-to-Rack Conversion Kit 09N4300</p> <p>Other options at ibm.com/pc/us/accessories</p>		<p>Preload with Windows XP Professional¹⁷</p> <p>Microsoft® Windows® XP Professional - Free license for Lotus® SmartSuite®</p> <p>- Free license for Lotus Notes® Client</p> <p>➤ Device Drivers and IBM Enhanced Diagnostics CD</p> <p>➤ IBM IntelliStation Documentation CD</p> <p>• Disk-to-Disk Recovery (in service partition)</p>

- LIMITED WARRANTY³**
- **3 year parts and labor**
 - **International Warranty Service³**
 - **On site, 8 am through 5 pm, Mon through Fri excluding holidays, next business day response time**
 - **On site warranty service upgrade options⁷ available as ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>**
 - **24x7¹⁴ toll-free support for warranty issues during the warranty period¹**

See footnotes for important warranty information
 US models announced October 7, 2003
 ⌘ US model available only through ibm.com and must be configured with additional hardware and software before purchase
 (6221C) © IBM Corp. October 2003

IBM® Type-model	Processor	FSB GHz ¹	MHz	Memory	Disk and rpm	Disk controllers	Optical	Graphics adapter and memory	Slots x bays	FireWire	Preload ¹⁷	Available date
6221-66U	1 x Xeon™	3.2	533	2GB	36.4GB U320 10K	Ultra320,EIDE	CD-RW	Quadro4 980XGL 128MB 6x6	1394	DOS2K	Mar 2004	
6221-67U	1 x Xeon	3.2	533	1GB	36.4GB U320 10K	Ultra320,EIDE	Combo	Quadro FX 1100 128MB 6x6	1394	XP Pro	Mar 2004	
6221-68U	1 x Xeon	3.2	533	2GB	40.0GB EIDE 7.2K	Ultra320,EIDE	Combo	Quadro FX 1100 128MB 6x6	1394	DOS2K	Mar 2004	

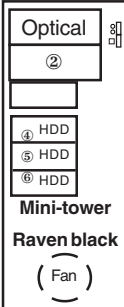
Processor	1 or 2 x Intel® Xeon at 3.2 GHz with 533MHz frontside bus (FSB)
L2 cache	512KB standard and maximum / at processor speed
L3 cache	1MB standard and maximum / at processor speed / 2MB L3 cache available via CTO
Processor upgrade	2-way SMP / up to two Xeon Processors (same speed/cache size)
Implementation	Systemboard contains two Intel 604-pin micro-PGA2 ZIF sockets, four DIMM slots, seven slots (one PCI 2.2, four PCI-X, one Mini PCI, one 8X AGP), and integrated SCSI and ethernet
Memory - std / max	1GB or 2GB std / 8GB ¹³ max / two slots used / two slots available / PC2100 266MHz registered 184-pin ECC DDR-SDRAM DIMMs / four DIMM gold-connector slots on systemboard / DIMMs must be installed in matched pairs [a bank] /
Memory - features	2-way memory interleave / dual channel / Error Checking and Correcting (ECC) via 16-bit Checksum Chipkill™ (corrects 1, 2, 3, or 4-bit errors on same chip and detects 2- through 8-bit errors contained in two chips)
Graphics controller (one of following)	(see IntelliStation Graphics sheet for full graphics specifications) <ul style="list-style-type: none"> • NVIDIA Quadro4 980XGL • NVIDIA Quadro FX 1100

IDE disk controller	Enhanced IDE busmaster / ATA-100 / integrated in I/O Controller Hub 4 / two connectors on planar
SCSI disk controller	LSI Logic® 53C1030 / dual channel Ultra320 SCSI controller (LVD 320MB/sec) / on planar / 64-bit 100MHz PCI-X / supports RAID-1 mirroring (Embedded Mirroring)
SCSI channels and cables	Two 16-bit channels (one internal and one external) / <i>Internal channel</i> : one 3-drop 16-bit 68-pin LVD SCSI cable from systemboard to internal disks bays; <i>External channel</i> : Optionally available 1-drop 16-bit 68-pin LVD SCSI cable from systemboard to rear external 68-pin connector (option part number 24P7929)
Cables	<i>EIDE models</i> : Two EIDE cables (one 2-drop cable to CD-ROM, one 2-drop cable to EIDE disk) <i>SCSI models</i> : One or two SCSI cables (listed above), one 2-drop EIDE cable (to optical)
Disk - features	<i>Some</i> : 40.0GB EIDE / ATA-100 / 7200 rpm / 9.0 ms seek; <i>Some</i> : 36.4GB Ultra320 SCSI / 10K rpm / 4.7 ms; <i>All</i> : S.M.A.R.T. ⁵
Rack support	4U ⁴ rack mount support via tower-to-rack kit option
Chipset	Intel E7505 chipset / E7505 MCH (Memory Controller Hub) for AGP 8X slot, P64H2, ICH4 / P64H2 for two 64-bit PCI-X buses (Bus A for slots 2 and 3 and ethernet controller; Bus B for slots 4 and 5 and SCSI controller) / I/O Controller Hub (ICH4) for PCI 2.2 bus (one slot and one Mini PCI slot), ATA-100 EIDE, USB, Low Pin Count Interface / NS PC87366 Super I/O off LPC interface
Gigabit ethernet	One gigabit 10/100/1000 ethernet controller / Broadcom BCM5703i / full gigabit ethernet MAC and PHY layer functions / chip on planar / PCI-X 64-bit 100MHz / full duplex / Wake on LAN® / Alert Standard Format 1.0 / one rear RJ-45 port
Diskette / Optical drives	3.5" 1.44MB diskette drive and one of the following: 48X-20X ⁶ CD-ROM, 48X/24X/48X/16X Max ^{6,19} CD-RW/DVD-ROM Combo or 48X/24X/48X Max ⁶ CD-RW
IEEE 1394(FireWire)	FireWire controller in Mini PCI slot / 1394A, 400Mbps, 6-pin port on rear, 4-pin port on front
Audio	Soft audio AC '97 v2.2 interface via ICH4 (AD1885) / internal speaker (use of audio line out requires powered speakers)
Rear ports	Two USB (Ver 2.0), two 9-pin serial, parallel, keyboard, mouse, ethernet, audio line in, audio line out, mic in / 6-pin 1394
Front ports	Two USB (Ver 2.0), audio line out (stereo), mic in / 4-pin 1394
Systems mgmt	Monitoring and alerting of thermal, fans, and voltage faults / Winbond® W791D

Keyboard / mouse	IBM 104-key keyboard (6-pin PS/2) / IBM three button mouse (6-pin PS/2 conn)	<p align="center">SECURITY</p> <ul style="list-style-type: none"> • U-bolt anchoring feature (U-bolt is optional; supports optional padlock) • Security slot (for attachment of optional cable lock such as Kensington cable lock) • Cover key lock • Cover tamper detect switch • Secure fixed DASD • Power-on password • Administrator password • Keyboard/mouse password • Boot sequence control • Boot without keyboard or mouse • Diskette boot inhibit and write-protect • Disable mouse • Diskette, disk, serial port, parallel port I/O control • Secure access openings • VPD stored in EEPROM • Write protection control for EEPROM • IBM Security Solutions
Cooling fans	Three variable speed fans (power supply, two in rear) / not redundant or hot-swap	
Power supply	425 watts / universal / auto sensing / built-in overload and surge protection	

	<p>Bay ① 5.25", HH 1.6", access, optical</p> <p>Bay ② 5.25", HH 1.6", access, open</p> <p>Bay ③ 3.5", SL 1", access, diskette</p> <p>Bay ④ 3.5", SL 1", no access, disk</p> <p>Bay ⑤ 3.5", SL 1", no access, open</p> <p>Bay ⑥ 3.5", SL 1", no access, open</p> <p>Slot 1: fullsize, 32-bit 33MHz, PCI 2.2 (5v)</p> <p>Slot 2: fullsize, 64-bit 100MHz, PCI-X 1.0</p> <p>Slot 3: fullsize, 64-bit 100MHz, PCI-X 1.0</p> <p>Slot 4: fullsize, 64-bit 100MHz, PCI-X 1.0*</p> <p>Slot 5: fullsize, 64-bit 100MHz, PCI-X 1.0</p> <p>Slot 6: Mini PCI type III - FireWire</p> <p>Slot: fullsize, AGP 8X (1.5v) - used by std AGP graphics adapter * Extended slot</p>	<ul style="list-style-type: none"> ➤ Metal cage for disk bays 4,5,6 rotates out of chassis ➤ Two front stabilizing feet ➤ Handle grip on top ➤ H 17.375" x W 6.5" x D 19.375" ➤ H 441mm x W 165mm x D 492mm ➤ 36 lb to 45.8 lb (16.3kg to 20.8kg) <ul style="list-style-type: none"> • <i>Maximum internal disk capacity¹³</i>: <ul style="list-style-type: none"> SCSI: 438GB (3 disks x 146GB) EIDE: 240GB (2 disks x 120GB) • Removable left side panel • BIOS Setup Utility via F1 at startup • LSI Configuration Utility near startup by pressing CTRL+C • Product Recovery Program via F11 at startup • Adv Config Power Interface (ACPI) 1.0a • DMI 2.2-compliant <p>Preload with Windows XP Professional¹⁷</p> <ul style="list-style-type: none"> • Microsoft® Windows® XP Professional - Free license for Lotus® SmartSuite® • Free license for Lotus Notes® Client • Device Drivers and IBM Enhanced Diagnostics CD • IBM IntelliStation Documentation CD • Disk-to-Disk Recovery (in service partition)
<p>Xeon 3.2GHz/1MB L3 Cache Proc Upgrade 13N0691</p> <p>512MB PC2100 CL2.5 ECC DDR-SDRAM x4 33L5038</p> <p>1GB PC2100 CL2.5 ECC DDR-SDRAM DIMM 33L5039</p> <p>2GB PC2100 CL2.5 ECC DDR-SDRAM DIMM 33L5040</p> <p>IBM 36.4GB 10K rpm Ultra320 SCSI HDD 32P0723</p> <p>IBM 73.4GB 10K rpm Ultra320 SCSI HDD 32P0724</p> <p>IBM 146GB 10K rpm Ultra320 SCSI HDD 32P0725</p> <p>IBM 120GB 7.2K rpm ATA-100 EIDE HDD 09N4231</p> <p>IBM ThinkVision L200P 20.1inLCD Black A/D 6736-HB0</p> <p>IBM T221 22.2inLCD Black Digital 9503-DG3</p> <p>IBM 4Ux20D Tower-to-Rack Conversion Kit 09N4300</p> <p>Other options at ibm.com/pc/us/accessories</p>	<p align="center">LIMITED WARRANTY³</p> <ul style="list-style-type: none"> ➤ 3 year parts and labor ➤ International Warranty Service³ ➤ On site, 8 am through 5 pm, Mon through Fri excluding holidays, next business day response time ➤ On site warranty service upgrade options⁷ available as ServicePac options at http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf ➤ 24x7¹⁴ toll-free support for warranty issues during the warranty period¹ 	

See footnotes for important warranty information (6221D) © IBM Corp. March 2004
 US models announced March 16, 2004
 Ⓢ US model available only through ibm.com and must be configured with additional hardware and software before purchase

IBM® Type-GAV-model	Processor & GHz ¹	L2	Memory	Disk & rpm	Disk controllers	Optical	Graphics adapter and memory	Slots x FireWire bays	Preload ¹⁷	Available date																																							
6223-10y-10U 1	x Xeon® 3.4GHz	1MB	512MB	80GB 7.2K	SATA	CD-ROM	Quadro NVS 280 64MB	1394 6x6	XP Pro	Sept 2004																																							
6223-11y-11U 1	x Xeon 3.4GHz	1MB	1GB	80GB 7.2K	SATA	CD-RW	Quadro NVS 280 64MB	1394 6x6	XP Pro	Sept 2004																																							
6223-14y-14U 1	x Xeon 3.4GHz	1MB	1GB	73GB 10K	Ultra320	COMBO	Quadro FX 3400 256MB	1394 6x6	XP Pro	Sept 2004																																							
6223-21y-21U 1	x Xeon 3.6GHz	1MB	1GB	80GB 7.2K	SATA	CD-RW	Quadro FX 1300 128MB	1394 6x6	XP Pro	Sept 2004																																							
6223-22y-22U 1	x Xeon 3.6GHz	1MB	1GB	73GB 10K	Ultra320	CD-RW	Quadro FX 1300 128MB	1394 6x6	XP Pro	Sept 2004																																							
6223-23y-23U 1	x Xeon 3.6GHz	1MB	1GB	80GB 7.2K	SATA	COMBO	Quadro FX 3400 256MB	1394 6x6	XP Pro	Sept 2004																																							
6223-24y-24U 1	x Xeon 3.6GHz	1MB	1GB	73GB 10K	Ultra320	COMBO	Quadro FX 3400 256MB	1394 6x6	XP Pro	Sept 2004																																							
6223-28y-28U 1	x Xeon 3.6GHz	1MB	1GB	73GB 10K	Ultra320	CD-RW	Quadro FX 1300 256MB	1394 6x6	RH 3	Sept 2004																																							
6223-29y-29U 2	x Xeon 3.6GHz	1MB	1GB	73GB 10K	Ultra320	CD-RW	Quadro FX 3400 256MB	1394 6x6	RH 3	Sept 2004																																							
Positioning <i>Powerfull multi processor workstation with Extended Memory 64 Technology</i>																																																	
Processor 1 or 2 x Intel® Xeon at 3.4, 3.6GHz with 800MHz frontside bus (FSB) & Extended Memory 64 Technology (EM64T)																																																	
L2 cache 1MB standard and maximum / at processor speed																																																	
Processor upgrade 2-way SMP / up to two Xeon Processors (same speed/cache size)																																																	
Implementation Systemboard contains two Intel 604-pin micro-PGA2 ZIF sockets, six DIMM slots, six slots (one PCI Express, three PCI-X, 2 PCI), and integrated dual SCSI, integrated SATA and gigabit ethernet																																																	
Memory - std / max 512MB or 1GB std / 16GB ^{13,21} max / two slots used / four slots available / PC3200 400MHz registered ECC DDR2-SDRAM																																																	
Memory - features DIMMs / six DIMM gold-connector slots on systemboard / DIMMs must be installed in matched pairs [a bank] / 2-way memory interleave / dual channel / Error Checking and Correcting (ECC) / optional 16-bit Checksum Chipkill™ (corrects 1, 2, 3, or 4-bit errors on same chip and detects 2- through 8-bit errors contained in two chips)																																																	
Graphics controller (see IntelliStation Graphics sheet for full graphics specifications) (one of following) <ul style="list-style-type: none"> • NVIDIA Quadro4 NVS280 2D 64MB PCI-Express • NVIDIA Quadro FX 1300 3D 128MB PCI-Express • NVIDIA Quadro FX 3400 3D 256MB PCI-Express 																																																	
SATA controller SATA-150 controller (150MB/sec / integrated in ICH5R / two connectors on planar / supports SATA HostRAID																																																	
SCSI controller Adaptec® 7902 / dual channel Ultra320 SCSI controller (LVD 320MB/sec) / on planar / 64-bit 100MHz PCI-X / HostRAID supports RAID-0 & 1 mirroring																																																	
SCSI channels and cables Two 16-bit channels (one internal and one external) / <i>Internal channel:</i> one 3-drop 16-bit 68-pin LVD SCSI cable from systemboard to internal disks bays; <i>External channel:</i> Optionally available 1-drop 16-bit 68-pin LVD SCSI cable from systemboard to rear external 68-pin connector (option part number 24P7929)																																																	
Cables <i>SATA models:</i> Two SATA cables (1 drop) <i>SCSI models:</i> One or two SCSI cables (listed above), <i>ALL:</i> one 2-drop EIDE cable (to optical)																																																	
Disk - features <i>Some:</i> 80GB / SATA-150 / 7200 rpm / 9.0 ms seek; <i>Some:</i> 73.0GB Ultra320 SCSI / 10K rpm / 4.7 ms; <i>All:</i> S.M.A.R.T. ⁵																																																	
Rack support 5U ⁴ rack mount support via tower-to-rack kit option																																																	
Chipset Intel E7525 chipset / E7525 MCH (Memory Controller Hub) for PCI-Express x16(vid), Broadcom, PXH, ICH5R / PXH BUS A supports Adaptec 7902, 2 64bit/100MHz PCI-X slots (5 & 6), BUS B supports one 64bit/133MHz PCI-X slot (4) / ICH5R for two 32-bit/33MHz PCI slots (slots 2 & 3), 1394A , SATA, 4xUSB(2.0), Low Pin Count Interface / NS PC87366 Super I/O off LPC interface																																																	
Gigabit ethernet One gigabit 10/100/1000 ethernet controller / Broadcom BCM5721 / full gigabit ethernet MAC and PHY layer functions / chip on planar / PCI-X 64-bit 100MHz / full duplex / Wake on LAN® / Alert Standard Format 2.0 / one rear RJ-45 port																																																	
Diskette / Optical drives <i>Diskette:</i> none <i>Optical:</i> One of the following: 48X-20X ⁶ CD-ROM, 48X/24X/48X/16X Max ^{6,19} CD-RW/DVD-ROM Combo or 48X/32X/48X Max ⁶ CD-RW																																																	
IEEE 1394(FireWire) FireWire on planar / 1394A, 400Mbps, 6-pin port on rear, 4-pin port on front																																																	
Audio AC - 97 Audio, ADI1981B via ICH5r / internal speaker (use of audio line out requires powered speakers)																																																	
Rear ports Four USB (Ver 2.0), two 9-pin serial, parallel, keyboard, mouse, ethernet, audio line in, audio line out, mic in / 6-pin 1394																																																	
Front ports Two USB (Ver 2.0), audio line out (stereo), mic in / 4-pin 1394																																																	
Systems mgmt Monitoring and alerting of thermal, fans, and voltage faults / Winbond® W791D																																																	
Keyboard / mouse IBM 104-key keyboard (6-pin PS/2) / IBM three button mouse (6-pin PS/2 conn)																																																	
Cooling fans Four variable speed fans (1 PCI, 1 HDD, 2 Fr) / not redundant or hot-swap																																																	
Power supply 530 watts / universal / auto sensing / built-in overload and surge protection																																																	
SECURITY																																																	
<ul style="list-style-type: none"> • U-bolt anchoring feature (U-bolt is optional; supports optional padlock) • Security slot (for attachment of optional cable lock such as Kensington cable lock) • Cover key lock • Cover tamper detect switch • Secure fixed DASD • Power-on password • Administrator password • Boot sequence control • Boot without keyboard or mouse • Diskette boot inhibit and write-protect • Disable mouse • Diskette, disk, serial port, parallel port I/O control • Secure access openings • VPD stored in EEPROM • Write protection control for EEPROM • IBM Security Solutions 																																																	
LIMITED WARRANTY³																																																	
<ul style="list-style-type: none"> ↔ 3 year parts and labor ↔ International Warranty Service³ ↔ On site, 8 am through 5 pm, Mon through Fri excluding holidays, next business day response time ↔ On site warranty service upgrade options⁷ available as ServicePac options at http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf ↔ 24x7¹⁴ toll-free support for warranty issues during the warranty period¹ 																																																	
<div style="display: flex; justify-content: space-between;"> <div style="width: 30%;">  <p>Bay ① 5.25", HH 1.6", access, optical</p> <p>Bay ② 5.25", HH 1.6", access, open</p> <p>Bay ③ 3.5", SL 1", access, open</p> <p>Bay ④ 3.5", SL 1", no access, disk</p> <p>Bay ⑤ 3.5", SL 1", no access, open</p> <p>Bay ⑥ 3.5", SL 1", no access, open</p> <p>Slot 1: fullsize, PCI-Express x16 (std vid)</p> <p>Slot 2: fullsize, 32-bit 33MHz, PCI (5v)</p> <p>Slot 3: fullsize, 32-bit 33MHz, PCI (5v)</p> <p>Slot 4: fullsize, 64-bit 133MHz, PCI-X 1.0 (3.3v)</p> <p>Slot 5: fullsize, 64-bit 100MHz, PCI-X 1.0*(3.3v)</p> <p>Slot 6: fullsize, 64-bit 100MHz, PCI-X 1.0 (3.3v)</p> <p>* - Must be used if installing ServeRAID 6i+</p> </div> <div style="width: 65%;"> <ul style="list-style-type: none"> ↔ Metal cage for disk bays 4,5,6 rotates out of chassis ↔ Two front stabilizing feet ↔ Handle grip on top ↔ H 18.5" x W 8.5" x D 19.5" ↔ H 450mm x W 216mm x D 496mm ↔ 36 lb to 50 lb (16.3kg to 22.6kg) • Maximum internal disk capacity¹³: SCSI: 584GB (4 disks x 146GB) SATA: 500GB (2 disks x 250GB), 1TB with optional ServRAID 7t (4 disks x 1TB) • Removable left side panel • BIOS Setup Utility via F1 at startup • Adaptec Configuration Utility near startup by pressing CTRL+C • Product Recovery Program via F11 at startup • Adv Config Power Interface (ACPI) 1.0a • DMI 2.2-compliant <p>Preload with Windows XP Professional¹⁷</p> <ul style="list-style-type: none"> Microsoft® Windows® XP Professional - Free license for Lotus® SmartSuite® - Free license for Lotus Notes® Client ↔ Device Drivers and IBM Enhanced Diagnostics CD ↔ IBM IntelliStation Documentation CD • Disk-to-Disk Recovery (in service partition) </div> </div>																																																	
<table border="0" style="width: 100%;"> <tr> <td style="width: 33%;">Xeon 3.4GHz/1MB L2 Cache Proc Upgrade</td> <td style="width: 33%;">13N0674</td> <td style="width: 33%;"></td> </tr> <tr> <td>Xeon 3.6GHz/1MB L2 Cache Proc Upgrade</td> <td>13N0675</td> <td></td> </tr> <tr> <td>512MB PC3200 CL3 ECC DDR2-SDRAM</td> <td>73P3523</td> <td></td> </tr> <tr> <td>1GB PC3200 CL3 ECC DDR2-SDRAM</td> <td>73P3522</td> <td></td> </tr> <tr> <td>1GB PC3200 CL3 ECC DDR2-SDRAM ChipK</td> <td>73P2865</td> <td></td> </tr> <tr> <td>2GB PC3200 CL3 ECC DDR2-SDRAM ChipK</td> <td>73P2866</td> <td></td> </tr> <tr> <td>IBM 73.4GB 10K rpm Ultra320 SCSI HDD</td> <td>32P0724</td> <td></td> </tr> <tr> <td>IBM 146GB 10K rpm Ultra320 SCSI HDD</td> <td>32P0725</td> <td></td> </tr> <tr> <td>IBM 160GB 7.2K rpm SATA-150 HDD</td> <td>09N4254</td> <td></td> </tr> <tr> <td>IBM ThinkVision L200P 20.1inLCD Black A/D</td> <td>6736-HB0</td> <td></td> </tr> <tr> <td>IBM T221 22.2inLCD Black Digital</td> <td>9503-DG5</td> <td></td> </tr> <tr> <td>IBM 4Ux20 Tower-to-Rack Conversion Kit</td> <td>13N2455</td> <td></td> </tr> <tr> <td>Other options at ibm.com/pc/us/accessories</td> <td></td> <td></td> </tr> </table>											Xeon 3.4GHz/1MB L2 Cache Proc Upgrade	13N0674		Xeon 3.6GHz/1MB L2 Cache Proc Upgrade	13N0675		512MB PC3200 CL3 ECC DDR2-SDRAM	73P3523		1GB PC3200 CL3 ECC DDR2-SDRAM	73P3522		1GB PC3200 CL3 ECC DDR2-SDRAM ChipK	73P2865		2GB PC3200 CL3 ECC DDR2-SDRAM ChipK	73P2866		IBM 73.4GB 10K rpm Ultra320 SCSI HDD	32P0724		IBM 146GB 10K rpm Ultra320 SCSI HDD	32P0725		IBM 160GB 7.2K rpm SATA-150 HDD	09N4254		IBM ThinkVision L200P 20.1inLCD Black A/D	6736-HB0		IBM T221 22.2inLCD Black Digital	9503-DG5		IBM 4Ux20 Tower-to-Rack Conversion Kit	13N2455		Other options at ibm.com/pc/us/accessories		
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Graphics Adapter	NVIDIA Quadro™ NVS 280	NVIDIA Quadro4™ 580 XGL	NVIDIA Quadro FX 500	NVIDIA Quadro 4 980 XGL	NVIDIA Quadro FX 1100	NVIDIA Quadro FX 3000	NVIDIA Quadro FX 4000
Category	Perf 2D	Entry 3D	Advanced 3D	Advanced 3D	Advanced 3D	High-Adv 3D	Extreme 3D
Total Memory	64MB	64MB	128MB	128MB	128MB	256MB	256MB
Memory Type	200MHz DDR-SDRAM	275MHz DDR-SDRAM	243MHz DDRSDRAM	325MHz DDR-SDRAM	325MHz DDRSDRAM	425MHz DDR SDRAM	500MHz GDDR3 SDRAM
RAMDAC Detail	Dual 350Mhz	Dual 350Mhz	Dual 350MHz	Dual 350MHz	Dual 400MHz	Dual 400MHz	Dual 400MHz
Graphics Pipeline	64-bit	128-bit	128-bit	128-bit	128-bit	256-bit	256-bit
Supported Bus	AGP 8X	AGP 8X	AGP 8X	AGP 8X	AGP 8X	AGP 8X	AGP 8X
Maximum Displays	Two	Two	2 Analog 1 Digital	Two	Two	Two	Two
Supported Displays Analog Digital CRT Flat Panel	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes
Max Analog Resolution	2048x1536x32 @ 60Hz	2048x1536x32 @ 60Hz	2048x1536x32 @ 75 Hz	2048x1536x32 @ 60Hz	2048x1536x32 @ 85 Hz	2048x1536x32 @ 85Hz	2048x1536x32 @ 85Hz
Max Digital Resolution	1280x1024x32 @ 60Hz	1280x1024x32 @ 60Hz	1600x1200x32 @ 60Hz	1600x1200x32 @ 60Hz 3840x2400x32 @ 25Hz	1600x1200x32 @ 60Hz 2048x1536x32 @ 41Hz 3840x2400x32 @ 13Hz	1600x1200x32 @ 60Hz 3840x2400x32 @ 48Hz	2048x1536x32 @ 60Hz 3840x2400x32 @ 48Hz
Connectors	One LFH60	One LFH60	One DVI-I to 3-pin stereo, One VGA	Two DVI-I, One 3-pin stereo	Two DVI-I, One 3-pin stereo	*Two DVI-I, One 3-pin stereo	*Two DVI-I, One 3-pin stereo
Cables Included	One LFH-to-Dual DB-15 cable included, LFH-to-Dual DVI-I optional	One LFH-to-Dual DB-15 cable included, LFH-to-Dual DVI-I optional	One DVI-I -to- DB-15 cable included	Two DVI-I -to- DB-15 cables included	Two DVI-I -to- DB-15 cables included	Two DVI-I -to- DB-15 cables included	Two DVI-I -to- DB-15 cables included
Other						*One single-link DVI-I and One dual-link DVI-I	*Two dual-link DVI-I and One dual-link DVI-I

NOTE: Four-head and/or TV-in graphics adapters available by special bid

Graphics Adapter	NVIDIA Quadro™ NVS 280	ATI FireGL™ V3100	NVIDIA Quadro FX 1300	NVIDIA Quadro FX 3400				
Category	Perf 2D	Value 3D	Advanced 3D	High-Adv 3D				
Total Memory	64MB	128MB	128MB	256MB				
Memory Type	200MHz DDR SDRAM	400MHz DDR SDRAM	275MHz DDR SDRAM	450MHz DDR3 SDRAM				
RAMDAC Detail	Dual 350Mhz	Dual 400MHz	Dual 400MHz	Dual 400MHz				
Graphics Pipeline	64-bit	256-bit	256-bit	256-bit				
Supported Bus	PCI Express x16	PCI Express x16	PCI Express x16	PCI Express x16				
Maximum Displays	Two	Two	Two	Two				
Supported Displays Analog Digital CRT Flat Panel	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes				
Max Analog Resolution	2048x1536x32 @ 60Hz	2048x1536x32 @ 85 Hz	2048x1536x32 @ 60 Hz	2048x1536x32 @ 85 Hz				
Max Digital Resolution	1280x1024x32 @ 60Hz	1600x1200x32 @ 60 Hz	1600x1200x32 @ 60 Hz 3840x2400x32 @ 24 Hz	1600x1200x32 @ 60 Hz 3840x2400x32 @ 48 Hz				
Connectors	One DM5-59	One DVI-I, One VGA, One 3-pin stereo	*Two DVI-I, One 3-pin stereo	*Two DVI-I, One 3-pin stereo				
Cables Included	One DM5-59-to-Dual DB-15 cable included	Two DVI-I -to-DB-15 cables included	Two DVI-I -to-DB-15 cables included	Two DVI-I -to-DB-15 cables included				
Other	DM5-59-to-dual VGA option			*One single-link DVI-I and One dual-link DVI-I				

NOTE: Four-head and/or TV-in graphics adapters available by special bid

For GAV systems, lowercase "x" should be replaced with a country-specific code.

IBM® Machine Type	GAV model	Processor	GHz ¹	L2 cache	FSB MHz	Memory	Disk	Disk controller	Maximum Capacity	PCI slots x bays	Hard disk bays	Ethernet	Available date
8482 1Mx	11X	Pentium 4®	2.8	1MB	800	512MB	None	SCSI	440.4GB	5 x 7	3 hot-swap	Gigabit	Apr 2004
8482 1Rx	14X	Pentium 4	2.8	1MB	800	512MB	36.4GB U320	SCSI	587.2GB	5 x 7	4 fixed	Gigabit	Apr 2004
8482 1Sx	15X	Pentium 4	2.8	1MB	800	256MB	None	SATA	320GB	5 x 7	2 simple-swap	Gigabit	Apr 2004
8482 2Mx	21X	Pentium 4	3.0	1MB	800	512MB	None	SCSI	440.4GB	5 x 7	3 hot-swap	Gigabit	Apr 2004
8482 2Rx	24X	Pentium 4	3.0	1MB	800	512MB	36.4GB U320	SCSI	587.2GB	5 x 7	4 fixed	Gigabit	Apr 2004
8482 2Sx	25X	Pentium 4	3.0	1MB	800	256MB	None	SATA	320GB	5 x 7	2 simple-swap	Gigabit	Apr 2004
8482 9Mx	91X	Celeron®	2.4	128KB	800	256MB	80GB SATA	SATA	320GB	5 x 7	2 simple-swap	Gigabit	Apr 2004
8482 3Mx	31X	Pentium 4	3.2	1MB	800	512MB	None	SCSI	440.4GB	5 x 7	3 hot-swap	Gigabit	Jun 2004
8482 3Rx	34X	Pentium 4	3.2	1MB	800	512MB	36.4GB U320	SCSI	587.2GB	5 x 7	4 fixed	Gigabit	Jun 2004
8482 3Sx	35X	Pentium 4	3.2	1MB	800	256MB	None	SATA	320GB	5 x 7	2 simple-swap	Gigabit	Jun 2004

Positioning	uniprocessor, entry server designed to meet small business needs and budgets												
Processor(s)	Intel® Pentium 4 2.8, 3.0, or 3.2GHz with 800MHz frontside bus (FSB) or Celeron at 2.4GHz												
L2 cache	Up to 1MB std and max / ECC / full speed												
Implementation	Motherboard contains one m478 PGA socket (processor/L2 cache in FC-PGA2), four DIMM sockets, three PCI slots, one AGP slot, ethernet controller, connector for extender board (two PCI slots and graphics controller)												
SMP support	No SMP support / no processor upgrade												
Memory	256MB or 512MB / 4GB ¹³ max / four 184-pin gold-plated DIMM sockets / one socket used / PC3200 supported in all models / PC2700 333MHz ECC DDR-SDRAM (models 1xx and 2xx) / PC3200 400MHz ECC DDR-SDRAM (models 3xx) / All Error Checking and Correcting (ECC) / DIMMs and ECC memory controller / industry std / unbuffered / CAS Latency 2.5 (CL2.5) / apart from single-DIMM configurations, memory must be added in matched pairs [a bank]												
SCSI disk controller	Some: single channel Ultra320 SCSI controller (LVD 320MB/sec)												
IDE disk controller	Enhanced IDE / ATA-100 / integrated in I/O Controller Hub / one connector on planar												
SATA disk controller	Some: dual channel SATA-150 controller (150MB/sec)												
Cables	One 2-drop EIDE cables (to CD-ROM) / Some: one 5-drop LVD SCSI cable / Some: two 1-drop SATA cables												
Disk	Some: 36.4GB U320 SCSI / 10,000 rpm / 4.7 ms seek / Some: 80GB SATA / 7,200 rpm / 9.0 ms / All: S.M.A.R.T.												
RAID Controller	IBM ServeRAID™ 7e (RAID 0 or 1) / on planar / supports SATA or SCSI interface / supports ServeRAID 6i+ controller												
Rack support	4U ⁴ rack mount support via tower-to-rack kit option												
Bus slots (see below)	One PCI bus / three 32-bit 33MHz 5v PCI 2.2 slots / two 64-bit 66MHz 3.3v PCI-X slots / no hot-swap Active™ PCI slots												
Chipset	Intel E7210 chipset / Memory Controller Hub (MCH) / I/O Controller Hub (ICH-S) for PCI 2.2 and PCI-X bus, ATA-100 EIDE, ethernet MAC, USB, Low Pin Count Interface / Firmware Hub / SMSC® LPC47M192 Super I/O for diskette, parallel, serial, keyboard, mouse												
Ethernet	10/100/1000 gigabit / Intel Kenai II / on planar / full duplex / PHY and MAC layers / Preboot eXecution Environment (PXE) / Wake on LAN® / Alert Standard Format 2.0												
CD-ROM / diskette	CD-ROM: 48X-20X ⁶ CD-ROM, IDE / Diskette: 3.5" 1.44MB diskette drive												
Ports	Front: two USB (Ver 2.0); Back: two serial (9-pin), parallel, two USB (Ver 2.0), keyboard, mouse, ethernet (RJ-45), monitor (analog DB-15)												
Diagnostics	Diagnostic LEDs / error LEDs for fans and memory / server diagnostic programs stored on IBM Enhanced Diagnostics CD												
Systems mgmt cntrl	Monitors system and processor temperature, fan speed and failure, and voltages / support for optional Remote Supervisor Adapter II (provides continuous health monitoring and control)												
Graphics controller	SVGA / ATI® 7000M / 16MB SDRAM std/max / PCI 2.2 32-bit 33MHz / on planar / analog 15-pin D-Sub conn				256MB PC2700 CL2.5 ECC DDR UDIMM				06P4053				
Security	Mechanical side panel key lock / optional U-Bolt support via knockout / power-on password / boot sequence control / operation without keyboard/mouse / cover tamper detect switch				512MB PC2700 CL2.5 ECC DDR UDIMM				06P4054				
					1GB PC2700 CL2.5 ECC DDR UDIMM				06P4055				
Software	ServerGuide™ (CD-based automated network OS installation and configuration tool), IBM Director (system hardware mgmt software) and many utilities				256MB PC3200 CL2.5 ECC DDR UDIMM				06P4049				
					512MB PC3200 CL2.5 ECC DDR UDIMM				06P4050				
Keyboard / mouse	IBM 101 key keyboard / IBM mouse (both black)				1GB PC3200 CL2.5 ECC DDR UDIMM				06P4051				
					IBM 80GB 7200 rpm simple-swap SATA-150 HDD				73P8002				
Cooling fans	Three fans (fansink, rear, pwr supply) plus additional fan on SCSI models / not redundant / not hot-swap				IBM 36.4GB 10000 rpm hot-swap U320 HDD				32P0726				
					IBM 32X/10X/40X/16X Max ⁶ CD-RW/DVD (black)				22P6973				
Power supply	340 watts / universal / auto switch / Automatic Server Restart (ASR) / not hot-swap / no redundancy / cooling fan in power supply (variable speed)				IBM Remote Supervisor Adapter II (PCI adapter)				59P2984				
					IBM 4Ux20D Tower-to-Rack Kit				09N4300				
					IBM ServeRAID-6i+ Controller				13N2190				
					IBM ServeRAID-7T Controller				71P8648				
					IBM 20/40GB TR7 Internal Tape Drive				48P7042				
					IBM 40/80GB DLT1 Internal Half-High Tape Drive				24P2398				
					IBM NetBAY11 Standard Rack Cabinet				9306110				
	Other options at ibm.com/pc/us/accessories												

<p>Slot 1: fullsize, 64-bit 66MHz, PCI-X (3.3v) Slot 2: fullsize, 64-bit 66MHz, PCI-X (3.3v) Slot 3: fullsize, 32-bit 33MHz, PCI 2.2 (5v) Slot 4: fullsize, 32-bit 33MHz, PCI 2.2 (5v) Slot 5: fullsize, 32-bit 33MHz, PCI 2.2 (5v)</p> <p>Bay ① 5.25", HH1.6", access, CD-ROM Bay ② 5.25", HH1.6", access, open (no disk) Bay ③ 3.5", SL 1", access, diskette Bay ④ 3.5", SL 1", access, open Bay ⑤ 3.5", SL 1", access (some), open Bay ⑥ 3.5", SL 1", access (some), open Bay ⑦ 3.5", SL 1", access (some), std disk (some)</p> <p>Mini-tower Stealth black</p> <p>◇ Removable left side panel ◇ Configuration/Setup Utility (in flash memory) invoked by pressing F1 at startup ◇ Advanced Configuration Power Interface (ACPI) 1.0 ◇ Device Drivers and Diagnostics CD-ROM included ◇ Four stabilizing feet ◇ Handle grip on top ◇ H 17.25" x W 6.5" x D 19.0" ◇ H 448mm x W 165mm x D 483mm ◇ 35 to 42 pounds (15.9 to 19.1kg)</p> <p>Maximum SATA capacity: 320GB¹³ (2 disks x 160GB) Maximum hot-swap SCSI capacity: 439.2GB¹³ (3 disks x 146.4GB) Maximum fixed SCSI capacity: 585.6GB¹³ (4 disks x 146.4GB)</p>
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LIMITED WARRANTY³

- ⇐ 1 year parts and labor
- ⇐ International Warranty Service³
- ⇐ On site, 8 am-5 pm, Mon-Fri excluding holidays, next business day response time
- ⇐ On site service upgrade options (in eligible locations):⁷
 - 3 year IOR 24x7, 2 hr avg response (ServicePac part num 69P9512)
 - 3 year IOR 24x7, 4 hr avg response (ServicePac part num 69P9511)
 - 3 year IOR 9x5, 4 hr avg response (ServicePac part num 69P9510)
 - 3 year IOR 9x5, NBD response (ServicePac part num 69P9509)
- ⇐ Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- ⇐ 24x7¹⁴ toll-free support for warranty issues during the warranty period⁵

IBM eServer™ xSeries™ 206 (August 2004)

xREF by eServer Field Skills and Education Team

For GAV systems, lowercase "v" should be replaced with a country-specific code.

IBM® Machine Type	GAV model	Processor	GHz ¹	L2 cache	FSB MHz	Memory	Disk	Disk controller	Maximum Capacity	PCI slots x bays	Hard disk bays	Ethernet	Available date
8482	- 4My -41x	Pentium 4® EM64T	3.2	1MB	800	512MB	None	SCSI	440.4GB	5 x 7	3 hot-swap	Gigabit	Aug 2004
8482	- 4Ry -44x	Pentium 4 EM64T	3.2	1MB	800	512MB	36.4GB U320	SCSI	587.2GB	5 x 7	4 fixed	Gigabit	Aug 2004
8482	- 4Sy -45x	Pentium 4 EM64T	3.2	1MB	800	256MB	None	SATA	500GB	5 x 7	2 simple-swap	Gigabit	Aug 2004
8482	- 5My -51x	Pentium 4 EM64T	3.4	1MB	800	512MB	None	SCSI	440.4GB	5 x 7	3 hot-swap	Gigabit	Jan 2005
8842	- 5Ry -54x	Pentium 4 EM64T	3.4	1MB	800	512MB	36.4GB U320	SCSI	587.2GB	5 x 7	4 fixed	Gigabit	Jan 2005
8842	- 5Sy -55x	Pentium 4 EM64T	3.4	1MB	800	256MB	None	SATA	500GB	5 x 7	2 simple-swap	Gigabit	Jan 2005

Positioning Uniprocessor, entry server designed to meet small business needs and budgets
Processor(s) Intel® Pentium 4 3.2 & 3.4 Ghz with 800MHz FSB Optimized for Extended Memory 64 Technology (EM64T)
L2 cache Up to 1MB std and max / ECC / full speed
Implementation Motherboard contains one m478 PGA socket (processor/L2 cache in FC-PGA2), four DIMM sockets, three 33MHz PCI slots, two 66MHz PCI slots, ethernet controller

SMP support No SMP support / no processor upgrade

Memory 256MB or 512MB / 4GB¹³ max / four 184-pin gold-plated DIMM sockets / one socket used / PC3200 400MHz ECC DDR-SDRAM / All Error Checking and Correcting (ECC) / DIMMs and ECC memory controller / industry std / unbuffered / CAS Latency 3 (CL3) / apart from single-DIMM configurations, memory must be added in matched pairs [a bank]

SCSI disk controller 4My & 4Ry: Adaptec® 7901 single channel Ultra320 SCSI controller (LVD 320MB/sec)
IDE disk controller Enhanced IDE / ATA-100 / integrated in I/O Controller Hub / one connector on planar
SATA disk controller 4Sy: single channel SATA-150 controller (150MB/sec) / supports 2 drives standard / supports 4 drives with adapter
Cables One 2-drop EIDE cables (to CD-ROM) / 4My & 4Ry: one 5-drop LVD SCSI cable / 4Sy: one 2-drop SATA cable
Disk 4Ry: 36.4GB U320 SCSI / 10,000 rpm / 4.7 ms seek / S.M.A.R.T.
RAID Controller IBM ServeRAID™ 7e (RAID 0 or 1) / on planar / supports SATA or SCSI interface / supports ServeRAID 6i+ controller

Rack support 4U⁴ rack mount support via tower-to-rack kit option
Bus slots (see below) One PCI bus / three 32-bit 33MHz 5v PCI 2.2 slots / two 64-bit 66MHz 3.3v PCI-X slots / no hot-swap Active™ PCI slots
Chipset Intel E7210 chipset / Memory Controller Hub (MCH) / I/O Controller Hub (ICH-S) for PCI 2.2 and PCI-X bus, ATA-100 EIDE, ethernet MAC, USB, Low Pin Count Interface / Firmware Hub / S.M.S.C® LPC47M192 Super I/O for diskette, parallel, serial, keyboard, mouse

Ethernet 10/100/1000 gigabit / Intel Kenai II / on planar / full duplex / PHY and MAC layers / Preboot eXecution Environment (PXE) / Wake on LAN® / Alert Standard Format 2.0
CD-ROM / diskette CD-ROM: 48X-20X⁶ CD-ROM, IDE / Diskette: 3.5" 1.44MB diskette drive
Ports Front: two USB (Ver 2.0); Back: two serial (9-pin), parallel, two USB (Ver 2.0), keyboard, mouse, ethernet (RJ-45), monitor (analog DB-15)

Diagnostics Diagnostic LEDs / error LEDs for fans and memory / server diagnostic programs stored on IBM Enhanced Diagnostics CD
Systems mgmt Monitors system and processor temperature, fan speed and failure, and voltages / support for optional Remote Supervisor Adapter II (provides continuous health monitoring and control)

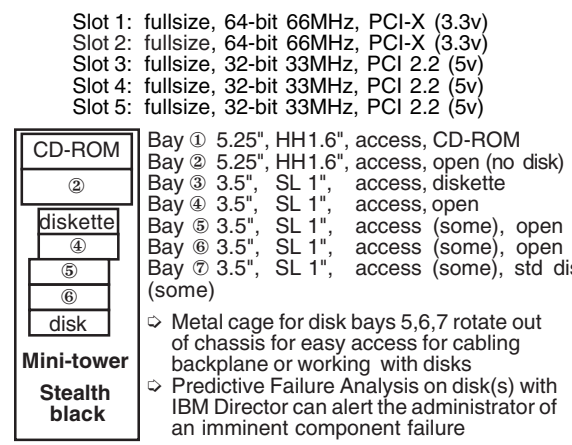
Graphics controller SVGA / ATI® Radeon™ 7000M / 16MB SDRAM std/max / on planar / analog 15-pin

Security Mechanical side panel key lock / optional U-Bolt support via knockout / power-on password / boot sequence control / operation without keyboard/mouse / cover tamper detect switch / ASF 2.0
 256MB PC3200 CL3 ECC DDR UDIMM 06P4049
 512MB PC3200 CL3 ECC DDR UDIMM 06P4050
 1GB PC3200 CL3 ECC DDR UDIMM 06P4051
 IBM 80GB SATA-150 (7.2K) simple-swap HDD 73P8002
 IBM 160GB SATA-150 (7.2K) simple-swap HDD 73P8003
 IBM 250GB SATA-150 (7.2K) simple-swap HDD 73P8006
 IBM 36.4GB 10K hot-swap U320 HDD 32P0726
 IBM 73.4GB 10K hot-swap U320 HDD 32P0724
 IBM 146.8GB 10K hot-swap U320 HDD 32P0725
 IBM 36.4GB 15K hot-swap U320 HDD 90P1318
 IBM 73.4GB 15K hot-swap U320 HDD 90P1319
 32X/10X/40X/16X Max⁶ CD-RW/DVD (black) 22P6973
 IBM Remote Supervisor Adapter II (PCI adapter) 59P2984
 IBM 4Ux20D Tower-to-Rack Kit 09N4300
 IBM ServeRAID-6i+ Controller 13N2190
 IBM ServeRAID-7t SATA Controller 71P8648
 IBM 20/40GB TR7 Internal Tape Drive 48P7042
 IBM 40/80GB DLT1 Internal Half-High Tape Drive 24P2398
 Other options at ibm.com/pc/us/accessories

Software ServerGuide™ (CD-based automated network OS installation and configuration tool), IBM Director (system hardware mgmt software) and many utilities

Keyboard / mouse IBM 101 key keyboard / IBM mouse (both black)
Cooling fans Three fans (fansink, rear, pwr supply) plus additional fan on SCSI models / not redundant / not hot-swap

Power supply 340 watts / universal / auto switch / Automatic Server Restart (ASR) / not hot-swap / no redundancy / cooling fan in power supply (variable speed)



- ◆ Removable left side panel
 - ◆ Configuration/Setup Utility (in flash memory) invoked by pressing F1 at startup
 - ◆ Advanced Configuration Power Interface (ACPI) 1.0
 - ◆ Device Drivers and Diagnostics CD-ROM included
 - ◆ Four stabilizing feet
 - ◆ Handle grip on top
 - ◆ H 17.25" x W 6.5" x D 19.0"
 - ◆ H 448mm x W 165mm x D 483mm
 - ◆ 35 to 42 pounds (15.9 to 19.1kg)
- Maximum SATA capacity:** 500GB¹³ (2 disks x 250GB) w/ optional ServeRAID 7t (4 disks x 1TB)
Maximum hot-swap SCSI capacity: 439.2GB¹³ (3 disks x 146.4GB)
Maximum fixed SCSI capacity: 585.6GB¹³ (4 disks x 146.4GB)

LIMITED WARRANTY³

- ↪ 1 year parts and labor
- ↪ International Warranty Service³
- ↪ On site, 8 am-5 pm, Mon-Fri excluding holidays, next business day response time
- ↪ On site service upgrade options (in eligible locations):⁷
 - 3 year IOR 24x7, 2 hr avg response (ServicePac part num 69P9512)
 - 3 year IOR 24x7, 4 hr avg response (ServicePac part num 69P9511)
 - 3 year IOR 9x5, 4 hr avg response (ServicePac part num 69P9510)
 - 3 year IOR 9x5, NBD response (ServicePac part num 69P9509)
- ↪ Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- ↪ 24x7¹⁴ toll-free support for warranty issues during the warranty period⁸

See footnotes for important warranty information

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◀ = Models announced January 18, 2005

IBM® Type-model	Processor	GHz¹	L2 cache	FSB MHz	Memory	Disk	Disk controller	Hot-swap disk bays	PCI slots x bays	Power supply number and type	Ethernet	Available date
8649-42X	1 x Xeon™	2.67	512KB	533	512MB	36.4GB² Ultra320	10K Ultra320	None (4 fixed)	6 x 7	One fixed	Gigabit	Feb 2004
8649-4AX	1 x Xeon	2.67	512KB	533	512MB	None (open-bay)	Ultra320	6 hot-swap	6 x 9	One fixed	Gigabit	Feb 2004
8649-4BX	1 x Xeon	2.67	512KB	533	512MB	None (open-bay)	Ultra320	6 hot-swap	6 x 9	Two redundant	Gigabit	Feb 2004
8649-52X	1 x Xeon	2.8B	512KB	533	512MB	36.4GB Ultra320	10K Ultra320	None (4 fixed)	6 x 7	One fixed	Gigabit	Feb 2004
8649-5AX	1 x Xeon	2.8B	512KB	533	512MB	None (open-bay)	Ultra320	6 hot-swap	6 x 9	One fixed	Gigabit	Feb 2004
8649-5BX	1 x Xeon	2.8B	512KB	533	512MB	None (open-bay)	Ultra320	6 hot-swap	6 x 9	Two redundant	Gigabit	Feb 2004
8649-62X	1 x Xeon	3.06	512KB	533	512MB	36.4GB Ultra320	10K Ultra320	None (4 fixed)	6 x 7	One fixed	Gigabit	Feb 2004
8649-6AX	1 x Xeon	3.06	512KB	533	512MB	None (open-bay)	Ultra320	6 hot-swap	6 x 9	One fixed	Gigabit	Feb 2004
8649-6BX	1 x Xeon	3.06	512KB	533	512MB	None (open-bay)	Ultra320	6 hot-swap	6 x 9	Two redundant	Gigabit	Feb 2004

Processor(s) **1 x Intel® Xeon up to 3.06 GHz with 533MHz frontside bus (FSB)** / Hyper-Threading technology
 SMP - L2 Cache **2-way SMP** / up to two Xeon Processors (same speed/cache size) / **512KB** std and max / at processor speed
 Implementation Systemboard contains two Intel 604-pin micro-PGA ZIF sockets, four DIMM slots, seven slots (one PCI 2.2, four PCI-X, one Mini PCI [used by graphics], one unavailable AGP), and integrated SCSI and ethernet

Memory **512MB** std / 8GB¹³ max / two slots used / two slots available / **PC2100** 266MHz CL2.5 registered 184-pin ECC DDR-SDRAM DIMMs / four DIMM gold-connector slots on systemboard / DIMMs must be installed in matched pairs [a bank] / 2-way memory interleave / dual channel / **Error Checking and Correcting (ECC)** via **16-bit Checksum Chipkill™** (corrects 1, 2, 3, or 4-bit errors on same chip and detects 2- through 8-bit errors contained in two chips) available on 512MB and greater DIMMs

IDE disk controller Enhanced IDE busmaster / ATA-100 / integrated in I/O Controller Hub 4 / two connectors on planar
 SCSI disk controller **LSI Logic® 53C1030 / dual channel Ultra320 SCSI controller** (LVD 320MB/sec) / on planar / 64-bit 100MHz PCI-X / supports **RAID-1 mirroring** (Embedded Mirroring) / shared with optional IBM ServeRAID™-5i Controller for low-cost RAID 0, 1, 1E, 5, 00, 10, 1E0, 50 (installed only in Slot 4) Two 16-bit channels (one internal and one external) / *Internal channel:* Fixed disk models: one 4-drop 16-bit 68-pin LVD SCSI cable from systemboard to internal disks bays; Hot-swap models: one 1-drop 16-bit 68-pin LVD SCSI cable to 6-bay backplane; *External channel:* cable available as option pn 24P7929 from systemboard to rear external 68-pin connector

SCSI channels and cables One SCSI cable (listed above), one 2-drop EIDE cable (to CD-ROM)
 Cables *Some:* 36.4GB Ultra320 SCSI / 10K rpm / 4.7 ms average read seek / S.M.A.R.T.⁵

Rack support 4U⁴ rack mount support via tower-to-rack kit option
 Bus slots (see below) Four 64-bit 100MHz PCI-X 1.0 / one PCI 2.2 / one Mini PCI / one AGP 8X (not available) / no hot-swap Active™ PCI slots
 Chipset **Intel E7505 chipset** / E7505 MCH (Memory Controller Hub) for AGP 8X slot, P64H2, ICH4 / P64H2 for two PCI-X buses (Bus A for slots 2 and 3 and ethernet controller; Bus B for slots 4 and 5 and SCSI controller) / I/O Controller Hub (ICH4) for PCI 2.2 bus (one slot and one Mini PCI slot), ATA-100 EIDE, USB, Low Pin Count Interface / NS PC87366 Super I/O off LPC interface

Ethernet One gigabit 10/100/1000 ethernet controller / Broadcom BCM5703i / full gigabit ethernet MAC and PHY layer functions / chip on planar / PCI-X 64-bit 100MHz / full duplex / Wake on LAN® / Alert Standard Format 1.0 / one rear RJ-45 port

CD-ROM / diskette Ports *CD-ROM:* 48X-20X⁶ CD-ROM, IDE / *Diskette:* 3.5" 1.44MB diskette drive
Front: two USB (Ver 2.0); *Back:* two USB (Ver 2.0), two serial (9-pin), parallel, keyboard, mouse, ethernet (RJ-45), monitor (analog DB-15), microphone-in (mono), line-in (stereo), line-out (stereo)

Diagnostics Diagnostic LEDs / error LEDs for fans and memory / server diagnostic programs stored on IBM Enhanced Diagnostics CD
 Systems mgmt cntrl Winbond® W791D / chip on planar / monitors system and processor temperature, fan speed and failure, and voltages / **support for optional Remote Supervisor Adapter II** (provides continuous health monitoring and control)

Graphics controller SVGA / ATI® RageXL / on Mini PCI adapter / 8MB SDRAM std and max / PCI 2.2 32-bit 33MHz / analog 15-pin D-Sub conn

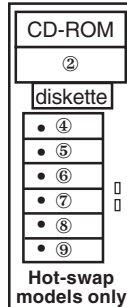
Security Mechanical side panel key lock (locks hot-swap disks on hot-swap models) / optional U-Bolt support via knockout / power-on password / boot sequence control / operation without keyboard/mouse / security slot (for opt cable lock)

Software **ServerGuide™** (CD-based automated network OS installation and configuration tool), IBM Director (system hardware mgmt software) and many utilities

Keyboard / mouse IBM 101 key keyboard / IBM mouse (both black, 6-pin PS/2)
 Cooling fans up to six / three for processor(s), memory, and disk bays / two power supply cage fans (three in dual power supply model)
All: not redundant / not hot-swap / all variable speed
Some: one 425 watt std and max / not hot-swap
xBX: two 514 watt std and max / hot-swap / redundant
All: universal / voltage-sensing / Automatic Server Restart (ASR) / cooling fan in power supply(s) (variable spd)

Power supply(s) Xeon 2.67 GHz/533/512KB L2 Cache Proc Upg 24P7861
 Xeon 2.80 GHz/533/512KB L2 Cache Proc Upg 24P8054
 Xeon 3.06 GHz/533/512KB L2 Cache Proc Upg 24P8122
 2x256MB PC2100 CL2.5 ECC non-Chipkill DIMM Kit 73P2868
 512MB PC2100 CL2.5 ECC DDR-SDRAM 33L5038
 1GB PC2100 CL2.5 ECC DDR-SDRAM DIMM 33L5039
 2GB PC2100 CL2.5 ECC DDR-SDRAM DIMM 33L5040
 IBM 73.4GB 10K Ultra320 SCSI 68-pin (not hot-swp) 32P0724
 IBM 146GB 10K Ultra320 SCSI 68-pin (not hot-swp) 32P0725
 IBM 36.4GB 15K Ultra320 SCSI Hot-Swap SL HDD 06P5776
 IBM 73GB 10K Ultra320 SCSI Hot-Swap SL HDD 32P0727
 IBM 146GB 10K Ultra320 SCSI Hot-Swap SL HDD 32P0728
 40X/12X/40X Max⁶ CD-RW internal (black) 22P6976
 IBM Remote Supervisor Adapter II (PCI adapter) 59P2984
 IBM 4U Extended Depth Tower-to-Rack Kit 59P4817
 IBM ServeRAID-5i Controller (adapter for Slot 4) 25P3492
 IBM ServeRAID-6i Controller (adapter for Slot 4) 71P8595
 Other options at ibm.com/pc/us/accessories

- Slot 1: half-length, 32-bit 33MHz, PCI 2.2 (5v)
 - Slot 2: fullsize, 64-bit 100MHz, PCI-X 1.0 (3.3v)
 - Slot 3: fullsize, 64-bit 100MHz, PCI-X 1.0 (3.3v)
 - Slot 4: fullsize, 64-bit 100MHz, PCI-X 1.0* (3.3v) extended*
 - Slot 5: fullsize, 64-bit 100MHz, PCI-X 1.0 (3.3v)
 - Slot 6: Mini PCI type III, 32-bit 33MHz (5v) - used graphics
 - Slot: fullsize, AGP 8X Pro50 (1.5v) - unavailable
- * Extended slot for opt IBM ServeRAID-5i



Bay ① 5.25", HH 1.6", access, CD-ROM
 Bay ② 5.25", HH 1.6", access, open
 Bay ③ 3.5", SL 1", access, diskette
Hot-swap models 6AX and 6BX:
 Six bays ④ to ⑨ 3.5", SL 1", access, hot-swp
Fixed disk models 62X:
 Bay ④ 3.5", SL 1", no access, not hot-swap
 Bay ⑤ 3.5", SL 1", no access, not hot-swap
 Bay ⑥ 3.5", SL 1", no access, not hot-swap
 Bay ⑦ 3.5", SL 1", no access, not hot-swap
 Bay ⑧ 3.5", SL 1", no access, not hot-swap
 Bay ⑨ 3.5", SL 1", no access, not hot-swap
Maximum internal SCSI disk capacity¹³:
 Fixed: 587.2GB (4 disks x 146.8GB)
 Hot-swap: 880.8GB (6 disks x 146.8GB)

- ◆ Raven black color
- ◆ Removable left side panel
- ◆ Configuration/Setup Utility invoked by pressing F1 at startup
- ◆ BIOS Setup Utility via F1 at startup
- ◆ LSI Configuration Utility near startup by pressing CTRL+C
- ◆ DMI 2.2-compliant
- ◆ Adv Config Power Interface (ACPI) 1.0a
- ◆ *Device Driver and IBM Enhanced Diagnostics* CD-ROM included
- ◆ Four stabilizing feet
- ◆ Handle grip on top
- ◆ H 18.4" x W 6.5" x D 26.0"
- ◆ H 467mm x W 165mm x D 660mm
- ◆ 44 to 57 pounds (20 to 25.8kg)
- ◆ *Fixed disk models:* metal cage for disk bays 4,5,6,7 rotate out of chassis for easy access for cabling
- ◆ Predictive Failure Analysis on disk(s) with IBM Director can alert the administrator of an imminent component failure

LIMITED WARRANTY³

- ⇒ 1 year parts and labor
- ⇒ International Warranty Service³
- ⇒ On site, 8 am-5 pm, Mon-Fri excluding holidays, next business day response time
- ⇒ On site service upgrade options (in eligible locations):⁷
 - 3 year IOR 9x5, NBD response (ServicePac® part num 96P2248)
 - 3 year IOR 9x5, 4 hr avg response (ServicePac part num 96P2249)
 - 3 year IOR 24x7, 4 hr avg response (ServicePac part num 96P2250)
 - 3 year IOR 24x7, 2 hr avg response (ServicePac part num 96P2251)
- ⇒ Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- ⇒ 24x7¹⁴ toll-free support for warranty issues during the warranty period³

IBM® Type-GAV-model	Processor	L2 Cache	FSB MHz	Memory	Disk	Disk controller	Hot-swap disk bays	PCI slots x bays	Power supply number and type	Ethernet	Available date
8648-00y-00x	1 x Xeon™	2.8 1MB	800	512MB	80GB ² SATA 7200	SATA	3 simple-swap	6 x 7	One fixed	Gigabit	Sept 2004
8648-0Ay-0Ax	1 x Xeon	2.8 1MB	800	512MB	None (open-bay)	Ultra320	6 hot-swap	6 x 9	One fixed	Gigabit	Sept 2004
8648-0By-0Bx	1 x Xeon	2.8 1MB	800	512MB	None (open-bay)	Ultra320	6 hot-swap	6 x 9	Two redundant	Gigabit	Sept 2004
8648-10Y-10x	1 x Xeon	3.0 1MB	800	512MB	80GB SATA 7200	SATA	3 simple-swap	6 x 7	One fixed	Gigabit	Sept 2004
8648-1AY-1Ax	1 x Xeon	3.0 1MB	800	512MB	None (open-bay)	Ultra320	6 hot-swap	6 x 9	One fixed	Gigabit	Sept 2004
8648-1BY-1Bx	1 x Xeon	3.0 1MB	800	512MB	None (open-bay)	Ultra320	6 hot-swap	6 x 9	Two redundant	Gigabit	Sept 2004
8648-20Y-20x	1 x Xeon	3.2 1MB	800	512MB	80GB SATA 7200	SATA	3 simple-swap	6 x 7	One fixed	Gigabit	Sept 2004
8648-2AY-2Ax	1 x Xeon	3.2 1MB	800	512MB	None (open-bay)	Ultra320	6 hot-swap	6 x 9	One fixed	Gigabit	Sept 2004
8648-2BY-2Bx	1 x Xeon	3.2 1MB	800	512MB	None (open-bay)	Ultra320	6 hot-swap	6 x 9	Two redundant	Gigabit	Sept 2004

Processor(s) SMP - L2 Cache Implementation: **1 x Intel® Xeon up to 3.2 GHz with 800MHz frontside bus (FSB) / EM64T / 1MB L2 ECC Cache / Hyper-Threading technology** / up to two Xeon Processors (same speed/cache size) / **1MB** std and max / at processor speed
Systemboard contains two Intel 604-pin micro-PGA ZIF sockets, six DIMM slots, six slots (3 PCI-X, 2 PCI, 1 PCI Express x16)

Memory: **512MB** std / 16GB¹³ max / two slots used / four slots available / **PC2-3200** 400MHz ECC DDR2-SDRAM DIMMs / Six 240 pin gold-connector slots on systemboard / DIMMs must be installed in matched pairs [a bank] / 2-way memory interleave / dual channel / **Error Checking and Correcting (ECC)** via **16-bit Checksum Chipkill™** (corrects 1, 2, 3, or 4-bit errors on same chip and detects 2- through 8-bit errors contained in two chips) available on 1GB (2x512) DIMM Kit and greater

SATA disk controller: Dual Channel SATA-150 controller (150MB/sec / two connectors on planar / supports ServeRAID™ 7e
SCSI disk controller: **Adaptec® 7902 / dual channel Ultra320 SCSI controller** (LVD 320MB/sec) / on planar / 64-bit 100MHz PCI-X / ServeRAID 7e supports **RAID-0 & 1 mirroring** / Two 16-bit channels (one internal and one external) / *Internal channel:* Hot-swap models: one 1-drop 16-bit 68-pin LVD SCSI cable to 6-bay backplane; *External channel:* cable available as option pn 24P7929 from systemboard to rear external 68-pin connector

Cables RAID Controller: One SCSI cable (listed above), two one-drop SATA, one 2-drop EIDE cable (to CD-ROM), IBM ServeRAID 7e (RAID 0 Or 1) / on planar / supports SATA or SCSI interface / supports ServeRAID 6i+ controller

Mechanical Bus slots (see below) Chipset: 4U⁴ Tower (rack mount support via tower-to-rack kit option)
One PCI-Express / three 64-bit (one 133MHz, 2 100MHz) PCI-X 1.0 / two 32-bit/33MHz / no hot-swap Active™ PCI slots
Intel E7520 chipset / E7525 MCH (Memory Controller Hub) for PCI-Express x16(vid), Broadcom, PXH, ICH5R / PXH BUS A supports Adaptec 7902, 2 64bit/100MHz PCI-X slots (5 & 6), BUS B supports one 64bit/133MHz PCI-X slot (4) / ICH5R for two 32-bit/33MHz PCI slots (slots 2 & 3), video, SATA, 4xUSB(2.0), Low Pin Count Interface / NS PC87366 Super I/O off LPC interface

Ethernet: One gigabit 10/100/1000 ethernet controller / Broadcom 5721 / full gigabit ethernet MAC and PHY layer functions / chip on planar / PCI-X 64-bit 100MHz / full duplex / Wake on LAN® / Alert Standard Format 2.0 / one rear RJ-45 port

CD-ROM / diskette Ports: *CD-ROM:* 48X-20X⁶ CD-ROM, IDE / *Diskette:* 3.5" 1.44MB diskette drive
Front: two USB (Ver 2.0); *Back:* two USB (Ver 2.0), two serial (9-pin), parallel, keyboard, mouse, ethernet (RJ-45), monitor (analog DB-15)

Diagnostics Systems mgmt cntrl: Diagnostic LEDs / error LEDs for fans and memory / server diagnostic programs stored on IBM Enhanced Diagnostics CD
Winbond® W791D / chip on planar / monitors system and processor temperature, fan speed and failure, and voltages / **support for optional Remote Supervisor Adapter II** (provides continuous health monitoring and control)

Graphics controller: SVGA / ATI® Radeon™ 7000M on Planar / 16MB SDRAM std and max / 15 pin connector

Security: Mechanical side panel key lock (locks hot-swap disks on hot-swap models) / optional U-Bolt support via knockout / power-on password / boot sequence control / operation without keyboard/mouse / security slot (for opt cable lock)

Software: **ServerGuide™** (CD-based automated network OS installation and configuration tool), IBM Director (system hardware mgmt software) and many utilities

Keyboard / mouse Cooling fans: IBM 101 key keyboard / IBM mouse (both black, 6-pin PS/2) up to six / three for processor(s), memory, and disk bays / two power supply cage fans (three in dual power supply model)
All: not redundant / not hot-swap / all variable speed

Power supply(s): *Some:* one 530 watt std and max / not hot-swap
xBX: two 514 watt std and max / hot-swap / redundant
All: universal / voltage-sensing / Automatic Server Restart (ASR) / cooling fan in power supply(s) (variable spd)

Xeon 2.80 GHz/800/1MB L2 Cache EM64TProc Upg	13N0671
Xeon 3.00 GHz/800/1MB L2 Cache EM64TProc Upg	13N0672
Xeon 3.2 GHz/800/1MB L2 Cache EM64TProc Upg	13N0673
512MB (2x256) PC2-3200 ECC DDR2	73P3523
1GB (2x512) PC2-3200 ECC DDR2	73P3522
1GB (2x512) PC2-3200 ECC DDR2 ChipK DIMM Kit	73P2865
2GB (2x1GB) PC2-3200 ECC DDR2 DIMM Kit	73P2866
IBM 80GB SATA-150 (7.2K) simple-swap HDD	73P8002
IBM 160GB SATA-150 (7.2K) simple-swap HDD	73P8003
IBM 250GB SATA-150 (7.2K) simple-swap HDD	73P8006
IBM 36.4GB 15K Ultra320 SCSI Hot-Swap SL HDD	06P5776
IBM 73GB 10K Ultra320 SCSI Hot-Swap SL HDD	32P0727
IBM 146GB 10K Ultra320 SCSI Hot-Swap SL HDD	32P0728
40X/12X/40X Max ⁶ CD-RW internal (black)	22P6976
IBM Remote Supervisor Adapter II (PCI adapter)	59P2984
IBM 4U Extended Depth Tower-to-Rack Kit	26K6095
IBM ServeRAID-6i+ controller (adapter for Slot 5)	13N2190
IBM ServeRAID 7t SATA controller	71P8648

Other options at ibm.com/pc/us/accessories

- Slot 1: fullsize, PCI-Express x16 (3.3v)*
 - Slot 2: fullsize, 32-bit/33MHz, PCI (5v)
 - Slot 3: fullsize, 32-bit/33MHz, PCI (5v)
 - Slot 4: fullsize, 64-bit 133MHz, PCI-X 1.0 (3.3v)
 - Slot 5: fullsize, 64-bit 100MHz, PCI-X 1.0 (3.3v)**
 - Slot 6: fullsize, 64-bit 100MHz, PCI-X 1.0 (3.3v)
- * support only for x8 adaptors
** slot for opt IBM ServeRAID-6i+

- Bay ① 5.25", HH 1.6", access, CD-ROM
- Bay ② 5.25", HH 1.6", access, open
- Bay ③ 3.5", SL 1", access, diskette

- Hot-swap models:*
Six bays ④ to ⑨ 3.5", SL 1", access, hot-swap
Simple-swap models: 2 std, 2 avail(up to 4 SATA HDDs maybe added with ServeRAID 7t controller)
Bay ④ 3.5", SL 1", simple-swap
Bay ⑤ 3.5", SL 1", simple-swap
Bay ⑥ 3.5", SL 1", simple-swap
Bay ⑦ 3.5", SL 1", fixed

Maximum internal disk capacity¹³:
SATA: 500GB (2 disks x 250GB); 1TB (4 disks x 250GB) w/ ServeRAID 7t
SCSI: 880.8GB (6 disks x 146.8GB)

- ◆ Raven black color
- ◆ Removable left side panel
- ◆ Configuration/Setup Utility invoked by pressing F1 at startup
- ◆ BIOS Setup Utility via F1 at startup
- ◆ Adaptec Configuration Utility near startup by pressing CTRL+I
- ◆ DMI 2.2-compliant
- ◆ Adv Config Power Interface (ACPI) 1.0a
- ◆ Device Driver and IBM Enhanced Diagnostics CD-ROM included
- ◆ Four stabilizing feet
- ◆ Handle grip on top
- ◆ H 18.4" x W 6.5" x D 25.9"
- ◆ H 467mm x W 165mm x D 658mm
- ◆ 44 to 57 pounds (20 to 25.8kg)

- ◇ *Fixed disk models:* metal cage for disk bays 4,5,6,7 rotate out of chassis for easy access for cabling
- ◇ Predictive Failure Analysis on disk(s) with IBM Director can alert the administrator of an imminent component failure

LIMITED WARRANTY³

- ⇒ 1 year parts and labor
- ⇒ International Warranty Service³
- ⇒ On site, 8 am-5 pm, Mon-Fri excluding holidays, next business day response time
- ⇒ On site service upgrade options (in eligible locations):⁷
 - 3 year IOR 9x5, NBD response (ServicePac® part num 96P2248)
 - 3 year IOR 9x5, 4 hr avg response (ServicePac part num 96P2249)
 - 3 year IOR 24x7, 4 hr avg response (ServicePac part num 96P2250)
 - 3 year IOR 24x7, 2 hr avg response (ServicePac part num 96P2251)
- ⇒ Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- ⇒ 24x7¹⁴ toll-free support for warranty issues during the warranty period³

See footnotes for important warranty information
● = Hot-swap bays in some models

IBM® Type-model	Qty x Processor	L2 cache	L3 cache	Memory	Disk	SCSI controller	Mechanical	Slots x bays (hot-swap bays)	Power supply	Ethernet	Available date
8671-K1X	1 x Xeon®	2.67GHz	512KB	0MB	512MB	None	2 x Ultra320 Tower	6x10 (6 hot-swap std; 9 max)	560W fixed	Gigabit	Jan 2004
8671-KAX	1 x Xeon	2.67GHz	512KB	0MB	512MB	None	2 x Ultra320 Tower	6x10 (6 hot-swap std; 9 max)	560W hot	Gigabit	Jan 2004
8671-L1X	1 x Xeon	2.8BGHz	512KB	0MB	512MB	None	2 x Ultra320 Tower	6x10 (6 hot-swap std; 9 max)	560W fixed	Gigabit	Jan 2004
8671-LAX	1 x Xeon	2.8BGHz	512KB	0MB	512MB	None	2 x Ultra320 Tower	6x10 (6 hot-swap std; 9 max)	560W hot	Gigabit	Jan 2004
8671-M1X	1 x Xeon	3.06GHz	512KB	0MB	512MB	None	2 x Ultra320 Tower	6x10 (6 hot-swap std; 9 max)	660W fixed	Gigabit	Jan 2004
8671-MAX	1 x Xeon	3.06GHz	512KB	0MB	512MB	None	2 x Ultra320 Tower	6x10 (6 hot-swap std; 9 max)	660W hot	Gigabit	Jan 2004

These models ship standard with **Non-Chipkill DIMMs**. Chipkill is **optionally available** with purchase of 512MB DIMMs or higher.

Positioning Processor(s) *Universal server; two-way server using the Xeon processor to provide power and performance at an affordable price*
L2 cache Up to **1 x Intel® Xeon™ Processor 3.06 GHz** with 533MHz frontside bus / Hyper-Threading technology
L3 cache **512KB** / all models / on die of processor / at processor speed
SMP support **1MB** / available on some models / on die of processor / at processor speed
Implementation **2-way SMP** / up to two Xeon Processors (same speed/cache size)
 Systemboard contains two Intel 603-pin micro-PGA ZIF sockets, six memory gold-connector DIMM slots, six PCI slots (two hot-swap Active™ PCI slots), and integrated SCSI, ethernet, graphics

Memory **512MB** std / 12GB max / two slots used / four slots available
PC2100 266MHz registered 184-pin ECC DDR-SDRAM DIMMs
 DIMMs must be installed in matched pairs [a bank] / 2-way memory interleave / dual channel / memory bus runs at 2x100MHz / **Error Checking and Correcting (ECC)** (corrects 1, 2, 3, or 4-bit errors on same chip and detects 2-through 8-bit errors contained in two chips) / **16-bit Checksum Chipkill™** **optionally available**, requiring 512MB DIMMs

SCSI disk controller **LSI Logic® 53C1030 / dual channel Ultra320 SCSI controller** (LVD 320MB/sec) / on planar / 64-bit 100MHz PCI-X / supports **RAID-1 mirroring** with up to one hot-spare disk / shared with optional IBM ServeRAID™-6i Controller for low-cost RAID 0, 1, 1E, 5, 00, 10, 1E0, 50 (installed only in Slot 4)

SCSI channels Two 16-bit channels / **SCSI Channel A:** 16-bit 68-pin LVD cable from controller to backplane; **Channel B:** 16-bit 68-pin interface for Bay 8 and 9 (may require a cable) or with optional 3-Pack Kit (cable included); supports external SCSI devices via external SCSI knockout in rear (cable req 32P8164) or via opt ServeRAID adapter with external connector(s)

IDE controller / cable Enhanced IDE ATA-100 controller in CSB5 South Bridge / one connector on planar / one 1-drop IDE cable (CD-ROM)
Disk - capacity None standard / supports 7200-15000 rpm disks / one backplane / all disk bays Ultra320-enabled
Disk - bays Six hot-swap / 80-pin SCA-2 connectors / three additional hot-swap bays with Kit 33P2751 for up to nine 15K rpm disks

Mechanical Tower / conversion to or EIA 19" Rack (5U⁴) via optional kit for support in IBM NetBAY™ Racks
Chipset **ServerWorks® Grand Champion™ 4.0 LE** / CMIC LE Host Bridge (memory controller and I/O Bridge) / two CIOB-X2 I/O Bridges (IMB2 bus to Host Bridge for PCI-X 1.0 Bus B with slots 2, 3, 4 and Ultra320 and ethernet controllers; IMB2 bus to Host Bridge for PCI-X 1.0 Bus C with slots 5 and 6) / CSB5 South Bridge (Thin IMB to Host Bridge for PCI 2.2 bus A with slot 1 and graphics controller, EIDE, USB, SMBus, LPC bus to Super I/O) / NS PC87417 Super I/O

Ethernet controller 10/100/1000 gigabit / Broadcom® BCM 5703 / on planar / PCI-X 64-bit 100MHz / full duplex / Wake on LAN® / Alert Standard Format
CD-ROM / diskette 48X-20X⁶ CD-ROM / IDE / 1.6" HH; **Diskette:** 3.5" 1.44MB diskette drive / dust cover
Rear ports **Rear:** two USB (Vers 1.1), keyboard, mouse, parallel, **two** serial (9-pin), graphics (DB-15), ethernet (RJ-45), two RJ-45 (sys mgmt)
Front port / graphics **Front:** one USB (Vers 1.1); **Graphics:** SVGA / ATI® Rage XL / on planar / 8MB SDRAM std/max / 32-bit 33MHz PCI 2.2 Bus

Security Power-on password / administrator password / hinged and lockable front door to cover disk bays, power button, and reset button / unattended boot / selectable boot

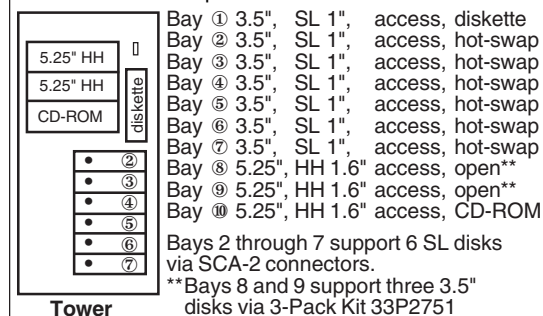
Systems mgmt **IBM Integrated system management processor (ISMP)** / H8S2148 / on planar / provides system and environmental monitoring such as temp, optional disks, fans, power supp / supports optional Remote Supervisor Adapter with 20-pin connector on planar for continuous power (no ext pwr reqd)
Diagnostics **Light Path Diagnostics™** panel providing LED map to failing part (under side cover) / Information LED Panel in front
Software **ServerGuide™** (CD-ROM installation and configuration utilities), IBM Director, others

Keyboard / mouse IBM 101-key keyboard / IBM mouse (both black)
Power supply **MAX:** std/max: two/two 660 watt
M1X: std/max: one/two 660 watt
xAX: std/max: two/two 560 watt
Rest: std/max: one/two 560 watt

Fans Four fans and two blowers / variable speed / hot-swap / redundant / PFA / fan in each power supply

Xeon 2.67GHz/512KB L2 Cache Proc Upg	71P8966
Xeon 2.8BGHz/512KB L2 Cache Proc Upg	71P8967
Xeon 3.06GHz/512KB L2 Cache Proc Upg	02R1988
2x256MB PC2100 Non-Chipkill DDR-SDRAM Kit	73P2868
512MB PC2100 CL2.5 ECC DDR-SDRAM DIMM	33L5038
1GB PC2100 CL2.5 ECC DDR-SDRAM RDIMM	33L5039
2GB PC2100 CL2.5 ECC DDR-SDRAM RDIMM	33L5040
IBM ServeRAID-6i Controller (adapter for slot 4)	71P8595
IBM Remote Supervisor Adapter II (PCI adapter)	59P2984
IBM T541 15" Flat Panel Color Monitor (black)	9512AB1
36.4GB 15K-2 80 Ultra320 SCSI Hot-Swap SL HDD	06P5776
3-Pack Ultra320 Hot-Swap Expansion Kit	33P2751
IBM 560W Hot-Swap Power Upgrade Kit*	02R1874
IBM 660W Hot-Swap Power Upgrade Kit (3.06 Only)	02R2015
Other options at ibm.com/pc/us/accessories	
*Not backward compatible with 400Mhz FSB x235	

Slot 1: full, 32-bit 33MHz 5v PCI 2.2, Bus A
 Slot 2: full, 64-bit 100MHz 3.3v PCI-X, not hot, Bus B
 Slot 3: full, 64-bit 100MHz 3.3v PCI-X, not hot, Bus B
 Slot 4: full, 64-bit 100MHz 3.3v PCI-X, not hot, Bus B*
 Slot 5: full, 64-bit 133MHz 3.3v PCI-X, hot-swap, Bus C
 Slot 6: full, 64-bit 133MHz 3.3v PCI-X, hot-swap, Bus C
 * Extended slot for opt IBM ServeRAID-5i Controller



- Quick release adapter slots (no screws)
- Configuration/Setup Utility invoked by pressing F1 at startup
- LSI Logic Configuration Utility near startup by pressing CTRL+C
- Diagnostics (PC-Doctor™) by pressing F2 at startup
- ACPI2.0-compliant
- Operator Information Panel (in front)
- Predictive failure analysis on disk options, memory, processors, VRMs, power supplies, and fans in conjunction with IBM Director can alert the system administrator of an imminent component failure
- Tower: H 17.31" x W 8.5" x D 27.6"
- 74 to 101 pounds
- Stealth black color

All models: Max int disk capacity: 1.321TB² with nine 146.8GB SL disks with 3-Pack Ultra160 Hot-Swap Expansion Kit

LIMITED WARRANTY³

- **3 year parts and labor**
- **International Warranty Service³**
- **On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time⁷**
- **3 year on site warranty service upgrade options (in eligible locations):⁷**
 - **9 hour coverage, Mon-Fri excluding holidays, 4 hour average response (ServicePac® part num 21P2083)**
 - **24 hr x 7 day coverage, 4 hour average response (ServicePac part number 21P2084)**
 - **24 hr x 7 day coverage, 2 hour average response (ServicePac part number 21P2085)**
- **24x7¹⁴ toll-free support for warranty issues during the warranty period³**

IBM® Type-model	Qty x Processor	L2 cache	Memory	Disk	SCSI controller	Mechanical	Slots x bays (hot-swap bays)	Power supply	Ethernet	Available date
8841-01y-01x	1 x Xeon® 2.8GHz	1MB	512MB	None	2 x Ultra320	Tower	6x10 (6 hot-swap std; 9 max)	1 x 670W hot-swap	2xGigabit	Aug 2004
8841-11y-11x	1 x Xeon 3.0GHz	1MB	1GB	None	2 x Ultra320	Tower	6x10 (6 hot-swap std; 9 max)	1 x 670W hot-swap	2xGigabit	Aug 2004
8841-21y-21x	1 x Xeon 3.2GHz	1MB	1GB	None	2 x Ultra320	Tower	6x10 (6 hot-swap std; 9 max)	1 x 670W hot-swap	2xGigabit	Aug 2004
8841-31y-31x	1 x Xeon 3.4GHz	1MB	1GB	None	2 x Ultra320	Tower	6x10 (6 hot-swap std; 9 max)	1 x 670W hot-swap	2xGigabit	Aug 2004
8841-32y-32x	1 x Xeon 3.4GHz	1MB	1GB	None	2 x Ultra320	Tower	6x10 (6 hot-swap std; 9 max)	2 x 670W hot-swap	2xGigabit	Aug 2004
8841-41y-41x	1 x Xeon 3.6GHz	1MB	1GB	None	2 x Ultra320	Tower	6x10 (6 hot-swap std; 9 max)	1 x 670W hot-swap	2xGigabit	Aug 2004
Positioning	<i>Universal server; two-way server using the Xeon processor to provide power and performance at an affordable price</i>									
Processor	Up to 1 x Intel® Xeon™ Processor 2.8, 3.0, 3.2, 3.4, 3.6 GHz with 800MHz frontside bus / Extended Memory 64 Technology (EM64T) / Simultaneous Multi-threading (SMT) / Hyper-Threading technology /									
L2 cache	1MB / all models / on die of processor / at processor speed									
SMP support	2-way SMP / up to two Xeon Processors (same speed/cache size)									
Implementation	Systemboard contains two Intel 604-pin micro-PGA ZIF sockets, eight memory gold-connector DIMM slots, six PCI slots (one hot-swap Active™ PCI slots), and integrated SCSI, ethernet, graphics									
Memory	512MB or 1MB std / 16GB max / two slots used / six slots available / PC3200 400MHz registered 240-pin ECC DDR2-SDRAM DIMMs / DIMMs must be installed in matched pairs [a bank] / 2-way memory interleave / dual channel / memory bus runs at 2x200MHz / Error Checking and Correcting (ECC) (corrects 1, 2, 3, or 4-bit errors on same chip and detects 2- through 8-bit errors contained in two chips) / Active Memory™ : memory mirroring, online-spare memory / 16-bit Checksum Chipkill™ optionally available , requiring 512MB DIMMs or greater									
SCSI disk controller	Adaptec AIC 7902 / dual channel Ultra320 SCSI controller (LVD 320MB/sec) / on planar / 64-bit 100MHz PCI-X / HostRAID supports RAID-0, 1 mirroring with up to one hot-spare disk / optional IBM ServeRAID™-6i Controller for low-cost RAID 0, 1, 1E, 1E0, 5, 00, 10, 50 (installed on internal connector)									
SCSI channels	Two 16-bit channels / <i>SCSI Channel B</i> : 16-bit 68-pin LVD cable from controller to backplane; <i>Channel A</i> : 16-bit 68-pin interface for Bay 8 and 9 (may require a cable) or with optional 3-Pack Kit (cable included); supports external SCSI devices via external SCSI knockout in rear (cable req 32P8164) or via opt ServeRAID adapter with external connector(s)									
IDE controller / cable	Enhanced IDE ATA-100 controller in ICH5R South Bridge / one connector on planar / one 1-drop IDE cable (CD-ROM)									
Disk - capacity	None std / supports 7200-15000 rpm disks / one backplane / all disk bays Ultra320-enabled									
Disk - bays	Six hot-swap / 80-pin SCA-2 connectors / three additional hot-swap bays with Kit 33P2751 for up to nine 15K rpm disks									
Mechanical	Tower / conversion to EIA 19" Rack (5U ⁴) via optional kit for support in IBM NetBAY™ Racks (13N0956)									
Slots	Two PCI-Express (one hot-plug), three PCI-X 64-bit (one 133MHz and two 100MHz), one 32-bit/33MHz slot									
Chipset (see below)	Intel E7525 chipset / Intel E7525 Memory Controller Hub (MCH): PXH, ICH5R, Dual Broadcom ethernet, two PCI-Express x8 slots (slots 2 & 3) / PXH: Bus A, two 64-bit/100MHz PCI-X slots (slots 4 & 5), Adaptec SCSI Bus B, one 64-bit/133MHz Hot-Plug slot (slot 6) / ICH5R: one 32-bit/33MHz slot (slot 1), ATI video, EIDE, USB, SMBus, LPC bus to Super I/O / NS PC87417 Super I/O									
Ethernet controller	Dual 10/100/1000 gigabit / Broadcom® BCM 5721 / on planar / PCI-X 64-bit 100MHz / full duplex / Wake on LAN® / Alert Standard Format (2.0) / IPMI (1.5)									
CD-ROM / diskette	48X-20X ⁶ CD-ROM / IDE / 1.6" HH; <i>Diskette</i> : 3.5" 1.44MB diskette drive / dust cover									
Rear ports	Rear: two USB (Vers 2.0), keyboard, mouse, parallel, one serial (9-pin), graphics (DB-15), two ethernet (RJ-45), RJ-45 (sys mgmt)									
Front port / graphics	Front: one USB (Vers 2.0); <i>Graphics</i> : SVGA / ATI® Radeon™ 7000M / on planar / 16MB DDR std/max / 32-bit/33MHz PCI 2.2									
Security	Power-on password / administrator password / hinged and lockable front door to cover disk bays, power button, and reset button / unattended boot / selectable boot									
Systems mgmt	IBM Integrated system management processor (ISMP) / H8S2148 / on planar / provides system and environmental monitoring such as temp, optional disks, fans, power supp / supports opt. Remote Supervisor Adapter II Slimline with 20-pin connector on planar for continuous power (std on 32y) (no ext pwr reqd)					Xeon 2.8GHz/1MB L2 Cache Proc Upg Xeon 3.4GHz/1MB L2 Cache Proc Upg Xeon 3.6GHz/1MB L2 Cache Proc Upg 512MB (2x256) PC3200 CL3 ECC DDR2 non-Chipk 1GB (2x512) PC3200 CL3 ECC DDR2 non-Chipk 1GB (2x512) PC3200 CL3 ECC DDR2 RDIMM 2GB (2x1GB) PC3200 CL3 ECC DDR2 RDIMM 73.4GB 10K Ultra320 SCSI Hot-Swap SL HDD 146.4GB 10K Ultra320 SCSI Hot-Swap SL HDD 36.4GB 15K Ultra320 SCSI Hot-Swap SL HDD 73.4GB 15K Ultra320 SCSI Hot-Swap SL HDD IBM ServeRAID-7k Controller IBM Remote Supervisor Adapter II Slimline IBM T541 15" Flat Panel Color Monitor (black) 3-Pack Ultra320 Hot-Swap Expansion Kit IBM 670W Hot-Swap Power Upgrade Kit (NA) Other options at www.ibm.com/pc/us/accessories				13N0681 13N0684 13N0685 73P3523 73P3522 73P2865 73P2866 32P0727 32P0728 06P5776 32P0735 71K8642 73P9341 9512AB1 33P2751 25K9560
Diagnostics	Light Path Diagnostics™ panel providing LED map to failing part (under side cover) / Information LED Panel in front									
Software	ServerGuide™ (CD-ROM installation and configuration utilities), IBM Director, others									
Keyboard / mouse	IBM 101-key keyboard / IBM mouse (both black)									
Power supply	std/max: one/two 670 watt / voltage-sensing / auto-restart / Fan in each std/max: four/six/ two fans (front), two fans on planar, (Opt) two fans (rear) / variable speed / hot-swap / redundant with optional rear fans / PFA / fan in each power supply									
Fans										

<p>Slot 1: half-length, 32-bit 33MHz 5v PCI 2.2, Bus A Slot 2: full, PCI-Express x8, Bus B Slot 3: full, PCI-Express x8, Bus C Slot 4: full, 64-bit 100MHz 3.3v PCI-X, Bus D Slot 5: full, 64-bit 100MHz 3.3v PCI-X, Bus D Slot 6: full, 64-bit 133MHz 3.3v PCI-X, hot-swap, Bus E</p> <p>Tower</p>	<p>Bay ① 3.5", SL 1", access, diskette Bay ② 3.5", SL 1", access, hot-swap Bay ③ 3.5", SL 1", access, hot-swap Bay ④ 3.5", SL 1", access, hot-swap Bay ⑤ 3.5", SL 1", access, hot-swap Bay ⑥ 3.5", SL 1", access, hot-swap Bay ⑦ 3.5", SL 1", access, hot-swap Bay ⑧ 5.25", HH 1.6" access, open** Bay ⑨ 5.25", HH 1.6" access, open** Bay ⑩ 5.25", HH 1.6" access, CD-ROM</p> <p>Bays 2 through 7 support 6 SL disks via SCA-2 connectors. **Bays 8 and 9 support three 3.5" disks via 3-Pack Kit 33P2751</p>	<ul style="list-style-type: none"> ➤ Quick release adapter slots (no screws) ➤ Configuration/Setup Utility invoked by pressing F1 at startup ➤ Adaptec Configuration Utility near startup by pressing CTRL+I ➤ Diagnostics (PC-Doctor™) by pressing F2 at startup ➤ ACPI2.0-compliant ➤ Operator Information Panel (in front) ➤ Predictive failure analysis on disk options, memory, processors, VRMs, power supplies, and fans in conjunction with IBM Director can alert the system administrator of an imminent component failure ➤ Tower: H 17.31" x W 8.5" x D 27.6" ➤ 74 to 101 pounds ➤ Stealth black color 	<p>LIMITED WARRANTY³</p> <ul style="list-style-type: none"> ➤ 3 year parts and labor ➤ International Warranty Service³ ➤ On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time⁷ ➤ 3 year on site warranty service upgrade options (in eligible locations):⁷ <ul style="list-style-type: none"> • 9 hour coverage, Mon-Fri excluding holidays, 4 hour average response (ServicePac[®] part num 21P2083) • 24 hr x 7 day coverage, 4 hour average response (ServicePac part number 21P2084) • 24 hr x 7 day coverage, 2 hour average response (ServicePac part number 21P2085) ➤ 24x7¹⁴ toll-free support for warranty issues during the warranty period³
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IBM® Type-model	Qty x Processor	L3 cache	Memory	ECC memory features	Disk	SCSI controller	Mechanical	Slots x disk bays (std/max)	Ethernet	Available date
8685-71X	1 x Xeon™ MP 2.0GHz	1MB	512MB	Hot Spare/Chipkill™	None	2 x Ultra160	Tower	7 x10	6/12 Gigabit	Jun 2003
8685-7RX	1 x Xeon MP 2.0GHz	1MB	512MB	Hot Spare/Chipkill	None	2 x Ultra160	Rack	7 x10	6/12 Gigabit	Jun 2003
8685-72X	2 x Xeon MP 2.0GHz	1MB	1GB	Hot Spare/Chipkill	None	2 x Ultra160	Tower	7 x10	6/12 Gigabit	Nov 2003
8685-73X	2 x Xeon MP 2.0GHz	1MB	3GB	Hot Spare/Chipkill	2 x 36.4GB 10K	2 x Ultra160	Tower	7 x10	6/12 Gigabit	Nov 2003
8685-81X	1 x Xeon MP 2.5GHz	1MB	1GB	Hot Spare/Chipkill	None	2 x Ultra160	Tower	7 x10	6/12 Gigabit	Jun 2003
8685-8RX	1 x Xeon MP 2.5GHz	1MB	1GB	Hot Spare/Chipkill	None	2 x Ultra160	Rack	7 x10	6/12 Gigabit	Jun 2003
8685-91X	1 x Xeon MP 2.8GHz	2MB	1GB	Hot Spare/Chipkill	None	2 x Ultra160	Tower	7 x10	6/12 Gigabit	Jun 2003
8685-9RX	1 x Xeon MP 2.8GHz	2MB	1GB	Hot Spare/Chipkill	None	2 x Ultra160	Rack	7 x10	6/12 Gigabit	Jun 2003

Processors	1 or 2 x Intel® Xeon™ Processor MP 2.0, 2.5, or 2.8GHz¹ with 400MHz frontside bus / Hyper-Threading technology									
L2 cache	512KB / on die of processor / at processor speed									
L3 cache	1MB or 2MB / on die of processor / at processor speed									
Processor upgrade Implementation	4-way SMP / up to four Xeon Processors MP (same speed/cache size) Systemboard contains four Intel 603-pin micro-PGA ZIF sockets, one memory board slot, six Active™ PCI-X slots, one PCI slot, and integrated SCSI, ethernet, graphics									
Memory	Up to 3GB std / 24GB¹³ max / two (or six on 73X) slots used / ten (or six) slots available / PC1600 200MHz registered 184-pin ECC DDR-SDRAM DIMMs / one memory-board std with 12 DIMM gold-connector slots / DIMMs must be installed in matched pairs or quads [a bank] / 2- or 4-way memory interleave / Hot Spare Memory (activated by failure of a pair or quad of DIMMs [a bank]; reqs additional memory matching failed bank) / Active Memory™ via memory mirroring (memory mirroring supported with any OS) / Error Checking and Correcting (ECC) via 16-bit Checksum Chipkill™ (corrects 1, 2, 3, or 4-bit errors on same chip and detects 2- through 8-bit errors contained in two chips)									
SCSI disk controller	Adaptec® AIC-7899 / Wide Ultra160 SCSI (LVD 160MB/sec) / two channel / 64-bit 66MHz PCI 2.2 / integrated on planar									
SCSI connectors	Channel B: 68-pin connector on planar to SCSI backplane (one-drop 16-bit LVD cable) / Channel A: 68-pin connector on planar for optional one-drop 16-bit LVD cable (32P8164) to rear 0.8mm VHDCI connector									
IDE controller / cabling	Enhanced IDE ATA-100 controller in CSB5 South Bridge / one one-drop IDE cable from IDE controller to CD-ROM									
Disk - capacity	None (or two) standard / supports up to 15,000 rpm disks / 80-pin SCA-2 connectors									
Disk - bays	Std: six hot-swap disk bays; max: six additional bays (via a SCSI backplane) with optional Upgrade Kit; All: Ultra320-enabled									
Mechanical	EIA 19" rack (7U⁴) or tower / tower models have hinged and lockable front door, side panels, casters									
Rack / conversion	Rack systems supported in IBM NetBAY™ racks / kit available to convert tower to rack (use NetBAY11 for rack to tower)									
Architecture / chipset	ServerWorks® Grand Champion™ 4.0 HE / CMIC Host Bridge (Memory Controller and I/O Bridge) and five REMCs / two CIOB-X I/O Bridges (IMB bus to Host Bridge, one with two PCI-X buses C and D, other with one PCI-X bus B and ethernet and one PCI 2.2 bus for SCSI) / CSB5 South Bridge (Thin IMB to Host Bridge, one PCI 2.2 bus A, EIDE, USB, SMBus, IOAPIC, LPC bus to Super I/O) / five peer PCI buses / NS PC87417 Super I/O (diskette, keyboard, mouse)									
Slots (Active™ PCI-X)	Six hot-swap PCI-X 1.0 slots¹⁰ available with power and attention indicator lights (optical sensors control power to slot) / hot replace, hot upgrade, hot expansion / separated by insulative plastic dividers / 3.3 volt or universal									
Ethernet controller	10/100/1000 gigabit ethernet / Broadcom® BCM 5703 / on PCI Bus B / full duplex / Wake on LAN® / Alert Standard Format 1.0									
CD-ROM / diskette	CD-ROM: 48X-20X⁶ CD-ROM, IDE (ATAPI), 1.6" HH, bootable / Diskette drive: 3.5" 1.44 MB diskette drive, dust cover									
Rear ports	Four USB (Vers 1.1), one serial (9-pin), keyboard (PS/2), mouse (PS/2), ethernet (RJ-45), graphics (DB-15), two RJ-45 (for integrated system management processor) / no parallel port									
Graphics controller	SVGA / ATI® Rage XL / on planar / 8MB SDRAM std/max / up to 1280x1024 at 85Hz / 32-bit 33MHz PCI 2.2 Bus A									
Security	Power-on password / administrator password / hinged and lockable front door to cover disk bays, power button, and reset button (tower only) / unattended boot / selectable boot									
Systems management	IBM integrated system management processor (ISMP) / H8S2148 / on planar / provides system and environmental monitoring such as temp, optional disks, fans, power supplies / supports optional Remote Supervisor Adapter with 20-pin connector on planar for continuous power (no external power req)				512MB PC1600 ECC DDR SDRAM RDIMM		33L3283			
Diagnostics	Light Path Diagnostics™ panel providing LED map to failing part (under top cover) / Information LED Panel in front				1GB PC1600 ECC DDR SDRAM RDIMM		33L3285			
					2GB PC1600 ECC DDR SDRAM RDIMM		33L3287			
Software	ServerGuide™ (CD-ROM installation and configuration utilities), IBM Director, and others				Xeon MP 2.0GHz/1MB L3 Cache Proc Upg		73P8805			
					Xeon MP 2.5GHz/1MB L3 Cache Proc Upg		73P8806			
Keyboard / mouse	Tower only: IBM 103-key keyboard / IBM mouse (both black) Std: two 370 watt hot-swap; Max: four 370 watt hot-swap / redundant with four power supplies / tool-free install / universal (voltage sensing) / fans in each power supply / PFA				Xeon MP 2.8GHz/2MB L3 Cache Proc Upg		73P8807			
					6-pack Ultra320 Hot-Swap Expansion Kit		32P8163			
Power supply	Nine hot-swap redundant fans / plus fan in each power supply / variable speed / PFA / fan failure signals diagnostic LED				370 watt Hot-Swap Redundant Power Supply		31P6133			
					IBM 7U x 26D Tower-to-Rack Conversion Kit III		32P1474			
Fans	variable speed / PFA / fan failure signals diagnostic LED				IBM External SCSI Interface Kit (for rear SCSI)		32P8164			
					Media Bay Cable Kit (2-drop SCSI to HH bays)		10K2340			
				IBM ServeRAID™-4H Ultra160 SCSI Adapter		37L6889				
				IBM 36.4GB 10K Ultra160 SCSI Hot-Swap SL		06P5755				
				IBM 73.4GB 10K Ultra160 SCSI Hot-Swap SL		06P5756				
				IBM Remote Supervisor Adapter II		59P2984				
				IBM T541 15" Flat Panel Color Monitor (black)		9512AB1				
				Other options at ibm.com/pc/us/accessories						

◊ Tower dim: H15.5" x W17.6" x D29.8"; 104 to 150 lb
◊ Rack dim: H12.0" x W17.6" x D27.7"; 104 to 150 lb

Rack or Tower

Standard hot-swap disk bays

Optional hot-swap disk bays

CD-ROM

HH 5.25"

HH 5.25"

Bay ① 3.5", SL 1", access, diskette
Bay ② 5.25", HH 1.6" access, CD-ROM
Bay ③ 5.25", HH 1.6" access, open*
Bay ④ 5.25", HH 1.6" access, open*
Bays 5 to 10 (six bays): standard 3.5" SL 1" hot-swap disk bays
Bays 11 to 16 (six bays): optional 3.5" SL 1" hot-swap disk bays

Slot 1: 32-bit 33MHz 5v PCI, not hot-swap, Bus A; primarily for optional Remote Supervisor Adp

Slot 2: full, 64-bit 100MHz 3.3v PCI-X, hot-swap, Bus B

Slot 3: full, 64-bit 100MHz 3.3v PCI-X, hot-swap, Bus B

Slot 4: full, 64-bit 100MHz 3.3v PCI-X, hot-swap, Bus C

Slot 5: full, 64-bit 100MHz 3.3v PCI-X, hot-swap, Bus C

Slot 6: full, 64-bit 100MHz 3.3v PCI-X, hot-swap, Bus D

Slot 7: full, 64-bit 100MHz 3.3v PCI-X, hot-swap, Bus D

◊ Setup Program is available by pressing F1 at startup; Diagnostics (PC-Doctor) by pressing F2 at startup; CTRL+A for SCSISelect Utility

◊ Removeable top cover

◊ Access adapters, memory, CPUs from top

◊ Predictive Failure Analysis®: alerts generated by mgmt processor for IBM Director for DIMM(s), processor(s), VRM(s), power supply(s), disk(s), and fans

Maximum internal disk capacity: 880GB² with twelve 73.4GB SL hot-swap SCSI disks

LIMITED WARRANTY³

◊ 3 year parts and labor

◊ International Warranty Service³

◊ On site, 8 am-5 pm, Mon-Fri coverage excluding holidays, next business day response time⁷

◊ On site service upgrade options (in eligible locations):⁷

- 3 year IOR 9x5, 4 hr avg resp. (ServicePac® part num 41L2738)
- 3 year IOR 24x7, 2 hr avg resp (ServicePac part num 31L2723)
- 5 year IOR 9x5, 4 hr avg resp. (ServicePac part num 69P9223)

◊ Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>

◊ 24x7¹⁴ toll-free support for warranty issues during the warranty period⁸

See footnotes for important warranty information • = Hot-swap

US models announced June 2003 or November 2003

⊗ Models withdrawn from marketing effective March 2004 (72X, 73X) and June 29, 2004 (81X, 8RX, 91X, 9RX)

IBM® Type-model	Qty x Processor	L3 cache	Memory	ECC memory features	Disk	SCSI controller	Mechanical	Slots x disk bays (std/max)	Ethernet	Available date
8685-A1X	1 x Xeon™ MP 2.2GHz	2MB	512MB	Hot Spare/Chipkill™	None	2 x Ultra160	Tower	7 x10	6/12 Gigabit	Mar 2004
8685-ARX	1 x Xeon MP 2.2GHz	2MB	512MB	Hot Spare/Chipkill	None	2 x Ultra160	Rack	7 x10	6/12 Gigabit	Mar 2004
8685-B1X	1 x Xeon MP 2.7GHz	2MB	1GB	Hot Spare/Chipkill	None	2 x Ultra160	Tower	7 x10	6/12 Gigabit	Mar 2004
8685-BRX	1 x Xeon MP 2.7GHz	2MB	1GB	Hot Spare/Chipkill	None	2 x Ultra160	Rack	7 x10	6/12 Gigabit	Mar 2004
8685-C1X	1 x Xeon MP 3.0GHz	4MB	1GB	Hot Spare/Chipkill	None	2 x Ultra160	Tower	7 x10	6/12 Gigabit	Mar 2004
8685-CRX	1 x Xeon MP 3.0GHz	4MB	1GB	Hot Spare/Chipkill	None	2 x Ultra160	Rack	7 x10	6/12 Gigabit	Mar 2004
8685-7EX	2 x Xeon MP 2.0 GHz	1MB	4GB	Hot Spare/Chipkill	3 x 73GB - 10k	2 x Ultra160	Tower	7 x10	6/12 Gigabit	Nov 2004

Processors	1 x Intel® Xeon™ Processor MP 2.0, 2.2, 2.7, or 3.0GHz ¹ with 400MHz frontside bus / Hyper-Threading technology									
L2 cache	512KB / on die of processor / at processor speed									
L3 cache	1MB, 2MB or 4MB / on die of processor / at processor speed									
Processor upgrade Implementation	4-way SMP / up to four Xeon Processors MP (same speed/cache size) Systemboard contains four Intel 603-pin micro-PGA ZIP sockets, one memory board slot, six Active™ PCI-X slots, one PCI slot, and integrated SCSI, ethernet, graphics									
Memory	Up to 4GB std / 24GB ¹³ max / 512 & 1GB: two slots used 4GB: 4 slots used / twelve slots / PC1600 100MHz registered 184-pin ECC DDR-SDRAM DIMMs / one memory-board std with 12 DIMM gold-connector slots / DIMMs must be installed in matched pairs or quads [a bank] / 2- or 4-way memory interleave / Hot Spare Memory (activated by failure of a pair or quad of DIMMs [a bank]; reqs additional memory matching failed bank) / Active Memory™ via memory mirroring (memory mirroring supported with any OS) / Error Checking and Correcting (ECC) via 16-bit Checksum Chipkill™ (corrects 1, 2, 3, or 4-bit errors on same chip and detects 2- through 8-bit errors contained in two chips)									
SCSI disk controller	Adaptec® AIC-7899 / Wide Ultra160 SCSI (LVD 160MB/sec) / two channel / 64-bit 66MHz PCI 2.2 / integrated on planar									
SCSI connectors	Channel B: 68-pin connector on planar to SCSI backplane (one-drop 16-bit LVD cable) / Channel A: 68-pin connector on planar for optional one-drop 16-bit LVD cable (32P8164) to rear 0.8mm VHDCI connector									
IDE controller / cabling	Enhanced IDE ATA-100 controller in CSB5 South Bridge / one one-drop IDE cable from IDE controller to CD-ROM									
Disk - capacity	7EX: 3 x 73GB - 10K / supports up to 15,000 rpm disks / 80-pin SCA-2 connectors									
Disk - bays	Std: six hot-swap disk bays; max: six additional bays (via a SCSI backplane) with optional Upgrade Kit; All: Ultra320-enabled									
Mechanical	EIA 19" rack (7U ⁴) or tower / tower models have hinged and lockable front door, side panels, casters									
Rack / conversion	Rack systems supported in IBM NetBAY™ racks / kit available to convert tower to rack (use NetBAY11 for rack to tower)									
Architecture / chipset	ServerWorks® Grand Champion™ 4.0 HE / CMIC Host Bridge (Memory Controller and I/O Bridge) and five REMCs / two CIOB-X I/O Bridges (IMB bus to Host Bridge, one with two PCI-X buses C and D, other with one PCI-X bus B and ethernet and one PCI 2.2 bus for SCSI) / CSB5 South Bridge (Thin IMB to Host Bridge, one PCI 2.2 bus A, EIDE, USB, SMBus, IOAPIC, LPC bus to Super I/O) / five peer PCI buses / NS PC87417 Super I/O (diskette, keyboard, mouse)									
Slots (Active™ PCI-X)	Six hot-swap PCI-X 1.0 slots ¹⁰ available with power and attention indicator lights (optical sensors control power to slot) / hot replace, hot upgrade, hot expansion / separated by insulative plastic dividers / 3.3 volt or universal									
Ethernet controller	10/100/1000 gigabit ethernet / Broadcom® BCM 5703 / on PCI Bus B / full duplex / Wake on LAN® / Alert Standard Format 1.0									
CD-ROM / diskette	CD-ROM: 48X-20X ⁶ CD-ROM, IDE (ATAPI), 1.6" HH, bootable / Diskette drive: 3.5" 1.44 MB diskette drive, dust cover									
Rear ports	Four USB (Vers 1.1), one serial (9-pin), keyboard (PS/2), mouse (PS/2), ethernet (RJ-45), graphics (DB-15), two RJ-45 (for integrated system management processor) / no parallel port									
Graphics controller	SVGA / ATI® Rage XL / on planar / 8MB SDRAM std/max / up to 1280x1024 at 85Hz / 32-bit 33MHz PCI 2.2 Bus A									
Security	Power-on password / administrator password / hinged and lockable front door to cover disk bays, power button, and reset button (tower only) / unattended boot / selectable boot									
Systems management	IBM integrated system management processor (ISMP) / H8S2148 / on planar / provides system and environmental monitoring such as temp, optional disks, fans, power supplies / supports optional Remote Supervisor Adapter with 20-pin connector on planar for continuous power (no external power req)					512MB PC1600 ECC DDR SDRAM RDIMM 33L3283 1GB PC1600 ECC DDR SDRAM RDIMM 33L3285 2GB PC1600 ECC DDR SDRAM RDIMM 33L3287 Xeon MP 2.0GHz/1MB L3 Cache Proc Upg 73P8805 Xeon MP 2.5GHz/1MB L3 Cache Proc Upg 73P8806 Xeon MP 2.8GHz/2MB L3 Cache Proc Upg 73P8807 6-pack Ultra320 Hot-Swap Expansion Kit 32P8163 370 watt Hot-Swap Redundant Power Supply 31P6133 IBM 7U x 26D Tower-to-Rack Conversion Kit III 32P1474 IBM External SCSI Interface Kit (for rear SCSI) 32P8164 Media Bay Cable Kit (2-drop SCSI to HH bays) 10K2340 IBM ServeRAID™-4H Ultra160 SCSI Adapter 17L6889 IBM 36.4GB 10K Ultra160 SCSI Hot-Swap SL 06P5755 IBM 73.4GB 10K Ultra160 SCSI Hot-Swap SL 06P5756 IBM Remote Supervisor Adapter II 59P2984 IBM T541 15" Flat Panel Color Monitor (black) 9512AB1 Other options at ibm.com/pc/us/accessories				
Diagnostics	Light Path Diagnostics™ panel providing LED map to failing part (under top cover) / Information LED Panel in front									
Software	ServerGuide™ (CD-ROM installation and configuration utilities), IBM Director, and others									
Keyboard / mouse	Tower only: IBM 103-key keyboard / IBM mouse (both black)									
Power supply	Std: two 370 watt hot-swap; Max: four 370 watt hot-swap / redundant with four power supplies / tool-free install / universal (voltage sensing) / fans in each power supply / PFA									
Fans	Nine hot-swap redundant fans / plus fan in each power supply / variable speed / PFA / fan failure signals diagnostic LED									

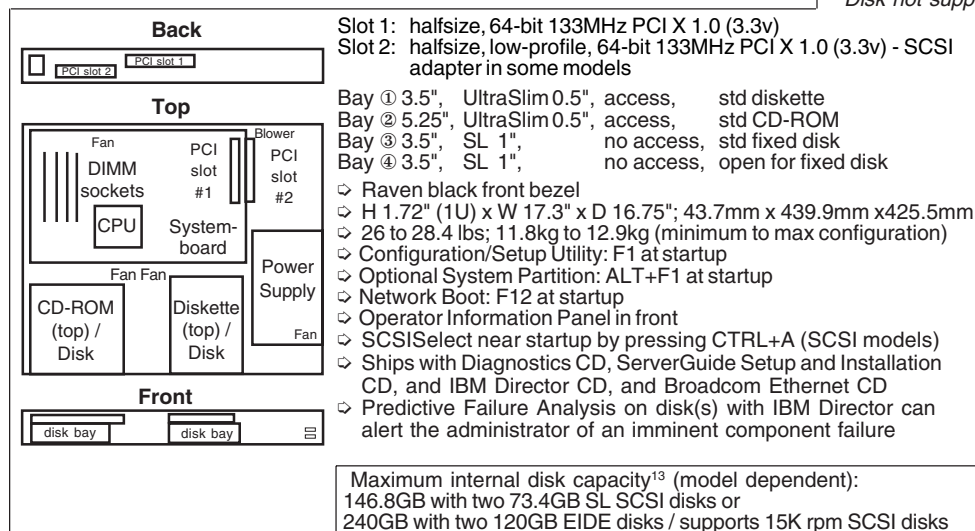
<p>⊖ Tower dim: H15.5" x W17.6" x D29.8"; 104 to 150 lb ⊖ Rack dim: H12.0" x W17.6" x D27.7"; 104 to 150 lb</p> <div style="border: 1px solid black; padding: 5px; display: inline-block;"> <p>Rack or Tower</p> <p>Standard hot-swap disk bays</p> <p>Optional hot-swap disk bays</p> <p>Diskette</p> <p>CD-ROM</p> <p>HH 5.25"</p> <p>HH 5.25"</p> </div> <p>⊖ Black color ⊖ ACPI 1.0 ⊖ Orange components and labels indicate hot-swap options ⊖ Vital Product Data ⊖ Backup BIOS</p> <p>⊖ Setup Program is available by pressing F1 at startup; Diagnostics (PC-Doctor) by pressing F2 at startup; CTRL+A for SCSISelect Utility ⊖ Removeable top cover ⊖ Access adapters, memory, CPUs from top ⊖ Predictive Failure Analysis®: alerts generated by mgmt processor for IBM Director for DIMM(s), processor(s), VRM(s), power supply(s), disk(s), and fans</p> <p>Maximum internal disk capacity: 880GB² with twelve 73.4GB SL hot-swap SCSI disks</p>	<p>LIMITED WARRANTY³</p> <ul style="list-style-type: none"> ⊖ 3 year parts and labor ⊖ International Warranty Service³ ⊖ On site, 8 am-5 pm, Mon-Fri coverage excluding holidays, next business day response time⁷ ⊖ On site service upgrade options (in eligible locations):⁷ <ul style="list-style-type: none"> • 3 year IOR 9x5, 4 hr avg response (ServicePac® part num 41L2738) • 3 year IOR 24x7, 2 hr avg resp (ServicePac part num 31L2723) • 5 year IOR 9x5, 4 hr avg response (ServicePac part num 69P9223) ⊖ http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf ⊖ 24x7⁴ toll-free support for warranty issues during the warranty period³
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See footnotes for important warranty information

• = Hot-swap
US models announced March 2004

IBM® Type-model	Qty x Processor	L2 cache	FSB MHz	Memory	Memory type	Disk	Disk controller	Disk bays	Mechanical	Slots x bays	Ethernet	Limited warranty ³	Available date	
8673-72X	Pentium 4	2.8BGHz	512KB	533	256MB	ECC	40GB EIDE	ATA-100	2 fixed	1U rack	2x4	2 x Gigabit	1 year	May2003
8673-73X	Pentium 4	2.8BGHz	512KB	533	256MB	ECC	18.2GB SCSI	Ultra160	2 fixed	1U rack	2x4	2 x Gigabit	1 year	May2003
8673-82X	Pentium 4	3.06GHz	512KB	533	256MB	ECC	40GB EIDE	ATA-100	2 fixed	1U rack	2x4	2 x Gigabit	1 year	Sep 2003
8673-83X	Pentium 4	3.06GHz	512KB	533	256MB	ECC	36.4GB SCSI	Ultra160	2 fixed	1U rack	2x4	2 x Gigabit	1 year	Sep 2003

Positioning	<i>A highly affordable, uni-processor, 1U rack-optimized server</i>												
Processor(s)	Intel® Pentium 4 up to 2.8BGHz¹ with 533MHz frontside bus (FSB)												
L2 cache	512KB / on die of processor / at processor speed (no L3 cache)												
SMP support	No SMP support												
Implementation	Systemboard contains one Intel mPGA478B socket (with Pentium 4 FC-PGA2 and heatsink), four memory DIMM slots, connector for one PCI-X slot, riser for one PCI-X slot, and integrated chipset, two EIDE connectors, ethernet, and graphics												
Memory	256MB std / 4GB max ¹³ / one slot used / three slots available / PC2100 266MHz registered 184-pin ECC DDR-SDRAM DIMMs / four DIMM gold-connector slots on systemboard / memory bus runs at 2 x 133MHz / Error Checking and Correcting (ECC) memory controller												
SCSI disk controller	<i>SCSI models:</i> Adaptec® 29160LP / single channel Wide Ultra160 SCSI (LVD 160MB/sec) / 64-bit 66MHz PCI adapter / one channel with up to 15 device support												
SCSI connectors	<i>SCSI models:</i> On adapter: one 68-pin SCSI connector												
IDE disk controller	Enhanced IDE busmaster / ATA-100 support / two connectors on systemboard												
Cables	<i>SCSI models:</i> one 2-drop 16-bit LVD SCSI cable, one 1-drop 40-conductor EIDE cable (connected to CD-ROM)												
Disk - features	<i>EIDE models:</i> one 2-drop EIDE cable (to CD-ROM and disk), one 1-drop EIDE cable (to second disk bay) <i>SCSI:</i> 18.2GB/36.4GB Ultra160 SCSI, 10K rpm, 5.2ms read seek; <i>EIDE:</i> 40GB ATA-100, 7200 rpm, 8.7ms read; <i>All:</i> S.M.A.R.T. ⁵												
Mechanical Architecture / chipsets	EIA 19" Rack (1U*) / rack-mount only / supports 16.75" deep racks for telco and colocation implementations ServerWorks® Grand Champion™ SL / CMIC-SL (Super Lite) Host Bridge (memory controller and I/O Bridge) / one CIOB-X2 I/O Bridge (IMB bus to Host Bridge for PCI-X Bus A with slots and PCI-X Bus B with dual ethernet) / CSB5 South Bridge (Thin IMB to Host Bridge for PCI 2.2-based graphics controller, EIDE, USB, LPC bus to Super I/O) / National Semiconductor® PC87414 Super I/O chip (serial, keyboard, mouse, diskette)												
Bus slots	(See below) two available PCI-X 1.0 / no hot-swap Active™ PCI slots												
Ethernet controllers	Two gigabit 10/100/1000 ethernet ports / Broadcom® BCM5703 / two full gigabit ethernet MAC and PHY layer functions / on planar / PCI-X 64-bit 100MHz Bus B / full duplex / PXE / Wake on LAN® / Alert Standard Format 1.0 / two rear RJ-45 ports												
CD-ROM / diskette	24X-10X ⁶ CD-ROM / IDE; <i>Diskette:</i> 3.5" 1.44MB diskette drive / dust cover												
Rear ports	<i>Rear:</i> serial (9-pin), two ethernet (RJ-45), keyboard, mouse, analog DB-15 monitor / no parallel port												
Front ports / graphics	<i>Front:</i> two USB (Vers 1.1); <i>Graphics:</i> SVGA / ATI® Rage XL / on planar / 8MB SDRAM std/max / 32-bit 33MHz PCI 2.2 bus												
Console interconnects	No system-to-system interconnect cable (separate keyboard, video, mouse ports on back)												
Systems mgmt	WinBond® W83791D / on planar / monitors system and processor temperature, fan speed and failure, and voltages												
Diagnostics	Diagnostics via PC-Doctor on a standard IBM Enhanced Diagnostics CD (diskette can be created) / support for optional Remote Supervisor Adapter with 20-pin conn on planar for continuous power (no external power required)												
Security	Power-on password / administrator password / unattended boot / selectable boot / unattended start mode												
Software	ServerGuide™ (CD-ROM installation and configuration utilities), IBM Director™, and others												
Cooling fans	Five fans (three fans for system, one blower in rear, one on power supply) / variable speed / not redundant or hot-swap												
Power supply	200 watt / universal / auto-sensing / auto-restart support												
Prerequisites	Monitor, keyboard, mouse, rack, operating system / supports IBM ACT CAT-5 chaining solutions												
	256MB PC2100 CL2.5 ECC DDR-SDRAM DIMM33L5037 512MB PC2100 CL2.5 ECC DDR-SDRAM DIMM33L5038 1GB PC2100 CL2.5 ECC DDR-SDRAM RDIMM 33L5039 120GB ATA-100 EIDE HDD (7200 rpm)* 09N4231 18.2GB 15K Ultra160 SCSI SL 68-pin HDD* 06P5765 36.4GB 15K Ultra160 SCSI SL 68-pin HDD* 06P5766 73.4GB 10K Ultra160 SCSI SL 68-pin HDD* 06P5752 Remote Supervisor Adapter 09N7585 ServeRAID™-4Lx Ultra160 SCSI Adapter 06P5740 IBM T541 15" Flat Panel Color Monitor (black) 9512AB1 IBM NetBAY25 Standard Rack 9306250 IBM NetBAY42 Enterprise Rack 930842S IBM ACT Local Console Manager 1735L04 Other options at ibm.com/pc/us/accessories * Disk not supported in all x305 systems												



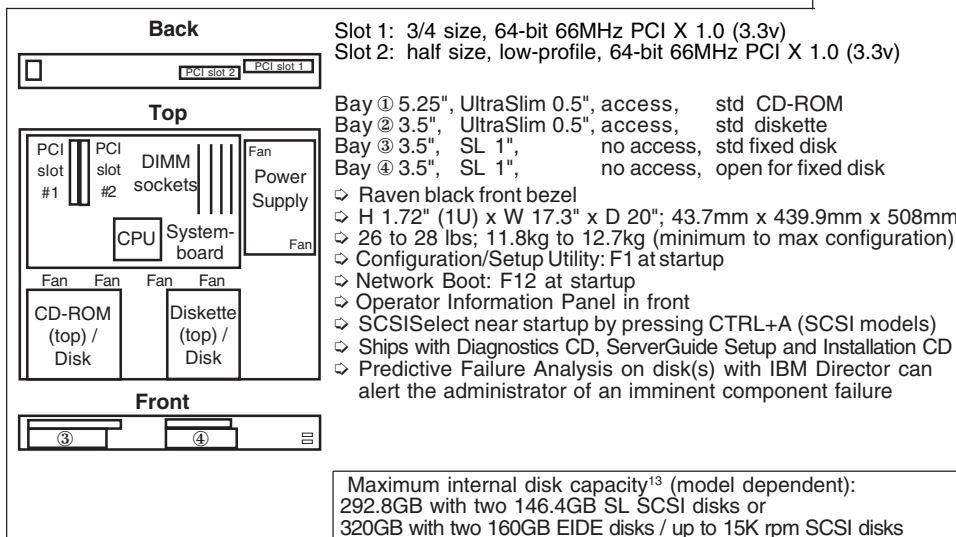
LIMITED WARRANTY³

- 1 year parts and labor
- International Warranty Service³
- On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time⁷
- On site service upgrade options (in eligible locations):⁷
 - 3 year IOR 9x5, NBD avg response (ServicePac® part num 69P9505)
 - 3 year IOR 9x5, 4 hr avg response (ServicePac part num 69P9506)
 - 3 year IOR 24x7, 4 hr avg response (ServicePac part num 69P9507)
 - 3 year IOR 24x7, 2 hr avg response (ServicePac part num 69P9508)
- Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- 24x7¹⁴ toll-free support for warranty issues during the warranty period³

See footnotes for important warranty information
 US models announced May 13, 2003 or September 9, 2003

For GAV systems, lowercase "x" should be replaced with a country-specific code.

IBM® Machine Type	GAV model	Processor	L2 cache	FSB MHz	Memory	Disk	Disk controller	Disk bays	Mechanical	Slots x bays	Ethernet	Ltd warr ³	Available date
8836	1Mx 11X	Pentium 4® 2.8GHz	1MB	800	512MB	36.4GB SCSI	Ultra320	2 fixed	1U ⁴ rack	2x4	Dual Gb	1 yr Apr 2004	
8836	1Sx 15X	Pentium 4 2.8GHz	1MB	800	512MB	open bay	SATA	2 simple-swap	1U rack	2x4	Dual Gb	1 yr Apr 2004	
8836	2Mx 21X	Pentium 4 3.0GHz	1MB	800	512MB	36.4GB SCSI	Ultra320	2 fixed	1U rack	2x4	Dual Gb	1 yr Apr 2004	
8836	2Sx 25X	Pentium 4 3.0GHz	1MB	800	512MB	open bay	SATA	2 simple-swap	1U rack	2x4	Dual Gb	1 yr Apr 2004	
8836	3Mx 31X	Pentium 4 3.2GHz	1MB	800	512MB	36.4GB SCSI	Ultra320	2 fixed	1U rack	2x4	Dual Gb	1 yr Jun 2004	
8836	3Sx 35X	Pentium 4 3.2GHz	1MB	800	512MB	open bay	SATA	2 simple-swap	1U rack	2x4	Dual Gb	1 yr Jun 2004	
Positioning Processor(s)	<i>A highly affordable, uni-processor, 1U rack-optimized server</i>												
L2 cache	Intel® Pentium 4 up to 3.2GHz¹ with 800MHz frontside bus (FSB)												
SMP support	1MB / on die of processor / at processor speed (no L3 cache)												
Implementation	No SMP support												
Memory	Systemboard contains one Intel mPGA478B socket (with Pentium 4 FC-PGA2 and heatsink), four memory DIMM slots, riser for two PCI-X slots, and integrated chipset, one EIDE connector, two SATA connectors, ethernet, and graphics												
SCSI disk controller	512MB std / 4GB max ¹³ / one slot used / three slots available / PC2700 333MHz (1xx, 2xx) or PC3200 400MHz (3xx) registered 184-pin ECC DDR-SDRAM DIMMs / four DIMM gold-connector slots on systemboard / memory bus runs at 2 x 166MHz / Error Checking and Correcting (ECC) memory controller / PC3200 memory supported in all models												
SCSI connectors	<i>SCSI models: Adaptec® chipset / single channel Wide Ultra320 SCSI (LVD 320MB/sec) / on PCI adapter / one channel with up to 15 device support / Integrated Raid 7e (Raid 0-1)</i>												
IDE disk controller	<i>SCSI models: On PCI adapter: one 68-pin SCSI connector</i>												
Cables	<i>Enhanced IDE busmaster / ATA-100 support / one connector on systemboard</i>												
Disk - features	<i>SCSI models: one 2-drop 16-bit LVD SCSI cable, one 1-drop EIDE cable (connected to CD-ROM)</i> <i>SATA models: two 1-drop SATA cables, one 1-drop EIDE cable (connected to CD-ROM)</i> <i>SCSI: 36.4GB Ultra320 SCSI, 10K rpm, 4.7ms read seek, S.M.A.R.T.⁵; SATA: open bay;</i>												
Mechanical Architecture / chipsets	EIA 19" Rack (1U⁴) / rack-mount only Intel E7210 chipset / Memory Controller Hub (MCH) / I/O Controller Hub (ICH-S) for PCI 2.2 and PCI-X bus, ATA-100 EIDE, ethernet MAC, USB, Low Pin Count Interface / Firmware Hub / SMSC® LPC47M192 Super I/O for diskette, parallel, serial, keyboard, mouse												
Bus slots	(See below) two available PCI-X 1.0 66MHz / no hot-swap Active™ PCI slots												
Ethernet controllers	Two gigabit 10/100/1000 ethernet ports / Intel Kenai II / two full gigabit ethernet MAC and PHY layer functions / on planar / port one is CSA, port two is PCI 2.2 / full duplex / PXE / Wake on LAN® / Alert Standard Format 2.0 / two rear RJ-45 ports												
CD-ROM / diskette	24X-10X ⁶ CD-ROM / IDE; <i>Diskette: 3.5" 1.44MB diskette drive / dust cover</i>												
Rear ports	<i>Rear: serial (9-pin), two ethernet (RJ-45), keyboard, mouse, analog DB-15 monitor / no parallel port / two USB (Vers 2.0)</i>												
Front ports / graphics	<i>Front: two USB (Vers 2.0); Graphics: SVGA / ATI® Radeon 7000 / on planar / 18MB DDR SDRAM std/max / 32-bit 33MHz PCI 2.2 bus</i>												
Console interconnects	No system-to-system interconnect cable (separate keyboard, video, mouse ports on back)												
Systems mgmt	On planar / monitors system and processor temperature, fan failure, and voltages												
Diagnostics	Diagnostics via PC-Doctor on a standard IBM Enhanced Diagnostics CD (diskette can be created) / support for optional Remote Supervisor Adapter with 20-pin conn on planar for continuous power (no external power required)												
Security	Power-on password / administrator password / unattended boot / selectable boot / unattended start mode												
Software	ServerGuide™ (CD-ROM installation and configuration utilities), IBM Director™, and others												
Cooling fans	Six fans (four fans for system, two on power supply) / variable speed / not redundant or hot-swap 300 watt / universal / auto-sensing / auto-restart support												
Prerequisites	Monitor, keyboard, mouse, rack, operating system												
											256MB PC2700 CL2.5 ECC DDR-SDRAM DIMM	06P4053	
											512MB PC2700 CL2.5 ECC DDR-SDRAM DIMM	06P4054	
											1GB PC2700 CL2.5 ECC DDR-SDRAM DIMM	06P4055	
											1GB PC3200 CL2.5 ECC DDR-SDRAM DIMM	06P4051	
											80GB SATA simple-swap HDD (7200 rpm)*	73P8002	
											160GB SATA simple-swap HDD (7200 rpm)*	73P8003	
											36.4GB 10K Ultra320 SCSI SL 68-pin HDD*	32P0723	
											73.4GB 10K Ultra320 SCSI SL 68-pin HDD*	32P0724	
											146.4GB 10K Ultra320 SCSI SL 68-pin HDD*	32P0725	
											Remote Supervisor Adapter II	59P2984	
											ServeRAID™-6i+ Ultra320 SCSI Adapter	13N2190	
											ServeRAID-7T SATA Controller	71P8648	
											IBM NetBAY25 Standard Rack	9306250	
											IBM NetBAY42 Enterprise Rack	930842S	
											IBM ACT Local Console Manager	1735L04	
	Other options at ibm.com/pc/us/accessories												
	* Disk not supported in all x306 systems												



LIMITED WARRANTY³

- ↪ 1 year parts and labor
- ↪ International Warranty Service³
- ↪ On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time⁷
- ↪ On site service upgrade options (in eligible locations):⁷
 - 3 year IOR 9x5, NBD avg response (ServicePac® part num 69P9505)
 - 3 year IOR 9x5, 4 hr avg response (ServicePac part num 69P9506)
 - 3 year IOR 24x7, 4 hr avg response (ServicePac part num 69P9507)
 - 3 year IOR 24x7, 2 hr avg response (ServicePac part num 69P9508)
- ↪ Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- ↪ 24x7¹⁴ toll-free support for warranty issues during the warranty period³

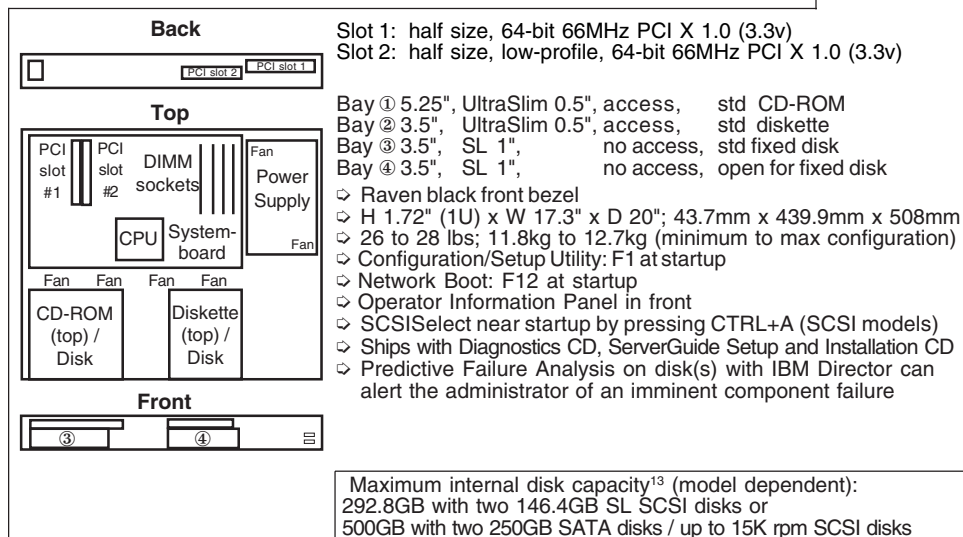
See footnotes for important warranty information
US models announced March 16, 2004 (1xx, 2xx) and June 8, 2004 (3xx)
Ⓢ = withdrawn product

IBM @server™ xSeries™ 306 (August 04)

xREF by eServer Field Skills and Education Team

For GAV systems, lowercase "v" should be replaced with a country-specific code.

IBM® Machine Type	GAV model	Processor	L2 cache	FSB MHz	Memory	Disk	Disk controller	Disk bays	Mechanical	Slots x bays	Ethernet	Ltd warr ³	Available date
8836 - 4My	-41x	Pentium 4® 3.2GHz	1MB	800	512MB	36.4GB	SCSI Ultra320	2 fixed	1U ⁴ rack	2x4	Dual Gb	1 yr	Aug 2004
8836 - 4Sy	-45x	Pentium 4 3.2GHz	1MB	800	512MB	open bay	SATA	2 simple-swap	1U rack	2x4	Dual Gb	1 yr	Aug 2004
8836 - 5My	-51x	Pentium 4 3.4GHz	1MB	800	512MB	36.4GB	SCSI Ultra320	2 fixed	1U ⁴ rack	2x4	Dual Gb	1 yr	Jan 2005
8836 - 5Sy	-55x	Pentium 4 3.4GHz	1MB	800	512MB	open bay	SATA	2 simple-swap	1U ⁴ rack	2x4	Dual Gb	1 yr	Jan 2005
Positioning	A highly affordable, uni-processor, 1U rack-optimized server												
Processor(s)	Intel® Pentium 4 at 3.2GHz ¹ & 3.4GHz with 800MHz FSB optimized for Extended Memory 64 Technology(EM64T)												
L2 cache	1MB min and max / at processor speed / ECC												
SMP support	No SMP support												
Implementation	Systemboard contains one Intel PGA604 socket (with Pentium 4 FC-PGA2 and heatsink), four memory DIMM slots, two PCI-X slots, and integrated chipset, one EIDE connector, two SATA connectors, dual ethernet, and graphics												
Memory	512MB std / 4GB max ¹³ / one slot used / three slots available / PC3200 400Mhz registered 184-pin ECC DDR-SDRAM DIMMs / four DIMM gold-connector slots on systemboard / memory bus runs at 2 x 200MHz / Error Checking and Correcting (ECC) memory controller												
SCSI disk controller	SCSI models: Adaptec® 7901 chipset / single channel Wide Ultra320 SCSI (LVD 320MB/sec) / on PCI adapter / one channel with up to 15 device support / Integrated Raid 7e (Raid 0-1) / 68 pin connector on PCI adapter												
SATA disk controller	SATA-150 controller (150MB/sec) / on planar / one connector on systemboard / Integrated Raid 7e (Raid 0-1)												
Cables	Enhanced IDE busmaster / ATA-100 support / one connector on systemboard												
Disk - features	SCSI models: one 2-drop 16-bit LVD SCSI cable, one 1-drop EIDE cable (connected to CD-ROM) SATA models: two 1-drop SATA cables, one 1-drop EIDE cable (connected to CD-ROM) SCSI: 36.4GB Ultra320 SCSI, 10K rpm, 4.7ms read seek, S.M.A.R.T. ⁵ ; SATA: open bay, simple swap												
Mechanical Architecture / chipsets	EIA 19" Rack (1U ⁴) / rack-mount only Intel E7210 chipset / Memory Controller Hub (MCH) / I/O Controller Hub (ICH-S) for PCI 2.2 and PCI-X bus, ATA-100 EIDE, ethernet MAC, USB, Low Pin Count Interface / Firmware Hub / SMSC® LPC47M192 Super I/O for diskette, parallel, serial, keyboard, mouse												
Bus slots	(See below) two available PCI-X 1.0 66MHz / no hot-swap Active™ PCI slots / half-length												
Ethernet controllers	Dual Gigabit 10/100/1000 ethernet ports / Intel Kenai II / two full gigabit ethernet MAC and PHY layer functions / integrated / port one is CSA, port two is PCI 2.2 / full duplex / PXE / Wake on LAN® / Alert Standard Format 2.0 / Rear RJ-45 ports (2)												
CD-ROM / diskette	24X-10X ⁶ CD-ROM Slim/ IDE; Diskette: 3.5" 1.44MB diskette drive / dust cover												
Rear ports	Rear: serial (9-pin), two ethernet (RJ-45), keyboard, mouse, analog DB-15 monitor / no parallel port / two USB (Vers 2.0)												
Front ports / Graphics	Front: two USB (Vers 2.0) SVGA / ATI® Radeon™ 7000 / on planar / 16MB DDR SDRAM std/max												
Console interconnects	No system-to-system interconnect cable (separate keyboard, video, mouse ports on back)												
Systems mgmt Diagnostics	On planar / monitors system and processor temperature, fan failure, and voltages Diagnostic LEDs/ Error LEDs for fans and memory/ Diagnostics via PC-Doctor on a standard IBM Enhanced Diagnostics CD (diskette can be created) / support for optional Remote Supervisor Adapter II with 20-pin conn on planar for continuous power (no external power required)												
Security	Power-on password / administrator password / unattended boot / selectable boot / unattended start mode / Secure Remote pwr on/off via ASF 2.0												
Software	ServerGuide™ (CD-ROM installation and configuration utilities), IBM Director™, and others												
Cooling fans	Six fans (four fans for system, two on power supply) / variable speed / not redundant or hot-swap 300 watt / universal / auto-sensing / auto-restart support												
Power supply Prerequisites	Monitor, keyboard, mouse, rack, operating system												
											256MB PC3200 CL3 ECC DDR-SDRAM DIMM	06P4049	
											512MB PC3200 CL3 ECC DDR-SDRAM DIMM	06P4050	
											1GB PC3200 CL3 ECC DDR-SDRAM DIMM	06P4051	
											80GB SATA simple-swap HDD (7200 rpm)	73P8002	
											160GB SATA simple-swap HDD (7200 rpm)	73P8003	
											250GB SATA simple-swap HDD (7200 rpm)	73P8006	
											36.4GB 10K Ultra320 SCSI SL 68-pin HDD	32P0723	
											73.4GB 10K Ultra320 SCSI SL 68-pin HDD	32P0724	
											146.4GB 10K Ultra320 SCSI SL 68-pin HDD	32P0725	
											36.4GB 15K Ultra320 SCSI SL 68-pin HDD	32P0784	
											73.4GB 15K Ultra320 SCSI SL 68-pin HDD	32P0785	
											Remote Supervisor Adapter II	59P2984	
											ServeRAID™-6i+ Ultra320 SCSI Adapter	13N2190	
											ServeRAID-7i SATA Controller	71P8648	
											IBM NetBAY25 Standard Rack	9306250	
											Other options avail at www.ibm.com/pc/us/accessories		



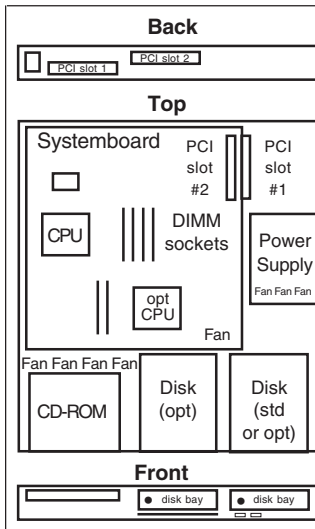
LIMITED WARRANTY³

- 1 year parts and labor
- International Warranty Service³
- On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time⁷
- On site service upgrade options (in eligible locations):⁷
 - 3 year IOR 9x5, NBD avg response (ServicePac[®] part num 69P9505)
 - 3 year IOR 9x5, 4 hr avg response (ServicePac part num 69P9506)
 - 3 year IOR 24x7, 4 hr avg response (ServicePac part num 69P9507)
 - 3 year IOR 24x7, 2 hr avg response (ServicePac part num 69P9508)
- Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- 24x7¹⁴ toll-free support for warranty issues during the warranty period³

See footnotes for important warranty information
⊖ = Models announced January 18, 2005

IBM® Type-model	Qty x Processor	Proc. Speed	L2 Cache	Memory	Memory type	Disk	Disk controller	Hot-swap or fixed disk bays	Slots x bays	Limited warranty ³	Available date
8835-21X	1 x Opteron™ 240	1.4Ghz ¹	1MB	1GB	Chipkill	None (open)	Ultra320	2 hot-swap	2x3	2 x Gigabit Ethernet	1 year Oct 2003
8835-22X	1 x Opteron 240	1.4Ghz	1MB	1GB	Chipkill	80GB ² EIDE	EIDE	2 fixed	2x3	2 x Gigabit Ethernet	1 year Oct 2003
8835-31X	1 x Opteron 242	1.6Ghz	1MB	1GB	Chipkill	None (open)	Ultra320	2 hot-swap	2x3	2 x Gigabit Ethernet	1 year Oct 2003
8835-32X	1 x Opteron 242	1.6Ghz	1MB	1GB	Chipkill	80GB ² EIDE	EIDE	2 fixed	2x3	2 x Gigabit Ethernet	1 year Oct 2003
8835-51X	1 x Opteron 246	2.0Ghz	1MB	1GB	Chipkill	None (open)	Ultra320	2 hot-swap	2x3	2 x Gigabit Ethernet	1 year Oct 2003
8835-52X	1 x Opteron 246	2.0Ghz	1MB	1GB	Chipkill	80GB ² EIDE	EIDE	2 fixed	2x3	2 x Gigabit Ethernet	1 year Oct 2003
8835-5DX	2 x Opteron 246	2.0Ghz	1MB	2GB	Chipkill	36.4GB 10K	Ultra320	2 hot-swap	2x3	2 x Gigabit Ethernet	1 year Oct 2003
Processor(s)	Up to 2 x AMD® Opteron™ 246 with 800Mhz HyperTransport technology / 64-bit x86 Instruction set / 32-bit compatible										
L2 cache	1MB / on die of processor / at processor speed (no L3 cache)										
SMP support Implementation	2-way SMP / up to two Opteron Processors (same speed/cache size required) Systemboard contains two AMD Socket 940 micro-PGA ZIF sockets, six memory DIMM slots, two 64-bit 100Mhz PCI-X slots, integrated SCSI, ethernet, graphics / AMD Opteron HyperLink bus interface										
Memory	Up to 2GB std / 12GB max ¹³ (when 2GB DIMMs become available) / four slots enabled with uni-processor, six with dual / two slots used (four slots used in 5DX model) / four slots available (two avail. in 5DX) / PC2700 333MHz registered 184-pin ECC DDR-SDRAM DIMMs / six DIMM gold-connector slots on systemboard / DIMMs must be installed in matched pairs [a bank] / 2-way memory interleave / dual channel / memory bus runs at 2 x 100MHz / Error Checking and Correcting (ECC) via 16-bit Checksum Chipkill™ (corrects 1, 2, 3, or 4-bit errors on same chip and detects 2- through 8-bit errors contained in two chips)										
SCSI disk controller	All (not used on EIDE models): LSI Logic® 53C1020 / Ultra320 SCSI controller (LVD 320MB/sec) / on planar / 64-bit 100MHz PCI-X Bus B / supports RAID-1 mirroring (Embedded Mirroring) with two SCSI disks in front bays / one 16-bit internal channel / 16-bit 68-pin LVD cable from systemboard to backplane for two disks / no external connector										
IDE controller / cable	All: Enhanced IDE ATA-100 controller in CSB5 South Bridge / two connectors on planar / one 1-drop IDE cable (CD-ROM) EIDE models: One 2-drop EIDE cable to two disk bays (primary) / one 1-drop EIDE cable to CD-ROM (secondary)										
Disk - capacity	SCSI models: 36.4GB supports up to 15000 rpm disks; EIDE models: 80GB / 7200 rpm / ATA-100 / 8.7ms seek										
Disk - bays	SCSI models: two hot-swap / 80-pin SCA-2 connectors / filler panels in each disk bay / all disk bays Ultra320-enabled										
Mechanical Architecture / chipsets	EIA 19" Rack (1U ⁴) / rack-mount only / supported in 26" deep racks such as the IBM NetBAY™ Rack products AMD® 8131 PCI-X Bridge Chip providing two PCI-X bridges running at 100MHz (bridge A for SCSI and Ethernet; bridge B for PCI-X expansion slots) / 8111 I/O HyperTransport Bridge Chip supporting a 200 Mhz double-pumped HyperTransport clock (PCI, AC '97, Ethernet, SMBus, USB, EIDE, LPC to BIOS and Super I/O) / National Semiconductor® PC87366 Super I/O chip										
Bus slots	(See below) two available PCI-X 1.0 / no hot-swap Active™ PCI slots										
Ethernet controllers	Two gigabit 10/100/1000 ethernet ports / Broadcom BCM5704 / two full gigabit ethernet MAC and PHY layer functions / on planar / PCI-X 64-bit 100MHz Bus B / full duplex / Wake on LAN® / Alert Standard Format 1.0 / two rear RJ-45 ports										
CD-ROM/diskette/kbd Rear ports	24X-10X ⁵ CD-ROM / IDE / Diskette and keyboard: none (USB diskette and keyboard optional); legacy not supported Rear: two USB (Vers 1.1), serial (9-pin), two ethernet (RJ-45) / parallel port not supported										
Front ports / graphics Console interconnects	Front: two USB (Vers 1.1); Graphics: SVGA / ATI® Rage XL / on planar / 8MB SDRAM std/max / 32-bit 33MHz PCI 2.2 Bus A C2T Interconnect™ cabling not supported / NetBay Local Console Manager (LCM), NetBay Remote Console Manager (RCM), and USB Conversion Option (UCO) are supported										
Systems mgmt	Standard MS-9549 QLogic system management / connector on planar / optional Remote Supervisor Adapter II card not supported							Opteron 240 Processor Upgrade		24P8189	
Diagnosics	Diagnositic LEDs for fans, memory DIMMs and processors only / Light Path Diagnostics not supported							Opteron 242 Processor Upgrade		24P8190	
Security	Power-on password / administrator password / unattended boot / selectable boot / unattended start mode							Opteron 246 Processor Upgrade		13N0700	
Software	ServerGuide™ (CD-ROM installation and configuration utilities), IBM Director™, and others							512MB PC2700 CL2.5 ECC DDR-SDRAM RDIMM		73P2266	
Cooling fans	Eight fans (five for system, three inside power supply) / variable speed / not redundant or hot-swap							1GB PC2700 CL2.5 ECC DDR-SDRAM RDIMM		73P2267	
Power supply Prerequisites	411 watt / universal / auto-sensing / auto-restart support Monitor, keyboard, mouse, rack, disk (some), operating sys							2GB PC2700 CL2.5 ECC DDR-SDRAM RDIMM		73P2269	
								80GB ATA-100 EIDE HDD*		09N4226	
								120GB ATA-100 EIDE HDD*		09N4231	
								36.4GB 15K Ultra320 SCSI Hot-Swap SL HDD*		32P0734	
								73.4GB 15K Ultra320 SCSI Hot-Swap SL HDD*		32P0735	
								IBM TotalStorage FC2-133 Host Bus Adapter		24P0960	
								IBM ServeRAID-6M SCSI (256MB Cache)		02R0988	
								USB Portable Diskette Drive		05K9276	
								NetBAY ACT Local Console Manager (LCM)		1735L04	
								NetBAY Remote Console Manager (RCM)		1735R16	
								1.5M USB Conversion Option		73P5832	

* Disk not supported in all e325 systems



Slot 1: half-length, 64-bit 100MHz PCI X 1.0 (3.3v); Bus C
Slot 2: full-length, 64-bit 100MHz PCI X 1.0 (3.3v); Bus C

Bay ① 5.25", UltraSlim 0.5", access, std CD-ROM
Bay ② 3.5", SL 1", access, std fixed or hot-swap disk
Bay ③ 3.5", SL 1", access, open for fixed or hot-swap disk

- Stealth black color front bezel
- Utility tray in front slides out from under middle bay (USB devices)
- H 1.72" (1U) x W 17.3" x D 25.7"; 43.7mm x 439.9mm x 653.3mm
- 26 to 32 lbs; 11.8kg to 14.6kg (minimum to max configuration)
- Configuration/Setup Utility: F1 at startup
- System Partition Boot: ALT+F1 at startup
- Network Boot: F12 at startup
- Operator Information Panel in front
- LSI Logic Configuration Utility: CTRL+C at startup
- Includes one line cord (9 ft universal interrack HV cable with IEC plug)
- Predictive Failure Analysis® on processor(s), voltage regulator modules, memory, fans, power supply, and disk options

Maximum internal disk capacity¹³ (model dependent):
293.6GB with two 146.8GB SL SCSI disks or
240GB with two 120GB EIDE disks

LIMITED WARRANTY³

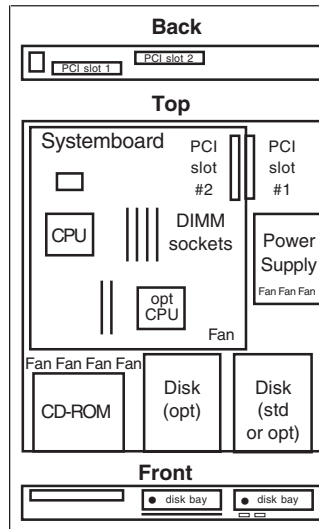
- 1 year parts and labor
- International Warranty Service³
- On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time⁷
- On site service upgrade options (in eligible locations):⁷
 - 1 year IOR 9x5, 4 hr avg response (ServicePac® part num 69P9399)
 - 2 year IOR 24x7, 4 hr avg response (ServicePac part num 96P2119)
 - 2 year IOR 24x7, 2 hr avg response (ServicePac part num 96P2120)
 - 3 year IOR 24x7, 4 hr avg response (ServicePac part num 69P9507)
 - 3 year IOR 9x5, NBD response (ServicePac part num 69P9506)
- Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- 24x7¹⁴ toll-free support for warranty issues during the warranty period³

See footnotes for important warranty information
• = Hot-swap in some models
US models announced August 5, 2003

IBM® Type-model	Qty x Processor	Proc. Speed	L2 Cache	Memory	Memory type	Disk	Disk controller	Hot-swap or fixed disk bays	Slots x bays	Ethernet	Limited warranty ³	Available date
8835-61X	1 x Opteron™ 248	2.2Ghz ¹	1MB	1GB	Chipkill	None (open)	Ultra320	2 hot-swap	2x3	2 x Gigabit	1 year	Jan 2004
8835-62X	1 x Opteron 248	2.2Ghz	1MB	1GB	Chipkill	80GB ² EIDE	EIDE	2 fixed	2x3	2 x Gigabit	1 year	Jan 2004
8835-71X	1 x Opteron 250	2.4Ghz	1MB	1GB	Chipkill	None (open)	Ultra320	2 hot-swap	2x3	2 x Gigabit	1 year	Jun 2004
8835-72X	1 x Opteron 250	2.4Ghz	1MB	1GB	Chipkill	80GB EIDE	EIDE	2 fixed	2x3	2 x Gigabit	1 year	Jun 2004

Processor(s) L2 cache SMP support Implementation	Up to 2 x AMD® Opteron™ 248 with 800Mhz HyperTransport technology / 64-bit x86 Instruction set / 32-bit compatible 1MB / on die of processor / at processor speed (no L3 cache) 2-way SMP / up to two Opteron Processors (same speed/cache size required) Systemboard contains two AMD Socket 940 micro-PGA ZIF sockets, six memory DIMM slots, two 64-bit 100Mhz PCI-X slots, integrated SCSI, ethernet, graphics / AMD Opteron HyperLink bus interface		
Memory	1GB std / 12GB max ¹³ / four slots enabled with uni-processor, six with dual / two slots used / four slots available / PC2700 333MHz registered 184-pin ECC DDR-SDRAM DIMMs / six DIMM gold-connector slots on systemboard / DIMMs must be installed in matched pairs [a bank] / 2-way memory interleave / dual channel / memory bus runs at 2 x 100MHz / Error Checking and Correcting (ECC) via 16-bit Checksum Chipkill™ (corrects 1, 2, 3, or 4-bit errors on same chip and detects 2-bit through 8-bit errors contained in two chips)		
SCSI disk controller	<i>All (not used on EIDE models): LSI Logic® 53C1020 / Ultra320 SCSI controller</i> (LVD 320MB/sec) / on planar / 64-bit 100MHz PCI-X Bus B / supports RAID-1 mirroring (Embedded Mirroring) with two SCSI disks in front bays / one 16-bit internal channel / 16-bit 68-pin LVD cable from systemboard to backplane for two disks / no external connector		
IDE controller / cable	<i>All: Enhanced IDE ATA-100 controller in CSB5 South Bridge / two connectors on planar / one 1-drop IDE cable (CD-ROM) EIDE models: One 2-drop EIDE cable to two disk bays (primary) / one 1-drop EIDE cable to CD-ROM (secondary)</i>		
Disk - capacity Disk - bays	<i>SCSI models: 36.4GB supports up to 15000 rpm disks; EIDE models: 80GB / 7200 rpm / ATA-100 / 8.7ms seek</i> <i>SCSI models: two hot-swap / 80-pin SCA-2 connectors / filler panels in each disk bay / all disk bays Ultra320-enabled</i>		
Mechanical Architecture / chipsets	EIA 19" Rack (1U⁴) / rack-mount only / supported in 26" deep racks such as the IBM NetBAY™ Rack products AMD® 8131 PCI-X Bridge Chip providing two PCI-X bridges running at 100MHz (bridge A for SCSI and Ethernet; bridge B for PCI-X expansion slots) / 8111 I/O HyperTransport Bridge Chip supporting a 200 Mhz double-pumped HyperTransport clock (PCI, AC '97, Ethernet, SMBus, USB, EIDE, LPC to BIOS and Super I/O) / National Semiconductor® PC87366 Super I/O chip		
Bus slots	(See below) two available PCI-X 1.0 / no hot-swap Active™ PCI slots		
Ethernet controllers	Two gigabit 10/100/1000 ethernet ports / Broadcom BCM5704 / two full gigabit ethernet MAC and PHY layer functions / on planar / PCI-X 64-bit 100MHz Bus B / full duplex / Wake on LAN® / Alert Standard Format 1.0 / two rear RJ-45 ports		
CD-ROM/diskette/kbd Rear ports Front ports / graphics Console interconnects	24X-10X ⁶ CD-ROM / IDE / <i>Diskette and keyboard: none</i> (USB diskette and keyboard optional); legacy not supported <i>Rear:</i> two USB (Vers 1.1), serial (9-pin), two ethernet (RJ-45) / parallel port not supported <i>Front:</i> two USB (Vers 1.1); <i>Graphics:</i> SVGA / ATI® Rage XL / on planar / 8MB SDRAM std/max / 32-bit 33MHz PCI 2.2 Bus A C2T Interconnect™ cabling not supported / NetBay Local Console Manager (LCM), NetBay Remote Console Manager (RCM), and USB Conversion Option (UCO) are supported		
Systems mgmt	Standard MS-9549 QLogic system management / connector on planar / Remote Supervisor Adapter II card not supported	Opteron 248 Processor Upgrade Opteron 250 Processor Upgrade	13N0701 13N0702
Diagnostics	Diagnostic LEDs for fans, memory DIMMs and processors only / Light Path Diagnostics not supported	512MB PC2700 CL2.5 ECC DDR-SDRAM RDIMM 1GB PC2700 CL2.5 ECC DDR-SDRAM RDIMM 2GB PC2700 CL2.5 ECC DDR-SDRAM RDIMM	73P2266 73P2267 73P2268
Security	Power-on password / administrator password / unattended boot / selectable boot / unattended start mode	80GB ATA-100 EIDE HDD* 120GB ATA-100 EIDE HDD*	09N4226 09N4231
Software	ServerGuide™ (CD-ROM installation and configuration utilities), IBM Director™, and others	36.4GB 15K Ultra320 SCSI Hot-Swap SL HDD* 73.4GB 15K Ultra320 SCSI Hot-Swap SL HDD* IBM TotalStorage FC2-133 Host Bus Adapter IBM ServeRAID-6M SCSI (256MB Cache) USB Portable Diskette Drive NetBAY ACT Local Console Manager (LCM)	32P0734 32P0735 24P0960 02R0988 05K9276 1735L04
Cooling fans	Eight fans (five for system, three inside power supply) / variable speed / not redundant or hot-swap	NetBAY Remote Console Manager (RCM) 1.5M USB Conversion Option	1735R16 73P5832
Power supply Prerequisites	411 watt / universal / auto-sensing / auto-restart support Monitor, keyboard, mouse, rack, disk (some), operating sys		

* Disk not supported in all e325 systems



Slot 1: half-length, 64-bit 100MHz PCI X 1.0 (3.3v); Bus C
Slot 2: full-length, 64-bit 100MHz PCI X 1.0 (3.3v); Bus C

Bay ① 5.25", UltraSlim 0.5", access, std CD-ROM
Bay ② 3.5", SL 1", access, std fixed or hot-swap disk
Bay ③ 3.5", SL 1", access, open for fixed or hot-swap disk

- Stealth black color front bezel
- Utility tray in front slides out from under middle bay (USB devices)
- H 1.72" (1U) x W 17.3" x D 25.7"; 43.7mm x 439.9mm x 653.3mm
- 26 to 32 lbs; 11.8kg to 14.6kg (minimum to max configuration)
- Configuration/Setup Utility: F1 at startup
- System Partition Boot: ALT+F1 at startup
- Network Boot: F12 at startup
- Operator Information Panel in front
- LSI Logic Configuration Utility: CTRL+C at startup
- Includes one line cord (9 ft universal interrack HV cable with IEC plug)
- Predictive Failure Analysis® on processor(s), voltage regulator modules, memory, fans, power supply, and disk options

Maximum internal disk capacity¹³ (model dependent):
293.6GB with two 146.8GB SL SCSI disks or
240GB with two 120GB EIDE disks

LIMITED WARRANTY³

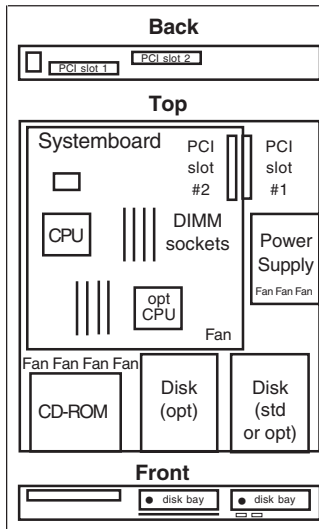
- 1 year parts and labor
- International Warranty Service³
- On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time⁷
- On site service upgrade options (in eligible locations):⁷
 - 1 year IOR 9x5, 4 hr avg response (ServicePac® part num 69P9399)
 - 2 year IOR 24x7, 4 hr avg response (ServicePac part num 96P2119)
 - 2 year IOR 24x7, 2 hr avg response (ServicePac part num 96P2120)
 - 3 year IOR 24x7, 4 hr avg response (ServicePac part num 69P9507)
 - 3 year IOR 9x5, NBD response (ServicePac part num 69P9506)
- Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- 24x7¹⁴ toll-free support for warranty issues during the warranty period³

See footnotes for important warranty information

• = Hot-swap in some models

US models announced January 2004 (61X, 62X), and May 25, 2004 (71X, 72X)

IBM® Type-GAV	Qty x Processor	Proc. Speed	L2 Cache	Memory	Memory type	Disk	Disk controller	Hot-swap or fixed disk bays	Slots x bays	Ethernet	Limited warranty ³	Available date
8848-51Y	1 x Opteron™ 246	2.0Ghz ¹	1MB	1GB	Chipkill	None (open)	Ultra320	2 hot-swap	2x3	2 x Gigabit	1 year	Sept 2004
8848-52Y	1 x Opteron 246	2.0Ghz	1MB	1GB	Chipkill	80GB ² SATA	SATA	2 fixed	2x3	2 x Gigabit	1 year	Sept 2004
8848-61Y	1 x Opteron 248	2.2Ghz	1MB	1GB	Chipkill	None (open)	Ultra320	2 hot-swap	2x3	2 x Gigabit	1 year	Sept 2004
8848-62Y	1 x Opteron 248	2.2Ghz	1MB	1GB	Chipkill	80GB SATA	SATA	2 fixed	2x3	2 x Gigabit	1 year	Sept 2004
8848-71Y	1 x Opteron 250	2.4Ghz	1MB	1GB	Chipkill	None (open)	Ultra320	2 hot-swap	2x3	2 x Gigabit	1 year	Sept 2004
8848-72Y	1 x Opteron 250	2.4Ghz	1MB	1GB	Chipkill	80GB SATA	SATA	2 fixed	2x3	2 x Gigabit	1 year	Sept 2004
Processor(s)	Up to 2 x AMD® Opteron™ 246, 248, 250 with 800Mhz HyperTransport technology / 64-bit x86 Instruction set / 32-bit compatible											
L2 cache	1MB / ECC / on die of processor / at processor speed (no L3 cache)											
SMP support	2-way SMP / up to two Opteron Processors (same speed/cache size required)											
Implementation	Systemboard contains two AMD Socket 940 micro-PGA ZIF sockets, eight memory DIMM slots, two 64-bit 133/100Mhz PCI-X slots, integrated SATA or SCSI, ethernet, graphics / AMD Opteron HyperLink bus interface											
Memory	1GB std / 16GB max ¹³ / four slots enabled with uni-processor, eight with dual / two slots used / six slots available / PC2700 or PC3200 registered 184-pin ECC DDR-SDRAM DIMMs / eight DIMM gold-connector slots on systemboard / DIMMs must be installed in matched pairs [a bank] / 2-way memory interleave / dual channel / memory bus runs at 2 x 100MHz / Chipkill™ supported											
SCSI disk controller	All (not used on SATA models): LSI Logic® 53C1020 / Ultra320 SCSI controller (LVD 320MB/sec) / on planar / 64-bit 100MHz PCI-X Bus B / supports RAID-1 mirroring (Embedded Mirroring) with two SCSI disks in front bays / one 16-bit internal channel / 16-bit 68-pin LVD cable from systemboard to backplane for two disks / no external connector											
SATA controller/cable	All: SATA-150 controller / two connectors on planar / two 1-drop cables / 1 IDE											
Disk - capacity	SCSI models: open; SATA models: 80GB / 7200 rpm / ATA-100 / 9.0ms seek											
Disk - bays	SCSI models: two hot-swap / 80-pin SCA-2 connectors / filler panels in each disk bay / all disk bays Ultra320-enabled, supports 15k drives											
Mechanical Architecture/chipsets	EIA 19" Rack (1U ⁴) / rack-mount only / supported in 26" deep racks such as the IBM NetBAY™ Rack products AMD® 8131 PCI-X Bridge Chip providing two PCI-X bridges running at 100Mhz (bridge A for SCSI and Ethernet; bridge B for PCI-X expansion slots) / 8111 I/O HyperTransport Bridge Chip supporting a 200 Mhz double-pumped HyperTransport clock (PCI, AC '97, Ethernet, SMBus, USB, SATA, IDE, LPC to BIOS and Super I/O) / National Semiconductor® PC87366 Super I/O chip (See detail below) two available PCI-X 1.0 / 1 full-length, 1 Half / 133MHz if using single adapter, 100MHz with 2 adaptors / no hot-swap Active™ PCI slots											
Bus slots												
Ethernet controllers	Two gigabit 10/100/1000 ethernet ports / Broadcom BCM5704C / two full gigabit ethernet MAC and PHY layer functions / on planar / PCI-X 64-bit 100MHz Bus B / full duplex / Wake on LAN® / Alert Standard Format 1.0 / two rear RJ-45 ports											
Optical/diskette/kbd	24X-10X ⁶ CD-ROM / IDE / Diskette and keyboard: none (USB diskette and keyboard optional); legacy not supported											
Rear ports	Rear: two USB (Vers 1.1), serial (9-pin), two ethernet (RJ-45) / parallel port not supported											
Front ports / graphics	Front: two USB (Vers 1.1); Graphics: SVGA / ATI® Rage XL / on planar / 8MB SDRAM std/max / 32-bit 33MHz PCI 2.2											
Console interconnects	C2T Interconnect™ cabling not supported / NetBay Local Console Manager (LCM), NetBay Remote Console Manager (RCM), and USB Conversion Option (UCO) are supported											
Systems mgmt	Standard MS-9549 QLogic system management / connector on planar / Remote Supervisor Adapter II card not supported							Opteron 246 Processor Upgrade		13N0705		
Diagnosics	Diagnositic LEDs for fans, memory DIMMs and processors only / Light Path Diagnostics not supported							Opteron 248 Processor Upgrade		13N0706		
Security	Power-on password / administrator password / unattended boot / selectable boot / unattended start mode							Opteron 250 Processor Upgrade		13N0702		
Software	ServerGuide™ (CD-ROM installation and configuration utilities), IBM Director™, and others							2GB PC2700 CL2.5 ECC DDR-SDRAM kit		73P2269		
Cooling fans	Eight fans (five for system, three inside power supply) / variable speed / not redundant or hot-swap							1GB PC3200 CL3 ECC DDR-SDRAM kit		73P3233		
Power supply	411 watt / universal / auto-sensing / auto-restart support							80GB SATA-150 7.2k HDD*		25R6902		
Prerequisites	Monitor, keyboard, mouse, rack, disk (some), operating sys,							160GB SATA-150 7.2k HDD*		25R6903		
								36.4GB 15K Ultra320 SCSI Hot-Swap SL HDD*		32P0734		
								73.4GB 15K Ultra320 SCSI Hot-Swap SL HDD*		32P0735		
								IBM TotalStorage FC2-133 Host Bus Adapter		24P0960		
								IBM ServeRAID-6M SCSI (256MB Cache)		02R0988		
								USB Portable Diskette Drive		05K9276		
								NetBAY ACT Local Console Manager (LCM)		1735L04		
								NetBAY Remote Console Manager (RCM)		1735R16		
								1.5M USB Conversion Option		73P5832		
	* Disk not supported in all e325 systems											



Slot 1: half-length, 64-bit 133/100MHz PCI X 1.0 (3.3v); Bus C
Slot 2: full-length, 64-bit 133/100MHz PCI X 1.0 (3.3v); Bus C

Bay ① 5.25", UltraSlim 0.5", access, std CD-ROM
Bay ② 3.5", SL 1", access, std fixed or hot-swap disk
Bay ③ 3.5", SL 1", access, open for fixed or hot-swap disk

- Stealth black color front bezel
- Utility tray in front slides out from under middle bay (USB devices)
- H 1.72" (1U) x W 17.3" x D 25.7"; 43.7mm x 439.9mm x 653.3mm
- 26 to 32 lbs; 11.8kg to 14.6kg (minimum to max configuration)
- Configuration/Setup Utility: F1 at startup
- System Partition Boot: ALT+F1 at startup
- Network Boot: F12 at startup
- Operator Information Panel in front
- LSI Logic Configuration Utility: CTRL+C at startup
- Includes one line cord (9 ft universal interrack HV cable with IEC plug)
- Predictive Failure Analysis® on processor(s), voltage regulator modules, memory, fans, power supply, and disk options

Maximum internal disk capacity¹³ (model dependent):
293.6GB with two 146.8GB SL SCSI disks or
320GB with two 160GB EIDE disks

LIMITED WARRANTY³

- 1 year parts and labor
- International Warranty Service³
- On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time⁷
- On site service upgrade options (in eligible locations):⁷
 - 1 year IOR 9x5, 4 hr avg response (ServicePac® part num 69P9399)
 - 2 year IOR 24x7, 4 hr avg response (ServicePac part num 96P2119)
 - 2 year IOR 24x7, 2 hr avg response (ServicePac part num 96P2120)
 - 3 year IOR 24x7, 4 hr avg response (ServicePac part num 69P9507)
 - 3 year IOR 9x5, NBD response (ServicePac part num 69P9505)
- Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- 24x7¹⁴ toll-free support for warranty issues during the warranty period³

See footnotes for important warranty information
• = Hot-swap in some models

IBM® Type-model	Qty x Processor	L2 cache	FSB MHz	Memory	Memory type	Disk	Disk controller	Hot-swap or fixed disk bays	Slots x bays	Ethernet	Limited warranty ³	Available date
8830-11X	1 x Xeon 2.8B GHz	512KB	533MHz	512MB	Chipkill	None (open)	Ultra320	2 hot-swap	2x4	2 x Gigabit	1 year	May 2003
8830-12X	1 x Xeon 2.8B GHz	512KB	533MHz	512MB	Chipkill	40GB ² EIDE	EIDE	2 fixed	2x4	2 x Gigabit	1 year	May 2003
8830-21X	1 x Xeon 3.06 GHz	512KB	533MHz	512MB	Chipkill	None (open)	Ultra320	2 hot-swap	2x4	2 x Gigabit	1 year	Apr 2003
8830-22X	1 x Xeon 3.06 GHz	512KB	533MHz	512MB	Chipkill	40GB ² EIDE	EIDE	2 fixed	2x4	2 x Gigabit	1 year	May 2003

Positioning A highly manageable, ultra-dense 1U, 2-way server that delivers performance computing in space-constrained environments
Processor(s) 1 x Intel® Xeon 2.8B or 3.06GHz¹ with 533MHz frontside bus / Hyper-Threading technology
L2 cache 512KB / on die of processor / at processor speed (no L3 cache)
SMP support 2-way SMP / up to two Xeon Processors (same speed/cache size)
Implementation Systemboard contains two Intel 603-pin micro-PGA ZIF sockets, four memory DIMM slots, connector for one PCI-X slot, riser for one PCI-X slot, and integrated SCSI, ethernet, graphics

Memory 512MB std / 8GB max¹³ / two slots used / two slots available / PC2100 266MHz registered 184-pin ECC DDR-SDRAM DIMMs / four DIMM gold-connector slots on systemboard / DIMMs must be installed in matched pairs [a bank] / 2-way memory interleave / dual channel / memory bus runs at 2 x 100MHz / **Error Checking and Correcting (ECC)** via 16-bit Checksum Chipkill™ (corrects 1, 2, 3, or 4-bit errors on same chip and detects 2- through 8-bit errors contained in two chips)

SCSI disk controller All (not used on EIDE models): LSI Logic® 53C1020 / Ultra320 SCSI controller (LVD 320MB/sec) / on planar / 64-bit 100MHz PCI-X Bus B / supports RAID-1 mirroring (Embedded Mirroring) with two SCSI disks in front bays / one 16-bit internal channel / 16-bit 68-pin LVD cable from systemboard to backplane for two disks / no external connector
IDE controller / cable All: Enhanced IDE ATA-100 controller in CSB5 South Bridge / two connectors on planar / one 1-drop IDE cable (CD-ROM) / EIDE models: One 2-drop EIDE cable to two disk bays / one 1-drop EIDE cable to CD-ROM
Disk - capacity SCSI models: none standard / supports up to 15000 rpm disks; EIDE models: 40GB / 7200 rpm / ATA-100 / 8.7ms seek
Disk - bays SCSI models: two hot-swap / 80-pin SCA-2 connectors / filler panels in each disk bay / all HD bays Ultra320-enabled

Mechanical Architecture / chipsets EIA 19" Rack (1U⁴) / rack-mount only / supported in 26" deep racks such as the IBM NetBAY™ Rack products ServerWorks® Grand Champion™ 4.0 LE / CMIC LE Host Bridge (memory controller and I/O Bridge) / one CIOB-X2 I/O Bridge (IMB2 bus to Host Bridge for PCI-X Bus A with slot 1 and dual ethernet and PCI-X Bus B with slot 2 and Ultra320 / CSB5 South Bridge (Thin IMB to Host Bridge for PCI 2.2 Bus C with graphics controller, EIDE, USB, SMBus, LPC bus to Super I/O) / National Semiconductor® PC87417 Super I/O chip
Bus slots (See below) two available PCI-X 1.0 / no hot-swap Active™ PCI slots

Ethernet controllers Two gigabit 10/100/1000 ethernet ports / Broadcom BCM5703 / two full gigabit ethernet MAC and PHY layer functions / on planar / PCI-X 64-bit 100MHz Bus A / full duplex / Wake on LAN® / Alert Standard Format 1.0 / two rear RJ-45 ports
CD-ROM / diskette 24X-10X⁶ CD-ROM / IDE; Diskette: 3.5" 1.44MB diskette drive / dust cover
Rear ports Rear: one USB (Vers 1.1), C2T in, C2T out, serial (9-pin), two ethernet (RJ-45), one RS-485 (sys mgmt) / no parallel port
Front ports / graphics Front: two USB (Vers 1.1); Graphics: SVGA / ATI® Rage XL / on planar / 8MB SDRAM std/max / 32-bit 33MHz PCI 2.2 bus
Console interconnects C2T Interconnect™ cable (10 inch, 245mm) is standard (Keyboard Video Mouse (KVM) chaining cable) / one Cable Chain Technology Cable Kit required at end of chain (a cable with separate keyboard, mouse, monitor connectors)

Systems mgmt IBM Integrated system management processor (ISMP) / H8S2148 / on planar / provides system and environmental monitoring such as temp, memory, optional disks, fans, power supply / support for optional Remote Supervisor Adapter with 20-pin conn on planar for continuous pwr (no ext pwr req)

Diagnostics Light Path Diagnostics™ (LED lights indicate failing component) and on-board diagnostics (via PC-Doctor in BIOS)

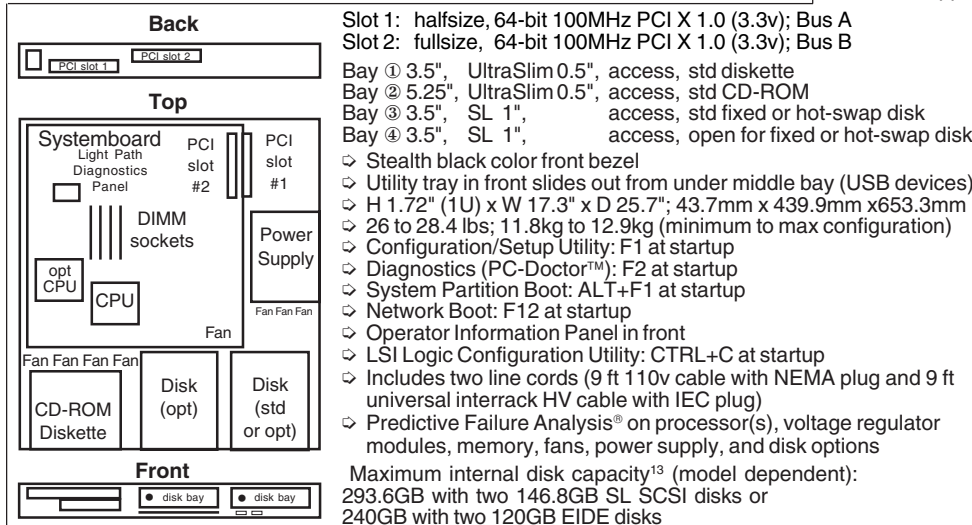
Security Power-on password / administrator password / unattended boot / selectable boot / unattended start mode

Software ServerGuide™ (CD-ROM installation and configuration utilities), IBM Director™, and others

Cooling fans Eight fans (five for system, three on power supply) / variable speed / not redundant or hot-swap
Power supply 332 watt / universal / auto-sensing / auto-restart support
Prerequisites Monitor, keyboard, mouse, rack, disk (some), operating sys, one Cable Chain Technology (C2T) Kit per chain of servers or NetBAY ACT CAT-5 chaining solutions

Xeon 2.4GHz/512KB L2 Cache Proc Upg	59P5102
Xeon 2.8GHz/512KB L2 Cache Proc Upg	02R8958
Xeon 2.8GHz/512KB L2 Cache Proc Upg	73P6382
512MB PC2100 CL2.5 ECC DDR-SDRAM DIMM	33L5038
1GB PC2100 CL2.5 ECC DDR-SDRAM RDIMM	33L5039
2GB PC2100 CL2.5 ECC DDR-SDRAM RDIMM	33L5040
80GB ATA-100 EIDE HDD*	09N4226
36.4GB 15K Ultra320 SCSI Hot-Swap SL HDD*	06P5776
73.4GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD*	06P5756
Remote Supervisor Adapter	09N7585
xSeries Cable Chain Technology Cable Kit (2 meter breakout cable and 2 meter KVM chaining cable)	06P4792
NetBAY ACT Local Console Manager	1735L04

* Disk not supported in all x335 systems



LIMITED WARRANTY³

- 1 year parts and labor
- International Warranty Service³
- On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time⁷
- On site service upgrade options (in eligible locations):⁷
 - 3 year IOR 9x5, NBD response (ServicePac® part num 69P9505)
 - 3 year IOR 9x5, 4 hr avg response (ServicePac part num 69P9506)
 - 3 year IOR 24x7, 4 hr avg response (ServicePac part num 69P9507)
 - 3 year IOR 24x7, 2 hr avg response (ServicePac part num 69P9508)
- Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- 24x7¹⁴ toll-free support for warranty issues during the warranty period³

See footnotes for important warranty information

• = Hot-swap in some models

⊗ US models withdrawn effective March 2004

⚡ 533Mhz FSB models may use 400Mhz FSB processors. 400Mhz FSB models may not use 533Mhz FSB processors.

IBM® Type-GAV-model	Qty x Processor	L2 cache	Memory	Memory type	Disk	Disk controller	Power Supply	Disk bays	Slots x bays	Ethernet	Limited warranty ³	Available date
8837-01y-01x	1 x Xeon® 2.8GHz	1MB	512MB	std	None (open 3.5)	Ultra320	585W	2 hot-swap	2x3	2 x Gigabit	3 year	Oct 2004
8837-02y-02x	1 x Xeon 2.8GHz	1MB	512MB	std	None (open 3.5)	SATA	585W	2 simple-sp	2x3	2 x Gigabit	3 year	Oct 2004
8837-11y-11x	1 x Xeon 3.0GHz	1MB	1GB	std	None (open 3.5)	Ultra320	585W	2 hot-swap	2x3	2 x Gigabit	3 year	Oct 2004
8837-21y-21x	1 x Xeon 3.2GHz	1MB	1GB	std	None (open 3.5)	Ultra320	585W	2 hot-swap	2x3	2 x Gigabit	3 year	Oct 2004
8837-2Ay-2Ax	1 x Xeon 3.2GHz	1MB	1GB	std	None (open 2.5)	Ultra320	585W	4 hot-swap	2x4	2 x Gigabit	3 year	Oct 2004
8837-22y-22x	1 x Xeon 3.2GHz	1MB	1GB	std	None (open 3.5)	SATA	585W	2 simple-sp	2x3	2 x Gigabit	3 year	Oct 2004
8837-31y-31x	1 x Xeon 3.4GHz	1MB	1GB	std	None (open 3.5)	Ultra320	585W	2 hot-swap	2x3	2 x Gigabit	3 year	Oct 2004
8837-41y-41x	1 x Xeon 3.6GHz	1MB	1GB	std	None (open 3.5)	Ultra320	585W	2 hot-swap	2x3	2 x Gigabit	3 year	Oct 2004
8837-4Ay-4Ax	1 x Xeon 3.6GHz	1MB	1GB	std	None (open 2.5)	Ultra320	585W	4 hot-swap	2x4	2 x Gigabit	3 year	Oct 2004
8837-42y-42x	1 x Xeon 3.6GHz	1MB	1GB	std	None (open 3.5)	SATA	585W	2 simple-sp	2x3	2 x Gigabit	3 year	Oct 2004

Positioning	A highly manageable, ultra-dense 1U, 2-way server that delivers performance computing in space-constrained environments											
Processor(s)	1 x Intel® Xeon 2.8, 3.0, 3.2, 3.4, 3.6GHz with 800MHz / 1MB L2 Cache / Extended Memory 64 Technology (EM64T)											
Cache	1MB L2 cache on all models / on die of processor / at processor speed / ECC											
SMP support	2-way SMP / up to two Xeon Processors (same speed/cache size)											
Implementation	Systemboard contains two Intel 604 pin micro-PGA ZIF sockets, eight DIMM slots, two PCI-X slots (one full length 133MHz, one low-profile 100MHz) and integrated SCSI, dual GB ethernet, graphics											
Memory	512MB or 1GB std / 16GB max ¹³ / 8 slots (6 avail) / PC2-3200 400MHz registered 240-pin ECC DDR2-SDRAM DIMMs / eight DIMM gold-connector slots on systemboard / DIMMs must be installed in matched pairs [a bank] / 2-way memory interleave / dual channel / Active Memory™: online spare and memory mirror / Error Checking and Correcting (ECC) via 16-bit Checksum Chipkill™: corrects 1, 2, 3, or 4-bit errors on same chip and detects 2- through 8-bit errors contained in two chips; optional on some 1GB (2x512) and greater DIMMS											
SCSI disk controller	LSI Logic® 53C1020 / Ultra320 SCSI controller (LVD 320MB/sec) / on planar / supports RAID-1 mirroring (Embedded Mirroring) with two SCSI disks in front bays / one 16-bit internal channel / no external connector											
SATA disk Controller	Enhanced SATA-150 (150MB/sec) controller / two connectors on planar / two one-drop cables											
IDE controller / cable	one 1-drop EIDE cable to DVD-ROM											
Disk - MAX capacity	SCSI 3.5: 292GB with two 146GB HDD SCSI 2.5: four 2.5" 73GB HDD SATA: 500GB with two 250GB HDD											
Disk - bays	SCSI: two hot-swap or four 2.5" hot-swap / 80-pin SCA-2 connectors SATA: 2 simple-swap											
Mechanical Architecture / chipsets	EIA 19" Rack (1U ⁴) / rack-mount only / supported in 26" deep racks such as the IBM NetBAY™ Rack products Intel E7520 / Intel Memory Controller Hub (MCH) / 3 PCI buses (one 64bit/133MHz PCI-X1.0, one 64bit/100MHz PCI-X1.0, and 32bit/33MHz PCI) / Intel PCI-X Bridge (supports 133MHz PCI-X slots 1 & 2, LSI Logic 53C1020) / ICH5R South Bridge (Thin IMB to Host Bridge for graphics controller, EIDE, USB, SMBus, LPC bus to Super I/O) / National PC87427 Super I/O (supports legacy components; keyboard, mouse, serial)											
Bus slots	(See below) two available PCI-X 1.0 / no hot-swap Active™ PCI slots / optional full-length PCI-Express x8 Riser Avail											
Ethernet controllers	Two gigabit 10/100/1000 ethernet ports / Broadcom BCM5721 / two full gigabit ethernet MAC and PHY layer functions / on planar / PCI-X 64-bit 100MHz / full duplex / Wake on LAN® / Alert Standard Format 2.0 / two rear RJ-45 ports											
DVD-ROM / diskette	Some: DVD-ROM / IDE; Diskette: none											
Rear ports	Rear: Two USB (2.0), serial (9-pin), video, two ethernet (RJ-45), one RJ-45 (sys mgmt) / mouse ps2 / keyboard ps2											
Graphics	SVGA / ATI® 7000m / on planar / 16MB SDRAM std/max / 32-bit 33MHz PCI 2.2 bus											
Systems mgmt	IBM Baseboard Management Controller (BMC) / H8S2168 / on planar / provides system and environmental monitoring such as temp, memory, optional disks, fans, power supply / support for optional Remote Supervisor Adapter II Slimline with 20-pin conn on planar for continuous pwr (no ext pwr req)											
Diagnostics	Drop down light path diagnostics Pull out Front panel (LED lights indicate failing component)											
Security	Power-on password / administrator password / unattended boot / selectable boot / unattended start mode											
Software	ServerGuide™ (CD-ROM installation and configuration utilities), IBM Director™, and others											
Cooling fans	seven-nine fans / variable speed / hot-swap / redundant											
Power supply	585 watt hot-swap (second Opt)/ universal / auto sensing / auto re-start											
Prerequisites	Monitor, keyboard, mouse, rack, disk (some), operating sys											

Back

PCI slot 1 PCI slot 2

Top

FanFan Systemboard Power Supply 1 & 2

PCI slot #2 slot #1 sockets

FanFanFan (opt)

Disk (opt) DVD-ROM

Disk (std or opt)

FanFanFanFan Fan Fan Fan Fan

Drop Down Light Path Diagnostics Panel

Front 3.5 HDD

disk bay disk bay

Front 2.5 HDD

disk bay disk bay disk bay disk bay

Slot 1: low-profile, halfsize, 64-bit 100MHz PCI X 1.0 (3.3v); Bus A
Slot 2: fullsize, 64-bit 133MHz PCI X 1.0 (3.3v); Bus B

Bay ① 5.25", UltraSlim 0.5", access, std DVD-ROM (3.5 model)
Bay ② 3.5", SL 1", access, std fixed or hot-swap disk
Bay ③ 3.5", SL 1", access, open for fixed or hot-swap disk
Bay ④ 4 bays only available with 2.5" drive model and no DVD-ROM

- Stealth black color front bezel
- Cable Management Arm
- H 1.69" (1U) x W 17.32" x D 27"; 43mm x 440mm x 686mm
- 26 to 28.4 lbs; 11.8kg to 12.9kg (minimum to max configuration)
- Configuration/Setup Utility: F1 at startup
- Diagnostics (PC-Doctor™): F2 at startup
- System Partition Boot: ALT+F1 at startup
- Network Boot: F12 at startup
- Operator Information Panel in front
- LSI Logic Configuration Utility: CTRL+C at startup
- Includes two line cords (9 ft 110v cable with NEMA plug and 9 ft universal interrack HV cable with IEC plug)
- Predictive Failure Analysis⁸ on processor(s), voltage regulator modules, memory, fans, power supply, and disk options

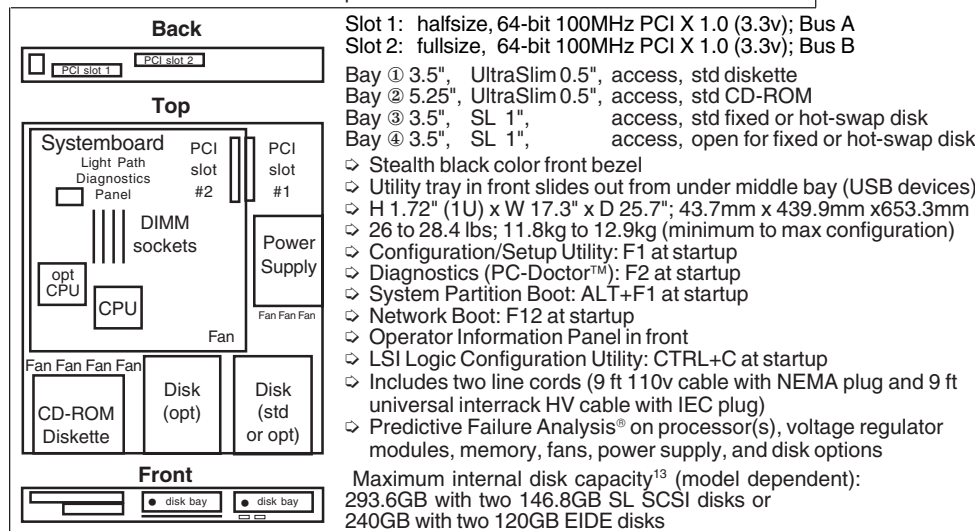
LIMITED WARRANTY³

- 3 year parts and labor
- International Warranty Service³
- On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time⁷
- On site service upgrade options (in eligible locations):⁷
 - 3 year IOR 9x5, 4 hr avg response (ServicePac® part num 21P2072)
 - 3 year IOR 24x7, 4 hr avg response (ServicePac part num 21P2073)
 - 3 year IOR 24x7, 2 hr avg response (ServicePac part num 21P2074)
 - 4 year IOR 24x7, 4 hr avg response (ServicePac part num 69P9244)
 - 5 year IOR 9x5, NBD response (ServicePac part num 69P9246)
- Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- 24x7¹⁴ toll-free support for warranty issues during the warranty period³

IBM® Type-model	Qty x Processor	L2 cache	FSB MHz	Memory	Memory type	Disk	Disk controller	Hot-swap or fixed disk bays	Slots x bays	Ethernet	Limited warranty ³	Available date
8676-1AX	1 x Xeon 2.8B GHz	512KB	533	512MB	Chipkill	None (open)	Ultra320	2 hot-swap	2x4	2 x Gigabit	3 year	Mar 2003

DC power models are designed for network infrastructures requiring network equipment to support DC power environments

Positioning	<i>A highly manageable, ultra-dense 1U, 2-way server that delivers performance computing in space-constrained environments</i>																																									
Processor(s)	1 x Intel® Xeon 2.8BGHz¹ with 533MHz frontside bus / Hyper-Threading technology																																									
L2 cache	512KB / on die of processor / at processor speed (no L3 cache)																																									
SMP support	2-way SMP / up to two Xeon Processors (same speed/cache size)																																									
Implementation	Systemboard contains two Intel 603-pin micro-PGA ZIF sockets, four memory DIMM slots, connector for one PCI-X slot, riser for one PCI-X slot, and integrated SCSI, ethernet, graphics																																									
Memory	512MB std / 8GB max ¹³ / two slots used / two slots available / PC2100 266MHz registered 184-pin ECC DDR-SDRAM DIMMs / four DIMM gold-connector slots on systemboard / DIMMs must be installed in matched pairs [a bank] / 2-way memory interleave / dual channel / memory bus runs at 2 x 100MHz / Error Checking and Correcting (ECC) via 16-bit Checksum Chipkill™ (corrects 1, 2, 3, or 4-bit errors on same chip and detects 2- through 8-bit errors contained in two chips)																																									
SCSI disk controller	<i>All (not used on EIDE models): LSI Logic® 53C1020 / Ultra320 SCSI controller</i> (LVD 320MB/sec) / on planar / 64-bit 100MHz PCI-X Bus B / supports RAID-1 mirroring (Embedded Mirroring) with two SCSI disks in front bays / one 16-bit internal channel / 16-bit 68-pin LVD cable from systemboard to backplane for two disks / no external connector																																									
IDE controller / cable	<i>All: Enhanced IDE ATA-100 controller in CSB5 South Bridge / two connectors on planar / one 1-drop IDE cable (CD-ROM) EIDE models: One 2-drop EIDE cable to two disk bays / one 1-drop EIDE cable to CD-ROM</i>																																									
Disk - capacity	<i>SCSI models: none standard / supports up to 15000 rpm disks; EIDE models: 40GB / 7200 rpm / ATA-100 / 8.7ms seek</i>																																									
Disk - bays	<i>SCSI models: two hot-swap / 80-pin SCA-2 connectors / filler panels in each disk bay / all disk bays Ultra320-enabled</i>																																									
Mechanical Architecture / chipsets	EIA 19" Rack (1U⁴) / rack-mount only / supported in 26" deep racks such as the IBM NetBAY™ Rack products ServerWorks® Grand Champion™ 4.0 LE / CMIC LE Host Bridge (memory controller and I/O Bridge) / one CIOB-X2 I/O Bridge (IMB2 bus to Host Bridge for PCI-X Bus A with slot 1 and dual ethernet and PCI-X Bus B with slot 2 and Ultra320 / CSB5 South Bridge (Thin IMB to Host Bridge for PCI 2.2 Bus C with graphics controller, EIDE, USB, SMBus, LPC bus to Super I/O) / National Semiconductor® PC87417 Super I/O chip																																									
Bus slots	(See below) two available PCI-X 1.0 / no hot-swap Active™ PCI slots																																									
Ethernet controllers	Two gigabit 10/100/1000 ethernet ports / Broadcom BCM5703 / two full gigabit ethernet MAC and PHY layer functions / on planar / PCI-X 64-bit 100MHz Bus A / full duplex / Wake on LAN® / Alert Standard Format 1.0 / two rear RJ-45 ports																																									
CD-ROM / diskette	24X-10X ⁶ CD-ROM / IDE; <i>Diskette: 3.5" 1.44MB diskette drive / dust cover</i>																																									
Rear ports	<i>Rear: one USB (Vers 1.1), C2T in, C2T out, serial (9-pin), two ethernet (RJ-45), one RS-485 (sys mgmt) / no parallel port</i>																																									
Front ports / graphics	<i>Front: two USB (Vers 1.1); Graphics: SVGA / ATI® Rage XL / on planar / 8MB SDRAM std/max / 32-bit 33MHz PCI 2.2 bus</i>																																									
Console interconnects	C2T Interconnect™ cable (10 inch, 245mm) is standard (Keyboard Video Mouse (KVM) chaining cable) / one Cable Chain Technology Cable Kit required at end of chain (a cable with separate keyboard, mouse, monitor connectors)																																									
Systems mgmt	IBM Integrated system management processor (ISMP) / H8S2148 / on planar / provides system and environmental monitoring such as temp, memory, optional disks, fans, power supply / support for optional Remote Supervisor Adapter with 20-pin conn on planar for continuous pwr (no ext pwr req)																																									
Diagnostics	Light Path Diagnostics™ (LED lights indicate failing component) and on-board diagnostics (via PC-Doctor in BIOS)																																									
Security	Power-on password / administrator password / unattended boot / selectable boot / unattended start mode																																									
Software	ServerGuide™ (CD-ROM installation and configuration utilities), IBM Director™, and others																																									
Cooling fans	Eight fans (five for system, three on power supply) / variable speed / not redundant or hot-swap																																									
Power supply	332 watt (-48 to -60 V dc [direct current]) / auto-sensing / supports dual input sources (two power sources) / not redundant / not hot-swap / auto-restart support																																									
Prerequisites	Monitor, keyb., mouse, rack, disk, operating sys, one C2T Kit per chain of servers or NetBAY ACT CAT-5																																									
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LIMITED WARRANTY³

- 3 year parts and labor
- International Warranty Service³
- On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time⁷
- On site service upgrade options (in eligible locations):⁷
 - 3 year IOR 9x5, 4 hr avg response (ServicePac® part num 21P2072)
 - 3 year IOR 24x7, 4 hr avg response (ServicePac part num 21P2073)
 - 3 year IOR 24x7, 2 hr avg response (ServicePac part num 21P2074)
 - 4 year IOR 24x7, 4 hr avg response (ServicePac part num 69P9244)
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- Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
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See footnotes for important warranty information

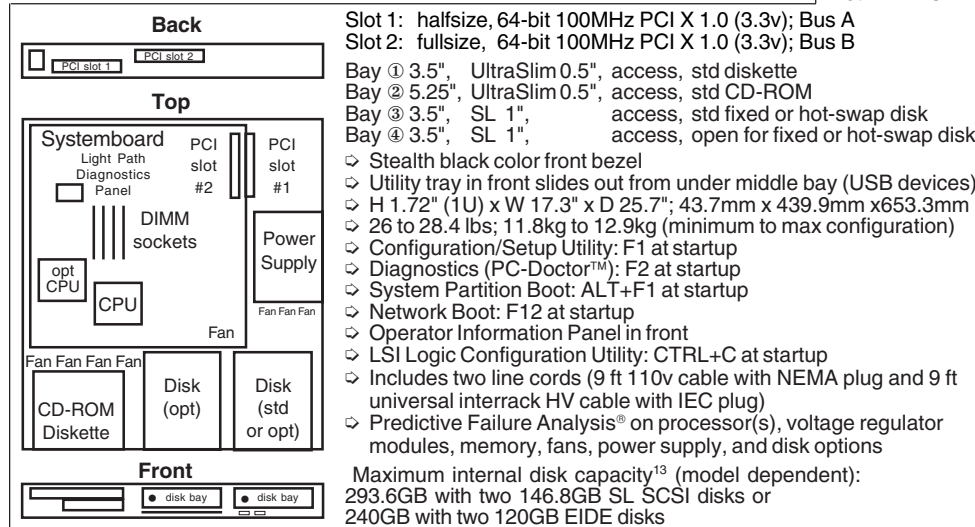
• = Hot-swap

® US models announced February 18, 2003

IBM® Type-model	Qty x Processor	L2 cache	FSB MHz	Memory	Memory type	Disk	Disk controller	Hot-swap or fixed disk bays	Slots x bays	Ethernet	Limited warranty ³	Available date
8676-LAX	1 x Xeon 2.8B GHz	512KB	533	512MB	Chipkill	None (open)	Ultra320	2 hot-swap	2x4	2 x Gigabit	3 year	Jan 2004

DC power models are designed for network infrastructures requiring network equipment to support DC power environments

Positioning	<i>A highly manageable, ultra-dense 1U, 2-way server that delivers performance computing in space-constrained environments</i>																																												
Processor(s)	1 x Intel® Xeon 2.8BGHz¹ with 533MHz frontside bus / Hyper-Threading technology																																												
L2 cache	512KB / on die of processor / at processor speed (no L3 cache)																																												
SMP support	2-way SMP / up to two Xeon Processors (same speed/cache size)																																												
Implementation	Systemboard contains two Intel 603-pin micro-PGA ZIF sockets, four memory DIMM slots, connector for one PCI-X slot, riser for one PCI-X slot, and integrated SCSI, ethernet, graphics																																												
Memory	512MB std / 8GB max ¹³ / two slots used / two slots available / PC2100 266MHz registered 184-pin ECC DDR-SDRAM DIMMs / four DIMM gold-connector slots on systemboard / DIMMs must be installed in matched pairs [a bank] / 2-way memory interleave / dual channel / memory bus runs at 2 x 100MHz / Error Checking and Correcting (ECC) via 16-bit Checksum Chipkill™ (corrects 1, 2, 3, or 4-bit errors on same chip and detects 2- through 8-bit errors contained in two chips). Chipkill available on DIMMs of 512MB or greater only.																																												
SCSI disk controller	<i>All (not used on EIDE models): LSI Logic® 53C1020 / Ultra320 SCSI controller (LVD 320MB/sec) / on planar / 64-bit 100MHz PCI-X Bus B / supports RAID-1 mirroring (Embedded Mirroring) with two SCSI disks in front bays / one 16-bit internal channel / 16-bit 68-pin LVD cable from systemboard to backplane for two disks / no external connector</i>																																												
IDE controller / cable	<i>All: Enhanced IDE ATA-100 controller in CSB5 South Bridge / two connectors on planar / one 1-drop IDE cable (CD-ROM) EIDE models: One 2-drop EIDE cable to two disk bays / one 1-drop EIDE cable to CD-ROM</i>																																												
Disk - capacity	<i>SCSI models: none standard / supports up to 15000 rpm disks; EIDE models: 40GB / 7200 rpm / ATA-100 / 8.7ms seek</i>																																												
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Mechanical Architecture / chipsets	EIA 19" Rack (1U⁴) / rack-mount only / supported in 26" deep racks such as the IBM NetBAY™ Rack products ServerWorks® Grand Champion™ 4.0 LE / CMIC LE Host Bridge (memory controller and I/O Bridge) / one CIOB-X2 I/O Bridge (IMB2 bus to Host Bridge for PCI-X Bus A with slot 1 and dual ethernet and PCI-X Bus B with slot 2 and Ultra320 / CSB5 South Bridge (Thin IMB to Host Bridge for PCI 2.2 Bus C with graphics controller, EIDE, USB, SMBus, LPC bus to Super I/O) / National Semiconductor® PC87417 Super I/O chip																																												
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Ethernet controllers	Two gigabit 10/100/1000 ethernet ports / Broadcom BCM5703 / two full gigabit ethernet MAC and PHY layer functions / on planar / PCI-X 64-bit 100MHz Bus A / full duplex / Wake on LAN® / Alert Standard Format 1.0 / two rear RJ-45 ports																																												
CD-ROM / diskette	24X-10X ⁶ CD-ROM / IDE; <i>Diskette: 3.5" 1.44MB diskette drive / dust cover</i>																																												
Rear ports	<i>Rear: one USB (Vers 1.1), C2T in, C2T out, serial (9-pin), two ethernet (RJ-45), one RS-485 (sys mgmt) / no parallel port</i>																																												
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Systems mgmt	IBM Integrated system management processor (ISMP) / H8S2148 / on planar / provides system and environmental monitoring such as temp, memory, optional disks, fans, power supply / support for optional Remote Supervisor Adapter with 20-pin conn on planar for continuous pwr (no ext pwr req)																																												
Diagnostics	Light Path Diagnostics™ (LED lights indicate failing component) and on-board diagnostics (via PC-Doctor in BIOS)																																												
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Cooling fans	Eight fans (five for system, three on power supply) / variable speed / not redundant or hot-swap																																												
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 - 3 year IOR 24x7, 2 hr avg response (ServicePac part num 21P2074)
 - 4 year IOR 24x7, 4 hr avg response (ServicePac part num 69P9244)
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See footnotes for important warranty information

• = Hot-swap

US models announced January 20, 2004

IBM® Type-model	Qty x Processor	L2 cache	Memory	Ultra160 SCSI disk	SCSI controller	Mechanical	Slots x bays	Fixed disk bays	Alarm Panel	Power supply	Compliant	Available date	
8827-14X	2 x Pentium® III 1.26GHz	512KB	2GB	1 x 36.4GB ² 10K	2 x Ultra160	2U ⁴ rack	6x4	2 fixed	Yes	DC power	NEBS-3	Apr 2002	
<p>DC power models are designed for network infrastructures requiring network equipment to support DC power environments</p>													
Positioning	Network Equipment Building System (NEBS) level 3-compliant for telecommunications carrier-grade environments												
Processor(s)	2 x Intel® Pentium® III 1.26GHz-S with 133MHz frontside bus												
L2 cache	512KB std and max / ECC / at processor speed / processor and L2 cache in Flip Chip Pin Grid Array (FC-PGA2)												
Implementation	Motherboard contains two Intel PGA370 sockets, six DIMM sockets, two PCI riser connectors, and integrated subsystems												
SMP support	2-way SMP via second identical processor is standard												
Memory	2GB std / 6GB ¹³ max / 6 sockets / 4 available (ships with two 1GB DIMMs) / Error Checking and Correcting (ECC) memory controller / matched pairs required / two-way interleaving / SDRAM / 133MHz / six 168-pin gold-plated sockets / PC133-compliant / supports registered SDRAM ECC DIMMs only												
SCSI disk controller	Adaptec® AHA-7899W / dual channel Wide Ultra160 SCSI controller (LVD 160MB/sec) / on planar / 64-bit PCI												
SCSI channels	SCSI Channel A: external 16-bit .8mm VHDCI 68-pin external connector (no cables) SCSI Channel B: one internal 16-bit 68-pin LVD cable from controller to two-bay disk drive carrier												
SCSI disk	1 x 36GB Ultra160 SCSI, 10K rpm, 4.9ms read seek, S.M.A.R.T. ⁵												
SCSI disk bays	Two fixed disk bays (not hot-swap) in disk drive carrier that slides out from front												
IDE controller / cable	EIDE ATA-33 controller in South Bridge / one connector on planar / one 1-drop IDE cable (to CD-ROM)												
Mechanical	EIA 19" Rack (2U ⁴) x 20-inch deep												
Rack support	Designed for installation in a two-post, 19" rack unit only (not supported in IBM NetBAY™ Racks) / ships with rack mount kit (See below) three full height full length 64-bit 33MHz slots / three low-profile half length 64-bit 66MHz PCI slots / PCI 2.2 / peer PCI buses / no hot-swap Active™ PCI slots												
PCI bus slots													
Chipset	ServerWorks® III HE-SL chipset / CNB20HE-SL North Bridge for CIOB and PCI A 32-bit 33MHz (graphics, ethernet, South Bridge) / NB6555 Champion I/O Bridge (CIOB20) for PCI Bus B (slots, SCSI) and C (slots) / CSB5 South Bridge for EIDE, USB, LPC bus for Super I/O National Semiconductor PC8741 (diskette, serial, keyboard) and Baseboard Management Controller												
Bays	(See diagram below): 4 bays / two disk bays (not hot-swap) / one CD-ROM bay / one diskette bay												
10/100 ethernet	2 x Intel 82550 / on planar / full duplex / supports Wake on LAN®, PXE 2.0 Boot Agent, Adapter Fault Tolerance Failover												
CD-ROM / diskette	24X-10X ⁶ CD-ROM / multisession / IDE interface / bootable; Diskette: 3.5" 1.44MB diskette drive / dust cover												
Rear ports	Two USB ports (Version 1.1); RJ-45 serial; PS/2 keyboard; two RJ-45 ethernet; DB-15 graphics; 68-pin SCSI; DB-15 male connector for front panel alarm relay contacts / no parallel port / mouse connects to USB port (or keyboard port with standard Y-splitter cable)												
Graphics controller	SVGA / PCI bus / ATI® Rage XL (on planar) / 8MB SDRAM std/max / 1600x1280 at 16M colors at 85Hz / 15-pin D-shell												
Security	Power-on password / admin password / unattended boot / selectable boot / boot without keyboard / diskette write protect												
Alarm panel	External alarm panel in front bezel provides 24x7 surveillance of critical, major and minor errors and power outages / four alarm panel LEDs: power alarm fault, critical alarm fault, major alarm fault, minor alarm fault												
Status LEDs	Operator Information Panel (in front) / includes switches (NMI, power, reset) and status LEDs (NIC, disk, main power)												
Systems mgmt	Integrated service processor (Baseboard Management Controller) / on planar / failures or thresholds in fans, memory, processors, temperature, voltage, and power supplies activate alarm panel LEDs /												
Diagnostics	LED diagnostics and on-board diagnostics providing an LED map to a failing component												
OS support	Red Hat Linux® 7.1												
Software ship group	Resource CD (CD-ROM installation and configuration utilities, Intel Server Control server management software, Product Guide), PC-Doctor™ diagnostics diskette, and IBM Director (on separate CD)												
Keyboard / mouse	None (since rack-based)					512MB SDRAM ECC DIMM 133MHz RDIMM					33L3324		
Power supply	Std: two; max: two / accessible from rear / 350 watt (-48 to -60 V dc [direct current]) / supports dual input sources (two power sources) / redundant / hot-swap / auto-restart support					1GB SDRAM ECC DIMM 133MHz RDIMM					33L3326		
						36.4GB 10K Ultra160 SCSI SL HDD					06P5751		
						IBM E54 (13.8" viewable) FST Monitor (black)					633147N		
						IBM Sleek Two-Button Mouse (black)					28L3673		
						IBM 84-key Space Saver Keyboard (black)					28L3644		
						Other options at ibm.com/pc/us/accessories							
Fans	Four fans / multispeed / not hot-swap / not redundant / fan failure signals front panel alarm LED / fan in each power supply / fan on each Pentium III processor												
Prerequisites	Appropriate dc power source and customer supplied wiring, monitor, keyboard, mouse, rack, operating system												

<p>Slot 1: fullsize, 64-bit 33MHz PCI 2.2 (5v), Bus B</p> <p>Slot 2: fullsize, 64-bit 33MHz PCI 2.2 (5v), Bus B</p> <p>Slot 3: fullsize, 64-bit 33MHz PCI 2.2 (5v), Bus B</p> <p>Slot 4: low-profile, 64-bit 66MHz PCI 2.2 (3.3v), Bus C</p> <p>Slot 5: low-profile, 64-bit 66MHz PCI 2.2 (3.3v), Bus C</p> <p>Slot 6: low-profile, 64-bit 66MHz PCI 2.2 (3.3v), Bus C</p>	<p>CD-ROM</p> <p>diskette</p> <p>disk bay</p> <p>disk bay</p> <p>2U Rack</p>	<ul style="list-style-type: none"> ➤ Raven black color (front bezel) ➤ Configuration/Setup Utility invoked by pressing F2 at startup ➤ SCSISelect near startup by pressing CTRL+A ➤ PC-Doctor™ diagnostics on diskette ➤ Several hardcopy publications ➤ H 3.5" x W 17.5" x D 20.0" ➤ H 89 mm x W 445 mm x D 508 mm ➤ 34 to 37 pounds (15.4 to 16.8 kg) ➤ IPMI 1.5 and WfM 2.0-compliant 	<p>LIMITED WARRANTY³</p> <ul style="list-style-type: none"> ↔ 1 year parts and labor ↔ International Warranty Service³ ↔ On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time⁷ ↔ 1 year on site warranty service upgrade options (in eligible locations):⁷ <ul style="list-style-type: none"> • 9 hr coverage, Mon-Fri excluding holidays, 4 hr response time (No ServicePac® part number) • 24 hr x 7 day coverage, 4 hour average response time (No ServicePac part number) • 24 hr x 7 day coverage, 2 hour average response time (No ServicePac part number) ↔ 24x7¹⁴ toll-free support for warranty issues during the warranty period³
<p>Bay ① 3.5", 0.5", access, std diskette</p> <p>Bay ② 3.5", 0.5", access, std CD-ROM</p> <p>Bay ③ 3.5", SL 1", no access, std disk</p> <p>Bay ④ 3.5", SL 1", no access, optional disk</p>		<p>All models: Max int disk capacity: 72.8GB² with two 36.4GB SL disks</p>	

See footnotes for important warranty information
US model announced March 19, 2002

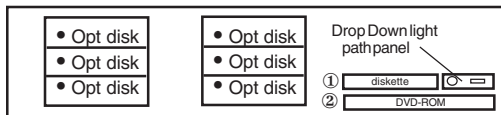
IBM® Type-model	Qty x Processor	L2 cache Memory	Ultra320 SCSI disk	SCSI controller	Mechanical	Slots x Disk Bays	Alarm Panel	Power supply	Compliant	Available date		
8847-14X	2 x Pentium® Xeon 2.4GHz	512KB 1GB	1 x 73.4GB ² 10K	2 x Ultra320	2U ⁴ rack	6x3 2 HS	Yes	DC power	NEBS-3	Jul 2004		
8847-24X	2 x Pentium Xeon 2.4GHz	512KB 2GB	1 x 146.8GB 10K	2 x Ultra320	2U rack	6x3 2 HS	Yes	DC power	NEBS-3	Jul 2004		
DC power models are designed for network infrastructures requiring network equipment to support DC power environments												
Positioning	Network Equipment Building System (NEBS) level 3-compliant for telecommunications carrier-grade environments											
Processor(s)	2 x Intel® Pentium® Xeon 2.4GHz with 533MHz frontside bus											
L2 cache	512KB std and max / ECC / at processor speed / processor and L2 cache in Flip Chip Pin Grid Array (FC-PGA2)											
Implementation	Motherboard contains two Intel Socket 604 INT3/FCPGA, six DIMM sockets, two PCI riser connectors, and integrated SMP support											
SMP support	via second identical processor is standard											
Memory	Up to 2GB std / 12GB ¹³ max / 266MHz SDRAM / Six 168-pin sockets / Two sockets used / Four sockets available / ships with two 512 GB or 1GB DIMMs / Error Checking and Correcting (ECC) memory controller / matched pairs required / two-way interleaving / optional 2GB upgrade kit available by special bid											
SCSI disk controller	Adaptec® AIC-7902W / dual channel Wide Ultra320 SCSI controller (LVD 320MB/sec) / on planar / 64-bit PCI											
SCSI channels	SCSI Channel A: external 16-bit .8mm VHDCI 68-pin external connector (no cables) SCSI Channel B: one internal 16-bit 68-pin LVD cable from controller to two-bay disk drive carrier											
SCSI disk	1 x 73.4GB or 146.8GB Ultra320 SCSI, 10K rpm, 4.9ms read seek, S.M.A.R.T. ⁵											
SCSI disk bays	Two fixed disk bays (not hot-swap) in disk drive carrier that slides out from front											
IDE controller / cable	EIDE ATA-66 controller in South Bridge / one connector on planar / one 1-drop IDE cable (to CD-ROM)											
Mechanical	EIA 19" Rack (2U ⁴) x 20-inch deep											
Rack support	Designed for installation in a two-post, 19" rack unit only (not supported in IBM NetBAY™ Racks) / ships with rack mount kit											
PCI bus slots	(See below) three full height full length 64-bit 133MHz slots / three low-profile half length 64-bit 66MHz PCI slots / PCI 2.2 / peer PCI buses / no hot-swap Active™ PCI slots											
Chipset	Intel® E7501 chipset / E7501 MCH North Bridge for CIOB and PCI A 64-bit 33MHz (graphics, ethernet, South Bridge) / P64Hz PCI Bus B (slots, SCSI) and C (slots) / ICH3-S South Bridge for EIDE, USB, LPC bus for Super I/O National Semiconductor PC87417 (serial, keyboard) and Baseboard Management Controller											
Bays	(See diagram below): 3 bays / two disk bays (hot-swap) / one CD-ROM bay											
10/100 ethernet	2 x Intel 82546 / on planar / full duplex / supports Wake on LAN®, PXE 2.0 Boot Agent, Adapter Fault Tolerance Failover											
CD-ROM / diskette	24X-10X ⁶ CD-ROM / multisession / IDE interface / bootable											
Rear ports	Two USB ports (Version 1.1); RJ-45 serial; PS/2 keyboard; two RJ-45 ethernet; DB-15 graphics; 68-pin SCSI; DB-15 male connector for front panel alarm relay contacts / no parallel port / mouse connects to USB port (or keyboard port with standard Y-splitter cable)											
Graphics controller	SVGA / PCI bus / ATI® Rage XL (on planar) / 8MB SDRAM std/max / 1600x1280 at 16M colors at 85Hz / 15-pin D-shell											
Security	Power-on password / admin password / unattended boot / selectable boot / boot without keyboard											
Alarm panel	External alarm panel in front bezel provides 24x7 surveillance of critical, major and minor errors and power outages / four alarm panel LEDs: power alarm fault, critical alarm fault, major alarm fault, minor alarm fault											
Status LEDs	Operator Information Panel (in front) / includes switches (NMI, power, reset) and status LEDs (NIC, disk, main power)											
Systems mgmt	Integrated service processor (Baseboard Management Controller) / on planar / failures or thresholds in fans, memory, processors, temperature, voltage, and power supplies activate alarm panel LEDs /											
Diagnostics	LED diagnostics and on-board diagnostics providing an LED map to a failing component											
OS support	Microsoft Windows 2000, Windows 2003 Advanced Server / Red Hat AS 2.1 / SLES											
Software ship group	Resource CD (CD-ROM installation and configuration utilities, Intel Server Control server management software, Product Guide)											
Keyboard / mouse	None (since rack-based)					2GB PC2100 DDR ECC RDIMM Memory Kit 73P4126						
Power supply	Std: one (14X) or two (24X); max: two / accessible from rear					Other options available via special Bid						
Fans	480 watt (-48 to -60 V dc [direct current]) / supports dual input sources (two power sources) / redundant / hot-swap / auto-restart support											
Prerequisites	Four fans / multispeed / not hot-swap / not redundant / fan failure signals front panel alarm LED / fan in each power supply / fan on each Pentium III processor Appropriate DC power source and customer supplied wiring, monitor, keyboard, mouse, rack, operating system											
Slot 1: fullsize, 64-bit 64MHz PCI-X (5v), Bus B Slot 2: fullsize, 64-bit 64MHz PCI-X (5v), Bus B Slot 3: fullsize, 64-bit 64MHz PCI-X (5v), Bus B Slot 4: low-profile, 64-bit 133MHz PCI-X (3.3v), Bus C Slot 5: low-profile, 64-bit 133MHz PCI-X (3.3v), Bus C Slot 6: low-profile, 64-bit 133MHz PCI-X (3.3v), Bus C			<p style="text-align: center;">2U Rack</p>			<ul style="list-style-type: none"> ⇨ Raven black color (front bezel) ⇨ Configuration/Setup Utility invoked by pressing F2 at startup ⇨ SCSISelect near startup by pressing CTRL+A ⇨ PC-Doctor™ diagnostics on diskette ⇨ Several hardcopy publications ⇨ H 3.45" x W 17.14" x D 20.0" ⇨ H 87.6 mm x W 435.3 mm x D 508 mm ⇨ 34 to 37 pounds (15.4 to 16.8 kg) 			<p style="text-align: center;">LIMITED WARRANTY³</p> <ul style="list-style-type: none"> ⇨ 3/3 year parts and labor ⇨ International Warranty Service³ ⇨ On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time⁷ ⇨ 2 year on site warranty service upgrade options (in eligible locations):⁷ <ul style="list-style-type: none"> • 9 hr coverage, Mon-Fri excluding holidays, 4 hr response time 96P2122 • 24 hr x 7 day coverage, 4 hour average response time 96P2123 • 24 hr x 7 day coverage, 2 hour average response time 96P2124 ⇨ 24x7¹⁴ toll-free support for warranty issues during the warranty period³ 			
Bay ② 3.5", 0.5", access, std CD-ROM Bay ③ 3.5", SL 1", no access, std disk Bay ④ 3.5", SL 1", no access, optional disk			All models: Max int disk capacity: 293.6GB ² with two 146.8GB SL disks									

See footnotes for important warranty information
US model announced June 15, 2004

IBM® Type-GAV-model	Qty x Processor	L2 Cache	Memory	Disk	SCSI controller	Form Factor	Slots x bays (hot-swap bays)	Power supply	Ethernet	Available date
8840-01y-01U	1 x Xeon™ 2.8GHz	1MB	512MB	None	2 x Ultra320	2U ⁴	4x8 (6 hot-swap)	1 x 625W hot-swap	2 x Gigabit	Aug 2004
8840-11y-11U	1 x Xeon 3.0GHz	1MB	1GB	None	2 x Ultra320	2U	4x8 (6 hot-swap)	1 x 625W hot-swap	2 x Gigabit	Aug 2004
8840-21y-21U	1 x Xeon 3.2GHz	1MB	1GB	None	2 x Ultra320	2U	4x8 (6 hot-swap)	1 x 625W hot-swap	2 x Gigabit	Aug 2004
8840-31y-31U	1 x Xeon 3.4GHz	1MB	1GB	None	2 x Ultra320	2U	4x8 (6 hot-swap)	1 x 625W hot-swap	2 x Gigabit	Aug 2004
8840-41y-41U	1 x Xeon 3.6GHz	1MB	1GB	None	2 x Ultra320	2U	4x8 (6 hot-swap)	1 x 625W hot-swap	2 x Gigabit	Aug 2004
Positioning Processor	A rack-dense 2-way server delivering high availability, scalability and expandability for application-serving Web environments 1 x Intel® Xeon™ Processor 2.8, 3.0, 3.2, 3.4, 3.6GHz with 800MHz frontside bus / Optimized for Extended Memory 64 Technology (EM64T) / Hyper-Threading technology / Simultaneous multi-threaded (SMT)									
L2 cache	1MB L2 Cache / on die of processor / at processor speed									
SMP support Implementation	2-way SMP / up to two Xeon Processors (same speed/cache size) Systemboard contains two Intel PGA604 micro-PGA ZIF sockets, eight memory DIMM slots, two low-profile PCI-X (100MHz) slots, two full-length PCI-X (133MHz) slots, and integrated SCSI, dual GB ethernet, graphics									
Memory	512MB or 1GB std / 16GB ¹³ max / two slots used / six slots available / DIMMs / PC3200 DDR2 400MHz registered 240-pin ECC DDR2-SDRAM DIMMs / eight DIMM gold-connector slots on systemboard / DIMMs must be installed in matched pairs [a bank] / 2-way memory interleave / dual channel / Active Memory™ : Memory mirroring, hot-spare memory / Error Checking and Correcting (ECC) / optional 16-bit Checksum Chipkill™ corrects 1, 2, 3, or 4-bit errors on same chip and detects 2- through 8-bit errors contained in two chips,									
SCSI disk controller	Adaptec® AIC-7902 / dual channel Ultra320 SCSI controller (LVD 320MB/sec) / on planar / 64-bit 100MHz PCI-X / supports RAID-0, 1, 10 with up to one hot-spare disk / optional IBM ServeRAID™-7k Adaptor for low-cost RAID 0, 1, 1E, 5, 00, 10, 1E0, 50 (installed on reserved internal connector)									
SCSI channels	Two 16-bit channels (one internal and one external) / <i>SCSI Channel B</i> : 16-bit 68-pin LVD cable from systemboard to backplane for six disks; <i>Channel A</i> : 16-bit 68-pin interface to support external SCSI devices via external SCSI 0.8mm VHDCI connector / supports optional ServeRAID adapters with external connector(s) for external devices									
IDE controller/cable	Enhanced IDE ATA-100 controller in ICH5 South Bridge / one connector on planar / one 1-drop IDE cable (CD-ROM)									
Disk - capacity	None standard / supports 7200-15000 rpm disks / one backplane									
Disk - bays	Six hot-swap / 80-pin SCA-2 connectors / filler panels installed in each disk bay / all disk bays Ultra320-enabled									
Mechanical Chipset	EIA 19" Rack (2U⁴) / rack-mount only / supported in IBM NetBAY™ Rack products / no rack to tower conversion Intel E7520 / Memory Controller Hub (MCH) / Intel I/O Controller Hub 5 (ICH5) / Two Intel PCI-X Hubs (133MHz PCI-X slots 3 & 4) / Intel Dodson I/O Processor (supports 100MHz PCI-X slots 1 & 2, Adaptec AIC-7902 and optional ServeRAID 7k Adapter / ICH5 South Bridge (Thin IMB to Host Bridge for graphics controller, EIDE, USB, SMBus, LPC bus to Super I/O) / LPC-SIO 8742x Super I/O									
Bus slots	(See below) Four available PCI-X 1.0 / no hot-swap Active™ PCI slots									
Ethernet controller	Two gigabit 10/100/1000 ethernet ports / Two Broadcom® 5721 / two full gigabit ethernet MAC and PHY layer functions / on planar / PCI-X 64-bit 100MHz / full duplex / Wake on LAN® / Alert Standard Format 2.0 / two RJ-45 ports in rear									
Optical / diskette	8X-24X⁶ DVD-ROM / IDE; <i>Diskette</i> : 3.5" 1.44MB diskette drive / dust cover									
Front & Rear ports	<i>Front</i> : one USB (Vers 2.0) <i>Rear</i> : two USB (Vers 2.0), keyboard, mouse, serial (9-pin), graphics (DB-15), two ethernet (RJ-45), two RJ-45 (sys mgmt) / no parallel port									
Graphics	SVGA / ATI® Radeon™ 7000m / on planar / 16MB DDR SDRAM std/max / 32-bit 33MHz PCI 2.2 bus									
Security	Power-on password / administrator password / unattended boot / selectable boot sequence									
Systems mgmt	IBM Baseboard Management Controller (BMC) / H8S2168 / on planar / provides system and environmental monitoring such as temp, optional disks, fans, power supp / supports optional Remote Supervisor Adapter II slimline with reserved connector for continuous power (no ext power reqd)								Xeon 2.8GHz 800MHz/1MB L2 Proc Upg	13N0681
									Xeon 3.0GHz 800MHz/1MB L2 Proc Upg	13N0688
									Xeon 3.2GHz 800MHz/1MB L2 Proc Upg	13N0683
									Xeon 3.4GHz 800MHz/1MB L2 Proc Upg	13N0684
									Xeon 3.6GHz 800MHz/1MB L2 Proc Upg	13N0685
Diagnosics	Drop down light path diagnostics panel providing LED map to failing part (located on front panel)								512MB (2x256) PC3200 CL3 ECC DDR2 Non-Chpk Kit	73P3523
									1GB (2x512) PC3200 CL3 ECC DDR2 Non-Chpk Kit	73P3522
Software	ServerGuide™ (CD-ROM installation and configuration utilities), IBM Director systems mgmt, others								2GB (2x1GB)PC3200 CL3 ECC DDR2-SDRAM	73P2866
									IBM ServeRAID-7k Adapter	71P8642
									IBM Remote Supervisor Adapter II Slim	73P9341
Keyboard / mouse	None standard (because rack-based)								73.4GB 10K Ultra320 SCSI Hot-Swap SL HDD	90P1305
Power supply	<i>Std/Max</i> : one/two 625 watt hot-swap / rear access / auto restart / redundant with two power supplies / auto-sensing								146.8GB 10K Ultra320 SCSI Hot-Swap SL HDD	90P1306
Fans	Calibrated Vectored Cooling™ <i>Std</i> : six fans; <i>Max</i> : twelve (six fans with optional second power supply) / redundant with twelve fans installed; <i>All</i> : variable speed / hot-swap / PFA								625W (N. Amreica) Hot-Swap Power Supply	26K5097
									NetBAY Local Console Manager	1735L04
									NetBAY Remote Console Manager	1735R16
									Other options at ibm.com/pc/us/accessories	
Prerequisites	Monitor, keyboard, mouse, SCSI disk, rack									
Slot 1: low-profile, 64-bit 100MHz 3.3v PCI-X, non hot, Bus A	Quick release adapter slots (no screws)									
Slot 2: low-profile, 64-bit 100MHz 3.3v PCI-X non hot, Bus A	Configuration/Setup Utility: F1 at startup									
Slot 3: full, 64-bit 133MHz 3.3v PCI-X, not hot-swap, Bus B	Diagnostics (PC-Doctor™): F2 at startup									
Slot 4: full, 64-bit 133MHz 3.3v PCI-X, not hot-swap, Bus B	System Partition Boot: ALT+F1 at startup									
*slots 3 & 4 riser may be replaced with PCI-Express riser	Network Boot: F12 at startup									
	Front indicators LEDs: Power-on LED, SCSI bus activity LED, system identification LED, information LED, and system-error LED									
	Predictive failure analysis on disk options, memory, processors, VRMs, power supplies, and fans in conjunction with IBM Director can alert the system administrator of an imminent component failure									
	Rack: H 3.36" x W 17.5" x D 27.5" (H 85.4mm x W 443.6mm x D 698mm)									
	46.5 to 62 pounds									
	Stealth black color									
	2U Rack									
	All models: Max int disk capacity: 880.0GB ² with six 146.8GB SL disks									

LIMITED WARRANTY³

- ↪ 3 year parts and labor
- ↪ International Warranty Service³
- ↪ On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time⁷
- ↪ 3 year on site warranty service upgrade options (in eligible locations):⁷
 - 9 hr coverage, Mon-Fri excluding holidays, 4 hr response time (ServicePac[®] 21P2077)
 - 24 hr x 7 day coverage, 4 hour average response time (ServicePac 21P2078)
 - 24 hr x 7 day coverage, 2 hour average response time (ServicePac 21P2093)
- ↪ Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- ↪ 24x7¹⁴ toll-free support for warranty issues during the warranty period³



Bay ① 3.5", 0.5", access, slim diskette
 Bay ② 5.25", 0.5", access, slim DVD-ROM
 Bay ③ 3.5", SL 1", access, hot-swap, open for disk
 Bay ④ 3.5", SL 1", access, hot-swap, open for disk
 Bay ⑤ 3.5", SL 1", access, hot-swap, open for disk
 Bay ⑥ 3.5", SL 1", access, hot-swap, open for disk
 Bay ⑦ 3.5", SL 1", access, hot-swap, open for disk
 Bay ⑧ 3.5", SL 1", access, hot-swap, open for disk
 Bays 3 through 8 support six SL disks; or 1 DDS5 Tape drive (2 slots used, additional PCI SCSI adaptor req) via SCA-2 connectors

IBM® Type-model	Qty x Processor	L3 cache	Memory	Disks	SCSI controller	Mechanical	Slots x bays	RXE Exp Ports	Hot-swap pwr supplies	Mgmt adapter	Available date
8686-1RQ	1 x Xeon™ MP 2.0GHz	1MB	1GB Chipkill™	None	Ultra160	3U ⁴ rack	6x5	One	One (not redund)	PCI	Jun 2003
8686-1SQ	2 x Xeon MP 2.0GHz	1MB	1GB Chipkill	None	Ultra160	3U rack	6x5	One	Two redundant	PCI	Nov 2003
8686-1TQ	2 x Xeon MP 2.0GHz	1MB	3GB Chipkill 2 x 36.4GB	10K	Ultra160	3U rack	6x5	One	Two redundant	PCI	Nov 2003
8686-2RQ	2 x Xeon MP 2.5GHz	1MB	2GB Chipkill	None	Ultra160	3U rack	6x5	One	Two redundant	PCI	Jun 2003
8686-3RQ	2 x Xeon MP 2.8GHz	2MB	2GB Chipkill	None	Ultra160	3U rack	6x5	One	Two redundant	PCI	Jun 2003
Processors	1 or 2 x Intel® Xeon™ Processor MP 2.0, 2.5, or 2.8GHz ¹ with 400MHz frontside bus / Hyper-Threading technology										
L2 cache	512KB / on die of processor / at processor speed										
L3 cache	1MB or 2MB / on die of processor / at processor speed										
Processor upgrade Implementation	4-way SMP / up to four Xeon Processors MP (same speed/cache size) Systemboard contains four Intel 603-pin micro-PGA ZIF sockets, one memory board slot, six Active™ PCI-X slots, and integrated SCSI, ethernet, graphics										
Memory	Up to 3GB std / 16GB max ^{12,13} / two (1GB model), four (2GB models) or six (3GB models) 512MB DIMMs installed / 1.7-inch tall / one memory board standard with 8 DIMM gold-connector slots / DIMMs must be installed in matched pairs / 128-bit simultaneous transfer from two DIMMs / PC1600 200MHz registered 184-pin DDR-SDRAM RDIMMs / Error Checking and Correcting (ECC) via 16-bit Checksum Chipkill™ (corrects 1, 2, 3, or 4-bit errors on same chip and detects 2- through 8-bit errors contained in two chips)										
SCSI disk controller	Adaptec® AIC-7892 / Wide Ultra160 SCSI (LVD 160MB/sec) / single channel / 64-bit 33MHz PCI / integrated on planar										
SCSI connectors	Controller hard-wired to SCSI backplane (no cable) / no external SCSI connector										
SCSI cabling	One standard 16-bit LVD cable included for attaching an optional ServeRAID adapter to the three-bay backplane; SCSI RAID adapter 68-pin connector on systemboard for this cable to get signals to three-bay backplane										
IDE controller / cabling	Enhanced IDE ATA-33 controller in OSB4 South Bridge										
Disk - capacity	None standard / supports up to 15,000 rpm disks										
Disk - bays	Three hot-swap bays / converged tray / 80-pin SCA-2 connectors										
Mechanical	EIA 19" rack models (3U ⁴) x 28" deep / supported in NetBAY™ Racks (such as NetBAY42 SR, NetBAY42 ER)										
Chipset	IBM XA-32™ chipset / IBM Memory I/O Controller (improved performance from earlier models) with two remote I/O ports (one to IBM PCI-X Host Bridge; one to RXE Expansion Port) / IBM PCI-X Host Bridge provides three peer PCI buses (two PCI-X 1.0, one PCI 2.2) / PCI 2.2 Bus 0 supports SCSI, graphics, ethernet, adapter slot with Remote Supervisor Adapter, and ServerWorks® OSB4 South Bridge (IDE, USB, ISA bus for Super I/O NS PC97317VUL [diskette, keyboard, mouse])										
Slots (Active™ PCI-X)	Six hot-swap PCI-X 1.0 slots ¹⁰ available with power and attention indicator lights (optical sensors control power to slot) / hot replace, hot upgrade, hot expansion / separated by insulative plastic dividers										
RXE Expansion Port	One port to support up to 12 additional PCI-X slots via an optional IBM RXE-100 Remote Expansion Enclosure										
CD-ROM / diskette	24X-10X ⁶ CD-ROM / 3.5" 1.44MB diskette drive										
Ethernet	Intel 82559 10/100 ethernet controller / on systemboard / full duplex / 32-bit PCI / Wake on LAN® / Alert on LAN™ 2										
Graphics controller	SVGA / S3® Savage4 LT / on systemboard / 8MB SDRAM std/max / up to 1280x1024 at 64K colors at 85Hz										
Ports	Rear: RXE-100 Expansion Port (to connect optional RXE-100), RXE Management Port (to manage optional RXE-100), two USB (Ver 1.1), keyboard, mouse, analog DB-15 graphics, ethernet / no serial or parallel ports / Front: one USB (Ver 1.1)										
Security	Power-on and administrator passwords / unattended boot / selectable boot										
Systems management	Remote Supervisor Adapter / PCI adapter / includes 10/100 ethernet, RJ-11, and serial connectors / provides remote console and mgmt / power on/off system / monitors power status, op system, temperature, disks, fans, power supplies										
Diagnostics	Light Path Diagnostics™ / primary indicator on information panel with LEDs associated with failing components / IBM Real Time Diagnostics (operated through IBM Director) available even while server running										
Software	ServerGuide™ (CD-ROM installation and configuration utilities), IBM Director, and others										
Keyboard / mouse	None standard (because rack-based)										
Power supplies	Std: one or two 370 watt hot-swap; Max: three hot-swap / redundant with two power supplies (some configurations) / worldwide / voltage-sensing / auto-restart / fans in each power supply / PFA										
Cooling fans	Six hot-swap, redundant, multi-speed fans / one additional fan in each power supply / PFA / fan failure signals Diagnostic LED and mgmt processor										
Six available 3.3 volt Active PCI-X slots:											
<ul style="list-style-type: none"> • Bus 2 (B) with two slots supports (slots 1, 2): <ul style="list-style-type: none"> - one fullsize, 64-bit, 133MHz PCI-X, hot-swap - or two fullsize, 64-bit, 100MHz PCI-X, hot-swap - or two fullsize, 64-bit, 66MHz PCI-X, hot-swap - or two fullsize, 64-bit, 66MHz PCI, hot-swap - or two fullsize, 64-bit, 33MHz PCI, hot-swap • Bus 1 (A) with four slots supports (slots 3, 4, 5, 6): <ul style="list-style-type: none"> - four fullsize, 64-bit, 66MHz PCI-X, hot-swap - or two fullsize, 64-bit, 66MHz PCI, hot-swap - or four fullsize, 64-bit, 33MHz PCI, hot-swap • Bus 0 with one slot supports: <ul style="list-style-type: none"> - only for standard Remote Supervisor Adapter halfsize, 64-bit, 33MHz PCI, not hot-swap 											
<ul style="list-style-type: none"> ◇ Dimensions: H5.25" x W17.4" x D27.6" ◇ Dimensions: H133.4mm x W442.0mm x D701mm ◇ Weight: 58.4 to 70lbs; 24.9 to 31.8kg ◇ Stealth black color ◇ Tool-free serviceability ◇ Access adapters, processors, memory, and systemboard from top ◇ Access power supplies and disks from front ◇ Setup Program by pressing F1 at startup ◇ Diagnostics (PC-Doctor) by pressing F2 at startup ◇ SCSISelect by pressing Ctrl+A at startup ◇ Top cover Light Path Diagnostics (level 2 diagnostic panel) for outside view of potential problem without removing cover ◇ Information LED panel, diagnostic LED panel, and component LEDs give visual indications of system well-being ◇ Predictive Failure Analysis® alerts on disks, power supplies, memory, processors, VRMs, and fans with IBM Director 											
<p style="text-align: center;">3U Rack</p>											
<p>Bay ① 3.5", 0.5", access, diskette Bay ② 3.5", 0.5", access, CD-ROM Bay ③ 3.5", SL 1", access, hot-swap Bay ④ 3.5", SL 1", access, hot-swap Bay ⑤ 3.5", SL 1", access, hot-swap</p>											
<p>All models: Maximum internal disk capacity: 220.2GB with three 73.4GB² hot-swap SCSI disks</p>											
<p style="text-align: center;">LIMITED WARRANTY³</p> <ul style="list-style-type: none"> ⇐ 3 year parts and labor ⇐ International Warranty Service³ ⇐ On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time⁷ ⇐ On site service upgrade options (in eligible locations):⁷ <ul style="list-style-type: none"> • 3 year IOR 24x7, 4 hr avg response (ServicePac® part num 96P2253) • 3 year IOR 24x7, 2 hr avg response (ServicePac part num 96P2254) • 4 year IOR 9x5, NBD response (ServicePac part num 96P2255) • 5 year IOR 9x5, NBD response (ServicePac part num 96P2259) ⇐ Other ServicePac options at http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf ⇐ 24x7¹⁴ toll-free support for warranty issues during the warranty period³ 											

See footnotes for important warranty information • = Hot-swap
 US models announced June 30, 2003 or November 11, 2003 (1SQ, 1TQ)
 ⚡ US models withdrawn effective December 30, 2003 (1SQ, 1TQ)

IBM® Type-model	Qty x Processor	L3 cache	Memory	DIMM slots	Disks	SCSI controller	Mechanical	Slots x bays	RXE Exp Ports	Hot-swap pwr supplies	Warranty (yrs.)	Available date	
8861-1RX	1 x Xeon™ MP 2.0GHz	1MB	1GB Chipkill™	8	None	Ultra320	3U ⁴ rack	6x8	One	One (not redund)	1	Dec 2003	
8862-1RX	1 x Xeon MP 2.0GHz	1MB	2GB Chipkill	8	None	Ultra320	3U rack	6x8	One	One (not redund)	3	Dec 2003	
8862-2RX	2 x Xeon MP 2.5GHz	1MB	2GB Chipkill	8	None	Ultra320	3U rack	6x8	One	Two redundant	3	Dec 2003	
8862-3RX	2 x Xeon MP 2.8GHz	2MB	2GB Chipkill	16	None	Ultra320	3U rack	6x8	One	Two redundant	3	Dec 2003	
Processors	1 or 2 x Intel® Xeon™ Processor MP 2.0, 2.5, or 2.8GHz ¹ with 400MHz frontside bus / Hyper-Threading technology												
L2 cache	512KB / on die of processor / at processor speed												
L3 cache	1MB or 2MB / on die of processor / at processor speed												
Processor upgrade Implementation	4-way SMP / up to four Xeon Processors MP (same speed/cache size) Systemboard contains four Intel 603-pin micro-PGA ZIF sockets, one memory board slot, six Active™ PCI/PCI-X slots, and integrated SCSI, ethernet, graphics												
Memory	Up to 2GB std / 32GB max ^{12,13} using high-capacity memory card / two (1GB model) or four (2GB models) 512MB DIMMs installed / one memory board standard with 8 or 16 DIMM gold-connector slots / DIMMs must be installed in matched pairs / PC2100 200MHz registered 184-pin DDR-SDRAM RDIMMs / Error Checking and Correcting (ECC) via 16-bit Checksum Chipkill™ / With 16 DIMMs installed: Memory ProteXion™ (redundant bit steering) and Active Memory™ supporting Memory Mirroring™ (non-OS specific)												
SCSI disk controller	LSI Logic® 53C1030 / Wide Ultra320 SCSI (LVD 320MB/sec) / dual channel / 64-bit 100MHz PCI-X / integrated on planar / Supports Raid 0/1												
SCSI connectors	One internal and one external SCSI connector / internal controller wired to SCSI backplane												
SCSI cabling	One standard 16-bit LVD cable can be reattached to optional ServeRAID adapter from six-bay backplane instead of motherboard												
IDE controller / cabling	SCSI RAID adapter 68-pin connector on systemboard for this cable to get signals to six-bay backplane												
Disk - capacity	Enhanced IDE ATA-33 controller in CSB6 South Bridge												
Disk - bays	None standard / supports up to 15,000 rpm disks Six hot-swap bays / converged tray / 80-pin SCA-2 connectors												
Mechanical	EIA 19" rack models (3U⁴) x 28" deep / supported in NetBAY™ Racks (such as NetBAY42 SR, NetBAY42 ER)												
Chipset	IBM XA-32™ chipset / IBM Memory I/O Controller (improved performance from earlier models) / IBM PCI-X Host Bridges provide six peer PCI-X buses / PCI-X Bus 0 supports adapter slot with Remote Supervisor Adapter II (inc. graphics), and ServerWorks® CSB6 South Bridge (IDE, USB, bus for Super I/O NS 87417 [diskette, keyboard, mouse]) / PCI-X Bus 1 supports gigabit Ethernet, SCSI, and slot for optional ServeRAID adapter												
Slots (Active™ PCI-X)	Six total PCI-X slots (one unavailable) / 5 hot-swap PCI-X 1.0 slots ¹⁰ available with power and attention indicator lights (optical sensors control power to slot) / hot replace, hot upgrade, hot expansion / separated by insulative plastic dividers/bv												
RXE Expansion Port	One port to support up to 12 additional PCI-X slots via an optional IBM RXE-100 Remote Expansion Enclosure												
CD-ROM / diskette	24X-10X ⁶ CD-ROM / 3.5" 1.44MB diskette drive												
Ethernet	Broadcom® 5704 10/100/1000 dual ethernet / on systemboard / 64-bit 100Mhz PCI-X / Wake on LAN® / Alert on LAN™ 2												
Graphics controller	onboard graphics disabled / uses video on Remote Supervisor Adapter II												
Ports	Rear: RXE-100 Expansion Port (to connect optional RXE-100), RXE Management Port (to manage optional RXE-100), two USB (Ver 1.1), keyboard, mouse, analog DB-15 graphics, ethernet / one serial / no parallel ports / Front: one USB (Ver 1.1)												
Security	Power-on and administrator passwords / unattended boot / selectable boot												
Systems management	Remote Supervisor Adapter II / PCI adapter / includes 10/100 ethernet, RJ-11, and serial connectors / provides remote console and mgmt / power on/off system / monitors power status, op system, temperature, disks, fans, power supplies												
Diagnostics	Light Path Diagnostics™ / primary indicator on information panel with LEDs associated with failing components / IBM Real Time Diagnostics (operated through IBM Director) available even while server running												
Software	ServerGuide™ (CD-ROM installation and configuration utilities), IBM Director, and others												
Keyboard / mouse	None standard (because rack-based)												
Power supplies	Std: one or two 950 watt hot-swap; Max: two hot-swap / redundant with two power supplies (some configurations) / worldwide / voltage-sensing / auto-restart / rear accessible fans in each power supply / PFA												
Cooling fans	Six hot-swap, redundant, multi-speed fans / one additional fan in each power supply / PFA / fan failure signals Diagnostic LED and mgmt processor												
<p>Six available 3.3 volt PCI/PCI-X slots:</p> <ul style="list-style-type: none"> • Buses 0-5 supports slots 1 - 6: <ul style="list-style-type: none"> - one fullsize, 64-bit, 33MHz PCI, hot-swap Standard Remote Supervisor Adapter installed - one fullsize, 64-bit, 100MHz PCI-X, hot-swap Optional ServeRAID adapter to install - one fullsize, 64-bit, 133MHz PCI-X, hot-swap Optional iSeries IXA adapter to install - three fullsize, 64-bit, 133MHz PCI-X, hot-swap ◊ Dimensions: H5.25" x W17.4" x D27.6" ◊ Dimensions: H133.4mm x W442.0mm x D701mm ◊ Weight: 63 to 83lbs; 28.6 to 37.6kg ◊ Stealth black color ◊ Tool-free serviceability ◊ Access adapters, processors, memory, and systemboard from top ◊ Access power supplies and disks from front ◊ Setup Program by pressing F1 at startup ◊ Diagnostics (PC-Doctor) by pressing F2 at startup ◊ SCSISelect by pressing Ctrl+A at startup ◊ Top cover Light Path Diagnostics (level 2 diagnostic panel) for outside view of potential problem without removing cover ◊ Information LED panel, diagnostic LED panel, and component LEDs give visual indications of system well-being ◊ Predictive Failure Analysis® alerts on disks, power supplies, memory, processors, VRMs, and fans with IBM Director 													
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<p>512MB PC2100 ECC DDR SDRAM RDIMM 33L5038</p> <p>1GB PC2100 ECC DDR SDRAM RDIMM 73P2031</p> <p>2GB PC2100 ECC DDR SDRAM RDIMM¹² 33L5040</p> <p>IBM x365Memory Upgrade Card 73P9710</p> <p>Xeon MP 2.0GHz/1MB L3 Cache Proc Upg 73P7073</p> <p>Xeon MP 2.5GHz/1MB L3 Cache Proc Upg 73P7074</p> <p>Xeon MP 2.8GHz/2MB L3 Cache Proc Upg 73P7075</p> <p>950 watt Hot-Swap Power Supply (WW) 73P7214</p> <p>IBM ServeRAID™-4Mx Ultra160 SCSI Adapter 06P5736</p> <p>IBM 73.4GB 15K Ultra320 SCSI Hot-Swap 32P0735</p> <p>IBM Integrated xSeries Adapter for iSeries 1519100</p> <p>IBM T541 15" Flat Panel Color Monitor (black) 9512AB1</p> <p>RXE-100 Remote Expansion Enclosure 86841RX</p> <p>Other options at ibm.com/pc/us/accessories</p>													
<p>LIMITED WARRANTY³</p> <ul style="list-style-type: none"> ↔ 1 or 3 year parts and labor ↔ International Warranty Service³ ↔ On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time⁷ ↔ On site service upgrade options (in eligible locations):⁷ <ul style="list-style-type: none"> • 3 year IOR 24x7, 4 hr avg response (30L9186 (8861) / 96P2253 (8862)) • 3 year IOR 24x7, 2 hr avg response (31L2722 (8861) / 96P2254 (8862)) • 4 year IOR 9x5, NBD response (69P9210 (8661) / 96P2255 (8862)) • 5 year IOR 9x5, NBD response (69P9214 (8661) / 69P2259 (8862)) ↔ Other ServicePac options at http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf ↔ 24x7¹⁴ toll-free support for warranty issues during the warranty period³ 													
<p>All models: Maximum internal disk capacity: 878.4GB with six 146.8GB² hot-swap SCSI disks</p>													

See footnotes for important warranty information
US models announced December 9, 2003

• = Hot-swap
↔ US models withdrawn effective May 28, 2004 (8662-2RX, 3RX)

IBM® Type-model	Qty x Processor	L3 cache	Memory	DIMM slots	Disks	SCSI controller	Mechanical	Slots x bays	RXE Exp Ports	Hot-swap pwr supplies	Warranty (yrs.)	Available date						
8861-4RX	1 x Xeon™ MP 2.2GHz	2MB	1GB Chipkill™	8	None	Ultra320	3U ⁴ rack	6x8	One	One (not redund)	1	Mar 2004						
8861-1EX	2 x Xeon MP 2.0GHz	1MB	4GB Chipkill	8	3x36.4-10k	Ultra320	3U rack	6x8	One	One (not redund)	1	Nov 2004						
8862-4RX	1 x Xeon MP 2.2GHz	2MB	2GB Chipkill	8	None	Ultra320	3U rack	6x8	One	One (not redund)	3	Mar 2004						
8862-5RX	2 x Xeon MP 2.7GHz	2MB	2GB Chipkill	8	None	Ultra320	3U rack	6x8	One	Two redundant	3	Mar 2004						
8862-6RX	2 x Xeon MP 3.0GHz	4MB	2GB Chipkill	8	None	Ultra320	3U rack	6x8	One	Two redundant	3	Mar 2004						
8862-5EX	4 x Xeon MP 2.7GHz	2MB	8GB Chipkill	8	6x36.4-15k	Ultra320	3U rack	6x8	One	Two redundant	3	Nov 2004						
Processors	1,2 or 4 x Intel® Xeon™ Processor MP 2.0, 2.2, 2.7, or 3.0GHz ¹ with 400MHz frontside bus / Hyper-Threading technology																	
L2 cache	512KB / on die of processor / at processor speed																	
L3 cache	1MB, 2MB or 4MB / on die of processor / at processor speed																	
Processor upgrade Implementation	4-way SMP / up to four Xeon Processors MP (same speed/cache size) Systemboard contains four Intel 603-pin micro-PGA ZIF sockets, one memory board slot, six Active™ PCI/PCI-X slots, and integrated SCSI, ethernet, graphics																	
Memory	Up to 4GB std / 32GB max ^{12,13} using high-capacity memory card / one memory board standard with 8 DIMM gold-connector slots / DIMMs must be installed in matched pairs / PC2100 200MHz registered 184-pin DDR-SDRAM RDIMMs / Error Checking and Correcting (ECC) via 16-bit Checksum Chipkill™ / With 16 DIMMs installed: Memory ProteXion™ (redundant bit steering) and Active Memory™ supporting Memory Mirroring™ (non-OS specific)																	
SCSI disk controller	LSI Logic® 53C1030 / Wide Ultra320 SCSI (LVD 320MB/sec) / dual channel / 64-bit 100MHz PCI-X / integrated Raid 0/1																	
SCSI connectors	One internal and one external SCSI connector / internal controller wired to SCSI backplane																	
SCSI cabling	One standard 16-bit LVD cable can be reattached to optional ServeRAID adapter from six-bay backplane instead of motherboard SCSI RAID adapter 68-pin connector on systemboard for this cable to get signals to six-bay backplane																	
IDE controller / cabling	Enhanced IDE ATA-33 controller in CSB6 South Bridge																	
Disk - capacity	1Ex: 3 x 36.4GB-10k 5Ex: 6 x 36.4GB-15K / supports up to 15,000 rpm disks																	
Disk - bays	Six hot-swap bays / converged tray / 80-pin SCA-2 connectors																	
Mechanical	EIA 19" rack models (3U ⁴) x 28" deep / supported in NetBAY™ Racks (such as NetBAY42 SR, NetBAY42 ER)																	
Chipset	IBM XA-32™ chipset / IBM Memory I/O Controller (improved performance from earlier models) / IBM PCI-X Host Bridges provide six peer PCI-X buses / PCI-X Bus 0 supports adapter slot with Remote Supervisor Adapter II (inc. graphics), and ServerWorks® CSB6 South Bridge (IDE, USB, bus for Super I/O NS 87417 [diskette, keyboard, mouse]) / PCI-X Bus 1 supports gigabit Ethernet, SCSI, and slot for optional ServeRAID adapter																	
Slots (Active™ PCI-X)	Six total PCI-X slots (one unavailable) / 5 hot-swap PCI-X 1.0 slots ¹⁰ available with power and attention indicator lights (optical sensors control power to slot) / hot replace, hot upgrade, hot expansion / separated by insulative plastic dividersbv																	
RXE Expansion Port	One port to support up to 12 additional PCI-X slots via an optional IBM RXE-100 Remote Expansion Enclosure																	
CD-ROM / diskette	24X-10X ⁶ CD-ROM / 3.5" 1.44MB diskette drive																	
Ethernet	Broadcom® 5704 10/100/1000 dual ethernet / on systemboard / 64-bit 100MHz PCI-X / Wake on LAN® / Alert on LAN™ 2																	
Graphics controller	onboard graphics disabled / uses video on Remote Supervisor Adapter II																	
Ports	Rear: RXE-100 Expansion Port (to connect optional RXE-100), RXE Management Port (to manage optional RXE-100), two USB (Ver 1.1), keyboard, mouse, analog DB-15 graphics, ethernet / one serial / one parallel ports / Front: one USB (Ver 1.1)																	
Security	Power-on and administrator passwords / unattended boot / selectable boot																	
Systems management	Remote Supervisor Adapter II / PCI adapter / includes 10/100 ethernet, RJ-11, and serial connectors / provides remote console and mgmt / power on/off system / monitors power status, op system, temperature, disks, fans, power supplies																	
Diagnostics	Light Path Diagnostics™ / primary indicator on information panel with LEDs associated with failing components / IBM Real Time Diagnostics (operated through IBM Director) available even while server running																	
Software	ServerGuide™ (CD-ROM installation and configuration utilities), IBM Director, and others																	
Keyboard / mouse	None standard (because rack-based)																	
Power supplies	Std: one or two 950 watt hot-swap; Max: two hot-swap / redundant with two power supplies (some configurations) / worldwide / voltage-sensing / auto-restart / rear accessible fans in each power supply / PFA																	
Cooling fans	Six hot-swap, redundant, multi-speed fans / one additional fan in each power supply / PFA / fan failure signals Diagnostic LED and mgmt processor																	
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<ul style="list-style-type: none"> • Buses 0-5 supports slots 1 - 6: - one fullsize, 64-bit, 33MHz PCI, hot-swap Standard Remote Supervisor Adapter installed - one fullsize, 64-bit, 100MHz PCI-X, hot-swap Optional ServeRAID adapter to install - one fullsize, 64-bit, 133MHz PCI-X, hot-swap Optional iSeries IXA adapter to install - three fullsize, 64-bit, 133MHz PCI-X, hot-swap 																		
<ul style="list-style-type: none"> ↗ Dimensions: H5.25" x W17.4" x D27.6" ↗ Dimensions: H133.4mm x W442.0mm x D701mm ↗ Weight: 63 to 83lbs; 28.6 to 37.6kg ↗ Stealth black color ↗ Tool-free serviceability ↗ Access adapters, processors, memory, and systemboard from top ↗ Access power supplies and disks from front ↗ Setup Program by pressing F1 at startup ↗ Diagnostics (PC-Doctor) by pressing F2 at startup ↗ SCSISelect by pressing Ctrl+A at startup ↗ Top cover Light Path Diagnostics (level 2 diagnostic panel) for outside view of potential problem without removing cover ↗ Information LED panel, diagnostic LED panel, and component LEDs give visual indications of system well-being ↗ Predictive Failure Analysis® alerts on disks, power supplies, memory, processors, VRMs, and fans with IBM Director 																		
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<p>512MB PC2100 ECC DDR SDRAM RDIMM 33L5038 1GB PC2100 ECC DDR SDRAM RDIMM 73P2031 2GB PC2100 ECC DDR SDRAM RDIMM¹² 73P2030 IBM x365 Memory Upgrade Card 73P9710 Xeon MP 2.2GHz/2MB L3 Cache Proc Upg 13N0711 Xeon MP 2.7GHz/2MB L3 Cache Proc Upg 13N0712 Xeon MP 3.0GHz/4MB L3 Cache Proc Upg 13N0710 950 watt Hot-Swap Power Supply (WW) 73P7214 IBM ServeRAID™-6M Ultra320 SCSI Adapter 32P0033 IBM 73.4GB 15K Ultra320 SCSI Hot-Swap 32P0735 IBM Integrated xSeries Adapter for iSeries 1519100 IBM T541 15" Flat Panel Color Monitor (black) 9512AB1 RXE-100 Remote Expansion Enclosure 86841RX Other options at ibm.com/pc/us/accessories</p>																		
<p>LIMITED WARRANTY³</p> <ul style="list-style-type: none"> ↔ 1 or 3 year parts and labor ↔ International Warranty Service³ ↔ On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time⁷ ↔ On site service upgrade options (in eligible locations):⁷ <ul style="list-style-type: none"> • 3 year IOR 24x7, 4 hr avg response (30L9186 (8861) / 96P2253 (8862)) • 3 year IOR 24x7, 2 hr avg response (31L2722 (8861) / 96P2254 (8862)) • 4 year IOR 9x5, NBD response (69P9210 (8661) / 96P2255 (8862)) • 5 year IOR 9x5, NBD response (69P9214 (8661) / 69P2259 (8862)) ↔ Other ServicePac options at http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf ↔ 24x7¹⁴ toll-free support for warranty issues during the warranty period³ 																		
<p>All models: Maximum internal disk capacity: 878.4GB with six 146.8GB² hot-swap SCSI disks</p>																		

See footnotes for important warranty information • = Hot-swap
 US models announced March 2, 2004 (8661-4RX, 8662-4RX, 5RX, 6RX)

IBM eServer™ xSeries™ 445 (8-way Xeon MP) (March 2004) xREF by eServer Field Skills Enablement Team

IBM® Type-model	Qty x Processor	L3 cache	L4 cache	Memory	Disk	SCSI controller	Mechanical	Slots x bays	SMP/RXE Exp Ports	Hot-swap pwr supplies	Mgmt adapter	Available date
8870-11X	2 x Xeon™ MP 2.0GHz	1MB	64MB	2GB Chipkill™	None	2xUltra320	4U ⁴ rack	6x4	3/1	Two redundant	PCI	May 2004
8870-12X	2 x Xeon MP 2.2GHz	2MB	64MB	2GB Chipkill	None	2xUltra320	4U rack	6x4	3/1	Two redundant	PCI	Mar 2004
8870-22X	2 x Xeon MP 2.7GHz	2MB	64MB	2GB Chipkill	None	2xUltra320	4U rack	6x4	3/1	Two redundant	PCI	Mar 2004
8870-42X	4 x Xeon MP 3.0GHz	4MB	64MB	2GB Chipkill	None	2xUltra320	4U rack	6x4	3/1	Two redundant	PCI	Mar 2004
8870-3EX	2 x Xeon DP 3.0GHz	N/A	64MB	2GB Chipkill	None	2xUltra320	4U rack	6x4	3/1	Two redundant	PCI	Mar 2004
8870-4EX	4 x Xeon DP 3.0GHz	N/A	64MB	2GB Chipkill	None	2xUltra320	4U rack	6x4	3/1	Two redundant	PCI	Mar 2004

Positioning Processors **Up to 8-way (16-way two chassis) power for high-end databases, server consolidation and mission-critical business applications**
2 or 4 Intel® Xeon™ Processor DP or MP 2.0GHz - 3.0GHz¹ with 400MHz frontside bus / supports Hyper-Threading
 L3 cache **Up to 4MB** each processor (Xeon MP models only) / on die of processor / at processor speed
 L4 cache **64MB XcE⁴™ Server Accelerator Cache** (up to **128MB** with optional SMP Expansion Module) / 64MB in each SMP Expansion Module / ECC / 64-bit 400MHz bus from Cache and Scalability Controller
 Processor upgrade **4-way SMP** (up to **8-way SMP** with optional SMP Expansion Module, for Xeon MP models only)
 SMP Expansion Module **One SMP Expansion Module std** / two max, for Xeon MP models only / each contains four Intel 603-pin micro-PGA ZIF sockets for Xeon, 64MB L4 cache, sixteen DIMM sockets, three SMP Expansion Ports (second module connected via one or two SMP Expansion Ports) / each SMP Expansion Module activates one RXE Expansion Port (one RXE Expansion Port supported)
 Additional boards One I/O Board (PCI-X Host Bridge, SCSI, ethernet, graphics, South Bridge, Super I/O, slot for Mgmt Adapter), one PCI Board (PCI-X Host Bridge, six PCI-X slots), one Midplane Board (connects SMP Exp Modules, I/O Board, PCI Board)

Memory **2GB std / 32GB max¹³** (up to **64GB** per chassis using optional SMP Expansion Module) / four 512MB DIMMs installed / 16 DIMM gold-connector slots / must install two identical DIMMs at same time / 2-way interleaving / PC2100 DDR SDRAM / **Error Checking and Correcting (ECC)** and **Chipkill™** via **Memory ProteXion™** (1, 2, 3, or 4-bit errors on same chip; up to two chips at once; redundant bit steering) / **Active Memory™** supporting **hot-swap** and **hot-add** (OS specific) and **Memory Mirroring™** (non-OS specific)

SCSI disk controller LSI Logic / Wide Ultra320 SCSI (LVD 32MB/sec) / dual channel / 64-bit 66MHz PCI / **integrated RAID-1** on I/O Board
 SCSI implementation First channel to internal 2-port SCSI backplane for internal hot-swap disks (16-bit LVD cable to SCSI backplane) / second channel to one external .8mm VHDCI 68-pin connector (16-bit LVD cable from I/O Board to ext connector) / one standard (longer) 16-bit LVD cable included for attaching an optional ServeRAID adapter to the two-bay backplane
 IDE controller Enhanced IDE ATA-100 controller in South Bridge / one one-drop IDE cable to backplane for diskette and CD-ROM
 Disk - capacity/bays No disks standard / supports up to 15K rpm SCSI disks / two hot-swap bays / converged tray / 80-pin SCA-2 connectors

Mechanical **EIA 19" rack models (4U⁴)** x 28" deep / supported in NetBAY™ Racks (such as NetBAY42 SR, NetBAY42 ER)

Chipset **IBM XA-32™ 2nd Generation chipset** / IBM Cache and Scalability Controller with L4 cache controller and three SMP Expansion Ports / IBM Memory I/O Controller with two remote I/O ports (each to a IBM PCI-X Host Bridge) / each IBM PCI-X Host Bridge provides three peer PCI buses / PCI 2.2 Bus E supports graphics, adapter slot with Remote Supervisor Adapter, VIA® 82C686B South Bridge (IDE ATA-100, USB, Super I/O PC97317VUL [keyboard, mouse]) / PCI 2.2 Bus F supports SCSI, ethernet / PCI-X Bus A, B, C, D support PCI-X slots / designed to the PCI-X 1.0 specification
 Slots (Active™ PCI-X) Six hot-swap PCI-X 1.0 slots¹⁰ available with power and attention indicator lights (optical sensors control power to slot) / **hot replace, hot upgrade, hot expansion** / separated by insulative plastic dividers
 RXE Expansion Port One RXE-100 Remote Expansion Enclosure can be shared between two x445 4-way, 8-way, or 16-way xSeries 445 servers or attached alone. Both PCI-X 6-packs must be installed to support **RIO sharing** as each server will access six additional PCI-X slots.

CD-ROM / diskette **24X-8X⁶ DVD-ROM / 3.5" 1.44MB** diskette drive / both removable from Ultrabay 2000 bays / supports CD-RW, DVD
 Ethernet **Dual Broadcom⁸ 5704 10/100/1000** ethernet controller / on I/O Board / full duplex / 64-bit 66MHz PCI bus / Wake on LAN®
 Graphics controller **SVGA / ATI® Rage XL** / on I/O Board / 8MB SDRAM std/max / up to 1280x1024 at 85Hz
 Ports **Rear:** RXE-100 Expansion Port (to connect optional RXE-100), RXE Management Port, two USB (Vers 1.1), keyboard, mouse, analog DB-15 graphics, ethernet / no serial or parallel ports / **Front:** one USB (Vers 1.1)

Security Power-on and administrator passwords / unattended boot / selectable boot

Systems mgmt **Remote Supervisor Adapter II** / PCI adapter / includes 10/100 ethernet, RJ-11, and serial connectors / provides remote console and mgmt / power on/off system / monitors power status, op system, temperature, disks, fans, power supplies
 Diagnostics **Light Path Diagnostics™** / primary indicator on information panel with LEDs associated with failing components / IBM Real Time Diagnostics (operated through IBM Director) available even while server running

Software	ServerGuide™ (CD-ROM installation and configuration utilities), IBM Director, and others	xSeries SMP Expansion Module 1GB DDR PC2100 ECC SDRAM RDIMM 2GB DDR PC2100 ECC SDRAM RDIMM Xeon MP 2.2GHz/2MB L3 Cache Proc Upg Xeon MP 2.7GHz/2MB L3 Cache Proc Upg Xeon MP 3.0GHz/4MB L3 Cache Proc Upg IBM 73.4GB 10K Ultra160 SCSI Hot-Swap IBM ServeRAID™-6M Ultra320 SCSI Adapter IBM Remote Supervisor Adapter II-EXA NetBAY11 Standard Rack Cabinet 8X/4X/24X Max CD-RW Ultrabay 2000 IBM T540 15" Flat Panel Color Monitor (black) Other options at ibm.com/pc/us/accessories	02R1870 33L5039 33L5040 13N0723 13N0722 13N0721 06P5756 32P0033 13N0382 9306110 22P9101 9511AG4
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Keyboard / mouse None standard (because rack-based)
 Power supplies **Std:** two; **max:** two / hot-swap / 1050 watts at 220v or 550 watts at 110v / redundant at 220v with two power supplies / front access / worldwide / voltage-sensing / auto-restart / fans in each power supply / PFA
 Cooling fans Four hot-swap, redundant, multi-speed fans / one additional fan in each power supply / PFA / fan failure signals Diagnostic LED and mgmt processor

Six available 3.3 volt Active PCI-X slots:

Slot 1: fullsize, 64-bit 66MHz PCI-X, hot-swap Bus A
 Slot 2: fullsize, 64-bit 66MHz PCI-X, hot-swap Bus A
 Slot 3: fullsize, 64-bit 100MHz PCI-X, hot-swap, Bus B
 Slot 4: fullsize, 64-bit 100MHz PCI-X, hot-swap, Bus B
 Slot 5: fullsize, 64-bit 133MHz PCI-X, hot-swap, Bus C
 Slot 6: fullsize, 64-bit 133MHz PCI-X, hot-swap, Bus D
 Slot: used by Remote Supervisor Adp, 32-bit 33MHz

- ⊖ Dimensions: H7.0" x W19.0" x D27.5"
- ⊖ Dimensions: H178mm x W483mm x D699mm
- ⊖ Max weight: 110 lbs; 50kg
- ⊖ Stealth black color
- ⊖ Tool-free serviceability
- ⊖ Access processors, memory, adapters, and SMP Expansion Module from top
- ⊖ Access power supplies and disks from front
- ⊖ Setup Program by pressing F1 at startup
- ⊖ Diagnostics (PC-Doctor) by pressing F2 at startup
- ⊖ SCSISelect by pressing Ctrl+A at startup
- ⊖ Information LED panel and front-accessible pull-out Light Path panel (1st and 2nd level diagnostics without removing cover)
- ⊖ Predictive Failure Analysis® alerts on processors, XcE⁴ Server Accelerator Cache, memory, fans, power supplies, and optional disks with IBM Director

4U Rack

LIMITED WARRANTY³

- ⊖ 3 year parts and labor
- ⊖ International Warranty Service³
- ⊖ On site, 9 hr x 5 day coverage, next day response time⁷
- ⊖ 3 year on site warranty service upgrade option (in eligible locations):⁷
 - 24 hr x 7 day coverage, 2 hour response time (No ServicePac available)
- ⊖ Post warranty maintenance services available
- ⊖ Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- ⊖ 24x7¹⁴ toll-free support for warranty issues during the warranty period³

Bay ① 3.5", 0.5", access, diskette (Ultrabay 2000)
 Bay ② 3.5", 0.5", access, CD-ROM (Ultrabay 2000)
 Bay ③ 3.5", SL 1", access, hot-swap
 Bay ④ 3.5", SL 1", access, hot-swap

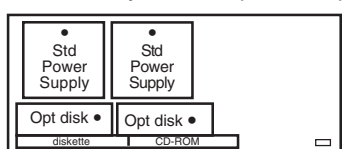
All models: Maximum internal disk capacity: 293.6GB with two 146.8GB² hot-swap SCSI disks

IBM @server™ xSeries™ 445 (8-way MS Datacenter#) (3/04) xREF by eServer Field Skills Enablement Team

IBM® Type-model	Qty x Processor	L3 cache	L4 cache	Memory	Disk	SCSI controller	Mechanical	Slots x bays	SMP/RXE Exp Ports	Hot-swap pwr supplies	Mgmt adapter	Available date
8870-1BX	2 x Xeon™ MP 2.2GHz	2MB	64MB	0GB Chipkill™	None	2xUltra320	4U ⁴ rack	6x4	3/1	Two redundant	PCI	Mar 2004
8870-2BX	2 x Xeon MP 2.7GHz	2MB	64MB	0GB Chipkill	None	2xUltra320	4U rack	6x4	3/1	Two redundant	PCI	Mar 2004
8870-4BX	2 x Xeon MP 3.0GHz	4MB	64MB	0GB Chipkill	None	2xUltra320	4U rack	6x4	3/1	Two redundant	PCI	Mar 2004

Positioning Processors	Up to 8-way (16-way two chassis) power for high-end databases, server consolidation and mission-critical business applications											
L3 cache	2 x Intel® Xeon™ Processor MP 2.2, 2.7, or 3.0GHz ¹ with 400MHz frontside bus / supports Hyper-Threading											
L4 cache	2MB or 4MB each processor / on die of processor / at processor speed											
Processor upgrade	64MB XceL4™ Server Accelerator Cache (up to 128MB with optional SMP Expansion Module) / 64MB in each SMP Expansion Module / ECC / 64-bit 400MHz bus from Cache and Scalability Controller											
SMP Expansion Module	SMP Expansion Module standard / ready for adding additional processors (up to 8 total) and memory											
Additional boards	One SMP Expansion Module std / two max / each contains four Intel 603-pin micro-PGA ZIF sockets for Xeon MP, 64MB L4 cache, sixteen DIMM sockets, three SMP Expansion Ports (second module connected via one or two SMP Expansion Ports) / each SMP Expansion Module activates one RXE Expansion Port (one RXE Expansion Port supported)											
Memory	One I/O Board (PCI-X Host Bridge, SCSI, ethernet, graphics, South Bridge, Super I/O, slot for Mgmt Adapter), one PCI Board (PCI-X Host Bridge, six PCI-X slots), one Midplane Board (connects SMP Exp Modules, I/O Board, PCI Board)											
Memory	0GB std / 64GB max ¹³ (uses standard SMP Expansion Module) / no DIMMs installed / 32 DIMM gold-connector slots / must install two identical DIMMs at same time / 2-way interleaving / PC2100 DDR SDRAM / Error Checking and Correcting (ECC) and Chipkill™ via Memory ProteXion™ (1, 2, 3, or 4-bit errors on same chip; up to two chips at once; redundant bit steering) / Active Memory™ supporting hot-swap and hot-add (OS specific) and Memory Mirroring™ (non-OS specific)											
SCSI disk controller	LSI Logic / Wide Ultra320 SCSI (LVD 32MB/sec) / dual channel / 64-bit 66MHz PCI / integrated RAID-1 on I/O Board											
SCSI implementation	First channel to internal 2-port SCSI backplane for internal hot-swap disks (16-bit LVD cable to SCSI backplane) / second channel to one external .8mm VHDCI 68-pin connector (16-bit LVD cable from I/O Board to ext connector) / one standard (longer) 16-bit LVD cable included for attaching an optional ServeRAID adapter to the two-bay backplane											
IDE controller	Enhanced IDE ATA-100 controller in South Bridge / one one-drop IDE cable to backplane for diskette and CD-ROM											
Disk - capacity/bays	No disks standard / supports up to 15K rpm SCSI disks / two hot-swap bays / converged tray / 80-pin SCA-2 connectors											
Mechanical	EIA 19" rack models (4U ⁴) x 28" deep / supported in NetBAY™ Racks (such as NetBAY42 SR, NetBAY42 ER)											
Chipset	IBM XA-32™ 2nd Generation chipset / IBM Cache and Scalability Controller with L4 cache controller and three SMP Expansion Ports / IBM Memory I/O Controller with two remote I/O ports (each to a IBM PCI-X Host Bridge) / each IBM PCI-X Host Bridge provides three peer PCI buses / PCI 2.2 Bus E supports graphics, adapter slot with Remote Supervisor Adapter, VIA® 82C686B South Bridge (IDE ATA-100, USB, Super I/O PC97317VUL [keyboard, mouse]) / PCI 2.2 Bus F supports SCSI, ethernet / PCI-X Bus A, B, C, D support PCI-X slots / designed to the PCI-X 1.0 specification											
Slots (Active™ PCI-X)	Six hot-swap PCI-X 1.0 slots ¹⁰ available with power and attention indicator lights (optical sensors control power to slot) / hot replace, hot upgrade, hot expansion / separated by insulative plastic dividers											
RXE Expansion Port	One RXE-100 Remote Expansion Enclosure can be shared between two x445 4-way, 8-way, or 16-way xSeries 445 servers or attached alone. Both PCI-X 6-packs must be installed to support RIO sharing as each server will access six additional PCI-X slots.											
CD-ROM / diskette	24X-8X ⁶ DVD-ROM / 3.5" 1.44MB diskette drive / both removable from Ultrabay 2000 bays / supports CD-RW, DVD											
Ethernet	Dual Broadcom® 5704 10/100/1000 ethernet controller / on I/O Board / full duplex / 64-bit 66MHz PCI bus / Wake on LAN®											
Graphics controller	SVGA / ATI® Rage XL / on I/O Board / 8MB SDRAM std/max / up to 1280x1024 at 85Hz.											
Ports	Rear: RXE-100 Expansion Port (to connect optional RXE-100), RXE Management Port, two USB (Vers 1.1), keyboard, mouse, analog DB-15 graphics, ethernet / no serial or parallel ports / Front: one USB (Vers 1.1)											
Security	Power-on and administrator passwords / unattended boot / selectable boot											
Systems mgmt	Remote Supervisor Adapter II / PCI adapter / includes 10/100 ethernet, RJ-11, and serial connectors / provides remote console and mgmt / power on/off system / monitors power status, op system, temperature, disks, fans, power supplies											
Diagnostics	Light Path Diagnostics™ / primary indicator on information panel with LEDs associated with failing components / IBM Real Time Diagnostics (operated through IBM Director) available even while server running											
Software	ServerGuide™ (CD-ROM installation and configuration utilities), IBM Director, and others											
Keyboard / mouse	None standard (because rack-based)											
Power supplies	Std: two; max: two / hot-swap / 1200 watts at 220v or 600 watts at 110v / redundant at 220v with two power supplies / front access / worldwide / voltage-sensing / auto-restart / fans in each power supply / PFA											
Cooling fans	Four hot-swap, redundant, multi-speed fans / one additional fan in each power supply / PFA / fan failure signals Diagnostic LED and mgmt processor											

<p>Six available 3.3 volt Active PCI-X slots:</p> <p>Slot 1: fullsize, 64-bit 66MHz PCI-X, hot-swap Bus A Slot 2: fullsize, 64-bit 66MHz PCI-X, hot-swap Bus A Slot 3: fullsize, 64-bit 100MHz PCI-X, hot-swap, Bus B Slot 4: fullsize, 64-bit 100MHz PCI-X, hot-swap, Bus B Slot 5: fullsize, 64-bit 133MHz PCI-X, hot-swap, Bus C Slot 6: fullsize, 64-bit 133MHz PCI-X, hot-swap, Bus D Slot: used by Remote Supervisor Adp, 32-bit 33MHz</p>	<ul style="list-style-type: none"> ↳ Dimensions: H7.0" x W19.0" x D27.5" ↳ Dimensions: H178mm x W483mm x D699mm ↳ Max weight: 110 lbs; 50kg ↳ Stealth black color ↳ Tool-free serviceability ↳ Access processors, memory, adapters, and SMP Expansion Module from top ↳ Access power supplies and disks from front ↳ Setup Program by pressing F1 at startup ↳ Diagnostics (PC-Doctor) by pressing F2 at startup ↳ SCSISelect by pressing Ctrl+A at startup ↳ Information LED panel and front-accessible pull-out Light Path panel (1st and 2nd level diagnostics without removing cover) ↳ Predictive Failure Analysis® alerts on processors, XceL4 Server Accelerator Cache, memory, fans, power supplies, and optional disks with IBM Director 	<p>LIMITED WARRANTY³</p> <ul style="list-style-type: none"> ↳ 3 year parts and labor ↳ International Warranty Service³ ↳ On site, 9 hr x 5 day coverage, next day response time⁷ ↳ 1 year on site warranty service upgrade option (in eligible locations):⁷ <ul style="list-style-type: none"> • 24 hr x 7 day coverage, 2 hour response time (No ServicePac available) ↳ Post warranty maintenance services available ↳ Other ServicePac options at http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf ↳ 24x7¹⁴ toll-free support for warranty issues during the warranty period³
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4U Rack

Bay ① 3.5", 0.5", access, diskette (Ultrabay 2000)
 Bay ② 3.5", 0.5", access, CD-ROM (Ultrabay 2000)
 Bay ③ 3.5", SL 1", access, hot-swap
 Bay ④ 3.5", SL 1", access, hot-swap

All models: Maximum internal disk capacity: 293.6GB with two 146.8GB² hot-swap SCSI disks

See footnotes for important warranty information (X445D8B) © IBM Corp. March 2004
 US models announced March 2, 2004 • = Hot-swap
 # = Memory, HDDs and Preload Kit for Microsoft Windows 2000 or 2003 Datacenter Edition must be ordered as part of the IBM Datacenter Solution for these models.

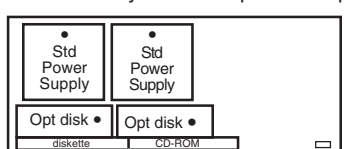
IBM® Type-model	Qty x Processor	L3 cache	L4 cache	Memory	Disk	SCSI controller	Mechanical	Slots x bays	SMP/RXE Exp Ports	Hot-swap pwr supplies	Mgmt adapter	Available date
8855-4BY	4 x Itanium 2™ 1.5Ghz	4MB	64MB	2GB Chipkill™	None	2 x Ultra320	4U ⁴ rack	6x2	0/1	Two redundant	PCI	Dec 2004
8855-5BY	4 x Itanium 2 1.6Ghz	6MB	64MB	2GB Chipkill	None	2 x Ultra320	4U rack	6x2	0/1	Two redundant	PCI	Dec 2004
8855-6BY	4 x Itanium 2 1.6Ghz	9MB	64MB	2GB Chipkill	None	2 x Ultra320	4U rack	6x2	0/1	Two redundant	PCI	Dec 2004

Positioning Processors	Up to 16-way power for high-end databases, server consolidation and mission-critical business applications																																			
L2 cache	4 x Intel® Itanium 2™ Processor 1.5GHz or 1.6GHz with 400MHz frontside bus																																			
L3 cache	256KB each processor / on die of processor / at processor speed																																			
L4 cache	4MB, 6MB or 9MB each processor / on die of processor / at processor speed																																			
Processor upgrade	64MB Xcel4™ Server Accelerator Cache																																			
SMP Exp. Module	ECC / 64-bit 400MHz bus from Cache and Scalability Controller																																			
Additional boards	4-way SMP per chassis																																			
Memory	Up to 16-way using four x455 chassis / requires appropriate 8-way or 16-way kits																																			
SCSI disk controller	One I/O Board (PCI-X Host Bridge, SCSI, ethernet, graphics, South Bridge, Super I/O, slot for Mgmt Adapter), one PCI Board (PCI-X Host Bridge, six PCI-X slots), one Midplane Board (connects SMP Exp Modules, I/O Board, PCI Board)																																			
SCSI implementation	2GB std (using 2 x 1GB DIMMs)/ 56GB max when installing 2GB DIMMs into 28 slots / 28 DIMM gold-connector slots																																			
IDE controller	PC2100 266MHz registered 184-pin ECC DDR-SDRAM DIMMs / DIMMs must be installed in matched pairs [a bank] / 2-way interleaving / Active Memory™ with Error Checking and Correcting (ECC), Chipkill™, Memory ProteXion™ (1, 2, 3, or 4-bit errors on same chip; up to two chips at once; redundant bit steering) / via memory mirroring (memory mirroring supported with any OS) / Hot-add and Hot-swappable using Microsoft Windows Server 2003																																			
Disk - capacity/bays	LSI® 53C1030 / Ultra320 SCSI (LVD 320MB/sec) / dual channel RAID / 64-bit 66MHz PCI / integrated on I/O Board																																			
Mechanical	Two channel backplane for internal hot-swap disks (16-bit LVD cable to SCSI backplane) / ServeRAID adapter and SCSI cable required if attaching external storage enclosures																																			
Chipset	Enhanced IDE ATA-100 controller in South Bridge / one one-drop IDE cable to backplane for diskette and CD-ROM																																			
Slots (Active™ PCI-X)	No disks standard / supports up to 15K rpm SCSI disks / two hot-swap bays / converged tray / 80-pin SCA-2 connectors																																			
RXE Expansion Port	EIA 19" rack models (4U ⁴) x 28" deep / supported in NetBAY™ Racks (such as NetBAY42 SR, NetBAY42 ER)																																			
CD-ROM / diskette	IBM XA-64™ chipset / IBM Cache and Scalability Controller with L4 cache controller / IBM Memory I/O Controller with two remote I/O ports (each to a IBM PCI-X Host Bridge) / each IBM PCI-X Host Bridge provides three peer PCI buses / PCI 2.2 Bus E supports graphics, adapter slot with Remote Supervisor Adapter, VIA® 82C686B South Bridge (IDE ATA-100, USB, Super I/O PC97317VUL [keyboard, mouse]) / PCI 2.2 Bus F supports SCSI, ethernet / PCI-X Bus A, B, C, D support PCI-X slots / designed to the PCI-X 1.0 specification																																			
Ethernet	Six hot-swap PCI-X 1.0 slots ¹⁰ available with power and attention indicator lights (optical sensors control power to slot) / hot replace, hot upgrade, hot expansion / separated by insulative plastic dividers																																			
Graphics controller	One RXE-100 Remote Expansion Enclosure can be shared between two x455 4-way, 8-way, or 16-way xSeries 455 servers or attached alone. Both PCI-X 6-packs must be installed to support RIO sharing as each server will access six additional PCI-X slots.																																			
Ports	CD-RW/DVD-ROM Combo IV drive standard / two removable Ultrabay™ 2000 bays																																			
Security	Dual Broadcom® 5704 10/100/1000 ethernet controller / on I/O Board / full duplex / 64-bit 66MHz PCI bus / Wake on LAN®																																			
Systems mgmt	SVGA / ATI® Rage XL / on I/O Board / 8MB SDRAM 125MHz std/max / up to 1280x1024 at 64K colors at 85Hz																																			
Diagnostics	Rear: RXE-100 Expansion Port (to connect optional RXE-100), RXE Management Port, two USB (Vers 1.1), analog DB-15 graphics, ethernet / no serial or parallel ports / no keyboard or mouse / Front: one USB (Vers 1.1)																																			
Software	Power-on and administrator passwords / unattended boot / selectable boot																																			
Keyboard / mouse	Remote Supervisor Adapter / PCI adapter / includes 10/100 ethernet, RJ-11, and serial connectors / provides remote console and mgmt / power on/off system / monitors power status, op system, temperature, disks, fans, power supplies																																			
Power supplies	Light Path Diagnostics™ / primary indicator on information panel with LEDs associated with failing components / IBM Real Time Diagnostics (operated through IBM Director) available even while server running																																			
Cooling fans	ServerGuide™ (CD-ROM installation and configuration utilities), IBM Director, and others																																			
	<table border="0"> <tr> <td>Itanium 2 1.3GHz/3MB L3 Cache Proc Upg</td> <td>73P7076</td> </tr> <tr> <td>Itanium 2 1.4GHz/4MB L3 Cache Proc Upg</td> <td>73P7077</td> </tr> <tr> <td>Itanium 2 1.5GHz/6MB L3 Cache Proc Upg</td> <td>73P7078</td> </tr> <tr> <td>512MB PC2100 CL2.5 ECC DDR SDRAM</td> <td>33L5038</td> </tr> <tr> <td>1GB PC2100 CL2.5 ECC DDR SDRAM</td> <td>33L5039</td> </tr> <tr> <td>2GB PC2100 CL2.5 ECC DDR SDRAM</td> <td>33L5040</td> </tr> <tr> <td>IBM 73.4GB 15K Ultra320 SCSI Hot-Swap</td> <td>32P0735</td> </tr> <tr> <td>IBM 146.8GB 10K Ultra320 SCSI Hot-Swap</td> <td>32P0728</td> </tr> <tr> <td>IBM ServeRAID™ 6M Ultra320 256MB Cache</td> <td>02R0988</td> </tr> <tr> <td>IBM RXE-100 Remote Storage Enclosure</td> <td>86841RX</td> </tr> <tr> <td>4-way to 8-way Expansion Option</td> <td>73P9911</td> </tr> <tr> <td>8-way to 16-way Supplemental Option</td> <td>73P9715</td> </tr> </table>												Itanium 2 1.3GHz/3MB L3 Cache Proc Upg	73P7076	Itanium 2 1.4GHz/4MB L3 Cache Proc Upg	73P7077	Itanium 2 1.5GHz/6MB L3 Cache Proc Upg	73P7078	512MB PC2100 CL2.5 ECC DDR SDRAM	33L5038	1GB PC2100 CL2.5 ECC DDR SDRAM	33L5039	2GB PC2100 CL2.5 ECC DDR SDRAM	33L5040	IBM 73.4GB 15K Ultra320 SCSI Hot-Swap	32P0735	IBM 146.8GB 10K Ultra320 SCSI Hot-Swap	32P0728	IBM ServeRAID™ 6M Ultra320 256MB Cache	02R0988	IBM RXE-100 Remote Storage Enclosure	86841RX	4-way to 8-way Expansion Option	73P9911	8-way to 16-way Supplemental Option	73P9715
Itanium 2 1.3GHz/3MB L3 Cache Proc Upg	73P7076																																			
Itanium 2 1.4GHz/4MB L3 Cache Proc Upg	73P7077																																			
Itanium 2 1.5GHz/6MB L3 Cache Proc Upg	73P7078																																			
512MB PC2100 CL2.5 ECC DDR SDRAM	33L5038																																			
1GB PC2100 CL2.5 ECC DDR SDRAM	33L5039																																			
2GB PC2100 CL2.5 ECC DDR SDRAM	33L5040																																			
IBM 73.4GB 15K Ultra320 SCSI Hot-Swap	32P0735																																			
IBM 146.8GB 10K Ultra320 SCSI Hot-Swap	32P0728																																			
IBM ServeRAID™ 6M Ultra320 256MB Cache	02R0988																																			
IBM RXE-100 Remote Storage Enclosure	86841RX																																			
4-way to 8-way Expansion Option	73P9911																																			
8-way to 16-way Supplemental Option	73P9715																																			

Six available 3.3 volt Active PCI-X slots:

Slot 1: fullsize, 64-bit 66MHz PCI-X, hot-swap Bus A
 Slot 2: fullsize, 64-bit 66MHz PCI-X, hot-swap Bus A
 Slot 3: fullsize, 64-bit 100MHz PCI-X, hot-swap, Bus B
 Slot 4: fullsize, 64-bit 100MHz PCI-X, hot-swap, Bus B
 Slot 5: fullsize, 64-bit 133MHz PCI-X, hot-swap, Bus C
 Slot 6: fullsize, 64-bit 133MHz PCI-X, hot-swap, Bus D
 Slot: used by Remote Supervisor Adp, 32-bit 33MHz

- ⊖ Dimensions: H6.9" x W17.3" x D28.1"
- ⊖ Dimensions: H175mm x W440mm x D713mm
- ⊖ Max weight: 120 lbs; 54.30kg
- ⊖ Stealth black color
- ⊖ Tool-free serviceability
- ⊖ Access processors, memory, adapters, and SMP Expansion Module from top
- ⊖ Access power supplies and disks from front
- ⊖ Setup Program by pressing F1 at startup
- ⊖ Diagnostics (PC-Doctor) by pressing F2 at startup
- ⊖ SCSISelect by pressing Ctrl+A at startup
- ⊖ Information LED panel and front-accessible pull-out Light Path panel (1st and 2nd level diagnostics without removing cover)
- ⊖ Predictive Failure Analysis® alerts on processors, Xcel4 Server Accelerator Cache, memory, fans, power supplies, and optional disks with IBM Director



4U Rack

Bay ①	3.5", 0.5"	access, open (Ultrabay 2000)
Bay ②	3.5", 0.5"	access, Combo (Ultrabay 2000)
Bay ③	3.5", SL 1"	access, hot-swap
Bay ④	3.5", SL 1"	access, hot-swap

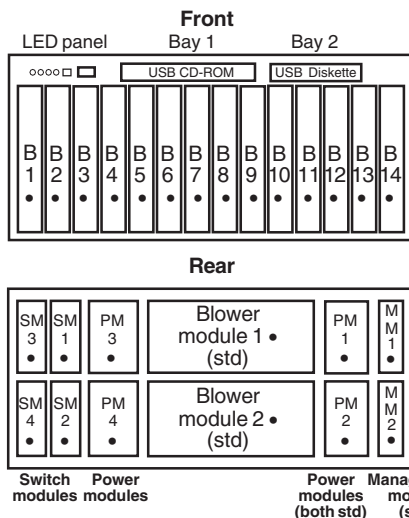
All models: Maximum internal disk capacity: 293.6GB with two 146.8GB² hot-swap SCSI disks

LIMITED WARRANTY³

- ⊖ 3 year parts and labor
- ⊖ International Warranty Service³
- ⊖ IBM On Site (IOR), 9-5 Next-Business-Day coverage⁷
- ⊖ 3 year on site warranty service upgrade option (in eligible locations):⁷
 - 24 hr x 7 day coverage, 2 hour response time 96P2689
- ⊖ Post warranty maintenance services available
- ⊖ Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- ⊖ 24x7¹⁴ toll-free support for warranty issues during the warranty period³

IBM® Type-model	Supported blades	Blade bays std / max	Switch module bays std / max	Switch module bays (type)	Management module bays std / max	Power module bays std / max	Power Module Wattage	Blower module bays std / max	Mechanical	Available date
8677-1XX	8678 / 8832 HS20	0 / 14	0 / 4	Ethernet, Fibre Channel	1 / 1	2 / 4	1200W	2 / 2	7U ⁴ rack	Nov 2002
8677-2XX	8678 / 8832 HS20	0 / 14	0 / 4	Ethernet, Fibre Channel	1 / 2	2 / 4	1800W	2 / 2	7U ⁴ rack	Oct 2003
Positioning Description		<i>Flexible, innovative design provides investment protection and reduces deployment costs</i> Provides common resources shared by blade servers such as power, system management, cabling, ethernet management and expansion, external Fibre Channel storage switching and connectivity, and I/O (diskette drive, CD-ROM drive, and ports for USB, keyboard, video, mouse)								
Blade bays		Supports 8678 and 8832 HS20 blades (and HS20 SCSI Storage Expansion Units) / 14 hot-pluggable bays / front access								
Switch modules Ethernet Switch Module		<i>Std: none; max: four / hot-swap / rear access</i> Supports two 4-port GB Ethernet Switch Modules in bays 1 and 2 / one Ethernet Switch Module required for ethernet support on HS20 blade server (two modules to support both ethernet controllers on HS20 and for failover redundancy) / bays 1 and 2 wired to the HS20 dual integrated ethernet controllers / four external ports / connects to std mgmt module								
Fibre Channel Switch Module		Supports two 2-port Fibre Channel Switch Modules in bays 3 and 4 / one Fibre Channel Switch Module required for one of two ports on optional Fibre Channel Expansion Card (two modules to support both ports and for failover redundancy) / bays 3 and 4 wired to the HS20 I/O expansion option connector / two external 2GBps small form factor pluggable ports								
Management modules		<i>Std: one; max: one or two / hot-swap / rear access / comprehensive system management functions / PowerPC® 401 controller / communicates with integrated system management processor on each HS20 server blade / multiplexor for console connectivity / ports: DB-15 analog video port, PS/2 keyboard port, PS/2 mouse port, 10/100 ethernet remote management connection port / all ports shared by up to 14 blade servers</i>								
Power modules		<i>Std: two in bays 1 and 2 (two 9ft IEC 320-C13 to C14 or two IEC 320-C19 to C20 cables for intrarack power distribution); max: four / hot-swap / rear access / 1200 or 1800 watts at 220v / both redundant to each other (N+N redundancy) / two std modules supply power to all modules and blade bays 1 through 6 / power for bays 7 through 14 requires two additional power modules in bays 3 and 4 (redundant to each other) / worldwide / voltage-sensing / auto-restart / no fans in each power module</i>								
Blower modules		<i>Std: two; max: two / hot-swap / redundant / variable speed / rear access / 325 cubic ft per min (CFM) / front to back airflow</i>								
Mechanical CD / diskette / USB		EIA 19" rack models (7U⁴) x 28" deep / supported in NetBAY™ Racks (such as NetBAY42 ER, NetBAY42 SR) 24X-10X ⁶ CD-ROM / 3.5" 1.44MB diskette drive / one USB port (Version 1.1) / all USB interface / not removable / front access / shared by up to 14 blade servers / requests for CD-ROM, diskette drive, and USB port by pressing CD select button on server blade front panel								
Keyboard / mouse		None standard / provides KVM console support / requests for keyboard, mouse, and video by pressing the display button on server blade front panel / supports NetBAY ACT CAT5 chaining solutions								
Ports		<i>Rear: keyboard (PS/2), mouse (PS/2), analog DB-15 graphics (on standard mgmt module) / no serial or parallel ports / Front: one USB (Version 1.1)</i>								
Security		Login password for remote connection / secure socket layer (SSL) security for remote management access / recommended in rack environment providing security through lockable doors or other security measures								
Ethernet		One of the dual integrated gigabit ethernet controllers on each HS20 blade servers connects to an optional 4-port GB Ethernet Switch Module (the second HS20 ethernet controller requires a second optional 4-port GB Ethernet Switch Module)								
Systems mgmt		Provides remote console and mgmt / power on/off blades/modules / monitors power status, operating system, temperature, disks, blowers, power modules / system diagnostic programs provided through IBM Director software								
System LED panel		System LED panel provides power-on, location, over-temperature, information, and system-error conditions								

NetBAY 1U Flat Panel Monitor Console Kit (with kybd/monitor)	32P1031	IBM 1200W Power Supply Module (includes two modules)	48P7052
NetBAY 2U Flat Panel Monitor Console Kit (with kybd/monitor)	32P1702	IBM 1800W Power Supply Module (includes two modules)	13N0570
NetBAY ACT Local Console Manager (CAT5 KVM cabling)	1735L04	IBM KVM/Redundant Management Module	48P7055
NetBAY ACT Remote Console Manager (CAT5 KVM cabling)	1735R16	IBM BladeCenter 4-port GB Ethernet Switch Module	48P7054
NetBAY ACT 250mm KVM Conversion Option	32P1636	IBM BladeCenter 2-port Fibre Channel Switch Module	48P7062
NetBAY ACT 1.5m KVM Conversion Option	32P1652	IBM BladeCenter Acoustic Attenuation Module (for rear)	49P2694
IBM Sleek 2-Button Stealth Black Mouse	28L3673	IBM FAST1700 Fibre Channel Storage Server	17421RU
NetBAY42 Enterprise Rack Cabinet	930842S	IBM FAST200 Storage Server	35421RU
NetBAY42 Standard Rack Cabinet	9306420	IBM T541 15" Flat Panel Color Monitor (black)	9512AB1
NetBAY25 Standard Rack Cabinet	9306250	• Other options at ibm.com/pc/us/accessories	
APC Smart-UPS 5000RMB	37L6861	• Solutions available from IBM BladeCenter Alliance program partners	



- ↳ Dimensions: H12.0" x W17.5" x D28"
 - ↳ Dimensions: H304.2mm x W444mm x D711.2mm
 - ↳ Weight: 99 to 240 lb; 44.91 to 108.86kg
 - ↳ Stealth black color bezel
 - ↳ Tool-free customer serviceability
 - ↳ Access HS20 server blades and SCSI Expansion Units from front
 - ↳ Access modules from rear
 - ↳ Midplane in center of system to interface for all major system components
 - ↳ Predictive Failure Analysis® alerts on blowers, blade server memory, processor(s), and optional disk(s) with IBM Director
- | Switch module bay | Switch module function |
|-------------------|---|
| 1 | Ethernet link 1 for all blade servers |
| 2 | Ethernet link 2 for all blade servers |
| 3 | Network connection 1 for all blade server I/O expansion options (Fibre Channel) |
| 4 | Network connection 2 for all blade server I/O expansion options (Fibre Channel) |

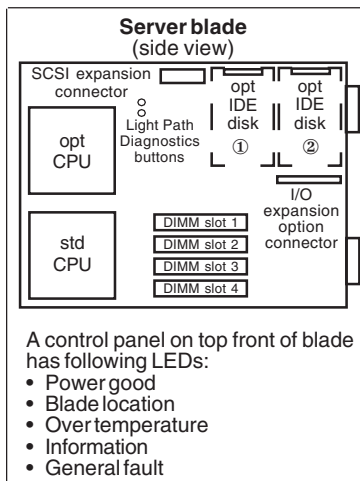
LIMITED WARRANTY³

- ↳ 3 year parts and labor
- ↳ International Warranty Service³
- ↳ On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time⁷
- ↳ On site service upgrade options (in eligible locations):⁷
 - 3 year IOR 24x7, 2 hr avg response (ServicePac® part num 21P2074)
 - 3 year IOR 24x7, 4 hr avg response (ServicePac part num 21P2073)
 - 3 year IOR 9x5, 4 hr avg response (ServicePac part num 21P2072)
 - 5 year IOR 9x5, 4 hr avg response (ServicePac part num 69P9247)
 - 5 year IOR 24x7, 2 hr avg response (ServicePac part num 69P9249)
- ↳ Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- ↳ 24x7¹⁴ toll-free support for warranty issues during the warranty

See footnotes for important warranty information • = Hot-swap (BC1) © IBM Corp. January 2004
 US models announced September 24, 2002 (1XX) or October 14, 2003 (2XX)
 ↳ US models withdrawn effective December 30, 2003 (1XX). 1200W Power module withdrawn effective February 24, 2004

IBM® Type-model	Qty x Processor ¹	Memory	Frontside Bus Mhz	L3 Cache	Disk	Disk controller	Disk bays	SCSI support with optional stor exp unit	Slots x bays	Mech-anical	Required chassis	Available date
8832-21X	1 x Xeon™2.8BGHz	512MB	533Mhz	0MB	None	EIDE	2 fixed	2 hot-swap	Ultra320	0x2 7U ⁴ blade	BladeCenter	July 2003
8832-31X	1 x Xeon 3.06GHz	512MB	533Mhz	0MB	None	EIDE	2 fixed	2 hot-swap	Ultra320	0x2 7U ⁴ blade	BladeCenter	Oct 2003
8832-G1X	1 x Xeon 3.2GHz	1GB	533Mhz	1MB	None	EIDE	2 fixed	2 hot-swap	Ultra320	0x2 7U ⁴ blade	BladeCenter	Nov 2003

Positioning Processor(s) L2/L3 Cache SMP support Implementation	<i>Ultra-dense, highly manageable modular computing platform with superior performance</i> Up to 1 x Intel® Xeon 3.2GHz with 533MHz frontside bus / Hyper-Threading technology / NetBurst™ microarchitecture 512KB L2 Cache / 1MB L3 Cache (some) / on die of processor / at processor speed 2-way SMP / up to two Xeon Processors (same speed/cache size) Server blade contains two Intel 604-pin micro-PGA ZIF sockets, four memory DIMM slots, two IDE connectors, one SCSI expansion connector, one I/O expansion option connector, and integrated graphics and dual ethernet											
Memory	512MB or 1GB std / 8GB max ¹³ / two slots used / two slots available / PC2100 266MHz registered 184-pin ECC DDR-SDRAM DIMMs / four DIMM gold-connector slots on systemboard / DIMMs must be installed in matched pairs [a bank] / 2-way memory interleave / dual channel / memory bus runs at 2 x 100MHz / Error Checking and Correcting (ECC) via 16-bit Checksum Chipkill™ (corrects 1, 2, 3, or 4-bit errors on same chip and detects 2- through 8-bit errors contained in two chips)											
IDE controller/bays	Enhanced IDE ATA-100 controller in CSB6-U South Bridge / two connectors/buses on planar / each supports one 2.5" IDE disk / no cable as IDE disk attaches to riser card and tray (included with option kit) / Supports max of two IDE disks / space for only one IDE disk if an I/O expansion option installed [Fibre Channel] / RAID-1 mirroring standard											
SCSI disk controller	None / supports optional SCSI Storage Expansion Unit (a blade occupying adjacent blade slot / connects to HS20 via one connector / LSI Logic® 53C1020 Ultra320 SCSI controller [LVD 320MB/sec] / 64-bit 133MHz PCI-X Bus B from CIOB-ES I/O Bridge (IMB2 bus to Host Bridge) / supports RAID-1 mirroring [Embedded Mirroring] with two hot-swap 3.5" one-inch high SL SCSI disks in front bays / one 16-bit internal channel / no cables or external connector)											
SCSI disk bays	Supports max of two hot-swap 3.5" SL Ultra320 SCSI disks in optional SCSI Storage Expansion Unit / 80-pin SCA-2 connectors / all SCSI bays Ultra320-enabled											
External storage	Support for IBM TotalStorage™ solutions (including FASiT and NAS family of products)											
Mechanical Architecture / chipsets	Supported in IBM BladeCenter (type 8677) / BladeCenter supported in 28" deep racks such as the IBM NetBAY™ Rack products ServerWorks® Grand Champion™ 4.0 LE / CMIC LE Host Bridge (memory controller and I/O Bridge) / single-slot one CIOBE-S I/O Bridge (IMB2 bus to Host Bridge) for two PCI-X Buses with Bus A for ethernet and Bus B for ethernet and the I/O expansion option connector / CSB6-U South Bridge (Thin IMB to Host Bridge) for EIDE, USB, LPC bus to Super I/O, and PCI 2.2 Bus C with graphics controller / National Semiconductor® PC87417 Super I/O chip No PCI or PCI-X slots (expansion via modules or network-interface option connector)											
Bus slots	Two gigabit Ethernet controllers / Broadcom® BCM5704S / on blade / two PCI-X 64-bit 133MHz buses / full duplex / Wake on LAN® / Alert Standard Format 1.0 / teaming and failover support / one of the dual controllers connects to an optional, supported Ethernet switch or <i>Optical Passthrough Module</i> (the second controller requires a second optional switch or OPM)											
Ethernet controllers	One connector for I/O expansion option (Fibre Channel Expansion Card) / requires same interface modules in bays 3 and 4 of BladeCenter / all blades in a single BladeCenter must contain the same expansion card (or no expansion card) / ethernet and serial I/O expansion cards planned for future release ²⁰											
Network-interface	None / requests for CD-ROM, diskette drive, and USB port in BladeCenter by pressing CD select button on front control panel											
CD / diskette / USB Kybd / video / mouse Graphics	None / requests for keyboard, mouse, and video in BladeCenter by pressing the display button on front control panel SVGA / ATI® Rage XL / on blade / 8MB SDRAM std/max / 32-bit 33MHz PCI 2.2 bus											
Systems mgmt	IBM integrated system management processor (ISMP) / H8S2148 / on blade / provides system and environmental monitoring, event recording, alert capability / RS-485 interface for communication with BladeCenter management module						Xeon 2.8Ghz/512KB L2 Cache Proc Upg 73P9073 Xeon 3.06Ghz/512KB L2 Cache Proc Upg 73P9074 Xeon 3.2Ghz/512KB L2 / 1MB L3 Proc Upg 13N0650 512MB PC2100 CL2.5 ECC DDR-SDRAM DIMM 33L5038 1GB PC2100 CL2.5 ECC DDR-SDRAM RDIMM 33L5039 2GB PC2100 CL2.5 ECC DDR-SDRAM RDIMM 33L5040 IBM HS20 SCSI Storage Expansion Unit (blade) 48P7058 IBM HS20 Fibre Channel Expansion Card (with two ports; each port requires a FC Switch Module) 48P7061 IBM HS20 40GB ² 5400 rpm ATA-100 HDD 48P7063 36.4GB 15K Ultra160 SCSI Hot-Swap SL HDD* 06P5768 36.4GB 15K Ultra320 SCSI Hot-Swap SL HDD* 06P5776 73.4GB 10K Ultra160 SCSI Hot-Swap SL HDD* 06P5756 146.8GB 10K Ultra320 SCSI Hot-Swap SL HDD* 32P0728 * Disk requires SCSI Storage Expansion Unit					
Diagnostics	Light Path Diagnostics™ (LED lights indicate failing component) and on-board diagnostics (via PC-Doctor in BIOS)											
Security	Power-on password / administrator password / unattended boot / selectable boot / unattended start mode											
Software ship group	Documentation CD, IBM Director 4.1 CD, Device Driver CD											
Cooling fans	Uses cooling from BladeCenter (type 8677) / thermal sensors on each processor and BladeCenter modules and front panel											
Power supply Prerequisites	Uses power module(s) in BladeCenter (type 8677) Monitor, keyboard, mouse for setup; ethernet switch module, disk, BladeCenter (type 8677), operating system											



- Bay ① 3.5", 9.5mm, no front access, optional ThinkPad® IDE disk
 - Bay ② 3.5", 9.5mm, no front access, optional ThinkPad IDE disk
 - Stealth black front bezel
 - H 9.7" x W 1.14" x D 17.6"
 - H 24.5cm x W 2.9cm x D 44.6cm
 - 12 lbs; 5.4kg (max configuration)
 - Configuration/Setup Utility: F1 at startup
 - Diagnostics (PC-Doctor™): F2 at startup
 - System Partition Boot: ALT+F1 at startup
 - Network Boot: F12 at startup
 - PXE Boot Agent Utility: Ctrl+S at startup
 - Blade control panel on each HS20 blade server provides media select button, keyboard/mouse/video select button, and indicators for blade error, information, location, disk activity, and power
 - Predictive Failure Analysis® alerts on memory, processor(s), and optional disk(s) with IBM Director
- Maximum internal disk capacity for each HS20 blade server¹³:*
80GB with two 40GB EIDE disks or
293.6GB* with two 146.8GB SL SCSI disks

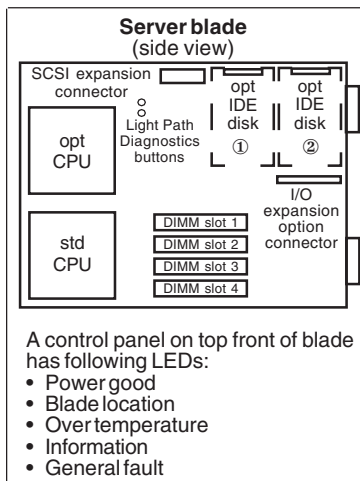
LIMITED WARRANTY³

- 3 year parts and labor
- International Warranty Service³
- On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time⁷
- On site service upgrade options (in eligible locations):⁷
 - 3 year IOR 24x7, 2 hr avg response (ServicePac® part num 69P9519)
 - 3 year IOR 24x7, 4 hr avg response (ServicePac part num 69P9518)
 - 3 year IOR 9x5, 4 hr avg response (ServicePac part num 69P9517)
 - 5 year IOR 9x5, 4 hr avg response (ServicePac part num 69P9525)
 - 5 year IOR 24x7, 2 hr avg response (ServicePac part num 69P9527)
 - Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- 24x7¹⁴ toll-free support for warranty issues during the warranty period⁵

IBM® Type-model	Qty x Processor ¹	Memory	Frontside BusMhz	L3 Cache	Disk	Disk controller	Disk bays	SCSI support with optional stor exp unit	Slots x bays	Mech-anical	Required chassis	Available date
8832-L1X	1 x Xeon™2.8BGHz	512MB	533Mhz	0MB	None	EIDE	2 fixed	2 hot-swap	Ultra320	0x2 7U ⁴ blade	BladeCenter	Jan 2004
8832-M1X	1 x Xeon 3.06GHz	512MB	533Mhz	0MB	None	EIDE	2 fixed	2 hot-swap	Ultra320	0x2 7U ⁴ blade	BladeCenter	Jan 2004

These models ship standard with **Non-Chipkill DIMMs**. Chipkill is **optionally available** with purchase of 512MB DIMMs or higher.

Positioning Processor(s) L2/L3 Cache SMP support Implementation	<i>Ultra-dense, highly manageable modular computing platform with superior performance</i> Up to 1 x Intel® Xeon 3.06GHz with 533MHz frontside bus / Hyper-Threading technology / NetBurst™ microarchitecture 512KB L2 Cache / on die of processor / at processor speed 2-way SMP / up to two Xeon Processors (same speed/cache size) Server blade contains two Intel 604-pin micro-PGA ZIF sockets, four memory DIMM slots, two IDE connectors, one SCSI expansion connector, one I/O expansion option connector, and integrated graphics and dual ethernet											
Memory	512MB Non-Chipkill std / 8GB max ¹³ / two slots used / two slots available / PC2100 266MHz registered 184-pin ECC DDR-SDRAM DIMMs / four DIMM gold-conductor slots on systemboard / DIMMs must be installed in matched pairs [a bank] / 2-way memory interleave / dual channel / memory bus runs at 2 x 100MHz / Error Checking and Correcting (ECC) (corrects 1, 2, 3, or 4-bit errors on same chip and detects 2- through 8-bit errors contained in two chips) / 16-bit Checksum Chipkill™ optionally available for configurations 1GB and above											
IDE controller/bays	Enhanced IDE ATA-100 controller in CSB6-U South Bridge / two connectors/buses on planar / each supports one 2.5" IDE disk / no cable as IDE disk attaches to riser card and tray (included with option kit) / Supports max of two IDE disks / space for only one IDE disk if an I/O expansion option installed [Fibre Channel] / RAID-1 mirroring standard											
SCSI disk controller	None / supports optional SCSI Storage Expansion Unit (a blade occupying adjacent blade slot / connects to HS20 via one connector / LSI Logic® 53C1020 Ultra320 SCSI controller [LVD 320MB/sec] / 64-bit 133MHz PCI-X Bus B from CIOB-ES I/O Bridge (IMB2 bus to Host Bridge) / supports RAID-1 mirroring [Embedded Mirroring] with two hot-swap 3.5" one-inch high SL SCSI disks in front bays / one 16-bit internal channel / no cables or external connector)											
SCSI disk bays	Supports max of two hot-swap 3.5" SL Ultra320 SCSI disks in optional SCSI Storage Expansion Unit / 80-pin SCA-2 connectors / all SCSI bays Ultra320-enabled											
External storage	Support for IBM TotalStorage™ solutions (including FASiT and NAS family of products)											
Mechanical Architecture / chipsets	Supported in IBM BladeCenter (type 8677) / BladeCenter supported in 28" deep racks such as the IBM NetBAY™ Rack products ServerWorks® Grand Champion™ 4.0 LE / CMIC LE Host Bridge (memory controller and I/O Bridge) / single slot one CIOBE-S I/O Bridge (IMB2 bus to Host Bridge) for two PCI-X Buses with Bus A for ethernet and Bus B for ethernet and the I/O expansion option connector / CSB6-U South Bridge (Thin IMB to Host Bridge) for EIDE, USB, LPC bus to Super I/O, and PCI 2.2 Bus C with graphics controller / National Semiconductor® PC87417 Super I/O chip No PCI or PCI-X slots (expansion via modules or network-interface option connector)											
Bus slots	Two gigabit Ethernet controllers / Broadcom® BCM5704S / on blade / two PCI-X 64-bit 133MHz buses / full duplex / Wake on LAN® / Alert Standard Format 1.0 / teaming and failover support / one of the dual controllers connects to an optional, supported Ethernet switch or <i>Optical Passthrough Module</i> (the second controller requires a second optional switch or OPM)											
Ethernet controllers	One connector for I/O expansion option (Fibre Channel Expansion Card) / requires same interface modules in bays 3 and 4 of BladeCenter / all blades in a single BladeCenter must contain the same expansion card (or no expansion card) / ethernet and serial I/O expansion cards planned for future release ²⁰											
Network-interface	None / requests for CD-ROM, diskette drive, and USB port in BladeCenter by pressing CD select button on front control panel											
CD / diskette / USB Kybd / video / mouse Graphics	None / requests for keyboard, mouse, and video in BladeCenter by pressing the display button on front control panel SVGA / ATI® Rage XL / on blade / 8MB SDRAM std/max / 32-bit 33MHz PCI 2.2 bus											
Systems mgmt	IBM integrated system management processor (ISMP) / H8S2148 / on blade / provides system and environmental monitoring, event recording, alert capability / RS-485 interface for communication with BladeCenter management module						Xeon 2.8Ghz/512KB L2 Cache Proc Upg 73P9073 Xeon 3.06Ghz/512KB L2 Cache Proc Upg 73P9074 512MB PC2100 CL2.5 ECC Non-Chipkill DDR-SDRAM RDIMM 73P2868					
Diagnostics	Light Path Diagnostics™ (LED lights indicate failing component) and on-board diagnostics (via PC-Doctor in BIOS)						1GB PC2100 CL2.5 ECC DDR-SDRAM RDIMM 33L5039 2GB PC2100 CL2.5 ECC DDR-SDRAM RDIMM 33L5040 IBM HS20 SCSI Storage Expansion Unit (blade) 48P7058 IBM HS20 Fibre Channel Expansion Card (with two ports; each port requires a FC Switch Module) 48P7061 IBM HS20 40GB ² 5400 rpm ATA-100 HDD 48P7063 36.4GB 15K Ultra160 SCSI Hot-Swap SL HDD* 06P5768 36.4GB 15K Ultra320 SCSI Hot-Swap SL HDD* 06P5776 73.4GB 10K Ultra160 SCSI Hot-Swap SL HDD* 06P5756 146.8GB 10K Ultra320 SCSI Hot-Swap SL HDD* 32P0728 * Disk requires SCSI Storage Expansion Unit					
Security	Power-on password / administrator password / unattended boot / selectable boot / unattended start mode											
Software ship group	Documentation CD, IBM Director 4.1 CD, Device Driver CD											
Cooling fans	Uses cooling from BladeCenter (type 8677) / thermal sensors on each processor and BladeCenter modules and front panel											
Power supply Prerequisites	Uses power module(s) in BladeCenter (type 8677) Monitor, keyboard, mouse for setup; ethernet switch module, disk, BladeCenter (type 8677), operating system											



- Bay ① 3.5", 9.5mm, no front access, optional ThinkPad® IDE disk
 - Bay ② 3.5", 9.5mm, no front access, optional ThinkPad IDE disk
 - Stealth black front bezel
 - H 9.7" x W 1.14" x D 17.6"
 - H 24.5cm x W 2.9cm x D 44.6cm
 - 12 lbs; 5.4kg (max configuration)
 - Configuration/Setup Utility: F1 at startup
 - Diagnostics (PC-Doctor™): F2 at startup
 - System Partition Boot: ALT+F1 at startup
 - Network Boot: F12 at startup
 - PXE Boot Agent Utility: Ctrl+S at startup
 - Blade control panel on each HS20 blade server provides media select button, keyboard/mouse/video select button, and indicators for blade error, information, location, disk activity, and power
 - Predictive Failure Analysis® alerts on memory, processor(s), and optional disk(s) with IBM Director
- Maximum internal disk capacity for each HS20 blade server¹³:*
80GB with two 40GB EIDE disks or
293.6GB* with two 146.8GB SL SCSI disks

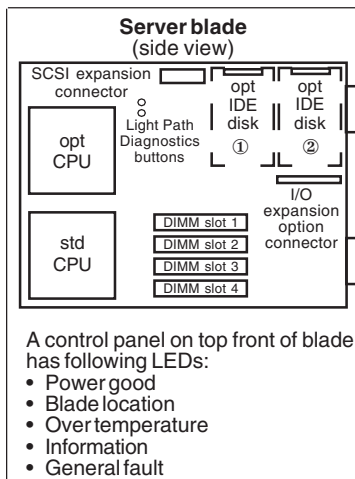
LIMITED WARRANTY³

- 3 year parts and labor
- International Warranty Service³
- On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time⁷
- On site service upgrade options (in eligible locations):⁷
 - 3 year IOR 24x7, 2 hr avg response (ServicePac® part num 69P9519)
 - 3 year IOR 24x7, 4 hr avg response (ServicePac part num 69P9518)
 - 3 year IOR 9x5, 4 hr avg response (ServicePac part num 69P9517)
 - 5 year IOR 9x5, 4 hr avg response (ServicePac part num 69P9525)
 - 5 year IOR 24x7, 2 hr avg response (ServicePac part num 69P9527)
 - Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- 24x7¹⁴ toll-free support for warranty issues during the warranty period⁵

See footnotes for important warranty information
US models announced January 20, 2004

IBM® Type-model	Qty x Processor ¹	Memory	Frontside BusMhz	L3 Cache	Disk	Disk controller	Disk bays	SCSI support with optional stor exp unit	Slots x bays	Mech-anical	Required chassis	Available date
8832-J1X	1 x Xeon 3.2GHz	1GB	533Mhz	2MB	None	EIDE	2 fixed	2 hot-swap Ultra320	0x2	7U ⁴ blade	BladeCenter	Feb 2004

Positioning Processor(s) L2/L3 Cache SMP support Implementation	<i>Ultra-dense, highly manageable modular computing platform with superior performance</i> 1 x Intel® Xeon 3.2GHz with 533MHz frontside bus / Hyper-Threading technology / NetBurst™ microarchitecture 512KB L2 Cache / 2MB L3 Cache / on die of processor / at processor speed 2-way SMP / up to two Xeon Processors (same speed/cache size) Server blade contains two Intel 604-pin micro-PGA ZIF sockets, four memory DIMM slots, two IDE connectors, one SCSI expansion connector, one I/O expansion option connector, and integrated graphics and dual ethernet											
Memory	1GB std / 8GB max ¹³ / two slots used / two slots available / PC2100 266MHz registered 184-pin ECC DDR-SDRAM DIMMs / four DIMM gold-connector slots on systemboard / DIMMs must be installed in matched pairs [a bank] / 2-way memory interleave / dual channel / memory bus runs at 2 x 100MHz / Error Checking and Correcting (ECC) via 16-bit Checksum Chipkill™ (corrects 1, 2, 3, or 4-bit errors on same chip and detects 2- through 8-bit errors contained in two chips)											
IDE controller/bays	Enhanced IDE ATA-100 controller in CSB6-U South Bridge / two connectors/buses on planar / each supports one 2.5" IDE disk / no cable as IDE disk attaches to riser card and tray (included with option kit) / Supports max of two IDE disks / space for only one IDE disk if an I/O expansion option installed [Fibre Channel] / RAID-1 mirroring standard											
SCSI disk controller	None / supports optional SCSI Storage Expansion Unit (a blade occupying adjacent blade slot / connects to HS20 via one connector / LSI Logic® 53C1020 Ultra320 SCSI controller [LVD 320MB/sec] / 64-bit 133MHz PCI-X Bus B from CIOB-ES I/O Bridge (IMB2 bus to Host Bridge) / supports RAID-1 mirroring [Embedded Mirroring] with two hot-swap 3.5" one-inch high SL SCSI disks in front bays / one 16-bit internal channel / no cables or external connector)											
SCSI disk bays	Supports max of two hot-swap 3.5" SL Ultra320 SCSI disks in optional SCSI Storage Expansion Unit / 80-pin SCA-2 connectors / all SCSI bays Ultra320-enabled											
External storage	Support for IBM TotalStorage™ solutions (including FASiT and NAS family of products)											
Mechanical Architecture / chipsets	Supported in IBM BladeCenter (type 8677) / BladeCenter supported in 28" deep racks such as the IBM NetBAY™ Rack products ServerWorks® Grand Champion™ 4.0 LE / CMIC LE Host Bridge (memory controller and I/O Bridge) / single slot one CIOBE-S I/O Bridge (IMB2 bus to Host Bridge) for two PCI-X Buses with Bus A for ethernet and Bus B for ethernet and the I/O expansion option connector / CSB6-U South Bridge (Thin IMB to Host Bridge) for EIDE, USB, LPC bus to Super I/O, and PCI 2.2 Bus C with graphics controller / National Semiconductor® PC87417 Super I/O chip No PCI or PCI-X slots (expansion via modules or network-interface option connector)											
Bus slots	Two gigabit Ethernet controllers / Broadcom® BCM5704S / on blade / two PCI-X 64-bit 133MHz buses / full duplex / Wake on LAN® / Alert Standard Format 1.0 / teaming and failover support / one of the dual controllers connects to an optional, supported Ethernet switch or <i>Optical Passthrough Module</i> (the second controller requires a second optional switch or OPM)											
Ethernet controllers	One connector for I/O expansion option (Fibre Channel Expansion Card) / requires same interface modules in bays 3 and 4 of BladeCenter / all blades in a single BladeCenter must contain the same expansion card (or no expansion card) / ethernet and serial I/O expansion cards planned for future release ²⁰											
Network-interface	None / requests for CD-ROM, diskette drive, and USB port in BladeCenter by pressing CD select button on front control panel											
CD / diskette / USB Kybd / video / mouse Graphics	None / requests for keyboard, mouse, and video in BladeCenter by pressing the display button on front control panel SVGA / ATI® Rage XL / on blade / 8MB SDRAM std/max / 32-bit 33MHz PCI 2.2 bus											
Systems mgmt	IBM integrated system management processor (ISMP) / H8S2148 / on blade / provides system and environmental monitoring, event recording, alert capability / RS-485 interface for communication with BladeCenter management module								Xeon 3.2Ghz/512KB L2 / 2MB L3 Cache 13N0743 Proc Upg			
Diagnostics	Light Path Diagnostics™ (LED lights indicate failing component) and on-board diagnostics (via PC-Doctor in BIOS)								512MB PC2100 CL2.5 ECC DDR-SDRAM DIMM 33L5038 1GB PC2100 CL2.5 ECC DDR-SDRAM RDIMM 33L5039 2GB PC2100 CL2.5 ECC DDR-SDRAM RDIMM 33L5040 IBM HS20 SCSI Storage Expansion Unit (blade) 48P7058 IBM HS20 Fibre Channel Expansion Card (with two ports; each port requires a FC Switch Module) 48P7061 IBM HS20 40GB ² 5400 rpm ATA-100 HDD 48P7063 36.4GB 15K Ultra160 SCSI Hot-Swap SL HDD* 06P5768 36.4GB 15K Ultra320 SCSI Hot-Swap SL HDD* 06P5776 73.4GB 10K Ultra160 SCSI Hot-Swap SL HDD* 06P5756 146.8GB 10K Ultra320 SCSI Hot-Swap SL HDD* 32P0728 * Disk requires SCSI Storage Expansion Unit			
Security	Power-on password / administrator password / unattended boot / selectable boot / unattended start mode											
Software ship group	Documentation CD, IBM Director 4.1 CD, Device Driver CD											
Cooling fans	Uses cooling from BladeCenter (type 8677) / thermal sensors on each processor and BladeCenter modules and front panel											
Power supply Prerequisites	Uses power module(s) in BladeCenter (type 8677) Monitor, keyboard, mouse for setup; ethernet switch module, disk, BladeCenter (type 8677), operating system											



- Bay ① 3.5", 9.5mm, no front access, optional ThinkPad® IDE disk
 - Bay ② 3.5", 9.5mm, no front access, optional ThinkPad IDE disk
 - Stealth black front bezel
 - H 9.7" x W 1.14" x D 17.6"
 - H 24.5cm x W 2.9cm x D 44.6cm
 - 12 lbs; 5.4kg (max configuration)
 - Configuration/Setup Utility: F1 at startup
 - Diagnostics (PC-Doctor™): F2 at startup
 - System Partition Boot: ALT+F1 at startup
 - Network Boot: F12 at startup
 - PXE Boot Agent Utility: Ctrl+S at startup
 - Blade control panel on each HS20 blade server provides media select button, keyboard/mouse/video select button, and indicators for blade error, information, location, disk activity, and power
 - Predictive Failure Analysis® alerts on memory, processor(s), and optional disk(s) with IBM Director
- Maximum internal disk capacity for each HS20 blade server¹³:
80GB with two 40GB EIDE disks or
293.6GB* with two 146.8GB SL SCSI disks

LIMITED WARRANTY³

- 3 year parts and labor
- International Warranty Service³
- On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time⁷
- On site service upgrade options (in eligible locations):⁷
 - 3 year IOR 24x7, 2 hr avg response (ServicePac® part num 69P9519)
 - 3 year IOR 24x7, 4 hr avg response (ServicePac part num 69P9518)
 - 3 year IOR 9x5, 4 hr avg response (ServicePac part num 69P9517)
 - 5 year IOR 9x5, 4 hr avg response (ServicePac part num 69P9525)
 - 5 year IOR 24x7, 2 hr avg response (ServicePac part num 69P9527)
 - Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- 24x7¹⁴ toll-free support for warranty issues during the warranty period⁵

IBM® Type-GAV-model	Processor	L2 GHz ¹ cache	FSB MHz	Memory	Disk controller	Disk bays	SCSI Support with optional stor exp unit	slots x bays	Mech- anical	Ethernet	Available date				
8843-01y-01x	1 x Xeon™	2.8	1MB	800	512MB	None	Ultra320	2-fixed	2	Hot-swap	Ultra320	0 x 2	7U ⁴ blade	2 x Gigabit	Sept 2004
8843-11y-11x	1 x Xeon	3.0	1MB	800	1GB	None	Ultra320	2-fixed	2	Hot-swap	Ultra320	0 x 2	7U blade	2 x Gigabit	Sept 2004
8843-21y-21x	1 x Xeon	3.2	1MB	800	1GB	None	Ultra320	2-fixed	2	Hot-swap	Ultra320	0 x 2	7U blade	2 x Gigabit	Sept 2004
8843-31y-31x	1 x Xeon	3.4	1MB	800	1GB	None	Ultra320	2-fixed	2	Hot-swap	Ultra320	0 x 2	7U blade	2 x Gigabit	Sept 2004
8843-41y-41x	1 x Xeon	3.6	1MB	800	1GB	None	Ultra320	2-fixed	2	Hot-swap	Ultra320	0 x 2	7U blade	2 x Gigabit	Sept 2004
8843-L1y-L1x	1 x Xeon	2.8	LV 1MB	800	512MB	None	Ultra320	2-fixed	2	Hot-swap	Ultra320	0 x 2	7U blade	2 x Gigabit	Feb 2005

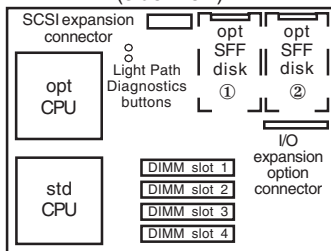
Full density population (14 Blades) requires 2000W power supplies

Processor(s)	1 x Intel® Xeon up to 3.6 GHz with 800MHz frontside bus (FSB) / EM64T / 1MB L2 ECC Cache / Hyper-Threading technology L7y: Features Low Voltage Processor for reduced heat output allowing greater rack density while utilizing existing facilities	
SMP - L2 Cache Implementation	2-way SMP / up to two Xeon Processors (same speed/cache size) / 1MB std and max / at processor speed Systemboard contains two Intel 604-pin micro-PGA ZIF sockets, four DIMM slots, one SCSI expansion connector, one I/O expansion option connector, integrated graphics and dual Gigabit ethernet	
Memory	512MB/1GB std / 8GB¹³ max / two slots used / two slots available / PC2-3200 400MHz CL2.5 ECC DDR2-SDRAM DIMMs / four 240 pin gold-connector slots on systemboard / DIMMs must be installed in matched pairs [a bank] / 2-way memory interleave / dual channel	
SCSI disk controller	LSI Logic® 53C1020 SCSI controller / Single channel Ultra320 SCSI controller (LVD 320MB/sec) / on planar / 64-bit 100MHz PCI-X / supports RAID-1 & 1E mirroring (supported in 32-bit legacy mode only) / One 16-bit channel (one internal) / <i>Internal channel</i> : one 2-drop 16-bit 68-pin LVD SCSI cable	
SCSI Disk bays	Two 2.5-inch Small Form Factor (SFF) Ultra320 internal fixed disk bays / Supports max of two hot-swap 3.5" SL Ultra320 SCSI disks in optional SCSI Storage Expansion Unit (80-pin SCA-2 connectors; all SCSI bays Ultra320-enabled) / Support for IBM TotalStorage™ solutions (including FASiT and NAS family of products)	
External Storage		
Mechanical Architecture/Chipset	7U Blade / Supported in IBM BladeCenter 8677-3XX or 8677-1XX/2XX (requires upgrade to 2000W power supply option 26K4816) Intel E7520 chipset / E7525 MCH (Memory Controller Hub) for PCI-Express bridge to PXH, ICH5R / PXH BUS supports PCI-X BUS / ICH5R supports USB (1.0) / LSI 1020 / Dual Broadcom 5704S / Low Pin Count Interface / NS PC87366 Super I/O of LPC interface	
BUS slots	No PCI or PCI-X slots (expansion via modules or network-interface option connector)	
Ethernet	Dual gigabit 10/100/1000 ethernet controller / Broadcom 5704S / two full gigabit ethernet MAC and PHY layer functions / chip on blade / PCI-X 64-bit 100MHz / full duplex / Wake on LAN® / PXE 2.0 Boot agent / Alert Standard Format 2.0 / Failover, adapter fault tolerance / Load balancing or teaming / one of the dual controllers connects to an optional, supported Ethernet switch or <i>Optical Passthrough Module</i> (the second controller requires a second optional switch or OPM)	
Network Interface	One connector for I/O expansion option (Fibre Channel Expansion Card) / requires same interface modules in bays 3 and 4 of BladeCenter / all blades in a single BladeCenter must contain the same expansion card (or no expansion card) / ethernet and serial I/O expansion cards planned for future release ²⁰	
CD / Diskette / USB Kybd / video / mouse Graphics controller	None / requests for CD-ROM, diskette drive, and USB port in BladeCenter by pressing CD select button on front control panel None / requests for keyboard, mouse, and video in BladeCenter by pressing the display button on front control panel NVGA / ATI® Radeon™ 7000M on Planar / 16MB SDRAM std and max / 15 pin connector	
Systems Mgmt	IBM Baseboard Management Controller (BMC) / H8S2168 / on blade / provides system and environmental monitoring, event recording, alert capability / RS-485 interface for intermanagement communication with BladeCenter Management module	
Diagnostics	Light Path Diagnostics™ (LED lights indicate failing component) and on-board diagnostics (via PC-Doctor in BIOS)	
Security	No security intrusion protection / Power-on password / administrator password / unattended boot / selectable boot / unattended start mode	
Software ship group	Documentation CD, Broadcom CD	
Cooling Fans	Uses cooling from BladeCenter (type 8677) / thermal sensors on each processor and BladeCenter modules and front panel	
Power supply(s) Prerequisites	Uses power module(s) in BladeCenter (type 8677) Monitor, keyboard, mouse for setup; ethernet switch module, disk, BladeCenter (type 8677), operating system	

Xeon 2.8 GHz/800/1MB L2 Cache EM64T Proc Upg	13N0692
Xeon 3.0 GHz/800/1MB L2 Cache EM64T Proc Upg	13N0693
Xeon 3.2 GHz/800/1MB L2 Cache EM64T Proc Upg	13N0657
Xeon 3.4 GHz/800/1MB L2 Cache EM64T Proc Upg	13N0658
Xeon 3.6 GHz/800/1MB L2 Cache EM64T Proc Upg	13N0659
512MB (2x256) PC2-3200 ECC DDR2	73P3522
1GB (2x512) PC2-3200 CL3 ECC DDR2	73P3522
2GB (2x1GB) PC2-3200 ECC DDR2 ChipK RDIMM Kit	73P2866
4GB (2x2GB) PC2-3200 ECC DDR2 ChipK RDIMM Kit	73P2867
IBM 36.4GB 10K Ultra320 SCSI 2.5" SFF NHS HDD	90P1312
IBM 73GB 10K Ultra320 SCSI 2.5" SFF NHS HDD	90P1313
BladeCenter SCSI Storage Exp Unit	26K4817
BladeCenter SFF Fibre Channel Exp Card	26K4841
BladeCenter SFF Gigabit Ethernet Exp Card	26K4842
BladeCenter Optical Pass-thru Module	02R9080
BladeCenter SCSI Storage Expansion Unit	26K4817
17-inch Flat Panel Monitor Console Kit w/ US Kybd	17231UX
Other options at ibm.com/pc/us/accessories	

Bay ① 3.5", 9.5mm, no front access, optional 2.5-inch SFF SCSI disk
 Bay ② 3.5", 9.5mm, no front access, optional 2.5-inch SFF SCSI disk

Server blade
(side view)



A control panel on top front of blade has following LEDs:

- Power good
- Blade location
- Over temperature
- Information
- General fault

- ▷ Stealth black front bezel
- ▷ H 9.7" x W 1.14" x D 17.6"; H 24.5cm x W 2.9cm x D 44.6cm
- ▷ 12 lbs; 5.4kg (max configuration)
- ▷ Configuration/Setup Utility: F1 at startup
- ▷ Diagnostics (PC-Doctor™): F2 at startup
- ▷ System Partition Boot: ALT+F1 at startup
- ▷ Network Boot: F12 at startup
- ▷ PXE Boot Agent Utility: Ctrl+S at startup
- ▷ Blade control panel on each HS20 blade server provides media select button, keyboard/mouse/video select button, and indicators for blade error, information, location, disk activity, and power
- ▷ Predictive Failure Analysis® alerts on memory, processor(s), and optional disk(s) with IBM Director

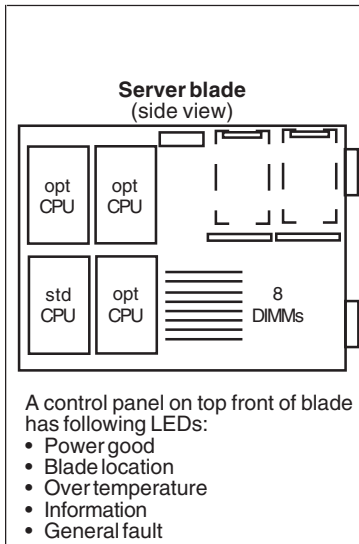
Maximum internal disk capacity for each HS20 blade server¹³: 146GB with two 73GB SCSI disks (with BladeCenter SCSI Storage Expansion Unit 2 x 146GB for total of 438GB)

LIMITED WARRANTY³

- ↻ 3 year parts and labor
- ↻ International Warranty Service³
- ↻ On site, 8 am-5 pm, Mon-Fri excluding holidays, next business day response time
- ↻ On site service upgrade options (in eligible locations):⁷
 - 4 year IOR 9x5, NBD response (ServicePac® part num 69P9520)
 - 4 year IOR 9x5, 4 hr avg response (ServicePac part num 69P9521)
 - 4 year IOR 24x7, 4 hr avg response (ServicePac part num 69P9522)
 - 4 year IOR 24x7, 2 hr avg response (ServicePac part num 69P9523)
- ↻ Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- ↻ 24x7¹⁴ toll-free support for warranty issues during the warranty period³

See footnotes for important warranty information
 ◀ = models announced January 2005

IBM® Type-model	Qty x Processor ¹	L3 Cache Memory	Frontside Bus Mhz	Disk controller	Disk bays	SCSI support with optional expansion unit	Slots x bays	Mechanical	Required chassis	Available date
8839-41X	1 x Xeon™ 2.8GHz MP	2MB	2GB	400Mhz	None	None	None	2 hot-swap Ultra320	0x2 6U ⁴ blade	BladeCenter Mar 2004
Positioning Processor(s) L2/L3 cache SMP support Implementation	<i>Ultra-dense, highly manageable modular computing platform with superior 4-way performance</i> 1 x Intel® Xeon 2.8GHz MP with 400MHz frontside bus / Hyper-Threading technology / NetBurst™ microarchitecture 512KB L2 Cache / 2MB L3 Cache / on die of processor / at processor speed 4-way SMP / up to four Xeon MP Processors (same speed/cache size) Server blade contains four Intel 604-pin micro-PGA ZIF sockets, eight memory DIMM slots, one SCSI expansion unit connector, two I/O expansion option connectors, integrated graphics and four ethernet ports									
Memory	2GB std / 16GB max¹³ / two slots used / six slots available / eight total slots PC2100 266MHz registered 184-pin ECC DDR-SDRAM DIMMs / eight DIMM gold-connector slots on systemboard / DIMMs must be installed in matched pairs [a bank] / 2-way memory interleave / dual channel / memory bus runs at 2 x 100MHz / Error Checking and Correcting (ECC) via 16-bit Checksum Chipkill™ (corrects 1, 2, 3, or 4-bit errors on same chip and detects 2- through 8-bit errors contained in two chips) / memory can be mixed									
SCSI disk controller	None / supports optional SCSI Storage Expansion Unit (a blade occupying adjacent blade slot / connects to HS40 via one connector / LSI Logic® 53C1020 Ultra320 SCSI controller [LVD 320MB/sec] / 64-bit 133MHz PCI-X Bus B from CIOB-ES I/O Bridge (IMB2 bus to Host Bridge) / supports RAID-1 mirroring [Embedded Mirroring] with two hot-swap 3.5" one-inch high SL SCSI disks in front bays / one 16-bit internal channel / no cables or external connector)									
SCSI disk bays	Supports max of two hot-swap 3.5" SL Ultra320 SCSI disks in optional SCSI Storage Expansion Unit / 80-pin SCA-2 connectors / all SCSI bays Ultra320-enabled									
External storage	Support for IBM TotalStorage™ solutions (including FASiT and NAS family of products)									
Mechanical	Supported in IBM BladeCenter (type 8677) / BladeCenter supported in 28" deep racks such as the IBM NetBAY™ Rack products									
Architecture / chipsets	ServerWorks® Grand Champion™ 4.0 LE / CMIC-LE5 Host Bridge (memory controller and I/O Bridge) / double slot one CIOB-X2 I/O Bridge (IMB2 bus to Host Bridge) for two PCI-X Buses with Bus A for ethernet and Bus B for ethernet and the I/O expansion option connector / CSB6 South Bridge (Thin IMB to Host Bridge) for EIDE, USB, LPC bus to Super I/O, and PCI 2.2 Bus C with graphics controller / National Semiconductor® PC87417 Super I/O chip									
Bus slots	No PCI or PCI-X slots (expansion via modules or network-interface option connector)									
Ethernet controllers	Four gigabit 10/100/1000 ethernet controllers / Intel 82545GM/82546EB / on blade / two PCI-X 64-bit 100MHz buses / full duplex / Wake on LAN® / Alert Standard Format 1.0 / teaming and failover support / one of the controllers connects to an optional 4-port GB Ethernet Switch Module (the second controller requires a second optional Ethernet Switch Module)									
Network-interface	Two connectors for I/O expansion option / requires same interface modules in bays 3 and 4 of BladeCenter / all blades in a single BladeCenter must contain the same expansion card (or no expansion card)									
CD / diskette / USB	None / requests for CD-ROM, diskette drive, and USB port in BladeCenter by pressing CD select button on front control panel									
Kybd / video / mouse	None / requests for keyboard, mouse, and video in BladeCenter by pressing the display button on front control panel									
Graphics	SVGA / ATI® Radeon 7000 / on blade / 16MB SDRAM std/max / 32-bit 33MHz PCI 2.2 bus									
Systems mgmt	Intel integrated Baseboard Management Controller (BMC) / on blade / provides system and environmental monitoring, event recording, alert capability / RS-485 interface for communication with BladeCenter management module									
Diagnostics	Light Path Diagnostics™ (LED lights indicate failing component) and on-board diagnostics (via PC-Doctor in BIOS)									
Security	Power-on password / administrator password / unattended boot / selectable boot / unattended start mode									
Software ship group	Documentation CD, IBM Director 4.1 CD, Device Driver CD									
Cooling fans	Uses cooling from BladeCenter (type 8677) / thermal sensors on each processor and BladeCenter modules and front panel									
Power supply	Uses power module(s) in BladeCenter (type 8677)									
Prerequisites	Monitor, keyboard, mouse for setup; ethernet switch module, disk, BladeCenter (type 8677), operating system									
	Xeon 2.8Ghz/2MB L3 Cache Proc Upg 13N0653 512MB PC2100 CL2.5 ECC DDR-SDRAM DIMM 33L5038 1GB PC2100 CL2.5 ECC DDR-SDRAM RDIMM 33L5039 2GB PC2100 CL2.5 ECC DDR-SDRAM RDIMM 33L5040 IBM HS40 SCSI Storage Expansion Unit (blade) 26K4847 IBM HS40 Fibre Channel Expansion Card (with two ports; each port requires a FC Switch Module) 48P7061 36.4GB 15K Ultra160 SCSI Hot-Swap SL HDD* 06P5768 36.4GB 15K Ultra320 SCSI Hot-Swap SL HDD* 06P5776 73.4GB 10K Ultra160 SCSI Hot-Swap SL HDD* 06P5756 146.8GB 10K Ultra320 SCSI Hot-Swap SL HDD* 32P0728 * Disk requires SCSI Storage Expansion Unit									



- Stealth black front bezel
 - H 9.7" x W 1.14" x D 17.6"; H 24.5cm x W 2.9cm x D 44.6cm
 - 12 lbs; 5.4kg (max configuration)
 - Configuration/Setup Utility: F1 at startup
 - Diagnostics (PC-Doctor™): F2 at startup
 - System Partition Boot: ALT+F1 at startup
 - Network Boot: F12 at startup
 - PXE Boot Agent Utility: Ctrl+S at startup
 - Blade control panel on each HS40 blade server provides media select button, keyboard/mouse/video select button, and indicators for blade error, information, location, disk activity, and power
 - Predictive Failure Analysis® alerts on memory, processor(s), and optional disk(s) with IBM Director
- Maximum internal disk capacity for each HS40 blade server¹³: 293.6GB* with two 146.8GB SL SCSI disks

LIMITED WARRANTY³

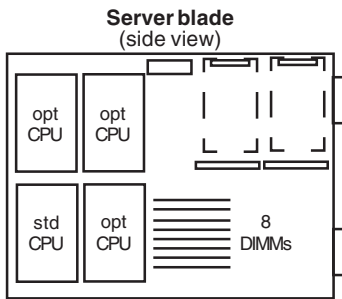
- 3 year parts and labor
- International Warranty Service³
- On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time⁷
- On site service upgrade options (in eligible locations):⁷
 - 3 year IOR 24x7, 2 hr avg response (ServicePac® part num 69P9519)
 - 3 year IOR 24x7, 4 hr avg response (ServicePac part num 69P9518)
 - 3 year IOR 9x5, 4 hr avg response (ServicePac part num 69P9517)
 - 5 year IOR 9x5, 4 hr avg response (ServicePac part num 69P9525)
 - 5 year IOR 24x7, 2 hr avg response (ServicePac part num 69P9527)
 - Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- 24x7¹⁴ toll-free support for warranty issues during the warranty period⁵

See footnotes for important warranty information

US model announced February 17, 2004; withdrawn effective June 29, 2004

IBM® Type-model	Qty x Processor ¹	L3 Cache Memory	Frontside Bus Mhz	Disk controller	Disk bays	SCSI support with optional expansion unit	Slots x bays	Mechanical	Required chassis	Available date
8839-51X	1 x Xeon™ 2.2GHz MP	2MB 1GB	400Mhz	None	None	2 hot-swap	Ultra320 0x2	7U ⁴ blade	BladeCenter	Mar 2004
8839-61X	1 x Xeon™ 2.7GHz MP	2MB 2GB	400Mhz	None	None	2 hot-swap	Ultra320 0x2	7U ⁴ blade	BladeCenter	Mar 2004
8839-71X	1 x Xeon™ 3.0GHz MP	4MB 2GB	400Mhz	None	None	2 hot-swap	Ultra320 0x2	7U ⁴ blade	BladeCenter	Mar 2004

Positioning Processor(s) L2/L3 cache SMP support Implementation	<i>Ultra-dense, highly manageable modular computing platform with superior 4-way performance</i> 1 x Intel® Xeon MP up to 3.0GHz with 400MHz frontside bus / Hyper-Threading technology / NetBurst™ microarchitecture 512KB L2 Cache / Up to 4MB L3 Cache / on die of processor / at processor speed 4-way SMP / up to four Xeon MP Processors (same speed/cache size) Server blade contains four Intel 604-pin micro-PGA ZIF sockets, eight memory DIMM slots, one SCSI expansion unit connector, two I/O expansion option connectors, integrated graphics and four ethernet ports	
Memory	Up to 2GB std / 16GB max ¹³ / 51X: two slots used 61X/71X: four slots used / eight total slots PC2100 266MHz registered 184-pin ECC DDR-SDRAM DIMMs / eight DIMM gold-connector slots on systemboard / DIMMs must be installed in matched pairs [a bank] / 2-way memory interleave / dual channel / memory bus runs at 2 x 100MHz / Error Checking and Correcting (ECC) via 16-bit Checksum Chipkill™ (corrects 1, 2, 3, or 4-bit errors on same chip and detects 2- through 8-bit errors contained in two chips) / memory can be mixed	
SCSI disk controller	None / supports optional SCSI Storage Expansion Unit (a blade occupying adjacent blade slot / connects to HS40 via one connector / LSI Logic® 53C1020 Ultra320 SCSI controller [LVD 320MB/sec] / 64-bit 133MHz PCI-X Bus B from CIOB-ES I/O Bridge (IMB2 bus to Host Bridge) / supports RAID-1 mirroring [Embedded Mirroring] with two hot-swap 3.5" one-inch high SL SCSI disks in front bays / one 16-bit internal channel / no cables or external connector)	
SCSI disk bays	Supports max of two hot-swap 3.5" SL Ultra320 SCSI disks in optional SCSI Storage Expansion Unit / 80-pin SCA-2 connectors / all SCSI bays Ultra320-enabled	
External storage	Support for IBM TotalStorage™ solutions (including FASiT and NAS family of products)	
Mechanical Architecture / chipsets	Supported in IBM BladeCenter (type 8677) / BladeCenter supported in 28" deep racks such as the IBM NetBAY™ Rack products ServerWorks® Grand Champion™ 4.0 LE / CMIC-LE5 Host Bridge (memory controller and I/O Bridge) / double slot one CIOB-X2 I/O Bridge (IMB2 bus to Host Bridge) for two PCI-X Buses with Bus A for ethernet and Bus B for ethernet and the I/O expansion option connector / CSB6 South Bridge (Thin IMB to Host Bridge) for EIDE, USB, LPC bus to Super I/O, and PCI 2.2 Bus C with graphics controller / National Semiconductor® PC87417 Super I/O chip	
Bus slots	No PCI or PCI-X slots (expansion via modules or network-interface option connector)	
Ethernet controllers	Four gigabit 10/100/1000 ethernet controllers / Intel 82545GM/82546EB / on blade / two PCI-X 64-bit 100MHz buses / full duplex / Wake on LAN® / Alert Standard Format 1.0 / teaming and failover support / one of the controllers connects to an optional 4-port GB Ethernet Switch Module (the second controller requires a second optional Ethernet Switch Module)	
Network-interface	One connector for I/O expansion option / requires same interface modules in bays 3 and 4 of BladeCenter / all blades in a single BladeCenter must contain the same expansion card (or no expansion card)	
CD / diskette / USB	None / requests for CD-ROM, diskette drive, and USB port in BladeCenter by pressing CD select button on front control panel	
Kybd / video / mouse Graphics	None / requests for keyboard, mouse, and video in BladeCenter by pressing the display button on front control panel SVGA / ATI® Radeon 7000 / on blade / 8MB SDRAM std/max / 32-bit 33MHz PCI 2.2 bus	
Systems mgmt	Intel integrated Baseboard Management Controller (BMC) / on blade / provides system and environmental monitoring, event recording, alert capability / RS-485 interface for communication with BladeCenter management module	
Diagnostics	Light Path Diagnostics™ (LED lights indicate failing component) and on-board diagnostics (via PC-Doctor in BIOS)	Xeon 2.2Ghz/2MB L3 Cache Proc Upg 13N0656 Xeon 2.7Ghz/2MB L3 Cache Proc Upg 13N0655 Xeon 3.0Ghz/4MB L3 Cache Proc Upg 13N0654 512MB PC2100 CL2.5 ECC DDR-SDRAM DIMM 33L5038 1GB PC2100 CL2.5 ECC DDR-SDRAM RDIMM 33L5039 2GB PC2100 CL2.5 ECC DDR-SDRAM RDIMM 33L5040 IBM HS40 SCSI Storage Expansion Unit (blade) 26K4847 IBM HS40 Fibre Channel Expansion Card (with two ports; each port requires a FC Switch Module) 48P7061 36.4GB 15K Ultra160 SCSI Hot-Swap SL HDD* 06P5768 36.4GB 15K Ultra320 SCSI Hot-Swap SL HDD* 06P5776 73.4GB 10K Ultra160 SCSI Hot-Swap SL HDD* 06P5756 146.8GB 10K Ultra320 SCSI Hot-Swap SL HDD* 32P0728 * Disk requires SCSI Storage Expansion Unit
Security	Power-on password / administrator password / unattended boot / selectable boot / unattended start mode	
Software ship group	Documentation CD, IBM Director 4.1 CD, Device Driver CD	
Cooling fans	Uses cooling from BladeCenter (type 8677) / thermal sensors on each processor and BladeCenter modules and front panel	
Power supply Prerequisites	Uses power module(s) in BladeCenter (type 8677) Monitor, keyboard, mouse for setup; ethernet switch module, disk, BladeCenter (type 8677), operating system	



A control panel on top front of blade has following LEDs:

- Power good
- Blade location
- Over temperature
- Information
- General fault

- ◇ Stealth black front bezel
- ◇ H 9.7" x W 1.14" x D 17.6"; H 24.5cm x W 2.9cm x D 44.6cm
- ◇ 12 lbs; 5.4kg (max configuration)
- ◇ Configuration/Setup Utility: F1 at startup
- ◇ Diagnostics (PC-Doctor™): F2 at startup
- ◇ System Partition Boot: ALT+F1 at startup
- ◇ Network Boot: F12 at startup
- ◇ PXE Boot Agent Utility: Ctrl+S at startup
- ◇ Blade control panel on each HS40 blade server provides media select button, keyboard/mouse/video select button, and indicators for blade error, information, location, disk activity, and power
- ◇ Predictive Failure Analysis® alerts on memory, processor(s), and optional disk(s) with IBM Director

Maximum internal disk capacity for each HS40 blade server¹³: 293.6GB* with two 146.8GB SL SCSI disks

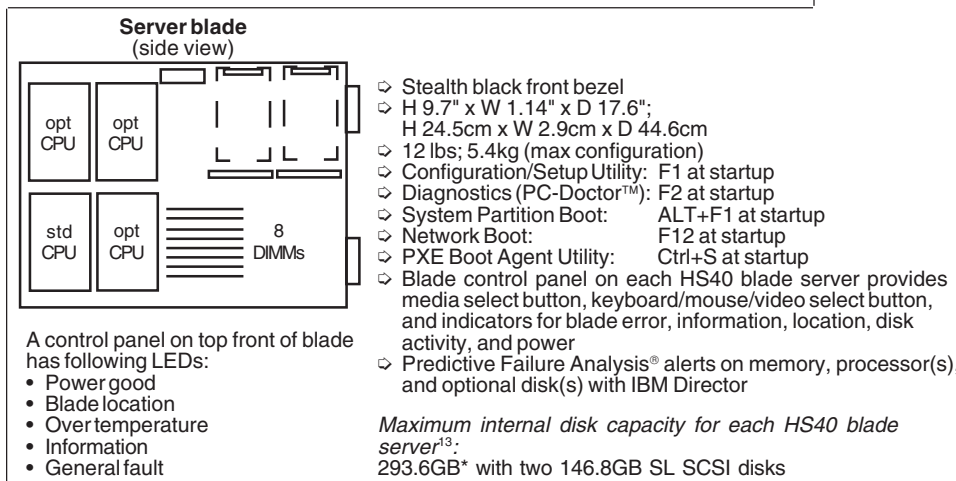
LIMITED WARRANTY³

- ⇒ 3 year parts and labor
- ⇒ International Warranty Service³
- ⇒ On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time⁷
- ⇒ On site service upgrade options (in eligible locations):⁷
 - 3 year IOR 24x7, 2 hr avg response (ServicePac® part num 69P9519)
 - 3 year IOR 24x7, 4 hr avg response (ServicePac part num 69P9518)
 - 3 year IOR 9x5, 4 hr avg response (ServicePac part num 69P9517)
 - 5 year IOR 9x5, 4 hr avg response (ServicePac part num 69P9525)
 - 5 year IOR 24x7, 2 hr avg response (ServicePac part num 69P9527)
 - Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- ⇒ 24x7¹⁴ toll-free support for warranty issues during the warranty period⁵

See footnotes for important warranty information
US models announced March 2, 2004

IBM® Type-model	Qty x Processor ¹	L3 Cache Memory	Frontside Bus Mhz	Disk controller	Disk bays	SCSI support with optional expansion unit	Slots x bays	Mechanical	Required chassis	Available date
8839-21X	1 x Xeon™ 2.0GHz MP	1MB 1GB	400Mhz	None	None	None	2 hot-swap Ultra320	0x2 7U ⁴ blade	BladeCenter	Apr 2004

Positioning Processor(s) L2/L3 cache SMP support Implementation	<i>Ultra-dense, highly manageable modular computing platform with superior 4-way performance</i> 1 x Intel® Xeon 2.0GHz MP with 400MHz frontside bus / Hyper-Threading technology / NetBurst™ microarchitecture 512KB L2 Cache / 1MB L3 Cache / on die of processor / at processor speed 4-way SMP / up to four Xeon Processors (same speed/cache size) Server blade contains four Intel 604-pin micro-PGA ZIF sockets, eight memory DIMM slots, one SCSI expansion connector, one I/O expansion option connector, and integrated graphics and dual ethernet																													
Memory	1GB std / 16GB max ¹³ / two slots used / six slots available / eight total slots PC2100 266MHz registered 184-pin ECC DDR-SDRAM DIMMs / eight DIMM gold-connector slots on systemboard / DIMMs must be installed in matched pairs [a bank] / 2-way memory interleave / dual channel / memory bus runs at 2 x 100MHz / Error Checking and Correcting (ECC) via 16-bit Checksum Chipkill™ (corrects 1, 2, 3, or 4-bit errors on same chip and detects 2- through 8-bit errors contained in two chips) / memory can be mixed																													
SCSI disk controller	None / supports optional SCSI Storage Expansion Unit (a blade occupying adjacent blade slot / connects to HS40 via one connector / LSI Logic® 53C1020 Ultra320 SCSI controller [LVD 320MB/sec] / 64-bit 133MHz PCI-X Bus B from CIOB-ES I/O Bridge (IMB2 bus to Host Bridge) / supports RAID-1 mirroring [Embedded Mirroring] with two hot-swap 3.5" one-inch high SL SCSI disks in front bays / one 16-bit internal channel / no cables or external connector)																													
SCSI disk bays	Supports max of two hot-swap 3.5" SL Ultra320 SCSI disks in optional SCSI Storage Expansion Unit / 80-pin SCA-2 connectors / all SCSI bays Ultra320-enabled																													
External storage	Support for IBM TotalStorage™ solutions (including FASiT and NAS family of products)																													
Mechanical Architecture / chipsets	Supported in IBM BladeCenter (type 8677) / BladeCenter supported in 28" deep racks such as the IBM NetBAY™ Rack products ServerWorks® Grand Champion™ 4.0 LE / CMIC-LE5 Host Bridge (memory controller and I/O Bridge) / double slot one CIOB-X2 I/O Bridge (IMB2 bus to Host Bridge) for two PCI-X Buses with Bus A for ethernet and Bus B for ethernet and the I/O expansion option connector / CSB6 South Bridge (Thin IMB to Host Bridge) for EIDE, USB, LPC bus to Super I/O, and PCI 2.2 Bus C with graphics controller / National Semiconductor® PC87417 Super I/O chip																													
Bus slots	No PCI or PCI-X slots (expansion via modules or network-interface option connector)																													
Ethernet controllers	Four gigabit 10/100/1000 ethernet controllers / Intel 82545GM/82546EB / on blade / two PCI-X 64-bit 100MHz buses / full duplex / Wake on LAN® / Alert Standard Format 1.0 / teaming and failover support / one of the controllers connects to an optional 4-port GB Ethernet Switch Module (the second controller requires a second optional Ethernet Switch Module)																													
Network-interface	One connector for I/O expansion option / requires same interface modules in bays 3 and 4 of BladeCenter / all blades in a single BladeCenter must contain the same expansion card (or no expansion card)																													
CD / diskette / USB	None / requests for CD-ROM, diskette drive, and USB port in BladeCenter by pressing CD select button on front control panel																													
Kybd / video / mouse Graphics	None / requests for keyboard, mouse, and video in BladeCenter by pressing the display button on front control panel SVGA / ATI® Radeon 7000 / on blade / 8MB SDRAM std/max / 32-bit 33MHz PCI 2.2 bus																													
Systems mgmt	Intel integrated Baseboard Management Controller (BMC) / on blade / provides system and environmental monitoring, event recording, alert capability / RS-485 interface for communication with BladeCenter management module																													
Diagnostics	Light Path Diagnostics™ (LED lights indicate failing component) and on-board diagnostics (via PC-Doctor in BIOS)																													
Security	Power-on password / administrator password / unattended boot / selectable boot / unattended start mode																													
Software ship group	Documentation CD, IBM Director 4.1 CD, Device Driver CD																													
Cooling fans	Uses cooling from BladeCenter (type 8677) / thermal sensors on each processor and BladeCenter modules and front panel																													
Power supply Prerequisites	Uses power module(s) in BladeCenter (type 8677) Monitor, keyboard, mouse for setup; ethernet switch module, disk, BladeCenter (type 8677), operating system																													
	<table border="0"> <tr> <td>Xeon 2.0Ghz/1MB L3 Cache Proc Upg</td> <td>13N0651</td> </tr> <tr> <td>512MB PC2100 CL2.5 ECC DDR-SDRAM DIMM</td> <td>33L5038</td> </tr> <tr> <td>1GB PC2100 CL2.5 ECC DDR-SDRAM RDIMM</td> <td>33L5039</td> </tr> <tr> <td>2GB PC2100 CL2.5 ECC DDR-SDRAM RDIMM</td> <td>33L5040</td> </tr> <tr> <td>IBM HS40 SCSI Storage Expansion Unit (blade)</td> <td>26K4847</td> </tr> <tr> <td>IBM HS40 Fibre Channel Expansion Card (with two ports; each port requires a FC Switch Module)</td> <td>48P7061</td> </tr> <tr> <td>36.4GB 15K Ultra160 SCSI Hot-Swap SL HDD*</td> <td>06P5768</td> </tr> <tr> <td>36.4GB 15K Ultra320 SCSI Hot-Swap SL HDD*</td> <td>06P5776</td> </tr> <tr> <td>73.4GB 10K Ultra160 SCSI Hot-Swap SL HDD*</td> <td>06P5756</td> </tr> <tr> <td>146.8GB 10K Ultra320 SCSI Hot-Swap SL HDD*</td> <td>32P0728</td> </tr> </table> <p>* Disk requires SCSI Storage Expansion Unit</p>										Xeon 2.0Ghz/1MB L3 Cache Proc Upg	13N0651	512MB PC2100 CL2.5 ECC DDR-SDRAM DIMM	33L5038	1GB PC2100 CL2.5 ECC DDR-SDRAM RDIMM	33L5039	2GB PC2100 CL2.5 ECC DDR-SDRAM RDIMM	33L5040	IBM HS40 SCSI Storage Expansion Unit (blade)	26K4847	IBM HS40 Fibre Channel Expansion Card (with two ports; each port requires a FC Switch Module)	48P7061	36.4GB 15K Ultra160 SCSI Hot-Swap SL HDD*	06P5768	36.4GB 15K Ultra320 SCSI Hot-Swap SL HDD*	06P5776	73.4GB 10K Ultra160 SCSI Hot-Swap SL HDD*	06P5756	146.8GB 10K Ultra320 SCSI Hot-Swap SL HDD*	32P0728
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LIMITED WARRANTY³

- 3 year parts and labor
- International Warranty Service³
- On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time⁷
- On site service upgrade options (in eligible locations):⁷
 - 3 year IOR 24x7, 2 hr avg response (ServicePac® part num 69P9519)
 - 3 year IOR 24x7, 4 hr avg response (ServicePac part num 69P9518)
 - 3 year IOR 9x5, 4 hr avg response (ServicePac part num 69P9517)
 - 5 year IOR 9x5, 4 hr avg response (ServicePac part num 69P9525)
 - 5 year IOR 24x7, 2 hr avg response (ServicePac part num 69P9527)
 - Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- 24x7¹⁴ toll-free support for warranty issues during the warranty period⁵

See footnotes for important warranty information
US models announced April 20, 2004

IBM® Type-model	Supported blades	Blade bays std / max	Switch module bays std / max	Switch module bays (type)	Management module bays std / max	Power module bays std / max	Power Module Wattage	Blower module bays std / max	Mechanical	Available date
8720-1RX 8832 HS20 / 8839 HS40		0 / 8	0 / 4	Ethernet, Fibre Channel	1 / 2	2 / 4	1300W	4 / 4	8U ⁴ rack	Jul 2004
Positioning Description	<i>Flexible, innovative design provides investment protection and reduces deployment costs for NEBS environments</i> Provides common resources shared by blade servers such as power, system management, cabling, ethernet management and expansion, external Fibre Channel storage switching and connectivity, and I/O (combo CD/DVD drive, and ports for USB, keyboard, video, mouse)									
Blade bays	Supports HS20 (8832), HS40 (8839) blades with Low Profile Handle, SCSI Storage Expansion Units and PCI I/O Expansion Blades / 8 hot-pluggable server bays / front access									
Switch modules Ethernet Switch Module	<i>Std: none; max: four / hot-swap / rear access</i> Supports two 4-port GB Ethernet Switch Modules in bays 1 and 2 / one Ethernet Switch Module required for ethernet support on HS20 blade server (two modules to support both ethernet controllers on HS20 and for failover redundancy) / bays 1 and 2 wired to the HS20 dual integrated ethernet controllers / four external ports / connects to std mgmt module / GB ethernet supported in bays 3-4 with optional Ethernet Expansion card on blade server									
Fibre Channel Switch Module	Supports two 2-port or 6-port Fibre Channel Switch Modules in bays 3 and 4 / one Fibre Channel Switch Module required for one of two ports on optional Fibre Channel Expansion Card (two modules to support both ports and for failover redundancy) / bays 3 and 4 wired to the HS20 I/O expansion option connector / two external 2GBps small form factor pluggable ports									
Management modules	<i>Std: one; max: two / hot-swap / rear access (I/O ports) / comprehensive system management functions / PowerPC® 401 controller / communicates with integrated system management processor on each server blade / multiplexor for console connectivity / controls external Telco alarm panel / ports: DB-15 analog video port, PS/2 keyboard port, PS/2 mouse port, 10/100 ethernet remote management connection port / all ports shared by up to 8 blade servers / ports all located on rear of chassis</i>									
Power modules	<i>Std: two in bays 1 and 2, max: four / hot-swap / front access / input voltages between -38/-75 VDC Min/Max (-48 VDC nominal) / 4-Lug Terminal Block / 1300 watts / Two standard modules (in slots 1 & 2) supply power to switch bays 1 & 2, both management modules, blade bays 1 - 4, and the media tray; two additional power modules provide full system redundant power and power to switch bays 3 & 4 and blade bays 5 - 8 All: load balancing/ voltage-sensing / auto-restart / no fans in power module(s)</i>									
Blower modules	<i>Std: four; max: four / hot-swap / redundant / variable speed / rear access / 330 cubic ft per min (CFM) / front to back airflow; filtered air intake</i>									
Mechanical Optical / USB	EIA 19" rack models (8U⁴) x 20" deep / designed for EIA-310D and UTF Four Post Racks 24X-10X-24X-8X ⁶ Combo / Two USB port (Version 1.1) / all USB interface (types A & C) / front access / shared by up to eight blade servers / requests for optical cd and USB port(s) by pressing CD select button on server blade front panel									
Keyboard / mouse	None standard / provides KVM console support / requests for keyboard, mouse, and video by pressing the display button on server blade front panel									
Ports	<i>Rear: keyboard (PS/2), mouse (PS/2), analog DB-15 graphics (on standard mgmt module) / no serial or parallel ports / DB-15 Telco Alarm Panel Front: two USB (Version 1.1) /</i>									
Security	Login password for remote connection / secure socket layer (SSL) security for remote management access / recommended in rack environment providing security through lockable doors or other security measures									
Ethernet	One of the dual integrated gigabit ethernet controllers on each blade servers connects to an optional 4-port GB Ethernet Switch Module (the second HS20/HS40 ethernet controller requires a second optional 4-port GB Ethernet Switch Module)									
Systems mgmt	Provides remote console and mgmt / power on/off blades/modules / monitors power status, operating system, temperature, disks, blowers, power modules / system diagnostic programs provided through IBM Director software									
System LED panel	System LED panel provides power-on, location, critical, major and minor alarm conditions									

IBM BladeCenter T Redundant Management Module	90P3741	IBM 1300W DC Power Supply Module (x2)	90P3742
IBM BladeCenter HS20 Low Profile Handle	25K8358	IBM BladeCenter PCI I/O Expansion Unit	90P3721
IBM BladeCenter HS40 Low Profile Handle	25K8359	IBM BladeCenter 1GB Flash Disk Drive	90P3771
IBM Sleek 2-Button Stealth Black Mouse	28L3673	IBM BladeCenter 2GB Flash Disk Drive	90P3772
NetBAY42 Enterprise Rack Cabinet	930842S	IBM BladeCenter 4GB Flash Disk Drive	90P3773
Four Post Rack Mount Kit	90P3775	IBM FASiT700 Fibre Channel Storage Server	17421RU
Two Post Rack Mount Kit	90P3774	IBM FASiT200 Storage Server	35421RU
		IBM External USB Floppy Drive	05K9276
		IBM T541 15" Flat Panel Color Monitor (black)	9512AB1
		<ul style="list-style-type: none"> • Other options at ibm.com/pc/us/accessories • Solutions available from IBM BladeCenter Alliance program partners 	

Front

- Dimensions: H13.76"(8U) x W17.4" x D20"(front bezel to rear I/O); H349.5mm x W441.9mm x D508mm
- Weight: 98 to 192 lb; 44.5 to 87.38kg
- Stealth black color bezel
- Tool-free customer serviceability
- Access server blades, power supplies, mgmt modules, media tray and expansion units from front
- Access switch modules and blowers from rear
- Fits into Standard Central Office environments
- Air Intake Filtering
- Predictive Failure Analysis® alerts on blowers, blade server memory, processor(s), and optional disk(s) with IBM Director

LIMITED WARRANTY³

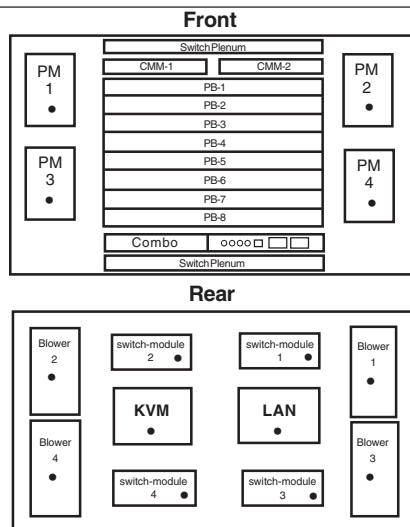
- 3 year parts and labor
- International Warranty Service³
- On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time⁷
- On site service upgrade options (in eligible locations):⁷
 - 3 year IOR 24x7, 2 hr avg response (ServicePac® part num 21P2065)
 - 3 year IOR 24x7, 4 hr avg response (ServicePac part num 30L9185)
 - 3 year IOR 9x5, 4 hr avg response (ServicePac part num 41L2736)
 - 5 year IOR 9x5, 4 hr avg response (ServicePac part num 69P9207)
 - 5 year IOR 24x7, 2 hr avg response (ServicePac part num 69P9205)
- Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- 24x7¹⁴ toll-free support for warranty issues during the warranty period³

Rear

Bay	Switch Function
1	Ethernet link 1 for all blade servers
2	Ethernet link 2 for all blade servers
3	Network connection 1 for all blade server I/O expansion options (Gb Ethernet/Fibre Channel)
4	Network connection 2 for all blade server I/O expansion options (Gb ethernet/Fibre Channel)

IBM® Type-model	Supported blades	Blade bays std / max	Switch module bays std / max	Switch module bays (type)	Management module bays std / max	Power module bays std / max	Power Module Wattage	Blower module bays std / max	Mechanical	Available date
8730-1RX 8832 HS20 / 8839 HS40		0 / 8	0 / 4	Ethernet, Fibre Channel	1 / 2	2 / 4	1300W	4 / 4	8U ⁴ rack	Jul 2004
Positioning Description	<i>Flexible, innovative design provides investment protection and reduces deployment costs for NEBS environments</i> Provides common resources shared by blade servers such as power, system management, cabling, ethernet management and expansion, external Fibre Channel storage switching and connectivity, and I/O (combo CD/DVD and ports for USB, keyboard, video, mouse)									
Blade bays	Supports HS20 (8832), HS40 (8839) blades with Low Profile Handle, HS20, HS40 SCSI Storage Expansion Units and PCI I/O Expansion Blades / 8 hot-pluggable server bays / front access									
Switch modules Ethernet Switch Module	<i>Std: none; max: four / hot-swap / rear access</i> Supports two 4-port GB Ethernet Switch Modules in bays 1 and 2 / one Ethernet Switch Module required for ethernet support on HS20 blade server (two modules to support both ethernet controllers on HS20 and for failover redundancy) / bays 1 and 2 wired to the HS20 dual integrated ethernet controllers / four external ports / connects to std mgmt module / supported in bays 3 and 4 with optional Gigabit expansion card on Server Blade									
Fibre Channel Switch Module	Supports two 2-port or 6-port Fibre Channel Switch Modules in bays 3 and 4 / one Fibre Channel Switch Module required for one of two ports on optional Fibre Channel Expansion Card (two modules to support both ports and for failover redundancy) / bays 3 and 4 wired to the HS20 I/O expansion option connector / two external 2GBps small form factor pluggable ports									
Management modules	<i>Std: one; max: two / hot-swap / rear access (I/O ports) / comprehensive system management functions / PowerPC® 401 controller / communicates with integrated system management processor on each server blade / multiplexor for console connectivity / controls external Telco alarm panel / ports: DB-15 analog video port, PS/2 keyboard port, PS/2 mouse port, 10/100 ethernet remote management connection port / all ports shared by up to 8 blade servers</i>									
Power modules	<i>Std: two in bays 1 and 2, max: four / hot-swap / Front access / input voltage range 180VAC - 264VAC Min/Max at 50/60Hz / two IEC320 C14 male appliance connector / 1300 watts / two std modules (in slots 1 & 2) supply power to switch bays 1 & 2, both management modules, blade bays 1 - 4 and media tray; Two additional power modules provide full system redundant power and power to switch bays 3 & 4, and blade bays 5 - 8 All: load balancing / voltage-sensing / auto-restart / no fans in power module(s)</i>									
Blower modules	<i>Std: four; max: four / Calibrated Vectedored Cooling / hot-swap / redundant / variable speed / rear access / 330 cubic ft per min (CFM) / front to back airflow; filtered air intake</i>									
Mechanical Optical / USB	EIA 19" rack models (8U⁴) x 20" deep / designed for EIA-310D and UTF Four Post Racks 24X-10X-24X-8X ⁶ Combo / Two USB port (Version 1.1) / all USB interface / front access (types A & C) / shared by up to eight blade servers / requests for optical cd, and USB port(s) by pressing CD select button on server blade front panel									
Keyboard / mouse	None standard / provides KVM console support / requests for keyboard, mouse, and video by pressing the display button on server blade front panel									
Ports	<i>Rear: keyboard (PS/2), mouse (PS/2), analog DB-15 graphics (on standard mgmt module) / no serial or parallel ports / DB15 Telco Alarm Panel Front: Two USB (Version 1.1)</i>									
Security	Login password for remote connection / secure socket layer (SSL) security for remote management access / recommended in rack environment providing security through lockable doors or other security measures									
Ethernet	One of the dual integrated gigabit ethernet controllers on each blade servers connects to an optional 4-port GB Ethernet Switch Module (the second HS20/HS40 ethernet controller requires a second optional 4-port GB Ethernet Switch Module)									
Systems mgmt	Provides remote console and mgmt / power on/off blades/modules / monitors power status, operating system, temperature, disks, blowers, power modules / system diagnostic programs provided through IBM Director software									
System LED panel	System LED panel provides power-on, location, critical, major and minor alarm conditions									

IBM BladeCenter T Redundant Management Module	90P3741	IBM 1300W AC Power Supply Module (x2)	90P3743
IBM BladeCenter HS20 Low Profile Handle	25K8358	IBM BladeCenter PCI I/O Expansion Unit	90P3721
IBM BladeCenter HS40 Low Profile Handle	25K8359	IBM BladeCenter 1GB Flash Disk Drive	90P3771
IBM Sleek 2-Button Stealth Black Mouse	28L3673	IBM BladeCenter 2GB Flash Disk Drive	90P3772
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Four Post Rack Mount Kit	90P3775	IBM FASiT700 Fibre Channel Storage Server	17421RU
Two Post Rack Mount Kit	90P3774	IBM FASiT200 Storage Server	35421RU
APC Smart-UPS 5000RMB	37L6861	IBM External USB Floppy Drive	05K9276
		IBM T541 15" Flat Panel Color Monitor (black)	9512AB1
		• Other options at ibm.com/pc/us/accessories	
		• Solutions available from IBM BladeCenter Alliance program partners	



- ◊ Dimensions: H13.76"(8U) x W17.4" x D20"(front bezel to rear I/O); H349.5mm x W441.9mm x D508mm
- ◊ Weight: 98 to 192 lb; 44.5 to 87.38kg
- ◊ Stealth black color bezel
- ◊ Tool-free customer serviceability
- ◊ Access server blades, power supplies, mgmt modules, media tray and expansion units from front
- ◊ Access switch modules and blowers from rear
- ◊ Fits into Standard Central Office environments
- ◊ Air Intake Filtering
- ◊ Predictive Failure Analysis® alerts blade server memory, processor(s), and optional disk(s) with IBM Director

Bay	Switch function
1	Ethernet link 1 for all blade servers
2	Ethernet link 2 for all blade servers
3	Network connection 1 for all blade server I/O expansion options (Gb Ethernet/Fibre)
4	Network connection 2 for all blade server I/O expansion options (Gb Ethernet/Fibre)

LIMITED WARRANTY³

- ↔ 3 year parts and labor
- ↔ International Warranty Service³
- ↔ On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time⁷
- ↔ On site service upgrade options (in eligible locations):⁷
 - 3 year IOR 24x7, 2 hr avg response (ServicePac® part num 21P2065)
 - 3 year IOR 24x7, 4 hr avg response (ServicePac part num 30L9185)
 - 3 year IOR 9x5, 4 hr avg response (ServicePac part num 41L2736)
 - 5 year IOR 9x5, 4 hr avg response (ServicePac part num 69P9207)
 - 5 year IOR 24x7, 2 hr avg response (ServicePac part num 69P9205)
- Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- ↔ 24x7¹⁴ toll-free support for warranty issues during the warranty period³

IBM® Type-model	Qty x Processor ¹	Memory	Frontside Bus Mhz	L3 Cache	Disk	Disk controller	Disk bays	SCSI support with optional stor exp unit	Slots x bays	Mech-anical	Required chassis	Available date
8832-GTX	1 x Xeon 3.2GHz	1GB	533Mhz	2MB	None	EIDE	2 fixed	2 HS Ultra320	0x2	8U ⁴ blade	BladeCenter T	Feb 2004
8832-9TX	1 x Xeon 2.4GHz	1GB	533Mhz	2MB	None	EIDE	2 fixed	2 HS Ultra320	0x2	8U ⁴ blade	BladeCenter T	Feb 2004

Positioning *Ultra-dense, highly manageable modular computing platform with superior performance*
Processor(s) **1 x Intel® Xeon 2.5 HGz or 3.2GHz** with 533MHz frontside bus / Hyper-Threading technology / NetBurst™ architecture
L2/L3 Cache **512KB L2 Cache / 0 - 2MB L3 Cache** / on die of processor / at processor speed
SMP support **2-way SMP** / up to two Xeon Processors (same speed/cache size)
Implementation Server blade contains two Intel 604-pin micro-PGA ZIF sockets, four memory DIMM slots, two IDE connectors, one SCSI expansion connector, one I/O expansion option connector, and integrated graphics and dual ethernet

Memory **1GB** std / 8GB max¹³ / two slots used / two slots available / **PC2100** 266MHz registered 184-pin ECC DDR-SDRAM DIMMs / four DIMM gold-connector slots on systemboard / DIMMs must be installed in matched pairs [a bank] / 2-way memory interleave / dual channel / memory bus runs at 2 x 100MHz / **Error Checking and Correcting (ECC)** via **16-bit Checksum Chipkill™** (corrects 1, 2, 3, or 4-bit errors on same chip and detects 2- through 8-bit errors contained in two chips)

IDE controller/bays Enhanced IDE ATA-100 controller in CSB6-U South Bridge / two connectors/buses on planar / each supports one 2.5" IDE disk / no cable as IDE disk attaches to riser card and tray (included with option kit) / Supports max of two IDE disks / space for only one IDE disk if an I/O expansion option installed [Fibre Channel] / **RAID-1 mirroring** standard
SCSI disk controller None / **supports optional SCSI Storage Expansion Unit** (a blade occupying adjacent blade slot / connects to HS20 via one connector / LSI Logic® 53C1020 Ultra320 SCSI controller [LVD 320MB/sec] / 64-bit 133MHz PCI-X Bus B from CIOB-ES I/O Bridge (IMB2 bus to Host Bridge) / supports **RAID-1 mirroring** [Embedded Mirroring] with two hot-swap 3.5" one-inch high SL SCSI disks in front bays / one 16-bit internal channel / no cables or external connector)
SCSI disk bays Supports max of two hot-swap 3.5" SL Ultra320 SCSI disks in optional SCSI Storage Expansion Unit / 80-pin SCA-2 connectors / **all SCSI bays Ultra320-enabled**
External storage Support for IBM TotalStorage™ solutions (including FASTT and NAS family of products)

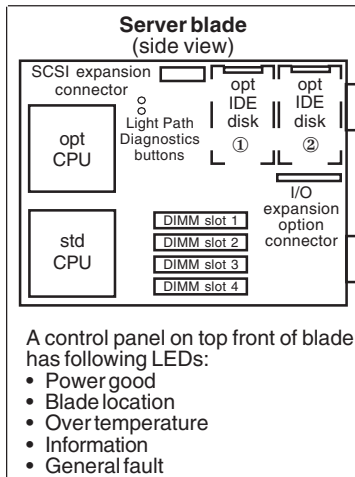
Mechanical Supported in IBM BladeCenter (type 8677) / BladeCenter supported in 28" deep racks such as the IBM NetBAY™ Rack products **ServerWorks® Grand Champion™ 4.0 LE** / CMIC LE Host Bridge (memory controller and I/O Bridge) / single slot one CIOBE-S I/O Bridge (IMB2 bus to Host Bridge) for two PCI-X Buses with Bus A for ethernet and Bus B for ethernet and the I/O expansion option connector / CSB6-U South Bridge (Thin IMB to Host Bridge) for EIDE, USB, LPC bus to Super I/O, and PCI 2.2 Bus C with graphics controller / National Semiconductor® PC87417 Super I/O chip No PCI or PCI-X slots (expansion via modules or network-interface option connector)

Ethernet controllers Two gigabit Ethernet controllers / Broadcom® BCM5704S / on blade / two PCI-X 64-bit 133MHz buses / full duplex / Wake on LAN® / Alert Standard Format 1.0 / teaming and failover support / one of the dual controllers connects to an optional, supported Ethernet switch or *Optical Passthrough Module* (the second controller requires a second optional switch or OPM)
Network-interface **One connector for I/O expansion option** (Fibre Channel Expansion Card) / requires same interface modules in bays 3 and 4 of BladeCenter / all blades in a single BladeCenter must contain the same expansion card (or no expansion card) / ethernet and serial I/O expansion cards planned for future release²⁰
CD / diskette / USB None / requests for CD-ROM, diskette drive, and USB port in BladeCenter by pressing CD select button on front control panel
Kybd / video / mouse None / requests for keyboard, mouse, and video in BladeCenter by pressing the display button on front control panel
Graphics SVGA / ATI® Rage XL / on blade / 8MB SDRAM std/max / 32-bit 33MHz PCI 2.2 bus

Systems mgmt **IBM integrated system management processor (ISMP)** / HS2148 / on blade / provides system and environmental monitoring, event recording, alert capability / RS-485 interface for communication with BladeCenter management module
Diagnostics **Light Path Diagnostics™** (LED lights indicate failing component) and on-board diagnostics (via PC-Doctor in BIOS)
Security Power-on password / administrator password / unattended boot / selectable boot / unattended start mode
Software ship group Documentation CD, IBM Director 4.1 CD, Device Driver CD
Cooling fans Uses cooling from BladeCenter (type 8720/30) / thermal sensors on each processor and BladeCenter modules and front panel
Power supply Uses power module(s) in BladeCenter (type 8677)
Prerequisites Monitor, keyboard, mouse for setup; ethernet switch module, disk, BladeCenter (type 8677), operating system

Xeon 3.2Ghz/512KB L2 / 1MB L3 Cache	13N0650
Proc Upg	
512MB PC2100 CL2.5 ECC DDR-SDRAM DIMM	33L5038
1GB PC2100 CL2.5 ECC DDR-SDRAM RDIMM	33L5039
2GB PC2100 CL2.5 ECC DDR-SDRAM RDIMM	33L5040
IBM HS20 SCSI Storage Expansion Unit (blade)	48P7058
IBM HS20 Fibre Channel Expansion Card (with two ports; each port requires a FC Switch Module)	48P7061
IBM HS20 40GB ² 5400 rpm ATA-100 HDD	48P7063
36.4GB 15K Ultra160 SCSI Hot-Swap SL HDD*	06P5768
36.4GB 15K Ultra320 SCSI Hot-Swap SL HDD*	06P5776
73.4GB 10K Ultra160 SCSI Hot-Swap SL HDD*	06P5756
146.8GB 10K Ultra320 SCSI Hot-Swap SL HDD*	32P0728

* Disk requires SCSI Storage Expansion Unit



- Bay ① 3.5", 9.5mm, no front access, optional ThinkPad® IDE disk
 - Bay ② 3.5", 9.5mm, no front access, optional ThinkPad IDE disk
 - Stealth black front bezel
 - H 9.7" x W 1.14" x D 17.6"
 - H 24.5cm x W 2.9cm x D 44.6cm
 - 12 lbs; 5.4kg (max configuration)
 - Configuration/Setup Utility: F1 at startup
 - Diagnostics (PC-Doctor™): F2 at startup
 - System Partition Boot: ALT+F1 at startup
 - Network Boot: F12 at startup
 - PXE Boot Agent Utility: Ctrl+S at startup
 - Blade control panel on each HS20 blade server provides media select button, keyboard/mouse/video select button, and indicators for blade error, information, location, disk activity, and power
 - Predictive Failure Analysis® alerts on memory, processor(s), and optional disk(s) with IBM Director
- Maximum internal disk capacity for each HS20 blade server¹³:*
 80GB with two 40GB EIDE disks or
 293.6GB* with two 146.8GB SL SCSI disks

LIMITED WARRANTY³

- 3 year parts and labor
- International Warranty Service³
- On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time⁷
- On site service upgrade options (in eligible locations):⁷
 - 3 year IOR 24x7, 2 hr avg response (ServicePac® part num 69P9519)
 - 3 year IOR 24x7, 4 hr avg response (ServicePac part num 69P9518)
 - 3 year IOR 9x5, 4 hr avg response (ServicePac part num 69P9517)
 - 5 year IOR 9x5, 4 hr avg response (ServicePac part num 69P9525)
 - 5 year IOR 24x7, 2 hr avg response (ServicePac part num 69P9527)
 - Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- 24x7¹⁴ toll-free support for warranty issues during the warranty period⁵

See footnotes for important warranty information
 US model announced February 17, 2004

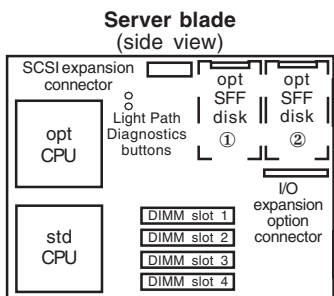
IBM eServer BladeCenter™ HS20 Low Profile Handle

(8843) January 2005

xREF by eServer Field Skills and Education Team

IBM® Type-GAV	Processor	GHz¹	L2 cache	FSB MHz	Memory	Disk controller	Disk controller	Diskbays	SCSI Support with optional stor exp unit	slots x bays	Mechanical	Ethernet	Available date	
8843-L1y	1 x Xeon™	2.8 Low Volt	1MB	800	512MB	None	Ultra320	2-fixed	2 Hot-swap	Ultra320	0 x 2	7U⁴ blade	2 x Gigabit	Feb 2005
8843-4Ty	1 x Xeon	3.6GHz	1MB	800	1GB	None	Ultra320	2-fixed	2 Hot-swap	Ultra320	0 x 2	7U⁴ blade	2 x Gigabit	Feb 2005
Processor(s)		1 x Intel® Xeon 2.8 Low Voltage or 3.6 GHz with 800MHz frontside bus (FSB) / EM64T / 1MB L2 ECC Cache / Hyper-Threading technology / Low Voltage Processors reduce heat output for increased rack density without increased cooling capacity												
SMP - L2 Cache Implementation		2-way SMP / up to two Xeon Processors (same speed/cache size) / 1MB std and max / at processor speed												
Memory		512MB/1GB std / 8GB¹³ max / two slots used / two slots available / PC2-3200 400MHz CL2.5 ECC DDR2-SDRAM DIMMs / four 240 pin gold-connector slots on systemboard / DIMMs must be installed in matched pairs [a bank] / 2-way memory interleave / dual channel /												
SCSI disk controller		LSI Logic® 53C1020 SCSI controller / Single channel Ultra320 SCSI controller (LVD 320MB/sec) / on planar / 64-bit 100MHz PCI-X / supports RAID-1 & 1E mirroring (supported in 32-bit legacy mode only) / One 16-bit channel (one internal) / Internal channel: one 2-drop 16-bit 68-pin LVD SCSI cable												
SCSI Disk bays		Two 2.5-inch Small Form Factor (SFF) Ultra320 internal fixed disk bays / Supports max of two hot-swap 3.5" SL Ultra320 SCSI disks in optional SCSI Storage Expansion Unit (80-pin SCA-2 connectors; all SCSI bays Ultra320-enabled) /												
External Storage		Support for IBM TotalStorage™ solutions (including FASTT and NAS family of products)												
Mechanical Architecture/Chipset		7U Blade / Supported in IBM BladeCenter 8677-3XX or 8677-1XX/2XX (requires upgrade to 2000W power supply option 26K4816) Intel E7520 chipset / E7525 MCH (Memory Controller Hub) for PCI-Express bridge to PXH, ICH5R / PXH BUS supports PCI-X BUS / ICH5R supports USB (1.0) / LSI 1020 / Dual Broadcom 5704S / Low Pin Count Interface / NS PC87366 Super I/O off LPC interface												
BUS slots		No PCI or PCI-X slots (expansion via modules or network-interface option connector)												
Ethernet		Dual gigabit 10/100/1000 ethernet controller / Broadcom 5704S / two full gigabit ethernet MAC and PHY layer functions / chip on blade / PCI-X 64-bit 100MHz / full duplex / Wake on LAN® / PXE 2.0 Boot agent / Alert Standard Format 2.0 / Failover, adapter fault tolerance / Load balancing or teaming / one of the dual controllers connects to an optional, supported Ethernet switch or Optical Passthrough Module (the second controller requires a second optional switch or OPM)												
Network Interface		One connector for I/O expansion option (Fibre Channel Expansion Card) / requires same interface modules in bays 3 and 4 of BladeCenter / all blades in a single BladeCenter must contain the same expansion card (or no expansion card) / ethernet and serial I/O expansion cards planned for future release²⁰												
CD / Diskette / USB Kybd / video / mouse Graphics controller		None / requests for CD-ROM, diskette drive, and USB port in BladeCenter by pressing CD select button on front control panel / None / requests for keyboard, mouse, and video in BladeCenter by pressing the display button on front control panel / SVGA / ATI® Radeon™ 7000M on Planar / 16MB SDRAM std and max / 15 pin connector												
Systems Mgmt		IBM Baseboard Management Controller (BMC) / H8S2168 / on blade / provides system and environmental monitoring, event recording, alert capability / RS-485 interface for intermanagement communication with BladeCenter Management module												
Diagnostics		Light Path Diagnostics™ (LED lights indicate failing component) and on-board diagnostics (via PC-Doctor in BIOS)												
Security		No security intrusion protection / Power-on password / administrator password / unattended boot / selectable boot / unattended start mode												
Software ship group		Documentation CD, Broadcom CD												
Cooling Fans		Uses cooling from BladeCenter (type 8677) / thermal sensors on each processor and BladeCenter modules and front panel												
Power supply(s) Prerequisites		Uses power module(s) in BladeCenter (type 8677) / Monitor, keyboard, mouse for setup; ethernet switch module, disk, BladeCenter (type 8677), operating system												
		Xeon 2.8 GHz/800/1MB Low Volt EM64T Proc Upg										13N0699		
		Xeon 3.6 GHz/800/1MB L2 Cache EM64T Proc Upg										13N0659		
		512MB (2x256) PC2-3200 ECC DDR2										73P3522		
		1GB (2x512) PC2-3200 CL3 ECC DDR2										73P3522		
		2GB (2x1GB) PC2-3200 ECC DDR2 ChipK RDIMM Kit										73P2866		
		4GB (2x2GB) PC2-3200 ECC DDR2 ChipK RDIMM Kit										73P2867		
		IBM 36.4GB 10K Ultra320 SCSI 2.5" SFF NHS HDD										90P1312		
		IBM 73GB 10K Ultra320 SCSI 2.5" SFF NHS HDD										90P1313		
		BladeCenter SCSI Storage Exp Unit										26K4817		
		BladeCenter SFF Fibre Channel Exp Card										26K4841		
		BladeCenter SFF Gigabit Ethernet Exp Card										26K4842		
		BladeCenter Optical Pass-thru Module										02R9080		
		BladeCenter SCSI Storage Expansion Unit										26K4817		
		17-inch Flat Panel Monitor Console Kit w/ US Kybd										17231UX		
		Other options at ibm.com/pc/us/accessories												

Bay ① 3.5", 9.5mm, no front access, optional 2.5-inch SFF SCSI disk
 Bay ② 3.5", 9.5mm, no front access, optional 2.5-inch SFF SCSI disk



A control panel on top front of blade has following LEDs:

- Power good
- Blade location
- Over temperature
- Information
- General fault

- ◇ Stealth black front bezel
- ◇ H 9.7" x W 1.14" x D 17.6"; H 24.5cm x W 2.9cm x D 44.6cm
- ◇ 12 lbs; 5.4kg (max configuration)
- ◇ Configuration/Setup Utility: F1 at startup
- ◇ Diagnostics (PC-Doctor™): F2 at startup
- ◇ System Partition Boot: ALT+F1 at startup
- ◇ Network Boot: F12 at startup
- ◇ PXE Boot Agent Utility: Ctrl+S at startup
- ◇ Blade control panel on each HS20 blade server provides media select button, keyboard/mouse/video select button, and indicators for blade error, information, location, disk activity, and power
- ◇ Predictive Failure Analysis® alerts on memory, processor(s), and optional disk(s) with IBM Director

Maximum internal disk capacity for each HS20 blade server¹³: 146GB with two 73GB SCSI disks (with BladeCenter SCSI Storage Expansion Unit 2 x 146GB for total of 438GB)

LIMITED WARRANTY³

- ⇒ 3 year parts and labor
- ⇒ International Warranty Service³
- ⇒ On site, 8 am-5 pm, Mon-Fri excluding holidays, next business day response time
- ⇒ On site service upgrade options (in eligible locations):⁷
 - 4 year IOR 9x5, NBD response (ServicePac® part num 69P9520)
 - 4 year IOR 9x5, 4 hr avg response (ServicePac part num 69P9521)
 - 4 year IOR 24x7, 4 hr avg response (ServicePac part num 69P9522)
 - 4 year IOR 24x7, 2 hr avg response (ServicePac part num 69P9523)
- ⇒ Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- ⇒ 24x7¹⁴ toll-free support for warranty issues during the warranty period³

See footnotes for important warranty information

IBM® Type-model	Qty x Processor ¹	L3 Cache Memory	Frontside Bus Mhz	Disk controller	Disk bays	SCSI support with optional exp. unit	Slots x bays	Mechanical	Required chassis	Available date
8839-6TX	1 x Xeon™ 2.8GHz MP	2MB 2GB	400Mhz	None	None	None	2 H-S Ultra320	0x2 8U ⁴ blade	BladeCenter T	Mar 2004

Positioning
 Processor(s) *Ultra-dense, highly manageable modular computing platform with superior 4-way performance*
 L2/L3 cache *Up to 1 x Intel® Xeon 2.8GHz MP with 400MHz frontside bus / Hyper-Threading technology / NetBurst™ microarchitecture*
 SMP support *512KB L2 Cache / 2MB L3 Cache / on die of processor / at processor speed*
 Implementation *4-way SMP / up to four Xeon MP Processors (same speed/cache size)*
Server blade contains four Intel 604-pin micro-PGA ZIF sockets, four memory DIMM slots, one SCSI expansion connector, two I/O expansion option connector, integrated graphics and four ethernet ports

Memory
2GB std / 16GB max¹³ / two slots used / six slots available / eight total slots
PC2100 266MHz registered 184-pin ECC DDR-SDRAM DIMMs / four DIMM gold-connector slots on systemboard / DIMMs must be installed in matched pairs [a bank] / 2-way memory interleave / dual channel / memory bus runs at 2 x 100MHz / Error Checking and Correcting (ECC) via 16-bit Checksum Chipkill™ (corrects 1, 2, 3, or 4-bit errors on same chip and detects 2- through 8-bit errors contained in two chips) / memory can be mixed

SCSI disk controller
None / supports optional SCSI Storage Expansion Unit (a blade occupying adjacent blade slot / connects to HS20 via one connector / LSI Logic® 53C1020 Ultra320 SCSI controller [LVD 320MB/sec] / 64-bit 133MHz PCI-X Bus B from CIOB-ES I/O Bridge (IMB2 bus to Host Bridge) / supports RAID-1 mirroring [Embedded Mirroring] with two hot-swap 3.5" one-inch high SL SCSI disks in front bays / one 16-bit internal channel / no cables or external connector)

SCSI disk bays
Supports max of two hot-swap 3.5" SL Ultra320 SCSI disks in optional SCSI Storage Expansion Unit / 80-pin SCA-2 connectors / all SCSI bays Ultra320-enabled

External storage
Support for IBM TotalStorage™ solutions (including FASiT and NAS family of products)

Mechanical
Supported in IBM BladeCenter (type 8677) / BladeCenter supported in 28" deep racks such as the IBM NetBAY™ Rack products

Architecture / chipsets
ServerWorks® Grand Champion™ 4.0 LE / CMIC-LE5 Host Bridge (memory controller and I/O Bridge) / one CIOB-X2 I/O Bridge (IMB2 bus to Host Bridge) for two PCI-X Buses with Bus A for ethernet and Bus B for ethernet and the I/O expansion option connector / CSB6 South Bridge (Thin IMB to Host Bridge) for EIDE, USB, LPC bus to Super I/O, and PCI 2.2 Bus C with graphics controller / National Semiconductor® PC87417 Super I/O chip

Bus slots
No PCI or PCI-X slots (expansion via modules or network-interface option connector)

Ethernet controllers
Four gigabit 10/100/1000 ethernet controllers / Intel 82545GM/82546EB / on blade / two PCI-X 64-bit 100MHz buses / full duplex / Wake on LAN® / Alert Standard Format 1.0 / teaming and failover support / one of the controllers connects to an optional 4-port GB Ethernet Switch Module (the second controller requires a second optional Ethernet Switch Module)

Network-interface
Two connectors for I/O expansion option (Fibre Channel Expansion Card) / requires same interface modules in bays 3 and 4 of BladeCenter / all blades in a single BladeCenter must contain the same expansion card (or no expansion card) / ethernet and serial I/O expansion cards planned for future release²⁰

CD / diskette / USB
None / requests for CD-ROM, diskette drive, and USB port in BladeCenter by pressing CD select button on front control panel
Kybd / video / mouse
None / requests for keyboard, mouse, and video in BladeCenter by pressing the display button on front control panel
Graphics
SVGA / ATI® Radeon 7000 / on blade / 16MB SDRAM std/max / 32-bit 33MHz PCI 2.2 bus

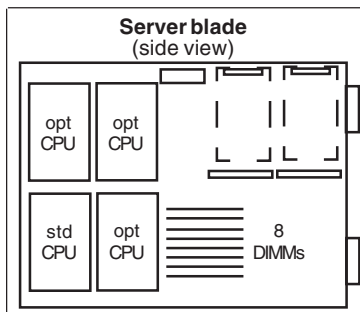
Systems mgmt
Intel integrated Baseboard Management Controller (BMC) / on blade / provides system and environmental monitoring, event recording, alert capability / RS-485 interface for communication with BladeCenter management module
Diagnostics
Light Path Diagnostics™ (LED lights indicate failing component) and on-board diagnostics (via PC-Doctor in BIOS)

Security
Power-on password / administrator password / unattended boot / selectable boot / unattended start mode
Software ship group
Documentation CD, IBM Director 4.1 CD, Device Driver CD

Cooling fans
Uses cooling from BladeCenter (type 8677) / thermal sensors on each processor and BladeCenter modules and front panel
Power supply
Uses power module(s) in BladeCenter (type 8677)
Prerequisites
Monitor, keyboard, mouse for setup; ethernet switch module, disk, BladeCenter (type 8677), operating system

Xeon 2.8Ghz/2MB L3 Cache Proc Upg	13N0653
512MB PC2100 CL2.5 ECC DDR-SDRAM DIMM	33L5038
1GB PC2100 CL2.5 ECC DDR-SDRAM RDIMM	33L5039
2GB PC2100 CL2.5 ECC DDR-SDRAM RDIMM	33L5040
IBM HS40 SCSI Storage Expansion Unit (blade)	26K4847
IBM HS40 Fibre Channel Expansion Card (with two ports; each port requires a FC Switch Module)	48P7061
IBM HS40 40GB ² 5400 rpm ATA-100 HDD	48P7063
36.4GB 15K Ultra160 SCSI Hot-Swap SL HDD*	06P5768
36.4GB 15K Ultra320 SCSI Hot-Swap SL HDD*	06P5776
73.4GB 10K Ultra160 SCSI Hot-Swap SL HDD*	06P5756
146.8GB 10K Ultra320 SCSI Hot-Swap SL HDD*	32P0728

* Disk requires SCSI Storage Expansion Unit



- ▷ Stealth black front bezel
- ▷ H 9.7" x W 1.14" x D 17.6"; H 24.5cm x W 2.9cm x D 44.6cm
- ▷ 12 lbs; 5.4kg (max configuration)
- ▷ Configuration/Setup Utility: F1 at startup
- ▷ Diagnostics (PC-Doctor™): F2 at startup
- ▷ System Partition Boot: ALT+F1 at startup
- ▷ Network Boot: F12 at startup
- ▷ PXE Boot Agent Utility: Ctrl+S at startup
- ▷ Blade control panel on each HS40 blade server provides media select button, keyboard/mouse/video select button, and indicators for blade error, information, location, disk activity, and power
- ▷ Predictive Failure Analysis® alerts on memory, processor(s), and optional disk(s) with IBM Director

Maximum internal disk capacity for each HS40 blade server¹³: 293.6GB* with two 146.8GB SL SCSI disks

- A control panel on top front of blade has following LEDs:
- Power good
 - Blade location
 - Over temperature
 - Information
 - General fault

LIMITED WARRANTY³

- ↪ 3 year parts and labor
- ↪ International Warranty Service³
- ↪ On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time⁷
- ↪ On site service upgrade options (in eligible locations):⁷
 - 3 year IOR 24x7, 2 hr avg response (ServicePac® part num 69P9519)
 - 3 year IOR 24x7, 4 hr avg response (ServicePac part num 69P9518)
 - 3 year IOR 9x5, 4 hr avg response (ServicePac part num 69P9517)
 - 5 year IOR 9x5, 4 hr avg response (ServicePac part num 69P9525)
 - 5 year IOR 24x7, 2 hr avg response (ServicePac part num 69P9527)
- ↪ Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- ↪ 24x7¹⁴ toll-free support for warranty issues during the warranty period⁵

Warranty information: For a copy of applicable product warranties, write to: Warranty Information, P.O. Box 12195, RTP, NC, 27709, Attn: Dept JDJA/B203. IBM makes no representation or warranty regarding third party products or services.

¹ MHz/GHz only measures microprocessor internal clock speed; many factors affect application performance.

² MB/GB/TB = 1 million/billion/trillion bytes when referring to storage capacity. Accessible capacity is less; up to 3GB is used in service partition.

³ For terms and conditions or a copy of IBM's Statement of Limited Warranty, call 1 800 772-2227 in the U.S. Copies available upon request. Telephone support may be subject to additional charges. For onsite labor, IBM will attempt to diagnose and resolve the problem remotely before sending a technician. International Warranty Service is available in any country in which this product is sold and serviced. Service delivery methods and parts availability vary by country, may be different from that in the country of purchase, and are subject to change without notice. Fees and restrictions may apply in some countries.

⁴ A single "U", or rack unit, is 1.75" or 44.45mm.

⁵ S.M.A.R.T. stands for Self-Monitoring, Analysis and Reporting Technology.

⁶ CD and DVD drives speeds are variable and are often less than the maximum.

⁷ These services are available for machines normally used for business, professional, or trade purposes, rather than personal, family or household purposes. Not all machine types and models are covered. Service period begins with the equipment date of purchase. Service must be purchased during the original limited product warranty period. Service levels are response time objectives and are not guarantees. A service technician is scheduled to arrive at your location within two or four business hours or the next business day (depending on service) after remote problem determination is completed. For the 9x5x4-hour service, calls dispatched after 1:00 p.m. local time, you can expect the service technician to arrive by the morning of the next business day. For non-critical service requests, a service technician will arrive by the end of the following business day. If the machine problem turns out to be a Customer Replaceable Unit (CRU), IBM will express ship the part to you for quick replacement. Onsite 24x7x2-hour service is not available in all locations. External peripherals, such as racks, tape drives, and channel controllers, require their own, separate service coverage, they are not covered under the attached Machine. Service activation is required immediately following purchase. For ThinkPad notebooks requiring LCD or other component replacement, IBM may choose to perform service at the depot repair center. For failing non-IBM components, customer must provide replacement part unless IBM has a Technical Support Agreement with the manufacturer. Service does not cover accessories, supply items and certain parts such as batteries, frames and covers. Not available in all states; call your IBM representative for details.

⁸ Subject to conditions.

⁹ Some software may differ from retail version (if any) and may not include user manuals or all program functionality. Software license agreements may apply.

¹⁰ Updated drivers and hot-swap services for certain operating systems may be required to support PCI hot-swap functions.

¹¹ Fire GL1, Fire GL2 and Fire GL4 are trademarks of ATI Technologies, Inc., and are used under license.

¹² Installation of 2GB RDIMMs requires BIOS and diagnostic firmware version 1.08 or later. When more than 8GB of memory is installed, the integrated SCSI controller must be disabled.

¹³ Maximum memory and internal hard disk capacities may require the replacement of standard component with largest supported component available.

¹⁴ Response times may vary. May exclude some holidays. Telephone support may be subject to additional charges.

¹⁵ IBM makes no representations or warranties regarding non-IBM products and services that are ServerProven, including but not limited to the implied warranties of merchantability and fitness for particular purpose. These products are offered and warranted by third parties, not IBM.

¹⁶ Asset ID allows your computer to be scanned by various radio frequency emitting devices which must be purchased separately from independent companies.

¹⁷ Some software may differ from its retail version (if available), and may not include user manual or all program functionality. Software license agreements may apply.

¹⁸ Diskettes and hard copy documentation available at extra charge.

¹⁹ For combination drives, maximum possible speeds only are given in the following order: CD read, CD write, CD re-write, DVD read.

²⁰ Statement of direction and subject to availability.

²¹ Max physical memory is currently 16GB contingent on general availability of 4GB memory DIMMs, running under select 64-bit Linux distributions; addressable capacity is less. Under select 32-bit Linux distributions, maximum physical memory is 16GB contingent on general availability of 4GB memory modules, with a maximum of 3GB allocated per thread. Maximum physical memory is 4GB running under Microsoft Windows XP Professional operating system; addressable capacity is less.

²² 16GB Memory max with PC2700 DIMMs, 8GB Max with PC3200 DIMMs



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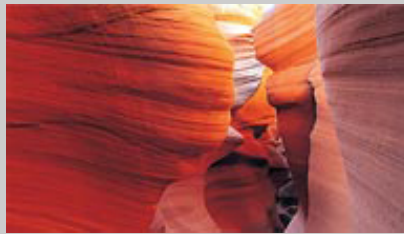
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