

xSeries Reference (xREF)

including

IBM @server™

IntelliStation™ / xSeries™ / BladeCenter™

March 25, 2003



IBM® Type-model	Processor	L2 cache	FSB MHz	Memory	Disk and rpm	SCSI adapter	CD-ROM	Graphics adapter and memory	Slots x bays	Preload ¹⁷	Available date	
6216-20U	Pentium® 4	2.0	512KB	400	256MB 40GB ²	7200 None	CD-ROM	Millennium G450 DVI-I 32MB4x3	Windows® XP Pro	Aug 02		
6216-22U	Pentium 4	2.0	512KB	400	256MB 40GB	7200 None	CD-ROM	NVIDIA™ Quadro4 64MB 4x3	Windows XP Pro	Aug 02		
6216-23U	Pentium 4	2.0	512KB	400	256MB 18.2GB	10K 29160LP	CD-ROM	NVIDIA Quadro4 64MB 4x3	Windows XP Pro	Aug 02		
6216-30U	Pentium 4	2.26	512KB	533	256MB 40GB	7200 None	CD-ROM	Millennium G450 DVI-I 32MB4x3	Windows XP Pro	Aug 02		
6216-32U	Pentium 4	2.26	512KB	533	256MB 40GB	7200 None	CD-ROM	NVIDIA Quadro4 64MB 4x3	Windows XP Pro	Aug 02		
6216-40U	Pentium 4	2.4	512KB	533	256MB 40GB	7200 None	CD-ROM	Millennium G450 DVI-I 32MB4x3	Windows XP Pro	Aug 02		
6216-42U	Pentium 4	2.4	512KB	533	256MB 40GB	7200 None	CD-ROM	NVIDIA Quadro4 64MB 4x3	Windows XP Pro	Aug 02		
Positioning		<i>Essential workstation performance</i>						Low-profile Desktop				
Processor	Intel® Pentium 4 at 2.0, 2.26, or 2.4GHz with 400 or 533MHz frontside bus (FSB)											
L2 cache	512KB std and max / ECC / full speed						Bay ① 3.5", SL 1", access, std diskette Bay ② 5.25", HH 1.6", access, std CD-ROM Bay ③ 3.5", SL 1", no access, std disk					
Implementation	Processor and L2 cache in FC-PGA2 in mPGA478 socket						Slot 1: low-profile, 32-bit AGP 4X (1.5v) - used Slot 2: low-profile, 32-bit PCI 2.2 (5v) Slot 3: low-profile, 32-bit PCI 2.2 (5v) Slot 4: low-profile, 32-bit PCI 2.2 (5v)- SCSI (some)					
SMP support	No SMP support						<ul style="list-style-type: none"> Stealth black color 14.2" W X 16.2" D X 4.1" H 360mm W X 412mm D X 104mm H 20.0 to 22.0 lb (9.1 to 10.0 kg) Bays 1 and 2/3 flip up (latched and pivoting) Toolless rails for disk mounting Toolless cover removal Toolless AGP and PCI slots Support for 100 lb monitor on top 					
Memory - std/max	256MB / 2GB ¹³ max											
Memory - sockets	Two 184-pin gold-plated DIMM sockets / one socket used											
Memory - type	PC2100 266MHz DDR-SDRAM / Error Checking and Correcting (ECC) DIMMs and ECC memory controller / industry std / unbuffered / CAS Latency 2.5 (CL2.5)											
Graphics controller (one of following)	<ul style="list-style-type: none"> Matrox® Millennium G450 DVI-I (high-perf 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 connors) NVIDIA Quadro4 200NVS (high-perf 2D) / AGP 4X adapter / NV17LT 250MHz GPU / 64MB 166MHz SDRAM / dual 350MHz RAMDACs / dual head: 2048x1536x16M each monitor / LFH60 connector for std cable with two DB-15 analog 											
SCSI disk controller	SCSI model: Adaptec® 29160LP / single channel Wide Ultra160 SCSI (LVD 160MB/sec) / 64-bit 33MHz PCI adapter (in a 32-bit slot) / one channel with up to 15 device support											
SCSI connectors	SCSI models: One 68-pin internal SCSI connector / one 0.8mm VHDCI 68-pin external SCSI connector											
Disk controller	Enhanced IDE / ATA-100 / integrated in I/O Controller Hub / two connectors on planar											
Cables	SCSI model: One 1-drop 16-bit LVD SCSI cable, one 1-drop EIDE 80-conductor cable (connected to CD-ROM)											
	EIDE models: Two EIDE 80-conductor cables (one 1-drop cable to CD, one 1-drop cable to disk)											
Disk	SCSI model: 18.2GB Ultra160 SCSI / 10000 rpm / 4.9 ms read / S.M.A.R.T. ⁵						SECURITY <ul style="list-style-type: none"> Optional U-bolt support via knockout Cover key lock (on rear) 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 Diskette, disk, serial port, parallel port I/O control Secure access openings Secure removable media VPD stored in EEPROM Write protection control for EEPROM Barcode labels on most components 					
	EIDE models: 40GB EIDE / ATA-100 / 7200 rpm / 9.0 ms read seek / S.M.A.R.T. ⁵											
Diskette / CD-ROM	3.5" 1.44MB diskette drive / 48X-20X ⁶ CD-ROM, bootable											
Rack support	None											
Chipset	Intel 845E chipset / 82845E Memory Controller Hub (MCH) / 82801DB I/O Controller Hub (ICH4) for PCI 2.2 bus, ATA-100 EIDE, ethernet MAC, USB, Low Pin Count Interface / Firmware Hub / SMSC® LPC47M102 Super I/O for diskette, parallel, serial, keyboard, mouse											
Ports	Front: two USB (Ver 2.0) Back: two 9-pin serial, parallel, two USB (Ver 2.0), keyboard, mouse, ethernet, monitor											
Audio	Integrated digital audio / SoundMAX® 3.0 with SPX™ / software-based audio (done by processor and ICH4) / AC '97 interface / Realtec®ALC202 codec / (analog mixing, Analog-to-Digital and Digital-to-Analog conversion)											
Audio connectors	Back: microphone-in (mono), line-in (stereo), line-out (stereo) [all 3.5mm]											
Speakers	One internal speaker for business audio											
Ethernet	10/100/1000 gigabit / Broadcom® BCM 5702 / on planar / PCI 2.2 32-bit 33MHz / full duplex / PHY and MAC layers / Wake on LAN® / Alert Standard Format 1.0											
Security chip	None						<ul style="list-style-type: none"> Maximum internal EIDE disk capacity: 80GB¹³ (1 disk x 80GB 7200 rpm) Maximum internal SCSI disk capacity: 73.4GB¹³ (1 disk x 73.4GB 10000 rpm) 					
Keyboard / mouse	104-key (rubber dome) keyboard / IBM 3-button mouse											
Cooling fans	Two or three variable speed fans (power sply, fansink, SCSI model has third fan)											
Power supply	160 watts with variable speed fan / universal / manual switch											
Preload with Windows XP Professional¹⁷		Options										
Microsoft® Windows® XP Professional		256MB PC2100 CL2.5 ECC DDR UDIMM 10K0067										
- Lotus® SmartSuite® Millennium license		512MB PC2100 CL2.5 ECC DDR UDIMM 10K0069										
- Lotus Notes® Client license		1GB PC2100 CL2.5 ECC DDR UDIMM 10K0071										
- Disk-to-Disk Recovery (in Service Partition)		40GB IDE Disk ATA-100 (7200 rpm) 22P7157										
◇ Device Drivers and Diagnostics CD-ROM		60GB IDE Disk ATA-100 (7200 rpm) 09N4207										
		80GB IDE Disk ATA-100 (7200 rpm) 09N4226										
		PCI Ultra160 SCSI Adapter 19K4646										
		36.4GB 10K rpm Ultra160 SCSI Disk 06P5751										
		73.4GB 10K rpm Ultra160 SCSI Disk 06P5752										
		40X/12X/40X Max ⁶ CD-RW internal (black) 22P6976										
		32X/10X/40X/16X Max ^{6,19} CD-RW/DVD-ROM Combo drive (black) 22P6973										
		IBM DVD-RAM/DVD-R Drive (black) 22P6959										
		IBM P97 19" (18.0" v.i.s.) Monitor (black) 6551U3N										
		IBM P275 21" (19.8" v.i.s.) Monitor (black) 6652U3N										
		IBM T545 15.1" Flat Panel Monitor (black) 6653HG2										
		IBM T750 17" Flat Panel Monitor (black) 6657HG2										
		IBM Wireless keyboard and mouse (black) 22P5170										
		Spaceball 3D Input Device 33L3252										
		Other options at ibm.com/pc/us/accessories										
		<ul style="list-style-type: none"> Configuration/Setup Utility invoked by pressing F1 at startup Product Recovery by pressing F11 at startup Systems management capabilities: Remote Deployment Manager, IBM Director Agent, System Migration Assistant Common Information Model (CIM) 2.2 PC 2001-compliant Advanced Power Management 1.2 Advanced Configuration and Power Interface (ACPI) 1.0b System Management BIOS DMI 2.0-compliant 										
		LIMITED WARRANTY³ <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 time On site service upgrade options (in eligible locations):⁷ <ul style="list-style-type: none"> 3yr IOR Mon-Fri 8-5, 4 hr average response (ServicePac® 41L2735) 3yr IOR 7 day x 24 hr, 4 hr average response (ServicePac 41L2741) 4yr IOR Mon-Fri 8-5, next business day response (ServicePac 69P9167) 4yr IOR Mon-Fri 8-5, 4 hr average response (ServicePac 69P9168) 4yr IOR 7 day x 24 hr, 4 hr average response (ServicePac 69P9169) 24x7¹⁴ toll-free support for warranty issues during the warranty period 										

See footnotes for important warranty information

US models announced July 16, 2002

⚡ US models withdrawn effective October 2002

IBM® Type-model	Processor	L2 cache	FSB MHz	Memory	Disk and rpm	SCSI adapter	CD-ROM	Graphics adapter and memory	Slots x bays	Preload ¹⁷	Available date	
6216-50U	Pentium® 4	2.67 512KB	533	256MB	40GB ² 7200	None	CD-ROM	Millennium G450 DVI-I 32MB	4x3	Windows® XP Pro	Nov02	
6216-52U	Pentium 4	2.67 512KB	533	256MB	40GB 7200	None	CD-ROM	Quadro® 4 200NVS 64MB	4x3	Windows XP Pro	Nov02	
6216-54U	Pentium 4	2.67 512KB	533	256MB	40GB 7200	None	CD-ROM	Quadro4 580XGL 64MB	4x3	Windows XP Pro	Nov02	
6216-55U	Pentium 4	2.67 512KB	533	256MB	18.2GB 10K	29160LP	CD-ROM	Quadro4 580XGL 64MB	4x3	Windows XP Pro	Nov02	
Positioning Processor	<i>Essential workstation performance</i> Intel® Pentium 4 at 2.67GHz with 533MHz frontside bus (FSB)							Low-profile Desktop				
L2 cache	512KB std and max / ECC / full speed											
Implementation	Processor and L2 cache in FC-PGA2 in mPGA478 socket							Bay ① 3.5", SL 1", access, std diskette Bay ② 5.25", HH 1.6", access, std CD-ROM Bay ③ 3.5", SL 1", no access, std disk				
SMP support	No SMP support							Slot 1: low-profile, 32-bit AGP 4X (1.5v) - used Slot 2: low-profile, 32-bit PCI 2.2 (5v) Slot 3: low-profile, 32-bit PCI 2.2 (5v) Slot 4: low-profile, 32-bit PCI 2.2 (5v)- SCSI (some)				
Memory - std/max	256MB / 2GB ¹³ max							<ul style="list-style-type: none"> Stealth black color 14.2" W X 16.2"D X 4.1"H 360mm W X 412mm D X 104mm H 20.0 to 22.0 lb (9.1 to 10.0 kg) Bays 1 and 2/3 flip up (latched and pivoting) Toolless rails for disk mounting Toolless cover removal Toolless AGP and PCI slots Support for 100 lb monitor on top 				
Memory - sockets	Two 184-pin gold-plated DIMM sockets / one socket used											
Memory - type	PC2100 266MHz DDR-SDRAM / Error Checking and Correcting (ECC) DIMMs and ECC memory controller / industry std / unbuffered / CAS Latency 2.5 (CL2.5)											
Graphics controller (one of following)	<ul style="list-style-type: none"> Matrox® Millennium G450 DVI-I (high-perf 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 connors) NVIDIA® Quadro4 200NVS (high-perf 2D) / AGP 4X adapter / NV17LT 250MHz GPU / 64MB 166MHz SDRAM / dual 350MHz RAMDACs / dual head: 2048x1536x16M each monitor / LFH60 connector for std cable with two DB-15 analog NVIDIA Quadro4 580XGL (entry 3D) / AGP 8X adapter / NV18GL 300MHz GPU / 64MB 275MHz DDR-SDRAM / dual 350MHz RAMDACs / dual head: 2048x1536x16M each monitor / LFH60 connector including std cable with two DB-15 analog connectors 											
SCSI disk controller	SCSI model: Adaptec® 29160LP / single channel Wide Ultra160 SCSI (LVD 160MB/sec) / 64-bit 33MHz PCI adapter (in a 32-bit slot) / one channel with up to 15 device support											
SCSI connectors	SCSI model: One 68-pin internal SCSI connector / one 0.8mm VHDCI 68-pin external SCSI connector											
Disk controller	Enhanced IDE / ATA-100 / integrated in I/O Controller Hub / two connectors on planar											
Cables	SCSI model: One 1-drop 16-bit LVD SCSI cable, one 1-drop EIDE 80-conductor cable (connected to CD-ROM)											
Disk	SCSI model: 18.2GB Ultra160 SCSI / 10000 rpm / 4.9 ms read / S.M.A.R.T. ⁵ EIDE models: 40GB EIDE / ATA-100 / 7200 rpm / 9.0 ms read seek / S.M.A.R.T.											
Diskette / CD-ROM	3.5" 1.44MB diskette drive / 48X-20X ⁶ CD-ROM, bootable							SECURITY <ul style="list-style-type: none"> Optional U-bolt support via knockout Cover key lock (on rear) 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 Diskette, disk, serial port, parallel port I/O control Secure access openings Secure removable media VPD stored in EEPROM Write protection control for EEPROM Barcode labels on most components <ul style="list-style-type: none"> Maximum internal EIDE disk capacity: 80GB¹³ (1 disk x 80GB 7200 rpm) Maximum internal SCSI disk capacity: 73.4GB¹³ (1 disk x 73.4GB 10000 rpm) 				
Rack support	None											
Chipset	Intel 845E chipset / 82845E Memory Controller Hub (MCH) / 82801DB I/O Controller Hub (ICH4) for PCI 2.2 bus, ATA-100 EIDE, ethernet MAC, USB, Low Pin Count Interface / Firmware Hub / SMSC® LPC47M102 Super I/O for diskette, parallel, serial, keyboard, mouse											
Ports	Front: two USB (Ver 2.0) Back: two 9-pin serial, parallel, two USB (Ver 2.0), keyboard, mouse, ethernet, monitor											
Audio	Integrated digital audio / SoundMAX® 3.0 with SPX™ / software-based audio (done by processor and ICH4) / AC '97 interface / Realtec®ALC202 codec / (analog mixing, Analog-to-Digital and Digital-to-Analog conversion)											
Audio connectors	Back: microphone-in (mono), line-in (stereo), line-out (stereo) [all 3.5mm]											
Speakers	One internal speaker for business audio											
Ethernet	10/100/1000 gigabit / Broadcom® BCM 5702 / on planar / PCI 2.2 32-bit 33MHz / full duplex / PHY and MAC layers / Wake on LAN® / Alert Standard Format 1.0											
Security chip	None											
Keyboard / mouse	104-key (rubber dome) keyboard / IBM 3-button mouse											
Cooling fans	Two or three variable speed fans (power sply, fansink, SCSI model has third fan)											
Power supply	160 watts with variable speed fan / universal / manual switch											
Preload with Windows XP Professional¹⁷			Options									
Microsoft® Windows® XP Professional			256MB PC2100 CL2.5 ECC DDR UDIMM 10K0067									
- Lotus® SmartSuite® Millennium license			512MB PC2100 CL2.5 ECC DDR UDIMM 10K0069									
- Lotus Notes® Client license			1GB PC2100 CL2.5 ECC DDR UDIMM 10K0071									
- Disk-to-Disk Recovery (in Service Partition)			40GB IDE Disk ATA-100 (7200 rpm) 22P7157									
◇ Device Drivers and Diagnostics CD-ROM			60GB IDE Disk ATA-100 (7200 rpm) 09N4207									
<ul style="list-style-type: none"> Configuration/Setup Utility invoked by pressing F1 at startup Product Recovery by pressing F11 at startup Systems management capabilities: Remote Deployment Manager, IBM Director Agent, System Migration Assistant Common Information Model (CIM) 2.2 PC 2001-compliant Advanced Power Management 1.2 Advanced Configuration and Power Interface (ACPI) 1.0b System Management BIOS DMI 2.0-compliant 			80GB IDE Disk ATA-100 (7200 rpm) 09N4226									
			PCI Ultra160 SCSI Adapter 19K4646									
			36.4GB 10K rpm Ultra160 SCSI Disk 06P5751									
			73.4GB 10K rpm Ultra160 SCSI Disk 06P5752									
			40X/12X/40X Max ⁶ CD-RW internal (black) 22P6976									
			32X/10X/40X/16X Max ^{6,19} CD-RW/DVD-ROM Combo drive (black) 22P6973									
			IBM DVD-RAM/DVD-R Drive (black) 22P6959									
			IBM P97 19" (18.0" v.i.s.) Monitor (black) 6551U3N									
			IBM P275 21" (19.8" v.i.s.) Monitor (black) 6652U3N									
			IBM T545 15.1" Flat Panel Monitor (black) 6653HG2									
			IBM T750 17" Flat Panel Monitor (black) 6657HG2									
			IBM Wireless keyboard and mouse (black) 22P5170									
			Spaceball 3D Input Device 33L3252									
			Other options at ibm.com/pc/us/accessories									
			LIMITED WARRANTY³ <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 time On site service upgrade options (in eligible locations):⁷ <ul style="list-style-type: none"> 3yr IOR Mon-Fri 8-5, 4 hr average response (ServicePac® 41L2735) 3yr IOR 7 day x 24 hr, 4 hr average response (ServicePac 41L2741) 4yr IOR Mon-Fri 8-5, next business day response (ServicePac 69P9167) 4yr IOR Mon-Fri 8-5, 4 hr average response (ServicePac 69P9168) 4yr IOR 7 day x 24 hr, 4 hr average response (ServicePac 69P9169) 24x7¹⁴ toll-free support for warranty issues during the warranty period 									

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

IBM® Type-model	Processor	L2 cache	FSB MHz	Memory	Disk and rpm	SCSI adapter	CD-ROM	Graphics adapter and memory	Slots x bays	Preload ¹⁷	Available date
6216-60U	Pentium® 4	2.8	512KB	533	256MB 40GB ²	7200	None	CD-ROM Millennium G450 DVI-I 32MB	4x3	Windows® XP Pro	Mar03
6216-63U	Pentium 4	2.8	512KB	533	256MB 40GB	7200	None	CD-ROM Quadro® 4 280NVS 64MB	4x3	Windows XP Pro	Mar03
6216-64U	Pentium 4	2.8	512KB	533	256MB 40GB	7200	None	CD-ROM Quadro4 580XGL 64MB	4x3	Windows XP Pro	Mar03
6216-65U	Pentium 4	2.8	512KB	533	256MB 18.2GB	10K	29160LP	CD-ROM Quadro4 580XGL 64MB	4x3	Windows XP Pro	Mar03
Positioning Processor	<i>Essential workstation performance</i> Intel® Pentium 4 at 2.8GHz with 533MHz frontside bus (FSB)							Low-profile Desktop			
L2 cache	512KB std and max / ECC / full speed										
Implementation	Processor and L2 cache in FC-PGA2 in mPGA478 socket							Bay ① 3.5", SL 1", access, std diskette Bay ② 5.25", HH 1.6", access, std CD-ROM Bay ③ 3.5", SL 1", no access, std disk			
SMP support	No SMP support							Slot 1: low-profile, 32-bit AGP 4X (1.5v) - used Slot 2: low-profile, 32-bit PCI 2.2 (5v) Slot 3: low-profile, 32-bit PCI 2.2 (5v) Slot 4: low-profile, 32-bit PCI 2.2 (5v)- SCSI (some)			
Memory - std/max	256MB / 2GB ¹³ max							<ul style="list-style-type: none"> Stealth black color 14.2" W X 16.2" D X 4.1" H 360mm W X 412mm D X 104mm H 20.0 to 22.0 lb (9.1 to 10.0 kg) Bays 1 and 2/3 flip up (latched and pivoting) Toolless rails for disk mounting Toolless cover removal Toolless AGP and PCI slots Support for 100 lb monitor on top 			
Memory - sockets	Two 184-pin gold-plated DIMM sockets / one socket used										
Memory - type	PC2100 266MHz DDR-SDRAM / Error Checking and Correcting (ECC) DIMMs and ECC memory controller / industry std / unbuffered / CAS Latency 2.5 (CL2.5)										
Graphics controller (one of following)	<ul style="list-style-type: none"> Matrox® Millennium G450 DVI-I (high-perf 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 connors) NVIDIA® Quadro4 280NVS (high-perf 2D) / AGP 8X adapter / NV17LT 250MHz 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 580XGL (entry 3D) / AGP 8X adapter / NV18GL 300MHz GPU / 64MB 275MHz DDR-SDRAM / dual 350MHz RAMDACs / dual head: 2048x1536x16M each monitor / LFH60 connector including std cable with two DB-15 analog connectors 										
SCSI disk controller	SCSI model: Adaptec® 29160LP / single channel Wide Ultra160 SCSI (LVD 160MB/sec) / 64-bit 33MHz PCI adapter (in a 32-bit slot) / one channel with up to 15 device support										
SCSI connectors	SCSI model: One 68-pin internal SCSI connector / one 0.8mm VHDCI 68-pin external SCSI connector										
Disk controller	Enhanced IDE / ATA-100 / integrated in I/O Controller Hub / two connectors on planar										
Cables	SCSI model: One 1-drop 16-bit LVD SCSI cable, one 1-drop EIDE 80-conductor cable (connected to CD-ROM)										
Disk	SCSI model: 18.2GB Ultra160 SCSI / 10000 rpm / 4.9 ms read / S.M.A.R.T. ⁵ EIDE models: 40GB EIDE / ATA-100 / 7200 rpm / 9.0 ms read seek / S.M.A.R.T.										
Diskette / CD-ROM	3.5" 1.44MB diskette drive / 48X-20X ⁶ CD-ROM, bootable										
Rack support	None										
Chipset	Intel 845E chipset / 82845E Memory Controller Hub (MCH) / 82801DB I/O Controller Hub (ICH4) for PCI 2.2 bus, ATA-100 EIDE, ethernet MAC, USB, Low Pin Count Interface / Firmware Hub / SMSC® LPC47M102 Super I/O for diskette, parallel, serial, keyboard, mouse										
Ports	Front: two USB (Ver 2.0) Back: two 9-pin serial, parallel, two USB (Ver 2.0), keyboard, mouse, ethernet, monitor										
Audio	Integrated digital audio / SoundMAX® 3.0 with SPX™ / software-based audio (done by processor and ICH4) / AC '97 interface / Realtec® ALC202 codec / (analog mixing, Analog-to-Digital and Digital-to-Analog conversion)										
Audio connectors	Back: microphone-in (mono), line-in (stereo), line-out (stereo) [all 3.5mm]										
Speakers	One internal speaker for business audio										
Ethernet	10/100/1000 gigabit / Broadcom® BCM 5702 / on planar / PCI 2.2 32-bit 33MHz / full duplex / PHY and MAC layers / Wake on LAN® / Alert Standard Format 1.0										
Security chip	None							SECURITY <ul style="list-style-type: none"> Optional U-bolt support via knockout Cover key lock (on rear) Cover tamper detect switch Secure fixed DASH Power-on password Administrator password Boot sequence control Boot without keyboard or mouse Diskette boot inhibit and write-protect Diskette, disk, serial port, parallel port I/O control Secure access openings Secure removable media VPD stored in EEPROM Write protection control for EEPROM Barcode labels on most components 			
Keyboard / mouse	104-key (rubber dome) keyboard / IBM 3-button mouse							<ul style="list-style-type: none"> Maximum internal EIDE disk capacity: 80GB¹³ (1 disk x 80GB 7200 rpm) Maximum internal SCSI disk capacity: 73.4GB¹³ (1 disk x 73.4GB 10000 rpm) 			
Cooling fans	Two or three variable speed fans (power sply, fansink, SCSI model has third fan)										
Power supply	160 watts with variable speed fan / universal / manual switch										
Preload with Windows XP Professional¹⁷ <ul style="list-style-type: none"> Microsoft® Windows® XP Professional Lotus® SmartSuite® Millennium license Lotus Notes® Client license Disk-to-Disk Recovery (in Service Partition) Device Drivers and Diagnostics CD-ROM 											
Options <ul style="list-style-type: none"> 256MB PC2100 CL2.5 ECC DDR UDIMM 10K0067 512MB PC2100 CL2.5 ECC DDR UDIMM 10K0069 1GB PC2100 CL2.5 ECC DDR UDIMM 10K0071 40GB IDE Disk ATA-100 (7200 rpm) 22P7157 60GB IDE Disk ATA-100 (7200 rpm) 09N4207 80GB IDE Disk ATA-100 (7200 rpm) 09N4226 PCI Ultra160 SCSI Adapter 19K4646 36.4GB 10K rpm Ultra160 SCSI Disk 06P5751 73.4GB 10K rpm Ultra160 SCSI Disk 06P5752 48X/24X/48X Max⁶ CD-RW internal (black) 22P6997 48X/24X/48X/16X Max^{6,19} CD-RW/DVD-ROM Combo drive (black) 22P7031 IBM DVD-RAM/DVD-R Drive (black) 22P6959 IBM P97 19" (18.0" v.i.s.) Monitor (black) 6551U3N IBM P275 21" (19.8" v.i.s.) Monitor (black) 6652U3N IBM T545 15.1" Flat Panel Monitor (black) 6653HG2 IBM T750 17" Flat Panel Monitor (black) 6657HG2 IBM Wireless keyboard and mouse (black) 22P5170 Spaceball 3D Input Device 33L3252 Other options at ibm.com/pc/us/accessories 											
LIMITED WARRANTY³ <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 time On site service upgrade options (in eligible locations):⁷ <ul style="list-style-type: none"> 3yr IOR Mon-Fri 8-5, 4 hr average response (ServicePac® 41L2735) 3yr IOR 7 day x 24 hr, 4 hr average response (ServicePac 41L2741) 4yr IOR Mon-Fri 8-5, next business day response (ServicePac 69P9167) 4yr IOR Mon-Fri 8-5, 4 hr average response (ServicePac 69P9168) 4yr IOR 7 day x 24 hr, 4 hr average response (ServicePac 69P9169) 24x7¹⁴ toll-free support for warranty issues during the warranty period 											

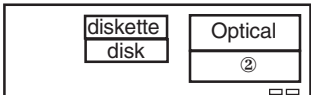
See footnotes for important warranty information
US models announced February 18, 2003

IBM® Type-model	Processor	GHz ²	L2 cache	FSB MHz	Memory	Disk and rpm	SCSI adapter	CD-ROM	Graphics adapter and memory	Slots x bays	Preload ¹⁷	Available date	
6226-20U	Pentium® 4	2.0	512KB	400	256MB	40GB ² 7200	None	CD-ROM	Millennium G450 DVI-I 32MB	4x4	Windows® XP Pro	Aug 02	
6226-22U	Pentium 4	2.0	512KB	400	256MB	40GB 7200	None	CD-ROM	NVIDIA™ Quadro4 64MB	4x4	Windows XP Pro	Aug 02	
6226-30U	Pentium 4	2.26	512KB	533	256MB	40GB 7200	None	CD-ROM	Millennium G450 DVI-I 32MB	4x4	Windows XP Pro	Aug 02	
6226-32U	Pentium 4	2.26	512KB	533	256MB	40GB 7200	None	CD-ROM	NVIDIA Quadro4 64MB	4x4	Windows XP Pro	Aug 02	
6226-35U	Pentium 4	2.26	512KB	533	256MB	18.2GB 10K 29160LP	None	CD-ROM	ATI® Fire GL8800™, 11 128MB	4x4	Windows XP Pro	Aug 02	
6226-40U	Pentium 4	2.4	512KB	533	256MB	40GB 7200	None	CD-ROM	Millennium G450 DVI-I 32MB	4x4	Windows XP Pro	Aug 02	
6226-42U	Pentium 4	2.4	512KB	533	256MB	40GB 7200	None	CD-ROM	NVIDIA Quadro4 64MB	4x4	Windows XP Pro	Aug 02	
6226-45U	Pentium 4	2.4	512KB	533	256MB	18.2GB 10K 29160LP	None	CD-ROM	ATI® Fire GL8800 128MB	4x4	Windows XP Pro	Aug 02	
Positioning Processor		<i>Essential workstation performance</i> Intel® Pentium 4 at 2.0, 2.26, or 2.4GHz with 400 or 533MHz frontside bus (FSB)							Full-size Desktop				
L2 cache Implementation SMP support		512KB std and max / ECC / full speed Processor and L2 cache in FC-PGA2 in mPGA478 socket No SMP support											
Memory - std/max		256MB / 2GB ¹³ max							Bay ① 5.25", HH 1.6", access, std CD-ROM Bay ② 5.25", HH 1.6" access, open Bay ③ 3.5", SL 1", access, std diskette Bay ④ 3.5", SL 1", no access, std disk Slot 1: full-length, full-height, 32-bit AGP 4X (1.5v) - used Slot 2: full-length, full-height, 32-bit PCI 2.2 (5v) Slot 3: full-length, full-height, 32-bit PCI 2.2 (5v) Slot 4: full-length, full-height, 32-bit PCI 2.2 (5v) - SCSI in some				
Memory - sockets		Two 184-pin gold-plated DIMM sockets / one socket used							• 16.7" W X 16.7" D X 5.5" H • 425mm W X 425mm D X 140mm H • 23 to 25 lb (10.46 to 11.36kg) • Stealth black color • Bay 1 and 2 in cage flips up (latched and pivoting) • Bay 3 and 4 in cage flips up (latched and pivoting) • Toolless rails for disk mounting • Toolless cover removal; toolless AGP and PCI slots				
Memory - type		PC2100 266MHz DDR-SDRAM / Error Checking and Correcting (ECC) DIMMs and ECC memory controller / industry std / unbuffered / CAS Latency 2.5 (CL2.5)											
Graphics controller (one of following)		<ul style="list-style-type: none"> • Matrox® Millennium G450 DVI-I (see the 6216 sheet for specs) • NVIDIA Quadro4 200NVS (high-perf 2D) / AGP 4X adapter / NV17LT 250MHz GPU / 64MB 166MHz SDRAM / dual 350MHz RAMDACs / dual head: 2048x1536x16M each monitor / LFH60 connector for std cable with two DB-15 analog • ATI Fire GL8800™, 11 (advanced 3D) / AGP 4X adapter / Radeon™ 8800 GPU / 128MB 300MHz DDR-SGRAM / dual RAMDAC [400/165MHz] / dual head support / one DB-15 analog and one DVI-I connector (ships with one DVI-I to DB-15 cable) 											
SCSI disk controller		SCSI model: Adaptec® 29160LP / single channel Wide Ultra160 SCSI (LVD 160MB/sec) / 64-bit 33MHz PCI adapter (in a 32-bit slot) / one channel with up to 15 device support											
SCSI connectors		SCSI models: One 68-pin internal SCSI connector / one 0.8mm VHDCI 68-pin external SCSI connector											
Disk controller		Enhanced IDE / ATA-100 / integrated in I/O Controller Hub / two connectors on planar											
Cables		SCSI models: One 3-drop 16-bit LVD SCSI cable, one 2-drop EIDE cable EIDE models: Two EIDE 80-conductor cables (one 2-drop cable to CD, one 1-drop cable to disk)											
Disk		SCSI models: 18.2GB Ultra160 SCSI / 10000 rpm / 4.9 ms read / S.M.A.R.T. ⁵ EIDE models: 40GB EIDE / ATA-100 / 7200 rpm / 9.0 ms read seek / S.M.A.R.T.											
Diskette / CD-ROM		3.5" 1.44MB diskette drive / 48X-20X ⁶ CD-ROM, bootable							SECURITY <ul style="list-style-type: none"> • Optional U-bolt support via knockout • Cover key lock (on rear) • 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 • Diskette, disk, serial port, parallel port I/O control • Secure access openings • Secure removable media • VPD stored in EEPROM • Write protection control for EEPROM • Barcode labels on most components <ul style="list-style-type: none"> • <i>Maximum internal EIDE disk capacity: 160GB¹³ (2 disks x 80GB 7200 rpm)</i> • <i>Maximum internal SCSI disk capacity: 146.8GB¹³ (2 disks x 73.4GB 10000 rpm)</i> 				
Chipset		Intel 845E chipset / 82845E Memory Controller Hub (MCH) / 82801DB I/O Controller Hub (ICH4) for PCI 2.2 bus, ATA-100 EIDE, ethernet MAC, USB, Low Pin Count Interface / Firmware Hub / SMSC® LPC47M102 Super I/O for diskette, parallel, serial, keyboard, mouse											
Ports		Front: two USB (Ver 2.0); Back: two 9-pin serial, parallel, two USB (Ver 2.0), keyboard, mouse, ethernet, monitor											
Audio		Integrated digital audio / SoundMAX® 3.0 with SPX™ / software-based audio (done by processor and ICH4) / AC '97 interface / Realtec® ALC202 codec / (analog mixing, Analog-to-Digital and Digital-to-Analog conversion)											
Audio connectors		Back: microphone-in (mono), line-in (stereo), line-out (stereo) [all 3.5mm]											
Speakers		One internal speaker for business audio											
Ethernet		10/100/1000 gigabit / Broadcom® BCM 5702 / on planar / PCI 2.2 32-bit 33MHz / full duplex / PHY and MAC layers / Wake on LAN® / Alert Standard Format 1.0											
Security chip		None											
Keyboard / mouse		104-key (rubber dome) keyboard / IBM 3-button mouse											
Cooling fans		Three or four variable spd fans (pwr sup, fansink, rear, SCSI models have 4th fan)											
Power supply		200 watts with variable speed fan / universal / manual switch											
Preload with Windows XP Professional¹⁷		<ul style="list-style-type: none"> • Configuration/Setup Utility invoked by pressing F1 at startup • Product Recovery by pressing F11 at startup • Systems management capabilities: Remote Deployment Manager, IBM Director Agent, System Migration Assistant • Common Information Model (CIM) 2.2 • PC2001-compliant • Advanced Power Management 1.2 • Advanced Configuration and Power Interface (ACPI) 1.0b • System Management BIOS • DMI 2.0-compliant 											
Options		256MB PC2100 CL2.5 ECC DDR UDIMM 10K0067 512MB PC2100 CL2.5 ECC DDR UDIMM 10K0069 1GB PC2100 CL2.5 ECC DDR UDIMM 10K0071 40GB IDE Disk ATA-100 (7200 rpm) 22P7157 60GB IDE Disk ATA-100 (7200 rpm) 09N4207 80GB IDE Disk ATA-100 (7200 rpm) 09N4226 PCI Ultra160 SCSI Adapter 19K4646 36.4GB 10K rpm Ultra160 SCSI Disk 06P5751 73.4GB 10K rpm Ultra160 SCSI Disk 06P5752 40X/12X/40X Max ⁶ CD-RW internal (black) 22P6976 32X/10X/40X/16X Max ^{6,19} CD-RW/DVD-ROM Combo drive (black) 22P6973 IBM DVD-RAM/DVD-R Drive (black) 22P6959 IBM P97 19" (18.0" v.i.s.) Monitor (black) 6551U3N IBM P275 21" (19.8" v.i.s.) Monitor (black) 6652U3N IBM T545 15.1" Flat Panel Monitor (black) 6653HG2 IBM T750 17" Flat Panel Monitor (black) 6657HG2 IBM Wireless keyboard and mouse (black) 22P5170 Spaceball 3D Input Device 33L3252 Other options at ibm.com/pc/us/accessories											
		<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 time ⇒ On site service upgrade options (in eligible locations):⁷ <ul style="list-style-type: none"> • 3yr IOR Mon-Fri 8-5, 4 hr average response (ServicePac® 41L2735) • 3yr IOR 7 day x 24 hr, 4 hr average response (ServicePac 41L2741) • 4yr IOR Mon-Fri 8-5, next business day response (ServicePac 69P9167) • 4yr IOR Mon-Fri 8-5, 4 hr average response (ServicePac 69P9168) • 4yr IOR 7 day x 24 hr, 4 hr average response (ServicePac 69P9169) ⇒ 24x7¹⁴ toll-free support for warranty issues during the warranty period 											

See footnotes for important warranty information
US models announced July 16, 2002

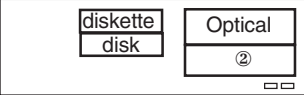
⚡ US models withdrawn effective October 2002; model 45U withdrawn effective April 25, 2003

IBM® Type-model	Processor	L2 cache	FSB MHz	Memory	Disk and rpm	SCSI adapter	CD-ROM	Graphics adapter and memory	Slots x bays	Preload ¹⁷	Available date
6226-50U	Pentium® 4	2.67 512KB	533	256MB	40GB ² 7200	None	CD-ROM	Millennium G450 DVI-I 32MB	4x4	Windows® XP Pro	Nov 02
6226-52U	Pentium 4	2.67 512KB	533	256MB	40GB 7200	None	CD-ROM	Quadro®4 200NVS 64MB	4x4	Windows XP Pro	Nov 02
6226-54U	Pentium 4	2.67 512KB	533	256MB	40GB 7200	None	CD-ROM	Quadro4 580XGL 64MB	4x4	Windows XP Pro	Nov 02
6226-55U	Pentium 4	2.67 512KB	533	256MB	18.2GB 10K	29160LP	CD-ROM	Quadro4 580XGL 64MB	4x4	Windows XP Pro	Nov 02

Positioning Processor	<i>Essential workstation performance</i> Intel® Pentium 4 at 2.67GHz with 533MHz frontside bus (FSB) 512KB std and max / ECC / full speed Processor and L2 cache in FC-PGA2 in mPGA478 socket No SMP support		Full-size Desktop 
L2 cache Implementation SMP support	Memory - std/max 256MB / 2GB¹³ max Memory - sockets Two 184-pin gold-plated DIMM sockets / one socket used Memory - type PC2100 266MHz DDR-SDRAM / Error Checking and Correcting (ECC) DIMMs and ECC memory controller / industry std / unbuffered / CAS Latency 2.5 (CL2.5)		
Graphics controller (one of following)	<ul style="list-style-type: none"> • Matrox® Millennium G450 DVI-I (see the 6216 sheet for specs) • NVIDIA® Quadro4 200NVS (high-perf 2D) / AGP 4X adapter / NV17LT 250MHz GPU / 64MB 166MHz SDRAM / dual 350MHz RAMDACs / dual head: 2048x1536x16M each monitor / LFH60 connector for std cable with two DB-15 analog connectors • NVIDIA Quadro4 580XGL (entry 3D) / AGP 8X adapter / NV18GL 300MHz GPU / 64MB 275MHz DDR-SDRAM / dual 350MHz RAMDACs / dual head: 2048x1536x16M each monitor / LFH60 connector including std cable with two DB-15 analog connectors 		Bay ① 5.25", HH 1.6", access, std CD-ROM Bay ② 5.25", HH 1.6" access, open Bay ③ 3.5", SL 1", access, std diskette Bay ④ 3.5", SL 1", no access, std disk Slot 1: full-length, full-height, 32-bit AGP 4X (1.5v) - used Slot 2: full-length, full-height, 32-bit PCI 2.2 (5v) Slot 3: full-length, full-height, 32-bit PCI 2.2 (5v) Slot 4: full-length, full-height, 32-bit PCI 2.2 (5v) - SCSI in some <ul style="list-style-type: none"> • Stealth black color • 16.7" W X 16.7" D X 5.5" H • 425mm W X 425mm D X 140mm H • 23 to 25 lb (10.46 to 11.36kg) • Bay 1 and 2 in cage flips up (latched and pivoting) • Bay 3 and 4 in cage flips up (latched and pivoting) • Toolless rails for disk mounting • Toolless cover removal; toolless AGP and PCI slots
SCSI disk controller	SCSI model: Adaptec® 29160LP / single channel Wide Ultra160 SCSI (LVD 160MB/sec) / 64-bit 33MHz PCI adapter (in a 32-bit slot) / one channel with up to 15 device support SCSI connectors SCSI model: One 68-pin internal SCSI connector / one 0.8mm VHDCI 68-pin external SCSI connector Disk controller Enhanced IDE / ATA-100 / integrated in I/O Controller Hub / two connectors on planar Cables SCSI model: One 3-drop 16-bit LVD SCSI cable, one 2-drop EIDE cable EIDE models: Two EIDE 80-conductor cables (one 2-drop cable to CD, one 1-drop cable to disk)		SECURITY <ul style="list-style-type: none"> • Optional U-bolt support via knockout • Cover key lock (on rear) • 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 • Diskette, disk, serial port, parallel port I/O control • Secure access openings • Secure removable media • VPD stored in EEPROM • Write protection control for EEPROM • Barcode labels on most components <ul style="list-style-type: none"> • <i>Maximum internal EIDE disk capacity: 160GB¹³ (2 disks x 80GB 7200 rpm)</i> • <i>Maximum internal SCSI disk capacity: 146.8GB¹³ (2 disks x 73.4GB 10000 rpm)</i>
SCSI connectors	Disk controller SCSI model: One 3-drop 16-bit LVD SCSI cable, one 2-drop EIDE cable Cables SCSI model: One 3-drop 16-bit LVD SCSI cable, one 2-drop EIDE cable EIDE models: Two EIDE 80-conductor cables (one 2-drop cable to CD, one 1-drop cable to disk)		
Diskette / CD-ROM	Chipset Intel 845E chipset / 82845E Memory Controller Hub (MCH) / 82801DB I/O Controller Hub (ICH4) for PCI 2.2 bus, ATA-100 EIDE, ethernet MAC, USB, Low Pin Count Interface / Firmware Hub / SMSC® LPC47M102 Super I/O for diskette, parallel, serial, keyboard, mouse		LIMITED WARRANTY³ <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 time ↔ On site service upgrade options (in eligible locations):⁷ <ul style="list-style-type: none"> • 3yr IOR Mon-Fri 8-5, 4 hr average response (ServicePac® 41L2735) • 3yr IOR 7 day x 24 hr, 4 hr average response (ServicePac 41L2741) • 4yr IOR Mon-Fri 8-5, next business day response (ServicePac 69P9167) • 4yr IOR Mon-Fri 8-5, 4 hr average response (ServicePac 69P9168) • 4yr IOR 7 day x 24 hr, 4 hr average response (ServicePac 69P9169) ↔ 24x7¹⁴ toll-free support for warranty issues during the warranty period
Ports	Audio <i>Front:</i> two USB (Ver 2.0); <i>Back:</i> two 9-pin serial, parallel, two USB (Ver 2.0), keyboard, mouse, ethernet, monitor Audio Integrated digital audio / SoundMAX® 3.0 with SPX™ / software-based audio (done by processor and ICH4) / AC '97 interface / Realtek® ALC202 codec / (analog mixing, Analog-to-Digital and Digital-to-Analog conversion) Audio connectors <i>Back:</i> microphone-in (mono), line-in (stereo), line-out (stereo) [all 3.5mm] Speakers One internal speaker for business audio Ethernet 10/100/1000 gigabit / Broadcom® BCM 5702 / on planar / PCI 2.2 32-bit 33MHz / full duplex / PHY and MAC layers / Wake on LAN® / Alert Standard Format 1.0 Security chip None		
Keyboard / mouse	Keyboard / mouse 104-key (rubber dome) keyboard / IBM 3-button mouse Cooling fans Three or four variable spd fans (pwr sup, fansink, rear, SCSI models have 4th fan) Power supply 200 watts with variable speed fan / universal / manual switch		
Preload with Windows XP Professional ¹⁷	Options <ul style="list-style-type: none"> 256MB PC2100 CL2.5 ECC DDR UDIMM 10K0067 512MB PC2100 CL2.5 ECC DDR UDIMM 10K0069 1GB PC2100 CL2.5 ECC DDR UDIMM 10K0071 40GB IDE Disk ATA-100 (7200 rpm) 22P7157 60GB IDE Disk ATA-100 (7200 rpm) 09N4207 80GB IDE Disk ATA-100 (7200 rpm) 09N4226 PCI Ultra160 SCSI Adapter 19K4646 36.4GB 10K rpm Ultra160 SCSI Disk 06P5751 73.4GB 10K rpm Ultra160 SCSI Disk 06P5752 40X/12X/40X Max⁶ CD-RW internal (black) 22P6976 32X/10X/40X/16X Max^{6,19} CD-RW/DVD-ROM Combo drive (black) 22P6973 IBM DVD-RAM/DVD-R Drive (black) 22P6959 IBM P97 19" (18.0" v.i.s.) Monitor (black) 6551U3N IBM P275 21" (19.8" v.i.s.) Monitor (black) 6652U3N IBM T545 15.1" Flat Panel Monitor (black) 6653HG2 IBM T750 17" Flat Panel Monitor (black) 6657HG2 IBM Wireless keyboard and mouse (black) 22P5170 Spaceball 3D Input Device 33L3252 Other options at ibm.com/pc/us/accessories 		
Microsoft® Windows® XP Professional	<ul style="list-style-type: none"> - Lotus® SmartSuite® Millennium license - Lotus Notes® Client license - Disk-to-Disk Recovery (in Service Partition) ◇ Device Drivers and Diagnostics CD-ROM <ul style="list-style-type: none"> • Configuration/Setup Utility invoked by pressing F1 at startup • Product Recovery by pressing F11 at startup • Systems management capabilities: Remote Deployment Manager, IBM Director Agent, System Migration Assistant • Common Information Model (CIM) 2.2 • PC2001-compliant • Advanced Power Management 1.2 • Advanced Configuration and Power Interface (ACPI) 1.0b • System Management BIOS • DMI 2.0-compliant 		

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

IBM® Type-model	Processor	L2 cache	FSB MHz	Memory	Disk and rpm	SCSI adapter	CD-ROM	Graphics adapter and memory	Slots x bays	Preload ¹⁷	Available date
6226-60U	Pentium® 4	2.8	512KB	533	256MB 40GB ²	7200 None	CD-ROM	Millennium G450 DVI-I 32MB	4x4	Windows® XP Pro	Mar 03
6226-63U	Pentium 4	2.8	512KB	533	256MB 40GB	7200 None	CD-ROM	Quadro®4 280NVS 64MB	4x4	Windows XP Pro	Mar 03
6226-64U	Pentium 4	2.8	512KB	533	256MB 40GB	7200 None	CD-ROM	Quadro4 580XGL 64MB	4x4	Windows XP Pro	Mar 03
6226-65U	Pentium 4	2.8	512KB	533	256MB 18.2GB	10K 29160LP	CD-ROM	Quadro4 580XGL 64MB	4x4	Windows XP Pro	Mar 03

Positioning Processor	<i>Essential workstation performance</i> Intel® Pentium 4 at 2.8GHz with 533MHz frontside bus (FSB) 512KB std and max / ECC / full speed Processor and L2 cache in FC-PGA2 in mPGA478 socket No SMP support		Full-size Desktop	
L2 cache	Implementation SMP support			
Memory - std/max	256MB / 2GB ¹³ max		Bay ① 5.25", HH 1.6", access, std CD-ROM Bay ② 5.25", HH 1.6" access, open Bay ③ 3.5", SL 1", access, std diskette Bay ④ 3.5", SL 1", no access, std disk Slot 1: full-length, full-height, 32-bit AGP 4X (1.5v) - used Slot 2: full-length, full-height, 32-bit PCI 2.2 (5v) Slot 3: full-length, full-height, 32-bit PCI 2.2 (5v) Slot 4: full-length, full-height, 32-bit PCI 2.2 (5v) - SCSI in some	
Memory - sockets	Two 184-pin gold-plated DIMM sockets / one socket used		<ul style="list-style-type: none"> Stealth black color 16.7" W X 16.7" D X 5.5" H 425mm W X 425mm D X 140mm H 23 to 25 lb (10.46 to 11.36kg) Bay 1 and 2 in cage flips up (latched and pivoting) Bay 3 and 4 in cage flips up (latched and pivoting) Toolless rails for disk mounting Toolless cover removal; toolless AGP and PCI slots 	
Memory - type	PC2100 266MHz DDR-SDRAM / Error Checking and Correcting (ECC) DIMMs and ECC memory controller / industry std / unbuffered / CAS Latency 2.5 (CL2.5)			
Graphics controller (one of following)	<ul style="list-style-type: none"> Matrox® Millennium G450 DVI-I (see the 6216 sheet for specs) NVIDIA® Quadro4 280NVS (high-perf 2D) / AGP 8X adapter / NV17LT 250MHz GPU / 64MB 200MHz DDR SDRAM / dual 350MHz RAMDACs / dual head: 2048x1536x16M each monitor / LFH60 connector for std cable with two DB-15 analog connectors NVIDIA Quadro4 580XGL (entry 3D) / AGP 8X adapter / NV18GL 300MHz GPU / 64MB 275MHz DDR-SDRAM / dual 350MHz RAMDACs / dual head: 2048x1536x16M each monitor / LFH60 connector including std cable with two DB-15 analog connectors 			
SCSI disk controller	SCSI model: Adaptec® 29160LP / single channel Wide Ultra160 SCSI (LVD 160MB/sec) / 64-bit 33MHz PCI adapter (in a 32-bit slot) / one channel with up to 15 device support			
SCSI connectors	SCSI model: One 68-pin internal SCSI connector / one 0.8mm VHDCI 68-pin external SCSI connector			
Disk controller	Enhanced IDE / ATA-100 / integrated in I/O Controller Hub / two connectors on planar			
Cables	SCSI model: One 3-drop 16-bit LVD SCSI cable, one 2-drop EIDE cable			
Disk	EIDE models: Two EIDE 80-conductor cables (one 2-drop cable to CD, one 1-drop cable to disk)		SECURITY <ul style="list-style-type: none"> Optional U-bolt support via knockout Cover key lock (on rear) 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 Diskette, disk, serial port, parallel port I/O control Secure access openings Secure removable media VPD stored in EEPROM Write protection control for EEPROM Barcode labels on most components 	
	SCSI model: 18.2GB Ultra160 SCSI / 10000 rpm / 4.9 ms read / S.M.A.R.T. ⁵ EIDE models: 40GB EIDE / ATA-100 / 7200 rpm / 9.0 ms read seek / S.M.A.R.T.			
Diskette / CD-ROM	3.5" 1.44MB diskette drive / 48X-20X ⁴ CD-ROM, bootable			
Chipset	Intel 845E chipset / 82845E Memory Controller Hub (MCH) / 82801DB I/O Controller Hub (ICH4) for PCI 2.2 bus, ATA-100 EIDE, ethernet MAC, USB, Low Pin Count Interface / Firmware Hub / SMSC® LPC47M102 Super I/O for diskette, parallel, serial, keyboard, mouse			
Ports	Front: two USB (Ver 2.0); Back: two 9-pin serial, parallel, two USB (Ver 2.0), keyboard, mouse, ethernet, monitor			
Audio	Integrated digital audio / SoundMAX® 3.0 with SPX™ / software-based audio (done by processor and ICH4) / AC '97 interface / Realtek® ALC202 codec / (analog mixing, Analog-to-Digital and Digital-to-Analog conversion)			
Audio connectors	Back: microphone-in (mono), line-in (stereo), line-out (stereo) [all 3.5mm]			
Speakers	One internal speaker for business audio			
Ethernet	10/100/1000 gigabit / Broadcom® BCM 5702 / on planar / PCI 2.2 32-bit 33MHz / full duplex / PHY and MAC layers / Wake on LAN® / Alert Standard Format 1.0			
Security chip	None		<ul style="list-style-type: none"> Maximum internal EIDE disk capacity: 160GB¹³ (2 disks x 80GB 7200 rpm) Maximum internal SCSI disk capacity: 146.8GB¹³ (2 disks x 73.4GB 10000 rpm) 	
Keyboard / mouse	104-key (rubber dome) keyboard / IBM 3-button mouse			
Cooling fans	Three or four variable spd fans (pwr sup, fansink, rear, SCSI models have 4th fan)			
Power supply	200 watts with variable speed fan / universal / manual switch			
Preload with Windows XP Professional¹⁷	Options			
Microsoft® Windows® XP Professional	256MB PC2100 CL2.5 ECC DDR UDIMM 10K0067			
- Lotus® SmartSuite® Millennium license	512MB PC2100 CL2.5 ECC DDR UDIMM 10K0069			
- Lotus Notes® Client license	1GB PC2100 CL2.5 ECC DDR UDIMM 10K0071			
- Disk-to-Disk Recovery (in Service Partition)	40GB IDE Disk ATA-100 (7200 rpm) 22P7157			
◆ Device Drivers and Diagnostics CD-ROM	60GB IDE Disk ATA-100 (7200 rpm) 09N4207			
	80GB IDE Disk ATA-100 (7200 rpm) 09N4226			
	PCI Ultra160 SCSI Adapter 19K4646			
	36.4GB 10K rpm Ultra160 SCSI Disk 06P5751			
	73.4GB 10K rpm Ultra160 SCSI Disk 06P5752			
	48X/24X/48X Max ⁶ CD-RW internal (black) 22P6997			
	48X/24X/48X/16X Max ^{6,19} CD-RW/DVD-ROM Combo drive (black) 22P7031			
	IBM DVD-RAM/DVD-R Drive (black) 22P6959			
	IBM P97 19" (18.0" v.i.s.) Monitor (black) 6551U3N			
	IBM P275 21" (19.8" v.i.s.) Monitor (black) 6652U3N			
	IBM T545 15.1" Flat Panel Monitor (black) 6653HG2			
	IBM T750 17" Flat Panel Monitor (black) 6657HG2			
	IBM Wireless keyboard and mouse (black) 22P5170			
	Spaceball 3D Input Device 33L3252			
	Other options at ibm.com/pc/us/accessories			
	<ul style="list-style-type: none"> Configuration/Setup Utility invoked by pressing F1 at startup Product Recovery by pressing F11 at startup Systems management capabilities: Remote Deployment Manager, IBM Director Agent, System Migration Assistant Common Information Model (CIM) 2.2 PC2001-compliant Advanced Power Management 1.2 Advanced Configuration and Power Interface (ACPI) 1.0b System Management BIOS DMI 2.0-compliant 		<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 time On site service upgrade options (in eligible locations):⁷ <ul style="list-style-type: none"> 3yr IOR Mon-Fri 8-5, 4 hr average response (ServicePac® 41L2735) 3yr IOR 7 day x 24 hr, 4 hr average response (ServicePac 41L2741) 4yr IOR Mon-Fri 8-5, next business day response (ServicePac 69P9167) 4yr IOR Mon-Fri 8-5, 4 hr average response (ServicePac 69P9168) 4yr IOR 7 day x 24 hr, 4 hr average response (ServicePac 69P9169) 24x¹⁴ toll-free support for warranty issues during the warranty period 	

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

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
6219-10U	Pentium®4	2.4	533	256MB	40.0GB ² EIDE	7.2K	EIDE	CD	Millennium G450 DVI-I	32MB	6x7	XP Pro Jan 2003
6219-12U	Pentium 4	2.4	533	256MB	40.0GB EIDE	7.2K	EIDE	CD	Quadro4 280NVS	64MB	6x7	XP Pro Jan 2003
6219-21U	Pentium 4	2.67	533	512MB	36.4GB U320	10K	Ultra320, EIDE	Combo	Millennium G450 DVI-I	32MB	6x7	XP Pro Jan 2003
6219-26U	Pentium 4	2.67	533	512MB	36.4GB U320	10K	Ultra320, EIDE	CD-RW	Quadro4 980XGL	128MB	6x7 1394	XP Pro Jan 2003
6219-32U	Pentium 4	2.8	533	512MB	40.0GB EIDE	7.2K	EIDE	CD	Quadro4 280NVS	64MB	6x7	XP Pro Jan 2003
6219-36U	Pentium 4	2.8	533	512MB	36.4GB U320	10K	Ultra320, EIDE	CD-RW	Quadro4 980XGL	128MB	6x7 1394	XP Pro Jan 2003
6219-37U	Pentium 4	2.8	533	1GB	36.4GB U320	10K	Ultra320, EIDE	CD-RW	Wildcat 4™ 7110	256MB	6x7 1394	XP Pro Jan 2003
6219-42U	Pentium 4	3.06	533	512MB	40.0GB EIDE	7.2K	EIDE	CD	Quadro4 280NVS	64MB	6x7	XP Pro Jan 2003
6219-46U	Pentium 4	3.06	533	512MB	36.4GB U320	10K	Ultra320, EIDE	CD-RW	Quadro4 980XGL	128MB	6x7 1394	XP Pro Jan 2003
6219-47U	Pentium 4	3.06	533	1GB	36.4GB U320	10K	Ultra320, EIDE	CD-RW	Wildcat 4 7110	256MB	6x7 1394	XP Pro Jan 2003
Processor	Intel® Pentium 4 at 2.4B, 2.67, 2.8 or 3.06GHz with 533MHz frontside bus (FSB) / 3.06 supports Hyper-Threading technology											
L2 cache	512KB std and max / at processor speed											
Processor upgrade	No SMP support											
Implementation	Motherboard contains one mPGA478B socket (processor/L2 cache in FC-PGA2), four DIMM sockets, one AGP slot, ethernet controller, three PCI slots, connector for extender board (two PCI slots, some have SCSI controller)											
Memory - std / max	256MB, 512MB or 1GB std / 4GB ¹³ max / two slots used / two slots available / PC2100 266MHz unbuffered 184-pin ECC											
Memory - features	CL2.5 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) DIMMs and memory controller											
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 / NV 18LT 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	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 cable to EIDE disk) 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: 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 E7205 chipset / E7205 MCH (Memory Controller Hub) for AGP 8X slot and ICH4 / I/O Controller Hub (ICH4) for PCI 2.2 bus (five slots and one Mini PCI slot), SCSI (som 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 / Broadcom® BCM5702 or 5705 / full gigabit ethernet MAC and PHY layer functions / chip on planar / PCI-X 64-bit 100MHz (limited to PCI 2.2 32-bit 33MHz) / full duplex / Wake on LAN® / Alert Standard Format 1.0											
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											
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® 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											
	<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", access, open</p> <p>Bay ⑤ 3.5", SL 1", no access, disk</p> <p>Bay ⑥ 3.5", SL 1", no access, open</p> <p>Bay ⑦ 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, 32-bit 33MHz, PCI 2.2 (5v)</p> <p>Slot 3: fullsize, 32-bit 33MHz, PCI 2.2 (5v)</p> <p>Slot 4: fullsize, 32-bit 33MHz, PCI 2.2 (5v)*</p> <p>Slot 5: fullsize, 32-bit 33MHz, PCI 2.2 (5v)*</p> <p>Slot 6: Mini PCI type III - FireWire (some)</p> <p>Slot: fullsize, AGP 8X (1.5v) - used by std AGP graphics adapter * on two-slot extender board</p> </div> <div style="width: 45%;"> <ul style="list-style-type: none"> ➤ 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: 282GB (4 disks x 73.4GB) EIDE: 320GB (3 disks x 80GB) • 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 </div> </div>											
256MB PC2100 CL2.5 ECC DDR-SDRAM	10K0067											
512MB PC2100 CL2.5 ECC DDR-SDRAM	10K0069											
1GB PC2100 CL2.5 ECC DDR-SDRAM DIMM	10K0071											
IBM 36.4GB 15K rpm Ultra160 SCSI HDD	06P5766											
IBM 36.4GB 10K rpm Ultra320 SCSI HDD	32P0723											
IBM 73.4GB 10K rpm Ultra320 SCSI HDD	32P0724											
IBM 80GB 7.2K rpm ATA-100 EIDE HDD	09N4226											
IBM 4Ux20D Tower-to-Rack Conversion Kit	09N4300											
IBM P97 19" (18.0" v.i.s.) Monitor (black)	6551U3N											
IBM T750 17" Flat Panel Monitor (black)	6657HG2											
Other options at ibm.com/pcus/accessories												
	<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>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 ibm.com/services/its/us/source/wamomxeu.pdf ➤ 24x7¹⁴ toll-free support for warranty issues during the warranty period¹ 											

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

⊗ US models withdrawn effective March 25, 2003; model 21U withdrawn effective April 25, 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
6219-22U	Pentium®4	2.67	533	512MB	36.4GB ² U320 10K Ultra320, EIDE	Combo	Millennium G450 DVI-I 32MB	6x7	1394	XP Pro	Mar 2003
6219-23U	Pentium 4	2.67	533	512MB	40.0GB EIDE 7.2K EIDE	CD-RW	Quadro4™ 580XGL 64MB	6x7		XP Pro	Mar 2003
6219-27U	Pentium 4	2.67	533	512MB	36.4GB U320 10K Ultra320, EIDE	CD-RW	Quadro4 980XGL 128MB	6x7	1394	XP Pro	Mar 2003
6219-34U	Pentium 4	2.8	533	512MB	36.4GB U320 10K Ultra320, EIDE	CD-RW	Quadro4 580XGL 64MB	6x7		XP Pro	Mar 2003
6219-35U	Pentium 4	2.8	533	1GB	36.4GB U320 10K Ultra320, EIDE	CD-RW	Quadro FX 1000 128MB	6x7	1394	XP Pro	Apr 2003
6219-38U	Pentium 4	2.8	533	512MB	36.4GB U320 10K Ultra320, EIDE	CD-RW	Quadro4 980XGL 128MB	6x7	1394	XP Pro	Mar 2003
6219-39U	Pentium 4	2.8	533	1GB	36.4GB U320 10K Ultra320, EIDE	CD-RW	Wildcat 4™ 7110 256MB	6x7	1394	XP Pro	Mar 2003
6219-45U	Pentium 4	3.06	533	1GB	36.4GB U320 10K Ultra320, EIDE	CD-RW	Quadro FX 1000 128MB	6x7	1394	XP Pro	Apr 2003
6219-48U	Pentium 4	3.06	533	512MB	36.4GB U320 10K Ultra320, EIDE	CD-RW	Quadro4 980XGL 128MB	6x7	1394	XP Pro	Mar 2003
6219-49U	Pentium 4	3.06	533	1GB	36.4GB U320 10K Ultra320, EIDE	CD-RW	Wildcat 4 7110 256MB	6x7	1394	XP Pro	Mar 2003

Processor **Intel® Pentium 4 at 2.67, 2.8 or 3.06GHz with 533MHz frontside bus (FSB) / 3.06 supports 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 **512MB or 1GB** std / 4GB¹³ max / two slots used / two slots available / **PC2100** 266MHz unbuffered 184-pin ECC CL2.5
 Memory - features 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 / **Error Checking and Correcting (ECC)** DIMMs and memory controller

Graphics controller (one of following) • **Matrox® Millennium G450 DVI-I** (entry 2D) / (see 6219 sheet for specs)
 • **NVIDIA Quadro4™ 580XGL** (entry 3D) / AGP 8X adapter / NV18GL 300MHz GPU / 64MB 275MHz DDR-SDRAM / dual 350MHz RAMDACs / dual head: 2048x1536x16M each monitor / LFH60 conn. including two DB-15 analog conn.
 • **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)
 • **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 **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)

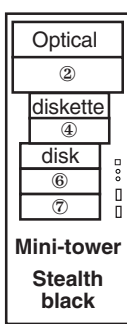
Cables **EIDE models:** Two EIDE cables (one 2-drop cable to CD-ROM, one 2-drop cable to EIDE disk)
SCSI models: One 4-drop 16-bit 68-pin LVD SCSI cable from extender to int disks bays, one 2-drop EIDE cable (to optical)
 Disk - features **Some:** 40.0GB EIDE / ATA-100 / 7200 rpm / 9.0 ms seek; **Some:** 36.4GB Ultra320 SCSI / 10K rpm / 4.7 ms; **All:** S.M.A.R.T.⁵

Rack support 4U¹⁷ rack mount support via tower-to-rack kit option
 Chipset **Intel E7205 chipset** / E7205 MCH (Memory Controller Hub) for AGP 8X slot and ICH4 / I/O Controller Hub (ICH4) for PCI 2.2 bus (five 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 / Broadcom® BCM5702 or 5705 / full gigabit ethernet MAC and PHY layer functions / chip on planar / PCI-X 64-bit 100MHz (limited to PCI 2.2 32-bit 33MHz) / full duplex / Wake on LAN® / Alert Standard Format 1.0
 Diskette drive 3.5" 1.44MB diskette drive
 Optical drive **One of following:** 48X/24X/48X/16X Max^{6,19} CD-RW/DVD-ROM Combo, or 48X/24X/48X Max⁶ CD-RW

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® 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

Slot 1: fullsize, 32-bit 33MHz, PCI 2.2 (5v)
 - N/A on models with Wildcat4 7110 vid
 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: Mini PCI type III - FireWire (some)
 Slot: fullsize, AGP 8X (1.5v)
 - used by std AGP graphics adapter
 * on two-slot extender board

➤ 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: 282GB (4 disks x 73.4GB)
EIDE: 320GB (3 disks x 80GB)
 • 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

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)

- 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 ibm.com/services/its/us/source/wamomxeu.pdf
 - 24x7¹⁴ toll-free support for warranty issues during the warranty period³

256MB PC2100 CL2.5 ECC DDR-SDRAM	10K0067
512MB PC2100 CL2.5 ECC DDR-SDRAM	10K0069
1GB PC2100 CL2.5 ECC DDR-SDRAM DIMM	10K0071
IBM 36.4GB 15K rpm Ultra160 SCSI HDD	06P5766
IBM 36.4GB 10K rpm Ultra320 SCSI HDD	32P0723
IBM 73.4GB 10K rpm Ultra320 SCSI HDD	32P0724
IBM 80GB 7.2K rpm ATA-100 EIDE HDD	09N4226
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-DG3

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

See footnotes for important warranty information
 US models announced March 18, 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
6221-10U	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	2.8	533	512MB	36.4GB U320	10K Ultra320, EIDE	CD	Quadro4 280NVS	64MB	6x6	XP Pro	Dec 2002
6221-36U	1 x Xeon	2.8	533	1GB	36.4GB U320	10K Ultra320, EIDE	CD-RW	Quadro4 980XGL	128MB	6x6 1394	XP Pro	Dec 2002
6221-37U	1 x Xeon	2.8	533	1GB	36.4GB U320	10K Ultra320, EIDE	Combo	Wildcat 4™	7110 10 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)											
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											
	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", no access, disk Bay ⑤ 3.5", SL 1", no access, open Bay ⑥ 3.5", SL 1", no access, open						Slot 1: fullsize, 32-bit 33MHz, PCI 2.2 (5v) - N/A on models with Wildcat4 7110 vid Slot 2: fullsize, 64-bit 100MHz, PCI-X 1.0 Slot 3: fullsize, 64-bit 100MHz, PCI-X 1.0 Slot 4: fullsize, 64-bit 100MHz, PCI-X 1.0* Slot 5: fullsize, 64-bit 100MHz, PCI-X 1.0 Slot 6: Mini PCI type III - FireWire (some) Slot: fullsize, AGP 8X (1.5v) - used by std AGP graphics adapter * Extended slot					
	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)						<ul style="list-style-type: none"> • Maximum internal disk capacity¹³: SCSI: 438GB (3 disks x 146GB) EIDE: 360GB (3 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 					
Preload with Windows XP Professional ¹⁷ 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)												
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 • 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 <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 ibm.com/services/its/us/source/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; others withdrawn effective April 25, 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
6221-38U 1 x Xeon™	2.8B 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	512MB	40.0GB EIDE 7.2K Ultra320, EIDE	CD	Millennium G450 DVI-I 32MBx6	6x6 1394	XP Pro	Apr 2003			
6221-42U 1 x Xeon	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	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	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	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	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	512MB	(none) open-bay	Ultra320, EIDE	None	Quadro4 280NVS 64MB	6x6	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) / <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) <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, 48X/24X/48X Max ⁶ CD-RW or 16X Max ⁶ DVD-ROM										
IEEE 1394(FireWire) Audio	<i>Some</i> : FireWire controller in Mini PCI slot / 1394A, 400Mbps, 6-pin port on rear, 4-pin port on front 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 / <i>some</i> : 6-pin 1394										
Front ports	Two USB (Ver 2.0), audio line out (stereo), mic in / <i>some</i> : 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) - 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) • <i>Maximum internal disk capacity¹³</i>: SCSI: 438GB (3 disks x 146GB) EIDE: 360GB (3 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 - 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>										
	<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 • 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 ibm.com/services/its/us/source/wamomxeu.pdf ➤ 24x7¹⁴ toll-free support for warranty issues during the warranty period¹ 										
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 L200P 20.1inLCD Black A/D	6736-HB31										
IBM T221 22.2inLCD Black Digital	9503-DG3										
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 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	GHz¹	L2 cache	FSB MHz	Memory	Disk	Disk controller	Extender board controllers	PCI slots x bays	Hot-swap disk bays	Ethernet	Available date	
≈ 8480-93X	Celeron®	1.8	128KB	400	256MB	40GB² EIDE	7200 rpm	EIDE	Graphics	5 x 7	None (fixed)	Gigabit	Dec 2002
8480-94X	Celeron	1.8	128KB	400	128MB	40GB EIDE	7200 rpm	EIDE	Graphics	5 x 7	None (fixed)	Gigabit	Feb 2003

Positioning	<i>Value Leader (VL); uniprocessor, entry server designed to meet small business needs and budgets</i>											
Processor(s)	Intel® Celeron at 1.8GHz with 400MHz frontside bus (FSB)											
L2 cache	128KB std and max / ECC / full speed											
Implementation	Motherboard contains one mPGA478 socket (processor/L2 cache in FC-PGA2), two 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 / 2GB¹³ max / two 184-pin gold-plated DIMM sockets / one socket used / PC2100 266MHz ECC DDR-SDRAM / Error Checking and Correcting (ECC) DIMMs and ECC memory controller / industry std / unbuffered / CAS Latency 2.5 (CL2.5)											
SCSI disk controller	None standard											
IDE disk controller	Enhanced IDE / ATA-100 / integrated in I/O Controller Hub / two connectors on planar											
Cables	Two 2-drop EIDE cables (one cable uses one drop to CD-ROM, other cable uses one drop to disk)											
Disk	40GB EIDE / ATA-100 / 7200 rpm / 9.0 ms average read seek / S.M.A.R.T.											
Rack support	4U ⁴ rack mount support via tower-to-rack kit option											
Bus slots (see below)	One PCI bus / five 32-bit 33MHz PCI 2.2 slots / one AGP 4X slot (not used) / no hot-swap Active™ PCI slots											
Chipset	Intel 845E chipset / 82845E Memory Controller Hub (MCH) / 82801DB I/O Controller Hub (ICH4) for PCI 2.2 bus, ATA-100 EIDE, ethernet MAC, USB, Low Pin Count Interface / Firmware Hub / SMSC® LPC47M102 Super I/O for diskette, parallel, serial, keyboard, mouse											
Ethernet	10/100/1000 gigabit / Broadcom® BCM 5702 or 5705 / on planar / PCI 2.2 32-bit 33MHz / full duplex / PHY and MAC layers / Preboot eXecution Environment (PXE) / Wake on LAN® / Alert Standard Format 1.0											
CD-ROM / diskette	CD-ROM: 48X-20X ⁶ CD-ROM, IDE / Diskette: 3.5" 1.44MB diskette drive											
Ports	Front: none; Back: two serial (9-pin), parallel, two USB (Ver 2.0), 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® W83791 / chip on planar / monitors system and processor temperature, fan speed and failure, and voltages / support for optional Remote Supervisor Adapter (provides continuous health monitoring and control)											
Graphics controller	SVGA / ATI® RageXL / on extender board / 4MB SDRAM std/max / PCI 2.2 32-bit 33MHz / analog 15-pin D-Sub conn											
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											
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) / not redundant / not hot-swap / full speed / 340 watts / universal / auto switch /											
Power supply	Automatic Server Restart (ASR) / not hot-swap / no redundancy / cooling fan in power supply (variable spd)											

Slot 1: fullsize, 32-bit 33MHz, PCI 2.2 (5v)	✦ Removable left side panel
Slot 2: fullsize, 32-bit 33MHz, PCI 2.2 (5v)	✦ Configuration/Setup Utility (in flash memory) invoked by pressing F1 at startup
Slot 3: fullsize, 32-bit 33MHz, PCI 2.2 (5v)	✦ Advanced Configuration Power Interface (ACPI) 1.0
Slot 4: fullsize, 32-bit 33MHz, PCI 2.2 (5v)**	✦ Device Drivers and Diagnostics CD-ROM included
Slot 5: fullsize, 32-bit 33MHz, PCI 2.2 (5v)**	✦ Four stabilizing feet
Slot: fullsize, 32-bit AGP 4X (1.5v)	✦ Handle grip on top
** on two-slot PCI extender board	✦ H 18.5" x W 6.5" x D 20.0"
	✦ H 470mm x W 165mm x D 508mm
	✦ 35 to 42 pounds (15.9 to 19.1kg)

CD-ROM	Bay ① 5.25", HH 1.6", access, CD-ROM
②	Bay ② 5.25", HH 1.6", access, open (no disk)
diskette	Bay ③ 3.5", SL 1", access, diskette
④	Bay ④ 3.5", SL 1", access, open
⑤	Bay ⑤ 3.5", SL 1", access, open
⑥	Bay ⑥ 3.5", SL 1", access, open
disk	Bay ⑦ 3.5", SL 1", access, std disk (some)

✦ Metal cage for disk bays 5,6,7 rotate out of chassis for easy access for cabling backplane or working with disks
 ✦ Predictive Failure Analysis on disk(s) with IBM Director can alert the administrator of an imminent component failure

Maximum internal IDE disk capacity:
 240GB¹³ (3 disks x 80GB)

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)
- ✦ 24x7¹⁴ toll-free support for warranty issues during the warranty period³

See footnotes for important warranty information
 US models announced November 19, 2002 and February 18, 2003
 ≈ US models withdrawn effective March 25, 2003
 (X205VL) © IBM Corp. December 2002

IBM® Type-model	Processor	GHz ¹	L2 cache	FSB MHz	Memory	Disk	Disk controller	Extender board controllers	PCI slots x bays	Hot-swap disk bays	Ethernet	Available date
8480-13X	Pentium® 4	1.8	512KB	400	256MB	40GB ² EIDE 7200 rpm	EIDE	Graphics	5 x 7	None (fixed)	Gigabit	Aug 2002
8480-22X	Pentium 4	2.0	512KB	400	256MB	18.2GB Ultra160 10K	Ultra160	Graphics, SCSI	5 x 7	None (fixed)	Gigabit	Aug 2002
8480-2AX	Pentium 4	2.0	512KB	400	256MB	None	Ultra160	Graphics, SCSI	5 x 7	3 hot-swap	Gigabit	Aug 2002
8480-23X	Pentium 4	2.0	512KB	400	256MB	40GB EIDE 7200 rpm	EIDE	Graphics	5 x 7	None (fixed)	Gigabit	Aug 2002
8480-32X	Pentium 4	2.4	512KB	533	256MB	36.4GB Ultra160 10K	Ultra160	Graphics, SCSI	5 x 7	None (fixed)	Gigabit	Aug 2002
8480-3AX	Pentium 4	2.4	512KB	533	256MB	None	Ultra160	Graphics, SCSI	5 x 7	3 hot-swap	Gigabit	Aug 2002
8480-33X	Pentium 4	2.4	512KB	533	256MB	40GB EIDE 7200 rpm	EIDE	Graphics	5 x 7	None (fixed)	Gigabit	Aug 2002

Positioning *An extremely affordable, uni-processor server that delivers value and availability for small and medium businesses*

Processor(s) **Intel® Pentium 4 at 1.8, 2.0, or 2.4GHz with 400 or 533MHz frontside bus (FSB)**

L2 cache **512KB std and max / ECC / full speed**

Implementation Motherboard contains one mPGA478 socket (processor/L2 cache in FC-PGA2), two DIMM sockets, three PCI slots, one AGP slot, ethernet controller, connector for extender board (two PCI slots, graphics controller, some have SCSI controller)

SMP support No SMP support / no processor upgrade

Memory **256MB / 2GB¹³ max / two 184-pin gold-plated DIMM sockets / one socket used / PC2100 266MHz ECC DDR-SDRAM / Error Checking and Correcting (ECC) DIMMs and ECC memory controller / industry std / unbuffered / CAS Latency 2.5 (CL2.5)**

SCSI disk controller *SCSI models: **Adaptec® AHA-7892 / single channel Ultra160 SCSI controller** (160MB/sec) / controller on extender board / 32-bit 33MHz PCI 2.1 / one 68-pin internal connector on extender board / no external SCSI connector*

SCSI connectors Enhanced IDE / ATA-100 / integrated in I/O Controller Hub / two connectors on planar

IDE disk controller *SCSI fixed disk models: one 5-drop 16-bit LVD SCSI cable, one 2-drop EIDE cable*

Cables *SCSI hot-swap models: one 1-drop 16-bit LVD SCSI cable (extender board to SCSI backplane), one 2-drop EIDE cable*

Disk - features *EIDE models: two 2-drop EIDE cables (one cable uses one drop to CD-ROM, other cable uses one drop to disk)*
Some SCSI models: 18.2GB or 36.4GB / Ultra160 SCSI / 10000 rpm / 5.2 ms read seek / S.M.A.R.T.⁵
EIDE models: 40GB EIDE / ATA-100 / 7200 rpm / 9.0 ms read seek / S.M.A.R.T.

Rack support 4U⁴ rack mount support via tower-to-rack kit option

Bus slots (see below) One PCI bus / five 32-bit 33MHz PCI 2.2 slots / one AGP 4X slot (not used) / no hot-swap Active™ PCI slots

Chipset **Intel 845E chipset / 82845E Memory Controller Hub (MCH) / 82801DB I/O Controller Hub (ICH4)** for PCI 2.2 bus, ATA-100 EIDE, ethernet MAC, USB, Low Pin Count Interface / Firmware Hub / SMSC® LPC47M102 Super I/O for diskette, parallel, serial, keyboard, mouse

Ethernet 10/100/1000 gigabit / Broadcom® BCM 5702 / on planar / PCI 2.2 32-bit 33MHz / full duplex / PHY and MAC layers / Preboot eXecution Environment (PXE) / Wake on LAN® / Alert Standard Format 1.0

CD-ROM / diskette *CD-ROM: 48X-20X⁶ CD-ROM, IDE / Diskette: 3.5" 1.44MB diskette drive*

Ports *Front: (none); Back: two serial (9-pin), parallel, two USB (Ver 2.0), 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® W83791 / chip on planar / monitors system and processor temperature, fan speed and failure, and voltages / **support for optional Remote Supervisor Adapter** (provides continuous health monitoring and control)

Graphics controller SVGA / ATI® RageXL / on extender board / 4MB SDRAM std/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 / cover tamper detect switch

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 *Fixed disk models: three fans (fansink, rear, pwr supply)*
Hot-swap models: four fans (fansink, two rear, pwr supply)
All: not redundant / not hot-swap / full speed

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

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: fullsize, 32-bit AGP 4X (1.5v)
 ** on two-slot PCI extender board

Bay ① 5.25", HH 1.6", access, CD-ROM
 Bay ② 5.25", HH 1.6", 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, open
 Bay ⑥ 3.5", SL 1", access, open
 Bay ⑦ 3.5", SL 1", access, std disk (some)

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

- ◇ Removable left side panel
- ◇ Configuration/Setup Utility (in flash memory) invoked by pressing F1 at startup
- ◇ SCSISelect near startup by pressing CTRL+A
- ◇ Adv Config Power Interface (ACPI) 1.0
- ◇ Device Drivers and Diagnostics CD-ROM included
- ◇ Four stabilizing feet
- ◇ Handle grip on top
- ◇ H 18.5" x W 6.5" x D 20.0"
- ◇ H 470mm x W 165mm x D 508mm
- ◇ 35 to 42 pounds (15.9 to 19.1kg)

Maximum internal SCSI disk capacity¹³: 293.6GB (4 disks x 73.4GB)
 Maximum internal IDE disk capacity¹³: 240GB (3 disks x 80GB)

LIMITED WARRANTY³

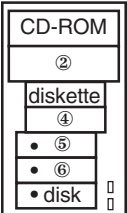
- ⇒ 1 year parts and labor
- ⇒ International Warranty Service³
- ⇒ On site, 8 am-5 pm, Mon-Fri excluding holidays, next business day response time
- ⇒ On site service upgrade options (in eligible locations):⁷
 - 3 year IOR 9x5, NBD response (ServicePac part num 69P9509)
 - 3 year IOR 9x5, 4 hr avg response (ServicePac⁹ part num 69P9510)
 - 3 year IOR 24x7, 4 hr avg response (ServicePac part num 69P9511)
 - 3 year IOR 24x7, 2 hr avg response (ServicePac part num 69P9512)
- ⇒ 24x7¹⁴ toll-free support for warranty issues during the warranty period³

See footnotes for important warranty information
 US models announced August 20, 2002
 • = Hot-swap bays in some models

⊗ = US model 13X withdrawn effective February 28, 2003; others withdrawn effective April 29, 2003

IBM® Type-model	Processor	GHz ¹	L2 cache	FSB MHz	Memory	Disk	Disk controller	Extender board controllers	PCI slots x bays	Hot-swap disk bays	Ethernet	Available date
8480-42X	Pentium® 4	2.67	512KB	533	256MB	36.4GB ² Ultra160 10K	Ultra160	Graphics, SCSI	5 x 7	None (fixed)	Gigabit	Feb 2003
8480-4AX	Pentium 4	2.67	512KB	533	256MB	None	Ultra160	Graphics, SCSI	5 x 7	3 hot-swap	Gigabit	Feb 2003
8480-43X	Pentium 4	2.67	512KB	533	256MB	40GB EIDE 7200 rpm	EIDE	Graphics	5 x 7	None (fixed)	Gigabit	Feb 2003
8480-52X	Pentium 4	2.8	512KB	533	256MB	36.4GB Ultra160 10K	Ultra160	Graphics, SCSI	5 x 7	None (fixed)	Gigabit	Feb 2003
8480-5AX	Pentium 4	2.8	512KB	533	256MB	None	Ultra160	Graphics, SCSI	5 x 7	3 hot-swap	Gigabit	Feb 2003
8480-53X	Pentium 4	2.8	512KB	533	256MB	40GB EIDE 7200 rpm	EIDE	Graphics	5 x 7	None (fixed)	Gigabit	Feb 2003

Positioning	<i>An extremely affordable, uni-processor server that delivers value and availability for small and medium businesses</i>											
Processor(s)	Intel® Pentium 4 at 2.67 or 2.8GHz with 533MHz frontside bus (FSB)											
L2 cache	512KB standard and maximum / ECC / full speed											
Implementation	Systemboard contains one mPGA478 socket (processor/L2 cache in FC-PGA2), two DIMM sockets, three PCI slots, one AGP slot, ethernet controller, connector for extender board (two PCI slots, graphics controller, some have SCSI controller)											
SMP support	No SMP support / no processor upgrade											
Memory	256MB / 2GB¹³ max / two 184-pin gold-plated DIMM sockets / one socket used / PC2100 266MHz ECC DDR-SDRAM / Error Checking and Correcting (ECC) DIMMs and ECC memory controller / industry std / unbuffered / CAS Latency 2.5 (CL2.5)											
SCSI disk controller	<i>SCSI models: Adaptec® AHA-7892 / single channel Ultra160 SCSI controller (160MB/sec) / controller on extender board / 32-bit 33MHz PCI 2.1 / one 68-pin internal connector on extender board / no external SCSI connector</i>											
SCSI connectors	<i>Enhanced IDE / ATA-100 / integrated in I/O Controller Hub / two connectors on planar</i>											
IDE disk controller	<i>SCSI fixed disk models: one 5-drop 16-bit LVD SCSI cable, one 2-drop EIDE cable</i>											
Cables	<i>SCSI hot-swap models: one 1-drop 16-bit LVD SCSI cable (extender board to SCSI backplane), one 2-drop EIDE cable</i>											
Disk - features	<i>EIDE models: two 2-drop EIDE cables (one cable uses one drop to CD-ROM, other cable uses one drop to disk)</i> <i>Some SCSI models: 36.4GB / Ultra160 SCSI / 10000 rpm / 5.2 ms read seek / S.M.A.R.T.⁵</i> <i>EIDE models: 40GB EIDE / ATA-100 / 7200 rpm / 9.0 ms read seek / S.M.A.R.T.</i>											
Rack support	4U ⁴ rack mount support via tower-to-rack kit option											
Bus slots (see below)	One PCI bus / five 32-bit 33MHz PCI 2.2 slots / one AGP 4X slot (not used) / no hot-swap Active™ PCI slots											
Chipset	Intel 845E chipset / 82845E Memory Controller Hub (MCH) / 82801DB I/O Controller Hub (ICH4) for PCI 2.2 bus, ATA-100 EIDE, ethernet MAC, USB, Low Pin Count Interface / Firmware Hub / SMSC® LPC47M102 Super I/O for diskette, parallel, serial, keyboard, mouse											
Ethernet	10/100/1000 gigabit / Broadcom® BCM 5702 / on planar / PCI 2.2 32-bit 33MHz / full duplex / PHY and MAC layers / Preboot eXecution Environment (PXE) / Wake on LAN® / Alert Standard Format 1.0											
CD-ROM / diskette	<i>CD-ROM: 48X-20X⁶ CD-ROM, IDE / Diskette: 3.5" 1.44MB diskette drive</i>											
Ports	<i>Front: (none); Back: two serial (9-pin), parallel, two USB (Ver 2.0), keyboard, mouse, ethernet (RJ-45), monitor (analog DB-15), microphone-in (mono), line-in (stereo), line-out (stereo)</i>											
Diagnostics	Diagnostic LEDs / error LEDs for fans and memory / server diagnostic programs stored on IBM Enhanced Diagnostics CD											
Systems mgmt cntrl	Winbond® W83791 / chip on planar / monitors system and processor temperature, fan speed and failure, and voltages / support for optional Remote Supervisor Adapter (provides continuous health monitoring and control)											
Graphics controller	SVGA / ATI® RageXL / on extender board / 4MB SDRAM std/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 / cover tamper detect switch											
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	<i>Fixed disk models: three fans (fansink, rear, pwr supply)</i> <i>Hot-swap models: four fans (fansink, two rear, pwr supply)</i> <i>All: not redundant / not hot-swap / full speed</i>											
Power supply	340 watts / universal / auto switch / Automatic Server Restart (ASR) / not hot-swap / no redundancy / cooling fan in power supply (variable spd)											

Slot 1: fullsize, 32-bit 33MHz, PCI 2.2 (5v)	✦ Removable left side panel	<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 excluding holidays, next business day response time ➤ On site service upgrade options (in eligible locations):⁷ <ul style="list-style-type: none"> • 3 year IOR 9x5, NBD response (ServicePac part num 69P9509) • 3 year IOR 9x5, 4 hr avg response (ServicePac® part num 69P9510) • 3 year IOR 24x7, 4 hr avg response (ServicePac part num 69P9511) • 3 year IOR 24x7, 2 hr avg response (ServicePac part num 69P9512) ➤ 24x7¹⁴ toll-free support for warranty issues during the warranty period³
Slot 2: fullsize, 32-bit 33MHz, PCI 2.2 (5v)	✦ Configuration/Setup Utility (in flash memory) invoked by pressing F1 at startup	
Slot 3: fullsize, 32-bit 33MHz, PCI 2.2 (5v)	✦ SCSISelect near startup by pressing CTRL+A	
Slot 4: fullsize, 32-bit 33MHz, PCI 2.2 (5v)**	✦ Adv Config Power Interface (ACPI) 1.0	
Slot 5: fullsize, 32-bit 33MHz, PCI 2.2 (5v)**	✦ Device Drivers and Diagnostics CD-ROM included	
Slot: fullsize, 32-bit AGP 4X (1.5v)	✦ Four stabilizing feet	
** on two-slot PCI extender board	✦ Handle grip on top	
	✦ H 18.5" x W 6.5" x D 20.0"	
	✦ H 470mm x W 165mm x D 508mm	
	✦ 35 to 42 pounds (15.9 to 19.1kg)	
 <p>Bay ① 5.25", HH 1.6", access, CD-ROM</p> <p>Bay ② 5.25", HH 1.6", access, open (no disk)</p> <p>Bay ③ 3.5", SL 1", access, diskette</p> <p>Bay ④ 3.5", SL 1", access, open</p> <p>Bay ⑤ 3.5", SL 1", access, open</p> <p>Bay ⑥ 3.5", SL 1", access, open</p> <p>Bay ⑦ 3.5", SL 1", access, std disk (some)</p> <p>✦ Fixed disk models: metal cage for disk bays 5,6,7 rotate out of chassis for easy access for cabling backplane or working with disks</p> <p>✦ Predictive Failure Analysis on disk(s) with IBM Director can alert the administrator of an imminent component failure</p>	<p>Maximum internal SCSI disk capacity¹³: 293.6GB (4 disks x 73.4GB)</p> <p>Maximum internal IDE disk capacity¹³: 240GB (3 disks x 80GB)</p>	

See footnotes for important warranty information

US models announced February 18, 2003

• = Hot-swap bays in some models

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
8647-22X	1 x Xeon™	2.0	512KB	400	256MB	36.4GB² Ultra320 10K	Ultra320	None (4 fixed)	6 x 7	One fixed	Gigabit	Dec 2002
8647-2AX	1 x Xeon	2.0	512KB	400	512MB	None (open)	Ultra320	6 hot-swap	6 x 9	One fixed	Gigabit	Dec 2002
8647-32X	1 x Xeon	2.4B	512KB	533	256MB	36.4GB Ultra320 10K	Ultra320	None (4 fixed)	6 x 7	One fixed	Gigabit	Dec 2002
8647-3AX	1 x Xeon	2.4B	512KB	533	512MB	None (open)	Ultra320	6 hot-swap	6 x 9	One fixed	Gigabit	Dec 2002
8647-3BX	1 x Xeon	2.4B	512KB	533	512MB	None (open)	Ultra320	6 hot-swap	6 x 9	Two redundant	Gigabit	Dec 2002

Positioning Performance and data protection at an affordable price
Processor(s) 1 x Intel® Xeon at 2.0 or 2.4B GHz with 400 or 533MHz frontside bus (FSB)
SMP - L2 cache Implementation 2-way SMP / up to two Xeon Processors (same speed/cache size) / 512KB std and max / at processor speed
 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 256MB or 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)

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)

SCSI channels and cables 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 32P8164 from systemboard to rear external 68-pin connector
Cables One SCSI cable (listed above), one 2-drop EIDE cable (to CD-ROM)
Disk - features 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 CD-ROM: 48X-20X⁶ CD-ROM, IDE / Diskette: 3.5" 1.44MB diskette drive
Ports 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 (provides continuous health monitoring and control)

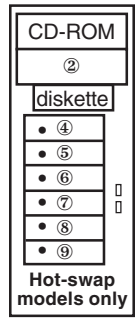
Graphics controller SVGA / ATI® RageXL / on Mini PCI adapter / 8MB SDRAM std and max / PCI 2.2 32-bit 33MHz / analog 15-pin D-Sub conn

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)
 Xeon DP 2.0GHz/400/512KB L2 Cache Proc Upg 59P5112
 Xeon DP 2.4B GHz/533/512KB L2 Cache Proc Upg 59P5108
 256MB PC2100 CL2.5 ECC DDR-SDRAM 33L5037
 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

Software ServerGuide™ (CD-based automated network OS installation and configuration tool), IBM Director (system hardware mgmt software) and many utilities
 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 (PCI adapter) 09N7585
 IBM 4U Extended Depth Tower-to-Rack Kit 59P4817
 IBM ServeRAID-5i Controller (adapter for Slot 4) 25P3492
 IBM T541 15" Flat Panel Color Monitor (black) 9512AB1
 Other options at ibm.com/pc/us/accessories

Keyboard / mouse IBM 101 key keyboard / IBM mouse (both black, 6-pin PS/2)
Cooling fans Four / three for processor(s), memory, and disk bays / one power supply cage fan (even in dual power supply model)
 All: not redundant / not hot-swap / all variable speed
Power supply(s) Some: one 425 watt std and max / not hot-swap
 3BX: two 350 watt std and max / hot-swap / redundant
 All: universal / voltage-sensing / Automatic Server Restart (ASR) / cooling fan in power supply(s) (variable spd)

Slot 1: fullsize, 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 2AX, 3AX, and 3BX:
 Six bays ④ to ⑨ 3.5", SL 1", access, hot-swp
Fixed disk models 22X and 32X:
 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
Maximum internal SCSI disk capacity¹³:
 Fixed: 584GB (4 disks x 146GB)
 Hot-swap: 876GB (6 disks x 146GB)

- ◆ 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), memory, processors, VRMs, and fans with IBM Director can alert the administrator of an imminent componet failure

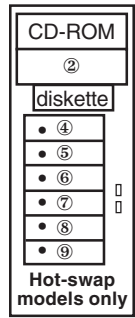
LIMITED WARRANTY³

- ⇒ 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 69P9509)
 - 3 year IOR 9x5, 4 hr avg response (ServicePac part num 69P9510)
 - 3 year IOR 24x7, 4 hr avg response (ServicePac part num 69P9511)
 - 3 year IOR 24x7, 2 hr avg response (ServicePac part num 69P9512)
- ⇒ 24x7¹⁴ toll-free support for warranty issues during the warranty period³

See footnotes for important warranty information
 US models announced November 19, 2002
 • = Hot-swap bays in some models

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
8647-42X	1 x Xeon™	2.67	512KB	533	256MB	36.4GB² Ultra320 10K	Ultra320	None (4 fixed)	6 x 7	One fixed	Gigabit	Feb 2003
8647-4AX	1 x Xeon	2.67	512KB	533	512MB	None (open-bay)	Ultra320	6 hot-swap	6 x 9	One fixed	Gigabit	Feb 2003
8647-4BX	1 x Xeon	2.67	512KB	533	512MB	None (open-bay)	Ultra320	6 hot-swap	6 x 9	Two redundant	Gigabit	Feb 2003
8647-52X	1 x Xeon	2.8B	512KB	533	256MB	36.4GB Ultra320 10K	Ultra320	None (4 fixed)	6 x 7	One fixed	Gigabit	Feb 2003
8647-5AX	1 x Xeon	2.8B	512KB	533	512MB	None (open-bay)	Ultra320	6 hot-swap	6 x 9	One fixed	Gigabit	Feb 2003
8647-5BX	1 x Xeon	2.8B	512KB	533	512MB	None (open-bay)	Ultra320	6 hot-swap	6 x 9	Two redundant	Gigabit	Feb 2003
Processor(s) SMP - L2 Cache Implementation	1 x Intel® Xeon at 2.67 or 2.8B GHz with 533MHz frontside bus (FSB) 2-way SMP / up to two Xeon Processors (same speed/cache size) / 512KB std and max / at processor speed 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	256MB or 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)											
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) / <i>Internal channel:</i> Fixed disk models: one 4-drop 16-bit 68-pin LVD SCSI cable from systemboard to internal disks bays; <i>Hot-swap models:</i> one 1-drop 16-bit 68-pin LVD SCSI cable to 6-bay backplane; <i>External channel:</i> cable available as option pn 32P8164 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											
Disk - features	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 Mini 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	CD-ROM: 48X-20X⁶ CD-ROM, IDE / <i>Diskette:</i> 3.5" 1.44MB diskette drive <i>Front:</i> two USB (Ver 2.0); <i>Back:</i> 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)											
Ports	Diagnostic LEDs / error LEDs for fans and memory / server diagnostic programs stored on IBM Enhanced Diagnostics CD											
Diagnostics	Winbond® W791D / chip on planar / monitors system and processor temperature, fan speed and failure, and voltages / support for optional Remote Supervisor Adapter (provides continuous health monitoring and control)											
Systems mgmt cntrl	support for optional Remote Supervisor Adapter (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	Four / three for processor(s), memory, and disk bays / one power supply cage fan (even in dual power supply model) All: not redundant / not hot-swap / all variable speed											
Power supply(s)	Some: one 425 watt std and max / not hot-swap 3BX: two 350 watt std and max / hot-swap / redundant All: universal / voltage-sensing / Automatic Server Restart (ASR) / cooling fan in power supply(s) (variable spd)											

- Slot 1: fullsize, 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 4AX, 4BX, 5AX, and 5BX:
- Six bays ④ to ⑨ 3.5", SL 1", access, hot-swap
- Fixed disk models 42X and 52X:
- 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
- Maximum internal SCSI disk capacity¹³:
- Fixed: 584GB (4 disks x 146GB)
- Hot-swap: 876GB (6 disks x 146GB)

- ◆ 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), memory, processors, VRMs, and fans 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 69P9509)
 - 3 year IOR 9x5, 4 hr avg response (ServicePac part num 69P9510)
 - 3 year IOR 24x7, 4 hr avg response (ServicePac part num 69P9511)
 - 3 year IOR 24x7, 2 hr avg response (ServicePac part num 69P9512)
- ⇒ 24x7¹⁴ toll-free support for warranty issues during the warranty period³

See footnotes for important warranty information
 US models announced February 18, 2003
 • = Hot-swap bays in some models

IBM® Type-model	Qty x Processor	L2 cache	Memory	Memory type	Disk	SCSI controller	Mechanical	Slots x bays (hot-swap bays)	Power supply	Ethernet	Available date
8671-11X	1 x Xeon® 1.8GHz ¹	512KB	256MB	ECC	None	2 x Ultra320	Tower 6x10	(6 hot-swap std; 9 max)	1 fixed	Gigabit	Jun 2002
8671-1AX	1 x Xeon 1.8GHz	512KB	512MB	Chipkill™	None	2 x Ultra320	Tower 6x10	(6 hot-swap std; 9 max)	2 hot-swap	Gigabit	Jun 2002
8671-21X	1 x Xeon 2.0GHz	512KB	256MB	ECC	None	2 x Ultra320	Tower 6x10	(6 hot-swap std; 9 max)	1 fixed	Gigabit	Jun 2002
8671-2AX	1 x Xeon 2.0GHz	512KB	512MB	Chipkill	None	2 x Ultra320	Tower 6x10	(6 hot-swap std; 9 max)	2 hot-swap	Gigabit	Jun 2002
8671-31X	1 x Xeon 2.2GHz	512KB	256MB	ECC	None	2 x Ultra320	Tower 6x10	(6 hot-swap std; 9 max)	1 fixed	Gigabit	Jun 2002
8671-3AX	1 x Xeon 2.2GHz	512KB	512MB	Chipkill	None	2 x Ultra320	Tower 6x10	(6 hot-swap std; 9 max)	2 hot-swap	Gigabit	Jun 2002
8671-41X	1 x Xeon 2.4GHz	512KB	256MB	ECC	None	2 x Ultra320	Tower 6x10	(6 hot-swap std; 9 max)	1 fixed	Gigabit	Jun 2002
8671-4AX	1 x Xeon 2.4GHz	512KB	512MB	Chipkill	None	2 x Ultra320	Tower 6x10	(6 hot-swap std; 9 max)	2 hot-swap	Gigabit	Jun 2002

Positioning Universal server; two-way server using the Xeon DP processor to provide power and performance at an affordable price
Processor(s) 1 x Intel® Xeon™ Processor 1.8, 2.0, 2.2 or 2.4GHz with 400MHz 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 DP (same speed/cache size)
Implementation 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 256 or 512MB std / 12GB¹³ 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 / 256MB models: **Error Checking and Correcting (ECC)** / corrects single-bit errors and detects 2-bit errors / 512MB models: **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 requires all 256MB or higher x4 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™-5i 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-20X® 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, 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 sup / 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 x1X: std: one 560 watt / not hot-swap or redundant max: two 560 watt with optional Upgrade Kit 33P2753
 xAX: std: two 560W / hot-swap / redundant

Fans All: voltage-sensing / auto-restart / fan in each power supply
 Four fans and two blowers / variable speed / hot-swap / redundant / PFA / fan in each power supply

Xeon DP 1.8GHz/512KB L2 Cache Proc Upg	19K4642
Xeon DP 2.0GHz/512KB L2 Cache Proc Upg	33P2931
Xeon DP 2.2GHz/512KB L2 Cache Proc Upg	33P2932
Xeon DP 2.4GHz/512KB L2 Cache Proc Upg	37L3533
256MB PC2100 CL2.5 ECC DDR-SDRAM DIMM	33L5037
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-5i Controller (adapter for slot 4)	25P3492
IBM Remote Supervisor Adapter (PCI adapter)	09N7585
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 Power Upgrade Kit (two supplies)	33P2753
5Ux24D Tower-to-Rack Conversion Kit III	59P4211
Other options at ibm.com/pc/us/accessories	

<p>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</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 ➤ LSI Logic Configuration Utility near startup by pressing CTRL+C ➤ Diagnostics (PC-Doctor™) by pressing F2 at startup ➤ ACPI 2.0-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>All models: Max int disk capacity: 660.6GB² with nine 73.4GB SL disks with 3-Pack Ultra160 Hot-Swap Expansion Kit</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 ➤ 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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See footnotes for important warranty information • = Hot-swap (X235) © IBM Corp. July 2002
 US models announced June 11, 2002
 < = Models withdrawn from marketing effective January or March 25, 2003; models 21X and 2AX withdrawn effective April 29, 2003

IBM® Type-model	Qty x Processor	L2 cache	FSB MHz	Memory	Disk	SCSI controller	Mechanical	Slots x bays (hot-swap bays)	Power supply	Ethernet	Available date
8671-61X	1 x Xeon® 2.67GHz ¹	512KB	533Mhz	512MB	None	2 x Ultra320	Tower	6x10 (6 hot-swap std; 9 max)	1 fixed	Gigabit	Mar 2003
8671-6AX	1 x Xeon 2.67GHz	512KB	533Mhz	512MB	None	2 x Ultra320	Tower	6x10 (6 hot-swap std; 9 max)	2 hot-swp	Gigabit	Mar 2003
8671-71X	1 x Xeon 2.8BGHz	512KB	533Mhz	512MB	None	2 x Ultra320	Tower	6x10 (6 hot-swap std; 9 max)	1 fixed	Gigabit	Mar 2003
8671-7AX	1 x Xeon 2.8BGHz	512KB	533Mhz	512MB	None	2 x Ultra320	Tower	6x10 (6 hot-swap std; 9 max)	2 hot-swp	Gigabit	Mar 2003

Positioning *Universal server; two-way server using the Xeon processor to provide power and performance at an affordable price*
Processor(s) **1 x Intel® Xeon™ Processor 2.67 or 2.8BGHz** 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, six memory gold-connector DIMM slots, six PCI slots (two hot-swap Active™ PCI slots), and integrated SCSI, ethernet, graphics

Memory **512MB** std / 12GB¹³ 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)** 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 requires all 256MB or higher x4 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™-5i 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-20X® 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

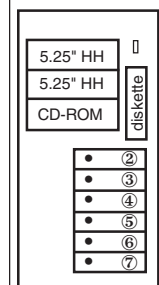
Security Power-on password / administrator password / hinged and lockable front door to cover disk bays, power button, and reset button / unattended boot / selectable boot

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

Xeon 2.67GHz/512KB L2 Cache Proc Upg	71P8966
Xeon 2.8BGHz/512KB L2 Cache Proc Upg	71P8967
128MB PC2100 CL2.5 ECC DDR-SDRAM DIMM	33L5036
256MB PC2100 CL2.5 ECC DDR-SDRAM DIMM	33L5037
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-5i Controller (adapter for slot 4)	25P3492
IBM Remote Supervisor Adapter (PCI adapter)	09N7585
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
5Ux24D Tower-to-Rack Conversion Kit III	59P4211
Other options at ibm.com/pc/us/accessories	
*02R1874 is not backward compatible with 400Mhz FSB x235	

Keyboard / mouse IBM 101-key keyboard / IBM mouse (both black)
Power supply x1X: std: one 560 watt / not hot-swap or redundant
 max: two 560 watt with optional Upgrade Kit 02R1874
 xAX: std: two 560W / hot-swap / redundant
All: voltage-sensing / auto-restart / fan in each power supp
Fans Four fans and two blowers / variable speed / hot-swap / redundant / PFA / fan in each power supply

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



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
 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

- 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
- ACPI 2.0-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: 660.6GB² with nine 73.4GB 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**

See footnotes for important warranty information
 US models announced February 18, 2003

• = Hot-swap

IBM® Type-model	Qty x Processor	L3 cache	Memory	ECC memory features	Disk	SCSI controller	Mechanical	Slots x bays	Hot-swap disk bays (std/max)	Ethernet	Available date
8685-41X	1 x Xeon™ MP 1.5GHz	1MB	512MB	Hot Spare/Chipkill™	None	2 x Ultra160	Tower	7 x10 (16 bays max)	6/12	Gigabit	Nov 2002
8685-4RX	1 x Xeon MP 1.5GHz	1MB	512MB	Hot Spare/Chipkill	None	2 x Ultra160	7U ⁴ rack	7 x10 (16 bays max)	6/12	Gigabit	Nov 2002
8685-51X	1 x Xeon MP 1.9GHz	1MB	1GB	Hot Spare/Chipkill	None	2 x Ultra160	Tower	7 x10 (16 bays max)	6/12	Gigabit	Nov 2002
8685-5RX	1 x Xeon MP 1.9GHz	1MB	1GB	Hot Spare/Chipkill	None	2 x Ultra160	7U rack	7 x10 (16 bays max)	6/12	Gigabit	Nov 2002
8685-61X	1 x Xeon MP 2.0GHz	2MB	1GB	Hot Spare/Chipkill	None	2 x Ultra160	Tower	7 x10 (16 bays max)	6/12	Gigabit	Nov 2002
8685-6RX	1 x Xeon MP 2.0GHz	2MB	1GB	Hot Spare/Chipkill	None	2 x Ultra160	7U rack	7 x10 (16 bays max)	6/12	Gigabit	Nov 2002

Positioning Processors	Intel Xeon Processor MP system loaded with X-Architecture™ high availability features like Hot Spare Memory technology											
L2 cache	1 x Intel® Xeon™ Processor MP 1.5, 1.9, or 2.0GHz ¹ with 400MHz frontside bus / Hyper-Threading technology											
L3 cache	512KB / on die of processor / at processor speed											
Processor upgrade Implementation	1MB or 2MB / on die of processor / at processor speed											
Memory	4-way SMP / up to four Xeon Processors MP (same speed/cache size)											
SCSI disk controller	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											
SCSI connectors	Adaptec® AIC-7899 / Wide Ultra160 SCSI (LVD 160MB/sec) / two channel / 64-bit 66MHz PCI 2.2 / integrated on planar 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 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 Rack / conversion Architecture / chipset	EIA 19" rack (7U ⁴) or tower / tower models have hinged and lockable front door, side panels, casters Rack systems supported in IBM NetBAY™ racks / kit available to convert tower to rack (use NetBAY11 for rack to tower) 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)											
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											
	256MB PC1600 ECC DDR SDRAM RDIMM						33L3281					
	512MB PC1600 ECC DDR SDRAM RDIMM						33L3283					
	1GB PC1600 ECC DDR SDRAM RDIMM						33L3285					
	Xeon MP 1.5GHz/1MB L3 Cache Proc Upg						59P6815					
	Xeon MP 1.9GHz/1MB L3 Cache Proc Upg						59P6816					
	Xeon MP 2.0GHz/2MB L3 Cache Proc Upg						59P6817					
	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						37L6889					
	IBM 36.4GB 15K Ultra160 SCSI Hot-Swap SL						06P5768					
	IBM 73.4GB 10K Ultra160 SCSI Hot-Swap SL						06P5756					
	IBM Remote Supervisor Adapter (PCI adapter)						09N7585					
	IBM T541 15" Flat Panel Color Monitor (black)						9512AB1					
	Other options at ibm.com/pc/us/accessories											

<p>↻ Tower dim: H15.5" x W17.6" x D29.8"; 104 to 150 lb</p> <p>↻ Rack dim: H12.0" x W17.6" x D27.7"; 104 to 150 lb</p> <p>Bay ① 3.5", SL 1", access, diskette</p> <p>Bay ② 5.25", HH 1.6" access, CD-ROM</p> <p>Bay ③ 5.25", HH 1.6" access, open*</p> <p>Bay ④ 5.25", HH 1.6" access, open*</p> <p>Bays 5 to 10 (six bays): standard 3.5" SL 1" hot-swap disk bays</p> <p>Bays 11 to 16 (six bays): optional 3.5" SL 1" hot-swap disk bays</p>	<p>Slot 1: 32-bit 33MHz 5v PCI, not hot-swap, Bus A; primarily for optional Remote Supervisor Adp</p> <p>Slot 2: full, 64-bit 100MHz 3.3v PCI-X, hot-swap, Bus B</p> <p>Slot 3: full, 64-bit 100MHz 3.3v PCI-X, hot-swap, Bus B</p> <p>Slot 4: full, 64-bit 100MHz 3.3v PCI-X, hot-swap, Bus C</p> <p>Slot 5: full, 64-bit 100MHz 3.3v PCI-X, hot-swap, Bus C</p> <p>Slot 6: full, 64-bit 100MHz 3.3v PCI-X, hot-swap, Bus D</p> <p>Slot 7: full, 64-bit 100MHz 3.3v PCI-X, hot-swap, Bus D</p> <p>↻ Setup Program is available by pressing F1 at startup; Diagnostics (PC-Doctor) by pressing F2 at startup; CTRL+A for SCSISelect Utility</p> <p>↻ Removeable top cover</p> <p>↻ Access adapters, memory, CPUs from top</p> <p>↻ 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> <p>↻ 3 year parts and labor</p> <p>↻ International Warranty Service³</p> <p>↻ On site, 8 am-5 pm, Mon-Fri coverage excluding holidays, next business day response time⁷</p> <p>↻ On site service upgrade options (in eligible locations):⁷</p> <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) • Other ServicePac options at ibm.com/services/its/us/source/wamomxeu.pdf <p>↻ 24x7¹⁴ toll-free support for warranty issues during the warranty period³</p>
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See footnotes for important warranty information

• = Hot-swap

US models announced November 5, 2002

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	
8673-92X	Pentium® 4	1.8GHz	512KB	400	256MB	ECC	40GB ² EIDE	ATA-100	2 fixed	1U ⁴ rack	2x4	2 x Gigabit	1 year	Aug 2002
8673-12X	Pentium 4	2.0GHz	512KB	400	256MB	ECC	40GB EIDE	ATA-100	2 fixed	1U rack	2x4	2 x Gigabit	1 year	Aug 2002
8673-13X	Pentium 4	2.0GHz	512KB	400	256MB	ECC	18.2GB SCSI	Ultra160	2 fixed	1U rack	2x4	2 x Gigabit	1 year	Aug 2002
8673-42X	Pentium 4	2.4GHz	512KB	533	256MB	ECC	40GB EIDE	ATA-100	2 fixed	1U rack	2x4	2 x Gigabit	1 year	Oct 2002
8673-43X	Pentium 4	2.4GHz	512KB	533	256MB	ECC	18.2GB SCSI	Ultra160	2 fixed	1U rack	2x4	2 x Gigabit	1 year	Oct 2002
8673-62X	Pentium 4	2.67GHz	512KB	533	256MB	ECC	40GB EIDE	ATA-100	2 fixed	1U rack	2x4	2 x Gigabit	1 year	Oct 2002
8673-63X	Pentium 4	2.67GHz	512KB	533	256MB	ECC	18.2GB SCSI	Ultra160	2 fixed	1U rack	2x4	2 x Gigabit	1 year	Oct 2002

Positioning A highly affordable, uni-processor, 1U rack-optimized server
Processor(s) Intel® Pentium 4 at 1.8 or 2.0GHz¹ with 400MHz frontside bus (FSB) or 2.4 or 2.67GHz 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 max¹³ / 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 SCSI models: 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 On adapter: one 68-pin SCSI connector / one 0.8mm VHDCI 68-pin external connector
IDE disk controller Enhanced IDE busmaster / ATA-100 support / two connectors on systemboard
Cables SCSI models: one 2-drop 16-bit LVD SCSI cable, one 1-drop 40-conductor EIDE cable (connected to CD-ROM)
Disk - features EIDE models: one 2-drop EIDE cable (to CD-ROM and disk), one 1-drop EIDE cable (to second disk bay)
 SCSI: 18.2GB Ultra160 SCSI, 10K rpm, 5.2ms read seek; EIDE: 40GB ATA-100, 7200 rpm, 8.7ms read; All: S.M.A.R.T.⁵

Mechanical Architecture / chipsets EIA 19" Rack (1U⁴) / 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

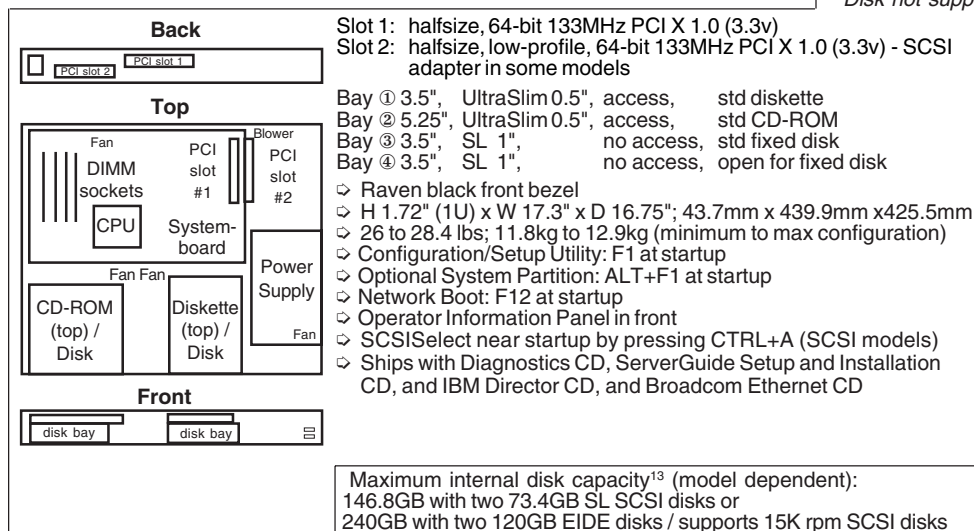
Ethernet controllers Two gigabit 10/100/1000 ethernet ports / Broadcom® BCM5703 / two full gigabit ethernet MAC and PHY layer functions / on planar / PCI-X 64-bit 100MHz Bus B / full duplex / PXE / Wake on LAN® / Alert Standard Format 1.0 / two rear RJ-45 ports
CD-ROM / diskette 24X-10X⁶ CD-ROM / IDE; 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
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 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 DIMM 33L5037
 - 512MB PC2100 CL2.5 ECC DDR-SDRAM DIMM 33L5038
 - 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
- * Disk not supported in all x305 systems



LIMITED WARRANTY³

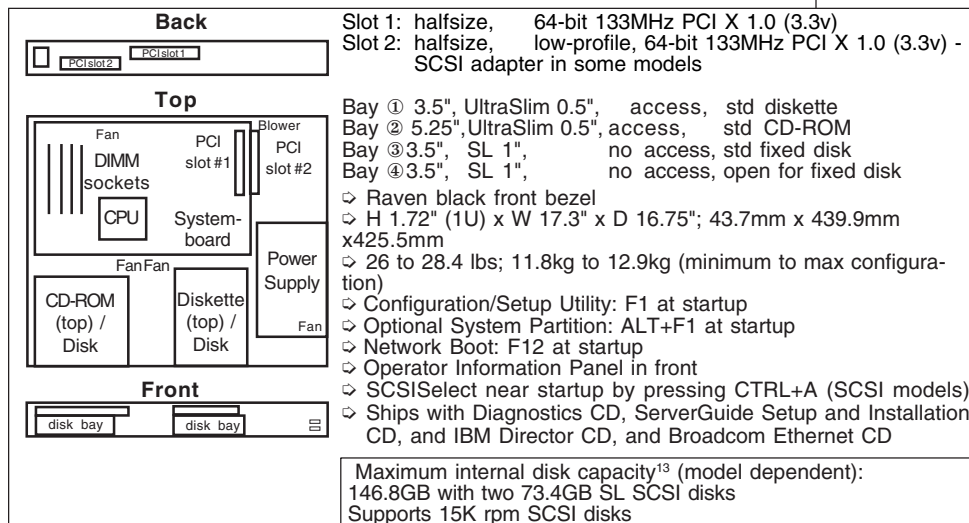
- ⊕ 1 year parts and labor
- ⊕ International Warranty Service³
- ⊕ On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time⁷
- ⊕ On site service upgrade options (in eligible locations):⁷
 - 3 year IOR 9x5, NBD avg response (ServicePac® part num 69P9505)
 - 3 year IOR 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)
- ⊕ 24x7¹⁴ toll-free support for warranty issues during the warranty period³

See footnotes for important warranty information (X305) © IBM Corp. December 2002
¹ US models announced October 15, 2002; previous models on August 20, 2002
² US models withdrawn effective February 28, 2003

IBM® Type-model	Processor	Memory	Disk	Disk controller	Mechanical	Slots x bays	Hot-swap disk bays	Ethernet	Power supply	Available date
8673-4AX	Pentium 4® 2.4Ghz ¹	256MB	36.4GB ²	Ultra 160	1U ⁴ rack	2 slots x 4 bays	None	2 x Gigabit	DC power	Mar 2003

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

Positioning	<i>A compact yet expandable ultra-thin 1U server that is remarkably affordable</i>									
Processor	Intel® Pentium 4 2.4Ghz with 533MHz frontside bus									
L2 cache	512KB / on die of processor / at processor speed (no L3 cache)									
SMP support	No SMP support									
Processor upgrade	None supported									
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 - std / max	256MB std / 4GB max ¹³									
Memory - sockets	4 sockets / 3 available / ECC (Error Checking and Correcting) DDR DIMMs and ECC memory controller									
Memory - features	PC2100 266MHz registered 184-pin gold-plated DIMM									
Memory - support	Supports unbuffered SDRAM ECC DIMMs / mixing of memory sizes									
SCSI disk controller	Adaptec® 29160LP / single channel Wide Ultra160 SCSI (LVD 160MB/sec) / 64-bit 66MHz PCI adapter / 15 device									
SCSI Connectors	On adapter: one 68-pin SCSI connector / one 0.8mm VHDCI 68-pin external connector									
Cables	one 2-drop 16-bit LVD SCSI cable, one 1-drop 40-conductor EIDE cable (connected to CD-ROM)									
Disk - features	36.4GB Ultra160 SCSI, 10K rpm, 5.2ms read seek									
Architecture / chipsets	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)									
Mechanical	EIA 19" Rack (1U⁴) / rack-mount only / supported in IBM NetBAY™ Rack products (rack requires vented front door)									
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-10X⁶ 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)									
Graphics controller	SVGA / PCI bus / ATI® Rage XL (on planar) / 8MB SDRAM std and max / DDC2B / analog 15-pin D-shell									
Security	Power-on password / administrator password / unattended boot / selectable boot / unattended start mode									
Software ⁹	ServerGuide™ (CD-ROM installation and configuration utilities), IBM Director™, and others									
Keyboard / mouse	None standard									
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 (-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	Appropriate dc power source and customer supplied wiring, monitor, keyboard, mouse, rack with perforated door, operating system									
	OPTIONS									
	256MB PC2100 CL2.5 ECC DDR-SDRAM DIMM 33L5037									
	512MB PC2100 CL2.5 ECC DDR-SDRAM DIMM 33L5038									
	1GB PC2100 CL2.5 ECC DDR-SDRAM RDIMM 33L5039									
	18.2GB 15K Ultra160 SCSI SL 68-pin HDD 06P5765									
	36.4GB 10K Ultra160 SCSI SL 68-pin HDD 06P5751									
	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									
	NetBAY ACT Local Console Manager 1735L04									
	Other options at 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)
- ⊃ 24x7¹⁴ toll-free support for warranty issues during the warranty period³

See footnotes for important warranty information
 US model 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
8830-61X	1 x Xeon™ 2.4GHz	512KB	400	512MB	Chipkill™	None (open)	Ultra320	2 hot-swap	2x4	2 x Gigabit	1 year	Aug 2002
8830-62X	1 x Xeon 2.4GHz	512KB	400	512MB	Chipkill	40GB ² EIDE	EIDE	2 fixed	2x4	2 x Gigabit	1 year	Aug 2002
8830-81X	1 x Xeon 2.8GHz	512KB	400	512MB	Chipkill	None (open)	Ultra320	2 hot-swap	2x4	2 x Gigabit	1 year	Nov 2002
8830-82X	1 x Xeon 2.8GHz	512KB	400	512MB	Chipkill	40GB ² EIDE	EIDE	2 fixed	2x4	2 x Gigabit	1 year	Nov 2002
8830-11X	1 x Xeon 2.8B GHz	512KB	533 ⁴	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	533 ⁴	512MB	Chipkill	40GB ² EIDE	EIDE	2 fixed	2x4	2 x Gigabit	1 year	May 2003

Positioning Processor(s) *A highly manageable, ultra-dense 1U, 2-way server that delivers performance computing in space-constrained environments*
 L2 cache **1 x Intel® Xeon 2.4, 2.8, or 2.8BGHz¹** with 400MHz or 533MHz frontside bus / Hyper-Threading technology
 SMP support **512KB** / on die of processor / at processor speed (no L3 cache)
 Implementation **2-way SMP** / up to two Xeon Processors (same speed/cache size)
 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 **152MB** 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

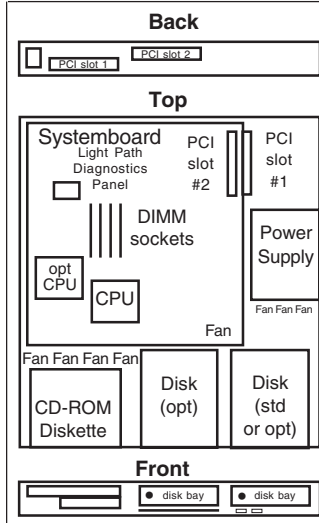
Cooling fans Eight fans (five for system, three on power supply) / variable speed / not redundant or hot-swap

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 2.8BGHz/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



Slot 1: halfsize, 64-bit 100MHz PCI X 1.0 (3.3v); Bus A
 Slot 2: fullsize, 64-bit 100MHz PCI X 1.0 (3.3v); Bus B
 Bay ① 3.5", UltraSlim 0.5", access, std diskette
 Bay ② 5.25", UltraSlim 0.5", access, std CD-ROM
 Bay ③ 3.5", SL 1", access, std fixed or hot-swap disk
 Bay ④ 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 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 Analysis® on processor(s), voltage regulator modules, memory, fans, power supply, and disk options
 Maximum internal disk capacity¹³ (model dependent):
 292GB with two 146GB 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
 • 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)
 24x7¹⁴ toll-free support for warranty issues during the warranty period³

See footnotes for important warranty information (X3351) © IBM Corp. December 2002
 • = Hot-swap in some models
 US models announced February 18, 2003; previous models on August 20, 2002 and November 19, 2002
 533Mhz FSB models may use 400Mhz FSB processors. 400Mhz FSB models may not use 533Mhz FSB processors.

IBM® Type-model	Qty x Processor	L2 cache	Memory	Memory type	Disk	Disk controller	Hot-swap or fixed disk bays	Mech-anical	Slots x bays	Ethernet	Limited warranty ³	Available date
8676-41X	1 x Xeon™ 2.0GHz	512KB	512MB	Chipkill™	None (open)	Ultra320	2 hot-swap	1U ⁴ rack	2x4	2 x Gigabit	3 year	Aug 2002
8676-42X	1 x Xeon 2.0GHz	512KB	512MB	Chipkill	40GB ²	EIDE EIDE	2 fixed	1U rack	2x4	2 x Gigabit	3 year	Aug 2002
8676-61X	1 x Xeon 2.4GHz	512KB	512MB	Chipkill	None (open)	Ultra320	2 hot-swap	1U rack	2x4	2 x Gigabit	3 year	Aug 2002
8676-62X	1 x Xeon 2.4GHz	512KB	512MB	Chipkill	40GB	EIDE EIDE	2 fixed	1U rack	2x4	2 x Gigabit	3 year	Aug 2002

Positioning Processor(s) *A highly manageable, ultra-dense 1U, 2-way server that delivers performance computing in space-constrained environments*
L2 cache **1 x Intel® Xeon 2.0 or 2.4GHz¹** with 400MHz frontside bus / Hyper-Threading technology
SMP support Implementation **2-way SMP** / up to two Xeon Processors (same speed/cache size)
 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 disk 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)

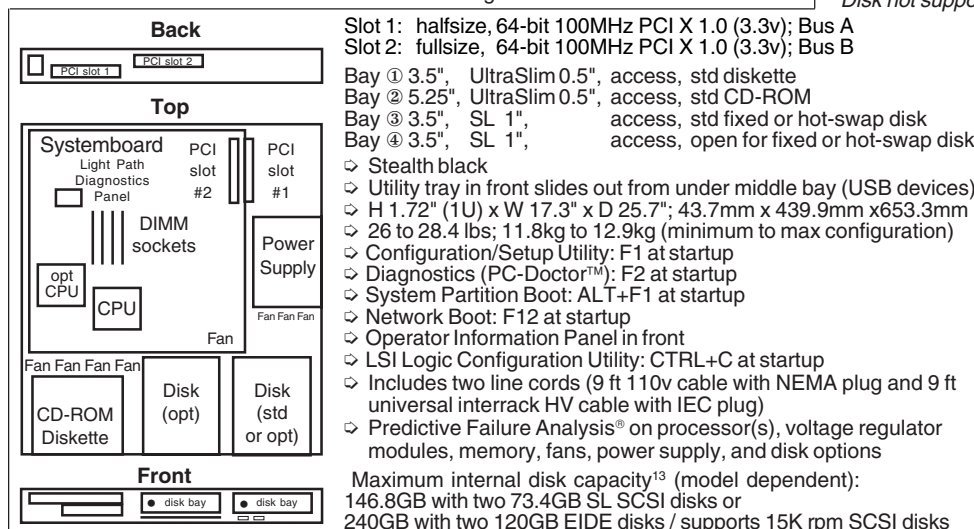
Diagnostics **Light Path Diagnostics™** (LED lights indicate failing component) and on-board diagnostics (via PC-Doctor in BIOS)

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 DP 2.0GHz/512KB L2 Cache Proc Upg	59P5100
Xeon DP 2.4GHz/512KB L2 Cache Proc Upg	59P5102
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
Remote Supervisor Adapter	09N7585
ServeRAID™-4Mx Ultra160 SCSI Adapter	06P5736
IBM T541 15" Flat Panel Color Monitor (black)	9512AB1
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

- 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 number 21P2072)
 - 24 hr x 7 day coverage, 4 hour average response (ServicePac part number 21P2073)
 - 24 hr x 7 day coverage, 2 hour average response (ServicePac part number 21P2074)
- Other ServicePac options at ibm.com/services/its/us/source/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
8676-71X	1 x Xeon™ 2.6GHz	512KB	400	512MB	Chipkill™	None (open)	Ultra320	2 hot-swap	2x4	2 x Gigabit	3 year	Aug 2002
8676-72X	1 x Xeon 2.6GHz	512KB	400	512MB	Chipkill	40GB ² EIDE	EIDE	2 fixed	2x4	2 x Gigabit	3 year	Aug 2002
8676-81X	1 x Xeon 2.8GHz	512KB	400	512MB	Chipkill	None (open)	Ultra320	2 hot-swap	2x4	2 x Gigabit	3 year	Nov 2002
8676-82X	1 x Xeon 2.8GHz	512KB	400	512MB	Chipkill	40GB ² EIDE	EIDE	2 fixed	2x4	2 x Gigabit	3 year	Nov 2002
8676-11X	1 x Xeon 2.8B GHz	512KB	533 ⁴	512MB	Chipkill	None (open)	Ultra320	2 hot-swap	2x4	2 x Gigabit	3 year	May 2003
8676-12X	1 x Xeon 2.8B GHz	512KB	533 ⁴	512MB	Chipkill	40GB ² EIDE	EIDE	2 fixed	2x4	2 x Gigabit	3 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 2.6, 2.8 or 2.8BGHz¹** with 400MHz or 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*

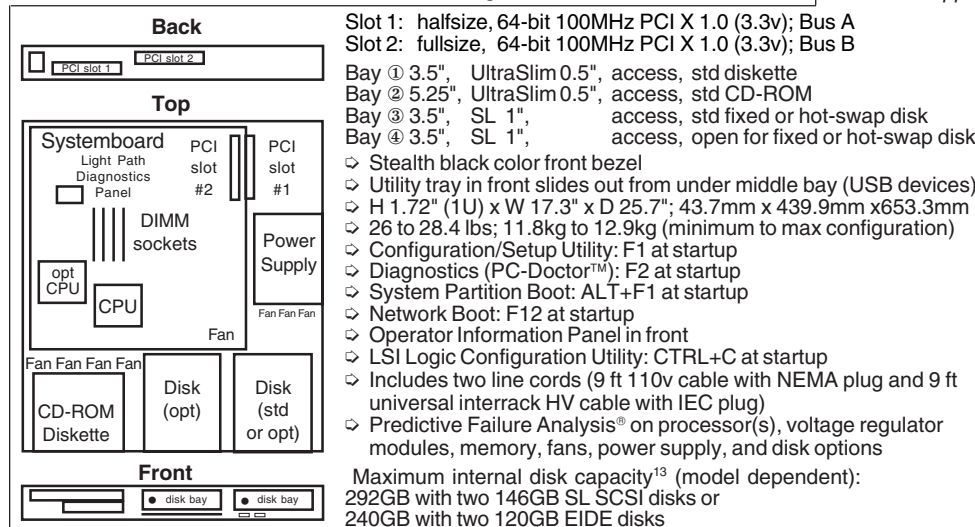
Disk - capacity *SCSI models: none standard / supports up to 15000 rpm disks; EIDE models: 40GB / 7200 rpm / ATA-100 / 8.7ms seek*
 Disk - bays *SCSI models: two hot-swap / 80-pin SCA-2 connectors / filler panels in each disk bay / all disk bays Ultra320-enabled*

Mechanical **EIA 19" Rack (1U⁴)** / rack-mount only / supported in 26" deep racks such as the IBM NetBAY™ Rack products
 Architecture / chipsets **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)	Xeon 2.6GHz/512KB L2 Cache Proc Upg	02R8957
Security	Power-on password / administrator password / unattended boot / selectable boot / unattended start mode	Xeon 2.8GHz/512KB L2 Cache Proc Upg	02R8958
Software	ServerGuide™ (CD-ROM installation and configuration utilities), IBM Director™, and others	Xeon 2.8BGHz/512KB L2 Cache Proc Upg	73P6382
Cooling fans	Eight fans (five for system, three on power supply) / variable speed / not redundant or hot-swap	512MB PC2100 CL2.5 ECC DDR-SDRAM RDIMM	33L5038
Power supply	332 watt / universal / auto-sensing / auto-restart support	1GB PC2100 CL2.5 ECC DDR-SDRAM RDIMM	33L5039
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	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
		Remote Supervisor Adapter	09N7585
		ServeRAID™-4Mx Ultra160 SCSI Adapter	06P5736
		xSeries Cable Chain Technology Cable Kit (2M breakout cable and 2M KVM chaining cable)	06P4792
		NetBAY ACT Local Console Manager	1735L04
		* Disk not supported in all x335 systems	



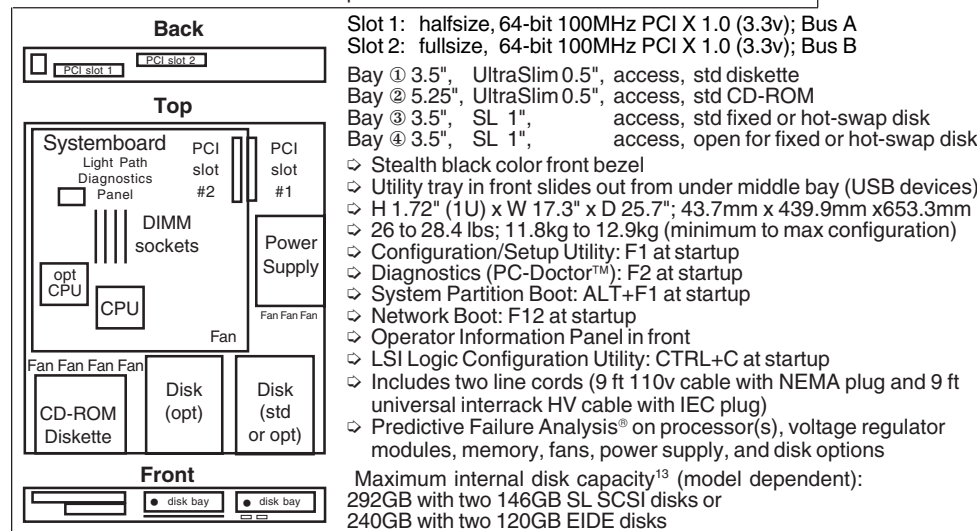
LIMITED WARRANTY³
 • 3 year parts and labor
 • International Warranty Service³
 • On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time⁷
 • On site service upgrade options (in eligible locations):⁷
 • 3 year IOR 9x5, 4 hr avg response (ServicePac® part num 21P2072)
 • 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 ibm.com/services/its/us/source/wamomxeu.pdf
 • 24x7¹⁴ toll-free support for warranty issues during the warranty period³

See footnotes for important warranty information (X335V) © IBM Corp. December 2002
 • = Hot-swap in some models
 1 US models announced February 18, 2003; previous models on November 19, 2002
 2 533Mhz FSB models may use 400Mhz FSB processors but 400Mhz FSB models may not use 533Mhz FSB processors.

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 (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>																																									
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)
•	5 year IOR 9x5, NBD response (ServicePac part num 69P9246)
•	Other ServicePac options at ibm.com/services/its/us/source/wamomxueu.pdf
➤	24x7¹⁴ toll-free support for warranty issues during the warranty period³

See footnotes for important warranty information

• = Hot-swap

© US models announced February 18, 2003

IBM® Type-model	Qty x Processor	L2 cache	Memory	Memory type	Disk	SCSI controller	Mechanical	Slots x bays (hot-swap bays)	Power supply	Ethernet	Available date
8670-11X	1 x Xeon™ 2.0GHz	512KB	512MB	Chipkill™	None	2 x Ultra320	2U ⁴ rack	5x8 (6 hot-swap)	1 x hot-swap	2 x Gigabit	Jul 2002
8670-21X	1 x Xeon 2.2GHz	512KB	512MB	Chipkill	None	2 x Ultra320	2U rack	5x8 (6 hot-swap)	1 x hot-swap	2 x Gigabit	Jul 2002
8670-31X	1 x Xeon 2.4GHz	512KB	512MB	Chipkill	None	2 x Ultra320	2U rack	5x8 (6 hot-swap)	1 x hot-swap	2 x Gigabit	Jul 2002
Positioning		A rack-dense 2-way server delivering high availability, scalability and expandability for application-serving Web environments									
Processor(s)		1 x Intel® Xeon™ Processor 2.0, 2.2, or 2.4GHz ² with 400MHz 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 MP Processors (same speed/cache size)									
Implementation		Systemboard contains two Intel 603-pin micro-PGA ZIF sockets, four memory DIMM slots, two low-profile PCI-X slots, slot for standard PCI riser card (with two PCI-X slots and one PCI slot), and integrated SCSI, ethernet, graphics									
Memory		512MB std / 8GB max ¹³ / two slots used / two slots available / two total power supplies required when using 2GB DIMMs 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		LSI Logic® 53C1030 / dual channel Ultra320 SCSI controller (LVD 320MB/sec) / on planar / 64-bit 100MHz PCI-X / supports RAID-1 mirroring (Embedded Mirroring) with up to one hot-spare disk / shared with optional IBM ServeRAID™-5i Controller for low-cost RAID 0, 1, 1E, 5, 00, 10, 1E0, 50 (installed only in Slot 2)									
SCSI channels		Two 16-bit channels (one internal and one external) / SCSI Channel A: 16-bit 68-pin LVD cable from systemboard to backplane for six disks; Channel B: 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)									
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									
Disk - bays		Six hot-swap / 80-pin SCA-2 connectors / filler panels installed in each disk bay / all disk bays Ultra320-enabled									
Mechanical		EIA 19" Rack (2U ⁴) / rack-mount only / supported in IBM NetBAY™ Rack products / no rack to tower conversion									
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 Bus A with low profile slots 1, 2, and Ultra320 and ethernet controllers; IMB2 bus to Host Bridge for PCI Bus B with slots 3 and 4 on riser card) / CSB5 South Bridge (Thin IMB to Host Bridge for PCI 2.2 bus C with slot 5 (on riser card) and graphics controller, EIDE, USB, SMBus, LPC bus to Super I/O) / NS PC87417 Super I/O									
Bus slots		(See below) Four available PCI-X 1.0 / one available PCI 2.2 32-bit 33MHz slot / no hot-swap Active™ PCI slots									
Ethernet controller		Two gigabit 10/100/1000 ethernet ports (dual port) / Intel 82546EB / two full gigabit ethernet MAC and PHY layer functions / on planar / PCI-X 64-bit 100MHz / full duplex / Wake on LAN® / Alert Standard Format 1.0 / two RJ-45 ports in rear									
CD-ROM / diskette		24X-10X ⁶ CD-ROM / IDE; Diskette: 3.5" 1.44MB diskette drive / dust cover									
Rear ports		Rear: two USB (Vers 1.1), keyboard, mouse, serial (9-pin), graphics (DB-15), two ethernet (RJ-45), two RJ-45 (sys mgmt) / no parallel port									
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 / unattended boot / selectable boot sequence									
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 riser for continuous power (no ext power reqd)								Xeon DP 2.0GHz/512KB L2 Cache Proc Upg 33P2931 Xeon DP 2.2GHz/512KB L2 Cache Proc Upg 33P2932 Xeon DP 2.4GHz/512KB L2 Cache Proc Upg 37L3533 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* 33L5039	
Diagnostics		Light Path Diagnostics™ panel providing LED map to failing part (under top cover) / Information LED Panel in front								IBM ServeRAID-5i Controller (adapter for slot 2) 25P3492 IBM Remote Supervisor Adapter (PCI adapter) 09N7585 36.4GB 15K-2 80 Ultra320 SCSI Hot-Swap SL HDD 06P5776 73.4GB 10K-5 80 Ultra320 SCSI Hot-Swap SL HDD 32P0727 146.8GB 10K-5 80 Ultra320 SCSI Hot-Swap SL HDD 32P0728 350W Hot-Swap Power Supply (with three fans) 59P4057 NetBAY 250mm KVM Conversion Option 32P1636 NetBAY Local Console Manager 1735L04 NetBAY Remote Console Manager 1735R16	
Software		ServerGuide™ (CD-ROM installation and configuration utilities), IBM Director systems mgmt, others								Other options at ibm.com/pc/us/accessories *additional 59P4057 required when installing 33L5040	
Keyboard / mouse		None standard (because rack-based)									
Power supply		Std: one 350 watt / hot-swap; Max: two 350 watt / hot-swap / All: rear access / redundant with two power supplies / worldwide / voltage-sensing / auto-restart									
Fans		Std: five fans; Max: eight (three fans with optional second power supply) / redundant with eight fans installed; All: variable speed / hot-swap / PFA									
Prerequisites		Monitor, keyboard, mouse, SCSI disk, rack									
Slot 1: low-profile, 64-bit 100MHz 3.3v PCI-X, not hot, Bus A		Slot 2: low-profile, 64-bit 100MHz 3.3v PCI-X, not hot, Bus A		Slot 3: full, 64-bit 133MHz 3.3v PCI-X, not hot-swap, Bus B		Slot 4: full, 64-bit 133MHz 3.3v PCI-X, not hot-swap, Bus B		Slot 5: half, 32-bit 33MHz 5v PCI 2.2, not hot-swap, Bus C**		* Extended slot for optional IBM ServeRAID-5i Controller ** Primarily for optional Remote Supervisor Adapter	
		2U Rack		<ul style="list-style-type: none"> Quick release adapter slots (no screws) Configuration/Setup Utility: F1 at startup Diagnostics (PC-Doctor™): F2 at startup System Partition Boot: ALT+F1 at startup Network Boot: F12 at startup LSI Logic Configuration Utility: CTRL+C 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" 44 to 62 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 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 ibm.com/services/its/us/source/wamomxeu.pdf 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 5.25", 0.5", access, std CD-ROM</p> <p>Bay ③ 3.5", SL 1", access, hot-swap, open for disk</p> <p>Bay ④ 3.5", SL 1", access, hot-swap, open for disk</p> <p>Bay ⑤ 3.5", SL 1", access, hot-swap, open for disk</p> <p>Bay ⑥ 3.5", SL 1", access, hot-swap, open for disk</p> <p>Bay ⑦ 3.5", SL 1", access, hot-swap, open for disk</p> <p>Bay ⑧ 3.5", SL 1", access, hot-swap, open for disk</p> <p>Bays 3 through 8 support six SL disks via SCA-2 connectors</p>		<p>All models: Max int disk capacity: 880.0GB² with six 146.8GB SL disks</p>									

See footnotes for important warranty information
US models announced July 16, 2002

• = Hot-swap

(X345) © IBM Corp. July 2002

⋈ = 21X model withdrawn from marketing effective January 2003; 11X model withdrawn effective April 29, 2003

IBM® Type-model	Qty x Processor	L2 cache	Memory	Memory type	Disk	SCSI controller	Mechanical	Slots x bays (hot-swap bays)	Power supply	Ethernet	Available date
8670-51X	1 x Xeon™ 2.67GHz	512KB	512MB	Chipkill™	None	2 x Ultra320	2U ⁴ rack	5x8 (6 hot-swap)	1 x hot-swap	2 x Gigabit	Feb 2003
8670-61X	1 x Xeon 2.8BGHz	512KB	512MB	Chipkill	None	2 x Ultra320	2U rack	5x8 (6 hot-swap)	1 x hot-swap	2 x Gigabit	Feb 2003
Positioning	<i>A rack-dense 2-way server delivering high availability, scalability and expandability for application-serving Web environments</i>										
Processor(s)	1 x Intel® Xeon™ Processor 2.67 or 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 MP Processors (same speed/cache size)										
Implementation	Systemboard contains two Intel 603-pin micro-PGA ZIF sockets, four memory DIMM slots, two low-profile PCI-X slots, slot for standard PCI riser card (with two PCI-X slots and one PCI slot), and integrated SCSI, ethernet, graphics										
Memory	512MB std / 8GB max ¹³ / two slots used / two slots available / two total power supplies required when using 2GB DIMMs 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 133MHz / 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	LSI Logic® 53C1030 / dual channel Ultra320 SCSI controller (LVD 320MB/sec) / on planar / 64-bit 100MHz PCI-X / supports RAID-1 mirroring (Embedded Mirroring) with up to one hot-spare disk / shared with optional IBM ServeRAID™-5i Controller for low-cost RAID 0, 1, 1E, 5, 00, 10, 1E0, 50 (installed only in Slot 2)										
SCSI channels	Two 16-bit channels (one internal and one external) / Channel A: 16-bit 68-pin LVD cable from systemboard to backplane for six disks; Channel B: 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)										
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										
Disk - bays	Six hot-swap / 80-pin SCA-2 connectors / filler panels installed in each disk bay / all disk bays Ultra320-enabled										
Mechanical	EIA 19" Rack (2U⁴) / rack-mount only / supported in IBM NetBAY™ Rack products / no rack to tower conversion										
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 Bus A with low profile slots 1, 2, and Ultra320 and ethernet controllers; IMB2 bus to Host Bridge for PCI Bus B with slots 3 and 4 on riser card) / CSB5 South Bridge (Thin IMB to Host Bridge for PCI 2.2 bus C with slot 5 (on riser card) and graphics controller, EIDE, USB, SMBus, LPC bus to Super I/O) / NS PC87417 Super I/O										
Bus slots	(See below) Four available PCI-X 1.0 / one available PCI 2.2 32-bit 33MHz slot / no hot-swap Active™ PCI slots										
Ethernet controller	Two gigabit 10/100/1000 ethernet ports (dual port) / Intel 82546EB / two full gigabit ethernet MAC and PHY layer functions / on planar / PCI-X 64-bit 100MHz / full duplex / Wake on LAN® / Alert Standard Format 1.0 / two RJ-45 ports in rear										
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> two USB (Vers 1.1), keyboard, mouse, serial (9-pin), graphics (DB-15), two ethernet (RJ-45), two RJ-45 (sys mgmt) / no parallel port										
Front port / graphics	<i>Front:</i> one USB (Vers 1.1); <i>Graphics:</i> SVGA / ATI® Rage XL / on planar / 8MB SDRAM std/max / 32-bit 33MHz PCI 2.2 bus										
Security	Power-on password / administrator password / unattended boot / selectable boot sequence										
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 riser for continuous power (no ext power reqd)				Xeon DP 2.67GHz/512KB L2 Cache Proc Upg Xeon DP 2.8BGHz/512KB L2 Cache Proc Upg 512MB PC2100 CL2.5 ECC DDR-SDRAM DIMM 1GB PC2100 CL2.5 ECC DDR-SDRAM RDIMM 2GB PC2100 CL2.5 ECC DDR-SDRAM RDIMM*				71P8966 71P8967 33L5038 33L5039 33L5040		
Diagnostics	Light Path Diagnostics™ panel providing LED map to failing part (under top cover) / Information LED Panel in front				IBM ServeRAID-5i Controller (adapter for slot 2) IBM Remote Supervisor Adapter (PCI adapter) IBM T541 15" Flat Panel Color Monitor (black)				25P3492 09N7585 9512AB1		
Software	ServerGuide™ (CD-ROM installation and configuration utilities), IBM Director systems mgmt, others				36.4GB 15K-2 80 Ultra320 SCSI Hot-Swap SL HDD 73.4GB 10K-5 80 Ultra320 SCSI Hot-Swap SL HDD 146.8GB 10K-5 80 Ultra320 SCSI Hot-Swap SL HDD 350W Hot-Swap Power Supply (with three fans) NetBAY 250mm KVM Conversion Option NetBAY Local Console Manager NetBAY Remote Console Manager				06P5776 32P0727 32P0728 59P4057 32P1636 1735L04 1735R16		
Keyboard / mouse	None standard (because rack-based)										
Power supply	<i>Std:</i> one 350 watt / hot-swap; <i>Max:</i> two 350 watt / hot-swap <i>All:</i> rear access / redundant with two power supplies / worldwide / voltage-sensing / auto-restart										
Fans	<i>Std:</i> five fans; <i>Max:</i> eight (three fans with optional second power supply) / redundant with eight fans installed; <i>All:</i> variable speed / hot-swap / PFA										
Prerequisites	Monitor, keyboard, mouse, SCSI disk, rack										
<p>Slot 1: low-profile, 64-bit 100MHz 3.3v PCI-X, not hot, Bus A</p> <p>Slot 2: low-profile, 64-bit 100MHz 3.3v PCI-X, not hot, Bus A*</p> <p>Slot 3: full, 64-bit 133MHz 3.3v PCI-X, not hot-swap, Bus B</p> <p>Slot 4: full, 64-bit 133MHz 3.3v PCI-X, not hot-swap, Bus B</p> <p>Slot 5: half, 32-bit 33MHz 5v PCI 2.2, not hot-swap, Bus C**</p> <p>* Extended slot for optional IBM ServeRAID-5i Controller</p> <p>** Primarily for optional Remote Supervisor Adapter</p>											
<p style="text-align: center;">2U Rack</p> <p>Bay ① 3.5", 0.5", access, std diskette</p> <p>Bay ② 5.25", 0.5", access, std CD-ROM</p> <p>Bay ③ 3.5", SL 1", access, hot-swap, open for disk</p> <p>Bay ④ 3.5", SL 1", access, hot-swap, open for disk</p> <p>Bay ⑤ 3.5", SL 1", access, hot-swap, open for disk</p> <p>Bay ⑥ 3.5", SL 1", access, hot-swap, open for disk</p> <p>Bay ⑦ 3.5", SL 1", access, hot-swap, open for disk</p> <p>Bay ⑧ 3.5", SL 1", access, hot-swap, open for disk</p> <p>Bays 3 through 8 support six SL disks via SCA-2 connectors</p>											
<p>Quick release adapter slots (no screws)</p> <p>Configuration/Setup Utility: F1 at startup</p> <p>Diagnostics (PC-Doctor™): F2 at startup</p> <p>System Partition Boot: ALT+F1 at startup</p> <p>Network Boot: F12 at startup</p> <p>LSI Logic Configuration Utility: CTRL+C at startup</p> <p>Front indicators LEDs: Power-on LED, SCSI bus activity LED, system identification LED, information LED, and system-error LED</p> <p>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</p> <p>Rack: H 3.36" x W 17.5" x D 27.5"</p> <p>44 to 62 pounds</p> <p>Stealth black color</p>											
<p>LIMITED WARRANTY³</p> <p>3 year parts and labor</p> <p>International Warranty Service³</p> <p>On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time⁷</p> <p>3 year on site warranty service upgrade options (in eligible locations):⁷</p> <ul style="list-style-type: none"> 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) <p>Other ServicePac options at ibm.com/services/its/us/source/wamomxeu.pdf</p> <p>24x7¹⁴ toll-free support for warranty issues during the warranty period³</p>											
<p><i>All models:</i> Max int disk capacity: 880.0GB² with six 146.8GB SL disks</p>											

See footnotes for important warranty information
US models announced January 21, 2003

• = Hot-swap

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
8686-7RX	1 x Xeon™ MP 1.5GHz	1MB	1GB Chipkill™	None	Ultra160	3U ⁴ rack	6x5	One	One (not redund)	PCI	Dec 2002
8686-8RX	2 x Xeon MP 1.9GHz	1MB	2GB Chipkill	None	Ultra160	3U rack	6x5	One	Two redundant	PCI	Dec 2002
8686-9RX	2 x Xeon MP 2.0GHz	2MB	2GB Chipkill	None	Ultra160	3U rack	6x5	One	Two redundant	PCI	Dec 2002

Positioning *Space efficient 4-way, 3U, rack-dense server with ground breaking Enterprise X-Architecture™ technology*
Processors **1 or 2 x Intel® Xeon™ Processor MP 1.5, 1.9, or 2.0GHz¹** 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 **1GB or 2GB** std / 8GB max¹³ / two (1GB model) or four (2GB 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 (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) 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 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 port to support up to 12 additional PCI-X slots via an optional IBM RXE-100 Remote Expansion Enclosure**

CD-ROM / diskette 24X-10X⁶ 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)

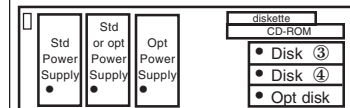
Security Power-on and administrator passwords / unattended boot / selectable boot

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	Other options at ibm.com/pc/us/accessories	Part Number
ServerGuide™ (CD-ROM installation and configuration utilities), IBM Director, and others	RXE-100 Remote Expansion Enclosure	86841RX
	256MB PC1600 ECC DDR SDRAM RDIMM	33L3281
	512MB PC1600 ECC DDR SDRAM RDIMM	33L3283
	1GB PC1600 ECC DDR SDRAM RDIMM	33L3285
	Xeon MP 1.5GHz/1MB L3 Cache Proc Upg	59P6815
	Xeon MP 1.9GHz/1MB L3 Cache Proc Upg	59P6816
	Xeon MP 2.0GHz/2MB L3 Cache Proc Upg	59P6817
	370 watt Hot-Swap Redundant Power Supply	31P6108
	IBM ServeRAID™-4Mx Ultra160 SCSI Adapter	06P5736
	IBM 73.4GB 10K Ultra 160 SCSI Hot-Swap SL	06P5756
	IBM NetBAY42 Standard Rack (SR)	9306420
	IBM Integrated xSeries Adapter for iSeries	1519100
	IBM T541 15" Flat Panel Color Monitor (black)	9512AB1

- Six available 3.3 volt Active PCI-X slots:
- Bus 2 (B) with two slots supports (slots 1, 2):
 - 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):
 - 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:
 - only for standard Remote Supervisor Adapter halfsize, 64-bit, 33MHz PCI, not hot-swap



- 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

- ◇ 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

All models: Maximum internal disk capacity: 220.2GB with three 73.4GB² hot-swap SCSI disks

LIMITED WARRANTY³

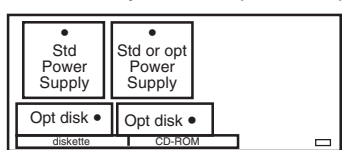
- ⇐ 3 year parts and labor
- ⇐ International Warranty Service³
- ⇐ On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time⁷
- ⇐ On site service upgrade options (in eligible locations):⁷
 - 3 year IOR 24x7, 4 hr avg response (ServicePac® part num 21P2078)
 - 3 year IOR 24x7, 2 hr avg response (ServicePac part num 21P2093)
 - 4 year IOR 9x5, NBD response (ServicePac part num 69P9258)
 - 5 year IOR 9x5, NBD response (ServicePac part num 69P9262)
 - Other ServicePac options at ibm.com/services/its/us/source/wamomxeu.pdf
- ⇐ 24x7¹⁴ toll-free support for warranty issues during the warranty period³

See footnotes for important warranty information
 US models announced November 5, 2002
 • = Hot-swap

IBM® Type-model	Qty x Processor	SMP Exp Modules	L3 cache	L4 cache	Memory	Disk	SCSI controller	Mechanical	Slots x bays	Hot-swap pwr supplies	Mgmt adapter	Available date
8687-3RY	2 x Xeon™ MP 2.4GHz	One	None	32MB	2GB Chipkill™	None	2 x Ultra160	4U ⁴ rack	6x4	Two redundant	PCI	Aug 2002
8687-4RY	4 x Xeon MP 2.4GHz	Two	None	64MB	4GB Chipkill	None	2 x Ultra160	4U rack	6x4	Two redundant	PCI	Aug 2002
Positioning	<i>SMP power for high-end databases, server consolidation and mission-critical business applications</i>											
Processors	2 or 4 x Intel® Xeon™ Processor MP 2.4GHz¹ with 400MHz frontside bus / supports Hyper-Threading technology											
L2 cache	512KB each processor / on die of processor / at processor speed (optional Xeon MP has 256KB in each processor)											
L3 cache	None / on die of processor / at processor speed (optional Xeon MP has 512KB or 1MB in each processor)											
L4 cache	3RY: 32MB; 4RY: 64MB; All: Xcel4™ Server Accelerator Cache / 32MB in each SMP Expansion Module / ECC / 64-bit 400MHz bus from Cache and Scalability Controller											
Processor upgrade	3RY: 4-way SMP with two SMP Expansion Modules; All: models can be upgraded to Xeon MP processors to support up to 8-way SMP with two SMP Expansion Modules or up to 16-way SMP in the third quarter 2002 with two xSeries 440 systems											
SMP Expansion Modules	3RY: one std; 4RY: two std; All: two max / each contains four Intel 603-pin micro-PGA ZIF sockets for Xeon, 32MB 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 (only 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	3RY: 2GB std with 4 x 512MB DIMMs / 16MB max ¹³ (up to 32GB with optional SMP Expansion Module) / 4RY: 4GB std with 8 x 512MB DIMMs (4 DIMMs in each SMP Exp Module) / 32GB max ¹³ / All: Each SMP Expansion Module has 16 DIMM gold-connector slots / must install four identical DIMMs at same time / 4-way interleaving / PC133-compliant / 3.3v registered 168-pin SDRAM RDIMMs / 133MHz / 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™ via memory mirroring (memory mirroring supported with any OS)											
SCSI disk controller	Adaptec® AIC-7899W / Wide Ultra160 SCSI (LVD 160MB/sec) dual channel / 64-bit 66MHz PCI / integrated 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™ 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 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 / both removable from Ultrabay™ 2000 bays / supports CD-RW, DVD											
Ethernet	Broadcom® 5700 10/100/1000 ethernet controller / on I/O Board / full duplex / 64-bit 66MHz PCI bus / Wake on LAN®											
Graphics controller	SVGA / S3® Savage4 Pro / on I/O Board / 8MB SDRAM 125MHz std/max / up to 1280x1024 at 64K colors 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 / 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)											
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 / 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



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

- 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 opt disks with IBM Director
- All models:** Maximum internal disk capacity: 146.8GB with two 73.4GB² hot-swap SCSI disks

LIMITED WARRANTY³

- 1 year parts and labor
- International Warranty Service³
- On site, 24 hr x 7 day coverage, same day response time⁷
- 1 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
- 24x7¹⁴ toll-free support for warranty issues during the warranty period³

See footnotes for important warranty information
 US models announced August 13, 2002
 • = Hot-swap

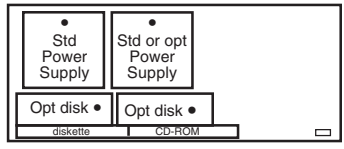
IBM® Type-model	Qty x Processor	L3 cache	L4 cache	Memory	Disk	SCSI controller	Mechanical	Slots x bays	SMP/RXE Exp Ports	Hot-swap pwr supplies	Mgmt adapter	Available date
8687-4RX	2 x Xeon™ MP 1.5GHz	1MB	32MB	2GB Chipkill™	None	2xUltra160	4U ⁴ rack	6x4	3/1	Two redundant	PCI	Nov 2002
8687-5RX	2 x Xeon MP 1.9GHz	1MB	32MB	2GB Chipkill	None	2xUltra160	4U rack	6x4	3/1	Two redundant	PCI	Nov 2002
8687-6RX	4 x Xeon MP 1.9GHz	1MB	32MB	4GB Chipkill	None	2xUltra160	4U rack	6x4	3/1	Two redundant	PCI	Nov 2002
8687-7RX	4 x Xeon MP 2.0GHz	2MB	32MB	2GB Chipkill	None	2xUltra160	4U rack	6x4	3/1	Two redundant	PCI	Nov 2002

Positioning	<i>Up to 8-way power for high-end databases, server consolidation and mission-critical business applications</i>											
Processors	2 or 4 x Intel® Xeon™ Processor MP 1.5, 1.9, or 2.0GHz¹ with 400MHz frontside bus / supports Hyper-Threading technology											
L2 cache	512KB each processor / on die of processor / at processor speed											
L3 cache	1MB or 2MB each processor / on die of processor / at processor speed											
L4 cache	32MB XcelL4™ Server Accelerator Cache (up to 64MB with optional SMP Expansion Module) / 32MB 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)											
SMP Expansion Module	One SMP Expansion Module std / two max / each contains four Intel 603-pin micro-PGA ZIF sockets for Xeon MP, 32MB 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 (only 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 or 4GB std / 16GB max¹³ (up to 32GB with optional SMP Expansion Module) / four DIMMs installed (512MB or 1GB) / 16 DIMM gold-connector slots / must install four identical DIMMs at same time / 4-way interleaving / PC133-compliant / 3.3v registered 168-pin SDRAM RDIMMs / 133MHz / 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™ via memory mirroring (memory mirroring supported with any OS)											
SCSI disk controller	Adaptec® AIC-7899W / Wide Ultra160 SCSI (LVD 160MB/sec) / dual channel / 64-bit 66MHz PCI / integrated 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™ 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 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 / both removable from Ultrabay™ 2000 bays / supports CD-RW, DVD											
Ethernet	Broadcom® 5700 10/100/1000 ethernet controller / on I/O Board / full duplex / 64-bit 66MHz PCI bus / Wake on LAN®											
Graphics controller	SVGA / S3® Savage4 Pro / on I/O Board / 8MB SDRAM 125MHz std/max / up to 1280x1024 at 64K colors 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 / 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 / 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											

xSeries SMP Expansion Module	59P5188
512MB PC133 ECC SDRAM RDIMM	33L3324
1GB PC133 ECC SDRAM RDIMM	31P8300
Xeon MP 1.5GHz/1MB L3 Cache Proc Upg	59P5171
Xeon MP 1.9GHz/1MB L3 Cache Proc Upg	59P5172
Xeon MP 2.0GHz/2MB L3 Cache Proc Upg	59P5173
IBM 73.4GB 10K Ultra160 SCSI Hot-Swap	06P5756
IBM ServeRAID™-4H Ultra160 SCSI Adapter	37L6889
8X/4X/24X Max CD-RW Ultrabay 2000	22P9101
IBM T540 15" Flat Panel Color Monitor (black)	9511AG4
Other options at ibm.com/pc/us/accessories	

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, XcelL4 Server Accelerator Cache, memory, fans, power supplies, and optional disks with IBM Director



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

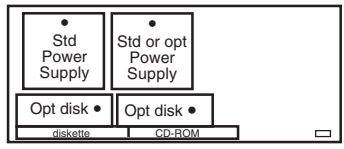
All models: Maximum internal disk capacity: 146.8GB with two 73.4GB² hot-swap SCSI disks

LIMITED WARRANTY³

- ↳ 1 year parts and labor
- ↳ International Warranty Service³
- ↳ On site, 24 hr x 7 day coverage, same day response time⁷
- ↳ 1 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
- ↳ 24x7¹⁴ toll-free support for warranty issues during the warranty period³

See footnotes for important warranty information
 US models announced November 5, 2002

• = Hot-swap

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
8687-1AX	2 x Xeon™ MP 1.4GHz	512KB	32MB	0GB Chipkill™	None	2xUltra160	4U ⁴ rack	6x4	3/1	Two redundant	PCI	Jul 2002
8687-2AX	2 x Xeon MP 1.5GHz	512KB	32MB	0GB Chipkill	None	2xUltra160	4U rack	6x4	3/1	Two redundant	PCI	Jul 2002
8687-3AX	2 x Xeon MP 1.6GHz	1MB	32MB	0GB Chipkill	None	2xUltra160	4U rack	6x4	3/1	Two redundant	PCI	Jul 2002
8687-4AX	2 x Xeon MP 1.5GHz	1MB	32MB	0GB Chipkill	None	2xUltra160	4U rack	6x4	3/1	Two redundant	PCI	Jan 2003
8687-5AX	2 x Xeon MP 1.9GHz	1MB	32MB	0GB Chipkill	None	2xUltra160	4U rack	6x4	3/1	Two redundant	PCI	Jan 2003
8687-7AX	2 x Xeon MP 2.0GHz	2MB	32MB	0GB Chipkill	None	2xUltra160	4U rack	6x4	3/1	Two redundant	PCI	Jan 2003
Processors	2 x Intel® Xeon™ Processor MP 1.5, 1.9, or 2.0GHz ¹ with 400MHz frontside bus / supports Hyper-Threading technology											
L2 cache	512KB each processor / on die of processor / at processor speed											
L3 cache	Up to 2MB each processor / on die of processor / at processor speed											
L4 cache	32MB Xcel4™ Server Accelerator Cache (up to 64MB with optional SMP Expansion Module) / 32MB 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)											
SMP Expansion Module	One SMP Expansion Module std / two max / each contains four Intel 603-pin micro-PGA ZIF sockets for Xeon MP, 32MB 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 (only one RXE Expansion Port supported)											
Memory	0GB std / 16GB max (up to 32GB with optional SMP Expansion Module) / zero DIMMs installed / 16 DIMM gold-connector slots / must install four identical DIMMs at same time / 4-way interleaving / PC133-compliant / 3.3v registered 168-pin SDRAM RDIMMs / 133MHz / 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™ via memory mirroring (memory mirroring supported with any OS)											
SCSI disk controller	Adaptec® AIC-7899W / Wide Ultra160 SCSI (LVD 160MB/sec) / dual channel / 64-bit 66MHz PCI / integrated 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™ 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 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 / both removable from Ultrabay™ 2000 bays / supports CD-RW, DVD											
Ethernet	Broadcom® 5700 10/100/1000 ethernet controller / on I/O Board / full duplex / 64-bit 66MHz PCI bus / Wake on LAN®											
Graphics controller	SVGA / S3® Savage4 Pro / on I/O Board / 8MB SDRAM 125MHz std/max / up to 1280x1024 at 64K colors 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 / 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	IBM Director Extensions 3.1, APC® UPS software											
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											
- IBM Datacenter Solution: models certified with up to 8-way SMP												
- Prerequisite: Preload Kit for Microsoft® Windows® 2000 Datacenter Offerings												
<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>Six available 3.3 volt Active PCI-X slots:</p> <p>Slot 1: fullsize, 64-bit 66MHz PCI-X, hot-swap Bus A</p> <p>Slot 2: fullsize, 64-bit 66MHz PCI-X, hot-swap Bus A</p> <p>Slot 3: fullsize, 64-bit 100MHz PCI-X, hot-swap, Bus B</p> <p>Slot 4: fullsize, 64-bit 100MHz PCI-X, hot-swap, Bus B</p> <p>Slot 5: fullsize, 64-bit 133MHz PCI-X, hot-swap, Bus C</p> <p>Slot 6: fullsize, 64-bit 133MHz PCI-X, hot-swap, Bus D</p> <p>Slot: used by Remote Supervisor Adp, 32-bit 33MHz</p> </div> <div style="width: 45%;"> <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 </div> </div>												
<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;">  <p style="text-align: center;">4U Rack</p> <p>Bay ① 3.5", 0.5", access, diskette (Ultrabay 2000)</p> <p>Bay ② 3.5", 0.5", access, CD-ROM (Ultrabay 2000)</p> <p>Bay ③ 3.5", SL 1", access, hot-swap</p> <p>Bay ④ 3.5", SL 1", access, hot-swap</p> </div> <div style="width: 45%;"> <p>LIMITED WARRANTY³</p> <ul style="list-style-type: none"> ⊗ 1 year parts and labor ⊗ International Warranty Service³ ⊗ On site, 24 hr x 7 day coverage, same 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 ⊗ 24x7¹⁴ toll-free support for warranty issues during the warranty period³ </div> </div>												
<p>All models: Maximum internal disk capacity: 146.8GB with two 73.4GB² hot-swap SCSI disks</p>												

See footnotes for important warranty information
US models announced December 3, 2002

• = Hot-swap

(X440D8) © IBM Corp. December 2002

⊗ US models announced June 2002, withdrawn effective March 25, 2003.

IBM® Type-model	Qty x Processor	L3 cache	L4 cache	Memory	Disk	SCSI controller	Mechanical	Slots x bays	SMP Exp Modules	Hot-swap pwr supplies	Mgmt adapter	Available date
8687-18X	8 x Xeon™ MP 1.4GHz	512KB	64MB	0GB Chipkill™	None	2xUltra160	4U ⁴ rack	6x4	Two	Two redundant	PCI	Jan 2003
8687-28X	8 x Xeon MP 1.5GHz	512KB	64MB	0GB Chipkill	None	2xUltra160	4U rack	6x4	Two	Two redundant	PCI	Jan 2003
8687-38X	8 x Xeon MP 1.6GHz	1MB	64MB	0GB Chipkill	None	2xUltra160	4U rack	6x4	Two	Two redundant	PCI	Jan 2003
8687-48X	8 x Xeon MP 1.5GHz	1MB	64MB	0GB Chipkill	None	2xUltra160	4U rack	6x4	Two	Two redundant	PCI	Feb 2003
8687-58X	8 x Xeon MP 1.9GHz	1MB	64MB	0GB Chipkill	None	2xUltra160	4U rack	6x4	Two	Two redundant	PCI	Feb 2003
8687-78X	8 x Xeon MP 2.0GHz	2MB	64MB	0GB Chipkill	None	2xUltra160	4U rack	6x4	Two	Two redundant	PCI	Feb 2003
- Models certified for 16-way SMP with Microsoft® Windows® 2000 Datacenter / Must be ordered in matched pairs to create a 16-way SMP solution; separate 8-way applications not supported												
Processors	8 x Intel® Xeon™ Processor MP up to 2.0GHz¹ with 400MHz frontside bus / supports Hyper-Threading technology											
L2 cache	256KB or 512KB each processor / on die of processor / at processor speed											
L3 cache	512KB or 1MB each processor / on die of processor / at processor speed											
L4 cache	64MB Xcel4™ Server Accelerator Cache (32MB in each SMP Expansion Module) / ECC / 64-bit 400MHz bus from Cache and Scalability Controller											
Processor upgrade	16-way SMP with matched pair of 8-way servers											
SMP Expansion Module	Two SMP Expansion Modules std / two max / each contains four Intel 603-pin micro-PGA ZIF sockets for Xeon MP, 32MB 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 (only one RXE Expansion Port supported)											
Memory	0GB std / 32GB max per chassis (up to 64GB per config) / zero DIMMs installed / 32 DIMM gold-connector slots (16 slots in each SMP Expansion Module) / must install four identical DIMMs at same time / 4-way interleaving / PC133-compliant / 3.3v registered 168-pin SDRAM RDIMMs / 133MHz / 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)											
SCSI disk controller	Adaptec® AIC-7899W / Wide Ultra160 SCSI (LVD 160MB/sec) / dual channel / 64-bit 66MHz PCI / integrated 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™ 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 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 / both removable from Ultrabay™ 2000 bays / supports CD-RW, DVD											
Ethernet	Broadcom® 5700 10/100/1000 ethernet controller / on I/O Board / full duplex / 64-bit 66MHz PCI bus / Wake on LAN®											
Graphics controller	SVGA / S3® Savage4 Pro / on I/O Board / 8MB SDRAM 125MHz std/max / up to 1280x1024 at 64K colors 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 / 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 Software	Light Path Diagnostics™ / primary indicator on information panel with LEDs associated with failing components / APC® UPS software											
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											
Cables	Three copper scalability cables (one 10", two 2.5M) / crossover ethernet cable											
Prerequisites	IBM Preload Kit for Microsoft Windows 2000 Datacenter, 1-16 Processors											
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)												
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: 146.8GB with two 73.4GB ² hot-swap SCSI disks												

LIMITED WARRANTY³

- 1 year parts and labor
- International Warranty Service³
- On site, 24 hr x 7 day coverage, same day response time⁷
- 1 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
- 24x7¹⁴ toll-free support for warranty issues during the warranty period³

IBM® Type-model	Qty x Processor	L3 cache	L4 cache	Memory	Disk	SCSI controller	Mechanical	Slots x bays	SMP Exp Modules	Hot-swap pwr supplies	Mgmt adapter	Available date
8687-1VX	8 x Xeon™ MP 1.4GHz	512KB	64MB	4GB Chipkill™	None	2xUltra160	4U ⁴ rack	6x4	Two	Two redundant	PCI	Jan 2003
8687-2VX	8 x Xeon MP 1.5GHz	512KB	64MB	4GB Chipkill	None	2xUltra160	4U rack	6x4	Two	Two redundant	PCI	Jan 2003
8687-3VX	8 x Xeon MP 1.6GHz	1MB	64MB	4GB Chipkill	None	2xUltra160	4U rack	6x4	Two	Two redundant	PCI	Jan 2003
8687-4VX	8 x Xeon MP 1.5GHz	1MB	64MB	4GB Chipkill	None	2xUltra160	4U rack	6x4	Two	Two redundant	PCI	Feb 2003
8687-5VX	8 x Xeon MP 1.9GHz	1MB	64MB	4GB Chipkill	None	2xUltra160	4U rack	6x4	Two	Two redundant	PCI	Feb 2003
8687-7VX	8 x Xeon MP 2.0GHz	2MB	64MB	4GB Chipkill	None	2xUltra160	4U rack	6x4	Two	Two redundant	PCI	Feb 2003

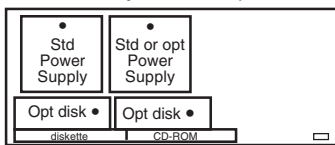
- Models certified for 16-way with VMware™ ESX Server 1.5.1 / Must be ordered in matched pairs to create a 16-way solution

Processors	8 x Intel® Xeon™ Processor MP up to 2.0GHz ¹ with 400MHz frontside bus / supports Hyper-Threading technology											
L2 cache	256KB or 512KB each processor / on die of processor / at processor speed											
L3 cache	Up to 2MB each processor / on die of processor / at processor speed											
L4 cache	64MB XcelL4™ Server Accelerator Cache (32MB in each SMP Expansion Module) / ECC / 64-bit 400MHz bus from Cache and Scalability Controller											
Processor upgrade	16-way with matched pair of 8-way servers											
SMP Expansion Module	Two SMP Expansion Modules std / two max / each contains four Intel 603-pin micro-PGA ZIF sockets for Xeon MP, 32MB 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 (only one RXE-100 supported per config)											
Memory	4GB std / 32GB max ¹³ per chassis (up to 16GB in each SMP Expansion Module) / eight 512MB DIMMs installed / 32 DIMM gold-connector slots (16 slots in each SMP Expansion Module) / must install four identical DIMMs at same time / 4-way interleaving / PC133-compliant / 3.3v registered 168-pin SDRAM RDIMMs / 133MHz / 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)											
SCSI disk controller	Adaptec® AIC-7899W / Wide Ultra160 SCSI (LVD 160MB/sec) / dual channel / 64-bit 66MHz PCI / integrated 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™ 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 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 / both removable from Ultrabay™ 2000 bays / supports CD-RW, DVD											
Ethernet	Broadcom® 5700 10/100/1000 ethernet controller / on I/O Board / full duplex / 64-bit 66MHz PCI bus / Wake on LAN®											
Graphics controller	SVGA / S3® Savage4 Pro / on I/O Board / 8MB SDRAM 125MHz std/max / up to 1280x1024 at 64K colors 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 / 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 Software	Light Path Diagnostics™ / primary indicator on information panel with LEDs associated with failing components / None											
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											
Cables	Three copper scalability cables (one 10", two 2.5M) / crossover ethernet cable											
Prerequisites	VMware ESX Server 1.5 (16 processor license), monitor, keyboard, mouse, SCSI disk, rack											

VMware ESX Server 1.5 (16 processor license)	481716X
512MB PC133 ECC SDRAM RDIMM	33L3324
1GB PC133 ECC SDRAM RDIMM	31P8300
IBM 36.4GB 10K Ultra160 SCSI Hot-Swap	06P5755
IBM 36.4GB 15K Ultra160 SCSI Hot-Swap	06P5768
IBM 73.4GB 10K Ultra160 SCSI Hot-Swap	06P5756
IBM ServeRAID™-4Mx Ultra160 SCSI Adapter	06P5736
4 to 16-Way Configuration Kit*	73P8734
8 to 16-way Configuration Kit*	73P8735
8X/4X/24X Max CD-RW Ultrabay 2000	22P9101
*Other options at ibm.com/pc/us/accessories	
*For upgrading existing x440 systems only	

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



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

- 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)
- VMware ESX Server supports Windows NT 4.0, Windows 2000 Server, Windows 2000 Advanced Server, Red Hat Linux 7.1 or 7.2, SuSE 7.3

All models: Maximum internal disk capacity: 146.8GB with two 73.4GB² hot-swap SCSI disks

LIMITED WARRANTY³

- ⇒ 1 year parts and labor
- ⇒ International Warranty Service³
- ⇒ On site, 24 hr x 7 day coverage, same day response time⁷
- ⇒ 1 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
- ⇒ 24x7¹⁴ toll-free support for warranty issues during the warranty period³

See footnotes for important warranty information

® US models announced February 18, 2003; others announced December 3, 2002

• = Hot-swap

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	Blower module bays std / max	Mechanical	Available date
8677-1XX	8678 HS20, SCSI Exp	0 / 14	0 / 4	Ethernet, Fibre Channel	1 / 1	2 / 4	2 / 2	7U ⁴ rack	Nov 2002
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 HS20 blades (and HS20 SCSI Storage Expansion Units) / 14 hot-pluggable bays / front access								
Switch modules	<i>Std: none; max: four / hot-swap / rear access</i>								
Ethernet Switch Module	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 / 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 (with two 9ft IEC 320-C13 to IEC 320-C14 cables for intrarack power distribution); max: four / hot-swap / rear access / 1200 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 BladeCenter 4-port GB Ethernet Switch Module	48P7054
NetBAY ACT Local Console Manager (CAT5 KVM cabling)	1735L04	IBM BladeCenter 2-port Fibre Channel Switch Module	48P7062
NetBAY ACT Remote Console Manager (CAT5 KVM cabling)	1735R16	IBM BladeCenter Acoustic Attenuation Module (for rear)	49P2694
NetBAY ACT 250mm KVM Conversion Option	32P1636	IBM FAST1700 Fibre Channel Storage Server	17421RU
NetBAY ACT 1.5m KVM Conversion Option	32P1652	IBM FAST200 Storage Server	35421RU
IBM Sleek 2-Button Stealth Black Mouse	28L3673	IBM G78 (16.0" vis) CRT flat shadow mask Monitor (blk)	66274AN
NetBAY42 Enterprise Rack Cabinet	930842S	IBM E54 (13.8" viewable) FST Monitor (black)	633147N
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	

Front

Rear

- ↳ 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

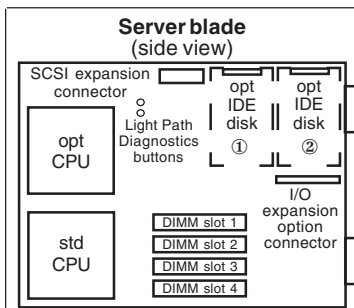
Switch module bay	Switch module function
1	Ethernet link 1 for all blade servers
2	Ethernet link 2 for all blade servers
3	Network connection 1 for all blade server I/O expansion options (Fibre Channel)
4	Network connection 2 for all blade server I/O expansion options (Fibre Channel)

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 ibm.com/services/its/us/source/wamomxeu.pdf
- ↳ 24x7¹⁴ toll-free support for warranty issues during the warranty period³

See footnotes for important warranty information
 • = Hot-swap
 US models announced September 24, 2002

IBM® Type-model	Qty x Processor ¹	Memory	Frontside Bus Mhz	Disk	Disk controller	Disk bays	SCSI support with optional stor exp unit	Slots x bays	Mechanical	Required chassis	Available date
8678-21X	1 x Xeon™ 2.0GHz	512MB	400Mhz	None (open)	EIDE	2 fixed	2 hot-swap	Ultra320	0x2 6U ⁴ blade	BladeCenter	Nov 2002
8678-41X	1 x Xeon 2.4GHz	512MB	400Mhz	None (open)	EIDE	2 fixed	2 hot-swap	Ultra320	0x2 6U blade	BladeCenter	Nov 2002
8678-51X	1 x Xeon 2.67GHz	512MB	400Mhz	None (open)	EIDE	2 fixed	2 hot-swap	Ultra320	0x2 6U blade	BladeCenter	Mar 2003
8678-61X	1 x Xeon 2.8GHz	512MB	400Mhz	None (open)	EIDE	2 fixed	2 hot-swap	Ultra320	0x2 6U blade	BladeCenter	Mar 2003
<p>Positioning Processor(s) <i>Ultra-dense, highly manageable modular computing platform with superior performance</i></p> <p>L2 cache 1 x Intel® Xeon 2.0 to 2.8GHz with 400 MHz frontside bus / Hyper-Threading technology / NetBurst™ microarchitecture</p> <p>SMP support 512KB / on die of processor / at processor speed (no L3 cache)</p> <p>Implementation 2-way SMP / up to two Xeon Processors (same speed/cache size)</p> <p>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</p>											
Memory	<p>512MB std / 8GB max¹³ / 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) 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)</p>										
IDE controller	Enhanced IDE ATA-100 controller in CSB5 South Bridge / two connectors on planar / each supports one 2.5" IDE disk / no cable as IDE disk attaches to riser card and tray (included with option kit) / each IDE connector on separate bus										
IDE disk bays	Supports max of two IDE disks / space for only one IDE disk if an I/O expansion option installed [Fibre Channel]										
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 100MHz PCI-X Bus B from CIOB-X2 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 LE 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 / CSB5 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	Two gigabit 10/100/1000 ethernet controllers / Broadcom® BCM5703 / 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 dual 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 (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	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) / H8S2148 / on blade / provides system and environmental monitoring, event recording, alert capability / RS-485 interface for communication with BladeCenter management module						Xeon 2.0GHz/512KB L2 Cache Proc Upg 48P7060			Xeon 2.4GHz/512KB L2 Cache Proc Upg 48P7096	
Diagnosics	Light Path Diagnostics™ (LED lights indicate failing component) and on-board diagnostics (via PC-Doctor in BIOS)						Xeon 2.67Ghz/512KB L2 Cache Proc Upg 73P5982			Xeon 2.8GHz/512KB L2 Cache Proc Upg 73P5983	
Security	Power-on password / administrator password / unattended boot / selectable boot / unattended start mode						512MB PC2100 CL2.5 ECC DDR-SDRAM DIMM 33L5038			1GB PC2100 CL2.5 ECC DDR-SDRAM RDIMM 33L5039	
Software ship group	Documentation CD, IBM Director 4.1 CD, Device Driver CD						2GB PC2100 CL2.5 ECC DDR-SDRAM RDIMM 33L5040			IBM HS20 SCSI Storage Expansion Unit (blade) 48P7058	
Cooling fans	Uses cooling from BladeCenter (type 8677) / thermal sensors on each processor and BladeCenter modules and front panel						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	
Power supply	Uses power module(s) in BladeCenter (type 8677)						36.4GB 15K Ultra160 SCSI Hot-Swap SL HDD* 06P5768			36.4GB 15K Ultra320 SCSI Hot-Swap SL HDD* 06P5776	
Prerequisites	Monitor, keyboard, mouse for setup; ethernet switch module, disk, BladeCenter (type 8677), operating system						73.4GB 10K Ultra160 SCSI Hot-Swap SL HDD* 06P5756			* 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
 146.8GB* with two 73.4GB 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 ibm.com/services/its/us/source/wamomxeu.pdf
- 24x7¹⁴ toll-free support for warranty issues during the warranty period³

See footnotes for important warranty information

Ⓜ US models announced March 11, 2003; others September 24, 2002

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.
- 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.



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