

IBM STG Field Skills Education

System x Reference (xREF)



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including

IBM®
System x® & BladeCenter®

April 22, 2009

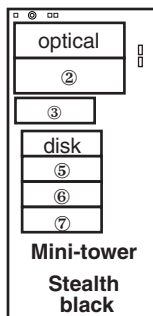


This document is available at
<http://www.redbooks.ibm.com/xref>

IBM® Machine Type	Machine model	Processor / Speed / Core	FSB MHz	L2 cache	Memory	Disk/Disk controller	Maximum Capacity	slots x bays	Hard disk bays	Power Supply	Ethernet	Available date
4367/4368	22Y	Core™ 2 Duo E4600 2.4GHz/DC	800	2MB	1x512MB	None/SATA	3.0TB	4 x 7	4 simple-swap	1x400W	Gb	Jan 2008
4367/4368	32Y	Xeon® E3110 3.0GHz/DC	1333	6MB	2x512MB	None/SATA	3.0TB	4 x 7	4 simple-swap	1x400W	Gb	Feb 2008
4367/4368	34Y	Xeon E3110 3.0GHz/DC	1333	6MB	2x512MB	None/SAS/SATA	3.0TB	4 x 7	4 hot-swap	1x400W	Gb	Feb 2008
4367/4368	42Y	Xeon X3320 2.5GHz/QC	1333	6MB	2x512MB	None/SAS/SATA	3.0TB	4 x 7	4 hot-swap	1x400W	Gb	Apr 2008
4367/4368	52Y	Xeon X3350 2.66GHz/QC	1333	12MB	2x512MB	None/SAS	584GB	4 x 7	4 hot-swap	1x400W	Gb	Apr 2008
4367/4368	54Y	Xeon X3350 2.66GHz/QC	1333	12MB	2x512MB	None/SAS/SATA	3.0TB	4 x 7	4 hot-swap	2x430W	Gb	Apr 2008
4367/4368	72Y	Xeon X3360 2.83GHz/QC	1333	12MB	2x512MB	None/SAS/SATA	3.0TB	4 x 7	4 hot-swap	1x400W	Gb	Apr 2008
4367/4368	74Y	Xeon X3360 2.83GHz/QC	1333	12MB	2x512MB	None/SAS	584GB	4 x 7	4 hot-swap	2x430W	Gb	Apr 2008

Positioning Processor(s)	<i>Single socket, entry server for small and medium size business' and distributed enterprises</i> Intel® Core 2 Duo up to 2.4GHz 800MHz FSB / Xeon up to 3.0GHz 1333MHz FSB / Dual-Core / Xeon up to 2.83GHz 1333MHz FSB / Quad-Core / All Optimized for Extended Memory 64 Technology (EM64T)											
L2 cache Implementation	2MB std on Core 2 Duo / 6 or 12MB std on Xeon Motherboard contains one LGA-775 socket, four DIMM sockets, two PCI Express slots, three PCI slots, SAS/SATA support, ATI video and Gigabit Ethernet.											
SMP support	No SMP support / no processor upgrade											
Memory	512MB or 1GB std / 8GB ¹³ max / four 184-pin gold-plated DIMM sockets / one or two socket used / PC2-5300 667MHz ECC DDR2-SDRAM / All Error Checking and Correcting (ECC) / DIMMs and ECC memory controller / industry std / unbuffered											
SAS/SATA controller	LSI Logic® 1064e / daughter card / supports SAS or SATA drives / four-port / PCI-Express / RAID 0,1											
SATA controller Cables Disk	Four channel SATA controller (3.0GB/sec) / supports 4 drives standard / integrated One 1-drop SATA cable per installed hard disk / one 1-drop SATA cable per installed optical drive None standard											
Rack support Bus slots (see below)	5U ⁴ rack mount support via tower-to-rack kit option One PCI-E x8 / one PCI-E x4 / two 32-bit 33MHz 5v PCI 2.2 slots / one optional 64-bit 133MHz PCI-X slot											
Chipset	Intel 3210 chipset / Memory Controller Hub (MCH) / I/O Controller Hub (ICH9R) for PCI 2.2, ethernet MAC, USB, Low Pin Count Interface / Firmware Hub / SMSC® SCH5027 Super I/O for diskette, parallel, serial, keyboard, mouse											
Ethernet	10/100/1000 gigabit / Broadcom® 5722 / on planar / full-duplex / PHY and MAC layers / Preboot eXecution Environment (PXE) / Wake on LAN®											
Optical / diskette Ports Diagnostics Systems mgmt	DVD-ROM, SATA / None standard <i>Front:</i> two USB (2.0); <i>Rear:</i> two serial (9-pin), parallel, four USB (2.0), ethernet (RJ45) and video Diagnostic LEDs / error LEDs for fans and memory / server diagnostic programs stored on IBM Enhanced Diagnostics CD Mini-baseboard management controller / IPMI 2.0 / monitors system and processor temperature, fan speed and failure, and voltages / secure remote power on/off / support for optional Remote Supervisor Adapter II											
Graphics controller	ATI® ES1000(RN50) / 16MB DDR2 SDRAM std/max / on planar / analog 15-pin / up to 1024x768x32bit@85Hz											
Security	Chassiss intrusion detection / mechanical side panel key lock / U-Bolt Tie-down capability/power-on password / boot sequence control / operation without kybd/mouse											
Software	ServerGuide™ (CD-based automated network OS installation and configuration tool), IBM Director (system hardware management software) and many utilities											
Keyboard / mouse Cooling fans Power supply	Standard Three fans (cpu, rear, pwr supply) plus additional fan on SAS models / not redundant / not hot-swap Some: 400W / not hot-swap / no redundancy / some: 430W / hot-swap / redundant / all: universal / auto switch / Automatic Server Restart (ASR) / cooling fan in power supply (variable speed)											
	512MB PC2-5300 ECC DDR2 667MHz 2GB(2x1GB) PC2-5300 ECC DDR2 667MHz 4GB(2x2GB) PC2-5300 ECC DDR2 667MHz IBM 160GB SATA (7.2K) simple-swap HDD IBM 250GB SATA (7.2K) simple-swap HDD IBM 500GB SATA (7.2K) simple-swap HDD IBM 750GB SATA (7.2K) simple-swap HDD 160GB Hot-Swap SATA HDD 250GB Hot-Swap SATA HDD 500GB Hot-Swap SATA HDD 750GB Hot-Swap SATA HDD 73GB 15K 3.5" SAS Hot-Swap HDD 146GB 15K 3.5" SAS Hot-Swap HDD IBM HH SATA Multiburner Comb drive (DVD-RAM) IBM Remote Supervisor Adapter II slimline IBM 5Ux20D Tower-to-Rack Kit IBM SAS HBA Controller										41Y2726 41Y2729 41Y2732 39M4504 39M4508 39M4514 43W7572 39M4522 39M4526 39M4530 43W7576 40K1043 40K1044 43W8265 39Y9566 42C8923 25R8060	

Other options at ibm.com/products/us



- Slot 1: fullsize, PCI-E x8 (x8 electrical)
- Slot 2: fullsize, PCI-E x4 (x1 electrical)
- Slot 3: fullsize, 64-bit 133MHz, 3.3v PCI-X (Optional)
- Slot 4: fullsize, 32-bit 33MHz, PCI 2.2 (5v)
- Slot 5: fullsize, 32-bit 33MHz, PCI 2.2 (5v)

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

- ◇ Predictive Failure Analysis on disk(s) with IBM Director can alert the administrator of an imminent component failure
- ◇ Redundant power supplies standard in some models

- ◇ Removable left side panel
- ◇ Configuration/Setup Utility (in flash memory) invoked by pressing F1 at startup
- ◇ Advanced Configuration Power Interface (ACPI) 2.0
- ◇ Device Drivers and Diagnostics CD-ROM included
- ◇ Four stabilizing feet
- ◇ H 17.25" x W 8.5" x D 21.25"
- ◇ H 448mm x W 215.9mm x D 539.75mm
- ◇ 36 to 56 pounds (16.3 to 25.2kg)

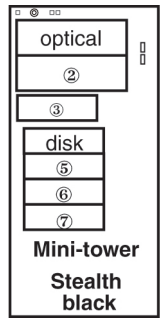
Maximum SATA capacity:
3TB¹³ (4 disks x 750GB)
Maximum hot-swap SAS capacity:
584GB¹³ (4 disks x 146GB)

LIMITED WARRANTY³

- ⇨ 1 year parts and labor standard 4367MTM
- ⇨ 3 year parts and labor standard 4368 MTM
- ⇨ 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 51J9055)
 - 3 year IOR 24x7, 4 hr avg response (ServicePac part num 51J9054)
 - 3 year IOR 9x5, 4 hr avg response (ServicePac part num 51J9053)
 - 3 year IOR 9x5, NBD response (ServicePac part num 51J9052)
- ⇨ Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- ⇨ 24x7¹⁴ toll-free support for warranty issues during the warranty period³

IBM [®] Machine Type	Machine model	Processor / Speed / Core	FSB MHz	L2 cache	Memory	Disk/Disk controller	slots x bays	Hard disk bays	Power Supply	Ethernet	Available date
4367/4368	B2Y	Core™ 2 Duo E2200 2.2GHz/DC	800	1MB	1x512MB	Open/SATA	4 x 7	4 simple-swap	1x400W	Gigabit	Sep 2008
4367/4368	C2Y	Core 2 Duo E7200 2.53GHz/DC	1066	3MB	1x512MB	Open/SATA	4 x 7	4 simple-swap	1x400W	Gigabit	Sep 2008
4367/4368	76Y	Xeon® X3360 2.83GHz/QC	1333	12MB	2x512MB	Open/SAS/SATA	4 x 7	4 hot-swap	1x400W	Gigabit	Sep 2008
4367/4368	84Y	Xeon X3370 3.0GHz/QC	1333	12MB	2x1GB	Open/SAS/SATA	4 x 7	4 hot-swap	2x430W	Gigabit	Sep 2008
4367/4368	E4U*	Xeon X3370 3.0GHz/QC	1333	12MB	2x2GB	Open/SAS/SATA	4 x 7	4 hot-swap	2x430W	Gigabit	Dec 2008

Positioning Processor(s)	<i>Single socket, entry server for small and medium size business' and distributed enterprises</i> Intel® Core 2 Duo at 2.2GHz 800MHz FSB Dual-Core / Core 2 Duo at 2.53GHz 1066MHz FSB Dual-Core / Xeon up to 3.0GHz 1333MHz FSB Quad-Core / All Optimized for Extended Memory 64 Technology (EM64T)											
L2 cache Implementation	2MB std on Core 2 Duo / 6 or 12MB std on Xeon											
SMP support	Motherboard contains one LGA-775 socket, four DIMM sockets, two PCI Express slots, three PCI slots, SAS/SATA support, ATI video and Gigabit Ethernet. No SMP support / no processor upgrade											
Memory	512MB, 1 or 2GB std / 8GB ¹³ max / four 184-pin gold-plated DIMM sockets / one or two socket used / PC2-6400 800MHz ECC DDR2-SDRAM / All Error Checking and Correcting (ECC) / DIMMs and ECC memory controller / industry std / unbuffered											
SAS/SATA controller	LSI Logic® 1064e / daughter card / supports SAS or SATA drives / four-port / PCI-Express / RAID 0,1											
SATA controller	Four channel SATA controller (3.0Gb/sec) / supports 4 drives standard / integrated											
Cables	One 1-drop SATA cable per installed hard disk / one 1-drop SATA cable per installed optical drive											
Disk	None standard											
Rack support	5U ⁴ rack mount support via tower-to-rack kit option											
Bus slots (see below)	One PCI-E x8 / one PCI-E x4 / two 32-bit 33MHz 5v PCI 2.2 slots / one optional 64-bit 133MHz PCI-X slot											
Chipset	Intel 3210 chipset / Memory Controller Hub (MCH) / I/O Controller Hub (ICH9R) for PCI 2.2, ethernet MAC, USB, Low Pin Count Interface / Firmware Hub / SMSC® SCH5027 Super I/O for diskette, parallel, serial, keyboard, mouse											
Ethernet	Gigabit Ethernet / Broadcom® 5722 / on planar / full-duplex / PHY and MAC layers / Preboot eXecution Environment (PXE) / Wake on LAN [®]											
Optical / diskette Ports	DVD-ROM, SATA / None standard											
Diagnosics	<i>Front:</i> two USB (2.0); <i>Rear:</i> two serial (9-pin), parallel, four USB (2.0), ethernet (RJ45) and video											
Systems mgmt	Diagnostic LEDs / error LEDs for fans and memory / server diagnostic programs stored on IBM Enhanced Diagnostics CD Mini-baseboard management controller / IPMI 2.0 / monitors system and processor temperature, fan speed and failure, and voltages / secure remote power on/off / support for optional Remote Supervisor Adapter II											
Graphics controller	ATI® ES1000(RN50) / 16MB DDR2 SDRAM std/max / on planar / analog 15-pin / up to 1024x768x32bit@85Hz											
Security	Chassiss intrusion detection / mechanical side panel key lock / U-Bolt Tie-down capability/power-on password / boot sequence control / operation without kybd/mouse											
Software	ServerGuide™ (CD-based automated network OS installation and configuration tool), IBM Director (system hardware management software) and many utilities											
Keyboard / mouse	Standard											
Cooling fans	Three fans (cpu, rear, pwr supply) plus additional fan on SAS models / not redundant / not hot-swap											
Power supply	Some: 400W / not hot-swap / no redundancy / some: 430W / hot-swap / redundant / all: universal / auto switch / Automatic Server Restart (ASR) / cooling fan in power supply (variable speed)											



- Slot 1: fullsize, PCI-E x8 (x8 electrical)
- Slot 2: fullsize, PCI-E x4 (x1 electrical)
- Slot 3: fullsize, 64-bit 133MHz, 3.3v PCI-X (Optional)
- Slot 4: fullsize, 32-bit 33MHz, PCI 2.2 (5v)
- Slot 5: fullsize, 32-bit 33MHz, PCI 2.2 (5v)
- Bay 1 5.25", HH 1.6", access, optical
- Bay 2 5.25", HH 1.6", access, open (no disk)
- Bay 3 3.5", SL 1", access, open
- Bay 4 3.5", SL 1", access, std disk (some)
- Bay 5 3.5", SL 1", access, open
- Bay 6 3.5", SL 1", access, open
- Bay 7 3.5", SL 1", access, open
- ◇ Predictive Failure Analysis on disk(s) with IBM Director can alert the administrator of an imminent component failure
- ◇ Redundant power supplies standard in some models

- ◇ Removable left side panel
- ◇ Configuration/Setup Utility (in flash memory) invoked by pressing F1 at startup
- ◇ Advanced Configuration Power Interface (ACPI) 2.0
- ◇ Device Drivers and Diagnostics CD-ROM included
- ◇ Four stabilizing feet
- ◇ H 17.25" x W 8.5" x D 21.25"
- ◇ H 448mm x W 215.9mm x D 539.75mm
- ◇ 36 to 56 pounds (16.3 to 25.2kg)

Maximum SATA capacity:
4TB¹³ (4 disks x 1TB)
Maximum hot-swap SAS capacity:
584GB¹³ (4 disks x 146GB)

Other options at ibm.com/products/us

LIMITED WARRANTY³

- 1 year parts and labor standard 4367MTM
- 3 year parts and labor standard 4368 MTM
- 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 51J9055)
 - 3 year IOR 24x7, 4 hr avg response (ServicePac part num 51J9054)
 - 3 year IOR 9x5, 4 hr avg response (ServicePac part num 51J9053)
 - 3 year IOR 9x5, NBD response (ServicePac part num 51J9052)
- Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- 24x7¹⁴ toll-free support for warranty issues during the warranty period³

See footnotes for important warranty information

* = Express Models

IBM® Machine Type	model	Processor / Speed / Core	L2 cache	FSB MHz	Memory	Disk controller	Disk bays	Mechanical	Slots x bays	Ethernet	Ltd warr ³	Available date
4190/4194 15Y	Celeron® 440	2.0GHz/SC	512KB	800	2 x 512MB	SATA (no RAID)	2 simple-swap	1U ⁴ rack	2x3	Dual Gb	1/3yr	Jan 2008
4190/4194 22Y	Core™ 2 Duo E4600	2.4GHz/DC	2MB	800	2 x 512MB	SATA (no RAID)	2 simple-swap	1U rack	2x3	Dual Gb	1/3yr	Jan 2008
4190/4194 52Y	Xeon® E3110	3.0GHz/DC	6MB	1333	2 x 512MB	SAS/SATA	2 hot-swap	1U rack	2x3	Dual Gb	1/3yr	Feb 2008
4190/4194 62Y	Xeon X3320	2.5GHz/QC	6MB	1333	2 x 512MB	SATA (no RAID)	2 simple-swap	1U rack	2x3	Dual Gb	1/3yr	Apr 2008
4190/4194 64Y	Xeon X3320	2.5GHz/QC	6MB	1333	2 x 512MB	SAS/SATA	2 hot-swap	1U rack	2x3	Dual Gb	1/3yr	Apr 2008
4190/4194 66Y	Xeon X3320	2.5GHz/QC	6MB	1333	2 x 512MB	SAS	4 hot-swap	1U rack	2x5	Dual Gb	1/3yr	Apr 2008
4190/4194 72Y	Xeon X3350	2.66GHz/QC	12MB	1333	2 x 1GB	SAS/SATA	2 hot-swap	1U rack	2x3	Dual Gb	1/3yr	Apr 2008
4190/4194 74Y	Xeon X3350	2.66GHz/QC	12MB	1333	2 x 1GB	SAS	4 hot-swap	1U rack	2x5	Dual Gb	1/3yr	Apr 2008

Positioning Processor(s) *Efficient and dense 1U, single-socket, rack-optimized server for web and network infrastructure*
Intel® Celeron up to 2.0GHz 800MHz FSB / Core 2 Duo up to 2.4GHz 800MHz FSB Dual-Core / Xeon up to 3.0GHz 1333MHz FSB Dual-Core / Xeon up to 2.66GHz 1333MHz FSB Quad-Core / All Optimized for Extended Memory 64 Technology (EM64T)
 L2 cache **512KB** std on Celeron / **2MB** std on Core 2 Duo / **6 or 12MB** std on Xeon
 SMP support **No SMP support**
 Implementation **Motherboard contains one LGA-775 socket, four DIMM sockets, integrated SATA or SAS/SATA, Dual Gigabit Ethernet and two PCI Express® x8 slots**

Memory **1 or 2GB** std / **8GB¹³ max** / four 184-pin gold-plated DIMM sockets / two sockets used / **PC2-5300 667MHz ECC DDR2-SDRAM** / **All Error Checking and Correcting (ECC)** / DIMMs and ECC memory controller / industry std / unbuffered

SAS/SATA controller **LSI Logic® 1064e** / daughter card / supports SAS or SATA drives / four-port / PCI-Express / **RAID 0,1**
 SATA controller **Four channel SATA controller (3.0Gb/sec) / 2 drives supported / integrated into South Bridge / RAID via ServeRAID-BR10i SAS/SATA controller kit(44X0411)**
 IDE controller **Enhanced IDE busmaster / ATA-100 support / one connector on systemboard**
 Cables **SAS models: one 1-drop EIDE cable (connected to Optical)**
SATA models: two 1-drop SATA cables, one 1-drop EIDE cable (connected to Optical)

Mechanical Architecture / chipsets **EIA 22" Rack (1U⁴) / rack-mount only**
Intel 3210 chipset / Memory Controller Hub (MCH) / I/O Controller Hub (ICH9R) for PCI-E, ATA-100 EIDE, ethernet MAC, USB, Low Pin Count Interface / Firmware Hub / SMSC® SCH5027 Super I/O for serial, keyboard, mouse
 Bus slots **(See below) two PCI-E™ x8**

Ethernet controllers **Dual-Gigabit** Ethernet ports / Broadcom® 5722 & 5703 / full gigabit ethernet MAC and PHY layer functions / integrated / port one is PCI-E, port two is PCI 2.2 / full duplex / PXE / Wake on LAN® / Rear RJ-45 ports (2)
 Optical / diskette Ports **48X-32X-48X-16X® CD-RW/DVD-ROM, IDE / Diskette: none**
Front: two USB (2.0) / Rear: serial (9-pin), two ethernet (RJ-45), video (DB-15), two USB (2.0), one systems mgt (RJ-45)

Graphics **ATI® ES1000(RN50) / 16MB SDRAM std/max / on planar / analog 15-pin / up to 1024x768x32bit@85Hz**

Console interconnects **No system-to-system interconnect cable**

Systems mgmt **Mini-baseboard management controller / IPMI 2.0 / monitors system and processor temperature, fan failure, and voltages**

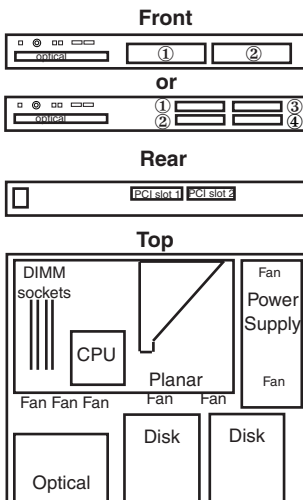
Diagnostics **Diagnostic LEDs/ Error LEDs for fans and memory/ Diagnostics via PC-Doctor on a standard IBM Enhanced Diagnostics CD (diskette can be created) / support for optional slimline Remote Supervisor Adapter II with dedicated slot on planar for continuous power (no external power required)**

Security **Power-on password / administrator password / unattended boot / selectable boot / unattended start mode / secure remote power on / off via IPMI 2.0**
 Software **ServerGuide™** (CD-ROM installation and configuration utilities), IBM Director™ and others

Cooling fans **Seven fans (five fans for system, two on power supply) / variable speed / not redundant or hot-swap**
 Power supply **351 watt / universal / auto-sensing / auto-restart support**
 Prerequisites **Monitor, keyboard, mouse, rack**

- 512MB PC2-5300 ECC DDR2
- 2GB(2x1GB) PC2-5300 ECC DDR2
- 4GB(2x2GB) PC2-5300 ECC DDR2
- IBM 73GB SFF SAS HDD
- 40K1052
- IBM 160GB SATA (7.2K) simple-swap HDD
- 39M4504
- IBM 250GB SATA (7.2K) simple-swap HDD
- 39M4508
- IBM 500GB SATA (7.2K) simple-swap HDD
- 39M4514
- IBM 750GB SATA (7.2K) simple-swap HDD
- 43W7572
- 160GB Hot-Swap SATA HDD
- 39M4522
- 250GB Hot-Swap SATA HDD
- 39M4526
- 500GB Hot-Swap SATA HDD
- 39M4530
- 750GB Hot-Swap SATA HDD
- 43W7576
- 73GB 15K 3.5" SAS Hot-Swap HDD
- 40K1043
- 146GB 15K 3.5" SAS Hot-Swap HDD
- 40K1044
- 300GB 15K 3.5" SAS Hot-Swap HDD
- 43X0802
- 73GB 10K SFF SAS Hot-Swap HDD
- 40K1052
- 146GB 10K SFF SAS Hot-Swap HDD
- 43X0824
- 73GB 15K SFF SAS Hot-Swap HDD
- 43X0837
- IBM Remote Supervisor Adapter II slimline
- 39Y9566
- ServeRAID-BR10i SAS/SATA controller kit
- 44X0411
- ServeRAID-MR10i SAS/SATA controller kit
- 43W4296

Other options at ibm.com/products/us



Some:
 Bay 1 2.5", SFF, access, open for hot-swap disk
 Bay 2 2.5", SFF, access, open for hot-swap disk
 Bay 3 2.5", SFF, access, open for hot-swap disk
 Bay 4 2.5", SFF, access, open for hot-swap disk
 Bay 5 5.25", UltraSlim 0.5", access, std optical

- Some:
- Bay 1 3.5", SL 1", access, open for simple-swap/hot-swap disk
- Bay 2 3.5", SL 1", access, open for simple-swap/hot-swap disk
- Bay 3 5.25", UltraSlim 0.5", access, std optical
- ⇒ Raven black front bezel
- ⇒ H 1.75" (1U) x W 17.32" x D 22"; 43mm x 440mm x 559mm
- ⇒ 24.4 to 28 lbs; 11kg to 12.7kg (minimum to max configuration)
- ⇒ Configuration/Setup Utility: F1 at startup
- ⇒ Network Boot: F12 at startup
- ⇒ Operator Information Panel in front
- ⇒ Ships with Diagnostics CD, ServerGuide Setup and Installation CD
- ⇒ Predictive Failure Analysis on disk(s) with IBM Director can alert the administrator of an imminent component failure

Maximum internal disk capacity¹³ (model dependent):
 1.5TB with two 750GB 3.5" SATA disks, 600GB with two 300GB 3.5" SAS disks or 292GB with four 2.5" 73GB SAS disks

LIMITED WARRANTY³

- ⇒ 1 year parts and labor standard 4190 MTM
- ⇒ 3 year parts and labor standard 4194 MTM
- ⇒ 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 avg response (ServicePac part num 51J9180)
- ⇒ 3 year IOR 9x5, 4 hr avg response (ServicePac part num 51J9181)
- ⇒ 3 year IOR 24x7, 4 hr avg response (ServicePac part num 51J9182)
- ⇒ Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- ⇒ 24x7¹⁴ toll-free support for warranty issues during the warranty period³

IBM® Machine Type	model	Processor / Speed / Core	L2 cache	FSB MHz	Memory	Disk controller	Disk bays	Mechanical	Slots x bays	Ethernet	Ltd warr ³	Available date
4190/4194 B2Y		Core™ 2 Duo E2200 2.2GHz/DC	1MB	800	2 x 512MB	SATA (no RAID)	2 simple-swap	1U ⁴ rack	2x3	Dual Gb	1/3yr	Sep 2008
4190/4194 C2Y		Core 2 Duo E7200 2.53GHz/DC	3MB	1066	2 x 512MB	SATA (no RAID)	2 simple-swap	1U rack	2x3	Dual Gb	1/3yr	Sep 2008
4190/4194 42Y		Xeon® E3120 3.16GHz/DC	6MB	1333	2 x 512MB	SAS/SATA	2 hot-swap	1U rack	2x3	Dual Gb	1/3yr	Sep 2008
4190/4194 D2Y		Xeon X3330 2.66GHz/QC	6MB	1333	2 x 512MB	SATA (no RAID)	2 simple-swap	1U rack	2x3	Dual Gb	1/3yr	Sep 2008
4190/4194 D4Y		Xeon X3330 2.66GHz/QC	6MB	1333	2 x 512MB	SAS/SATA	2 hot-swap	1U rack	2x3	Dual Gb	1/3yr	Sep 2008
4190/4194 D6Y		Xeon X3330 2.66GHz/QC	6MB	1333	2 x 512MB	SAS	4 hot-swap	1U rack	2x5	Dual Gb	1/3yr	Sep 2008
4190/4194 82Y		Xeon X3360 2.83GHz/QC	12MB	1333	1 x 1GB	SAS/SATA	2 hot-swap	1U rack	2x3	Dual Gb	1/3yr	Sep 2008
4190/4194 84Y		Xeon X3360 2.83GHz/QC	12MB	1333	1 x 1GB	SAS	4 hot-swap	1U rack	2x5	Dual Gb	1/3yr	Sep 2008

Positioning Processor(s) *Efficient and dense 1U, single-socket, rack-optimized server for web and network infrastructure*
Intel® Core 2 Duo at 2.2GHz 800MHz FSB Dual-Core / Core 2 Duo at 2.53GHz 1066MHz FSB Dual-Core / Xeon at 3.16GHz 1333MHz FSB Dual-Core / Xeon up to 2.83GHz 1333MHz FSB Quad-Core / All Optimized for Extended Memory 64 Technology (EM64T)
 1 or 3MB std on Core 2 Duo / 6 or 12MB std on Xeon
 SMP support No SMP support
 Implementation Motherboard contains one LGA-775 socket, four DIMM sockets, integrated SATA or SAS/SATA, Dual Gigabit Ethernet and two PCI Express® x8 slots

Memory **1GB std / 8GB¹³ max / four 184-pin gold-plated DIMM sockets / one or two sockets used / PC2-6400 800MHz ECC DDR2-SDRAM / All Error Checking and Correcting (ECC) / DIMMs and ECC memory controller / industry std / unbuffered**

SAS/SATA controller **LSI Logic® 1064e** / daughter card / supports SAS or SATA drives / four-port / PCI-Express / **RAID 0,1**
 SATA controller Four channel SATA controller (3.0Gb/sec) / 2 drives supported / integrated into South Bridge / RAID via ServeRAID-BR10i SAS/SATA controller kit(44X0411)
 IDE controller Enhanced IDE busmaster / ATA-100 support / one connector on systemboard
 Cables **SAS models:** one 1-drop EIDE cable (connected to Optical)
SATA models: two 1-drop SATA cables, one 1-drop EIDE cable (connected to Optical)

Mechanical Architecture / chipsets **EIA 22" Rack (1U⁴) / rack-mount only**
Intel 3210 chipset / Memory Controller Hub (MCH) / I/O Controller Hub (ICH9R) for PCI-E, ATA-100 EIDE, ethernet MAC, USB, Low Pin Count Interface / Firmware Hub / SMSC® SCH5027 Super I/O for serial, keyboard, mouse
 Bus slots (See below) two PCI-E™ x8

Ethernet controllers **Dual-Gigabit** Ethernet ports / Broadcom® 5722 & 5703 / full gigabit ethernet MAC and PHY layer functions / integrated / port one is PCI-E, port two is PCI 2.2 / full duplex / PXE / Wake on LAN® / Rear RJ-45 ports (2)
 Optical / diskette Ports **48X-32X-48X-16X® CD-RW/DVD-ROM, IDE / Diskette: none**
Front: two USB (2.0) / **Rear:** serial (9-pin), two ethernet (RJ-45), video (DB-15), two USB (2.0), one systems mgt (RJ-45)

Graphics ATI® ES1000(RN50) / 16MB SDRAM std/max / on planar / analog 15-pin / up to 1024x768x32bit@85Hz

Console interconnects No system-to-system interconnect cable

Systems mgmt Mini-baseboard management controller / IPMI 2.0 / monitors system and processor temperature, fan failure, and voltages

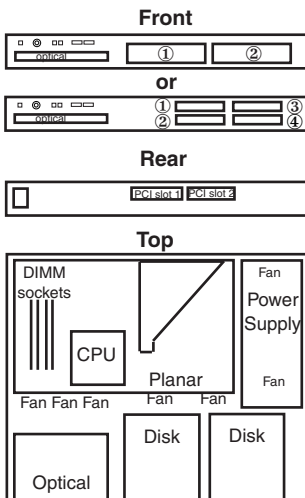
Diagnostics Diagnostic LEDs/ Error LEDs for fans and memory/ Diagnostics via PC-Doctor on a standard IBM Enhanced Diagnostics CD (diskette can be created) / support for optional slimline Remote Supervisor Adapter II with dedicated slot on planar for continuous power (no external power required)

Security Power-on password / administrator password / unattended boot / selectable boot / unattended start mode / **secure remote power on / off via IPMI 2.0**
 Software **ServerGuide™** (CD-ROM installation and configuration utilities), IBM Director™ and others

Cooling fans Seven fans (five fans for system, two on power supply) / variable speed / not redundant or hot-swap
 Power supply Prerequisites 351 watt / universal / auto-sensing / auto-restart support
 Monitor, keyboard, mouse, rack

1GB(2x512MB) PC2-6400 CL6 ECC DDR2 800MHz DIMM Kit	46C7443
2GB(2x1GB) PC2-6400 CL6 ECC DDR2 800MHz DIMM Kit	46C7428
4GB(2x2GB) PC2-6400 CL6 ECC DDR2 800MHz DIMM Kit	46C7429
512MB PC2-5300 ECC DDR2	41Y2726
2GB(2x1GB) PC2-5300 ECC DDR2	41Y2729
4GB(2x2GB) PC2-5300 ECC DDR2	41Y2732
IBM 73GB SFF SAS HDD	40K1052
IBM 160GB SATA (7.2K) simple-swap HDD	39M4504
IBM 250GB SATA (7.2K) simple-swap HDD	39M4508
IBM 500GB SATA (7.2K) simple-swap HDD	39M4514
IBM 750GB SATA (7.2K) simple-swap HDD	43W7572
160GB Hot-Swap SATA HDD	39M4522
250GB Hot-Swap SATA HDD	39M4526
500GB Hot-Swap SATA HDD	39M4530
750GB Hot-Swap SATA HDD	43W7576
1TB Hot-Swap SATA HDD	43W7626
73GB 15K 3.5" SAS Hot-Swap HDD	40K1043
146GB 15K 3.5" SAS Hot-Swap HDD	40K1044
300GB 15K 3.5" SAS Hot-Swap HDD	43X0802
73GB 10K SFF SAS Hot-Swap HDD	40K1052
146GB 10K SFF SAS Hot-Swap HDD	43X0824
73GB 15K SFF SAS Hot-Swap HDD	43X0837
IBM Remote Supervisor Adapter II slimline	39Y9566
ServeRAID-BR10i SAS/SATA controller kit	44X0411
ServeRAID-MR10i SAS/SATA controller kit	43W4296

Other options at ibm.com/products/us



Slot 1: 3/4 length, full height, PCI-E x8
 Slot 2: half length, low-profile, PCI-E x8

Some:
 Bay ① 2.5", SFF, access, open for hot-swap disk
 Bay ② 2.5", SFF, access, open for hot-swap disk
 Bay ③ 2.5", SFF, access, open for hot-swap disk
 Bay ④ 2.5", SFF, access, open for hot-swap disk
 Bay ⑤ 5.25", UltraSlim 0.5", access, std optical

Some:
 Bay ① 3.5", SL 1", access, open for simple-swap/hot-swap disk
 Bay ② 3.5", SL 1", access, open for simple-swap/hot-swap disk
 Bay ③ 5.25", UltraSlim 0.5", access, std optical

- Raven black front bezel
- H 1.75" (1U) x W 17.32" x D 22"; 43mm x 440mm x 559mm
- 24.4 to 28 lbs; 11kg to 12.7kg (minimum to max configuration)
- Configuration/Setup Utility: F1 at startup
- Network Boot: F12 at startup
- Operator Information Panel in front
- Ships with Diagnostics CD, ServerGuide Setup and Installation CD
- Predictive Failure Analysis on disk(s) with IBM Director can alert the administrator of an imminent component failure

Maximum internal disk capacity¹³ (model dependent):
 2TB with two 1TB 3.5" SATA disks, 600GB with two 300GB SAS disks or 584GB with four 2.5" 146GB SAS disks

LIMITED WARRANTY³

- 1 year parts and labor standard 4190 MTM
- 3 year parts and labor standard 4194 MTM
- 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 avg response (ServicePac part num 51J9180)
 - 3 year IOR 9x5, 4 hr avg response (ServicePac part num 51J9181)
 - 3 year IOR 24x7, 4 hr avg response (ServicePac part num 51J9182)
- Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- 24x7¹⁴ toll-free support for warranty issues during the warranty period³

IBM® Machine Type	Machine model	Processor / Speed / Core	L2 cache	FSB MHz	Memory	Disk controller	Disk bays	Mechanical	Slots x bays	Ethernet	Ltd warr ³	Available date
4192/4193 32Y	Xeon® 3065	2.33GHz/DC	4MB	1333	2 x 512MB	SATA (no RAID)	2 simple-swap	1U ⁴ rack	2x3	Dual Gb	1/3yr	Jan 2008
4192/4193 42Y	Xeon 3075	2.66GHz/DC	4MB	1333	2 x 512MB	SATA (no RAID)	2 simple-swap	1U rack	2x3	Dual Gb	1/3yr	Jan 2008
4192/4193 44Y	Xeon 3075	2.66GHz/DC	4MB	1333	2 x 512MB	SAS/SATA	2 hot-swap	1U rack	2x3	Dual Gb	1/3yr	Jan 2008
4192/4193 52Y	Xeon E3110	3.0GHz/DC	6MB	1333	2 x 512MB	SAS/SATA	2 hot-swap	1U rack	2x3	Dual Gb	1/3yr	Feb 2008
4192/4193 62Y	Xeon X3320	2.5GHz/QC	12MB	1333	2 x 1GB	SAS	4 hot-swap	1U rack	2x5	Dual Gb	1/3yr	Apr 2008
4192/4193 72Y	Xeon X3350	2.66GHz/QC	12MB	1333	2 x 1GB	SAS	4 hot-swap	1U rack	2x5	Dual Gb	1/3yr	Apr 2008
4192/4193 82Y	Xeon X3360	2.83GHz/QC	12MB	1333	2 x 1GB	SAS	4 hot-swap	1U rack	2x5	Dual Gb	1/3yr	Apr 2008

Positioning Processor(s) *Efficient and dense 1U, single-socket, rack-optimized server for web and network infrastructure*
Intel® Xeon up to 3.0GHz 1333MHz FSB Dual-Core / Xeon up to 3.0GHz 1333MHz FSB Quad-Core / All Optimized for Extended Memory 64 Technology (EM64T)
4, 6 or 12MB std on Xeon

L2 cache No SMP support
 SMP support Motherboard contains one LGA-775 socket, four DIMM sockets, integrated SATA or SAS/SATA, Dual Gigabit Ethernet and
 Implementation two PCI Express® x8 slots

Memory **1 or 2GB** std / 8GB¹³ max / four 240-pin gold-plated DIMM sockets / two sockets used / **PC2-5300 667MHz ECC DDR2-SDRAM / All Error Checking and Correcting (ECC)** / DIMMs and ECC memory controller / industry std / unbuffered

SAS/SATA controller **LSI Logic® 1064e** / daughter card / supports SAS or SATA drives / four-port / PCI-Express / **RAID 0,1**
 SATA controller Four channel SATA controller (3.0Gb/sec) / 2 drives supported / integrated into South Bridge / RAID via ServeRAID-BR10i SAS/SATA controller kit(44X0411)

IDE controller Enhanced IDE busmaster / ATA-100 support / one connector on systemboard
 Cables **SAS models:** one 1-drop EIDE cable (connected to Optical)
SATA models: two 1-drop SATA cables, one 1-drop EIDE cable (connected to Optical)

Mechanical Architecture / chipsets **EIA 22" Rack (1U⁴)** / rack-mount only
Intel 3210 chipset / Memory Controller Hub (MCH) / I/O Controller Hub (ICH9R) for PCI-E, ATA-100 EIDE, ethernet MAC, USB, Low Pin Count Interface / Firmware Hub / SMSC® SCH5027 Super I/O for serial, keyboard, mouse
 Bus slots (See below) two PCI-E™ x8

Ethernet controllers **Dual-Gigabit** 10/100/1000 ethernet ports / Two Broadcom® 5722 / two full gigabit ethernet MAC and PHY layer functions / integrated / port one is PCI-E, port two is PCI 2.2 / full duplex / PXE / Wake on LAN® / Rear RJ-45 ports (2)

Optical / diskette Ports **48X-32X-48X-16X® CD-RW/DVD-ROM, IDE / Diskette:** none
Front: two USB (2.0), video (DB-15) / **Rear:** serial (9-pin), two ethernet (RJ-45), video (DB-15), two USB (2.0), one systems mgt (RJ-45)

Graphics ATI® ES1000(RN50) / 16MB SDRAM std/max / on planar / analog 15-pin / up to 1024x768x32bit@85Hz

Console interconnects No system-to-system interconnect cable

Systems mgmt **IBM Integrated Baseboard Management Controller(BMC)** / IPMI 2.0 / H82166 / on planar / monitors system and processor temperature, fan failure and voltages / **IBM Active Energy Manager™** / support for optional slimline Remote Supervisor Adapter II with dedicated slot on planar for continuous power (no external power required)

Diagnostics **Light Path Diagnostics** panel providing LED map to failing part (located on front panel) / Diagnostics via preboot DSA on std IBM Enhanced Diagnostics CD (diskette can be created)

Security Power-on password / administrator password / unattended boot / selectable boot / unattended start mode / **secure remote power on / off via IPMI 2.0**

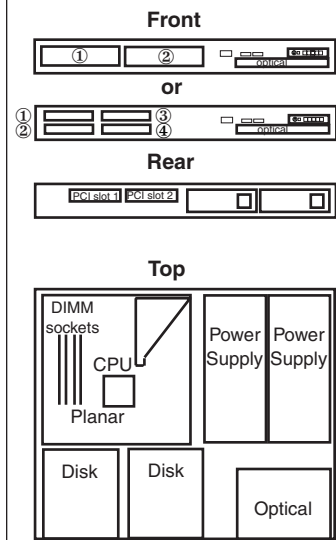
Software **ServerGuide™** (CD-ROM installation and configuration utilities), IBM Director™ and others

Cooling fans **Calibrated Vectored Cooling™** / Six fans (four fans for system, two in power supplies) / variable speed / redundant and hot-swap

Power supply 450 watt / hot-swap / universal / auto-sensing / auto-restart support

Prerequisites Monitor, keyboard, mouse, rack

- 512MB PC2-5300 ECC DDR2
- 2GB(2x1GB) PC2-5300 ECC DDR2
- 4GB(2x2GB) PC2-5300 ECC DDR2
- IBM 160GB SATA (7.2K) simple-swap HDD
- IBM 250GB SATA (7.2K) simple-swap HDD
- IBM 500GB SATA (7.2K) simple-swap HDD
- IBM 750GB SATA (7.2K) simple-swap HDD
- 160GB Hot-Swap SATA HDD
- 250GB Hot-Swap SATA HDD
- 500GB Hot-Swap SATA HDD
- 750GB Hot-Swap SATA HDD
- 73GB 15K 3.5" SAS Hot-Swap HDD
- 146GB 15K 3.5" SAS Hot-Swap HDD
- 300GB 15K 3.5" SAS Hot-Swap HDD
- 73GB 10K SFF SAS Hot-Swap HDD
- 146GB 10K SFF SAS Hot-Swap HDD
- 73GB 15K SFF SAS Hot-Swap HDD
- IBM Remote Supervisor Adapter II slimline
- ServeRAID-BR10i SAS/SATA controller kit
- ServeRAID-MR10i SAS/SATA controller kit



Slot 1: half length, full height, PCI-E x8
 Slot 2: half length, full height, PCI-E x8

Some:
 Bay ① 2.5", SFF, access, open for hot-swap disk
 Bay ② 2.5", SFF, access, open for hot-swap disk
 Bay ③ 2.5", SFF, access, open for hot-swap disk
 Bay ④ 2.5", SFF, access, open for hot-swap disk
 Bay ⑤ 5.25", UltraSlim 0.5", access, std optical

Some:
 Bay ① 3.5", SL 1", access, open for simple-swap/hot-swap disk
 Bay ② 3.5", SL 1", access, open for simple-swap/hot-swap disk
 Bay ③ 5.25", UltraSlim 0.5", access, std optical

- Raven black front bezel
- H 1.75" (1U) x W 17.32" x D 28"; 43mm x 440mm x 711mm
- 24.4 to 28 lbs; 11kg to 12.7kg (minimum to max configuration)
- Configuration/Setup Utility: F1 at startup
- Network Boot: F12 at startup
- Operator Information Panel in front
- Ships with Diagnostics CD, ServerGuide Setup and Installation CD
- Predictive Failure Analysis on disk(s) with IBM Director can alert the administrator of an imminent component failure

Maximum internal disk capacity¹³ (model dependent):
 1.5TB with two 750GB 3.5" SATA disks, 600GB with two 300GB 3.5" SAS disks or 292GB with four 2.5" 73GB SAS disks

LIMITED WARRANTY³

- 1 year parts and labor standard 4192 MTM
- 3 year parts and labor standard 4193 MTM
- 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 avg response (ServicePac part num 51J9142)
 - 3 year IOR 9x5, 4 hr avg response (ServicePac part num 51J9143)
 - 3 year IOR 24x7, 4 hr avg response (ServicePac part num 51J9144)
- Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- 24x7¹⁴ toll-free support for warranty issues during the warranty period³

IBM® Machine Type	Machine model	Processor / Speed / Core	L2 cache	FSB MHz	Memory	Disk controller	Disk bays	Mechanical	Slots x bays	Ethernet	Ltd warr ³	Available date
4192/4193 B2Y	Xeon® E3120	3.16GHz/DC	6MB	1333	2 x 512MB	SAS/SATA	2 hot-swap	1U ⁴ rack	2x3	Dual Gb	1/3yr	Sep 2008
4192/4193 B4Y	Xeon E3120	3.16GHz/DC	6MB	1333	2 x 512MB	SATA (no RAID)	2 simple-swap	1U rack	2x3	Dual Gb	1/3yr	Sep 2008
4192/4193 D2Y	Xeon X3330	2.66GHz/QC	6MB	1333	2 x 1GB	SAS	4 hot-swap	1U rack	2x5	Dual Gb	1/3yr	Sep 2008
4192/4193 84Y	Xeon X3360	2.83GHz/QC	12MB	1333	2 x 1GB	SAS	4 hot-swap	1U rack	2x5	Dual Gb	1/3yr	Sep 2008
4192/4193 92Y	Xeon X3370	3.0GHz/QC	12MB	1333	2 x 1GB	SAS	4 hot-swap	1U rack	2x5	Dual Gb	1/3yr	Sep 2008

Positioning Processor(s) *Efficient and dense 1U, single-socket, rack-optimized server for web and network infrastructure*
Intel® Xeon up to 3.0GHz 1333MHz FSB / Quad-Core / Xeon up to 3.16GHz 1333MHz FSB / Dual-Core / All Optimized for Extended Memory 64 Technology (EM64T)
 L2 cache **6 or 12MB** std
 SMP support No SMP support
 Implementation Motherboard contains one LGA-775 socket, four DIMM sockets, integrated SATA or SAS/SATA, Dual Gigabit Ethernet and two PCI Express® x8 slots

Memory **1 or 2GB** std / 8GB¹³ max / four 240-pin gold-plated DIMM sockets / two sockets used / **PC2-6400 800MHz ECC DDR2-SDRAM / All Error Checking and Correcting (ECC)** / DIMMs and ECC memory controller / industry std / unbuffered

SAS/SATA controller **LSI Logic® 1064e** / daughter card / supports SAS or SATA drives / four-port / PCI-Express / **RAID 0,1**
 SATA controller Four channel SATA controller (3.0Gb/sec) / 2 drives supported / integrated into South Bridge / RAID via ServeRAID-BR10i SAS/SATA controller kit(44X0411)

IDE controller **Enhanced IDE busmaster / ATA-100 support / one connector on systemboard**

Cables **SAS models:** one 1-drop EIDE cable (connected to Optical)
SATA models: two 1-drop SATA cables, one 1-drop EIDE cable (connected to Optical)

Mechanical Architecture / chipsets **EIA 22" Rack (1U⁴) / rack-mount only**
Intel 3210 chipset / Memory Controller Hub (MCH) / I/O Controller Hub (ICH9R) for PCI-E, ATA-100 EIDE, ethernet MAC, USB, Low Pin Count Interface / Firmware Hub / SMSC® SCH5027 Super I/O for serial, keyboard, mouse
 Bus slots (See below) two PCI-E™ x8

Ethernet controllers **Dual Gigabit** ethernet ports / Two Broadcom® 5722 / two full gigabit ethernet MAC and PHY layer functions / integrated / port one is PCI-E, port two is PCI 2.2 / full duplex / PXE / Wake on LAN® / Rear RJ-45 ports (2)

Optical / diskette Ports **48X-32X-48X-16X⁶ CD-RW/DVD-ROM, IDE / Diskette:** none
Front: two USB (2.0), video (DB-15) / **Rear:** serial (9-pin), two ethernet (RJ-45), video (DB-15), two USB (2.0), one systems mgt (RJ-45)

Graphics **ATI® ES1000(RN50) / 16MB SDRAM std/max / on planar / analog 15-pin / up to 1024x768x32bit@85Hz**

Console interconnects No system-to-system interconnect cable

Systems mgmt **IBM Integrated Baseboard Management Controller(BMC)** / IPMI 2.0 / H82166 / on planar / monitors system and processor temperature, fan failure and voltages / **IBM Active Energy Manager™** / support for optional slimline Remote Supervisor Adapter II with dedicated slot on planar for continuous power (no external power required)

Diagnostics **Light Path Diagnostics** panel providing LED map to failing part (located on front panel) / Diagnostics via preboot DSA on std IBM Enhanced Diagnostics CD (diskette can be created)

Security Power-on password / administrator password / unattended boot / selectable boot / unattended start mode / **secure remote power on / off via IPMI 2.0**

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

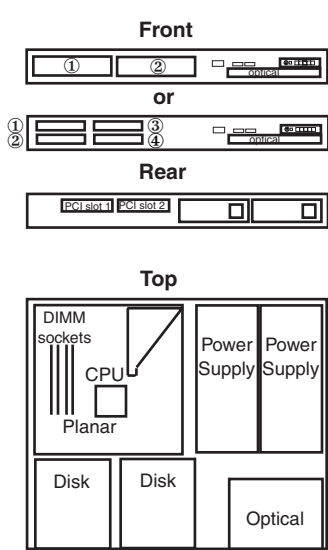
Cooling fans **Calibrated Vectored Cooling™** / Six fans (four fans for system, two in power supplies) / variable speed / redundant and hot-swap

Power supply 450 watt / hot-swap / universal / auto-sensing / auto-restart support

Prerequisites Monitor, keyboard, mouse, rack

- 512MB PC2-5300 ECC DDR2 41Y2726
- 2GB(2x1GB) PC2-5300 ECC DDR2 41Y2729
- 4GB(2x2GB) PC2-5300 ECC DDR2 41Y2732
- 1GB(2x512MB) PC2-6400 CL6 ECC 800MHz DIMM 46C7443
- 2GB(2x1GB) PC2-6400 CL6 ECC 800MHz DIMM 46C7428
- 4GB(2x2GB) PC2-6400 CL6 ECC 800MHz DIMM 46C7429
- IBM 160GB SATA (7.2K) simple-swap HDD 39M4504
- IBM 250GB SATA (7.2K) simple-swap HDD 39M4508
- IBM 500GB SATA (7.2K) simple-swap HDD 39M4514
- IBM 750GB SATA (7.2K) simple-swap HDD 43W7572
- 160GB Hot-Swap SATA HDD 39M4522
- 250GB Hot-Swap SATA HDD 39M4526
- 500GB Hot-Swap SATA HDD 39M4530
- 750GB Hot-Swap SATA HDD 43W7576
- 73GB 15K 3.5" SAS Hot-Swap HDD 40K1043
- 146GB 15K 3.5" SAS Hot-Swap HDD 40K1044
- 300GB 15K 3.5" SAS Hot-Swap HDD 43X0802
- 73GB 10K SFF SAS Hot-Swap HDD 40K1052
- 146GB 10K SFF SAS Hot-Swap HDD 43X0824
- 73GB 15K SFF SAS Hot-Swap HDD 43X0837
- IBM Remote Supervisor Adapter II slimline 39Y9566
- ServeRAID-BR10i SAS/SATA controller kit 44X0411
- ServeRAID-MR10i SAS/SATA controller kit 43W4296

Other options at ibm.com/products/us



Slot 1: half length, full height, PCI-E x8
 Slot 2: half length, full height, PCI-E x8

Some:
 Bay ① 2.5", SFF, access, open for hot-swap disk
 Bay ② 2.5", SFF, access, open for hot-swap disk
 Bay ③ 2.5", SFF, access, open for hot-swap disk
 Bay ④ 2.5", SFF, access, open for hot-swap disk
 Bay ⑤ 5.25", UltraSlim 0.5", access, std optical

Some:
 Bay ① 3.5", SL 1", access, open for simple-swap/hot-swap disk
 Bay ② 3.5", SL 1", access, open for simple-swap/hot-swap disk
 Bay ③ 5.25", UltraSlim 0.5", access, std optical

- Raven black front bezel
- H 1.75" (1U) x W 17.32" x D 28"; 43mm x 440mm x 711mm
- 24.4 to 28 lbs; 11kg to 12.7kg (minimum to max configuration)
- Configuration/Setup Utility: F1 at startup
- Network Boot: F12 at startup
- Operator Information Panel in front
- Ships with Diagnostics CD, ServerGuide Setup and Installation CD
- Predictive Failure Analysis on disk(s) with IBM Director can alert the administrator of an imminent component failure

Maximum internal disk capacity¹³ (model dependent):
 1.5TB with two 750GB 3.5" SATA disks, 2TB with two 1TB 3.5" SAS disks or 584GB with four 2.5" 146GB SAS disks

LIMITED WARRANTY³

- 1 year parts and labor standard 4192 MTM
- 3 year parts and labor standard 4193 MTM
- 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 avg response (ServicePac part num 51J9142)
 - 3 year IOR 9x5, 4 hr avg response (ServicePac part num 51J9143)
 - 3 year IOR 24x7, 4 hr avg response (ServicePac part num 51J9144)
- Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- 24x7¹⁴ toll-free support for warranty issues during the warranty period³

IBM® Type-GAV-model	Qty x Processor	L2 Core cache	Memory	Disk controller	Mechanical	Slots x bays (std/max)	Warranty	Power supply	Ethernet	Available date
7973/74-42y-42x	1x Xeon™ 5110 1.6GHz	DC 4MB	1GB	Open SATA	Tower	6x7 (4/4 SS)	1/3yr	1 x 670W fixed	GB	Aug 2006
7973/74-52y-52x	1x Xeon 5120 1.86GHz	DC 4MB	1GB	Open SATA	Tower	6x7 (4/4 SS)	1/3yr	1 x 670W fixed	GB	Aug 2006
7973/74-62y-62x	1x Xeon 5130 2.0GHz	DC 4MB	1GB	Open SATA	Tower	6x7 (4/4 SS)	1/3yr	1 x 670W fixed	GB	Aug 2006
7973/74-12y-12x	1x Xeon 5050 3.0GHz	DC 4MB	1GB	Open SATA	Tower	6x7 (4/4 SS)	1/3yr	1 x 670W fixed	GB	Sep 2006
7975/76-42y-42x	1x Xeon 5110 1.6GHz	DC 4MB	1GB	Open SAS/SATA	Tower	6x11 (4/8 HS)	1/3yr	1 x 670W fixed	GB	Aug 2006
7975/76-4Ay-4Ax	1x Xeon 5110 1.6GHz	DC 4MB	1GB	Open SAS/SATA	Tower	6x11 (4/8 HS)	1/3yr	1 x 835W hot-swap	GB	Aug 2006
7975/76-52y-52x	1x Xeon 5120 1.86GHz	DC 4MB	1GB	Open SAS/SATA	Tower	6x11 (4/8 HS)	1/3yr	1 x 670W fixed	GB	Aug 2006
7975/76-5Ay-5Ax	1x Xeon 5120 1.86GHz	DC 4MB	1GB	Open SAS/SATA	Tower	6x11 (4/8 HS)	1/3yr	1 x 835W hot-swap	GB	Aug 2006
7975/76-62y-62x	1x Xeon 5130 2.0GHz	DC 4MB	1GB	Open SAS/SATA	Tower	6x11 (4/8 HS)	1/3yr	1 x 670W fixed	GB	Aug 2006
7975/76-6Ay-6Ax	1x Xeon 5130 2.0GHz	DC 4MB	1GB	Open SAS/SATA	Tower	6x11 (4/8 HS)	1/3yr	1 x 835W hot-swap	GB	Aug 2006
7975/76-14y-14x	1x Xeon 5050 3.0GHz	DC 4MB	1GB	Open SAS/SATA	Tower	6x11 (4/8 HS)	1/3yr	1 x 670W fixed	GB	Sep 2006
7975/76-16y-16x	1x Xeon 5050 3.0GHz	DC 4MB	1GB	Open SAS/SATA	Tower	6x11 (4/8 HS)	1/3yr	1 x 835W hot-swap	GB	Sep 2006
7975/76-B2y-B2x	1x Xeon E5310 1.6GHz	QC 8MB	1GB	Open SAS/SATA	Tower	6x11 (4/8 HS)	1/3yr	1 x 835W hot-swap	GB	Dec 2006
7975/76-C2y-C2x	1x Xeon E5320 1.86GHz	QC 8MB	1GB	Open SAS/SATA	Tower	6x11 (4/8 HS)	1/3yr	1 x 835W hot-swap	GB	Dec 2006

Positioning Processor *Universal server; two-way server using the Xeon processor to provide power and performance at an affordable price*
 Up to 1 x Intel® Xeon 3.0GHz with 667MHz FSB / 1 x Intel Xeon 1.86GHz with 1066MHz FSB / 1 x Intel Xeon 2.0GHz with 1333MHz FSB / 4MB L2 ECC Cache / Dual-Core / 1 x Intel Xeon 1.86GHz with 1066MHz FSB / 8MB L2 ECC Cache / Quad-Core / All EM64T

L2 cache 4 or 8MB / std and max / at processor speed

SMP support Implementation 2-way SMP / up to two Xeon Processors (same speed/cache size)
 Systemboard contains two Intel LGA771 sockets, eight memory gold-connector DIMM slots, three PCI-E slots, two PCI-X slots, one PCI slot, integrated SAS, ethernet and graphics controllers

Memory 1GB std / 32GB¹³ max / two slots used / six slots available / PC2-5300 667MHz FBD 240-pin ECC DDR2-SDRAM DIMMs / DIMMs must be installed in matched pairs [a bank] / Fully Buffered / 2-way memory interleave / dual channel / Error Checking and Correcting (ECC) (corrects any x4 or x8 SDRAM device failure, detects all two wire faults on DIMMs, detects all permutations of two x4 DRAM failures, detects any two bits in error within 8 bytes of data, corrects any single bit error within 8 bytes of data) / Active Memory™: memory mirroring, online-spare memory, Chipkill

SAS/SATA controller MTs 7973/4: native SATA / on planar / PCI-Express / HostRAID 0 & 1 / MTs 7975/6: ServeRAID 8k-l std / Adaptec® AIC-9580W / eight port SAS(300MB/sec) or SATA(150MB/sec) / hot-swap / on planar / PCI-Express / RAID 0, 1 & 10

SAS connectors Dual channel controller wired to hot-swap DASD backplane

SAS cabling Mini SAS cable connects controller to 4-bay backplane

IDE controller / cable IDE ATA 66/33 / one connector on planar / one 2-drop IDE cable (CD-ROM)

Disk - capacity None std / supports 7200-15000 rpm disks / single backplane (upgradeable to dual backplanes)

Disk - bays Some: four hot-swap SAS/SATA bays (upgradeable to eight); some: four simple-swap SATA bays

Mechanical Tower / conversion to EIA 26" Rack (5U⁴) via optional kit 39Y8382

Slots (see below) Three PCI-Express, two PCI-X 64-bit/133MHz and one PCI 32-bit/33MHz slot

Chipset Intel 5000P chipset / Intel Memory Controller Hub (MCH) provides two PCI-Express x8 slots / Enterprise Southbridge(ESB-2E) provides: one PCI-Express x8 slot with x4 Links, two 64-bit/100MHz PCI-X slots, one 32-bit/33MHz PCI slot, ATI video, Gigabit ethernet, IDE, USB, SMBus, LPC bus to NS PC8374L for Super I/O

Ethernet controller One 10/100/1000 gigabit / Broadcom® BCM 5721 / on planar / PCI-Express / full duplex / Wake on LAN® / IPMI (2.0)

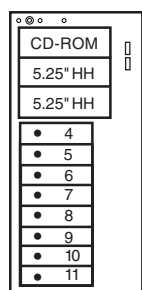
CD-ROM / diskette 48X⁶ CD-ROM / IDE / 1.6" HH; *Diskette*: USB only

Rear ports Rear: two USB (Vers 2.0), keyboard, mouse, parallel, two serial (9-pin), graphics (DB-15), one ethernet (RJ-45), RJ-45 (sys mgmt)

Front port / graphics Front: two USB (Vers 2.0); Graphics: XVGA / ATI® RN50(ES1000) / on planar / 16MB DDR std/max / 32-bit/33MHz PCI 2.2

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

Systems mgmt	IBM Integrated Baseboard Management Controller(BMC) / IPMI 2.0 H8S2166 ⁷ / on planar / provides system and environmental monitoring such as temp, optional disks, fans, power supp / supports opt. Remote Supervisor Adapter II Slimline with 140-pin connector on planar for continuous power (no ext pwr reqd)	Xeon 5050 3.0GHz/667MHz/4MB L2 Cache Proc Upg	25R8926
Diagnostics	System error LED Panel in front	Xeon E5310 1.6GHz/1066MHz/8MB L2 Cache Proc Upg	43W5821
Software	ServerGuide™ (CD-ROM installation and configuration utilities), IBM Director, others	Xeon E5320 1.86GHz/1066MHz/8MB L2 Cache Proc Upg	43W5822
Keyboard / mouse	Optional	Xeon 5110 1.6GHz/1066MHz/4MB L2 Cache Proc Upg	40K1231
Power supply	Some: 670 watt / fixed / one std/max; some: 835 watt / hot-swap / one/two std/max / redundant with two; all: voltage-sensing / auto-restart std/max: three/six / three fans (mid-chassis) / variable speed / hot-swap (Opt) two additional mid-chassis fans and one rear / redundant with optional fans / PFA / fan in each power supply	Xeon 5120 1.86GHz/1066MHz/4MB L2 Cache Proc Upg	40K1232
Fans		Xeon 5130 2.0GHz/1333MHz/4MB L2 Cache Proc Upg	40K1233
		1GB Kit (2x512MB DIMM) PC2-5300 DDR2 FBD CL4	39M5782
		2GB Kit (2x1GB DIMM) PC2-5300 DDR2 FBD CL4	39M5785
		4GB Kit (2x2GB DIMM) PC2-5300 DDR2 FBD CL4	39M5791
		73GB 10K SAS Hot-Swap HDD	40K1039
		146GB 10K SAS Hot-Swap HDD	40K1040
		300GB 10K SAS Hot-Swap HDD	40K1041
		36GB 15K SAS Hot-Swap HDD	40K1042
		73GB 15K SAS Hot-Swap HDD	40K1043
		146GB 15K SAS Hot-Swap HDD	40K1044
		500GB 7.2K SATA Hot-Swap HDD	39M4530
		IBM Remote Supervisor Adapter II Slimline	39Y9566
		IBM Redundant Power and Cooling Option(NA)	39Y8487
		Other options at www.ibm.com/pc/us/accessories	



Bay 1 5.25", HH 1.6" access, CD-ROM
 Bay 2 5.25", HH 1.6" access, open
 Bay 3 5.25", HH 1.6" access, open
Hot-Swap SAS/SATA models:
 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, open
 Bay 8 3.5", SL 1", access, open
 Bay 9 3.5", SL 1", access, open
 Bay 10 3.5", SL 1", access, open
 Bay 11 3.5", SL 1", access, open
Simple-Swap SATA models:
 Bay 8 3.5", SL 1", access, open
 Bay 9 3.5", SL 1", access, open
 Bay 10 3.5", SL 1", access, open
 Bay 11 3.5", SL 1", access, open

- ⇨ Quick release adapter slots (no screws)
- ⇨ Configuration/Setup Utility invoked by pressing F1 at startup
- ⇨ RAID Configuration Utility near startup by pressing CTRL+A
- ⇨ 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 17.3" x W 8.6" x D 29.4"
- ⇨ 42 to 84 pounds
- ⇨ Stealth black color

Slot 1: half-length, PCI-Express x8(x4 electrical)
 Slot 2: full, PCI-Express x8
 Slot 3: full, PCI-Express x8
 Slot 4: full, 64-bit 133MHz 3.3v PCI-X
 Slot 5: full, 64-bit 133MHz 3.3v PCI-X
 Slot 6: half-length, 32-bit 33MHz 5.0v PCI

Hot-Swap models: Max internal disk capacity: 2.4TB² with eight 300GB 10K SAS or 4.0TB² with eight 500GB SATA hot-swap HDDs
Simple-Swap models: Max internal disk capacity: 1.0TB² with four 250GB SATA non-hot-swap HDDs

LIMITED WARRANTY³

- ⇨ 1 yr parts and labor 7973/7975 MTM
- ⇨ 3 yr parts and labor 7974/7976 MTM
- ⇨ International Warranty Service³
- ⇨ On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time⁴
- ⇨ 3 year on site warranty service upgrade options (ineligible locations):⁷
 - 9 hour coverage, Mon-Fri excluding holidays, 4 hour average response (ServicePac[®] part num 21P2083)
 - 24 hr x 7 day coverage, 4 hour average response (ServicePac part number 21P2084)
 - 24 hr x 7 day coverage, 2 hour average response (ServicePac part number 21P2085)
- ⇨ 24x7¹⁴ toll-free support for warranty issues during the warranty period³

IBM® Type-GAV-model	Qty x Processor	L2 Core cache	Memory	Disk controller	Mechanical	Slots x bays (std/max)	Warranty	Power supply	Ethernet	Available date
7973/74-A2x	1x Xeon™E5405 2.0GHz	QC 12MB	1GB	Open SATA	Tower	6x7 (4/4 SS)	1/3yr	1 x 670W fixed	GB	Jan 2008
7973/74-D2x	1x Xeon E5410 2.33GHz	QC 12MB	1GB	Open SATA	Tower	6x7 (4/4 SS)	1/3yr	1 x 670W fixed	GB	Jan 2008
7973/74-J2x	1x Xeon E5420 2.5GHz	QC 12MB	1GB	Open SATA	Tower	6x7 (4/4 SS)	1/3yr	1 x 670W fixed	GB	Jan 2008
7973/74-L2x	1x Xeon E5430 2.66GHz	QC 12MB	1GB	Open SATA	Tower	6x7 (4/4 SS)	1/3yr	1 x 670W fixed	GB	Jan 2008
7975/76-A2x	1x Xeon E5405 2.0GHz	QC 12MB	1GB	Open SAS/SATA	Tower	6x11 (4/8 HS)	1/3yr	1 x 670W fixed	GB	Jan 2008
7975/76-D2x	1x Xeon E5410 2.33GHz	QC 12MB	1GB	Open SAS/SATA	Tower	6x11 (4/8 HS)	1/3yr	1 x 670W fixed	GB	Jan 2008
7975/76-J2x	1x Xeon E5420 2.5GHz	QC 12MB	1GB	Open SAS/SATA	Tower	6x11 (4/8 HS)	1/3yr	1 x 670W fixed	GB	Jan 2008
7975/76-L2x	1x Xeon E5430 2.66GHz	QC 12MB	1GB	Open SAS/SATA	Tower	6x11 (4/8 HS)	1/3yr	1 x 670W fixed	GB	Jan 2008
7975/76-ABx	1x Xeon E5405 2.0GHz	QC 12MB	1GB	Open SAS/SATA	Tower	6x11 (4/8 HS)	1/3yr	1 x 835W hot-swap	GB	Jan 2008
7975/76-DBx	1x Xeon E5410 2.33GHz	QC 12MB	1GB	Open SAS/SATA	Tower	6x11 (4/8 HS)	1/3yr	1 x 835W hot-swap	GB	Jan 2008
7975/76-JBx	1x Xeon E5420 2.5GHz	QC 12MB	1GB	Open SAS/SATA	Tower	6x11 (4/8 HS)	1/3yr	1 x 835W hot-swap	GB	Jan 2008
7975/76-LBx	1x Xeon E5430 2.66GHz	QC 12MB	1GB	Open SAS/SATA	Tower	6x11 (4/8 HS)	1/3yr	1 x 835W hot-swap	GB	Jan 2008

Positioning Processor L2 cache SMP support *Universal server: two-way server using the Xeon processor to provide power and performance at an affordable price*
Up to 1 x Intel® Xeon 2.66GHz with 1333MHz FSB / 12MB L2 ECC Cache / Quad-Core / All EM64T
12MB / std and max / at processor speed
2-way SMP / up to two Xeon Processors (same speed/cache size)

Implementation Systemboard contains two Intel LGA771 sockets, eight memory gold-connector DIMM slots, three PCI-E slots, two PCI-X slots, one PCI slot, integrated SAS, ethernet and graphics controllers

Memory **1GB std / 32GB¹³ max / two slots used / six slots available / PC2-5300 667MHz FBD 240-pin ECC DDR2-SDRAM DIMMs / DIMMs must be installed in matched pairs [a bank] / Fully Buffered / 2-way memory interleave / dual channel / Error Checking and Correcting (ECC) (corrects any x4 or x8 SDRAM device failure, detects all two wire faults on DIMMs, detects all permutations of two x4 DRAM failures, detects any two bits in error within 8 bytes of data, corrects any single bit error within 8 bytes of data) / Active Memory™: memory mirroring, online-spare memory, Chipkill**

SAS/SATA controller MTs 7973/4: native SATA / on planar / PCI-Express / HostRAID 0 & 1 / MTs 7975/6: ServeRAID 8k-I std / **Adaptec® AIC-9580W / eight port SAS(300MB/sec) or SATA(150MB/sec) / hot-swap / on planar / PCI-Express / RAID 0, 1 & 10**
 SAS connectors Dual channel controller wired to hot-swap DASD backplane
 SAS cabling Mini SAS cable connects controller to 4-bay backplane
 IDE controller / cable IDE ATA 66/33 / one connector on planar / one 2-drop IDE cable (CD-ROM)
 Disk - capacity None std / supports 7200-15000 rpm disks / single backplane (upgradeable to dual backplanes)
 Disk - bays Some: four hot-swap SAS/SATA bays (upgradeable to eight); some: four simple-swap SATA bays

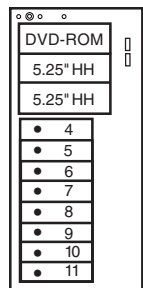
Mechanical Slots (see below) Chipset Tower / conversion to EIA 26" Rack (5U⁴) via optional kit 39Y8382
 Three PCI-Express, two PCI-X 64-bit/133MHz and one PCI 32-bit/33MHz slot
Intel 5000P chipset / Intel Memory Controller Hub (MCH) provides two PCI-Express x8 slots / Enterprise Southbridge(ESB-2E) provides: one PCI-Express x8 slot with x4 Links, two 64-bit/100MHz PCI-X slots, one 32-bit/33MHz PCI slot, ATI video, Gigabit ethernet, IDE, USB, SMBus, LPC bus to NS PC8374L for Super I/O
 Ethernet controller **One 10/100/1000 gigabit / Broadcom® BCM 5721 / on planar / PCI-Express / full duplex / Wake on LAN® / IPMI (2.0)**

DVD-ROM / diskette Rear ports Front port / graphics Security **16X⁶ DVD-ROM / IDE / 1.6" HH; Diskette: USB only**
Rear: two USB (Vers 2.0), keyboard, mouse, parallel, two serial (9-pin), graphics (DB-15), one ethernet (RJ-45), RJ-45 (sys mgmt)
Front: two USB (Vers 2.0); Graphics: XVGA / ATI® RN50(ES1000) / on planar / 16MB DDR std/max / 32-bit/33MHz PCI 2.2
 Power-on password / administrator password / front door to cover disk bays and power button / unattended boot / selectable boot

Systems mgmt **IBM Integrated Baseboard Management Controller(BMC) / IPMI 2.0 H8S2166 / on planar / provides system and environmental monitoring such as temp, optional disks, fans, power supp / supports opt. Remote Supervisor Adapter II Slimline with 140-pin connector on planar for continuous power (no ext pwr reqd)**
 Diagnostics System error LED Panel in front

Software **ServerGuide™ (CD-ROM installation and configuration utilities), IBM Director, others**
 Keyboard / mouse Power supply **Optional**
Some: 670 watt / fixed / one std/max; some: 835 watt / hot-swap / one/two std/max / redundant with two; all: voltage-sensing / auto-restart std/max: three/six / three fans (mid-chassis) / variable speed / hot-swap (Opt) two additional mid-chassis fans and one rear / redundant with optional fans / PFA / fan in each power supply

Fans	Xeon E5310 1.6GHz/1066MHz/8MB L2 Cache Proc Upg 43W5821 Xeon E5320 1.86GHz/1066MHz/8MB L2 Cache Proc Upg 43W5822 Xeon E5335 2.0GHz/1066MHz/8MB L2 Cache Proc Upg 43W5823 Xeon E5405 2.0GHz/1333MHz/12MB L2 Cache Proc Upg 44R5630 Xeon E5405 2.33GHz/1333MHz/12MB L2 Cache Proc Upg 44R5631 Xeon E5405 2.5GHz/1333MHz/12MB L2 Cache Proc Upg 44R5632 Xeon E5405 2.66GHz/1333MHz/12MB L2 Cache Proc Upg 44R5633 1GB Kit (2x512MB DIMM) PC2-5300 CL5 ECC Chipkill AMF 39M5782 2GB Kit (2x1GB DIMM) PC2-5300 CL5 ECC Chipkill AMF 39M5785 4GB Kit (2x2GB DIMM) PC2-5300 CL5 ECC Chipkill AMF 39M5791 8GB Kit (2x4GB DIMM) PC2-5300 CL5 ECC Chipkill AMF 39M5797 73GB 10K SAS Hot-Swap HDD 40K1039 146GB 10K SAS Hot-Swap HDD 40K1040 300GB 10K SAS Hot-Swap HDD 40K1041 36GB 15K SAS Hot-Swap HDD 40K1042 73GB 15K SAS Hot-Swap HDD 40K1043 146GB 15K SAS Hot-Swap HDD 40K1044 500GB 7.2K SATA Hot-Swap HDD 39M4530 IBM Remote Supervisor Adapter II Slimline 39Y9566 IBM Redundant Power and Cooling Option(NA) 39Y8487 Other options at www.ibm.com/products/us
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Bay 1 5.25", HH 1.6" access, DVD-ROM
 Bay 2 5.25", HH 1.6" access, open
 Bay 3 5.25", HH 1.6" access, open
Hot-Swap SAS/SATA models:
 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, open
 Bay 8 3.5", SL 1", access, open
 Bay 9 3.5", SL 1", access, open
 Bay 10 3.5", SL 1", access, open
 Bay 11 3.5", SL 1", access, open
Simple-Swap SATA models:
 Bay 8 3.5", SL 1", access, open
 Bay 9 3.5", SL 1", access, open
 Bay 10 3.5", SL 1", access, open
 Bay 11 3.5", SL 1", access, open

- Quick release adapter slots
- Configuration/Setup Utility invoked by pressing F1 at startup
- RAID Configuration Utility near startup by pressing CTRL+A
- 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 17.3" x W 8.6" x D 29.4"
- 42 to 84 pounds
- Stealth black color

Hot-Swap models: Max internal disk capacity: 2.4TB² with eight 300GB 10K SAS or 6.0TB² with eight 750GB SATA hot-swap HDDs
Simple-Swap models: Max internal disk capacity: 3.0TB² with four 750GB SATA non-hot-swap HDDs

LIMITED WARRANTY³

- 1 yr parts and labor 7973/7975 MTM
- 3 yr parts and labor 7974/7976 MTM
- 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 (ineligible 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

• = Hot-swap

IBM® Type-GAV-model	Qty x Processor	L2 Core cache Memory	Disk controller	Mechanical	Slots x bays (std/max)	Warranty	Power supply	Ethernet	Available date
7973/74-2Bx	1x Xeon™E5205 1.86GHz	DC 6MB 1GB	Open SATA	Tower	6x7 (4/4 SS)	1/3yr	1 x 670W fixed	Gb	Nov 2008
7975/76-2Bx	1x Xeon E5205 1.86GHz	DC 6MB 1GB	Open SAS/SATA	Tower	6x11 (4/8 HS)	1/3yr	1 x 670W fixed	Gb	Nov 2008
7975/76-2Cx	1x Xeon E5205 1.86GHz	DC 6MB 1GB	Open SAS/SATA	Tower	6x11 (4/8 HS)	1/3yr	1 x 835W hot-swap	Gb	Nov 2008

Positioning Processor L2 cache SMP support *Universal server; two-way server using the Xeon processor to provide power and performance at an affordable price*
 Up to **2 x Intel® Xeon 1.86GHz with 1066MHz FSB / 6MB L2 ECC Cache / Dual-Core / All EM64T**
6MB / std and max / at processor speed
2-way SMP / up to two Xeon Processors (same speed/cache size)

Implementation Systemboard contains two Intel LGA771 sockets, eight memory gold-connector DIMM slots, three PCI-E slots, two PCI-X slots, one PCI slot, integrated SAS, ethernet and graphics controllers

Memory **1GB** std / **32GB¹³** max / two slots used / six slots available / **PC2-5300 667MHz FBD 240-pin ECC DDR2-SDRAM DIMMs / DIMMs must be installed in matched pairs [a bank] / Fully Buffered / 2-way memory interleave / dual channel / Error Checking and Correcting (ECC)** (corrects any x4 or x8 SDRAM device failure, detects all two wire faults on DIMMs, detects all permutations of two x4 DRAM failures, detects any two bits in error within 8 bytes of data, corrects any single bit error within 8 bytes of data) / **Active Memory™: memory mirroring, online-spare memory, Chipkill**

SAS/SATA controller MTs 7973/4: native SATA / on planar / PCI-Express / HostRAID 0 & 1 / MTs 7975/6: ServeRAID 8k-l std / **Adaptec® AIC-9580W / eight port SAS(300MB/sec) or SATA(150MB/sec) / hot-swap / on planar / PCI-Express / RAID 0, 1 & 10**

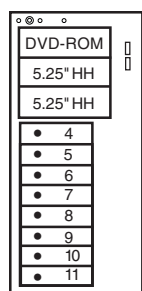
SAS connectors Dual channel controller wired to hot-swap DASD backplane
 SAS cabling Mini SAS cable connects controller to 4-bay backplane
 IDE controller / cable IDE ATA 66/33 / one connector on planar / one 2-drop IDE cable (CD-ROM)
 Disk - capacity None std / supports 7200-15000 rpm disks / single backplane (upgradeable to dual backplanes)
 Disk - bays Some: four hot-swap SAS/SATA bays (upgradeable to eight); some: four simple-swap SATA bays

Mechanical Slots (see below) Chipset Tower / conversion to EIA 26" Rack (5U⁴) via optional kit 39Y8382
 Three PCI-Express, two PCI-X 64-bit/133MHz and one PCI 32-bit/33MHz slot
Intel 5000P chipset / Intel Memory Controller Hub (MCH) provides two PCI-Express x8 slots / Enterprise Southbridge(ESB-2E) provides: one PCI-Express x8 slot with x4 Links, two 64-bit/100MHz PCI-X slots, one 32-bit/33MHz PCI slot, ATI video, Gigabit ethernet, IDE, USB, SMBus, LPC bus to NS PC8374L for Super I/O

Ethernet controller **One** 10/100/1000 gigabit / Broadcom® BCM 5721 / on planar / PCI-Express / full duplex / Wake on LAN® / IPMI (2.0)

DVD-ROM / diskette 16X⁶ DVD-ROM / IDE / 1.6" HH; *Diskette*: USB only
 Rear ports *Rear*: two USB (Vers 2.0), keyboard, mouse, parallel, **two** serial (9-pin), graphics (DB-15), one ethernet (RJ-45), RJ-45 (sys mgmt)
 Front port / graphics *Front*: two USB (Vers 2.0); *Graphics*: X VGA / ATI® RN50(ES1000) / on planar / 16MB DDR std/max / 32-bit/33MHz PCI 2.2
 Security Power-on password / administrator password / front door to cover disk bays and power button / unattended boot / selectable boot

Systems mgmt	IBM Integrated Baseboard Management Controller(BMC) / IPMI 2.0 H8S2166 / on planar / provides system and environmental monitoring such as temp, optional disks, fans, power supp / supports opt. Remote Supervisor Adapter II Slimline with 140-pin connector on planar for continuous power (no ext pwr reqd)	Xeon E5205 1.86GHz/1066MHz/6MB L2 Cache Proc Upg 1GB Kit (2x512MB DIMM) PC2-5300 CL5 ECC Chipkill AMF 2GB Kit (2x1GB DIMM) PC2-5300 CL5 ECC Chipkill AMF 4GB Kit (2x2GB DIMM) PC2-5300 CL5 ECC Chipkill AMF 73GB 10K SAS Hot-Swap HDD 146GB 10K SAS Hot-Swap HDD 300GB 10K SAS Hot-Swap HDD 36GB 15K SAS Hot-Swap HDD 73GB 15K SAS Hot-Swap HDD 146GB 15K SAS Hot-Swap HDD 80GB 7200 rpm SATA Hot-Swap HDD 160GB 7200 rpm SATA Hot-Swap HDD 250GB 7200 rpm SATA Hot-Swap HDD 80GB 7200 rpm SATA Simple-Swap HDD 160GB 7200 rpm SATA Simple-Swap HDD 250GB 7200 rpm SATA Simple-Swap HDD IBM Remote Supervisor Adapter II Slimline IBM Redundant Power and Cooling Option(NA) IBM ServeRAID-MR10is VAULT SAS/SATA Controller	44E5134 39M5782 39M5785 39M5791 40K1039 40K1040 40K1041 40K1042 40K1043 40K1044 39M4518 39M4522 39M4526 39M4500 39M4504 39M4508 39Y9566 39Y8487 44E8695
Diagnostics	System error LED Panel in front	Other options at www.ibm.com/products/us	
Software	ServerGuide™ (CD-ROM installation and configuration utilities), IBM Director, others		
Keyboard / mouse	Optional		
Power supply	<i>Some</i> : 670 watt / fixed / one std/max; <i>some</i> : 835 watt / hot-swap / one/two std/max / redundant with two; <i>all</i> : voltage-sensing / auto-restart std/max: three/six / three fans (mid-chassis) / variable speed / hot-swap (Opt) two additional mid-chassis fans and one rear / redundant with optional fans / PFA / fan in each power supply		
Fans			



Bay 1 5.25", HH 1.6" access, DVD-ROM
 Bay 2 5.25", HH 1.6" access, open
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Hot-Swap SAS/SATA models:
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 Bay 5 3.5", SL 1", access, open
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 Bay 7 3.5", SL 1", access, open
 Bay 8 3.5", SL 1", access, open
 Bay 9 3.5", SL 1", access, open
 Bay 10 3.5", SL 1", access, open
 Bay 11 3.5", SL 1", access, open
Simple-Swap SATA models:
 Bay 8 3.5", SL 1", access, open
 Bay 9 3.5", SL 1", access, open
 Bay 10 3.5", SL 1", access, open
 Bay 11 3.5", SL 1", access, open

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- ⇨ Configuration/Setup Utility invoked by pressing F1 at startup
- ⇨ RAID Configuration Utility near startup by pressing CTRL+A
- ⇨ 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 17.3" x W 8.6" x D 29.4"
- ⇨ 42 to 84 pounds
- ⇨ Stealth black color

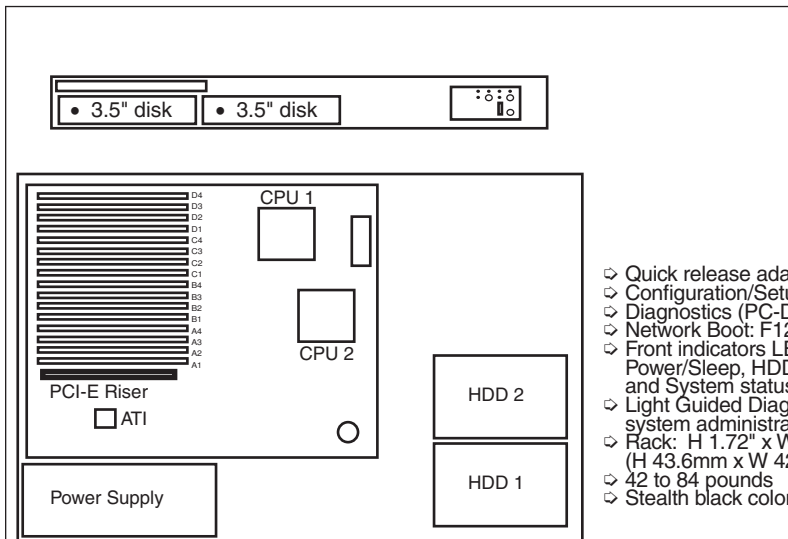
Slot 1: half-length, PCI-Express x8(x4 electrical)
 Slot 2: full, PCI-Express x8
 Slot 3: full, PCI-Express x8
 Slot 4: full, 64-bit 133MHz 3.3v PCI-X
 Slot 5: full, 64-bit 133MHz 3.3v PCI-X
 Slot 6: half-length, 32-bit 33MHz 5.0v PCI

Hot-Swap models: Max internal disk capacity: 6.0TB² with eight 750GB SATA hot-swap HDDs
Simple-Swap models: Max internal disk capacity: 3.0TB² with four 750GB SATA non-hot-swap HDDs

LIMITED WARRANTY³

- ⇨ 1 yr parts and labor 7973/7975 MTM
- ⇨ 3 yr parts and labor 7974/7976 MTM
- ⇨ International Warranty Service³
- ⇨ On site, 8 am - 5 pm, M-F coverage excluding holidays, next business day response time⁷
- ⇨ 3 year on site warranty service upgrade options for 7973/7975 MTM:
 - 9 hr coverage, M-F excluding holidays, 4 hr avg response (ServicePac[®] part number 38R3487)
 - 24 hr x 7 day coverage, 4 hour average response (ServicePac part number 38R3488)
- ⇨ 3 year on site warranty service upgrade options for 7974/7976 MTM:
 - 9 hr coverage, M-F excluding holidays, 4 hr avg response (ServicePac part number 40M6919)
 - 24 hr x 7 day coverage, 4 hour average response (ServicePac part number 40M6920)
- ⇨ 24x7¹⁴ toll-free support for warranty issues during the warranty period³ (eligible locations only⁷)

IBM® Type-model	Qty x Processor/Core	L2 cache	Memory	Disk controller	Disk bays	Disks	Optical	Power Supply	Slots x bays	Ethernet	Limited warranty ³	Available date
7948-22x	2 x Xeon™ X5272	3.4GHz/DC 6MB	2x2GB	SATA	2 fixed	(open 3.5)	open	1x600W	1x2	2 x GB	1 year	May 2008
7948-32x	2 x Xeon E5462	2.8GHz/QC 12MB	2x2GB	SATA	2 fixed	(open 3.5)	open	1x600W	1x2	2 x GB	1 year	May 2008
7948-42x	2 x Xeon X5472	3.0GHz/QC 12MB	2x2GB	SATA	2 fixed	(open 3.5)	open	1x600W	1x2	2 x GB	1 year	May 2008
7948-52x	2 x Xeon E5472	3.0GHz/QC 12MB	2x2GB	SATA	2 fixed	(open 3.5)	open	1x600W	1x2	2 x GB	1 year	May 2008
7948-54x	2 x Xeon E5472	3.0GHz/QC 12MB	8x4GB	SATA	2 fixed	1x500GB	open	1x600W	1x2	2 x GB	1 year	May 2008
7948-56x	2 x Xeon E5472	3.0GHz/QC 12MB	16x4GB	SATA	2 fixed	1x500GB	open	1x600W	1x2	2 x GB	1 year	May 2008
7948-58x	2 x Xeon E5472	3.0GHz/QC 12MB	16x4GB	SATA	2 fixed	2x500GB	open	1x600W	1x2	2 x GB	1 year	May 2008
Positioning Processor	1U, dual-socket server providing High Performance Computing in space-constrained environments											
L2 cache	Two Intel® Xeon Processors up to 3.0GHz / 12MB L2 ECC Cache / Quad-Core / Two Xeon Processors 3.4GHz / 6MB L2 ECC Cache / Dual-Core / All 1600MHz FSB / Extended Memory 64 Technology (EM64T) / Enhanced Intel Speedstep Technology (EIST)											
SMP support Implementation	12 or 6MB / std and max / at processor speed											
Memory	2-way SMP / two Xeon Processors (same speed/cache size) standard											
SATA controller	Systemboard contains two Intel LGA771 sockets, sixteen memory gold-connector DIMM slots, one 2nd Generation PCI-E slot, integrated SATA, ethernet and graphics controllers											
SATA connectors	4, 32 or 64GB std / 64GB ¹³ max / 2, 8 or 16 slots used / 14, 8 or 0 slots available / PC2-5300 667MHz FBD 240-pin ECC DDR2-SDRAM DIMMs / dual channel / 2-way memory interleave / DIMMs must be installed in matched pairs [a bank] / Fully Buffered / Error Checking and Correcting (ECC) (corrects any x4 or x8 SDRAM device failure, detects all two wire faults on DIMMs, detects all permutations of two x4 DRAM failures, detects any two bits in error within 8 bytes of data, corrects any single bit error within 8 bytes of data) / Chipkill											
IDE controller/cable	Integrated in ESB2-E / six port SATA controller (300MB/sec) / on planar / PCI-Express											
Disk - capacity	Two internal SATA ports on systemboard are connected with one-drop SATA cables directly to individual disks											
Disk - bays	Enhanced IDE/ATA 100 controller integrated in I/O Controller Hub / one connector on planar / one 1-drop IDE cable (DVD-ROM) Some: 500Gb or 1TB; some: open / supports 7200 rpm SATA disks / no backplane											
Chipset	Two fixed 3.5" SATA HDD / filler panels installed in each disk bay											
Mechanical	Intel chipset / Intel 5400 Memory Controller Hub (MCH) provides one PCI-Express x16 slot / Enterprise Southbridge(ESB-2E) provides: ATI video, Dual Gigabit ethernet, IDE, USB, SMBus, LPC bus to NS PC87427 for Super I/O											
Bus slots	EIA 19" Rack (1U ⁴) / rack-mount only / supported in IBM NetBAY™ Rack products / no rack to tower conversion (See below) one 2nd Generation PCI-Express x16 slot (x16 Links)											
Ethernet controller	Two 10/100/1000 ethernet ports / Two Intel 82563EB / two full gigabit ethernet MAC and PHY layer functions / on planar / PCI-Express / full duplex / Wake on LAN® / Alert Standard Format 2.0 / two RJ-45 ports in rear											
Optical / diskette	Open / USB only											
Front & Rear ports	Front: one USB (Vers 2.0); Rear: two USB (Vers 2.0), keyboard and mouse(stacked PS/2s), graphics (DB-15), two ethernet (RJ-45), one RJ-45 (serial) / no parallel port											
Graphics	SVGA / ATI® RN50(ES1000) / rear port / on planar / 32MB DDR std/max / 32-bit/33MHz PCI 2.3											
Security	Power-on password / administrator password / unattended boot / selectable boot sequence											
Systems mgmt	Intel Integrated Baseboard Management Controller(BMC) / IPMI 2.0 / H8S2166 / on planar / provides system and environmental monitoring such as temp, optional disks, fans, power supply											
Diagnostics Software	Light Guided Diagnostics / integrated diagnostic LEDs to assist in troubleshooting board level issues											
Keyboard / mouse	System x3450 Quick Setup Guide and Documentation CD: Option Installation Guide, Installation Guide, User's Guide and Hardware Maintenance Manual and Troubleshooting Guide											
Power supply	None standard (because rack-based) / PS/2											
Fans	Std/Max: one 600 watt / rear access / auto restart / auto-sensing											
Prerequisites	Std/max: five / fixed / variable speed											
	Monitor, keyboard, mouse, SATA disk(some), rack, OS											



Slot 1:PCI-Express x16 Gen2 (full height and length)

- ⊖ Quick release adapter slots (no screws)
- ⊖ Configuration/Setup Utility: F1 at startup
- ⊖ Diagnostics (PC-Doctor™): F2 at startup
- ⊖ Network Boot: F12 at startup
- ⊖ Front indicators LEDs: NIC 1&2 Activity, Power/Sleep, HDD activity, Identification, and System status
- ⊖ Light Guided Diagnostics can alert the system administrator of a component failure
- ⊖ Rack: H 1.72" x W 16.7" x D 27.4" (H 43.6mm x W 424mm x D 696mm)
- ⊖ 42 to 84 pounds
- ⊖ Stealth black color

4GB PC2-5300 FBD (2 x 2GB)	39M5791
8GB PC2-5300 FBD (2 x 4GB)	39M5797
IBM 250GB 7.2K rpm SATA simple-swap HDD	39M4508
IBM 500GB 7.2K rpm SATA simple-swap HDD	39M4514
IBM 750GB 7.2K rpm SATA simple-swap HDD	43W7572

Other options at ibm.com/products/us

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
- ⊖ 3 year on site warranty service upgrade options (in eligible locations):⁷
 - 9-5PM coverage, Mon-Fri excluding holidays, NBD response time (ServicePac[®] 51J9496)
 - 9-5PM coverage, Mon-Fri excluding holidays, 4 hr response time (ServicePac 51J9497)
 - 24 hr x 7 day coverage, 4 hour average response time (ServicePac 51J9498)
- ⊖ Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- ⊖ 24x7¹⁴ toll-free support for warranty issues during the warranty period³

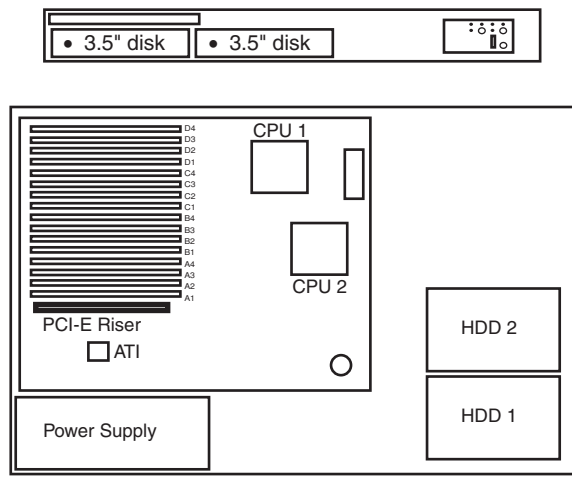
Max internal disk capacity:
3.5" SATA models: 1.5TB² with two 750GB SL disks

See footnotes for important warranty information

IBM® Type-model	Qty x Processor/Core	L2 cache	Memory	Disk controller	Disk bays	Disks	Optical	Power Supply	Slots x bays	Ethernet	Limited warranty ³	Available date
7948-2Cx	2 x Xeon™ X5272 3.4GHz/DC	6MB	2x4GB	SATA	2 fixed (open 3.5)	open	1x600W	1x2	2 x GB	1 year	Sep 2008	
7948-3Cx	2 x Xeon E5462 2.8GHz/DC	12MB	2x4GB	SATA	2 fixed (open 3.5)	open	1x600W	1x2	2 x GB	1 year	Sep 2008	
7948-5Cx	2 x Xeon E5472 3.0GHz/QC	12MB	2x4GB	SATA	2 fixed (open 3.5)	open	1x600W	1x2	2 x GB	1 year	Sep 2008	
7948-6Cx	2 x Xeon X5482 3.2GHz/QC	12MB	2x4GB	SATA	2 fixed (open 3.5)	open	1x600W	1x2	2 x GB	1 year	Nov 2008	
7948-5Dx	2 x Xeon E5472 3.0GHz/QC	12MB	8x4GB	SATA	2 fixed 1x500GB	open	1x600W	1x2	2 x GB	1 year	Sep 2008	
7948-5Fx	2 x Xeon E5472 3.0GHz/QC	12MB	16x4GB	SATA	2 fixed 1x500GB	open	1x600W	1x2	2 x GB	1 year	Sep 2008	
7948-5Gx	2 x Xeon E5472 3.0GHz/QC	12MB	16x4GB	SATA	2 fixed 2x500GB	open	1x600W	1x2	2 x GB	1 year	Sep 2008	
Positioning Processor	1U, dual-socket server providing High Performance Computing in space-constrained environments Two Intel® Xeon Processors up to 3.2GHz / 12MB L2 ECC Cache / Quad-Core / Two Xeon Processors 3.4GHz / 6MB L2 ECC Cache / Dual-Core / All 1600MHz FSB / Extended Memory 64 Technology (EM64T) / Enhanced Intel Speedstep Technology (EIST)											
L2 cache	12 or 6MB / std and max / at processor speed											
SMP support Implementation	2-way SMP / two Xeon Processors (same speed/cache size) standard Systemboard contains two Intel LGA771 sockets, sixteen memory gold-connector DIMM slots, one 2nd Generation PCI-E slot, integrated SATA, ethernet and graphics controllers											
Memory	4, 32 or 64GB std / 64GB ¹³ max / 2, 8 or 16 slots used / 14, 8 or 0 slots available / PC2-6400 800MHz FBD 240-pin ECC DDR2-SDRAM DIMMs / dual channel / 2-way memory interleave / DIMMs must be installed in matched pairs [a bank] / Fully Buffered / Error Checking and Correcting (ECC) (corrects any x4 or x8 SDRAM device failure, detects all two wire faults on DIMMs, detects all permutations of two x4 DRAM failures, detects any two bits in error within 8 bytes of data, corrects any single bit error within 8 bytes of data) / Chipkill											
SATA controller	Integrated in ESB2-E / six port SATA controller (300MB/sec) / on planar / PCI-Express											
SATA connectors	Two internal SATA ports on systemboard are connected with one-drop SATA cables directly to individual disks											
IDE controller/cable	Enhanced IDE/ATA 100 controller integrated in I/O Controller Hub / one connector on planar / one 1-drop IDE cable (DVD-ROM)											
Disk - capacity	Some: 500Gb or 1TB; some: open / supports 7200 rpm SATA disks / no backplane											
Disk - bays	Two fixed 3.5" SATA HDD / filler panels installed in each disk bay											
Chipset	Intel chipset / Intel 5400 Memory Controller Hub (MCH) provides one PCI-Express x16 slot / Enterprise Southbridge(ESB-2E) provides: ATI video, Dual Gigabit ethernet, IDE, USB, SMBus, LPC bus to NS PC87427 for Super I/O											
Mechanical	EIA 19" Rack (1U ⁴) / rack-mount only / supported in IBM NetBAY™ Rack products / no rack to tower conversion											
Bus slots	(See below) one 2nd Generation PCI-Express x16 slot (x16 Links)											
Ethernet controller	Two 10/100/1000 ethernet ports / Two Intel 82563EB / two full gigabit ethernet MAC and PHY layer functions / on planar / PCI-Express / full duplex / Wake on LAN® / Alert Standard Format 2.0 / two RJ-45 ports in rear											
Optical / diskette	Open / USB only											
Front & Rear ports	Front: one USB (Vers 2.0); Rear: two USB (Vers 2.0), keyboard and mouse(stacked PS/2s), graphics (DB-15), two ethernet (RJ-45), one RJ-45 (serial) / no parallel port											
Graphics	SVGA / ATI® RN50(ES1000) / rear port / on planar / 32MB DDR std/max / 32-bit/33MHz PCI 2.3											
Security	Power-on password / administrator password / unattended boot / selectable boot sequence											
Systems mgmt	Intel Integrated Baseboard Management Controller(BMC) / IPMI 2.0 / H8S2166 / on planar / provides system and environmental monitoring such as temp, optional disks, fans, power supply											
Diagnostics Software	Light Guided Diagnostics / integrated diagnostic LEDs to assist in troubleshooting board level issues System x3450 Quick Setup Guide and Documentation CD: Option Installation Guide, Installation Guide, User's Guide and Hardware Maintenance Manual and Troubleshooting Guide											
Keyboard / mouse	None standard (because rack-based) / PS/2											
Power supply	Std/Max: one 600 watt / rear access / auto restart / auto-sensing											
Fans	Std/max: five / fixed / variable speed											
Prerequisites	Monitor, keyboard, mouse, SATA disk(some), rack, OS											

4GB PC2-6400 FBD (2 x 2GB)	46C7571
8GB PC2-6400 FBD (2 x 4GB)	46C7572
IBM 250GB 7.2K rpm SATA simple-swap HDD	39M4508
IBM 500GB 7.2K rpm SATA simple-swap HDD	39M4514
IBM 750GB 7.2K rpm SATA simple-swap HDD	43W7572

Other options at ibm.com/products/us



- ⊖ Quick release adapter slots (no screws)
- ⊖ Configuration/Setup Utility: F1 at startup
- ⊖ Diagnostics (PC-Doctor™): F2 at startup
- ⊖ Network Boot: F12 at startup
- ⊖ Front indicators LEDs: NIC 1&2 Activity, Power/Sleep, HDD activity, Identification, and System status
- ⊖ Light Guided Diagnostics can alert the system administrator of a component failure
- ⊖ Rack: H 1.72" x W 16.7" x D 27.4" (H 43.6mm x W 424mm x D 696mm)
- ⊖ 42 to 84 pounds
- ⊖ Stealth black color

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
- ⊖ 3 year on site warranty service upgrade options (in eligible locations):⁷
 - 9-5PM coverage, Mon-Fri excluding holidays, NBD response time (ServicePac® 51J8880)
 - 9-5PM coverage, Mon-Fri excluding holidays, 4 hr response time (ServicePac 51J8881)
 - 24 hr x 7 day coverage, 4 hour average response time (ServicePac 51J8882)
- ⊖ Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- ⊖ 24x7¹⁴ toll-free support for warranty issues during the warranty period³

Max internal disk capacity:
3.5" SATA models: 1.5TB² with two 750GB SL disks

See footnotes for important warranty information

IBM® Type-model	Qty x Processor	Speed/Core	L2 Cache	Optical	Memory	Disk / Controller / bays	Slots x bays	Ethernet	Warranty ³ (years)	Available date
7940 - 32U	1 x Opteron™ 2352	2.1GHz/QC	2MB	Open	2x1GB	160GB / SATA / 2 fixed	2x3	Dual Gigabit	1	June 2008
7940 - 52U	1 x Opteron 2356	2.3GHz/QC	2MB	Open	2x1GB	160GB / SATA / 2 fixed	2x3	Dual Gigabit	1	June 2008
7940 - 62U	2 x Opteron 2360SE	2.5GHz/QC	2MB	Open	4x2GB	160GB / SATA / 2 fixed	2x3	Dual Gigabit	1	July 2008

Positioning Processor(s) **Quad-Core, Dual-Socket Rack-Optimized High Performance Computing Server with entry pricing**
 Up to two AMD® Opteron 2000 Series Quad Core Processors up to 2.5GHz¹ / simultaneously supports 32 and 64-bit computing
L2 cache **512KB** / per core / at processor speed
SMP support **2-way SMP** / up to two Opteron Processors (same speed/cache size required)
Implementation Systemboard contains two LGA 1207-pin sockets, twelve memory DIMM slots, integrated SATA, dual ethernet, graphics, one PCI-E x16 slot and either one PCI-E x8 or one HTx slot

Memory **2 or 8 GB** std / 24GB max¹³ per processor (48GB max per dual cpu system) / *single cpu system*: two slots used, four slots available; *dual cpu system*: four slots used, eight slots available / **PC-5300 667MHz registered 240-pin DDR2-SDRAM RDIMMs** / twelve DIMM gold-connector slots on systemboard / DIMMs must be installed in matched pairs [a bank] / dual channel / two-way interleaving / **Error Checking and Correcting (ECC)** via 16-bit Checksum / **Xcelerated Memory Technology™** / **Chipkill™** on 1, 2 and 4GB DIMMs / online hot-spare memory / hardware scrubbing

SATA disk controller **Integrated SATA II controller** / provided by HT1000 South Bridge / two port / optional SAS / optional RAID
SATA controller/cable Two connectors on planar / two 1-drop cables / one 1-drop IDE cable (for optical drive)
Disk - capacity 80GB / 7200 rpm / 9.0ms seek
Disk - bays Two 3.5" fixed / SATA connectors / filler panels in each disk bay / supports 15k drives
Mechanical **EIA 19" Rack (1U⁴)** / rack-mount only / supported in 26" deep racks such as the IBM NetBAY™ Rack products

Architecture/chipsets **ServerWorks™ Chipset / HT2100 System I/O Controller** provides: one PCI-Express x16 slot, one PCI-Express x8 or one HTx slot, HyperTransport bridge to HT1000 South Bridge / **HT1000 South Bridge** provides: PCI-X, USB(2.0), ATI video, SATA, Dual GB ethernet, IDE and LPC bus to NS PC87427 for Super I/O

Bus slots (See detail below) one half-length PCI-E x16 and one half-length PCI-E x8 / option to convert PCI-E x8 slot to HTx slot

Ethernet Dual Gigabit Ethernet ports / Broadcom® 5704 / two full gigabit ethernet MAC and PHY layer functions / on planar / PCI-X 64-bit 133MHz / full duplex / Wake on LAN® / two rear RJ-45 ports

Optical / diskette Optional / IDE / *Diskette* none (USB diskette optional)
Rear ports *Rear*: four USB (Vers 2.0), serial (9-pin), two ethernet (RJ-45), analog DB-15 graphics / parallel port not supported
Front ports *Front*: two USB (Vers 2.0)
Graphics SVGA / ATI® RN50b(ES1000) / on planar / 16MB SDRAM std/max
Keyboard / mouse None standard (because rack-based)

Security Systems mgmt Power-on and administrator passwords / unattended boot / selectable boot
IBM Integrated Baseboard Management Controller(BMC) / H82166 / IPMI 2.0

Diagnostics Diagnostic LEDs for fans, memory DIMMs and processors / PFA / Light Path Diagnostics not supported

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

Cooling Five fans total / three blowers for processors, memory and HDD bays / two fans inside power supply / **Calibrated Vector Cooling™** / variable speed / not redundant / not hot-swap

Power supply Prerequisites 650 watt / universal / auto-sensing / auto-restart support
 Monitor, keyboard, mouse, rack, os

AMD Opteron Processor Model 2352	43W7461
AMD Opteron Processor Model 2356	43W7463
1GB (2x512) PC2-5300 CL5 ECC DDR2 FBDIMM	41Y2759
2GB (2x1GB) PC2-5300 CL5 ECC DDR2 FBDIMM	41Y2762
4GB (2x2GB) PC2-5300 CL5 ECC DDR2 FBDIMM	41Y2765
8GB (2x4GB) PC2-5300 CL5 ECC DDR2 FBDIMM	41Y2768
IBM 80GB 7.2K 3.5" SATA HDD	39M4500
IBM 160GB 7.2K 3.5" SATA HDD	39M4504
IBM 250GB 7.2K 3.5" SATA HDD	39M4508
IBM 500GB 7.2K 3.5" SATA HDD	39M4514
IBM 750GB 7.2K 3.5" SATA HDD	43W7572
IBM 73GB 10K 3.5" SAS HDD*	40K1045
IBM 146GB 10K 3.5" SAS HDD*	40K1046
IBM 300GB 10K 3.5" SAS HDD*	40K1047
IBM 73GB 15K 3.5" SAS HDD*	40K1049
IBM 146GB 15K 3.5" SAS HDD*	40K1050
IBM SAS HBA Controller	25R8060
IBM InfiniBand HTx Adapter by Q Logic	41Y4519
PCI-E x8 Riser Card	32R3288
HTx Riser Card	40K7462

Other options at ibm.com/products/us

Slot 1: Full height, half-length, PCI-E x16
 Slot 2: Full height, half-length, PCI-E x8 or HTx

Bay ① 5.25", UltraSlim 0.5", access, optional optical
 Bay ② 3.5", SL 1", no access, std fixed disk
 Bay ③ 3.5", SL 1", no access, open for fixed disk

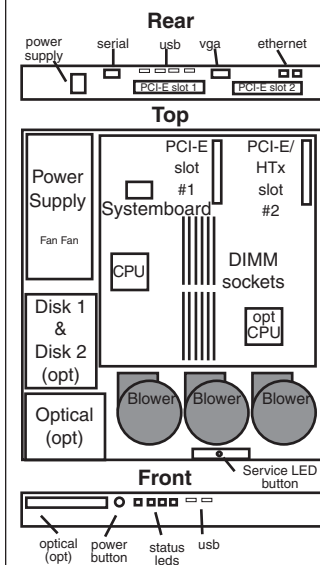
- ⇨ Stealth black color front bezel
- ⇨ H 1.72" (1U) x W 17.3" x D 25.7"
 H 43.7mm x W 439.9mm x L 653.3mm
- ⇨ 26 to 32 lbs; 11.8kg to 14.6kg (minimum to max configuration)
- ⇨ Configuration/Setup Utility: F1 at startup
- ⇨ Network Boot: F12 at startup
- ⇨ Operator Information Panel in front
- ⇨ Includes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

Maximum internal disk capacity¹³:
 1.5TB with two 750GB SATA disks or
 600GB with two 300GB SAS disks
 and optional* SAS controller

*IBM SAS HBA Controller option required for SAS support

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, NBDresponse (ServicePac® part num 46D4095)
 - 3 year IOR 9x5, 4 hr avg response (ServicePac part num 46D4096)
 - 3 year IOR 24x7, 4 hr avg response (ServicePac part num 46D4097)
 - 3 year IOR 24x7, 2 hr avg response (ServicePac part num 46D4098)
- ⇨ Other ServicePac options at www.ibm.com/services/us/its/pdf/wamomxeu.pdf
- ⇨ 24x7¹⁴ toll-free support for warranty issues during the warranty period⁵



IBM® Type-GAV-model	Qty x Processor	L2 Core cache Memory	Disk controller	Mechanical	Slots x bays (hot-swap bays)	Power supply	Ethernet	Available date
7977-12y-12x	1 x Xeon™ 5050 3.0GHz	DC 4MB 1GB	Open SAS/SATA	Tower	6x11 (8 HS std/max)	1 x 835W HS	2xGigabit	July 2006
7977-22y-22x	1 x Xeon 5060 3.2GHz	DC 4MB 1GB	Open SAS/SATA	Tower	6x11 (8 HS std/max)	1 x 835W HS	2xGigabit	July 2006
7977-42y-42x	1 x Xeon 5110 1.6GHz	DC 4MB 1GB	Open SAS/SATA	Tower	6x11 (8 HS std/max)	1 x 835W HS	2xGigabit	July 2006
7977-52y-52x	1 x Xeon 5120 1.86GHz	DC 4MB 1GB	Open SAS/SATA	Tower	6x11 (8 HS std/max)	1 x 835W HS	2xGigabit	July 2006
7977-62y-62x	1 x Xeon 5130 2.0GHz	DC 4MB 1GB	Open SAS/SATA	Tower	6x11 (8 HS std/max)	1 x 835W HS	2xGigabit	July 2006
7977-72y-72x	1 x Xeon 5140 2.33GHz	DC 4MB 1GB	Open SAS/SATA	Tower	6x11 (8 HS std/max)	1 x 835W HS	2xGigabit	July 2006
7977-82y-82x	1 x Xeon 5150 2.66GHz	DC 4MB 1GB	Open SAS/SATA	Tower	6x11 (8 HS std/max)	1 x 835W HS	2xGigabit	July 2006
7977-92y-92x	1 x Xeon 5160 3.0GHz	DC 4MB 1GB	Open SAS/SATA	Tower	6x11 (8 HS std/max)	1 x 835W HS	2xGigabit	July 2006
7977-B2y-B2x	1 x Xeon E5310 1.6GHz	QC 8MB 1GB	Open SAS/SATA	Tower	6x11 (8 HS std/max)	1 x 835W HS	2xGigabit	Dec 2006
7977-C2y-C2x	1 x Xeon E5320 1.86GHz	QC 8MB 1GB	Open SAS/SATA	Tower	6x11 (8 HS std/max)	1 x 835W HS	2xGigabit	Dec 2006

Positioning Processor *Universal server; two-way server using the Xeon processor to provide power and performance at an affordable price*
 Up to 1 x Intel® Xeon Processor 3.0 GHz with 667MHz FSB / up to 1 x Intel Xeon Processor 3.2 GHz with 1066MHz FSB / 4MB L2 ECC Cache / Dual-Core / up to 1.86GHz with 1066MHz FSB / 8MB L2 ECC Cache / Quad-Core / All EM64T

L2 cache **4 or 8MB** / std and max / at processor speed

SMP support **2-way SMP** / up to two Xeon Processors (same speed/cache size)

Implementation Systemboard contains two Intel LGA771 sockets, twelve memory gold-connector DIMM slots, three PCI-E slots, two PCI-X slots, one PCI slot, integrated SAS, ethernet and graphics controllers

Memory **1GB** std / 48GB¹⁹ max (48GB maximum can be achieved when 4GB DIMMs are supported, 24GB is the max with less than 4GB DIMMs) / two slots used / ten slots available / **PC2-5300 667MHz FBD 240-pin ECC DDR2-SDRAM DIMMs** / DIMMs must be installed in matched pairs [a bank] / **Fully Buffered** / 2-way memory interleave / dual channel / **Error Checking and Correcting (ECC)** (corrects any x4 or x8 SDRAM device failure, detects all two wire faults on DIMMs, detects all permutations of two x4 DRAM failures, detects any two bits in error within 8 bytes of data, corrects any single bit error within 8 bytes of data) / **Active Memory™**: **memory mirroring, online-spare memory, Chipkill**

SAS/SATA controller **Adaptec® AIC-9580W / eight port SAS or SATA** (300MB/sec SAS) (150MB/sec SATA) / hot-swap / on planar / PCI-Express / supports **RAID 0, 1, 5 & 10** / ServeRAID 8k std

SAS connectors Dual channel controller wired to two hot-swap DASD backplanes

SAS cabling Two mini SAS cables connect controller to dual 4-bay backplanes

IDE controller / cable IDE ATA 66/33 / one connector on planar / one 2-drop IDE cable (DVD-ROM)

Disk - capacity None std / supports 7200-15000 rpm disks / dual backplanes

Disk - bays Eight hot-swap SAS/SATA bays

Mechanical Tower / conversion to EIA 26" Rack (5U⁴) via optional kit 39Y8382

Slots (see below) Three PCI-Express, two PCI-X 64-bit/133MHz and one PCI 32-bit/33MHz slot

Chipset **Intel 5000P chipset** / Intel Memory Controller Hub (MCH) provides two PCI-Express x8 slots / Enterprise Southbridge(ESB-2E) provides: one PCI-Express x8 slot with x4 Links, two 64-bit/100MHz PCI-X slots, one 32-bit/33MHz PCI slot, ATI video, Dual Gigabit ethernet, IDE, USB, SMBus, LPC bus to NS PC8374L for Super I/O

Ethernet controller **Dual 10/100/1000 gigabit** / Broadcom® BCM 5721 / on planar / PCI-Express 64-bit 100MHz / full duplex / Wake on LAN® / IPMI (2.0)

DVD-ROM / diskette 16X⁶ DVD-ROM / IDE / 1.6" HH; *Diskette*: USB only

Rear ports *Rear*: two USB (Vers 2.0), keyboard, mouse, parallel, **two** serial (9-pin), graphics (DB-15), two ethernet (RJ-45), RJ-45 (sys mgmt)

Front port / graphics *Front*: two USB (Vers 2.0); *Graphics*: SVGA / ATI® RN50(ES1000) / on planar / 16MB DDR std/max / 32-bit/33MHz PCI 2.2

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

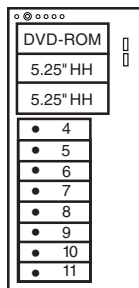
Systems mgmt	IBM Integrated Baseboard Management Controller(BMC) / IPMI 2.0 H8S2166 / on planar / provides system and environmental monitoring such as temp, optional disks, fans, power supp / supports opt. Remote Supervisor Adapter II Slimline with 140-pin connector on planar for continuous power (no ext pwr reqd)	Xeon 5050 3.0GHz/667MHz/4MB L2 Cache Proc Upg	25R8926
Diagnosics	Light Path Diagnostics™ panel providing LED map to failing part (on side cover) / Information LED Panel in front	Xeon 5060 3.2GHz/1066MHz/4MB L2 Cache Proc Upg	25R8912
Software	ServerGuide™ (CD-ROM installation and configuration utilities), IBM Director, others	Xeon 5110 1.6GHz/1066MHz/4MB L2 Cache Proc Upg	40K1231
		Xeon 5120 1.86GHz/1066MHz/4MB L2 Cache Proc Upg	40K1232
		Xeon E5310 1.6GHz/1066MHz/8MB L2 Cache Proc Upg	43W5821
		Xeon E5320 1.86GHz/1066MHz/8MB L2 Cache Proc Upg	43W5822
		Xeon 5130 2.0GHz/1333MHz/4MB L2 Cache Proc Upg	40K1233
		Xeon 5140 2.33GHz/1333MHz/4MB L2 Cache Proc Upg	40K1234
		Xeon 5150 2.66GHz/1333MHz/4MB L2 Cache Proc Upg	40K1235
		Xeon 5160 3.0GHz/1333MHz/4MB L2 Cache Proc Upg	40K1236
		1GB Kit (2x512MB DIMM) PC2-5300 DDR2 FBD CL4	39M5782
		2GB Kit (2x1GB DIMM) PC2-5300 DDR2 FBD CL4	39M5785
		4GB Kit (2x2GB DIMM) PC2-5300 DDR2 FBD CL4	39M5791
		146GB 10K SAS Hot-Swap HDD	40K1040
		300GB 10K SAS Hot-Swap HDD	40K1041
		36GB 15K SAS Hot-Swap HDD	40K1042
		73GB 15K SAS Hot-Swap HDD	40K1043
		146GB 15K SAS Hot-Swap HDD	40K1044
		160GB 7.2K SATA Hot-Swap HDD	39M4522
		250GB 7.2K SATA Hot-Swap HDD	39M4526
		500GB 7.2K SATA Hot-Swap HDD	39M4530
		IBM Remote Supervisor Adapter II Slimline	39Y9566
		IBM Redundant Power and Cooling Option(NA)	39Y8487

Keyboard / mouse Optional

Power supply 835 watt / std/max: one/two / hot-swap / voltage-sensing / auto-restart / redundant with optional power supply

Fans std/max: three/six / three fans (mid-chassis) / variable speed / hot-swap / (Opt) two additional mid-chassis fans and one rear / redundant with optional fans / PFA / fan in each power supply

Tower



- Bay 1 5.25", HH 1.6" access, DVD-ROM
- Bay 2 5.25", HH 1.6" access, open
- Bay 3 5.25", HH 1.6" access, open
- 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 3.5", SL 1", access, hot-swap
- Bay 9 3.5", SL 1", access, hot-swap
- Bay 10 3.5", SL 1", access, hot-swap
- Bay 11 3.5", SL 1", access, hot-swap

- Slot 1: half-length, PCI-Express x8(x4 electrical)
- Slot 2: full, PCI-Express x8
- Slot 3: full, PCI-Express x8
- Slot 4: full, 64-bit 133MHz 3.3v PCI-X
- Slot 5: full, 64-bit 133MHz 3.3v PCI-X
- Slot 6: half-length, 32-bit 33MHz 5.0v PCI

- Quick release adapter slots (no screws)
- Configuration/Setup Utility invoked by pressing F1 at startup
- Aurora RAID Configuration Utility near startup by pressing CTRL+A
- 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 17.3" x W 8.6" x D 29.4"
- 74 to 101 pounds
- Stealth black color

All models: Max internal disk capacity: 2.4TB² with eight 300GB 10K SAS or 2.0TB² with eight 250GB SATA hot-swap HDDs

LIMITED WARRANTY³

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

IBM® Type-model	Qty x Processor	L2 Core cache	Memory	Disk	Disk controller	Mechanical	Slots x bays (hot-swap bays)	Power supply	Ethernet	Available date
7977- F2x	1 x Xeon™ E5335 2.0GHz	QC 8MB	1GB	Open	SAS/SATA	Tower	6x11 (8 HS std/max)	1 x 835W HS	2xGigabit	Feb 2007
7977- G2x	1x Xeon E5345 2.33GHz	QC 8MB	1GB	Open	SAS/SATA	Tower	6x11 (8 HS std/max)	1 x 835W HS	2xGigabit	Feb 2007
7977- H2x	1x Xeon E5355 2.66GHz	QC 8MB	1GB	Open	SAS/SATA	Tower	6x11 (8 HS std/max)	1 x 835W HS	2xGigabit	Feb 2007
7977- A2x	1x Xeon E5405 2.0GHz	QC 12MB	1GB	Open	SAS/SATA	Tower	6x11 (8 HS std/max)	1 x 835W HS	2xGigabit	Jan 2008
7977- D2x	1x Xeon E5410 2.33GHz	QC 12MB	1GB	Open	SAS/SATA	Tower	6x11 (8 HS std/max)	1 x 835W HS	2xGigabit	Jan 2008
7977- J2x	1x Xeon E5420 2.5GHz	QC 12MB	1GB	Open	SAS	Tower	6x15 (12 HS std/max)	1 x 835W HS	2xGigabit	Jan 2008
7977- L2x	1x Xeon E5430 2.66GHz	QC 12MB	1GB	Open	SAS	Tower	6x15 (12 HS std/max)	1 x 835W HS	2xGigabit	Jan 2008
7977- M2x	1x Xeon E5440 2.83GHz	QC 12MB	1GB	Open	SAS/SATA	Tower	6x11 (8 HS std/max)	1 x 835W HS	2xGigabit	Jan 2008
7977- R2x	1x Xeon E5450 3.0GHz	QC 12MB	1GB	Open	SAS/SATA	Tower	6x11 (8 HS std/max)	1 x 835W HS	2xGigabit	Jan 2008

Positioning Processor *Universal server; two-way server using the Xeon processor to provide power and performance at an affordable price*
 Up to 1 x Intel® Xeon Processor up to 3.0GHz with 1333MHz FSB / 12MB L2 ECC Cache / Xeon Processor up to 2.66GHz with 1333MHz FSB / 8MB L2 ECC Cache / All Quad-Core / All EM64T

L2 cache **8 or 12MB** / std and max / at processor speed

SMP support **2-way SMP** / up to two Xeon Processors (same speed/cache size)

Implementation System board contains two Intel LGA771 sockets, twelve memory gold-connector DIMM slots, three PCI-E slots, two PCI-X slots, one PCI slot, integrated SAS, ethernet and graphics controllers

Memory **1GB** std / 48GB¹³ max (48GB maximum can be achieved when 4GB DIMMs are supported, 24GB is the max with less than 4GB DIMMs) / two slots used / ten slots available / **PC2-5300 667MHz FBD 240-pin ECC DDR2-SDRAM DIMMs** / DIMMs must be installed in matched pairs [a bank] / **Fully Buffered** / 2-way memory interleave / dual channel / **Error Checking and Correcting (ECC)** (corrects any x4 or x8 SDRAM device failure, detects all two wire faults on DIMMs, detects all permutations of two x4 DRAM failures, detects any two bits in error within 8 bytes of data, corrects any single bit error within 8 bytes of data) / **Active Memory™**: **memory mirroring, online-spare memory, Chipkill**

SAS/SATA controller **Adaptec® AIC-9580W / eight port SAS or SATA** (300MB/sec SAS) (150MB/sec SATA) / hot-swap / on planar / PCI-Express / supports **RAID 0, 1, 5 & 10** / ServeRAID 8k std

SAS connectors Dual channel controller wired to two hot-swap DASD backplanes

SAS cabling Two mini SAS cables connect controller to dual 4-bay backplanes

IDE controller / cable IDE ATA 66/33 / one connector on planar / one 2-drop IDE cable (DVD-ROM)

Disk - capacity None std / supports 7200-15000 rpm disks / dual backplanes

Disk - bays Eight hot-swap SAS/SATA bays or 12 hot-swap SFF SAS bays

Mechanical Tower / conversion to EIA 26" Rack (5U⁴) via optional kit 39Y8382

Slots (see below) Three PCI-Express, two PCI-X 64-bit/133MHz and one PCI 32-bit/33MHz slot

Chipset **Intel 5000P chipset** / Intel Memory Controller Hub (MCH) provides two PCI-Express x8 slots / Enterprise Southbridge(ESB-2E) provides one PCI-Express x8 slot with x4 Links, two 64-bit/100MHz PCI-X slots, one 32-bit/33MHz PCI slot, ATI video, Dual Gigabit ethernet, IDE, USB, SMBus, LPC bus to NS PC8374L for Super I/O

Ethernet controller **Dual 10/100/1000 gigabit** / Broadcom® BCM 5721 / on planar / PCI-Express 64-bit 100MHz / full duplex / Wake on LAN® / IPMI (2.0)

DVD-ROM / diskette **16X® DVD-ROM / IDE / 1.6" HH; Diskette: USB only**

Rear ports *Rear: two USB (Vers 2.0), keyboard, mouse, parallel, two serial (9-pin), graphics (DB-15), two ethernet (RJ-45), RJ-45 (sys mgmt)*

Front port / graphics *Front: two USB (Vers 2.0); Graphics: SVGA / ATI® RN50(ES1000) / on planar / 16MB DDR std/max / 32-bit/33MHz PCI 2.2*

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

Systems mgmt **IBM Integrated Baseboard Management Controller(BMC)** / IPMI 2.0 H8S2166 / on planar / provides system and environmental monitoring such as temp, optional disks, fans, power supp / supports opt. Remote Supervisor Adapter II Slimline with 140-pin connector on planar for continuous power (no ext pwr reqd)

Diagnostics **Light Path Diagnostics™** panel providing LED map to failing part (on side cover) / Information LED Panel in front

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

Keyboard / mouse Optional

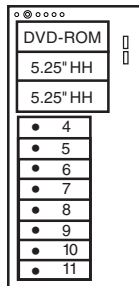
Power supply 835 watt / std/max: one/two / hot-swap / voltage-sensing / auto-restart / redundant with optional power supply

Fans std/max: three/six / three fans (mid-chassis) / variable speed / hot-swap / (Opt) two additional mid-chassis fans and one rear / redundant with optional fans / PFA / fan in each power supply

Xeon E5335 2.0GHz/1333MHz/8MB L2 Cache Proc Upg	43W5823
Xeon E5345 2.33GHz/1333MHz/8MB L2 Cache Proc Upg	43W5824
Xeon E5355 2.66GHz/1333MHz/8MB L2 Cache Proc Upg	43W5825
Xeon E5405 2.0GHz/1333MHz/12MB L2 Cache Proc Upg	44R5630
Xeon E5410 2.33GHz/1333MHz/12MB L2 Cache Proc Upg	44R5631
Xeon E5420 2.5GHz/1333MHz/12MB L2 Cache Proc Upg	44R5632
Xeon E5430 2.66GHz/1333MHz/12MB L2 Cache Proc Upg	44R5633
Xeon E5440 2.83GHz/1333MHz/12MB L2 Cache Proc Upg	44R5634
Xeon E5450 3.0GHz/1333MHz/12MB L2 Cache Proc Upg	44E5122
1GB Kit (2x512MB DIMM) PC2-5300 DDR2 FBD CL4	39M5782
2GB Kit (2x1GB DIMM) PC2-5300 DDR2 FBD CL4	39M5785
4GB Kit (2x2GB DIMM) PC2-5300 DDR2 FBD CL4	39M5791
146GB 10K SAS Hot-Swap HDD	40K1040
300GB 10K SAS Hot-Swap HDD	40K1041
36GB 15K SAS Hot-Swap HDD	40K1042
73GB 15K SAS Hot-Swap HDD	40K1043
146GB 15K SAS Hot-Swap HDD	40K1044
160GB 7.2K SATA Hot-Swap HDD	39M4522
250GB 7.2K SATA Hot-Swap HDD	39M4526
500GB 7.2K SATA Hot-Swap HDD	39M4530
IBM Remote Supervisor Adapter II Slimline	39Y9566
IBM Redundant Power and Cooling Option(NA)	39Y8487

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

Tower



- Bay 1 5.25", HH 1.6" access, DVD-ROM
- Bay 2 5.25", HH 1.6" access, open
- Bay 3 5.25", HH 1.6" access, open
- 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 3.5", SL 1", access, hot-swap
- Bay 9 3.5", SL 1", access, hot-swap
- Bay 10 3.5", SL 1", access, hot-swap
- Bay 11 3.5", SL 1", access, hot-swap

- ⇨ Quick release adapter slots (no screws)
- ⇨ Configuration/Setup Utility invoked by pressing F1 at startup
- ⇨ Aurora RAID Configuration Utility near startup by pressing CTRL+A
- ⇨ 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 17.3" x W 8.6" x D 29.4"
- ⇨ 74 to 101 pounds
- ⇨ Stealth black color

- Slot 1: half-length, PCI-Express x8(x4 electrical)
- Slot 2: full, PCI-Express x8
- Slot 3: full, PCI-Express x8
- Slot 4: full, 64-bit 133MHz 3.3v PCI-X
- Slot 5: full, 64-bit 133MHz 3.3v PCI-X
- Slot 6: half-length, 32-bit 33MHz 5.0v PCI

All models: Max internal disk capacity: 2.4TB² with eight 300GB 10K SAS or 6.0TB² with eight 750GB SATA hot-swap HDDs

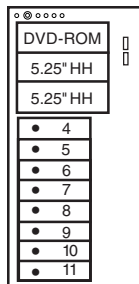
LIMITED WARRANTY³

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

IBM® Type-model Qty x Processor	L2 Core cache Memory	Disk controller Mechanical	Slots x bays (hot-swap bays)	Power supply	Ethernet	Available date
7977- Q4x 1 x Xeon™ X5460 3.16GHz QC 12MB 1GB	Open SAS/SATA Tower	6x11 (8 HS std/max)	1 x 835W HS	2 x Gb	Nov 2008	

Positioning Processor	<i>Universal server; two-way server using the Xeon processor to provide power and performance at an affordable price</i> Up to 2 x Intel® Xeon Processor up to 3.16GHz with 1333MHz FSB / 12MB L2 ECC Cache / Quad-Core / All EM64T					
L2 cache SMP support Implementation	12MB / std and max / at processor speed 2-way SMP / up to two Xeon Processors (same speed/cache size) Systemboard contains two Intel LGA771 sockets, twelve memory gold-connector DIMM slots, three PCI-E slots, two PCI-X slots, one PCI slot, integrated SAS, ethernet and graphics controllers					
Memory	1GB std / 48GB ¹³ max (48GB maximum can be achieved when 4GB DIMMs are supported, 24GB is the max with less than 4GB DIMMs) / two slots used / ten slots available / PC2-5300 667MHz FBD 240-pin ECC DDR2-SDRAM DIMMs / DIMMs must be installed in matched pairs [a bank] / Fully Buffered / 2-way memory interleave / dual channel / Error Checking and Correcting (ECC) (corrects any x4 or x8 SDRAM device failure, detects all two wire faults on DIMMs, detects all permutations of two x4 DRAM failures, detects any two bits in error within 8 bytes of data, corrects any single bit error within 8 bytes of data) / Active Memory™: memory mirroring, online-spare memory, Chipkill					
SAS/SATA controller	Adaptec® AIC-9580W / eight port SAS or SATA (300MB/sec SAS) (150MB/sec SATA) / hot-swap / on planar / PCI-Express / supports RAID 0, 1, 5 & 10 / ServeRAID 8k std					
SAS connectors SAS cabling	Dual channel controller wired to two hot-swap DASD backplanes Two mini SAS cables connect controller to dual 4-bay backplanes					
IDE controller / cable	IDE ATA 66/33 / one connector on planar / one 2-drop IDE cable (DVD-ROM)					
Disk - capacity	None std / supports 7200-15000 rpm disks / dual backplanes					
Disk - bays	Eight hot-swap SAS/SATA bays or 12 hot-swap SFF SAS bays					
Mechanical Slots (see below) Chipset	Tower / conversion to EIA 26" Rack (5U ⁴) via optional kit 39Y8382 Three PCI-Express, two PCI-X 64-bit/133MHz and one PCI 32-bit/33MHz slot Intel 5000P chipset / Intel Memory Controller Hub (MCH) provides two PCI-Express x8 slots / Enterprise Southbridge(ESB-2E) provides: one PCI-Express x8 slot with x4 Links, two 64-bit/100MHz PCI-X slots, one 32-bit/33MHz PCI slot, ATI video, Dual Gigabit ethernet, IDE, USB, SMBus, LPC bus to NS PC8374L for Super I/O					
Ethernet controller	Dual 10/100/1000 gigabit / Broadcom® BCM 5721 / on planar / PCI-Express 64-bit 100MHz / full duplex / Wake on LAN® / IPMI (2.0)					
DVD-ROM / diskette	16X ⁶ DVD-ROM / IDE / 1.6" HH; Diskette: USB only					
Rear ports	Rear: two USB (Vers 2.0), keyboard, mouse, parallel, two serial (9-pin), graphics (DB-15), two ethernet (RJ-45), RJ-45 (sys mgmt)					
Front port / graphics	Front: two USB (Vers 2.0); Graphics: SVGA / ATI® RN50(ES1000) / on planar / 16MB DDR std/max / 32-bit/33MHz PCI 2.2					
Security	Power-on password / administrator password / front door to cover disk bays and power button / unattended boot / selectable boot					
Systems mgmt	IBM Integrated Baseboard Management Controller(BMC) / IPMI 2.0 H8S2166 / on planar / provides system and environmental monitoring such as temp, optional disks, fans, power supp / supports opt. Remote Supervisor Adapter II Slimline with 140-pin connector on planar for continuous power (no ext pwr reqd)					
Diagnostics	Light Path Diagnostics™ panel providing LED map to failing part (on side cover) / Information LED Panel in front					
Software	ServerGuide™ (CD-ROM installation and configuration utilities), IBM Director, others					
Keyboard / mouse	Optional					
Power supply	835 watt / std/max: one/two / hot-swap / voltage-sensing / auto-restart / redundant with optional power supply					
Fans	std/max: three/six / three fans (mid-chassis) / variable speed / hot-swap / (Opt) two additional mid-chassis fans and one rear / redundant with optional fans / PFA / fan in each power supply					
					Xeon X5460 3.16GHz/1333MHz/12MB L2 Cache Proc Upg	44E5635
					1GB Kit (2x512MB DIMM) PC2-5300 DDR2 FBD CL4	39M5782
					2GB Kit (2x1GB DIMM) PC2-5300 DDR2 FBD CL4	39M5785
					4GB Kit (2x2GB DIMM) PC2-5300 DDR2 FBD CL4	39M5791
					73GB 10K SAS Hot-Swap HDD	40K1039
					146GB 10K SAS Hot-Swap HDD	40K1040
					300GB 10K SAS Hot-Swap HDD	40K1041
					36GB 15K SAS Hot-Swap HDD	40K1042
					73GB 15K SAS Hot-Swap HDD	40K1043
					146GB 15K SAS Hot-Swap HDD	40K1044
					IBM Remote Supervisor Adapter II Slimline	39Y9566
					IBM Redundant Power and Cooling Option(NA)	39Y8487
					IBM ServeRAID-MR10is VAULT SAS/SATA Controller	44E8695
	Other options at www.ibm.com/pc/us/accessories					

Tower



- Bay 1 5.25", HH 1.6" access, DVD-ROM
- Bay 2 5.25", HH 1.6" access, open
- Bay 3 5.25", HH 1.6" access, open
- Bay 4 3.5", SL 1", access, hot-swap
- Bay 5 3.5", SL 1", access, hot-swap
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- Bay 9 3.5", SL 1", access, hot-swap
- Bay 10 3.5", SL 1", access, hot-swap
- Bay 11 3.5", SL 1", access, hot-swap

- ⇨ Quick release adapter slots (no screws)
- ⇨ Configuration/Setup Utility invoked by pressing F1 at startup
- ⇨ Aurora RAID Configuration Utility near startup by pressing CTRL+A
- ⇨ 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 17.3" x W 8.6" x D 29.4"
- ⇨ 74 to 101 pounds
- ⇨ Stealth black color

- Slot 1: half-length, PCI-Express x8(x4 electrical)
- Slot 2: full, PCI-Express x8
- Slot 3: full, PCI-Express x8
- Slot 4: full, 64-bit 133MHz 3.3v PCI-X
- Slot 5: full, 64-bit 133MHz 3.3v PCI-X
- Slot 6: half-length, 32-bit 33MHz 5.0v PCI

Max internal disk capacity:
6.0TB² with eight 750GB SATA hot-swap HDDs

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 43X3670)
 - 24 hr x 7 day coverage, 4 hour average response (ServicePac part number 43X3669)
- ⇨ 24x7¹⁴ toll-free support for warranty issues during the warranty period³

IBM® Type-GAV-model	Qty x Processor/Core	L2 cache Memory	Disk	Disk controller	Optical	Power Supply	Disk bays	Slots x bays	Ethernet	Limited warranty ³	Available date
7978-61y-61x	1 x Xeon™ 5150 2.66GHz/DC	4MB 1GB	(open 3.5)	SAS/SATA Combo	670W	2 hot-swap	2x4	2 x GB	3 year Aug	2006	
7978-6Ay-6Ax	1 x Xeon 5150 2.66GHz/DC	4MB 1GB	(open 2.5)	SAS/SATA Combo	670W	4 hot-swap	2x4	2 x GB	3 year Aug	2006	
7978-71y-71x	1 x Xeon 5160 3.0GHz/DC	4MB 1GB	(open 3.5)	SAS/SATA Combo	670W	2 hot-swap	2x4	2 x GB	3 year Aug	2006	
7978-7Ay-7Ax	1 x Xeon 5160 3.0GHz/DC	4MB 1GB	(open 2.5)	SAS/SATA Combo	670W	4 hot-swap	2x4	2 x GB	3 year Aug	2006	

Positioning Processor
A highly manageable, ultra-dense 1U, 2-way server delivering performance computing in space-constrained environments
 Up to **1x Intel® Xeon Processor 3.0 GHz** with 667MHz FSB Dual Core / Up to **1 x Intel Xeon Processor 3.73 GHz** with 1066MHz FSB Dual Core / **1x Intel® Xeon Processor 3.0 GHz** with 1333MHz FSB Dual Core / **Extended Memory 64 Technology (EM64T)** / Hyper-Threading technology / Enhanced Intel Speedstep Technology (EIST)
2 MB / per core / at processor speed
2-way SMP / up to two Xeon Processors (same speed/cache size)
SMP support Implementation
 Systemboard contains two Intel LGA771 sockets, eight memory gold-connector DIMM slots, two PCI-E slots or one PCI-E slot and one PCI-X slot, integrated SAS or SATA, ethernet and graphics controllers

Memory
1GB std / 32GB¹³ max / two slots used / six slots available / **PC2-5300 667MHz FBD 240-pin ECC DDR2-SDRAM DIMMs** / dual channel / 2-way memory interleave / DIMMs must be installed in matched pairs [a bank] / **Fully Buffered / Error Checking and Correcting (ECC)** (corrects any x4 or x8 SDRAM device failure, detects all two wire faults on DIMMs, detects all permutations of two x4 DRAM failures, detects any two bits in error within 8 bytes of data, corrects any single bit error within 8 bytes of data) / **Active Memory™**: memory mirroring, online-spare memory, Chipkill

SAS/SATA controller **Adaptec® AIC-9580W** / dual channel SAS controller / four port SAS or two port SATA (300MB/sec SATA) / on planar / PCI-Express / some: hot-swap, supports **RAID 0, 1, &10** ; some: simple swap, supports **HostRAID** / optional IBM ServeRAID™-8k Adaptor for low-cost RAID 0, 1, 1E, 5, 00, 10, 1E0, 50 (installed on reserved internal connector)
SAS connectors
 One internal connection wired to DASD backplane
IDE controller/cable
 Enhanced IDE/ATA 100 controller in Enterprise South Bridge / one connector on planar / one 1-drop IDE cable (DVD-ROM)
Disk - capacity
 None standard / supports 7200-15000 rpm disks / one backplane
Disk - bays
 Some: two hot-swap 3.5" SAS HDD ; some: four hot-swap 2.5" SAS HDD ; some: two simple swap 3.5" SATA HDD / filler panels installed in each disk bay

Mechanical Chipset
EIA 19" Rack (1U⁴) / rack-mount only / supported in IBM NetBAY™ Rack products / no rack to tower conversion
Intel 5000X chipset / Intel Memory Controller Hub (MCH) provides one PCI-Express x8 slot / Enterprise Southbridge(ESB-2E) provides: one PCI-Express x8 slot with x4 Links or one 64-bit/133MHz PCI-X slot, ATI video, Dual Gigabit ethernet, IDE, USB, SMBus, LPC bus to NS PC8742XVUL for Super I/O
Bus slots
 (See below) one PCI-Express x8 (x8 Links) / one PCI-X 1.0 or one PCI-Express x8 (x4 Links) / no hot-swap Active™ PCI slots

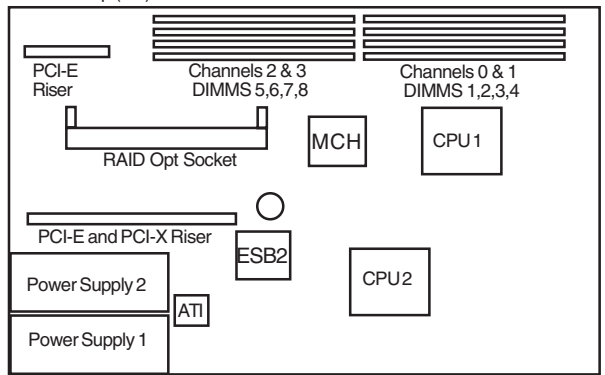
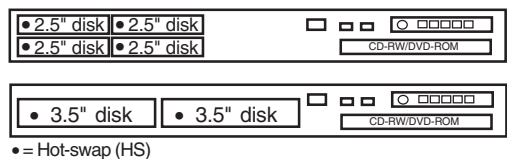
Ethernet controller
 Two gigabit 10/100/1000 ethernet ports / **Two Broadcom® 5708** / two full gigabit ethernet MAC and PHY layer functions / on planar / PCI-X 64-bit 100MHz / full duplex / Wake on LAN® / TCP/IP Offload Engine (TOE) / Alert Standard Format 2.0 / two RJ-45 ports in rear

Optical / diskette Front & Rear ports
 8X-24X⁶ CD-RW/DVD-ROM / USB only
Graphics
 Front: two USB (Vers 2.0), graphics (DB-15) Rear: two USB (Vers 2.0), serial (9-pin), graphics (DB-15), two ethernet (RJ-45), one RJ-45 (sys mgmt) / no parallel port
 SVGA / ATI® RN50(ES1000) / front and rear ports / on planar / 16MB DDR std/max / 32-bit/33MHz PCI 2.3

Security Systems mgmt
 Power-on password / administrator password / unattended boot / selectable boot sequence
IBM Integrated Baseboard Management Controller(BMC) / IPMI 2.0 / H8S2166 / on planar / provides system and environmental monitoring such as temp, optional disks, fans, power supply / supports opt. Remote Supervisor Adapter II Slimline with 140-pin connector on planar for continuous power (no external power required)

Diagnostics	Drop down Light Path Diagnostics panel providing LED map to failing part (located on front panel)	Xeon 2.66GHz/1333MHz - 2 x 2MB L2 Cache	40K1241
Software	ServerGuide™ (CD-ROM installation and configuration utilities), IBM Director systems mgmt, others	Xeon 3.0GHz/1333MHz - 2 x 2MB L2 Cache	40K1242
Keyboard / mouse	None standard (because rack-based) / USB only	1GB PC2-5300 FBD (2 x 512MB)	39M5782
Power supply	Std/Max: one/two 670 watt hot-swap / rear access / auto restart / redundant with two power supplies / auto-sensing	2GB PC2-5300 FBD (2 x 1GB)	39M5785
Fans	Calibrated Vectored Cooling™ Std: ten fans; Max: twelve (two fans with optional second cpu) / variable speed / hot-swap / PFA	4GB PC2-5300 FBD (2 x 2GB)	39M5791
Prerequisites	Monitor, keyboard, mouse, SAS/SATA disk, rack, OS	8GB PC2-5300 FBD (2 x 4GB)	39M5797
		IBM ServeRAID-8k Adapter	25R8064
		IBM Remote Supervisor Adapter II Slim	39Y9566
		300GB 10K-rpm SAS HS 3.5" (MM carrier) HDD	40K1041
		73.4GB 10K-rpm SAS SFF HS 2.5" (SFF tray) HDD	40K1052
		73.4GB 15K-rpm SAS HS 3.5" (MM carrier) HDD	40K1043
		146.4GB 15K-rpm SAS HS 3.5" (MM carrier) HDD	40K1044
		670 Watt Hot-swap Power Supply Option (US)	32R2815
		PCI Riser Card PCI-X Option	32R8216

Other options at ibm.com/products/us



Slot 1: PCI-Express x8(x8 Links) half length
 Slot 2*: PCI-Express x8(x4 Links) or 64-bit 133MHz 3.3v PCI-X; both half length
 * riser determines PCI-Express or PCI-X

Max internal disk capacity:
 3.5" SAS models: 600GB² with two 300GB SL disks
 2.5" SAS models: 292GB² with four 73.4GB SFF disks
 3.5" SATA models: 1TB² with two 500GB SL disks

See footnotes for important warranty information

LIMITED WARRANTY³

- 3 year parts and labor
- International Warranty Service³
- On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time⁷
- 3 year on site warranty service upgrade options (in eligible locations):⁷
 - 9 hr coverage, Mon-Fri excluding holidays, 4 hr response time (ServicePac[®] 21P2172)
 - 24 hr x 7 day coverage, 4 hour average response time (ServicePac21P2173)
 - 24 hr x 7 day coverage, 2 hour average response time (ServicePac21P2074)
- Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- 24x7¹⁴ toll-free support for warranty issues during the warranty period³

IBM® Type-model	Qty x Processor/Core	L2 cache	Memory	Disk	Disk controller	Optical	Power Supply	Disk bays	Slots x bays	Ethernet	Limited warranty ³	Available date
7978-BAX	1 x Xeon™ E5405 2.0GHz/QC	12MB	2GB	(open 2.5)	SAS	Combo	1x670W	4 hot-swap	2x4	2 x GB	3 year	Jan 2008
7978-B1x	1 x Xeon E5405 2.0GHz/QC	12MB	2GB	(open 3.5)	SAS/SATA	Combo	1x670W	2 hot-swap	2x2	2 x GB	3 year	Jan 2008
7978-BCx	1 x Xeon E5420 2.5GHz/QC	12MB	2GB	(open 2.5)	SAS	Combo	1x670W	4 hot-swap	2x4	2 x GB	3 year	Jan 2008
7978-B3x	1 x Xeon E5420 2.5GHz/QC	12MB	2GB	(open 3.5)	SAS/SATA	Combo	1x670W	2 hot-swap	2x2	2 x GB	3 year	Jan 2008
7978-BDx	1 x Xeon E5430 2.66GHz/QC	12MB	2GB	(open 2.5)	SAS	Combo	1x670W	4 hot-swap	2x4	2 x GB	3 year	Jan 2008
7978-B4x	1 x Xeon E5430 2.66GHz/QC	12MB	2GB	(open 3.5)	SAS/SATA	Combo	1x670W	2 hot-swap	2x2	2 x GB	3 year	Jan 2008

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Up to 2 x Intel® Xeon Processor 3.16GHz with 1333MHz FSB / 12MB L2 ECC Cache / Quad-Core / Extended Memory 64 Technology (EM64T) / Enhanced Intel Speedstep Technology (EIST)
12 MB / std and max / at processor speed
SMP support **2-way SMP / up to two Xeon Processors (same speed/cache size)**
Implementation Systemboard contains two Intel LGA771 sockets, eight memory gold-connector DIMM slots, two PCI-E slots or one PCI-E slot and one PCI-X slot, integrated SAS or SATA, ethernet and graphics controllers

Memory **2GB (2x1GB) std / 32GB¹³ max / two slots used / six slots available / PC2-5300 667MHz FBD 240-pin ECC DDR2-SDRAM DIMMs / dual channel / 2-way memory interleave / DIMMs must be installed in matched pairs [a bank] / Fully Buffered / Error Checking and Correcting (ECC) (corrects any x4 or x8 SDRAM device failure, detects all two wire faults on DIMMs, detects all permutations of two x4 DRAM failures, detects any two bits in error within 8 bytes of data, corrects any single bit error within 8 bytes of data) / Active Memory™: memory mirroring, online-spare memory, Chipkill**

SAS/SATA controller **Adaptec® AIC-9580W / dual channel SAS controller / four port SAS or two port SATA (300MB/sec SAS) (150MB/sec SATA) / on planar / PCI-Express / some: hot-swap, supports RAID 0, 1, & 10 / some: simple swap, supports HostRAID / optional IBM ServeRAID™-8k Adaptor for low-cost RAID 0, 1, 1E, 5, 00, 10, 1E0, 50 (installed on reserved internal connector)**

SAS connectors One internal connection wired to DASD backplane
IDE controller/cable Enhanced IDE/ATA 100 controller in Enterprise South Bridge / one connector on planar / one 1-drop IDE cable (DVD-ROM)
Disk - capacity None standard / supports 7200-15000 rpm disks / one backplane
Disk - bays Some: two hot-swap 3.5" SAS HDD / some: four hot-swap 2.5" SAS HDD / some: two simple swap 3.5" SATA HDD / filler panels installed in each disk bay

Mechanical Chipset **EIA 19" Rack (1U⁴) / rack-mount only / supported in IBM NetBAY™ Rack products / no rack to tower conversion**
Intel 5000X chipset / Intel Memory Controller Hub (MCH) provides one PCI-Express x8 slot / Enterprise Southbridge(ESB-2E) provides: one PCI-Express x8 slot with x4 Links or one 64-bit/133MHz PCI-X slot, ATI video, Dual Gigabit ethernet, IDE, USB, SMBus, LPC bus to NS PC8742XVUL for Super I/O

Bus slots (See below) one PCI-Express x8 (x8 Links) / one PCI-X 1.0 or one PCI-Express x8 (x4 Links) / no hot-swap Active™ PCI slots

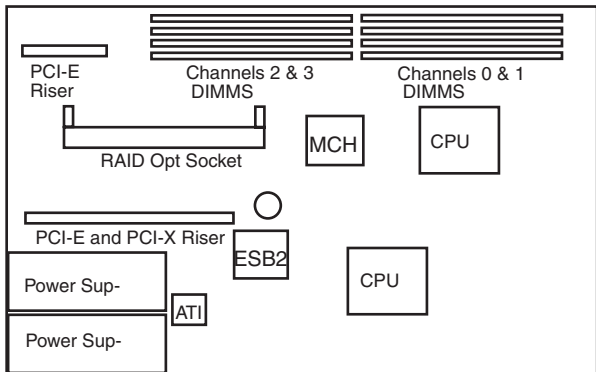
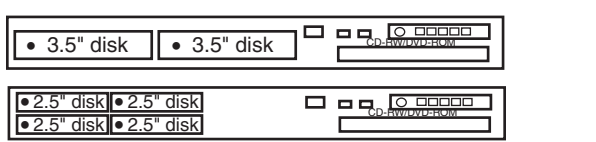
Ethernet controller Two gigabit 10/100/1000 ethernet ports / **Two Broadcom® 5708 / two full gigabit ethernet MAC and PHY layer functions / on planar / PCI-X 64-bit 100MHz / full duplex / Wake on LAN® / TCP/IP Offload Engine (TOE) / Alert Standard Format 2.0 / two RJ-45 ports in rear**

Optical / diskette Front & Rear ports **8X-24X⁶ CD-RW/DVD-ROM / USB only**
Front: two USB (Vers 2.0), graphics (DB-15) **Rear:** two USB (Vers 2.0), serial (9-pin), graphics (DB-15), two ethernet (RJ-45), one RJ-45 (sys mgmt) / no parallel port

Graphics SVGA / ATI⁹ RN50(ES1000) / front and rear ports / on planar / 16MB DDR std/max / 32-bit/33MHz PCI 2.3

Security Systems mgmt Power-on password / administrator password / unattended boot / selectable boot sequence
IBM Integrated Baseboard Management Controller (BMC) / IPMI 2.0 / H8S2166 / on planar / provides system and environmental monitoring such as temp, optional disks, fans, power supply / supports opt. Remote Supervisor Adapter II Slimline with 140-pin connector on planar for continuous power (no external power required)

Diagnostics	Drop down Light Path Diagnostics panel providing LED map to failing part (located on front panel)	Xeon E5405 2.0GHz/1333MHz/12MB L2 Cache	44E5074
Software	ServerGuide™ (CD-ROM installation and configuration utilities), IBM Director systems mgmt, others	Xeon E5420 2.5GHz/1333MHz/12MB L2 Cache	44E5076
Keyboard / mouse	None standard (because rack-based) / USB only	Xeon E5430 2.66GHz/1333MHz/12MB L2 Cache	44E5077
Power supply	Std/Max: one/two 670 watt hot-swap / rear access / auto restart / redundant with two power supplies / auto-sensing	1GB PC2-5300 FBD (2 x 512MB)	39M5782
Fans	Calibrated Vectored Cooling™ Std: ten fans; Max: twelve (two fans with optional second cpu) / variable speed / hot-swap / PFA	2GB PC2-5300 FBD (2 x 1GB)	39M5785
Prerequisites	Monitor, keyboard, mouse, SAS/SATA disk, rack, OS	4GB PC2-5300 FBD (2 x 2GB)	39M5791
		8GB PC2-5300 FBD (2 x 4GB)	39M5797
		IBM ServeRAID-8k Adaptor	25R8064
		IBM Remote Supervisor Adapter II Slim	39Y9566
		250GB 7.2K rpm SATA II hot-swap	39M4526
		500GB 7.2K rpm SATA hot-swap 300MB/sec	39M4530
		750GB 7.2K rpm SATA hot-swap 300MB/sec	43W7576
		1TB 7.2K rpm SATA hot-swap 300MB/sec	43W7676
		300GB 15K-rpm SAS HS 3.5" (MM carrier) HDD	43X0802
		73.4GB 10K-rpm SAS SFF HS 2.5" (SFF tray) HDD	40K1052
		146GB 10K-rpm SAS SFF HS 2.5" (SFF tray) HDD	43X0824
		73.4GB 15K-rpm SAS SF HS 2.5" (SFF tray) HDD	43X0837
		73.4GB 15K-rpm SAS HS 3.5" (MM carrier) HDD	40K1043
		146.4GB 15K-rpm SAS HS 3.5" (MM carrier) HDD	40K1044
		670 Watt Hot-swap Power Supply Option (US)	32R2815
		PCI Riser Card PCI-X Option	32R8216



Slot 1: PCI-Express x8(x8 Links) half length
 Slot 2*: PCI-Express x8(x4 Links) or 64-bit 133MHz 3.3v PCI-X; both half length
 * riser determines PCI-Express or PCI-X

Max internal disk capacity:
 3.5" SAS models: 600GB² with two 300GB SL disks
 2.5" SAS models: 292GB² with four 73.4GB SFF disks
 3.5" SATA models: 1TB² with two 500GB SL disks

See footnotes for important warranty information

Other options at ibm.com/products/us

- ❖ Quick release adapter slots (no screws)
- ❖ Configuration/Setup Utility: F1 at startup
- ❖ Diagnostics (PC-Doctor™): F2 at startup
- ❖ Network Boot: F12 at startup
- ❖ Front indicators LEDs: Power-on LED, HDD activity LED, locator LED, system 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 1.75" x W 17.3" x D 27.5" (H 43mm x W 440mm x D 711.4mm)
- ❖ 28 to 35.5 pounds
- ❖ Stealth black color

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
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- ~ 24 hr x 7 day coverage, 2 hour average response time (ServicePac 21P2074)
- ~ Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- ~ 24x7¹⁴ toll-free support for warranty

IBM® Type-model	Qty x Processor/Core	L2 cache	Memory	Disk	Disk controller	Optical	Power Supply	Disk bays	Slots x bays	Ethernet	Limited warranty ³	Available date
7978-BEx	1 x Xeon™ E5440 2.8GHz/QC	12MB	2GB	(open 2.5)	SAS	Combo	1x670W	4 hot-swap	2x4	2 x GB	3 year	Jan 2008
7978-B5x	1 x Xeon E5440 2.8GHz/QC	12MB	2GB	(open 3.5)	SAS/SATA	Combo	1x670W	2 hot-swap	2x2	2 x GB	3 year	Jan 2008
7978-BJx	1 x Xeon X5450 3.0GHz/QC	12MB	2GB	(open 2.5)	SAS	Combo	1x670W	4 hot-swap	2x4	2 x GB	3 year	Jan 2008
7978-B9x	1 x Xeon X5450 3.0GHz/QC	12MB	2GB	(open 3.5)	SAS/SATA	Combo	1x670W	2 hot-swap	2x2	2 x GB	3 year	Jan 2008
7978-BGx	1 x Xeon X5460 3.16GHz/QC	12MB	2GB	(open 2.5)	SAS	Combo	1x670W	4 hot-swap	2x4	2 x GB	3 year	Jan 2008
7978-B7x	1 x Xeon X5460 3.16GHz/QC	12MB	2GB	(open 3.5)	SAS/SATA	Combo	1x670W	2 hot-swap	2x2	2 x GB	3 year	Jan 2008

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12 MB / std and max / at processor speed
SMP support Implementation **2-way SMP / up to two Xeon Processors (same speed/cache size)**
 Systemboard contains two Intel LGA771 sockets, eight memory gold-connector DIMM slots, two PCI-E slots or one PCI-E slot and one PCI-X slot, integrated SAS or SATA, ethernet and graphics controllers

Memory **2GB (2x1GB) std / 32GB¹³ max / two slots used / six slots available / PC2-5300 667MHz FBD 240-pin ECC DDR2-SDRAM DIMMs / dual channel / 2-way memory interleave / DIMMs must be installed in matched pairs [a bank] / Fully Buffered / Error Checking and Correcting (ECC) (corrects any x4 or x8 SDRAM device failure, detects all two wire faults on DIMMs, detects all permutations of two x4 DRAM failures, detects any two bits in error within 8 bytes of data, corrects any single bit error within 8 bytes of data) / Active Memory™: memory mirroring, online-spare memory, Chipkill**

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SAS connectors One internal connection wired to DASD backplane
IDE controller/cable Enhanced IDE/ATA 100 controller in Enterprise South Bridge / one connector on planar / one 1-drop IDE cable (DVD-ROM)
Disk - capacity None standard / supports 7200-15000 rpm disks / one backplane
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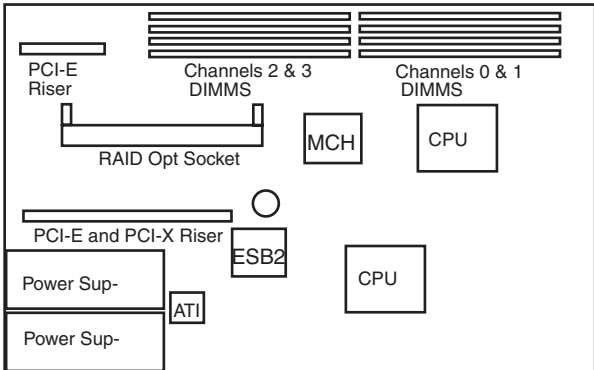
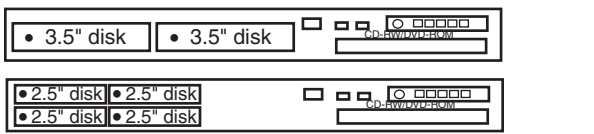
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Diagnostics	Drop down Light Path Diagnostics panel providing LED map to failing part (located on front panel)	Xeon E5440 2.83GHz/1333MHz/12MB L2 Cache	44E5078
Software	ServerGuide™ (CD-ROM installation and configuration utilities), IBM Director systems mgmt, others	Xeon X5450 3.0GHz/1333MHz/12MB L2 Cache	44E5121
Keyboard / mouse	None standard (because rack-based) / USB only	Xeon X5460 3.16GHz/1333MHz/12MB L2 Cache	44E5080
Power supply	Std/Max: one/two 670 watt hot-swap / rear access / auto restart / redundant with two power supplies / auto-sensing	1GB PC2-5300 FBD (2 x 512MB)	39M5782
Fans	Calibrated Vectored Cooling™ Std: ten fans; Max: twelve (two fans with optional second cpu) / variable speed / hot-swap / PFA	2GB PC2-5300 FBD (2 x 1GB)	39M5785
Prerequisites	Monitor, keyboard, mouse, SAS/SATA disk, rack, OS	4GB PC2-5300 FBD (2 x 2GB)	39M5791
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		500GB 7.2K rpm SATA hot-swap 300MB/sec	39M4530
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Other options at ibm.com/products/us

- Quick release adapter slots (no screws)
- Configuration/Setup Utility: F1 at startup
- Diagnostics (PC-Doctor™): F2 at startup
- Network Boot: F12 at startup
- Front indicators LEDs: Power-on LED, HDD activity LED, locator LED, system 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 1.75" x W 17.3" x D 27.5" (H 43mm x W 440mm x D 711.4mm)
- 28 to 35.5 pounds
- Stealth black color

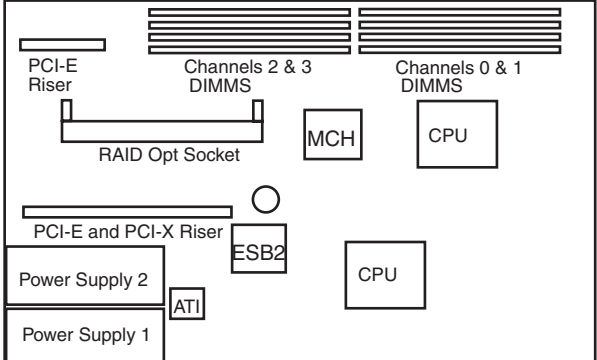
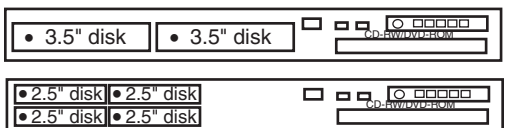
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- 3 year parts and labor
- International Warranty Service³
- On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time⁷
- 3 year on site warranty service upgrade options (in eligible locations):⁷
 - 9 hr coverage, Mon-Fri excluding holidays, 4 hr response time (ServicePac[®] 21P2172)
 - 24 hr x 7 day coverage, 4 hour average response time (ServicePac 21P2173)
 - 24 hr x 7 day coverage, 2 hour average response time (ServicePac 21P2074)
- Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- 24x7¹⁴ toll-free support for warranty

IBM® Type-model	Qty x Processor/Core	L2 cache	Memory	Disk	Disk controller	Optical	Power Supply	Disk bays	Slots x bays	Ethernet	Limited warranty ³	Available date
7978-82x	1 x Xeon™ X5470 3.3GHz/QC	12MB	2GB	(open 3.5)	SAS/SATA	Combo	1x670W	2 hot-swap	2x2	2 x GB	3 year	Sep 2008
7978-8Bx	1 x Xeon X5470 3.3GHz/QC	12MB	2GB	(open 2.5)	SAS	Combo	1x670W	4 hot-swap	2x4	2 x GB	3 year	Sep 2008

Positioning Processor	<i>A highly manageable, ultra-dense 1U, dual-socket server providing performance computing in space-constrained environments</i> Up to 2 x Intel® Xeon Processor 3.3GHz with 1333MHz FSB / 12MB L2 ECC Cache / Quad-Core / Extended Memory 64 Technology (EM64T) / Enhanced Intel Speedstep Technology (EIST) 12 MB / std and max / at processor speed
L2 cache	2-way SMP / up to two Xeon Processors (same speed/cache size)
SMP support	Systemboard contains two Intel LGA771 sockets, eight memory gold-connector DIMM slots, two PCI-E slots or one PCI-E slot and one PCI-X slot, integrated SAS or SATA, ethernet and graphics controllers
Implementation	
Memory	2GB (2x1GB) std / 32GB ¹³ max / two slots used / six slots available / PC2-5300 667MHz FBD 240-pin ECC DDR2-SDRAM DIMMs / dual channel / 2-way memory interleave / DIMMs must be installed in matched pairs [a bank] / Fully Buffered / Error Checking and Correcting (ECC) (corrects any x4 or x8 SDRAM device failure, detects all two wire faults on DIMMs, detects all permutations of two x4 DRAM failures, detects any two bits in error within 8 bytes of data, corrects any single bit error within 8 bytes of data) / Active Memory™: memory mirroring, online-spare memory, Chipkill
SAS/SATA controller	Adaptec® AIC-9580W / dual channel SAS controller / four port SAS or two port SATA (300MB/sec SAS) / (150MB/sec SATA) / on planar / PCI-Express / some: hot-swap, supports RAID 0, 1, & 10 ; some: simple swap, supports HostRAID / optional IBM ServeRAID™-8k Adaptor for low-cost RAID 0, 1, 1E, 5, 00, 10, 1E0, 50 (installed on reserved internal connector)
SAS connectors	One internal connection wired to DASD backplane
IDE controller/cable	Enhanced IDE/ATA 100 controller in Enterprise South Bridge / one connector on planar / one 1-drop IDE cable (DVD-ROM)
Disk - capacity	None standard / supports 7200-15000 rpm disks / one backplane
Disk - bays	Some: two hot-swap 3.5" SAS HDD ; some: four hot-swap 2.5" SAS HDD ; some: two simple swap 3.5" SATA HDD / filler panels installed in each disk bay
Mechanical	EIA 19" Rack (1U⁴) / rack-mount only / supported in IBM NetBAY™ Rack products / no rack to tower conversion
Chipset	Intel 5000X chipset / Intel Memory Controller Hub (MCH) provides one PCI-Express x8 slot / Enterprise Southbridge(ESB-2E) provides: one PCI-Express x8 slot with x4 Links or one 64-bit/133MHz PCI-X slot, ATI video, Dual Gigabit ethernet, IDE, USB, SMBus, LPC bus to NS PC8742XVUL for Super I/O
Bus slots	(See below) one PCI-Express x8 (x8 Links) / one PCI-X 1.0 or one PCI-Express x8 (x4 Links) / no hot-swap Active™ PCI slots
Ethernet controller	Two gigabit 10/100/1000 ethernet ports / Two Broadcom® 5708 / two full gigabit ethernet MAC and PHY layer functions / on planar / PCI-X 64-bit 100MHz / full duplex / Wake on LAN® / TCP/IP Offload Engine (TOE) / Alert Standard Format 2.0 / two RJ-45 ports in rear
Optical / diskette	8X-24X ⁶ CD-RW/DVD-ROM / USB only
Front & Rear ports	Front: two USB (Vers 2.0), graphics (DB-15) Rear: two USB (Vers 2.0), serial (9-pin), graphics (DB-15), two ethernet (RJ-45), one RJ-45 (sys mgmt) / no parallel port
Graphics	SVGA / ATI® RN50(ES1000) / front and rear ports / on planar / 16MB DDR std/max / 32-bit/33MHz PCI 2.3
Security	Power-on password / administrator password / unattended boot / selectable boot sequence
Systems mgmt	IBM Integrated Baseboard Management Controller (BMC) / IPMI 2.0 / H8S2166 / on planar / provides system and environmental monitoring such as temp, optional disks, fans, power supply / supports opt. Remote Supervisor Adapter II Slimline with 140-pin connector on planar for continuous power (no external power required)

Diagnosics	Drop down Light Path Diagnostics panel providing LED map to failing part (located on front panel)	Xeon X5470 3.3GHz/1333MHz/12MB L2 Cache	46M1031
Software	ServerGuide™ (CD-ROM installation and configuration utilities), IBM Director systems mgmt, others	1GB PC2-5300 FBD (2 x 512MB)	39M5782
Keyboard / mouse	None standard (because rack-based) / USB only	2GB PC2-5300 FBD (2 x 1GB)	39M5785
Power supply	Std/Max: one/two 670 watt hot-swap / rear access / auto restart / redundant with two power supplies / auto-sensing	4GB PC2-5300 FBD (2 x 2GB)	39M5791
Fans	Calibrated Vectored Cooling™ Std: ten fans; Max: twelve (two fans with optional second cpu) / variable speed / hot-swap / PFA	8GB PC2-5300 FBD (2 x 4GB)	39M5797
Prerequisites	Monitor, keyboard, mouse, SAS/SATA disk, rack, OS	IBM ServeRAID-8k Adapter	25R8064



- ⊘ Quick release adapter slots (no screws)
- ⊘ Configuration/Setup Utility: F1 at startup
- ⊘ Diagnostics (PC-Doctor™): F2 at startup
- ⊘ Network Boot: F12 at startup
- ⊘ Front indicators LEDs: Power-on LED, HDD activity LED, locator LED, system 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 1.75" x W 17.3" x D 27.5" (H 43mm x W 440mm x D 711.4mm)
- ⊘ 28 to 35.5 pounds
- ⊘ Stealth black color

LIMITED WARRANTY³

- 3 year parts and labor
- International Warranty Service³
- On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time⁷
- 3 year on site warranty service upgrade options (in eligible locations):⁷
 - 9 hr coverage, Mon-Fri excluding holidays, 4 hr avg response time (ServicePac[®] 12X6610)
 - 24 hr x 7 day coverage, 4 hr avg response time (ServicePac 12X6611)
- Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- 24x7¹⁴ toll-free support for warranty issues during the warranty period³

Slot 1: PCI-Express x8(x8 Links) half length
 Slot 2: PCI-Express x8(x4 Links) or 64-bit 133MHz 3.3v PCI-X; both half length
 * riser determines PCI-Express or PCI-X

Max internal disk capacity:
 2.5": SAS models: 594GB² with four 146GB SFF disks
 3.5" SATA models: 1.5TB² with two 750GB disks

See footnotes for important warranty information

IBM® Type-model	Qty x Processor/Core	L3 cache	Memory	Disk	Disk controller	Optical	Power Supply	Disk bays	Slots x bays	Ethernet	Available date
7946-12x	1 x Xeon® E5502	1.86GHz/2C 4MB	2x1GB	open 2.5	SAS/SATA	Combo	1x675W	6 hot-swap	2x7	2 x Gb	Apr 2009
7946-22x	1 x Xeon E5504	2.0GHz/4C 4MB	2x1GB	open 2.5	SAS/SATA	Combo	1x675W	6 hot-swap	2x7	2 x Gb	Apr 2009
7946-3Ax	1 x Xeon E5506	2.13GHz/4C 4MB	2x1GB	open 2.5	SAS/SATA	Combo	1x675W	6 hot-swap	2x7	2 x Gb	Apr 2009
7946-32x	1 x Xeon E5520	2.26GHz/4C 8MB	2x1GB	open 2.5	SAS/SATA	Combo	1x675W	6 hot-swap	2x7	2 x Gb	Apr 2009
7946-42x	1 x Xeon L5520	2.26GHz/4C 8MB	2x1GB	open 2.5	SAS/SATA	Combo	1x675W	6 hot-swap	2x7	2 x Gb	Apr 2009
7946-52x	1 x Xeon E5530	2.4GHz/4C 8MB	2x1GB	open 2.5	SAS/SATA	Combo	1x675W	6 hot-swap	2x7	2 x Gb	Apr 2009
7946-62x	1 x Xeon E5540	2.53GHz/4C 8MB	2x1GB	open 2.5	SAS/SATA	Combo	1x675W	6 hot-swap	2x7	2 x Gb	Apr 2009
7946-92x	1 x Xeon X5570	2.93GHz/4C 8MB	2x1GB	open 2.5	SAS/SATA	Combo	1x675W	6 hot-swap	2x7	2 x Gb	Apr 2009
7946-E1x	1 x Xeon E5502	1.86GHz/2C 4MB	2x2GB	open 2.5	SAS/SATA	Combo	1x675W	6 hot-swap	2x7	2 x Gb	Apr 2009
7946-E2x	1 x Xeon E5530	2.4GHz/4C 8MB	2x2GB	open 2.5	SAS/SATA	Combo	2x675W	6 hot-swap	2x7	2 x Gb	Apr 2009
7946-E3x	1 x Xeon X5560	2.8GHz/4C 8MB	2x2GB	open 2.5	SAS/SATA	Combo	2x675W	6 hot-swap	2x7	2 x Gb	Apr 2009

Positioning Processor(s) *Business critical compact application server to significantly reduce total cost of ownership packed with IBM innovation*
 up to two Next Generation Intel® Xeon featuring Quick Path Interconnect(QPI) technology at up to 2.93GHz with 8MB L3 / 4 Core / with Intel Turbo Boost Technology and Hyper-Threading / up to 2.13GHz with 4MB L3 / 2 or 4 Core / with Hyper-Threading

L3 cache **4 or 8MB** std and max / at processor speed

SMP **2-way SMP** / up to two Xeon Processors (same speed/cache size)

Implementation Systemboard contains two Socket B (LGA1366) sockets, sixteen DIMM slots, two PCI-E slots, integrated SAS, ethernet and graphics controllers

Memory **2 or 4GB std / 64GB max per processor(using 8GB DIMMs) / PC3-10600 1333MHz LP 240-pin Registered ECC DDR3 SDRAM DIMMs** / sixteen slots on systemboard / eight DIMMs per processor / ChipKill / memory mirroring

Disk Controller **LSI Logic® 1068 SAS/SATA controller** / up to eight port / on riser card / PCI-Express / supports **RAID-0/1/1E** / upgradeable to LSI 1078(RAID-0/1/5/6/10/50/60) / optional battery backed cache / SATA controller integrated into ICH10

Disk bays **Six 2.5-inch Small Form Factor (SFF) hot swap disk bays** std / supports SAS, SATA or SSD SFF hot swap disks

Flash Storage **USB-based slot on SAS riser card** for optional Hypervisor USB key

Mechanical Architecture/Chipset **EIA 19" Rack (1U⁴)** / rack-mount only / supported in IBM NetBAY™ Rack products / no rack to tower conversion
Intel 5520 Chipset / Intel IO Hub provides PCI-Express slots and links to BCM5709, enterprise south bridge interface to ICH10 South Bridge / ICH10 South Bridge provides: USB, SATA, PCI-Express links to LSI SAS/SATA controller and LPC bus to VSC452 for video and limited Super I/O

BUS slots (See below) **Two second-generation PCI-Express x16 slots** / both slots convertible via riser to PCI-X

Ethernet **Two Gigabit Ethernet ports** / Broadcom® 5709C / two full gigabit ethernet MAC and PHY layer functions / integrated / PCI-Express / full duplex / TCP/IP Offload Engine (TOE) / Wake on LAN® / Serial over LAN / PXE 2.0 / Failover, adapter fault tolerance / Load balancing / upgradeable to four Ethernet ports with additional Broadcom 5709 daughter card

Optical / diskette Front & Rear ports **8X-24X⁶ CD-RW/DVD-ROM / USB only**
 Front: two USB (Vers 2.0), graphics (DB-15) Rear: two USB (Vers 2.0), serial (9-pin), graphics (DB-15), two ethernet (RJ-45), one RJ-45 (sys mgmt) / no parallel port

Graphics **SVGA / Matrox® G200e** integrated in IMM on systemboard / 16MB DDR2-250MHz SDRAM std/max / 32-bit 33MHz PCI 2.2

Systems Mgmt **Integrated Management Module (IMM)** / VSC452 / WPCT201BA0WG / integrated / provides system and environmental monitoring, event recording, alert capability / TPM 1.2 / ASR / SOL / IPMI 2.0 / SMASH / upgradeable to Remote Presence, blue screen capture via optional IBM Virtual Media Key

Diagnostics Security **Light Path Diagnostics™** (LED lights indicate failing component) and on-board diagnostics
 Power-on password / administrator password / unattended boot / selectable boot / unattended start mode

Publications **Installation Guide and Documentation CD**

Keyboard / mouse **None standard (because rack-based) / USB only**

Power supply(s) **Std/Max: one or two/two 675 watt hot-swap / rear access / auto restart / redundant with two power supplies / auto-sensing**

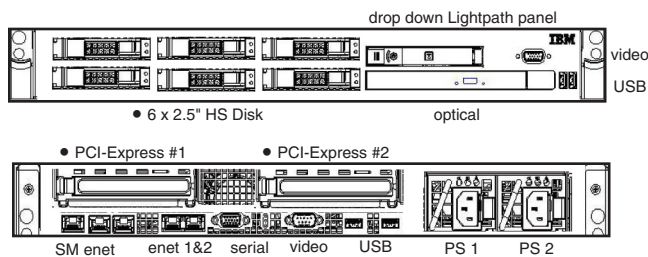
Cooling **Calibrated Vecteded Cooling™ Std/Max: six / hot-swap redundant / variable speed / PFA**

Prerequisites **Monitor, keyboard, mouse, SAS/SATA disk, rack, OS**

Xeon E5502 1.86GHz/4.8GTs/4MB L3 Cache	46M1077
Xeon E5504 2.0GHz/4.8GTs/4MB L3 Cache	46M1078
Xeon E5506 2.13GHz/4.8GTs/4MB L3 Cache	46M1079
Xeon L5506 2.13GHz/4.8GTs/4MB L3 Cache	46M1082
Xeon L5520 2.26GHz/5.86GTs/8MB L3 Cache	46M1080
Xeon E5520 2.26GHz/5.86GTs/8MB L3 Cache	46M1081
Xeon E5530 2.4GHz/5.86GTs/8MB L3 Cache	46M1083
Xeon E5540 2.53GHz/5.86GTs/8MB L3 Cache	46M1084
Xeon X5550 2.66GHz/6.4GTs/8MB L3 Cache	46M1085
Xeon X5560 2.8GHz/6.4GTs/8MB L3 Cache	46M1086
Xeon X5570 2.93GHz/6.4GTs/8MB L3 Cache	46M1087
1x1GB (1Rx8) PC3-10600 ECC DDR3 RDIMM	44T1480
1x2GB (2Rx8) PC3-10600 ECC DDR3 RDIMM	44T1481
1x2GB (1Rx4) PC3-10600 ECC DDR3 Chipkill RDIMM	44T1482
1x4GB (2Rx4) PC3-10600 ECC DDR3 Chipkill RDIMM	44T1483
IBM Virtual Media key	46C7526
PCI-X Riser card	46M1071
Dual-port 1 Gb Ethernet Daughter card	46M1076
675 Watt Hot-swap Power Supply Option (US)	46M1075
IBM ServeRAID-MR10i SAS/SATA Controller	43W4296
73.4GB 10K-rpm SAS SFF Slim-HS 2.5" HDD	43W7535
146GB 10K-rpm SAS SFF Slim-HS 2.5" HDD	43W7536

Other options at ibm.com/products/us

1U Rack with 2.5" HS SAS



Slot 1*:PCI-Express x16 low profile
 Slot 2*:PCI-Express x16 full height, half length
 *slots convertible to 64-bit 1333MHz 3.3v PCI-X via riser card

Max internal disk capacity:
 2.5": SAS models: 1.8TB² with six 300GB SFF disks

- ↳ Quick release adapter slots (no screws)
- ↳ Configuration/Setup Utility: F1 at startup
- ↳ Diagnostics (preboot DSA): F2 at startup
- ↳ Network Boot: F12 at startup
- ↳ Front indicators LEDs: Power-on LED, HDD activity LED, locator LED, system information LED, and system-error LED
- ↳ Predictive failure analysis on disk options, memory, power supplies, and fans in conjunction with IBM Director can alert the system administrator of an imminent component failure
- ↳ Rack: H 1.75" x W 17.3" x D 27.5" (H 43mm x W 440mm x D 711.4mm)
- ↳ 28 to 35.5 pounds
- ↳ Stealth black color

LIMITED WARRANTY³

- ↳ 3 year parts and labor
- ↳ International Warranty Service³ - On site, 8 am - 5 pm, Mon - Fri excluding holidays, next business day response time⁷
- ↳ 3 year on site warranty service upgrade options (in eligible locations):
 9 hr coverage, Mon-Fri excluding holidays, 4 hr avg response time (ServicePac[®] 65Y214)
 24 hr x 7 day coverage, 4 hr avg response time (ServicePac 65Y215)
- ↳ Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- ↳ 24x7¹⁴ toll-free support for warranty issues during the warranty period³

See footnotes for important warranty information

IBM® Type-GAV-model	Qty x Processor	L2 Core cache	Memory	Disk	Disk controller	Mechanical	Slots x bays (hot-swap bays)	Power supply	Ethernet	Available date
7979-51y-51x	1 x Xeon™ 5140 2.33GHz	DC 4MB	1GB	None	SAS	Rack	4x7 (4 or 6 hot-swap)	1 x 835W Hot-Swap	2xGigabit	July 2006
7979-5Ay-5Ax	1 x Xeon 5140 2.33GHz	DC 4MB	1GB	None	SAS	Rack	4x10 (8 hot-swap)	1 x 835W Hot-Swap	2xGigabit	July 2006
7979-61y-61x	1 x Xeon 5150 2.66GHz	DC 4MB	1GB	None	SAS	Rack	4x7 (4 or 6 hot-swap)	1 x 835W Hot-Swap	2xGigabit	July 2006
7979-6Ay-6Ax	1 x Xeon 5150 2.66GHz	DC 4MB	1GB	None	SAS	Rack	4x10 (8 hot-swap)	1 x 835W Hot-Swap	2xGigabit	July 2006
7979-71y-71x	1 x Xeon 5160 3.0GHz	DC 4MB	1GB	None	SAS	Rack	4x7 (4 or 6 hot-swap)	1 x 835W Hot-Swap	2xGigabit	July 2006
7979-7Ay-7Ax	1 x Xeon 5160 3.0GHz	DC 4MB	1GB	None	SAS	Rack	4x10 (8 hot-swap)	1 x 835W Hot-Swap	2xGigabit	July 2006

Positioning Processor A rack-dense 2-way server delivering high availability, scalability and expandability for application-serving Web environments Up to **2 x Intel® Xeon Processor 1.86 GHz** with 1066MHz FSB Dual Core / Up to **1 x Intel Xeon Processor 3.0 GHz** with 1333MHz FSB Dual Core / **Extended Memory 64 Technology (EM64T)** / Enhanced Intel Speedstep Technology (EIST)

L2 cache 2 MB / per core / at processor speed
SMP support 2-way SMP / up to two Xeon Processors (same speed/cache size)
Implementation Systemboard contains two Intel LGA771 sockets, twelve memory gold-connector DIMM slots, four PCI-E slots or two PCI-E slots and two PCI-X slots, integrated SAS, ethernet and graphics controllers

Memory 1GB std / 48GB¹³ max / two slots used / ten slots available / **PC2-5300 667MHz FBD 240-pin ECC DDR2-SDRAM DIMMs** / dual channel / 2-way memory interleave / DIMMs must be installed in matched pairs [a bank] / **Fully Buffered / Error Checking and Correcting (ECC)** (corrects any x4 or x8 SDRAM device failure, detects all two wire faults on DIMMs, detects all permutations of two x4 DRAM failures, detects any two bits in error within 8 bytes of data, corrects any single bit error within 8 bytes of data) / **Active Memory™**: memory mirroring, online-spare memory, Chipkill

SAS controller **Adaptec® AIC-9580W / dual channel SAS controller / eight port SAS** (300MB/sec SAS) / hot-swap / on planar / PCI-Express / supports **RAID 0, 1 & 10** / optional IBM ServeRAID™-8k Adaptor for low-cost RAID 0, 1, 1E, 10, 5 & 6 (installed on reserved internal connector)
SAS connectors One internal connection wired to DASD backplane / one external connector
IDE controller/cable Enhanced IDE/ATA 100 controller in Enterprise South Bridge / one connector on planar / one 1-drop IDE cable (CD-RW/DVD-ROM)
Disk - capacity None standard / supports 7200-15000 rpm disks / one backplane
Disk - bays Some: six hot-swap 3.5" SAS HDD / some: eight hot-swap 2.5" SAS HDD / filler panels installed in each disk bay
Tape backup Optional internal and external / 3.5" / USB or SATA

Mechanical Chipset **EIA 19" Rack (2U⁴)** / rack-mount only / supported in IBM NetBAY™ Rack products / no rack to tower conversion
Intel 5000P chipset / Intel Memory Controller Hub (MCH) provides riser connector for either two PCI-Express x8 slots or two 64-bit/133MHz PCI-X slots / Enterprise Southbridge(ESB-2E) provides: two PCI-Express x8 slot with x4 Links, ATI video, Dual Gigabit ethernet, IDE, USB, SMBus, LPC bus to NS PC8742XVUL for Super I/O
Bus slots (See below) Two PCI-Express x8 (x4 Links) / Two PCI-X 1.0 or two PCI-Express x8 (x8 Links) / no hot-swap Active™ PCI slots

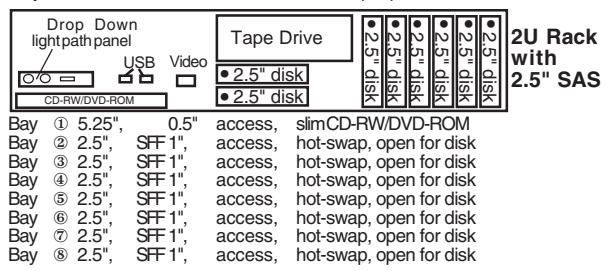
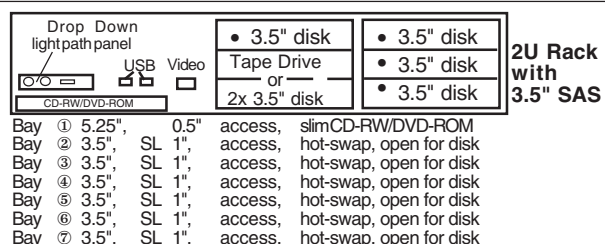
Ethernet controller Dual gigabit 10/100/1000 ethernet ports / **Two Broadcom® 5708** / two full gigabit ethernet MAC and PHY layer functions / on planar / PCI-Express / full duplex / Wake on LAN® / TCP/IP Offload Engine (TOE) / Alert Standard Format 2.0 / two RJ-45 ports in rear
Optical / diskette 8X-24X⁶ CD-RW/DVD-ROM / USB only
Front & Rear ports Front: two USB (Vers 2.0), graphics (DB-15) Rear: two USB (Vers 2.0), serial (9-pin), graphics (DB-15), two ethernet (RJ-45), one RJ-45 (sys mgmt), one SAS / no parallel port
Graphics SVGA / ATI® RN50(ES1000) / front and rear ports / on planar / 16MB DDR std/max / 32-bit/33MHz PCI 2.3

Security Systems mgmt Power-on password / administrator password / unattended boot / selectable boot sequence
IBM Integrated Baseboard Management Controller(BMC) / IPMI 2.0 / H8S2166 / on planar / provides system and environmental monitoring such as temp, optional disks, fans, power supply / supports opt. Remote Supervisor Adapter II Slimline with 140-pin connector on planar for continuous power (no external power required)

Diagnostics **Drop down Light Path Diagnostics** panel providing LED map to failing part (located on front panel)
Software **ServerGuide™** (CD-ROM installation and configuration utilities), IBM Director systems mgmt, others
Keyboard / mouse None standard (because rack-based) / USB only
Power supply Std/Max: one/two 835 watt hot-swap / rear access / auto restart / redundant with two power supplies / auto-sensing
Fans **Calibrated Vectored Cooling™** Std: five fans; Max: ten (five fans with optional second power supply) / redundant with ten fans installed; All: variable speed / hot-swap / PFA
Prerequisites Monitor, keyboard, mouse, SAS disk, rack, OS

Xeon 2.33GHz/1333MHz - 2 x 2MB L2 Cache	40K1234
Xeon 2.66GHz/1333MHz - 2 x 2MB L2 Cache	40K1235
Xeon 3.0GHz/1333MHz - 2 x 2MB L2 Cache	40K1236
1GB PC2-5300 FBD (2 x 512 MB)	39M5782
2GB PC2-5300 FBD (2 x 1GB)	39M5785
4GB PC2-5300 FBD (2 x 2GB)	39M5791
8GB PC2-5300 FBD (2 x 4GB) - When available	39M5797
IBM ServeRAID-8k Adapter	25R8064
IBM Remote Supervisor Adapter II Slim	39Y9566
300GB 10K-rpm SAS HS 3.5" (MM carrier) HDD	40K1041
73.4GB 10K-rpm SAS SFF HS 2.5" (SFF tray) HDD	40K1052
73.4GB 15K-rpm SAS HS 3.5" (MM carrier) HDD	40K1043
146.4GB 15K-rpm SAS HS 3.5" (MM carrier) HDD	40K1044
835 Watt Hot-swap Power Supply Option (US)	40K1905
PCI Riser Card PCI-Express Option	40K1907
PCI Riser Card PCI-X Option	40K1908

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



- ⊘ Quick release adapter slots (no screws)
- ⊘ Configuration/Setup Utility: F1 at startup
- ⊘ Diagnostics (PC-Doctor™): F2 at startup
- ⊘ Network Boot: F12 at startup
- ⊘ Front indicators LEDs: Power-on LED, HDD activity LED, locator LED, system information LED, and system-error LED
- ⊘ Predictive failure analysis on disk options, memory, processors, VRMs, power supplies, and fans in conjunction with IBM Director can alert the system administrator of an imminent component failure
- ⊘ Rack: H 3.36" x W 17.5" x D 27.5" (H 85.4mm x W 443.6mm x D 698mm)
- ⊘ 46.5 to 65 pounds
- ⊘ Stealth black color

LIMITED WARRANTY³

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

• = Hot-swap (HS)
 Slot 1*: PCI-Express x8(x8 Links) or full length 64-bit 133MHz 3.3v PCI-X
 Slot 2*: PCI-Express x8(x8 Links) or half length 64-bit 133MHz 3.3v PCI-X
 Slot 3: low-profile, PCI-Express x8(x4 Links)
 Slot 4: low-profile, PCI-Express x8(x4 Links)
 *slots 1 & 2 riser determines PCI-Express or PCI-X
 See footnotes for important warranty information

Max internal disk capacity:
 3.5" SAS models: 1.8TB² with six 300GB SL disks
 2.5" SAS models: 584GB² with eight 73.4GB SFF disks

IBM® Type-model	Qty x Processor/Core	L2 cache	Memory	Disk	Disk controller	Optical	Power Supply	Disk bays	Slots x bays	Ethernet	Available date	
7979-BAX	1 x Xeon™ E5405	2.0GHz/QC	12MB	2GB	2.5" Open	SAS	Combo	1 x 835W	8 hot-swap	4x8	2 x GB	Jan 2008
7979-B1x	1 x Xeon E5405	2.0GHz/QC	12MB	2GB	3.5" Open	SAS/SATA	Combo	1 x 835W	6 hot-swap	4x6	2 x GB	Jan 2008
7979-BCx	1 x Xeon E5420	2.5GHz/QC	12MB	2GB	2.5" Open	SAS	Combo	1 x 835W	8 hot-swap	4x8	2 x GB	Jan 2008
7979-B3x	1 x Xeon E5420	2.5GHz/QC	12MB	2GB	3.5" Open	SAS/SATA	Combo	1 x 835W	6 hot-swap	4x6	2 x GB	Jan 2008
7979-BDx	1 x Xeon E5430	2.66GHz/QC	12MB	2GB	2.5" Open	SAS	Combo	1 x 835W	8 hot-swap	4x8	2 x GB	Jan 2008
7979-B4x	1 x Xeon E5430	2.66GHz/QC	12MB	2GB	3.5" Open	SAS/SATA	Combo	1 x 835W	6 hot-swap	4x6	2 x GB	Jan 2008

Positioning 2U Rack with high availability, scalability and expandability for application-serving Web environments
Processor Up to 2 x Intel® Xeon Processor 3.16GHz with 1333MHz FSB / Quad-Core / **Extended Memory 64 Technology (EM64T)** / Enhanced Intel Speedstep Technology (EIST)
L2 cache 12MB / std and max / at processor speed
SMP support 2-way SMP / up to two Xeon Processors (same speed/cache size)
Implementation Systemboard contains two Intel LGA771 sockets, twelve memory gold-connector DIMM slots, four PCI-E slots or two PCI-E slots and two PCI-X slots, integrated SAS, ethernet and graphics controllers

Memory 2GB std / 48GB¹³ max / two slots used / ten slots available / **PC2-5300 667MHz FBD 240-pin ECC DDR2-SDRAM DIMMs** / dual channel / 2-way memory interleave / DIMMs must be installed in matched pairs [a bank] / **Fully Buffered / Error Checking and Correcting (ECC)** (corrects any x4 or x8 SDRAM device failure, detects all two wire faults on DIMMs, detects all permutations of two x4 DRAM failures, detects any two bits in error within 8 bytes of data, corrects any single bit error within 8 bytes of data) / **Active Memory™: memory mirroring, online-spare memory, Chipkill**

SAS/SATA controller **Adaptec® AIC-9580W / dual channel SAS controller / eight port SAS or SATA** (300MB/sec SAS) (150MB/sec SATA) / hot-swap / on planar / PCI-Express / supports **RAID 0, 1 & 10** / optional IBM ServeRAID™-8k Adaptor for low-cost RAID 0, 1, 1E, 10, 5 & 6 (installed on reserved internal connector) / simultaneous SAS and SATA disks environments are unsupported
SAS connectors One internal connection wired to DASD backplane / one external connector
IDE controller/cable Enhanced IDE/ATA 100 controller in Enterprise South Bridge / one connector on planar / one 1-drop IDE cable (CD-RW/DVD-ROM)
Disk - capacity None standard / supports 7200-15000 rpm disks / one backplane
Disk - bays Some: six hot-swap 3.5" SAS or SATA HDD / some: eight hot-swap 2.5" SAS HDD / filler panels installed in open bays
Tape backup Optional internal and external / 3.5" / USB or SATA

Mechanical **EIA 19" Rack (2U*)** / rack-mount only / supported in IBM NetBay™ Rack products / no rack to tower conversion
Chipset **Intel 5000P chipset** / Intel Memory Controller Hub (MCH) provides riser connector for either two PCI-Express x8 slots or two 64-bit/133MHz PCI-X slots / Enterprise Southbridge(ESB-2E) provides: two PCI-Express x8 slot with x4 Links, ATI video, Dual Gigabit ethernet, IDE, USB, SMBus, LPC bus to NS PC8742XVUL for Super I/O
Bus slots (See below) Four PCI-Express x8 or two PCI-X 1.0 and two PCI-Express x8 / no hot-swap Active™ PCI slots

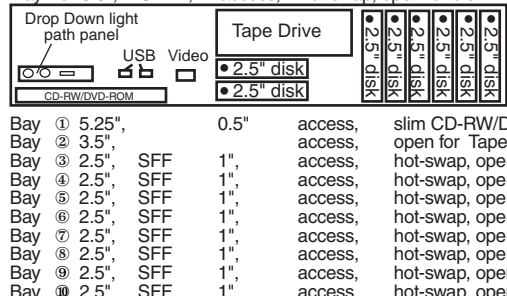
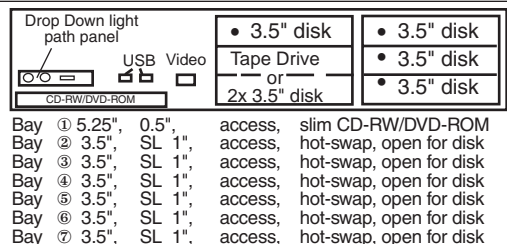
Ethernet controller Dual gigabit 10/100/1000 ethernet ports / **Two Broadcom® 5708** / two full gigabit ethernet MAC and PHY layer functions / on planar / PCI-Express / full duplex / Wake on LAN® / TCP/IP Offload Engine (TOE) / Alert Standard Format 2.0 / two RJ-45 ports in rear
Optical / diskette 8X-24X⁶ CD-RW/DVD-ROM / USB only
Front & Rear ports *Front:* two USB (Vers 2.0), graphics (DB-15) *Rear:* two USB (Vers 2.0), serial (9-pin), graphics (DB-15), two ethernet (RJ-45), one RJ-45 (sys mgmt), one SAS / no parallel port
Graphics SVGA / ATI® RN50(ES1000) / front and rear ports / on planar / 16MB DDR std/max / 32-bit/33MHz PCI 2.3

Security Power-on password / administrator password / unattended boot / selectable boot sequence
Systems mgmt **IBM Integrated Baseboard Management Controller (iBMC)** / IPMI 2.0 / H8S2166 / on planar / provides system and environmental monitoring such as temp, optional disks, fans, power supply / supports opt. Remote Supervisor Adapter II Slimline with 140-pin connector on planar for continuous power (no external power required)

Diagnostics **Drop down Light Path Diagnostics** panel providing LED map to failing part (located on front panel)
Software **ServerGuide™** (CD-ROM installation and configuration utilities), IBM Director systems mgmt, others
Keyboard / mouse None standard (because rack-based) / USB only
Power supply *Std/Max:* one/two 835 watt hot-swap / rear access / auto restart / redundant with two power supplies / auto-sensing
Fans **Calibrated Vectored Cooling™** *Std:* five fans; *Max:* ten (five fans with optional second power supply) / redundant with ten fans installed; *All:* variable speed / hot-swap / PFA
Prerequisites Monitor, keyboard, mouse, SAS/SATA disk, rack, OS

Xeon E5405 2.0GHz/1333MHz/12MB L2 Cache	44E5074
Xeon E5420 2.5GHz/1333MHz/12MB L2 Cache	44R5632
Xeon E5430 2.66GHz/1333MHz/12MB L2 Cache	44E5077
1GB PC2-5300 FBD (2 x 512 MB)	39M5782
2GB PC2-5300 FBD (2 x 1GB)	39M5785
4GB PC2-5300 FBD (2 x 2GB)	39M5791
8GB PC2-5300 FBD (2 x 4GB)	39M5797
IBM ServeRAID-8k Adapter	25R8064
IBM Remote Supervisor Adapter II Slim	39Y9566
250GB 7.2K rpm SATA II hot-swap	39M4526
500GB 7.2K rpm SATA hot-swap 300MB/sec	39M4530
750GB 7.2K rpm SATA hot-swap 300MB/sec	43W5756
1TB 7.2K rpm SATA hot-swap 300MB/sec	43W7676
300GB 15K-rpm SAS HS 3.5" (MM carrier) HDD	43X0802
73.4GB 10K-rpm SAS SFF HS 2.5" (SFF tray) HDD	40K1052
146GB 10K-rpm SAS SFF HS 2.5" (SFF tray) HDD	43X0824
73.4GB 15K-rpm SAS SFF HS 2.5" (SFF tray) HDD	43X0837
73.4GB 15K-rpm SAS HS 3.5" (MM carrier) HDD	40K1043
146.4GB 15K-rpm SAS HS 3.5" (MM carrier) HDD	40K1044
835 Watt Hot-swap Power Supply Option (US)	40K1905
PCI Riser Card PCI-X Option	40K1908

Other options at ibm.com/products/us



Bay ① 5.25", 0.5", access, slim CD-RW/DVD-ROM
 Bay ② 3.5", SL 1", access, open for Tape Drive
 Bay ③ 3.5", SL 1", access, hot-swap, open for disk
 Bay ④ 3.5", SL 1", access, hot-swap, open for disk
 Bay ⑤ 3.5", SL 1", access, hot-swap, open for disk
 Bay ⑥ 3.5", SL 1", access, hot-swap, open for disk
 Bay ⑦ 3.5", SL 1", access, hot-swap, open for disk
 Bay ⑧ 3.5", SL 1", access, hot-swap, open for disk

Slot 1*: PCI-Express x8(x8 Links) or full length 64-bit 1333MHz 3.3v PCI-X
 Slot 2*: PCI-Express x8(x8 Links) or half length 64-bit 1333MHz 3.3v PCI-X
 Slot 3: low-profile, PCI-Express x8(x4 Links)
 Slot 4: low-profile, PCI-Express x8(x4 Links)
 *slots 1 & 2 riser determines PCI-Express or PCI-X

- ↳ Quick release adapter slots (no screws)
- ↳ Configuration/Setup Utility: F1 at startup
- ↳ Diagnostics (PC-Doctor™): F2 at startup
- ↳ Network Boot: F12 at startup
- ↳ Front indicators LEDs: Power-on LED, HDD activity LED, locator LED, system information LED, and system-error LED
- ↳ Predictive failure analysis on disk options, memory, processors, VRMs, power supplies, and fans in conjunction with IBM Director can alert the system administrator of an imminent component failure
- ↳ Rack: H 3.36" x W 17.5" x D 27.5" (H 85.4mm x W 443.6mm x D 698mm)
- ↳ 46.5 to 65 pounds
- ↳ Stealth black color

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 time
- ↳ 3 year on site warranty service upgrade options (in eligible locations):⁷
 - 9 hr coverage, Mon-Fri excluding holidays, 4 hr response time (ServicePac 21P2077)
 - 24 hr x 7 day coverage, 4 hour average response time (ServicePac 21P2078)
 - 24 hr x 7 day coverage, 2 hour average response time (ServicePac 21P2093)
- ↳ Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- ↳ 24x7¹⁴ toll-free support for warranty issues during the warranty period³

See footnotes for important warranty information

Max internal disk capacity:
 3.5" SAS models: 1.8TB² with six 300GB SL disks
 3.5" SATA models: 4.5TB² with six 750GB disks
 2.5" SAS models: 1.2TB² with eight 146GB SFF disks

IBM® Type-model	Qty x Processor/Core	L2 cache	Memory	Disk	Disk controller	Optical	Power Supply	Disk bays	Slots x bays	Ethernet	Available date	
7979-BEx	1 x Xeon™ E5440	2.83GHz/QC	12MB	2GB	2.5" Open	SAS	Combo	1 x 835W	8 hot-swap	4x8	2 x GB	Jan 2008
7979-B5x	1 x Xeon E5440	2.83GHz/QC	12MB	2GB	3.5" Open	SAS/SATA	Combo	1 x 835W	6 hot-swap	4x6	2 x GB	Jan 2008
7979-BFx	1 x Xeon X5450	3.0GHz/QC	12MB	2GB	2.5" Open	SAS	Combo	1 x 835W	8 hot-swap	4x8	2 x GB	Jan 2008
7979-B6x	1 x Xeon X5450	3.0GHz/QC	12MB	2GB	3.5" Open	SAS/SATA	Combo	1 x 835W	6 hot-swap	4x6	2 x GB	Jan 2008
7979-BGx	1 x Xeon X5460	3.16GHz/QC	12MB	2GB	2.5" Open	SAS	Combo	1 x 835W	8 hot-swap	4x8	2 x GB	Jan 2008
7979-B7x	1 x Xeon X5460	3.16GHz/QC	12MB	2GB	3.5" Open	SAS/SATA	Combo	1 x 835W	6 hot-swap	4x6	2 x GB	Jan 2008

Positioning Processor 2U Rack with high availability, scalability and expandability for application-serving Web environments
Up to 2 x Intel® Xeon Processor 3.16GHz with 1333MHz FSB / Quad-Core / **Extended Memory 64 Technology (EM64T)** / Enhanced Intel Speedstep Technology (EIST)

L2 cache 12MB / std and max / at processor speed

SMP support 2-way SMP / up to two Xeon Processors (same speed/cache size)

Implementation Systemboard contains two Intel LGA771 sockets, twelve memory gold-connector DIMM slots, four PCI-E slots or two PCI-E slots and two PCI-X slots, integrated SAS, ethernet and graphics controllers

Memory 2GB std / 48GB¹³ max / two slots used / ten slots available / **PC2-5300 667MHz FBD 240-pin ECC DDR2-SDRAM DIMMs** / dual channel / 2-way memory interleave / DIMMs must be installed in matched pairs [a bank] / **Fully Buffered / Error Checking and Correcting (ECC)** (corrects any x4 or x8 SDRAM device failure, detects all two wire faults on DIMMs, detects all permutations of two x4 DRAM failures, detects any two bits in error within 8 bytes of data, corrects any single bit error within 8 bytes of data) / **Active Memory™: memory mirroring, online-spare memory, Chipkill**

SAS/SATA controller **Adaptec® AIC-9580W / dual channel SAS controller / eight port SAS or SATA** (300MB/sec SAS) (150MB/sec SATA) / hot-swap / on planar / PCI-Express / supports **RAID 0, 1 & 10** / optional **IBM ServeRAID™-8k** Adaptor for low-cost RAID 0, 1, 1E, 10, 5 & 6 (installed on reserved internal connector) / simultaneous SAS and SATA disks environments are unsupported

SAS connectors One internal connection wired to DASD backplane / one external connector

IDE controller/cable Enhanced IDE/ATA 100 controller in Enterprise South Bridge / one connector on planar / one 1-drop IDE cable (CD-RW/DVD-ROM)

Disk - capacity None standard / supports 7200-15000 rpm disks / one backplane

Disk - bays Some: six hot-swap 3.5" SAS or SATA HDD / some: eight hot-swap 2.5" SAS HDD / filler panels installed in open bays

Tape backup Optional internal and external / 3.5" / USB or SATA

Mechanical Chipset **EIA 19" Rack (2U⁴)** / rack-mount only / supported in IBM NetBAY™ Rack products / no rack to tower conversion
Intel 5000P chipset / Intel Memory Controller Hub (MCH) provides riser connector for either two PCI-Express x8 slots or two 64-bit/1333MHz PCI-X slots / Enterprise Southbridge(ESB-2E) provides: two PCI-Express x8 slot with x4 Links, ATI video, Dual Gigabit ethernet, IDE, USB, SMBus, LPC bus to NS PC8742XVUL for Super I/O

Bus slots (See below) Four PCI-Express x8 or two PCI-X 1.0 and two PCI-Express x8 / no hot-swap Active™ PCI slots

Ethernet controller Dual gigabit 10/100/1000 ethernet ports / **Two Broadcom® 5708** / two full gigabit ethernet MAC and PHY layer functions / on planar / PCI-Express / full duplex / Wake on LAN® / TCP/IP Offload Engine (TOE) / Alert Standard Format 2.0 / two RJ-45 ports in rear

Optical / diskette 8X-24X⁶ CD-RW/DVD-ROM / USB only

Front & Rear ports *Front:* two USB (Vers 2.0), graphics (DB-15) *Rear:* two USB (Vers 2.0), serial (9-pin), graphics (DB-15), two ethernet (RJ-45), one RJ-45 (sys mgmt), one SAS / no parallel port

Graphics SVGA / ATI® RN50(ES1000) / front and rear ports / on planar / 16MB DDR std/max / 32-bit/33MHz PCI 2.3

Security Power-on password / administrator password / unattended boot / selectable boot sequence

Systems mgmt **IBM Integrated Baseboard Management Controller(BMC)** / IPMI 2.0 / H8S2166 / on planar / provides system and environmental monitoring such as temp, optional disks, fans, power supply / supports opt. Remote Supervisor Adapter II Slimline with 140-pin connector on planar for continuous power (no external power required)

Diagnostics **Drop down Light Path Diagnostics** panel providing LED map to failing part (located on front panel)

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

Keyboard / mouse None standard (because rack-based) / USB only

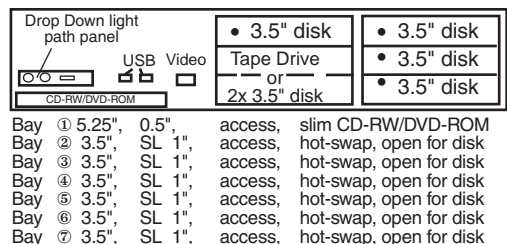
Power supply *Std/Max:* one/two 835 watt hot-swap / rear access / auto restart / redundant with two power supplies / auto-sensing

Fans **Calibrated Vectors Cooling™** *Std:* five fans; *Max:* ten (five fans with optional second power supply) / redundant with ten fans installed; *All:* variable speed / hot-swap / PFA

Prerequisites Monitor, keyboard, mouse, SAS/SATA disk, rack, OS

Xeon E5440 2.83GHz/1333MHz/12MB L2 Cache	44R5634
Xeon X5450 3.0GHz/1333MHz/12MB L2 Cache	44E5122
Xeon X5460 3.16GHz/1333MHz/12MB L2 Cache	44E5057
1GB PC2-5300 FBD (2 x 512 MB)	39M5782
2GB PC2-5300 FBD (2 x 1GB)	39M5785
4GB PC2-5300 FBD (2 x 2GB)	39M5791
8GB PC2-5300 FBD (2 x 4GB)	39M5797
IBM ServeRAID-8k Adapter	25R8064
IBM Remote Supervisor Adapter II Slim	39Y9566
250GB 7.2K rpm SATA II hot-swap	39M4526
500GB 7.2K rpm SATA hot-swap 300MB/sec	39M4530
750GB 7.2K rpm SATA hot-swap 300MB/sec	43W5756
1TB 7.2K rpm SATA hot-swap 300MB/sec	43W7676
300GB 15K-rpm SAS HS 3.5" (MM carrier) HDD	43X0802
73.4GB 10K-rpm SAS SFF HS 2.5" (SFF tray) HDD	40K1052
146GB 10K-rpm SAS SFF HS 2.5" (SFF tray) HDD	43X0824
73.4GB 15K-rpm SAS SFF HS 2.5" (SFF tray) HDD	43X0837
73.4GB 15K-rpm SAS HS 3.5" (MM carrier) HDD	40K1043
146.4GB 15K-rpm SAS HS 3.5" (MM carrier) HDD	40K1044
835 Watt Hot-swap Power Supply Option (US)	40K1905
PCI Riser Card PCI-X Option	40K1908

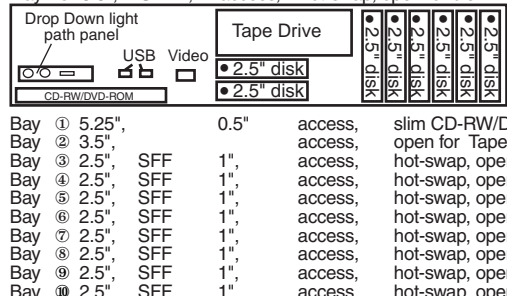
Other options at ibm.com/products/us



2U Rack with 3.5" SAS

- 3.5" disk
- 3.5" disk
- 3.5" disk
- 3.5" disk
- 3.5" disk
- 3.5" disk
- 3.5" disk

• = Hot-swap (HS)



2U Rack with 2.5" SAS

- 2.5" disk
- 2.5" disk
- 2.5" disk
- 2.5" disk
- 2.5" disk
- 2.5" disk
- 2.5" disk
- 2.5" disk
- 2.5" disk
- 2.5" disk

Slot 1*: PCI-Express x8(x8 Links) or full length 64-bit 1333MHz 3.3v PCI-X
Slot 2*: PCI-Express x8(x8 Links) or half length 64-bit 1333MHz 3.3v PCI-X
Slot 3: low-profile, PCI-Express x8(x4 Links)
Slot 4: low-profile, PCI-Express x8(x4 Links)
*slots 1 & 2 riser determines PCI-Express or PCI-X

Max internal disk capacity:
3.5" SAS models: 1.8TB² with six 300GB SL disks
3.5" SATA models: 4.5TB² with six 750GB disks
2.5" SAS models: 1.2TB² with eight 146GB SFF disks

See footnotes for important warranty information

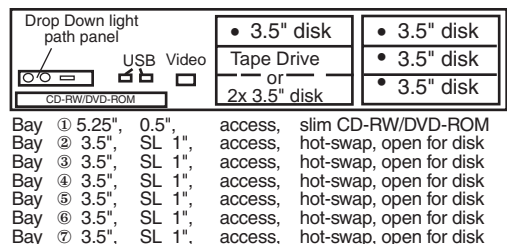
LIMITED WARRANTY³

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

IBM® Type-model	Qty x Processor/Core	L2 cache	Memory	Disk	Disk controller	Optical	Power Supply	Disk bays	Slots x bays	Ethernet	Available date
7979-82x	1 x Xeon™ X5470 3.3GHz/QC	12MB	2GB	3.5" Open	SAS/SATA	Combo	1 x 835W	6 hot-swap	4x6	2 x GB	Nov 2008
7979-8Bx	1 x Xeon X5470 3.3GHz/QC	12MB	2GB	2.5" Open	SAS	Combo	1 x 835W	8 hot-swap	4x8	2 x GB	Nov 2008
7979-EFU	1 x Xeon L5430 2.66GHz/QC	12MB	4GB	2.5" Open	SAS	Combo	1 x 835W	8 hot-swap	4x8	2 x GB	Dec 2008

Positioning Processor	2U Rack with high availability, scalability and expandability for application-serving Web environments Up to 2 x Intel® Xeon Processor 3.3GHz with 1333MHz FSB / Quad-Core / Extended Memory 64 Technology (EM64T) / Enhanced Intel Speedstep Technology (EIST)
L2 cache	12MB / std and max / at processor speed
SMP support	2-way SMP / up to two Xeon Processors (same speed/cache size)
Implementation	Systemboard contains two Intel LGA771 sockets, twelve memory gold-connector DIMM slots, four PCI-E slots or two PCI-E slots and two PCI-X slots, integrated SAS, ethernet and graphics controllers
Memory	2 or 4GB std / 48GB ¹³ max / two slots used / ten slots available / PC2-5300 667MHz FBD 240-pin ECC DDR2-SDRAM DIMMs / dual channel / 2-way memory interleave / DIMMs must be installed in matched pairs [a bank] / Fully Buffered / Error Checking and Correcting (ECC) (corrects any x4 or x8 SDRAM device failure, detects all two wire faults on DIMMs, detects all permutations of two x4 DRAM failures, detects any two bits in error within 8 bytes of data, corrects any single bit error within 8 bytes of data) / Active Memory™: memory mirroring, online-spare memory, Chipkill
SAS/SATA controller	Adaptec® AIC-9580W / dual channel SAS controller / eight port SAS or SATA (300MB/sec SAS) (150MB/sec SATA) / hot-swap / on planar / PCI-Express / supports RAID 0, 1 & 10 / optional IBM ServeRAID™-8k Adaptor for low-cost RAID 0, 1, 1E, 10, 5 & 6 (installed on reserved internal connector) / simultaneous SAS and SATA disks environments are unsupported
SAS connectors	One internal connection wired to DASD backplane / one external connector
IDE controller/cable	Enhanced IDE/ATA 100 controller in Enterprise South Bridge / one connector on planar / one 1-drop IDE cable (CD-RW/DVD-ROM)
Disk - capacity	None standard / supports 7200-15000 rpm disks / one backplane
Disk - bays	Some: six hot-swap 3.5" SAS or SATA HDD / some: eight hot-swap 2.5" SAS HDD / filler panels installed in open bays
Tape backup	Optional internal and external / 3.5" / USB or SATA
Mechanical Chipset	EIA 19" Rack (2U⁴) / rack-mount only / supported in IBM NetBAY™ Rack products / no rack to tower conversion Intel 5000P chipset / Intel Memory Controller Hub (MCH) provides riser connector for either two PCI-Express x8 slots or two 64-bit/133MHz PCI-X slots / Enterprise Southbridge(ESB-2E) provides: two PCI-Express x8 slot with x4 Links, ATI video, Dual Gigabit ethernet, IDE, USB, SMBus, LPC bus to NS PC8742XVUL for Super I/O
Bus slots	(See below) Four PCI-Express x8 or two PCI-X 1.0 and two PCI-Express x8 / no hot-swap Active™ PCI slots
Ethernet controller	Dual gigabit 10/100/1000 ethernet ports / Two Broadcom® 5708 / two full gigabit ethernet MAC and PHY layer functions / on planar / PCI-Express / full duplex / Wake on LAN® / TCP/IP Offload Engine (TOE) / Alert Standard Format 2.0 / two RJ-45 ports in rear
Optical / diskette	8X-24X⁶ CD-RW/DVD-ROM / USB only
Front & Rear ports	Front: two USB (Vers 2.0), graphics (DB-15) Rear: two USB (Vers 2.0), serial (9-pin), graphics (DB-15), two ethernet (RJ-45), one RJ-45 (sys mgmt), one SAS / no parallel port
Graphics	SVGA / ATI® RN50(ES1000) / front and rear ports / on planar / 16MB DDR std/max / 32-bit/33MHz PCI 2.3
Security	Power-on password / administrator password / unattended boot / selectable boot sequence
Systems mgmt	IBM Integrated Baseboard Management Controller(BMC) / IPMI 2.0 / H8S2166 / on planar / provides system and environmental monitoring such as temp, optional disks, fans, power supply / supports opt. Remote Supervisor Adapter II Slimline with 140-pin connector on planar for continuous power (no external power required)

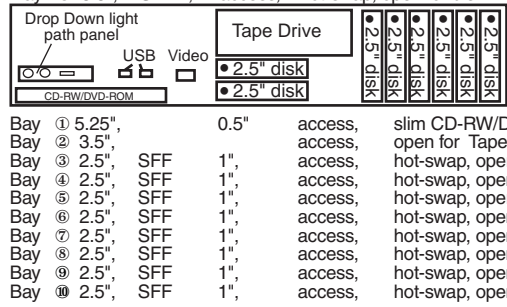
Diagnostics	Drop down Light Path Diagnostics panel providing LED map to failing part (located on front panel)	Xeon X5470 3.33GHz/1333MHz/12MB L2 Cache	46M1034
Software	ServerGuide™ (CD-ROM installation and configuration utilities), IBM Director systems mgmt, others	Xeon L5430 2.66GHz/1333MHz/12MB L2 Cache	46M1066
Keyboard / mouse	None standard (because rack-based) / USB only	Xeon X5260 3.33GHz/1333MHz/6MB L2 Cache	44E5164
Power supply	Std/Max: one/two 835 watt hot-swap / rear access / auto restart / redundant with two power supplies / auto-sensing	1GB PC2-5300 FBD (2 x 512 MB)	39M5782
Fans	Calibrated Vecteded Cooling™ Std: five fans; Max: ten (five fans with optional second power supply) / redundant with ten fans installed; All: variable speed / hot-swap / PFA	2GB PC2-5300 FBD (2 x 1GB)	39M5785
Prerequisites	Monitor, keyboard, mouse, SAS/SATA disk, rack, OS	4GB PC2-5300 FBD (2 x 2GB)	39M5791
		8GB PC2-5300 FBD (2 x 4GB)	39M5797
		IBM ServeRAID-8k Adapter	25R8064
		IBM Remote Supervisor Adapter II Slim	39Y9566
		250GB 7.2K rpm SATA II hot-swap	39M4526
		500GB 7.2K rpm SATA hot-swap 300MB/sec	39M4530
		750GB 7.2K rpm SATA hot-swap 300MB/sec	43W5756
		1TB 7.2K rpm SATA hot-swap 300MB/sec	43W7676
		300GB 15K-rpm SAS HS 3.5" (MM carrier) HDD	43X0802
		73.4GB 10K-rpm SAS SFF HS 2.5" (SFF tray) HDD	40K1052
		146GB 10K-rpm SAS SFF HS 2.5" (SFF tray) HDD	43X0824
		73.4GB 15K-rpm SAS SFF HS 2.5" (SFF tray) HDD	43X0837
		73.4GB 15K-rpm SAS HS 3.5" (MM carrier) HDD	40K1043
		146.4GB 15K-rpm SAS HS 3.5" (MM carrier) HDD	40K1044
		835 Watt Hot-swap Power Supply Option (US)	40K1905
		PCI Riser Card PCI-X Option	40K1908



2U Rack with 3.5" SAS	• 3.5" disk	• 3.5" disk
	Tape Drive	• 3.5" disk
	or	• 3.5" disk
	2x 3.5" disk	• 3.5" disk

• = Hot-swap (HS)

Other options at ibm.com/products/us



- Quick release adapter slots (no screws)
- Configuration/Setup Utility: F1 at startup
- Diagnostics (PC-Doctor™): F2 at startup
- Network Boot: F12 at startup
- Front indicators LEDs: Power-on LED, HDD activity LED, locator LED, system information LED, and system-error LED
- Predictive failure analysis on disk options, memory, processors, VRMs, power supplies, and fans in conjunction with IBM Director can alert the system administrator of an imminent component failure
- Rack: H 3.36" x W 17.5" x D 27.5" (H 85.4mm x W 443.6mm x D 698mm)
- 46.5 to 65 pounds
- Stealth black color

LIMITED WARRANTY³

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

Slot 1*: PCI-Express x8(x8 Links) or full length 64-bit 133MHz 3.3v PCI-X
 Slot 2*: PCI-Express x8(x8 Links) or half length 64-bit 133MHz 3.3v PCI-X
 Slot 3: low-profile, PCI-Express x8(x4 Links)
 Slot 4: low-profile, PCI-Express x8(x4 Links)
 **slots 1 & 2 riser determines PCI-Express or PCI-X

Max internal disk capacity:
 3.5" SATA models: 4.5TB² with six 750GB disks
 2.5" SAS models: 1.2TB² with eight 146GB SFF disks

See footnotes for important warranty information

IBM® Type-model	Qty x Processor/Core	L3 cache	Memory	Disk	Disk controller	Optical	Power Supply	Disk bays	Slots x bays	Ethernet	Available date	
7947-12x	1 x Xeon® E5502	1.86GHz/2C	4MB	2x1GB	2.5" Open	SAS/SATA	Combo	1 x 675W	8 hot-swap	4x9	2 x Gb	Apr 2009
7947-22x	1 x Xeon E5504	2.0GHz/4C	4MB	2x1GB	2.5" Open	SAS/SATA	Combo	1 x 675W	8 hot-swap	4x9	2 x Gb	Apr 2009
7947-3Ax	1 x Xeon E5506	2.13GHz/4C	4MB	2x1GB	2.5" Open	SAS/SATA	Combo	1 x 675W	8 hot-swap	4x9	2 x Gb	Apr 2009
7947-32x	1 x Xeon E5520	2.26GHz/4C	8MB	2x1GB	2.5" Open	SAS/SATA	Combo	1 x 675W	8 hot-swap	4x9	2 x Gb	Apr 2009
7947-42x	1 x Xeon L5520	2.26GHz/4C	8MB	2x1GB	2.5" Open	SAS/SATA	Combo	1 x 675W	8 hot-swap	4x9	2 x Gb	Apr 2009
7947-52x	1 x Xeon E5530	2.40GHz/4C	8MB	2x1GB	2.5" Open	SAS/SATA	Combo	1 x 675W	8 hot-swap	4x9	2 x Gb	Apr 2009
7947-62x	1 x Xeon E5540	2.53GHz/4C	8MB	2x1GB	2.5" Open	SAS/SATA	Combo	1 x 675W	8 hot-swap	4x9	2 x Gb	Apr 2009
7947-72x	1 x Xeon X5550	2.66GHz/4C	8MB	2x2GB	2.5" Open	SAS/SATA	Combo	1 x 675W	8 hot-swap	4x9	2 x Gb	Apr 2009
7947-92x	1 x Xeon X5570	2.93GHz/4C	8MB	2x2GB	2.5" Open	SAS/SATA	Combo	1 x 675W	8 hot-swap	4x9	2 x Gb	Apr 2009

Positioning Processor(s) **Flagship business critical server to significantly lower Total Cost of Ownership packed with IBM innovation Up to two Next Generation Intel® Xeon featuring Quick Path Interconnect(QPI) technology at up to 2.93GHz with 8MB L3 / 4 Core / with Intel Turbo Boost Technology and Hyper-Threading / up to 2.13GHz with 4MB L3 / 2 or 4 Core / Hyper-Threading 4 or 8MB std and max / at processor speed**

L3 cache SMP Implementation **2-way SMP / up to two Xeon Processors (same speed/cache size) Systemboard contains two Socket B (LGA1366) sockets, sixteen DIMM slots, four PCI-E slots, integrated SAS, ethernet and graphics controllers**

Memory **2 or 4GB std / 64GB max per processor(using 8GB DIMMs) / PC3-10600 1333MHz LP 240-pin Registered ECC DDR3 SDRAM DIMMs / sixteen slots on systemboard / eight DIMMS per processor / ChipKill / memory mirroring**

Disk Controller **LSI Logic® 1068 SAS/SATA controller / up to eight port / on riser card / PCI-Express / supports RAID-0/1/1E / upgradeable to LSI 1078(RAID-0/1/5/6/10/50/60) / optional battery backed cache / SATA controller integrated into ICH10**

Disk bays Flash Storage Tape backup **Eight 2.5-inch Small Form Factor (SFF) hot swap disk bays std / up to twelve optional / supports SAS, SATA or SSD SFF HS disks USB-based slot on SAS riser card for optional Hypervisor USB key Optional internal and external / 3.5" / USB or SATA connected via SAS riser card**

Mechanical Architecture/Chipset **EIA 19" Rack (2U) / rack-mount only / supported in IBM NetBAY™ Rack products / no rack to tower conversion Intel 5520 Chipset / Intel IO Hub provides PCI-Express slots and links to BCM5709, enterprise south bridge interface to ICH10 South Bridge / ICH10 South Bridge provides: USB, SATA, PCI-Express links to LSI SAS/SATA controller and LPC bus to VSC452 for video and limited Super I/O**

BUS slots **(See below) Four second-generation PCI-Express x8 slots / convertible via riser(s) to two PCI-E x16 or four 64-bit 133MHz PCI-X**

Ethernet **Two Gigabit Ethernet ports / Broadcom® 5709C / two full gigabit ethernet MAC and PHY layer functions / integrated / PCI-Express / full duplex / TCP/IP Offload Engine (TOE) / Wake on LAN® / Serial over LAN / PXE 2.0 / Failover, adapter fault tolerance / Load balancing / upgradeable to four Ethernet ports with additional Broadcom 5709 daughter card**

Optical / diskette Front & Rear ports **8X-24X® CD-RW/DVD-ROM / USB only Front: two USB (Vers 2.0), graphics (DB-15) Rear: two USB (Vers 2.0), serial (9-pin), graphics (DB-15), two ethernet (RJ-45), one RJ-45 (sys mgmt) / no parallel port**

Graphics **SVGA / Matrox® G200e integrated in IMM on systemboard / 16MB DDR2-250MHz SDRAM std/max / 32-bit 33MHz PCI 2.2**

Systems Mgmt **Integrated Management Module (IMM) / VSC452 / WPCT201BA0WG / integrated / provides system and environmental monitoring, event recording, alert capability / TPM 1.2 / ASR / SOL / IPMI 2.0 / SMASH / upgradeable to Remote Presence, blue screen capture via optional IBM Virtual Media Key**

Diagnostics Security **Light Path Diagnostics™ (LED lights indicate failing component) and on-board diagnostics Power-on password / administrator password / unattended boot / selectable boot / unattended start mode**

Publications Keyboard / mouse **Installation Guide and Documentation CD None standard (because rack-based) / USB only**

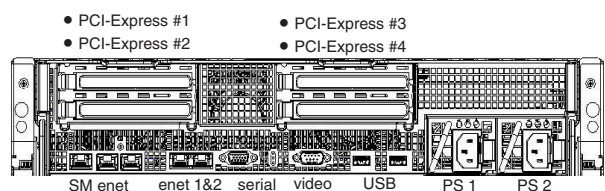
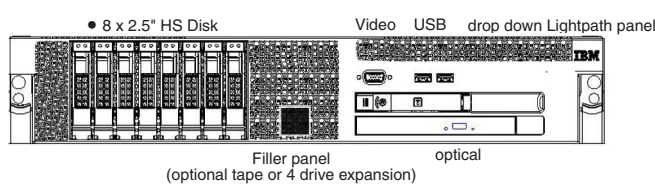
Power supply(s) **Std/Max: one/two 675 watt hot-swap / rear access / auto restart / redundant with two power supplies / auto-sensing**

Cooling **Calibrated Vecteded Cooling™ Std/Max: three / hot-swap redundant / variable speed / PFA**

Prerequisites **Monitor, keyboard, mouse, SAS/SATA disk, rack, OS**

Xeon E5502 1.86GHz/4.8GTs/4MB L3 Cache	46M1077
Xeon E5504 2.0GHz/4.8GTs/4MB L3 Cache	46M1078
Xeon E5506 2.13GHz/4.8GTs/4MB L3 Cache	46M1079
Xeon L5506 2.13GHz/4.8GTs/4MB L3 Cache	46M1082
Xeon L5520 2.26GHz/5.86GTs/8MB L3 Cache	46M1080
Xeon E5520 2.26GHz/5.86GTs/8MB L3 Cache	46M1081
Xeon E5530 2.4GHz/5.86GTs/8MB L3 Cache	46M1083
Xeon E5540 2.53GHz/5.86GTs/8MB L3 Cache	46M1084
Xeon X5550 2.66GHz/6.4GTs/8MB L3 Cache	46M1085
Xeon X5560 2.8GHz/6.4GTs/8MB L3 Cache	46M1086
Xeon X5570 2.93GHz/6.4GTs/8MB L3 Cache	46M1087
1x1GB (1Rx8) PC3-10600 DDR3 SDRAM Registered DIMM	44T1480
1x2GB (2Rx8) PC3-10600 DDR3 SDRAM Registered DIMM	44T1481
1x2GB (1Rx4) PC3-10600 DDR3 SDRAM Registered DIMM	44T1482
1x4GB (2Rx4) PC3-10600 DDR3 SDRAM Registered DIMM	44T1483
IBM Virtual Media key	46C7526
PCI-Express (2x8) Riser card	46M1072
+4 HDD Drive Enablement kit	46D2516
Dual-port 1 Gb Ethernet Daughter card	46M1076
675 Watt Hot-swap Power Supply Option (US)	46M1075
IBM ServeRAID-MR10i SAS/SATA Controller	43W4296
73.4GB 10K-rpm SAS SFF slim-HS 2.5" (SFF tray) HDD	43W7535
146GB 10K-rpm SAS SFF slim-HS 2.5" (SFF tray) HDD	43W7536
IBM 80/160 DDS Generation 6 USB Tape Drive	39M5636

2U Rack with 2.5" HS SAS



Slot 1: PCI-Express x8, full length, full height
 Slot 2: PCI-Express x8, low profile adapter with full height bracket
 Slot 3: PCI-Express x8, full length, full height
 Slot 4: PCI-Express x8, half length, full height
 **can be converted to from 4 x8 slots 2 x16 slots via optional riser card

- Quick release adapter slots (no screws)
- Configuration/Setup Utility: F1 at startup
- Diagnostics (preboot DSA): F2 at startup
- Network Boot: F12 at startup
- Front indicators LEDs: Power-on LED, HDD activity LED, locator LED, system information LED, and system-error LED
- Predictive failure analysis on disk options, memory, power supplies, and fans in conjunction with IBM Director can alert the system administrator of an imminent component failure
- Rack: H 3.36" x W 17.5" x D 27.5" (H 85.4mm x W 443.6mm x D 698mm)
- 46.5 to 65 pounds
- Stealth black color

LIMITED WARRANTY³

- 3 year parts and labor
- International Warranty Service³
- On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time⁷
- 3 year on site warranty service upgrade options (in eligible locations):⁷
 - 9 hr coverage, Mon-Fri excluding holidays, 4 hr response time (ServicePac³ 21P2077)
 - 24 hr x 7 day coverage, 4 hour average response time (ServicePac 21P2078)
 - 24 hr x 7 day coverage, 2 hour average response time (ServicePac 21P2093)
- Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- 24x7¹⁴ toll-free support for warranty issues during the warranty period³

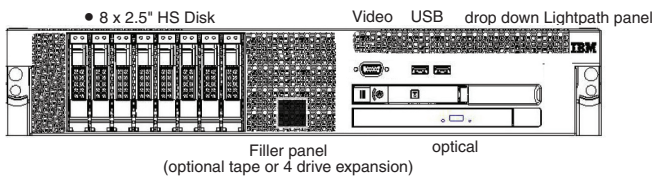
Max internal disk capacity:
 2.5" SAS models: 2.4TB² with eight 300GB SFF disks(std)
 2.5" SAS models: 3.6TB² with twelve 300GB SFF disks(opt)

See footnotes for important warranty information

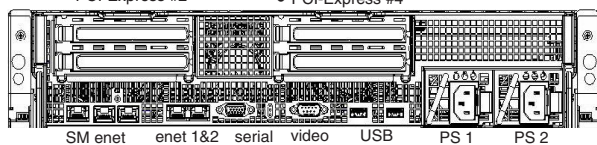
IBM® Type-model	Qty x Processor/Core	L3 cache	Memory	Disk	Disk controller	Optical	Power Supply	Disk bays	Slots x bays	Ethernet	Available date	
7947-E1x*	1 x Xeon® E5502	1.86GHz/2C	4MB	2x2GB	2.5" Open	SAS/SATA	Combo	1 x 675W	8 hot-swap	4x9	2 x Gb	Apr 2009
7947-E2x*	1 x Xeon® E5530	2.40GHz/4C	8MB	2x2GB	2.5" Open	SAS/SATA	Combo	2 x 675W	8 hot-swap	4x9	2 x Gb	Apr 2009
7947-E3x*	1 x Xeon® X5560	2.8GHz/4C	8MB	4x2GB	2.5" Open	SAS/SATA	Combo	2 x 675W	8 hot-swap	4x9	2 x Gb	Apr 2009

Positioning Processor(s)	<i>Flagship business critical server to significantly lower Total Cost of Ownership packed with IBM innovation</i> Up to two Next Generation Intel® Xeon featuring Quick Path Interconnect(QPI) technology at up to 2.4GHz with 8MB L3 / 4 Core / with Intel Turbo Boost Technology and Hyper-Threading / up to 1.86GHz with 4MB L3 / 4 Core / Hyper-Threading 4 or 8MB std and max / at processor speed 2-way SMP / up to two Xeon Processors (same speed/cache size) Systemboard contains two Socket B (LGA1366) sockets, sixteen DIMM slots, four PCI-E slots, integrated SAS, ethernet and graphics controllers	
L3 cache SMP Implementation		
Memory	2, 4 or 8GB std / 64GB max per processor (using 8GB DIMMs) / PC3-10600 1333MHz LP240-pin Registered ECC DDR3 SDRAM DIMMs / sixteen slots on systemboard / eight DIMMs per processor / ChipKill / memory mirroring	
Disk Controller	LSI Logic® 1068 SAS/SATA controller / up to eight port / on riser card / PCI-Express / supports RAID-0/1/1E / upgradeable to LSI 1078 (RAID-0/1/5/6/10/50/60) / optional battery backed cache / SATA controller integrated into ICH10	
Disk bays Flash Storage Tape backup	Eight 2.5-inch Small Form Factor (SFF) hot swap disk bays std / up to twelve optional / supports SAS, SATA or SSD SFF HS disks USB-based slot on SAS riser card for optional Hypervisor USB key Optional internal and external / 3.5" / USB or SATA connected via SAS riser card	
Mechanical Architecture/Chipset	EIA 19" Rack (2U) / rack-mount only / supported in IBM NetBAY™ Rack products / no rack to tower conversion Intel 5520 Chipset / Intel IO Hub provides PCI-Express slots and links to BCM5709, enterprise south bridge interface to ICH10 South Bridge / ICH10 South Bridge provides: USB, SATA, PCI-Express links to LSI SAS/SATA controller and LPC bus to VSC452 for video and limited Super I/O (See below) Four second-generation PCI-Express x8 slots / convertible via riser(s) to two PCI-E x16 or four 64-bit 133MHz PCI-X	
BUS slots		
Ethernet	Two Gigabit Ethernet ports / Broadcom® 5709C / two full gigabit ethernet MAC and PHY layer functions / integrated / PCI-Express / full duplex / TCP/IP Offload Engine (TOE) / Wake on LAN® / Serial over LAN / PXE 2.0 / Failover, adapter fault tolerance / Load balancing / upgradeable to four Ethernet ports with additional Broadcom 5709 daughter card	
Optical / diskette Front & Rear ports	8X-24X® CD-RW/DVD-ROM / USB only <i>Front:</i> two USB (Vers 2.0), graphics (DB-15) <i>Rear:</i> two USB (Vers 2.0), serial (9-pin), graphics (DB-15), two ethernet (RJ-45), one RJ-45 (sys mgmt) / no parallel port	
Graphics	SVGA / Matrox® G200e integrated in IMM on systemboard / 128MB DDR2-250MHz SDRAM std/max / 32-bit 33MHz PCI 2.2	
Systems Mgmt	Integrated Management Module (IMM) / VSC452 / WPCT201BA0WG / integrated / provides system and environmental monitoring, event recording, alert capability / TPM 1.2 / ASR / SOL / IPMI 2.0 / SMASH / upgradeable to Remote Presence, blue screen capture via optional IBM Virtual Media Key Light Path Diagnostics™ (LED lights indicate failing component) and on-board diagnostics Power-on password / administrator password / unattended boot / selectable boot / unattended start mode	
Diagnostics Security		
Publications Keyboard / mouse	Installation Guide and Documentation CD None standard (because rack-based) / USB only	Xeon E5502 1.86GHz/4.8GTs/4MB L3 Cache 46M1077 Xeon E5504 2.0GHz/4.8GTs/4MB L3 Cache 46M1078 Xeon E5506 2.13GHz/4.8GTs/4MB L3 Cache 46M1079 Xeon L5506 2.13GHz/4.8GTs/4MB L3 Cache 46M1082 Xeon L5520 2.26GHz/5.86GTs/8MB L3 Cache 46M1080 Xeon E5520 2.26GHz/5.86GTs/8MB L3 Cache 46M1081 Xeon E5530 2.4GHz/5.86GTs/8MB L3 Cache 46M1083 Xeon E5540 2.53GHz/5.86GTs/8MB L3 Cache 46M1084 Xeon X5550 2.66GHz/6.4GTs/8MB L3 Cache 46M1085 Xeon X5560 2.8GHz/6.4GTs/8MB L3 Cache 46M1086 Xeon X5570 2.93GHz/6.4GTs/8MB L3 Cache 46M1087
Power supply(s)	<i>Std/Max:</i> one/two 675 watt hot-swap / rear access / auto restart / redundant with two power supplies / auto-sensing	1x1GB (1Rx8) PC3-10600 DDR3 SDRAM Registered DIMM 44T1480 1x2GB (2Rx8) PC3-10600 DDR3 SDRAM Registered DIMM 44T1481 1x2GB (1Rx4) PC3-10600 DDR3 SDRAM Registered DIMM 44T1482 1x4GB (2Rx4) PC3-10600 DDR3 SDRAM Registered DIMM 44T1483 IBM Virtual Media key 46C7526 PCI-Express (2x8) Riser card 46M1072 +4 HDD Drive Enablement kit 46D2516 Dual-port 1 Gb Ethernet Daughter card 46M1076 675 Watt Hot-swap Power Supply Option (US) 46M1075 IBM ServeRAID-MR10i SAS/SATA Controller 43W4296 73.4GB 10K-rpm SAS SFF slim-HS 2.5" (SFF tray) HDD 43W7535 146GB 10K-rpm SAS SFF slim-HS 2.5" (SFF tray) HDD 43W7536 IBM 80/160 DDS Generation 6 USB Tape Drive 39M5636
Cooling	Calibrated Vectored Cooling™ <i>Std/Max:</i> three / hot-swap redundant / variable speed / PFA	
Prerequisites	Monitor, keyboard, mouse, SAS/SATA disk, rack, OS	

2U Rack with 2.5" HS SAS



- 8 x 2.5" HS Disk
- Video
- USB
- drop down Lightpath panel
- Filler panel (optional tape or 4 drive expansion)
- optical



- PCI-Express #1
 - PCI-Express #2
 - PCI-Express #3
 - PCI-Express #4
- Slot 1: PCI-Express x8, full length, full height
Slot 2: PCI-Express x8, low profile adapter with full height bracket
Slot 3: PCI-Express x8, full length, full height
Slot 4: PCI-Express x8, half length, full height
**can be converted to from 4 x8 slots 2 x16 slots via optional riser card

Other options at ibm.com/products/us

- ↳ Quick release adapter slots (no screws)
- ↳ Configuration/Setup Utility: F1 at startup
- ↳ Diagnostics (preboot DSA): F2 at startup
- ↳ Network Boot: F12 at startup
- ↳ Front indicators LEDs: Power-on LED, HDD activity LED, locator LED, system information LED, and system-error LED
- ↳ Predictive failure analysis on disk options, memory, power supplies, and fans in conjunction with IBM Director can alert the system administrator of an imminent component failure
- ↳ Rack: H 3.36" x W 17.5" x D 27.5" (H 85.4mm x W 443.6mm x D 698mm)
- ↳ 46.5 to 65 pounds
- ↳ Stealth black color

Max internal disk capacity:
2.5: SAS models: 2.4TB² with eight 300GB SFF disks(std)
2.5: SAS models: 3.6TB² with twelve 300GB SFF disks(opt)

LIMITED WARRANTY³

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

See footnotes for important warranty information

*Express models

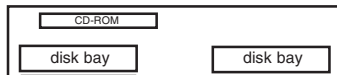
IBM® Type-model	Qty x Processor	L2 cache	Memory	Ultra320 SCSI disk	SCSI controller	Mechanical	Slots x bays	Disk Bays	Alarm Panel	Power supply	Compliant	Available date
7980-51X	2 x Xeon™ 3.2GHz	2MB	2GB	Open	2 x Ultra320	2U ⁴ rack	6x3	2 HS	Yes	DC power	NEBS-3	Aug 2006
7980-52X	2 x Xeon 3.2GHz	2MB	2GB	Open	2 x Ultra320	2U rack	6x3	2 HS	Yes	DC power	NEBS-3	May 2006
7980-53X	2 x Xeon 3.2GHz	2MB	2GB	Open	2 x Ultra320	2U rack	6x3	2 HS	Yes	AC power		May 2006
7980-54X	2 x Xeon 3.2GHz	2MB	2GB	2 x 146.8GB ² 10K	2 x Ultra320	2U rack	6x3	2 HS	Yes	DC power	NEBS-3	May 2006
7980-55X	2 x Xeon 3.2GHz	2MB	2GB	2 x 146.8GB 10K	2 x Ultra320	2U rack	6x3	2 HS	Yes	AC power		May 2006

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

Positioning	<i>High performance, carrier grade reliability for providers of the Next Generation Network</i>
Processor(s)	2 x Intel® Xeon 3.2GHz with 800MHz FSB / Optimized for Extended Memory 64 Technology™ (EM64T) / Hyper-Threading
L2 cache	2MB std and max / ECC / at processor speed
Implementation	Systemboard contains two Intel 604 pin micro-PGA ZIF sockets, six DIMM sockets, two PCI riser connectors, and integrated subsystems
SMP support	2-way SMP via second identical processor is standard
Memory	2GB std / 16GB¹³ max / PC2-3200 400MHz registered 240-pin ECC DDR2-SDRAM DIMMs / Six DIMM gold-connector slots on systemboard / Two sockets used / Four sockets available / ships with two 1GB DIMMs / DIMMs must be installed in matched pairs [a bank] / two-way memory interleave / dual-channel / Error Checking and Correcting (ECC) / Active Memory™ : online spare and memory mirror / Chipkill™ supported
SCSI disk controller	LSI® LSI53C1030 / Ultra320 SCSI controller (LVD 320MB/sec) / dual-channel / on planar / 64-bit PCI / Fusion-MPT™ architecture
SCSI channels	SCSI Channel A: one internal 16-bit 80-pin LVD cable from controller to two-bay disk drive carrier SCSI Channel B: external 16-bit .8mm VHDCI 68-pin external connector (no cables)
SCSI disk	Up to two 300GB Ultra320 SCSI, 15K rpm, 4.9ms read seek, S.M.A.R.T. ⁵ / RAID 0 and 1
SCSI disk bays	Two hot-swap disk bays in disk drive carriers that slides out from front
IDE controller / cable	EIDE ATA-100 controller in South Bridge / one connector on planar / one 1-drop IDE cable (to CD-DVD ROM)
Mechanical	EIA 19" Rack (2U⁴) x 20-inch deep
Rack support	Designed for installation in a two-post, 19" rack unit only (not supported in IBM NetBAY™ Racks) / ships with rack mount kit
PCI bus slots	(See below) three full height full length 64-bit 133MHz slots / three low-profile half length 64-bit 66MHz PCI slots / PCI 2.2 / peer PCI buses / no hot-swap Active™ PCI slots
Chipset	Intel® E7520 chipset / Intel Memory Controller Hub (MCH) / E7520 North Bridge / PXH I/O bridge / ICH-5R S South Bridge / 3 PCI buses (one 64-bit/100MHz PCI-X supporting: SCSI and full-length PCI riser board, one 64-bit/100MHz PCI-X supporting: Ethernet and low-profile PCI riser board and one 32-bit/33MHz PCI supporting graphics) / LPC bus for NS PC87431M for mBMC and NS PC87427 for Super I/O (serial, keyboard, mouse)
Bays	(See diagram below): 3 bays / two disk bays (hot-swap) / one peripheral drive bay
Ethernet	Dual Gigabit 10/100/1000 ethernet ports / Intel 82546 / on planar / full-duplex / supports Wake on LAN®, PXE 3.0 Boot Agent, Adapter Fault Tolerance, Failover
DVD-ROM / diskette	24X-10X⁶ slim-line CD-DVD ROM (applies to 51X, 53X, 54X & 55X models) (52X model CD-ROM only) / USB only
Ports	Rear: Two USB ports (Ver 2.0); RJ-45 serial; combo keyboard and mouse; two RJ-45 ethernet; DB-15 graphics; 68-pin SCSI; DB-15 male connector for front panel alarm relay contacts / no parallel port Front: One USB (Ver 2.0); RJ-45 serial
Graphics controller	SVGA / PCI bus / ATI® Rage XL (on planar) / 16MB SDRAM std/max / 1600x1200 at 16M colors at 85Hz / DB-15
Security	Power-on password / admin password / unattended boot / selectable boot / boot without keyboard
Alarm panel	External alarm panel in front bezel provides 24x7 surveillance of critical, major and minor errors and power outages / four alarm panel LEDs: power alarm fault, critical alarm fault, major alarm fault, minor alarm fault
Status LEDs	Operator Information Panel (in front) / includes switches (NMI, power, reset) and status LEDs (NIC, disk, main power)
Systems mgmt	Integrated service processor (Baseboard Management Controller) / on planar / failures or thresholds in fans, memory, processors, temperature, voltage, and power supplies activate alarm panel LEDs /
OS support	Microsoft® Windows™ Server 2003, Enterprise Edition / Red Hat® Enterprise Linux 3 & 4 AS / SUSE® Linux Enterprise Server 9
Software ship group	Resource CD (CD-ROM installation and configuration utilities, Intel Server Control server management software, Product Guide)

Keyboard / mouse	None (since rack-based)
Power supply	Std/Max: two / rear accessible / AC 600 watt (220V) or DC 600 watt (-48 to -60 V dc) / supports dual input sources / (1+1) redundant / hot-swap / auto-restart support
Fans	Four fans / multispeed / not hot-swap / not redundant / fan failure signals front panel alarm LED / fan in each power supply / fan on each processor
Prerequisites	Appropriate DC power source and customer supplied wiring, monitor, keyboard, mouse, rack, operating system

Options available via special Bid



2U Rack

- Slot 1: fullsize, 64-bit 100MHz PCI-X (5V)
- Slot 2: fullsize, 64-bit 100MHz PCI-X (5V)
- Slot 3: fullsize, 64-bit 100MHz PCI-X (5V)
- Slot 4: low-profile, 64-bit 133MHz PCI-X (3.3V)
- Slot 5: low-profile, 64-bit 133MHz PCI-X (3.3V)
- Slot 6: low-profile, 64-bit 133MHz PCI-X (3.3V)
- Bay ② 3.5", 0.5", access, std CD-DVD ROM
- Bay ③ 3.5", SL 1", access, some std disk
- Bay ④ 3.5", SL 1", access, some std disk

All models: Max int disk capacity: 600GB² with two 300GB SL disks

- ⇨ Raven black color (front bezel)
- ⇨ Configuration/Setup Utility invoked by pressing F2 at startup
- ⇨ SCSISelect near startup by pressing CTRL+A
- ⇨ PC-Doctor™ diagnostics on diskette
- ⇨ Several hardcopy publications
- ⇨ H 3.45" x W 17.14" x D 20.0"
- ⇨ H 87.6 mm x W 435.3 mm x D 508 mm
- ⇨ 34 to 37 pounds (15.4 to 16.8 kg)

LIMITED WARRANTY³

- ⇨ 3/3 year parts and labor
- ⇨ International Warranty Service³
- ⇨ On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time⁷
- ⇨ 2 year on site warranty service upgrade options (in eligible locations):⁷
 - 9 hr coverage, Mon-Fri excluding holidays, 4 hr response time 96P2122
 - 24 hr x 7 day coverage, 4 hour average response time 96P2123
 - 24 hr x 7 day coverage, 2 hour average response time 96P2124
- ⇨ 24x7¹⁴ toll-free support for warranty issues during the warranty period³

IBM® Type-model	Qty x Processor	Speed/Core	L2 Cache	Optical	Memory	Disk / Controller	Disk bays	Slots x bays	Ethernet	Warranty ³ (years)	Available date
7943 - 32U	1 x Opteron™ 2352	2.1GHz/QC	2MB	CD-RW/DVD	2x1GB	Open/SAS/SATA	8-2.5"HS	4x10	Dual Gigabit	3	July 2008
7943 - 34U	1 x Opteron 2352	2.1GHz/QC	2MB	CD-RW/DVD	2x1GB	Open/SAS/SATA	6-3.5"HS	4x7	Dual Gigabit	3	July 2008
7943 - 52U	1 x Opteron 2356	2.3GHz/QC	2MB	CD-RW/DVD	2x1GB	Open/SAS/SATA	8-2.5"HS	4x10	Dual Gigabit	3	July 2008
7943 - 22U	1 x Opteron 2344	1.7GHz/QC	2MB	CD-RW/DVD	2x1GB	Open/SAS/SATA	6-3.5"HS	4x7	Dual Gigabit	3	Aug 2008
7943 - E1U	1 x Opteron 2344	1.7GHz/QC	2MB	CD-RW/DVD	4x1GB	Open/SAS/SATA	6-3.5"HS	4x7	Dual Gigabit	3	Aug 2008
7943 - E2U	1 x Opteron 2352	2.1GHz/QC	2MB	CD-RW/DVD	4x1GB	Open/SAS/SATA	8-2.5"HS	4x10	Dual Gigabit	3	Aug 2008

Positioning Processor(s) **Rack optimized, Quad-Core, Dual-Socket business performance server**
 Up to two AMD® Opteron 2000 Series Quad-Core Processors up to 2.3GHz¹ / simultaneously supports 32 and 64-bit computing
L2 cache **512KB** / per core / at processor speed
SMP support Implementation **2-way SMP** / up to two Opteron Processors (same speed cache size required)
 Systemboard contains two AM2 sockets, sixteen memory DIMM slots, integrated SAS & SATA, dual ethernet, graphics, one PCI-E x4 slot, two PCI-E x8 slots and one HyperTransport (HTx) slot via riser card

Memory **2 GB** std / 32GB max¹³ per processor (64GB max per dual cpu system) / *single cpu system*: two slots used, six slots available; *dual cpu system*: four slots used, twelve slots available / **PC-5300 667MHz registered 240-pin DDR2-SDRAM RDIMMs** / sixteen DIMM gold-connector slots on systemboard / DIMMs must be installed in matched pairs [a bank] / dual channel / two-way interleaving / **Error Checking and Correcting (ECC)** via 16-bit Checksum / **Chipkill™** on 1, 2 and 4GB DIMMs / online hot-spare memory / hardware scrubbing

SAS controller **Adaptec® AIC-9580W / dual channel SAS controller / eight port SAS** (300MB/sec SAS) / hot-swap / on planar / PCI-Express / supports **RAID 0, 1 & 10** / optional IBM ServeRAID™-8k Adaptor for low-cost RAID 0, 1, 1E, 10, 5 & 6 (installed on reserved internal connector)
SAS connectors One internal connection wired to DASD backplane
SATA disk controller **Integrated SATA II controller** / provided by HT1000 South Bridge / four port
IDE controller/cable Enhanced IDE/ATA 100 controller integrated in South Bridge / one connector on planar / one 1-drop IDE cable (CD-RW/DVD-ROM)
Disk - capacity None standard / supports 7200-15000 rpm disks / one backplane
Disk - bays Some: six hot-swap 3.5" SAS HDD (4 3.5" HDD bays w/tape option) / some: eight hot-swap 2.5" SAS HDD / filler panels installed in each disk bay
Tape backup Optional internal and external / 3.5" / USB or SATA

Mechanical Chipset **EIA 19" Rack (2U⁴)** / rack-mount only / supported in IBM NetBAY™ Rack products / no rack to tower conversion
ServerWorks™ Chipset / HT2100 System I/O Controller provides: two PCI-Express x8 slot, one PCI-Express x4 slot, HyperTransport bridge to HT1000 South Bridge / **HT1000 South Bridge** provides: PCI-X, USB(2.0), ATI video, SATA, Dual GB ethernet, IDE and LPC bus to NS PC87427 for Super I/O
Bus slots (See detail below) one full-height, full-length HTx, two low profile PCI-E x8 and one low profile PCI-E x4 / option to convert HTx to PCI-X or PCI-E x16 slot
Ethernet Dual Gigabit Ethernet ports / Broadcom® 5706 / two full gigabit ethernet MAC and PHY layer functions / on planar / PCI-X 64-bit 100MHz / TCP/IP offload engine (TOE) / full duplex / Wake on LAN® / two rear RJ-45 ports
Optical / diskette Ports 24x/10x/24x/8x CD-RW/DVD / IDE / *Diskette* none (USB diskette optional)
Graphics Front: two USB (Vers 2.0), DB-15 graphics / Rear: four USB (Vers 2.0), serial (9-pin), two ethernet (RJ-45), system manage-
Keyboard / mouse None standard (because rack-based) / USB only

Security Power-on and administrator passwords / unattended boot / selectable boot
Systems mgmt **IBM Integrated Baseboard Management Controller (BMC)** / H82166 / IPMI 2.0 / **IBM Active Energy Manager™**
Diagnostics **Drop down Light Path Diagnostics** panel providing LED map to failing part (located on front panel)
Software **ServerGuide™** (CD-ROM installation and configuration utilities), IBM Director™, and others
Power supply *Std/Max*: one/two 835 watt hot-swap / rear access / auto restart / redundant with two power supplies / auto-sensing
Fans **Calibrated Vectored Cooling™** Std: five fans; Max: ten (five fans with optional second power supply) / redundant with ten fans installed; All: variable speed / hot-swap / PFA
Prerequisites Monitor, keyboard, mouse, disk, rack, OS

Quad Core AMD Opteron Processor Model 2344	46M2282
Quad Core AMD Opteron Processor Model 2352	44R5930
Quad Core AMD Opteron Processor Model 2356	44R5932
1GB (2x512) PC2-5300 CL5 ECC DDR2 RDIMM	41Y2759
2GB (2x1GB) PC2-5300 CL5 ECC DDR2 RDIMM	41Y2762
4GB (2x2GB) PC2-5300 CL5 ECC DDR2 RDIMM	41Y2765
8GB (2x4GB) PC2-5300 CL5 ECC DDR2 RDIMM	41Y2768
IBM 73GB 10K 3.5" SAS Hot-Swap HDD	40K1039
IBM 146GB 10K 3.5" SAS Hot-Swap HDD	40K1040
IBM 300GB 10K 3.5" SAS Hot-Swap HDD	40K1041
IBM 36GB 15K 3.5" SAS Hot-Swap HDD	40K1042
IBM 73GB 15K 3.5" SAS Hot-Swap HDD	40K1043
IBM 146GB 15K 3.5" SAS Hot-Swap HDD	40K1044
IBM 36GB 15K SAS SFF Hot-Swap HDD	40K1051
IBM 73GB 15K SAS SFF Hot-Swap HDD	40K1052
IBM 500GB 7.2K 3.5" SATA Hot-Swap HDD	39M4530
IBM 750GB 3.5" SATA Hot-Swap HDD	43W7576
IBM SAS HBA Controller	25R8060
PCI-E x16 Riser Card	40K7428
PCI-X Riser Card	40K7427
IBM Remote Supervisor Adapter II Slimline	39Y9566
IBM ServeRAID 8k SAS Controller	25R8064
Qlogic Infinipath HTx Infiniband Adapter	41Y4519
835W Redundant Power Supply (US)	40K1905

- H 1.72" x W 17.3" x D 25.7" (H 43.7mm x W 439.9mm x D 653.3mm)
- 26 to 32 pounds
- Stealth black color
- Quick release adapter slots (no screws)
- Configuration/Setup Utility: F1 at startup
- Diagnostics (PC-Doctor™): F2 at startup
- Network Boot: F12 at startup

- Front indicators LEDs: Power-on LED, HDD activity LED, locator LED, system 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

Other options at ibm.com/products/us

2U Rack with 2.5" SAS

Bay	Height	Access	Optical	Media	Hot-swap	Open
Bay 1	5.25", 0.5"	access,	slim CD-RW/DVD-ROM			
Bay 2	3.5", 2"	access,	open for tape drive			
Bay 3	2.5", SFF	1",	access,	hot-swap,	open	
Bay 4	2.5", SFF	1",	access,	hot-swap,	open	
Bay 5	2.5", SFF	1",	access,	hot-swap,	open	
Bay 6	2.5", SFF	1",	access,	hot-swap,	open	
Bay 7	2.5", SFF	1",	access,	hot-swap,	open	
Bay 8	2.5", SFF	1",	access,	hot-swap,	open	
Bay 9	2.5", SFF	1",	access,	hot-swap,	open	
Bay 10	2.5", SFF	1",	access,	hot-swap,	open	

Maximum internal disk capacity¹³:
 4.5TB with six 750GB SATA disks or • = Hot-swap (HS)
 2.4TB with six 300GB SAS disks

2U Rack with 3.5" SAS/SATA

Bay	Height	Access	Optical	Media	Hot-swap	Open
Bay 1	5.25", 0.5"	access,	slim CD-RW/DVD-ROM			
Bay 2	3.5", SL 1"	access,	hot-swap,	open		
Bay 3	3.5", SL 1"	access,	hot-swap,	open		
Bay 4	3.5", SL 1"	access,	hot-swap,	open		
Bay 5	3.5", SL 1"	access,	hot-swap,	open		
Bay 6	3.5", SL 1"	access,	hot-swap,	open		
Bay 7	3.5", SL 1"	access,	hot-swap,	open		

- Slot 1: Riser slot for PCI-Express x16(x16 Links), 64-bit 133MHz 3.3v PCI-X or HTx risers
- Slot 2: low-profile, PCI-Express x8(x4 Links)
- Slot 3: low-profile, PCI-Express x8(x8 Links)
- Slot 4: low-profile, PCI-Express x8(x8 Links)

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
 - 1 year IOR 9x5, 4 hr avg response (ServicePac® part num 69P9403)
 - 2 year IOR 24x7, 4 hr avg response (ServicePac part num 96P2123)
 - 2 year IOR 24x7, 2 hr avg response (ServicePac part num 96P2124)
 - 3 year IOR 24x7, 4 hr avg response (ServicePac part num 21P2078)
 - 3 year IOR 9x5, NBD response (ServicePac part num 69P9258)
- Other ServicePac options at www.ibm.com/services/us/its/pdf/wamomxeu.pdf
- 24x7¹⁴ toll-free support for warranty issues during the warranty period⁵

IBM® Type-model	Qty x Processor	Speed/Core	L2 cache	Watts	CPU/Memory cards	Memory	DIMM slots	Disk controller	Mechanical	Slots x bays	Hot-swap pwr supplies	Warranty (yrs.)	Available date
8877-1RY	1 x Opteron™ 8212	2.0GHz/DC	2MB	95W	One	2x512MB	8	SAS	4U ⁴ rack	7x5	1 x 1500W	3	Sep 2006
8877-2RY	1 x Opteron 8214	2.2GHz/DC	2MB	95W	One	2x512MB	8	SAS	4U rack	7x5	1 x 1500W	3	Sep 2006
8877-4RY	2 x Opteron 8218	2.6GHz/DC	2MB	95W	Two	4x1GB	16	SAS	4U rack	7x5	1 x 1500W	3	Sep 2006
8877-5RY	2 x Opteron 8220 SE	2.8GHz/DC	2MB	120W	Two	4x1GB	16	SAS	4U rack	7x5	1 x 1500W	3	Sep 2006
8877-3RY	1 x Opteron 8216	2.4GHz/DC	2MB	95W	One	2x512MB	8	SAS	4U rack	7x5	1 x 1500W	3	Apr 2007
8877-5SY	2 x Opteron 8220	2.8GHz/DC	2MB	95W	One	4x1GB	8	SAS	4U rack	7x5	1 x 1500W	3	Apr 2007
8877-6RY	2 x Opteron 8222 SE	3.0GHz/DC	2MB	120W	One	4x1GB	8	SAS	4U rack	7x5	1 x 1500W	3	May 2007
8677-E4U	2 x Opteron 8218	2.6GHz/DC	2MB	95W	One	4x2GB	8	SAS	4U rack	7x5	1 x 1500W	3	Apr 2007
8877-7RY	2 x Opteron 8224 SE	3.2GHz/DC	2MB	120W	One	4x1GB	8	SAS	4U rack	7x5	1 x 1500W	3	Oct 2007

Positioning Processors **Up to 4-way, high performance server with maximum memory availability and superior performance per watt**
 Up to two AMD® Opteron 8000 Series Dual Core Processor up to 3.0GHz / simultaneously supports 32-bit and 64-bit computing
 L2 cache **1MB** / per core / at processor speed
 Processor upgrade Implementation **4-way SMP** / up to four Opteron Processors (same speed/cache size) / Dual Core Capable
 System board contains four CPU/Memory Card Connectors, one HTx slot, four PCI-Express slots, two PCI-X slots, one dedicated slot for optional RSA II daughter card and integrated SAS, dual ethernet, graphics

Active Memory™ **1, 4 or 8GB** std / 32GB max per processor (128GB max per chassis using four cpu/memory cards) / one cpu/memory card standard (up to four) with 8 DIMM gold-connector slots each / DIMMs must be installed in matched pairs / PC-5300 667MHz registered 240-pin DDR2-SDRAM RDIMMs / two-way interleaving / **Error Checking and Correcting (ECC)** via 16-bit Checksum / **Xcelerated Memory Technology™ / Chipkill™** on 1, 2 and 4GB DIMMs / online hot-spare memory / hardware scrubbing

SAS disk controller **Adaptec® AIC-9580W** SAS controller (3Gb/sec) / dual channel / four port / on planar / PCI-Express / **RAID 0, 1 & 10** / optional IBM ServeRAID™-8k Adaptor for low-cost RAID 0, 1, 1E, 5, 00, 10, 1E0, 50 (installed on reserved internal connector)
 SAS connectors One internal connection wired to DASD backplane
 IDE controller / cabling Enhanced IDE ATA-100 controller integrated in South Bridge / one connector on planar / one 1-drop IDE cable (DVD-ROM)
 Disk - capacity Supports up to 300GB 10K rpm disks
 Disk - bays **Four** 3.5" hot-swap bays / converged tray / SAS connectors
 Mechanical **EIA 19" Rack (4U⁴)** / rack-mount only / supported in IBM NetBAY™ Rack products / no rack to tower conversion

Chipset **ServerWorks™ Chipset** / Two HT2100 PCI-Express Host Bridges / **HT2100A** provides: one PCI-Express x8 slot, one PCI-Express x4 slot, PCI-Express bridge to Adaptec SAS, PCI-Express bridge to Dual GB ethernet and HyperTransport bridge to HT1000 South Bridge / **HT2100B** provides: one PCI-Express x16 slot and one PCI-Express x8 slot / **HT1000 South Bridge** provides: two PCI-X 1.0 slots at up to 64-bit/133MHz, USB(2.0), ATI video, IDE and LPC bus to NS PC87427 for Super I/O

Bus Slots (See below) Four total PCI-Express / two PCI-X at up to 133 MHz / one HTx / one dedicated slot for optional RSA II daughter card

DVD-ROM / diskette 8X⁶ Slim DVD-ROM / none
 Ethernet Dual Broadcom® 5708C 10/100/1000 ethernet controllers / on systemboard / two full gigabit ethernet MAC and PHY layer functions / PCI-Express / full duplex / Wake on LAN® / Alert Standard Format 2.0 / two RJ-45 ports in rear
 Graphics controller **XVGA / ATI® RN50(ES1000)** / on planar / 16MB SDRAM std/max / 32-bit 33MHz PCI 2.2 bus
 Ports **Rear:** RSA ethernet, RSA serial, one USB(2.0), keyboard, mouse, analog DB-15 graphics, two ethernet, std. serial RS-485 / **Front:** two USB(2.0)

Security Systems mgmt Power-on and administrator passwords / unattended boot / selectable boot
 BMC standard / IPMI 2.0 / **Active Energy Manager™** / **Remote Supervisor Adapter II Slimline** optional (std on E4U) / PCI adapter / includes 10/100 ethernet and serial connectors / provides remote console and mgmt / power on/off system / monitors power status, op system, temperature, disks, fans, power supplies

Diagnostics **Drop down 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

Keyboard / mouse None standard (because rack-based)
 Power supplies **Std:** one 1500 watt hot-swap(240 VAC); **Max:** two hot-swap / redundant with two power supplies (some configurations) / worldwide / voltage-sensing / auto-restart / PFA

Cooling fans **Calibrated Vectored Cooling™ Std:** three fans; **Max:** six / hot-swap, redundant, multi-speed fans / one additional fan in each power supply / PFA / fan failure signals Diagnostic LED and management processor / redundant fan kit required for three or more processors

Dual Core AMD Opteron Processor Model 8212	40K1200
Dual Core AMD Opteron Processor Model 8214	40K1201
Dual Core AMD Opteron Processor Model 8216	43W7244
Dual Core AMD Opteron Processor Model 8218	40K1202
Dual Core AMD Opteron Processor Model 8220	43W7246
Dual Core AMD Opteron Processor Model 8220SE	40K1203
Dual Core AMD Opteron Processor Model 8222SE	43W7247
Dual Core AMD Opteron Processor Model 8224SE	44R6036
1GB (2x512) PC2-5300 CL5 ECC DDR2 RDIMM Kit	41Y2759
2GB (2x1GB) PC2-5300 CL5 ECC DDR2 RDIMM Kit	41Y2762
4GB (2x2GB) PC2-5300 CL5 ECC DDR2 RDIMM Kit	41Y2765
8GB (2x4GB) PC2-5300 CL5 ECC DDR2 RDIMM Kit	41Y2768
IBM 73GB 10K HS 3.5" SAS HDD	40K1039
IBM 146GB 10K HS 3.5" SAS HDD	40K1040
IBM 300GB 10K HS 3.5" SAS HDD	40K1041
IBM ServeRAID 8k SAS Controller	25R8064
1500W US Power Supply	40K7543
Redundant Fan Kit - 3 Fans	40K7545
Processor Pass Thru Card	40K7547

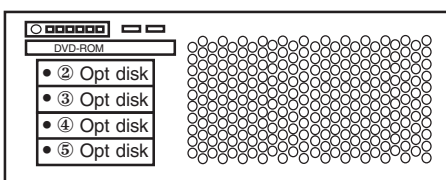
Max BTU Output:
 Ship Config: 409 Btu/hr (120 watts)
 Full Config: 1366 Btu/hr (400 watts)

- ⊖ Dimensions: H7" x W19" x D28"
- ⊖ Dimensions: H178mm x W483mm x D711mm
- ⊖ Weight: 26 to 32lbs; 11.8 to 14.6kg
- ⊖ Stealth black color
- ⊖ Tool-free serviceability
- ⊖ Access adapters, power supplies, processors, memory and systemboard from top
- ⊖ Setup Program by pressing F1 at startup
- ⊖ Diagnostics (PC-Doctor) by pressing F2 at startup
- ⊖ Drop Down 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: 1.2TB with four 300GB² hot-swap SAS 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 69P9507
 - 3 year IOR 24x7, 2 hr avg response 69P9508
 - 1 year IOR 9x5, NBD response 69P9398
 - 2 year IOR 9x5, NBD response 96P2117
- ⊖ Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- ⊖ 24x7¹⁴ toll-free support for warranty issues during the warranty period³



Bay ① 5.25", 0.5", access, std DVD-ROM
 Bay ② 3.5", SL 1", access, hot-swap, open
 Bay ③ 3.5", SL 1", access, hot-swap, open
 Bay ④ 3.5", SL 1", access, hot-swap, open
 Bay ⑤ 3.5", SL 1", access, hot-swap, open

Available expansion slots:
 Slot 1 - fullsize, PCI-Express x16
 Slot 2 - fullsize, PCI-Express x8
 Slot 3 - fullsize, PCI-Express x8
 Slot 4 - fullsize, PCI-Express x4
 Slot 5 - fullsize, 64-bit, PCI-X 1.0, 100/133MHz*
 Slot 6 - fullsize, 64-bit, PCI-X 1.0, 100/133MHz*
 RSA slot - supports RSA II slimline adapter
 *If one PCI-X 133MHz card is plugged into slot 6 and slot 5 is empty, then it will run at 133MHz. If one PCI-X 133 MHz card is plugged into slot 5 and 6 is empty, then it will run at 100MHz. If two 133MHz cards are plugged into slots 5 and 6, they will run at 100MHz

IBM® Type-model	Qty x Processor	Speed/Core	L2 cache	Watts	CPU/Memory cards	Memory	DIMM slots	Disk controller	Mechanical	Slots x bays	Hot-swap pwr supplies	Warranty (yrs.)	Available date
7163-1RU	2 x Opteron™ 8350	2.0GHz/QC	2MB	115W	Two	4x1GB	16	SAS	4U ⁴ rack	7x5	1 x 1500W	3	June 2008
7163-3RU	2 x Opteron 8356	2.3GHz/QC	2MB	115W	Two	4x1GB	16	SAS	4U rack	7x5	1 x 1500W	3	June 2008
7163-5RU	2 x Opteron 8360 SE	2.5GHz/QC	2MB	137W	Two	4x1GB	16	SAS	4U rack	7x5	1 x 1500W	3	July 2008
7163-ARU	2 x Opteron 8378	2.4GHz/QC	2MB	75W	Two	4x1GB	16	SAS	4U rack	7x5	1 x 1500W	3	Mar 2009
7163-DRU	2 x Opteron 8384	2.7GHz/QC	2MB	75W	Two	4x1GB	16	SAS	4U rack	7x5	1 x 1500W	3	Mar 2009

Positioning Processors L2 cache Processor upgrade Implementation **Up to 4-way, high performance server with maximum memory availability and superior performance per watt**
Up to two AMD® Opteron 8000 Series Quad-Core Processor up to 2.7GHz¹ / simultaneously supports 32 and 64-bit computing
512KB / per core / at processor speed
4-way SMP / up to four Opteron Processors (same speed/cache size)
System board contains four CPU/Memory Card Connectors, one HTX slot, four PCI-Express slots, two PCI-X slots, one dedicated slot for optional RSA II daughter card and integrated SAS, dual ethernet, graphics

Active Memory™ **4GB** std / 32GB max per processor (128GB max per chassis using four cpu/memory cards) / two cpu/memory card standard (up to four) with 8 DIMM gold-connector slots each / DIMMs must be installed in matched pairs / PC2-5300 667MHz registered 240-pin DDR2-SDRAM RDIMMs / two-way interleaving / **Error Checking and Correcting (ECC)** via 16-bit Checksum / **Xcelerated Memory Technology™ / Chipkill™** on 1, 2 and 4GB DIMMs / online hot-spare memory / hardware scrubbing

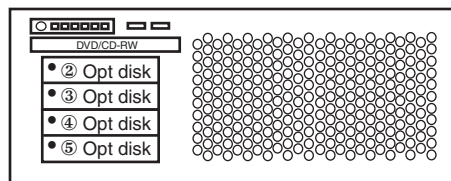
SAS disk controller **Adaptec® AIC-9580W** SAS controller (3Gb/sec) / dual channel / four port / on planar / PCI-Express / **RAID 0, 1 & 10** / optional IBM ServeRAID™.8k Adaptor for low-cost RAID 0, 1, 1E, 5, 00, 10, 1E0, 50 (installed on reserved internal connector)
SAS connectors One internal connection wired to DASD backplane
IDE controller / cabling Enhanced IDE ATA-100 controller integrated in South Bridge / one connector on planar / one 1-drop IDE cable (DVD-ROM)
Disk - capacity Supports up to 300GB 10K rpm disks
Disk - bays **Four 3.5"** hot-swap bays / converged tray / SAS connectors
Mechanical **EIA 19" Rack (4U⁴)** / rack-mount only / supported in IBM NetBAY™ Rack products / no rack to tower conversion

Chipset **ServerWorks™ Chipset** / Two HT2100 PCI-Express Host Bridges / **HT2100A** provides: one PCI-Express x8 slot, one PCI-Express x4 slot, PCI-Express bridge to Adaptec SAS, PCI-Express bridge to Dual GB ethernet and HyperTransport bridge to HT1000 South Bridge / **HT2100B** provides: one PCI-Express x16 slot and one PCI-Express x8 slot / **HT1000 South Bridge** provides: two PCI-X 1.0 slots at up to 64-bit/133MHz, USB(2.0), ATI video, IDE and LPC bus to NS PC87427 for Super I/O (See below) Four total PCI-Express / two PCI-X at up to 133 MHz / one HTx / one dedicated slot for optional RSA II daughter card

Optical / diskette Ethernet **24X-10x⁶ Slim DVD/CD-RW** / none
Dual Broadcom® 5708C Gigabit Ethernet controllers / on systemboard / two full gigabit ethernet MAC and PHY layer functions / PCI-Express / full duplex / Wake on LAN® / Alert Standard Format 2.0 / two RJ-45 ports in rear
Graphics controller ATI® RN50(ES1000) / on planar / 16MB SDRAM std/max / 32-bit 33MHz PCI 2.2 bus
Ports **Rear:** RSA ethernet, RSA serial, one USB(2.0), keyboard, mouse, analog DB-15 graphics, two ethernet, std. serial RS-485 / **Front:** two USB(2.0)

Security Systems mgmt Power-on and administrator passwords / unattended boot / selectable boot
BMC standard / IPMI 2.0 / **Active Energy Manager™ / Remote Supervisor Adapter II Slimline** optional / PCI adapter / includes 10/100 ethernet and serial connectors / provides remote console and mgmt / power on/off system / monitors power status, op system, temperature, disks, fans, power supplies
Diagnostics **Drop down 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

Keyboard / mouse	None standard (because rack-based)	Quad Core AMD Opteron Processor Model 8378	46M2489
Power supplies	Std: one 1500 watt hot-swap(240 VAC); Max: two hot-swap / redundant with two power supplies (some configurations) / worldwide / voltage-sensing / auto-restart / PFA	Quad Core AMD Opteron Processor Model 8380	46M2492
Cooling fans	Calibrated Vektored Cooling™ Std: three fans; Max: six / hot-swap, redundant, multi-speed fans / one additional fan in each power supply / PFA / fan failure signals Diagnostic LED and management processor / redundant fan kit required for three or more processors	Quad Core AMD Opteron Processor Model 8382	46M2495
		Quad Core AMD Opteron Processor Model 8384	46M2498
		Quad Core AMD Opteron Processor Model 8350	43R6295
		Quad Core AMD Opteron Processor Model 8356	43W7406
		Quad Core AMD Opteron Processor Model 8360SE	43W7408
		2GB (2x1GB) PC2-5300 CL5 ECC DDR2 RDIMM	41Y2762
		4GB (2x2GB) PC2-5300 CL5 ECC DDR2 RDIMM	46C7539
8GB (2x4GB) PC2-5300 CL5 ECC DDR2 RDIMM	46C7538		
	IBM 73GB 10K HS 3.5" SAS HDD	40K1039	
	IBM 146GB 10K HS 3.5" SAS HDD	40K1040	
	IBM 300GB 10K HS 3.5" SAS HDD	40K1041	
	IBM ServeRAID 8k SAS Controller	25R8064	
	1500W US Power Supply	40K7543	
	Redundant Fan Kit - 3 Fans	40K7545	
	Processor Pass Thru Card	40K7547	
	Other options at ibm.com/products/us		



- Bay ① 5.25", 0.5", access, std DVD/CD-RW
- Bay ② 3.5", SL 1", access, hot-swap, open
- Bay ③ 3.5", SL 1", access, hot-swap, open
- Bay ④ 3.5", SL 1", access, hot-swap, open
- Bay ⑤ 3.5", SL 1", access, hot-swap, open

- Available expansion slots:
- Slot 1 - fullsize, PCI-Express x16
 - Slot 2 - fullsize, PCI-Express x8
 - Slot 3 - fullsize, PCI-Express x8
 - Slot 4 - fullsize, PCI-Express x4
 - Slot 5 - fullsize, 64-bit, PCI-X 1.0, 100/133MHz*
 - Slot 6 - fullsize, 64-bit, PCI-X 1.0, 100/133MHz*
- RSA slot - supports RSA II slimline adapter
*If one PCI-X 133MHz card is plugged into slot 6 and slot 5 is empty, then it will run at 133MHz. If one PCI-X 100MHz card is plugged into slot 5 and slot 6 is empty, then it will run at 100MHz. If two 133MHz cards are plugged into slots 5 and 6, they will run at 100MHz

- Dimensions: H7" x W19" x D28"
- Dimensions: H178mm x W483mm x D711mm
- Weight: 26 to 32lbs; 11.8 to 14.6kg
- Stealth black color
- Tool-free serviceability
- Access adapters, power supplies, processors, memory and systemboard from top
- Setup Program by pressing F1 at startup
- Diagnostics (PC-Doctor) by pressing F2 at startup
- Drop Down 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

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 number 96P2253
 - 3 year IOR 24x7, 2 hr avg response ServicePac® part number 96P2254
 - 1 year IOR 9x5, NBD response ServicePac® part number 69P9402
 - 2 year IOR 9x5, NBD response ServicePac® part number 96P2121
- Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- 24x7¹⁴ toll-free support for warranty issues during the warranty period³

All models: Maximum internal disk capacity: 1.2TB with four 300GB² hot-swap SAS disks

IBM® Type-model	Qty x Processor	Speed/Core	L2 cache	Watts	CPU/Memory cards	Memory	DIMM slots	Disk controller	Mechanical	Slots x bays	Hot-swap pwr supplies	Warranty (yrs.)	Available date
7163-1RU	2 x Opteron™ 8350	2.0GHz/QC	2MB	115W	Two	4x1GB	16	SAS	4U ⁴ rack	7x5	1 x 1500W	3	June 2008
7163-3RU	2 x Opteron 8356	2.3GHz/QC	2MB	115W	Two	4x1GB	16	SAS	4U rack	7x5	1 x 1500W	3	June 2008
7163-5RU	2 x Opteron 8360 SE	2.5GHz/QC	2MB	137W	Two	4x1GB	16	SAS	4U rack	7x5	1 x 1500W	3	July 2008
7163-ARU	2 x Opteron 8378	2.4GHz/QC	2MB	75W	Two	4x1GB	16	SAS	4U rack	7x5	1 x 1500W	3	Mar 2009
7163-DRU	2 x Opteron 8384	2.7GHz/QC	2MB	75W	Two	4x1GB	16	SAS	4U rack	7x5	1 x 1500W	3	Mar 2009
7163-DBU	3 x Opteron 8384	2.7GHz/QC	2MB	75W	Three	6x2GB	24	SAS	4U rack	7x5	1 x 1500W	3	Mar 2009

Positioning Processors L2 cache Processor upgrade Implementation **Up to 4-way, high performance server with maximum memory availability and superior performance per watt**
Up to three AMD® Opteron 8000 Series Quad-Core Processor up to 2.7GHz¹ / simultaneously supports 32 and 64-bit computing
512KB / per core / at processor speed
4-way SMP / up to four Opteron Processors (same speed/cache size)
System board contains four CPU/Memory Card Connectors, one HTX slot, four PCI-Express slots, two PCI-X slots, one dedicated slot for optional RSA II daughter card and integrated SAS, dual ethernet, graphics

Active Memory™ **4GB** std / 32GB max per processor (128GB max per chassis using four cpu/memory cards) / two pr three cpu/memory card standard (up to four) with 8 DIMM gold-connector slots each / DIMMs must be installed in matched pairs / PC2-5300 667MHz registered 240-pin DDR2-SDRAM RDIMMs / two-way interleaving / **Error Checking and Correcting (ECC)** via 16-bit Checksum / **Xcelerated Memory Technology™ / Chipkill™** on 1, 2 and 4GB DIMMs / online hot-spare memory / hardware scrubbing

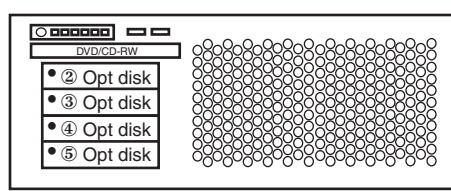
SAS disk controller **Adaptec® AIC-9580W** SAS controller (3Gb/sec) / dual channel / four port / on planar / PCI-Express / **RAID 0, 1 & 10** / optional IBM ServeRAID™-8k Adaptor for low-cost RAID 0, 1, 1E, 5, 00, 10, 1E0, 50 (installed on reserved internal connector)
SAS connectors One internal connection wired to DASD backplane
IDE controller / cabling Enhanced IDE ATA-100 controller integrated in South Bridge / one connector on planar / one 1-drop IDE cable (DVD-ROM)
Disk - capacity Supports up to 300GB 10K rpm disks
Disk - bays **Four 3.5"** hot-swap bays / converged tray / SAS connectors
Mechanical **EIA 19" Rack (4U⁴)** / rack-mount only / supported in IBM NetBAY™ Rack products / no rack to tower conversion

Chipset **ServerWorks™ Chipset** / Two HT2100 PCI-Express Host Bridges / **HT2100A** provides: one PCI-Express x8 slot, one PCI-Express x4 slot, PCI-Express bridge to Adaptec SAS, PCI-Express bridge to Dual GB ethernet and HyperTransport bridge to HT1000 South Bridge / **HT2100B** provides: one PCI-Express x16 slot and one PCI-Express x8 slot / **HT1000 South Bridge** provides: two PCI-X 1.0 slots at up to 64-bit/133MHz, USB(2.0), ATI video, IDE and LPC bus to NS PC87427 for Super I/O (See below) Four total PCI-Express / two PCI-X at up to 133 MHz / one HTx / one dedicated slot for optional RSA II daughter card

Optical / diskette Ethernet **24X-10x⁶ Slim DVD/CD-RW** / none
Dual Broadcom® 5708C Gigabit Ethernet controllers / on systemboard / two full gigabit ethernet MAC and PHY layer functions / PCI-Express / full duplex / Wake on LAN® / Alert Standard Format 2.0 / two RJ-45 ports in rear
Graphics controller ATI® RN50(ES1000) / on planar / 16MB SDRAM std/max / 32-bit 33MHz PCI 2.2 bus
Ports **Rear:** RSA ethernet, RSA serial, one USB(2.0), keyboard, mouse, analog DB-15 graphics, two ethernet, std. serial RS-485 / **Front:** two USB(2.0)

Security Systems mgmt Power-on and administrator passwords / unattended boot / selectable boot
BMC standard / IPMI 2.0 / **Active Energy Manager™ / Remote Supervisor Adapter II Slimline** optional / PCI adapter / includes 10/100 ethernet and serial connectors / provides remote console and mgmt / power on/off system / monitors power status, op system, temperature, disks, fans, power supplies
Diagnostics **Drop down 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

Keyboard / mouse	None standard (because rack-based)	Quad Core AMD Opteron Processor Model 8378	46M2489
Power supplies	Std: one 1500 watt hot-swap(240 VAC); Max: two hot-swap / redundant with two power supplies (some configurations) / worldwide / voltage-sensing / auto-restart / PFA	Quad Core AMD Opteron Processor Model 8380	46M2492
Cooling fans	Calibrated Vektored Cooling™ Std: three fans; Max: six / hot-swap, redundant, multi-speed fans / one additional fan in each power supply / PFA / fan failure signals Diagnostic LED and management processor / redundant fan kit required for three or more processors	Quad Core AMD Opteron Processor Model 8382	46M2495
		Quad Core AMD Opteron Processor Model 8384	46M2498
		Quad Core AMD Opteron Processor Model 8350	43R6295
		Quad Core AMD Opteron Processor Model 8356	43W7406
		Quad Core AMD Opteron Processor Model 8360SE	43W7408
		2GB (2x1GB) PC2-5300 CL5 ECC DDR2 RDIMM	41Y2762
		4GB (2x2GB) PC2-5300 CL5 ECC DDR2 RDIMM	46C7539
		8GB (2x4GB) PC2-5300 CL5 ECC DDR2 RDIMM	46C7538
	IBM 73GB 10K HS 3.5" SAS HDD	40K1039	
	IBM 146GB 10K HS 3.5" SAS HDD	40K1040	
	IBM 300GB 10K HS 3.5" SAS HDD	40K1041	
	IBM ServeRAID 8k SAS Controller	25R8064	
	1500W US Power Supply	40K7543	
	Redundant Fan Kit - 3 Fans	40K7545	
	Processor Pass Thru Card	40K7547	
	Other options at ibm.com/products/us		



- Bay ① 5.25", 0.5", access, std DVD/CD-RW
- Bay ② 3.5", SL 1", access, hot-swap, open
- Bay ③ 3.5", SL 1", access, hot-swap, open
- Bay ④ 3.5", SL 1", access, hot-swap, open
- Bay ⑤ 3.5", SL 1", access, hot-swap, open

Available expansion slots:
Slot 1 - fullsize, PCI-Express x16
Slot 2 - fullsize, PCI-Express x8
Slot 3 - fullsize, PCI-Express x8
Slot 4 - fullsize, PCI-Express x4
Slot 5 - fullsize, 64-bit, PCI-X 1.0, 100/133MHz*
Slot 6 - fullsize, 64-bit, PCI-X 1.0, 100/133MHz*
RSA slot - supports RSA II slimline adapter
*If one PCI-X 133MHz card is plugged into slot 6 and slot 5 is empty, then it will run at 133MHz. If one PCI-X 133 MHz card is plugged into slot 5 and 6 is empty, then it will run at 100MHz. If two 133MHz cards are plugged into slots 5 and 6, they will run at 100MHz

- Dimensions: H7" x W19" x D28"
- Dimensions: H178mm x W483mm x D711mm
- Weight: 26 to 32lbs; 11.8 to 14.6kg
- Stealth black color
- Tool-free serviceability
- Access adapters, power supplies, processors, memory and systemboard from top
- Setup Program by pressing F1 at startup
- Diagnostics (PC-Doctor) by pressing F2 at startup
- Drop Down 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

LIMITED WARRANTY³

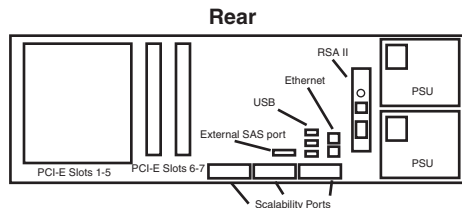
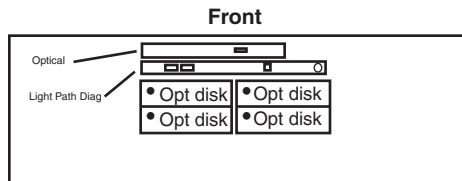
- 3 year parts and labor
- International Warranty Service³
- On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time⁷
- On site service upgrade options (in eligible locations):⁷
 - 3 year IOR 24x7, 4 hr avg response ServicePac® part number 96P2253
 - 3 year IOR 24x7, 2 hr avg response ServicePac® part number 96P2254
 - 1 year IOR 9x5, NBD response ServicePac® part number 69P9402
 - 2 year IOR 9x5, NBD response ServicePac® part number 96P2121
- Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- 24x7¹⁴ toll-free support for warranty issues during the warranty period³

All models: Maximum internal disk capacity: 1.2TB with four 300GB² hot-swap SAS disks

IBM® Type-model	Qty x Processor	Core	L2 cache	Memory	DIMM slots	Memory cards	RSA II	Disk controller	Mechanical	Slots x bays	Hot-swap pwr supplies	Warranty (yrs.)	Available date
7141-1RU	2 x Xeon™ MP E7210 2.4GHz	DC	2x4MB	4x1GB	16	Two	Std	SAS	4U ⁴ rack	7x5	2 x 1440W	3	Dec 2007
7141-2RU	2 x Xeon MP E7320 2.13GHz	QC	2x2MB	4x1GB	16	Two	Std	SAS	4U rack	7x5	2 x 1440W	3	Dec 2007
7141-3RU	2 x Xeon MP E7330 2.4GHz	QC	2x3MB	8x1GB	32	Four	Std	SAS	4U rack	7x5	2 x 1440W	3	Dec 2007
7141-4RU	2 x Xeon MP X7350 2.93GHz	QC	2x4MB	8x1GB	32	Four	Std	SAS	4U rack	7x5	2 x 1440W	3	Dec 2007

Processors	Two 64-bit Intel® Xeon™ Processor MP up to 2.4GHz¹Dual-Core / up to 2.93GHz²Quad-Core / All 1066MHz FSB / Extended Memory 64 Technology™ (EM64T)
L2 cache	2 x 2, 3 or 4 MB / on-die / at processor speed
Processor upgrade Implementation	4-way SMP / up to four Xeon Processors MP (same speed/cache size) System board contains four Intel 604-pin micro-PGA4 ZIF sockets, four memory board slots, two Active™ PCI-E x8 slots, five PCI-E x8 slots and integrated SAS, ethernet, graphics
Active Memory™	4 or 8GB std / 128GB max per chassis using high-capacity memory card / two or four memory cards standard (up to four) with 8 DIMM gold-connector slots each / DIMMs must be installed in matched pairs / PC2-5300 667MHz registered 240-pin DDR2-SDRAM DIMMs / Error Checking and Correcting (ECC) via 16-bit Checksum Chipkill™ / Memory ProteXion™ (redundant bit steering) and Memory Mirroring™ and Hot-swap (non-OS specific) / Hot-add (supported only with Microsoft® Windows™ Server 2003™)
SAS disk controller	Std: LSI® 1078 SAS Controller / Serial Attached SCSI (SAS) (3GB/sec) / PCI-E x8 / RAID 0,1 Optional: ServeRAID™ 10k / RAID 5, 5E, 50 & 6 / dedicated slot / dimm / battery backup
SAS connectors	Controller wired to SAS backplane / external 4x SAS port on rear
IDE controller	Enhanced IDE ATA-100 controller in ICH7 South Bridge
Disk - capacity	Supports up to 146GB 10K or 73GB 15K rpm disks
Disk - bays	Four 2.5" hot-swap bays / converged tray / 29-pin SAS connectors
Mechanical	EIA 19" rack models (4U⁴) x 28" deep / supported in NetBAY™ Racks
Chipset	IBM X4™ 4th Generation chipset / Integrated Processor and Memory Controller / Scalable from 4 to 16 sockets / Supports EM64T / provides 7 PCI-E x8 slots / supports optional ServeRAID Xi / Intel® I/O Controller Hub 7 (ICH7) South Bridge provides: IDE, USB, bus for Super I/O, Dual Port Broadcom 5709C, RSA2(video)
Slots	Two Active™ PCI-E x8 slots / slots available with power and attention indicator lights (optical sensors control power to slot) / hot replace, hot upgrade, hot expansion / separated by insulative plastic dividers / Five PCI-E x8 slots / all full height, half length
Optical / diskette	24x8x ⁶ CD-RW/DVD Combo / none
Ethernet	Broadcom® 5709C 10/100/1000 dual ethernet / on systemboard / PCI-E x4 / Wake on LAN® / Alert on LAN™ 2
Graphics controller	SVGA / ATI® RN50 (ES1000) / on planar / 16MB SDRAM std/max
Ports	Rear: RSA ethernet, RSA serial, three USB (2.0), DB-15 graphics, 4x SAS and two ethernet Front: two USB (2.0)
Security	Power-on and administrator passwords / unattended boot / selectable boot
System management	BMC standard / IPMI 2.0 / IBM Active Energy Manager™ / Remote Supervisor Adapter II Slimline std / PCI adapter / includes 10/100 ethernet 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 Card / 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

Keyboard / mouse	None standard (because rack-based)	
Power supplies	Std/Max: Two / 1440 watt (240 VAC) / rear access / hot-swap / redundant / worldwide / voltage-sensing / auto-restart / PFA	2GB PC2-5300 CL5 ECC DDR2 RDIMM (2x1GB) 41Y2762 4GB PC2-5300 CL5 ECC DDR2 RDIMM (2x2GB) 41Y2771 8GB PC2-5300 CL5 ECC DDR2 RDIMM (2x4GB) 41Y2768
Cooling fans	Six hot-swap, redundant, multi-speed fans / one additional fan in each power supply / PFA / fan failure signals Diagnostic LED and mgmt processor	IBM Active Memory 8-slot Expansion Card 44E4252 IBM Internal Removable Flash Drive 44E4251 Xeon E7210 2.4GHz/8MB L2/Dual Core Proc 44E4244 Xeon E7320 2.13GHz/4MB L2/Quad Core Proc 44E4241 Xeon E7330 2.4GHz/6MB L2/Quad Core Proc 44E4242 Xeon X7350 2.93GHz/8MB L2/Quad Core Proc 44E4243 IBM ServeRAID-MR10k SAS Controller 43W4280 IBM 73GB 10K 2.5" SAS Hot-swap HDD 40K1052 IBM 146GB 10K 2.5" SAS Hot-swap HDD 43X0824 IBM 73GB 15K 2.5" SAS Hot-Swap HDD 43X0837



- Bay ① 5.25", 0.5" access, CD-RW/DVD-ROM
- Bay ② 2.5", SL 1" access, hot-swap, open
- Bay ③ 2.5", SL 1" access, hot-swap, open
- Bay ④ 2.5", SL 1" access, hot-swap, open
- Bay ⑤ 2.5", SL 1" access, hot-swap, open

- Five available PCI-E x8 slots:
- Slot 1 - full-height, half-length, PCI-E x8
 - Slot 2 - full-height, half-length, PCI-E x8
 - Slot 3 - full-height, half-length, PCI-E x8
 - Slot 4 - full-height, half-length, PCI-E x8
 - Slot 5 - full-height, half-length, PCI-E x8

- Two available Hot-swap PCI-E x8 slots:
- Slot 6 - full-height, half-length, PCI-E x8, hot-swap
 - Slot 7 - full-height, half-length, PCI-E x8, hot-swap

- ⊗ Dimensions: H6.8" x W17.46" x D28.35"
- ⊗ Dimensions: H172mm x W443mm x D720mm
- ⊗ Weight: 70 to 95lbs; 31.75 to 43.2kg
- ⊗ Stealth black color
- ⊗ Tool-free serviceability
- ⊗ Access power supplies from rear
- ⊗ Access adapters, processors, memory and systemboard from top
- ⊗ Setup Program by pressing F1 at startup
- ⊗ Diagnostics (DSA) by pressing F2 at startup
- ⊗ SAS Select by pressing Ctrl+C at startup
- ⊗ Drop Down 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: 584GB with four 146GB² hot-swap SAS disks

Other options at ibm.com/products/us/

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 10N3059
 - 3 year IOR 24x7, 2 hr avg response 10N3060
 - 4 year IOR 9x5, NBD response 10N3061
 - 5 year IOR 9x5, NBD response 10N3065
- ⇒ Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- ⇒ 24x7¹⁴ toll-free support for warranty issues during the warranty period³

IBM® Type-model	Qty x Processor	Core	L2 cache	Memory	DIMM slots	Memory cards	RSA II controller	Disk controller	Mechanical	Slots x bays	Hot-swap pwr supplies	Warranty (yrs.)	Available date
7233-2RU	2 x Xeon™ MP E7420 2.13GHz	4	2x3MB	4x1GB	16	Two	Std	SAS	4U ⁴ rack	7x5	2 x 1440W	3	Oct 2008
7233-5RU	2 x Xeon MP E7450 2.4GHz	6	3x3MB	8x1GB	32	Four	Std	SAS	4U rack	7x5	2 x 1440W	3	Oct 2008
7233-6RU	2 x Xeon MP X7460 2.66GHz	6	3x3MB	8x1GB	32	Four	Std	SAS	4U rack	7x5	2 x 1440W	3	Oct 2008
7233-7RU	2 x Xeon MP L7445 2.13GHz	4	2x3MB	4x1GB	16	Two	Std	SAS	4U rack	7x5	2 x 1440W	3	Oct 2008
7233-E5U*	2 x Xeon MP E7450 2.4GHz	6	3x3MB	8x2GB	32	Four	Std	SAS	4U rack	7x5	2 x 1440W	3	Oct 2008
7233-E2U*	1 x Xeon MP E7420 2.13GHz	4	2x3MB	2x1GB	8	One	Std	SAS	4U rack	7x5	2 x 1440W	3	Mar 2009
7233-4RU	2 x Xeon MP E7440 2.4GHz	4	2x3MB	4x1GB	16	Two	Std	SAS	4U rack	7x5	2 x 1440W	3	Apr 2009

Processors **Two 64-bit Intel® Xeon™ Processor MP up to 2.66GHz¹ Six-Core / up to 2.13GHz¹ Quad-Core / All 1066MHz FSB / Extended Memory 64 Technology™ (EM64T)**
 L2 cache **6 or 9MB / on-die / at processor speed**
 Processor upgrade Implementation **4-way SMP / up to four Xeon Processors MP (same speed/cache size)**
 System board contains four Intel 604-pin micro-PGA4 ZIF sockets, four memory board slots, two Active™ PCI-E x8 slots, five PCI-E x8 slots and integrated SAS, ethernet, graphics

Active Memory™ **4, 8 or 16GB std / 128GB max per chassis using high-capacity memory card / two or four memory cards standard (up to four) with 8 DIMM gold-connector slots each / DIMMs must be installed in matched pairs / PC2-5300 667MHz registered 240-pin DDR2-SDRAM DIMMs / Error Checking and Correcting (ECC) via 16-bit Checksum Chipkill™ / Memory ProteXion™ (redundant bit steering) and Memory Mirroring™ and Hot-swap (non-OS specific) / Hot-add (supported only with Microsoft® Windows™ Server 2003™)**

SAS disk controller **Std: LSI® 1078 SAS Controller / Serial Attached SCSI (SAS) (3GB/sec) / PCI-E x8 / RAID 0,1**
Optional: ServeRAID™ 10k / RAID 5, 5E, 50 & 6 / dedicated slot / dimm / battery backup
 SAS connectors **Controller wired to SAS backplane / external 4x SAS port on rear**
 IDE controller **Enhanced IDE ATA-100 controller in ICH7 South Bridge**
 Disk - capacity **Supports up to 146GB 10K or 73GB 15K rpm disks**
 Disk - bays **Four 2.5" hot-swap bays / converged tray / 29-pin SAS connectors**
 Mechanical **EIA 19" rack models (4U⁴) x 28" deep / supported in NetBAY™ Racks**

Chipset **IBM X4™ 4th Generation chipset / Integrated Processor and Memory Controller / Scalable from 4 to 16 sockets / Supports EM64T / provides 7 PCI-E x8 slots / supports optional ServeRAID Xi / Intel® I/O Controller Hub 7 (ICH7) South Bridge provides: IDE, USB, bus for Super I/O, Dual Port Broadcom 5709C, RSA2(video)**
 Slots **Two Active™ PCI-E x8 slots / slots available with power and attention indicator lights (optical sensors control power to slot) / hot replace, hot upgrade, hot expansion / separated by insulative plastic dividers / Five PCI-E x8 slots / all full height, half length**
 Optical / diskette **24x8x6 CD-RW/DVD Combo / none**
 Ethernet **Broadcom® 5709C 10/100/1000 dual ethernet / on systemboard / PCI-E x4 / Wake on LAN® / Alert on LAN™ 2**
 Graphics controller **SVGA / ATI® RN50 (ES1000) / on planar / 16MB SDRAM std/max**
 Ports **Rear: RSA ethernet, RSA serial, three USB (2.0), DB-15 graphics, 4x SAS and two ethernet**
Front: two USB (2.0)

Security **Power-on and administrator passwords / unattended boot / selectable boot**
 System management **BMC standard / IPMI 2.0 / PowerExecutive™ / Remote Supervisor Adapter II Slimline std / PCI adapter / includes 10/100 ethernet 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 Card / 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**

Keyboard / mouse **None standard (because rack-based)**
 Power supplies **Std/Max: Two / 1440 watt (240 VAC) / rear access / hot-swap / redundant / worldwide / voltage-sensing / auto-restart / PFA**
 Cooling fans **Six hot-swap, redundant, multi-speed fans / one additional fan in each power supply / PFA / fan failure signals Diagnostic LED and mgmt processor**

Front

Optical
Light Path Diag
• Opt disk • Opt disk
• Opt disk • Opt disk

Other options at ibm.com/products/us/

- Xeon E7420 2.13GHz/6MB L2/Quad-Core Proc 44E4469
- Xeon E7440 2.4GHz/6MB L2/Quad-Core Proc 44E4471
- Xeon L7445 2.13GHz/6MB L2/Quad-Core Proc 44E4517
- Xeon E7450 2.4GHz/9MB L2/Six-Core Proc 44E4472
- Xeon X7460 2.66GHz/9MB L2/Six-Core Proc 44E4473
- IBM ServeRAID-MR10k SAS Controller 43W4280
- IBM 73GB 10K 2.5" SAS Hot-swap HDD 40K1052
- IBM 146GB 10K 2.5" SAS Hot-Swap HDD 43X0824
- IBM 73GB 15K 2.5" SAS Hot-Swap HDD 43X0837

Rear

PCI-E Slots 1-5 PCI-E Slots 6-7 Scalability Ports

RSA II Ethernet USB PSU PSU

External SAS port

- ⊖ Dimensions: H6.8" x W17.46" x D28.35"
- ⊖ Dimensions: H172mm x W443mm x D720mm
- ⊖ Weight: 70 to 95lbs; 31.75 to 43.2kg
- ⊖ Stealth black color
- ⊖ Tool-free serviceability
- ⊖ Access power supplies from rear
- ⊖ Access adapters, processors, memory and systemboard from top
- ⊖ Setup Program by pressing F1 at startup
- ⊖ Diagnostics (DSA) by pressing F2 at startup
- ⊖ SAS Select by pressing Ctrl+C at startup
- ⊖ Drop Down 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

Bay ① 5.25", 0.5", access, CD-RW/DVD-ROM
Bay ② 2.5", SL 1", access, hot-swap, open
Bay ③ 2.5", SL 1", access, hot-swap, open
Bay ④ 2.5", SL 1", access, hot-swap, open
Bay ⑤ 2.5", SL 1", access, hot-swap, open

Five available PCI-E x8 slots:
 Slot 1 - full-height, half-length, PCI-E x8
 Slot 2 - full-height, half-length, PCI-E x8
 Slot 3 - full-height, half-length, PCI-E x8
 Slot 4 - full-height, half-length, PCI-E x8
 Slot 5 - full-height, half-length, PCI-E x8

Two available Hot-swap PCI-E x8 slots:
 Slot 6 - full-height, half-length, PCI-E x8, hot-swap
 Slot 7 - full-height, half-length, PCI-E x8, hot-swap

All models: Maximum internal disk capacity: 584GB with four 146GB² hot-swap SAS disks

LIMITED WARRANTY³

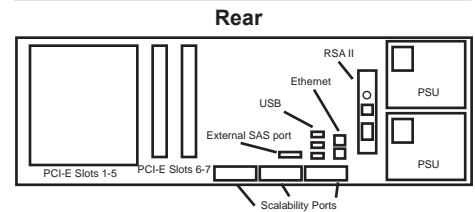
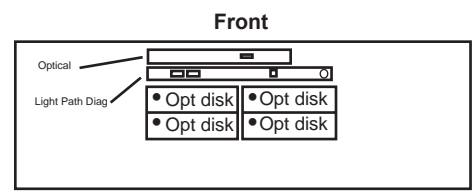
- ⇒ 3 year parts and labor
- ⇒ International Warranty Service³
- ⇒ On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time⁷
- ⇒ On site service upgrade options (in eligible locations):⁷
 - 3 year IOR 24x7, 4 hr avg response 10N3059
 - 3 year IOR 24x7, 2 hr avg response 10N3060
 - 4 year IOR 9x5, NBD response 10N3061
 - 5 year IOR 9x5, NBD response 10N3065
- ⇒ Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- ⇒ 24x7¹⁴ toll-free support for warranty issues during the warranty period³

IBM® Type-model	Qty x Processor	Core	L2 cache	Memory	DIMM slots	Memory cards	RSA II	Disk controller	Mechanical	Slots x bays	Hot-swap pwr supplies	Warranty (yrs.)	Available date
7141-1SU	2 x Xeon™ MP E7310	1.6GHz	DC 2x2MB	4x1GB	16	Two	Std	SAS	4U ⁴ rack	7x5	2 x 1440W	3	Mar 2008
7141-3SU	2 x Xeon MP E7330	2.4GHz	QC 2x3MB	8x1GB	32	Four	Std	SAS	4U rack	7x5	2 x 1440W	3	Feb 2008
7141-4SU	2 x Xeon MP X7350	2.93GHz	QC 2x4MB	8x1GB	32	Four	Std	SAS	4U rack	7x5	2 x 1440W	3	Feb 2008

Processors	Two 64-bit Intel® Xeon™ MP Processors up to 1.6GHz¹ Dual-Core / up to 2.93GHz¹ Quad-Core / All 1066MHz FSB / Extended Memory 64 Technology™ (EM64T)
L2 cache	2 x 2, 2 x 3 or 2 x 4 MB / on-die / at processor speed
Processor upgrade Implementation	4-way SMP / up to four Xeon Processors (same speed/cache/core) per chassis / up to 16-way/64-core (four chassis interconnected)
Active Memory™	4 or 8GB std / 256GB max per chassis using high-capacity memory card / two or four memory cards standard (up to four) with 8 DIMM gold-connector slots each / DIMMs must be installed in matched pairs / PC2-5300 667MHz registered 240-pin DDR2-SDRAM DIMMs / Error Checking and Correcting (ECC) via 16-bit Checksum Chipkill™ / Memory ProteXion™ (redundant bit steering) and Memory Mirroring™ and Hot-swap (non-OS specific) / Hot-add (supported only with Microsoft® Windows™ Server 2003™)
SAS disk controller	Std: LSI® 1078 SAS Controller / Serial Attached SCSI (SAS) (3GB/sec) / PCI-E x8 / RAID 0,1 Optional: ServeRAID™ 10k / RAID 5, 5E, 50 & 6 / dedicated slot / dimm / battery backup
SAS connectors	Controller wired to SAS backplane / external 4x SAS port on rear
IDE controller	Enhanced IDE ATA-100 controller in ICH7 South Bridge
Disk - capacity	Supports up to 146GB 10K or 73GB 15K rpm disks
Disk - bays	Four 2.5" hot-swap bays / converged tray / 29-pin SAS connectors
Mechanical	EIA 19" rack models (4U⁴) x 28" deep / supported in NetBAY™ Racks
Chipset	IBM X4™ 4th Generation chipset / Integrated Processor and Memory Controller / Scalable from 4 to 16 sockets / Supports EM64T / provides 7 PCI-E x8 slots / supports optional ServeRAID Xi / Intel® I/O Controller Hub 7 (ICH7) South Bridge provides: IDE, USB, bus for Super I/O, Dual Port Broadcom 5709C, RSA2(video)
Slots	Two Active™ PCI-E x8 slots / slots available with power and attention indicator lights (optical sensors control power to slot) / hot replace, hot upgrade, hot expansion / separated by insulative plastic dividers / Five PCI-E x8 slots / all full height, half length
Optical / diskette	24x8x ⁶ CD-RW/DVD Combo / none
Ethernet	Broadcom® 5709C 10/100/1000 dual ethernet / on systemboard / PCI-E x4 / Wake on LAN® / Alert on LAN™ 2
Graphics controller	SVGA / ATI® RN50 (ES1000) / on planar / 16MB SDRAM std/max
Ports	Rear: RSA ethernet, RSA serial, three USB (2.0), DB-15 graphics, 4x SAS and two ethernet Front: two USB (2.0)
Security	Power-on and administrator passwords / unattended boot / selectable boot
System management	BMC standard / IPMI 2.0 / PowerExecutive™ Remote Supervisor Adapter II Slimline std / PCI adapter / includes 10/100 ethernet 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 Card / 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

Keyboard / mouse	None standard (because rack-based)	2GB PC2-5300 CL5 ECC DDR2 RDIMM (2x1GB)	41Y2762
Power supplies	Std/Max: Two / 1440 watt (240 VAC) / rear access / hot-swap / redundant / worldwide / voltage-sensing / auto-restart / PFA	4GB PC2-5300 CL5 ECC DDR2 RDIMM (2x2GB)	41Y2771
Cooling fans	Six hot-swap, redundant, multi-speed fans / one additional fan in each power supply / PFA / fan failure signals Diagnostic LED and mgmt processor	8GB PC2-5300 CL5 ECC DDR2 RDIMM (2x4GB)	41Y2768
		16GB PC2-5300 CL5 ECC DDR2 RDIMM (2x8GB)	43V7356
		IBM Active Memory 8-slot Expansion Card	44E4252
		IBM Internal Removable Flash Drive	44E4251
		Xeon E7310 1.6GHz/4MB L2/Dual Core Proc	44W2784
		Xeon E7320 2.13GHz/4MB L2/Quad Core Proc	44E4241
		Xeon E7330 2.4GHz/6MB L2/Quad Core Proc	44E4242
		Xeon X7350 2.93GHz/8MB L2/Quad Core Proc	44E4243
		IBM ServeRAID-MR10k SAS Controller	43W4280
		IBM 73GB 10K 2.5" SAS Hot-swap HDD	40K1052
		IBM 146GB 10K 2.5" SAS Hot-Swap HDD	43X0824
		IBM 73GB 15K 2.5" SAS Hot-Swap HDD	43X0837
		IBM ScaleXpander Option Kit (2-3 Node)	44E4249
		IBM ScaleXpander Option Kit (4 Node)	44E4250

Other options at ibm.com/products/us/



- Bay ① 5.25", 0.5", access, CD-RW/DVD-ROM
- Bay ② 2.5", SL 1", access, hot-swap, open
- Bay ③ 2.5", SL 1", access, hot-swap, open
- Bay ④ 2.5", SL 1", access, hot-swap, open
- Bay ⑤ 2.5", SL 1", access, hot-swap, open

- Five available PCI-E x8 slots:
- Slot 1 - full-height, half-length, PCI-E x8
 - Slot 2 - full-height, half-length, PCI-E x8
 - Slot 3 - full-height, half-length, PCI-E x8
 - Slot 4 - full-height, half-length, PCI-E x8
 - Slot 5 - full-height, half-length, PCI-E x8

- Two available Hot-swap PCI-E x8 slots:
- Slot 6 - full-height, half-length, PCI-E x8, hot-swap
 - Slot 7 - full-height, half-length, PCI-E x8, hot-swap

- ⊘ Dimensions: H6.8" x W17.46" x D28.35"
- ⊘ Dimensions: H172mm x W443mm x D720mm
- ⊘ Weight: 70 to 95lbs; 31.75 to 43.2kg
- ⊘ Stealth black color
- ⊘ Tool-free serviceability
- ⊘ Access power supplies from rear
- ⊘ Access adapters, processors, memory and systemboard from top
- ⊘ Setup Program by pressing F1 at startup
- ⊘ Diagnostics (DSA) by pressing F2 at startup
- ⊘ SAS Select by pressing Ctrl+C at startup
- ⊘ Drop Down 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: 584GB with four 146GB² hot-swap SAS 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 number 10N3059
 - 3 year IOR 24x7, 2 hr avg response**
ServicePac part number 10N3060
 - 4 year IOR 9x5, NBD response**
ServicePac part number 10N3061
 - 5 year IOR 9x5, NBD response**
ServicePac part number 10N3065
- ⇒ **Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>**
- ⇒ **24x7¹⁴ toll-free support for warranty issues during the warranty period³**

See footnotes for important warranty information

IBM® Type-model	Qty x Processor	Core	L2 cache	Memory	DIMM slots	Memory cards	RSA II	Disk controller	Mechanical	Slots x bays	Hot-swap pwr supplies	Warranty (yrs.)	Available date
7233-2SU	2 x Xeon™ MP E7420	2.13GHz	4	2x3MB	4x1GB	16	Two	Std	SAS	4U ⁴ rack	7x5	2 x 1440W	3 Oct 2008
7233-5SU	2 x Xeon MP E7450	2.4GHz	6	3x3MB	8x1GB	32	Four	Std	SAS	4U rack	7x5	2 x 1440W	3 Oct 2008
7233-6SU	2 x Xeon MP X7460	2.66GHz	6	3x3MB	8x1GB	32	Four	Std	SAS	4U rack	7x5	2 x 1440W	3 Oct 2008
7233-7SU	2 x Xeon MP L7445	2.13GHz	4	2x3MB	4x1GB	16	Two	Std	SAS	4U rack	7x5	2 x 1440W	3 Oct 2008
7233-E6U*	4 x Xeon MP X7460	2.66GHz	6	3x3MB	2x1GB	32	Four	Std	SAS	4U rack	7x5	2 x 1440W	3 Mar 2009
7233-4SU	2 x Xeon MP E7440	2.4GHz	4	2x3MB	4x1GB	16	Two	Std	SAS	4U rack	7x5	2 x 1440W	3 Apr 2009

Processors 64-bit Intel® Xeon™ MP Processors up to 2.66GHz¹ Six-Core / up to 2.13GHz¹ Quad-Core / All 1066MHz FSB / Extended Memory 64 Technology™ (EM64T)
L2 cache 6 or 9MB std / on-die / at processor speed
Processor upgrade Implementation 4-way SMP / up to four Xeon Processors (same speed/cache/core) per chassis / up to 16-way/64-core (four chassis interconnected) System board contains four Intel 604-pin micro-PGA4 ZIF sockets, four memory board slots, two Active™ PCI-E x8 slots, five PCI-E x8 slots and integrated SAS, ethernet, graphics

Active Memory™ 2, 4 or 8GB std / 256GB max per chassis using high-capacity memory card / two or four memory cards standard (up to four) with 8 DIMM gold-connector slots each / DIMMs must be installed in matched pairs / PC2-5300 667MHz registered 240-pin DDR2-SDRAM DIMMs / Error Checking and Correcting (ECC) via 16-bit Checksum Chipkill™ / Memory ProteXion™ (redundant bit steering) and Memory Mirroring™ and Hot-swap (non-OS specific) / Hot-add (supported only with Microsoft® Windows™ Server 2003™)

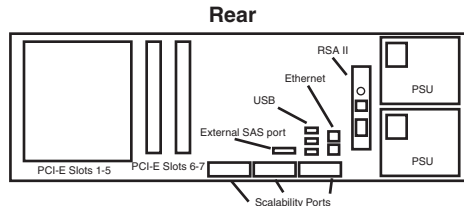
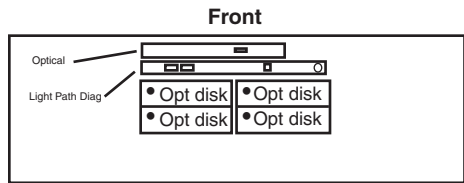
SAS disk controller Std: LSI® 1078 SAS Controller / Serial Attached SCSI (SAS) (3GB/sec) / PCI-E x8 / RAID 0,1
 Optional: ServeRAID™ 10k / RAID 5, 5E, 50 & 6 / dedicated slot / dimm / battery backup
SAS connectors Controller wired to SAS backplane / external 4x SAS port on rear
IDE controller Enhanced IDE ATA-100 controller in ICH7 South Bridge
Disk - capacity Supports up to 146GB 10K or 73GB 15K rpm disks
Disk - bays Four 2.5" hot-swap bays / converged tray / 29-pin SAS connectors
Mechanical EIA 19" rack models (4U⁴) x 28" deep / supported in NetBAY™ Racks

Chipset IBM X4™ 4th Generation chipset / Integrated Processor and Memory Controller / Scalable from 4 to 16 sockets / Supports EM64T / provides 7 PCI-E x8 slots / supports optional ServeRAID Xi / Intel® I/O Controller Hub 7 (ICH7) South Bridge provides: IDE, USB, bus for Super I/O, Dual Port Broadcom 5709C, RSA2 (video)
Slots Two Active™ PCI-E x8 slots / slots available with power and attention indicator lights (optical sensors control power to slot) / hot replace, hot upgrade, hot expansion / separated by insulative plastic dividers / Five PCI-E x8 slots / all full height, half length
Optical / diskette 24x8x6 CD-RW/DVD Combo / none
Ethernet Broadcom® 5709C 10/100/1000 dual ethernet / on systemboard / PCI-E x4 / Wake on LAN® / Alert on LAN™ 2
Graphics controller SVGA / ATI® RN50 (ES1000) / on planar / 16MB SDRAM std/max
Ports Rear: RSA ethernet, RSA serial, three USB (2.0), DB-15 graphics, 4x SAS and two ethernet
 Front: two USB (2.0)

Security Power-on and administrator passwords / unattended boot / selectable boot
System management BMC standard / IPMI 2.0 / PowerExecutive™ / Remote Supervisor Adapter II Slimline std / PCI adapter / includes 10/100 ethernet 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 Card / 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

Keyboard / mouse None standard (because rack-based)
Power supplies Std/Max: Two / 1440 watt (240 VAC) / rear access / hot-swap / redundant / worldwide / voltage-sensing / auto-restart / PFA
Cooling fans Six hot-swap, redundant, multi-speed fans / one additional fan in each power supply / PFA / fan failure signals Diagnostic LED and mgmt processor

- 2GB PC2-5300 CL5 ECC DDR2 RDIMM (2x1GB) 41Y2762
- 4GB PC2-5300 CL5 ECC DDR2 RDIMM (2x2GB) 41Y2771
- 8GB PC2-5300 CL5 ECC DDR2 RDIMM (2x4GB) 41Y2768
- 16GB PC2-5300 CL5 ECC DDR2 RDIMM (2x8GB) 43V7356
- IBM Active Memory 8-slot Expansion Card 44E4252
- IBM Internal Removable Flash Drive 44E4251
- Xeon E7420 2.13GHz/6MB L2/Quad-Core Proc 44E4469
- Xeon E7430 2.13GHz/6MB L2/Quad-Core Proc 44E4470
- Xeon L7445 2.13GHz/6MB L2/Quad-Core Proc 44E4517
- Xeon E7450 2.4GHz/9MB L2/Six-Core Proc 44E4472
- Xeon E7440 2.4GHz/9MB L2/Six-Core Proc 44E4471
- Xeon X7460 2.66GHz/9MB L2/Six-Core Proc 44E4473
- IBM ServeRAID-MR10k SAS Controller 43W4280
- IBM 73GB 10K 2.5" SAS Hot-swap HDD 40K1052
- IBM 146GB 10K 2.5" SAS Hot-Swap HDD 43X0824
- IBM 73GB 15K 2.5" SAS Hot-Swap HDD 43X0837
- IBM ScaleXpander Option Kit (2-3 Node) 44E4249
- IBM ScaleXpander Option Kit (4 Node) 44E4250
- Other options at ibm.com/products/us/



- Bay ① 5.25", 0.5" access, CD-RW/DVD-ROM
- Bay ② 2.5", SL 1" access, hot-swap, open
- Bay ③ 2.5", SL 1" access, hot-swap, open
- Bay ④ 2.5", SL 1" access, hot-swap, open
- Bay ⑤ 2.5", SL 1" access, hot-swap, open

- Five available PCI-E x8 slots:
 Slot 1 - full-height, half-length, PCI-E x8
 Slot 2 - full-height, half-length, PCI-E x8
 Slot 3 - full-height, half-length, PCI-E x8
 Slot 4 - full-height, half-length, PCI-E x8
 Slot 5 - full-height, half-length, PCI-E x8

- Two available Hot-swap PCI-E x8 slots:
 Slot 6 - full-height, half-length, PCI-E x8, hot-swap
 Slot 7 - full-height, half-length, PCI-E x8, hot-swap

- Dimensions: H6.8" x W17.46" x D28.35"
- Dimensions: H172mm x W443mm x D720mm
- Weight: 70 to 95lbs; 31.75 to 43.2kg
- Stealth black color
- Tool-free serviceability
- Access power supplies from rear
- Access adapters, processors, memory and systemboard from top
- Setup Program by pressing F1 at startup
- Diagnostics (DSA) by pressing F2 at startup
- SAS Select by pressing Ctrl+C at startup
- Drop Down 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: 584GB with four 146GB² hot-swap SAS 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 number 10N3059
 - 3 year IOR 24x7, 2 hr avg response ServicePac part number 10N3060
 - 4 year IOR 9x5, NBD response ServicePac part number 10N3061
 - 5 year IOR 9x5, NBD response ServicePac part number 10N3065
- Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- 24x7¹⁴ toll-free support for warranty issues during the warranty period³

IBM® Type-model	Supported Blades	Blade servers std/max	Switch modules std/max	Switch modules (type)	Management modules std/max	Power modules std/max	Power module Wattage	Blower modules std/max	Mechanical	Available date
8677-3RX**	HC10/HS12/HS20/HS21/HS21XM/HS22/HS40/JS12/JS20/JS21/LS20/LS21/LS22/LS41/LS42/QS20	0/14	0/4	SAS/Enet/FC/IB/OPM/CPM	1/2	2/4	2000W	2/2	7U ⁴ rack	Mar 2006
8677-3SX**	HC10/HS12/HS20/HS21/HS21XM/HS22HS40/JS12/JS20/JS21/JS22/LS20/LS21/LS22/LS40/LS41/LS42/QS20/QS22	0/14	0/4	SAS/Enet/FC/IB/OPM/CPM	1/2	2/4	2000W	2/2	7U rack	Mar 2009
8677-4SX	HC10/HS12/HS20/HS21/HS21XM/HS22HS40/JS12/JS20/JS21/JS22/LS20/LS21/LS22/LS40/LS41/LS42/QS20/QS22	0/14	0/4	SAS/Enet/FC/IB/OPM/CPM	1/2	2/4	2320W	2/2	7U rack	Mar 2009

Positioning Description	Flexible, innovative design provides investment protection and reduces deployment costs Provides common resources shared by Blade servers such as power, system management, cabling, ethernet management and expansion, external storage, switching and connectivity, and I/O (diskette(some), optical drive(some), and ports for USB, keyboard, video, mouse)
Blade bays	14 hot-swappable bays / front access / supports most Blade servers and all Blade expansion units
Switch modules	Std/max: none/four / hot-swap / rear access / SAS / Gb Ethernet / Fibre Channel / InfiniBand / Optical & Copper Pass-thru
Advanced Management module	Std/max: one/two / hot-swap / rear access / comprehensive system management functions / PowerPC®440GP controller / communicates with integrated system management processor on each server blade / complete KVM switch local functionality / ports: DB-15 analog video port, two USB 2.0, Serial(RJ45),10/100 ethernet remote management connection port / all ports shared by up to 14 Blade servers
Power modules	Std/max: two/four in bays 1 and 2 (two 9ft IEC 320-C13 to C14 or two IEC 320-C19 to C20 cables for intrarack power distribution) / hot-swap / rear access / 2000W(3RX & 3SX) at 220v / 2320W(4SX) 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
Blower modules	Std/max: two / hot-swap / redundant / variable speed / rear access / up to 325 cubic ft per min (CFM) / front to back airflow
Mechanical DVD / diskette / USB	EIA 19" rack models (7U⁴) x 28" deep / supported in NetBAY™ Racks 3RX: 8X-24X ⁶ DVD-ROM / 3.5" 1.44MB diskette drive / one USB port (Version 1.1) / fixed / front access / shared by up to 14 Blade servers / requests for optical, diskette and USB port by pressing media select button on server blade front panel 3SX & 4SX: CD/DVD-RW Multiburner / no diskette / filler plates std / one USB port (Version 2.0) / fixed / front access / shared by up to 14 Blade servers / requests for optical and USB port by pressing media select button on server blade front panel
Keyboard / mouse	None standard / provides KVM console support / requests for keyboard, video and mouse by pressing the display button on server blade front panel / supports NetBAY ACT CAT5 chaining solutions
Ports	Rear: two USB 2.0 (keyboard & mouse), DB-15 graphics, two RJ45 (Serial, 10/100 ethernet remote mgmt connection port) / all on Advanced Management module and shared by up to 14 Blade servers / no serial or parallel ports Front: one USB (3RX Version 1.1) (3SX & 4SX Version 2.0)
Security	Login password for remote connection / secure socket layer (SSL) security for remote management access / recommended in rack environment providing security through lockable doors or other security measures
Ethernet	One of the dual integrated gigabit ethernet controllers on each Blade server connects to an optional <i>Gigabit Ethernet Switch Module</i> (the second ethernet controller requires a second optional <i>Gigabit Ethernet Switch Module</i>)
Systems mgmt	Provides remote console and mgmt / power on/off Blades/modules / monitors realtime 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

Cisco Systems Fiber Intelligent Gigabit Ethernet Switch Module	32R1888	IBM Advanced Management Module	25R5778
Cisco Systems Gigabit Ethernet Switch Module	32R1892	IBM KVM/Redundant Management Module	48P7055
Nortel Networks Layer 2-7 Gigabit Ethernet Switch Module	32R1859	1U 17" Flat Panel Monitor Console Kit (with kybd/monitor)	17231UX
Brocade 10 port 4Gb SAN Switch Module	32R1813	2U 17" Flat Panel Monitor Console Kit (with kybd/monitor)	17232UX
Brocade 20 port 4Gb SAN Switch Module	32R1812	IBM BladeCenter 4-port GB Ethernet Switch Module	48P7054
Cisco Systems InfiniBand Switch Module for BladeCenter	32R1900	IBM BladeCenter 2-port Fibre Channel Switch Module	48P7062
NetBAY42 Enterprise Rack Cabinet	930842S	IBM 2-button mouse PS/2	28L3673
NetBAY42 Standard Rack Cabinet	9306420	IBM T115 15" Flat Panel Color Monitor (black)	494215U
IBM 2320W Power Supply Option (incl. two modules)(3SX & 4SX only)	46M0508	APC Smart-UPS 5000RMB (208V)	37L6861
IBM 2000W Power Supply Option (incl. two modules)(3RX only)	26K4816	Other options at ibm.com/products/us	

Front

LED panel Bay 1 Bay 2

Optical(some) Diskette(some)

Bays 1-14

Rear

SM 3 SM 1 PM 3 Blower module 1 (std) PM 1 M M 1

SM 4 SM 2 PM 4 Blower module 2 (std) PM 2 M M 2

Switch modules Power modules Mgmt modules (both std) (std)

- ↳ 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 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	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

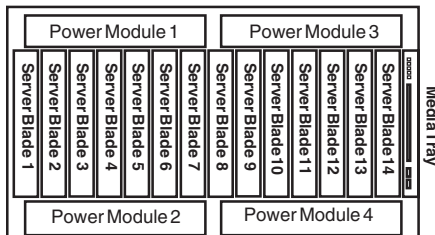
- ↳ 3 year parts and labor
- ↳ International Warranty Service³
- ↳ On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time⁷
- ↳ On site service upgrade options (in eligible locations):⁷
 - 3 year IOR 24x7, 4 hr avg response (ServicePac part num 51J8882)
 - 3 year IOR 9x5, 4 hr avg response (ServicePac part num 61P7613)
 - 3 year IOR 9x5, NBD response (ServicePac part num 51J8880)
 - 4 year IOR 24x7, 4 hr avg response (ServicePac part num 51J8885)
 - 4 year IOR 9x5, 4 hr avg response (ServicePac part num 51J8884)
 - 5 year IOR 9x5, NBD response (ServicePac part num 51J8886)
- ↳ Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- ↳ 24x7¹² toll-free support for warranty issues during the warranty period³

IBM® Type-model	Supported Blades	Blade Servers std / max	Switch modules std / max	Switch modules (type)	Advanced Management modules std / max	Power modules std / max	Power Module Wattage	Blower modules std / max	Mechanical	Available date
8852-4XX	HS20/HS21/JS20/JS21/LS20/LS21/LS41	0 / 14	0 / 10	Enet, Fibre Ch, IB, OPM and CPM	1 / 2	2 / 4	2900W	2 / 2	9U ⁴ rack	Mar 2006
Positioning Description	Revolutionary design provides the most efficient infrastructure building block for adding scale and capacity 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 (optical drive, USB and video)									
Blade bays	Supports all blades and Blade Expansion Units / 14 hot-swappable bays / front access									
Switch modules	Std: none; max: ten / hot-swap / rear access / Gb Ethernet / Fibre Channel / InfiniBand / Optical Pass-thru / Copper Pass-thru / Nortel Networks™ / Cisco™ / QLogic™ / Brocade® / McData®									
Advanced Management Modules	Std: one; max: two / hot-swap / rear access / comprehensive system management functions / PowerPC®440GP controller / communicates with integrated system management processor on each server blade / complete KVM switch local functionality / ports: DB-15 analog video port, Dual USB 2.0, Serial(RJ45), 10/100 ethernet remote management connection port									
Power modules	Std: two; max: four / hot-swap / front access / 2900 watts at 220V / redundant within pair (N+N redundancy) / two std modules supply power to blade bays 1 through 7 and both AMMs, SMs 1 & 2, and all blowers / two optional modules in bays 3 and 4 required if blade bays 8-14 or IO bays 5-10 used / worldwide / voltage-sensing / auto-restart / 3 fans per power module									
Blower modules	Std: two; max: two / hot-swap / redundant / throttled according to incoming air temperature / rear access / front to back airflow									
Mechanical Media Tray	EIA 19" rack models (9U⁴) x 29" deep / supported in NetBAY™ Racks (such as NetBAY42 ER) DVD-ROM / two USB ports (Version 2.0) / Full Light Path Diagnostic panel / customer serviceable / front access / shared by all blade servers / requests for DVD-ROM and USB port by pressing DVD select button on server blade front panel									
Keyboard / mouse	None standard / USB / 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	Rear: two USB, two RJ45 (one ethernet and one serial), analog DB-15 graphics (on advanced mgmt module) / one serial aggregate for break out cable; Front: two USB (Media Tray)									
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	Each of the dual integrated gigabit ethernet controllers on each blade connects to an optional <i>GB Ethernet Switch Module</i>									
Systems mgmt	Provides remote console and mgmt / power on/off/reset blades/modules / monitors power status, operating system, temperature, disks, blowers, power modules / system diagnostic programs provided through IBM Director software / Remote Deployment Manager									
System LED panel	System LED panel provides power-on, location, over-temperature, information, and system-error conditions									

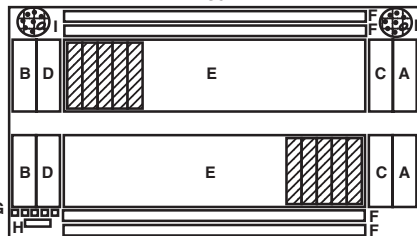
1U 17" Flat Panel Monitor Console Kit (with kybd/monitor)	17231UX	BladeCenter H 2900W Power Module pair with Fan Packs	31R3335
2U 17" Flat Panel Monitor Console Kit (with kybd/monitor)	17232UX	IBM Advanced Management Module	25R5778
NetBAY ACT Local Console Manager (CAT5 KVM cabling)	1735L04	BladeCenter H Double 30A NEMA L6-30P (208V) 4.3M	25R5783
NetBAY ACT Remote Console Manager (CAT5 KVM cabling)	1735R16	BladeCenter H Dual 32A IEC 309 P+N+G/16A IEC 320-C20 (230V) 4.3M	25R5784
NetBAY ACT 250mm KVM Conversion Option	32P1636	BladeCenter H Triple 16A IEC 320-C20 (200-240V) 2.8M	25R5785
NetBAY ACT 1.5m KVM Conversion Option	32P1652	BladeCenter H Double 30A KSC 8305 (220V) 4.3M (Korea)	25R5811
Cisco Systems Fiber Intelligent Gigabit Ethernet Switch Module	32R1888	BladeCenter H Dual 32A AS/NZS 3112/16A IEC320-C20 (ANZ)	25R5812
Cisco Systems Gigabit Ethernet Switch Module	32R1892	BladeCenter H Serial Port Breakout Cable	40K9605
Nortel Networks Layer 2-7 Gigabit Ethernet Switch Module	32R1859	IBM BladeCenter 4-port GB Ethernet Switch Module	48P7054
Brocade 10 port 4Gb SAN Switch Module	32R1813	IBM BladeCenter 2-port Fibre Channel Switch Module	48P7062
Brocade 20 port 4Gb SAN Switch Module	32R1812		
Cisco Systems InfiniBand Switch Module for BladeCenter	32R1900		
NetBAY42 Enterprise Rack Cabinet	930842S		

• Other options at ibm.com/products/us
• Solutions available from IBM BladeCenter Alliance program partners

Front



Rear



- ◇ Dimensions: H15.75" x W19" x D29"
- ◇ Dimensions: H400.05mm x W482.6mm x D766.6mm
- ◇ Weight: 90 to 350 lb; 40.82 to 158.8kg
- ◇ Stealth black color bezel
- ◇ Tool-free customer serviceability
- ◇ Access server blades, expansion units and power modules from front
- ◇ Access modules from rear
- ◇ Midplane in center of system to interface for all system components
- ◇ Predictive Failure Analysis® alerts on blowers, blade server memory, processor(s), and optional disk(s) with IBM Director

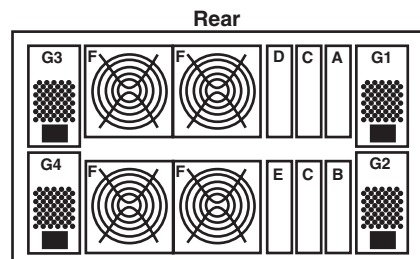
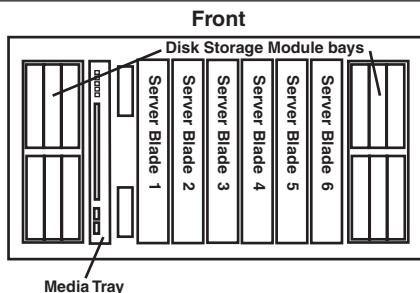
- A • Advanced Management Module
- B • Switch Module Bays 1 & 2 (dedicated ethernet)
- C • Switch Module Bays 3 & 4 –OR– Bridge Slots
- D • Dedicated Bridge Module Slots (up to 4)
- E • Blowers (2)
- F • High Speed Switch Module Bays (4)
- G • Light Path Diagnostic Panel
- H • Aggregated Serial Connector
- I • Consolidated Redundant Power Inputs (2)

LIMITED WARRANTY³

- ⇨ 3 year parts and labor
- ⇨ International Warranty Service³
- ⇨ On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time⁷
- ⇨ On site service upgrade options (in eligible locations):⁷
 - 3 year IOR 24x7, 2 hr avg response (ServicePac® part num 21P2065)
 - 3 year IOR 24x7, 4 hr avg response (ServicePac part num 21P2085)
 - 3 year IOR 9x5, 4 hr avg response (ServicePac part num 41L2736)
 - 5 year IOR 9x5, 4 hr avg response (ServicePac part num 69P9207)
 - 5 year IOR 24x7, 2 hr avg response (ServicePac part num 69P9209)
- ⇨ Other ServicePac options at <http://www-1.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- ⇨ 24x7¹⁴ toll-free support for warranty issues during the warranty

IBM® Type-model	Supported Blades	Blade Servers std / max	Switch modules std / max	Switch modules (type)	Storage modules std / max	Advanced Management modules std / max	Power modules std / max	Power Module Wattage	Blower modules std / max	Mechanical	Available date
8886-1MX	HC10/HS20/HS21/HS21XM/LS20/LS21/LS41	0 / 6	0 / 3	Enet, Fibre Ch, IB, OPM, CPM and SAS	0 / 2	1 / 1	2 / 4	950/1450W	4 / 4	7U ⁴ rack	Dec 2007
8886-E1X ¹	HC10/HS20/HS21/HS21XM/LS20/LS21/LS41	0 / 6	1 / 3	Enet, Fibre Ch, IB, OPM, CPM and SAS	1 / 2	1 / 1	4 / 4	950/1450W	4 / 4	7U ⁴ rack	Dec 2007
Positioning Description	Greatly Improved BladeCenter Platform for Small Office Environment with Integrated Storage 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 (optical drive, USB and video)										
Blade bays	Supports all blades and Blade Expansion Units / 6 hot-swappable bays / front access										
Switch modules	Std: some: one; some: none; max: three / hot-swap / rear access / Gb Ethernet / Fibre Channel / Optical Pass-thru / Copper Pass-thru										
Storage modules	Std: some: one; some: none; max: two / front access / 2 power supplies required per module / each module supports six hot-swap 3.5" SAS and SATA HDD's										
Advanced Management Modules	Std/max: one / hot-swap / rear access / comprehensive system management functions / PowerPC®440GP controller / communicates with integrated system management processor on each server blade / complete KVM switch local functionality / ports: DB-15 analog video port, Dual USB 2.0, Serial(RJ45), 10/100 ethernet remote management connection port										
Power modules	Std: two; max: four / hot-swap / rear access / 1450 watts at 220V / 950 watts at 110V / redundant within pair (N+N redundancy) / worldwide / voltage-sensing / auto-restart / 2 fans per power module / modules 1 and 2 standard / modules 3 and 4 required with 2nd Storage module installed										
Fan Packs	Std/max: four / hot-swap / redundant / throttled according to incoming air temperature / rear access / front to back airflow										
Mechanical Media Tray	EIA 19" rack models (U⁴) x 29" deep / supported in NetBAY™ Racks (such as NetBAY42 ER) DVD-ROM / two USB ports (Version 2.0) / Full Light Path Diagnostic panel / customer serviceable / front access / shared by all blade servers / requests for DVD-ROM and USB port by pressing DVD select button on server blade front panel										
Keyboard / mouse Ports	None standard / USB / 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 Rear: two USB, two RJ45 (one ethernet and one serial), analog DB-15 graphics (on advanced mgmt module) Front: two USB (Media Tray)										
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	Each of the dual integrated gigabit ethernet controllers on each blade connects to an optional <i>GB Ethernet Switch Module</i>										
Systems mgmt	Provides remote console and mgmt / power on/off/reset blades/modules / monitors power status, operating system, temperature, disks, blowers, power modules / system diagnostic programs provided through IBM Director software / Remote Deployment Manager										
System LED panel	System LED panel provides power-on, location, over-temperature, information, and system-error conditions										

Brocade 10-port Switch Module for IBM BladeCenter	32R1813	BladeCenter S 6-Disk Storage Module	43W3581
Cisco Systems 4Gb 10-port Fibre Channel Switch Module	39Y9284	BladeCenter S 950W/1450W Auto-Sensing Power Supplies 3 & 4	43W3582
QLogic 4Gb FC 10-port Full Fabric Switch	43W6724	BladeCenter S Serial Pass-thru module	43W3583
IBM BladeCenter SAS Connectivity Module	39Y9195	IBM DPI C19 PDU+C19 without line cord	39M2818
IBM BladeCenter Optical Pass-thru module	39Y9316	IBM DPI C19 3 Phase PDU+C19 with attached line cord	39M2819
IBM BladeCenter Copper Pass-thru module	39Y9320	DPI 60A Three Phase C19 Enterprise PDU with IEC309 3P+G (208V) fixed line cord	39Y8923
IBM BladeCenter PCI Expansion Unit 2	25K8373	DPI 60A Single Phase C19 Enterprise PDU w/o line cord	39Y8948
IBM BladeCenter PCI I/O Expansion Unit	43W6692		
750GB DP HS SATA HDD	43W7580		
IBM Server 73GB 15K SAS HS	43W7523	Other options at ibm.com/products/us	
IBM Server 146GB 15K SAS HS	43W7524	Solutions available from IBM BladeCenter Alliance program partners	
300GB SAS 15K HS	43X0802		
500GB SATA2 HDD	39M4558		



- ◇ Dimensions: H12" x W17.5" x D28.9"
- ◇ Dimensions: H306.3mm x W440mm x D733.4mm
- ◇ Weight: 90 to 240 lb; 40.82 to 108.86kg
- ◇ Stealth black color bezel
- ◇ Tool-free customer serviceability
- ◇ Access server blades, battery backup units, media tray and storage modules from front
- ◇ Access AMM, expansion modules, blower and power modules from rear
- ◇ Midplane in center of system to interface for all system components
- ◇ Predictive Failure Analysis® alerts on blowers, blade server memory, processor(s), and optional disk(s) with IBM Director

- A • Advanced Management Module
- B • Serial Module Bay
- C • I/O Module Bays 3 & 4
- D • I/O Module Bay 1 - for ethernet switch
- E • I/O Module Bay 2 - for future use
- F • Blower Modules (4) std
- G • Power Module Slots - G1&G2 std / G3&G4 opt

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 46D3900)
 - 3 year IOR 24x7, 4 hr avg response (ServicePac part num 46D3899)
 - 3 year IOR 9x5, 4 hr avg response (ServicePac part num 46D3898)
 - 5 year IOR 9x5, 4 hr avg response (ServicePac part num 46D3906)
 - 5 year IOR 24x7, 2 hr avg response (ServicePac part num 46D3908)
- ⇒ Other ServicePac options at <http://www-1.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- ⇒ 24x7¹⁴ toll-free support for warranty issues during the warranty period³

See footnotes for important warranty information

¹ Express Model

IBM BladeCenter® T 8720 (DC power)

xREF by STG Field Skills and Education Team

IBM® Type-model	Supported Blades	Blade Servers std / max	Switch modules std / max	Switch modules (type)	Management modules std / max	Power modules std / max	Power Module Wattage	Blower modules std / max	Mechanical	Available date
8720-1RX	HS20/HS21**/HS40/JS20/JS21/LS20/LS21**/LS41**	0 / 8	0 / 4	Enet, Fibre Ch, IB, OPM and CPM	1 / 2	2 / 4	1300W	4 / 4	8U ⁴ rack	Jul 2004
8720-2RX	HS20/HS21**/HS40/JS20/JS21/LS20/LS21**/LS41**	0 / 8	0 / 4	Enet, Fibre Ch, IB, OPM and CPM	1 / 2	2 / 4	1300W	4 / 4	8U rack	Mar 2006
Positioning Description	Flexible, innovative design provides investment protection and reduces deployment costs for NEBS environments Provides common resources shared by blade servers such as power, system management, cabling, ethernet management and expansion, external Fibre Channel storage switching and connectivity, and I/O (combo CD/DVD drive, and ports for USB, keyboard, video, mouse)									
Blade bays	Supports all blades and PCI I/O Expansion Blades / 8 hot-pluggable server bays / front access									
Switch modules	Std: none; max: four / hot-swap / rear access / Gb Ethernet / Fibre Channel / InfiniBand / Optical Pass-thru / Copper Pass-thru									
Advanced Management Module	Std: none; max: two / hot-swap / rear access / comprehensive system management functions / PowerPC®440GP controller / communicates with integrated system management processor on each server blade / complete KVM switch local functionality / ports: DB-15 analog video port, Dual USB 2.0, Serial(RJ45), 10/100 ethernet remote management connection port / all ports shared by up to 8 blade servers									
Power modules	Std: two in bays 1 and 2, max: four / hot-swap / front access / input voltage range -48V - 60V (Min/Max) at 50/60Hz / two IEC320 C14 male appliance connector / 1300 watts / two std modules (in slots 1 & 2) supply power to switch bays 1 & 2, both management modules, blade bays 1 - 4 and media tray; two additional power modules provide full system redundant power and power to switch bays 3 & 4, and blade bays 5 - 8 All: load balancing / voltage-sensing / auto-restart									
Blower modules	Std: four; max: four / Calibrated Vectored Cooling / hot-swap / redundant / variable speed / rear access / 330 cubic ft per min (CFM) / front to back airflow; filtered air intake									
Mechanical Optical / USB	EIA 19" rack models (8U⁴) x 20" deep / designed for EIA-310D and UTF Four Post Racks 24X-10X-24X-8X ⁶ Combo / Two USB port (Version 1.1) / all USB interface (types A & C) / front access / shared by up to eight blade servers / requests for optical cd and USB port(s) by pressing CD select button on server blade front panel									
Keyboard / mouse	None standard / provides KVM console support / requests for keyboard, mouse, and video by pressing the display button on server blade front panel									
Ports	Rear: keyboard (PS/2), mouse (PS/2), analog DB-15 graphics (on standard mgmt module) / no serial or parallel ports / DB-15 Telco Alarm Panel Front: two USB (Version 1.1) /									
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	Each of the dual integrated gigabit ethernet controllers on each blade servers connects to an optional 4-port GB Ethernet Switch Module									
Systems mgmt	Provides remote console and mgmt / power on/off blades/modules / monitors power status, operating system, temperature, disks, blowers, power modules / system diagnostic programs provided through IBM Director software									
System LED panel	System LED panel provides power-on, location, critical, major and minor alarm conditions									

IBM BladeCenter T Advanced Management Module	32R0835	IBM 1300W DC Power Supply Module (x2)	32R0833
McData EFCM Element Manager for BladeCenter	32R1799	IBM APC Smart-UPS 5000RMB (208V)	37L6861
IBM BladeCenter HS20 Low Profile Handle (800Mhz blade)	25K8360	IBM T115 15" Flat Panel Color Monitor (black)	494215U
IBM BladeCenter HS40 Low Profile Handle	25K8359	BladeCenter PCI I/O Expansion Unit II	25K8373
IBM BladeCenter T Filter	25K8376	IBM DS4000 EXP700 Fibre Channel Expansion Unit	17001RS
NetBAY42 Enterprise Rack Cabinet	930842S	IBM USB Floppy Drive	05K9276
Four Post Rack Mount Kit	32R0837		
Two Post Rack Mount Kit	32R0836		
		<ul style="list-style-type: none"> • Other options at ibm.com/pc/us/accessories • Solutions available from IBM BladeCenter Alliance program partners 	

Front

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

LIMITED WARRANTY³

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

Rear

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

IBM® Type-model	Supported Blades	Blade Servers std / max	Switch modules std / max	Switch modules (type)	Management modules std / max	Power modules std / max	Power Module Wattage	Blower modules std / max	Mechanical	Available date
8730-1RX	HS20/HS21**/HS40/JS20/JS21/LS20/LS21**/LS41**	0 / 8	0 / 4	Enet, Fibre Ch, IB, OPM and CPM	1 / 2	2 / 4	1300W	4 / 4	8U ⁴ rack	Jul 2004
8730-2RX	HS20/HS21**/HS40/JS20/JS21/LS20/LS21**/LS41**	0 / 8	0 / 4	Enet, Fibre Ch, IB, OPM and CPM	1 / 2	2 / 4	1300W	4 / 4	8U rack	Mar 2006
Positioning Description	Flexible, innovative design provides investment protection and reduces deployment costs for NEBS environments Provides common resources shared by blade servers such as power, system management, cabling, ethernet management and expansion, external Fibre Channel storage switching and connectivity, and I/O (combo CD-RW/DVD and ports for USB, keyboard, video, mouse)									
Blade bays	Supports all blades and PCI I/O Expansion Units / 8 hot-pluggable server bays / front access									
Switch modules	Std: none; max: four / hot-swap / rear access / Gb Ethernet / Fibre Channel / InfiniBand / Optical Pass-thru / Copper Pass-thru									
Advanced Management Module	Std: none; max: two / hot-swap / rear access / comprehensive system management functions / PowerPC®440GP controller / communicates with integrated system management processor on each server blade / complete KVM switch local functionality / ports: DB-15 analog video port, Dual USB 2.0, Serial(RJ45), 10/100 ethernet remote management connection port / all ports shared by up to 8 blade servers									
Management Modules	Std: one; max: two / hot-swap / rear access (I/O ports) / comprehensive system management functions / PowerPC® 401 controller / communicates with integrated system management processor on each server blade / multiplexor for console connectivity / controls external Telco alarm panel / ports: DB-15 analog video port, PS/2 keyboard port, PS/2 mouse port, 10/100 ethernet remote management connection port / all ports shared by up to 8 blade servers									
Power modules	Std: two in bays 1 and 2, max: four / hot-swap / front access / input voltage range 180VAC - 264VAC (Min/Max) at 50/60Hz / two IEC320 C14 male appliance connector / 1300 watts / two std modules (in slots 1 & 2) supply power to switch bays 1 & 2, both management modules, blade bays 1 - 4 and media tray; two additional power modules provide full system redundant power and power to switch bays 3 & 4, and blade bays 5 - 8 All: load balancing / voltage-sensing / auto-restart									
Blower modules	Std: four; max: four / Calibrated Vectedored Cooling / hot-swap / redundant / variable speed / rear access / 330 cubic ft per min (CFM) / front to back airflow; filtered air intake									
Mechanical Optical / USB	EIA 19" rack models (8U⁴) x 20" deep / designed for EIA-310D (types A & C) and UTF four post racks 24X-10X-24X-8X ⁶ Combo / Two USB port (Version 1.1) / all USB interface / front access / shared by up to eight blade servers / requests for optical CD, and USB port(s) by pressing CD select button on blade server front panel									
Keyboard / mouse	None standard / provides KVM console support / requests for keyboard, mouse, and video by pressing the display button on server blade front panel									
Ports	Rear: keyboard (PS/2), mouse (PS/2), analog DB-15 graphics (on standard mgmt module) / no serial or parallel ports / DB15 Telco Alarm Panel Front: Two USB (Version 1.1)									
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	Each of the dual integrated gigabit ethernet controllers on each blade server connects to an optional <i>GB Ethernet Switch Module</i>									
Systems mgmt	Provides remote console and mgmt / power on/off blades/modules / monitors power status, operating system, temperature, disks, blowers, power modules / system diagnostic programs provided through IBM Director software									
System LED panel	System LED panel provides power-on, location, critical, major and minor alarm conditions									

IBM BladeCenter T Advanced Management Module	32R0835	IBM 1300W AC Power Supply Module (x2)	32R0834
McData EFCM Element Managerfor BladeCenter	32R1799	IBM APC Smart-UPS 5000RMB (208V)	37L6861
IBM BladeCenter HS20 Low Profile Handle (800Mhz blade)	25K8360	IBM T115 15" Flat Panel Color Monitor (black)	494215U
IBM BladeCenter HS40 Low Profile Handle	25K8359	BladeCenter PCI I/O Expansion Unit	25K8373
IBM BladeCenter T Filter	25K8376	IBM DS4000 EXP700 Fibre Channel Expansion Unit	17001RS
NetBAY42 Enterprise Rack Cabinet	930842S	IBM USB Floppy Drive	05K9276
Four Post Rack Mount Kit	32R0837		
Two Post Rack Mount Kit	32R0836		

• Other options at ibm.com/products/us
• Solutions available from IBM BladeCenter Alliance program partners

Front

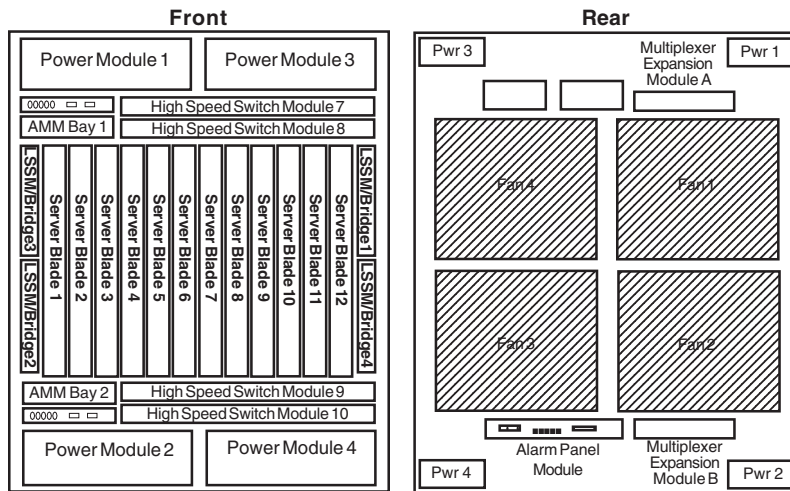
Rear

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

LIMITED WARRANTY³

- ↔ **3 year parts and labor**
- ↔ **International Warranty Service³**
- ↔ **On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time⁷**
- ↔ **On site service upgrade options (in eligible locations):⁷**
 - **3 year IOR 24x7, 2 hr avg response** (ServicePac® part num 21P2065)
 - **3 year IOR 24x7, 4 hr avg response** (ServicePac part num 30L9185)
 - **3 year IOR 9x5, 4 hr avg response** (ServicePac part num 41L2736)
 - **5 year IOR 9x5, 4 hr avg response** (ServicePac part num 69P9207)
 - **5 year IOR 24x7, 2 hr avg response** (ServicePac part num 69P9205)
- **Other ServicePac options at <http://www-1.ibm.com/services/us/its/pdf/wamomxeu.pdf>**
- ↔ **24x7¹⁴ toll-free support for warranty issues during the warranty period³**

IBM® Type-model	Supported Blades	Blade Servers std / max	Switch modules std / max	Switch modules (type)	Advanced Management modules std / max	Power modules std / max	Power module Wattage	Fan modules std / max	Mechanical	Available date
8750-1RX	HS20/HS21/JS20/JS21/LS20/LS21/LS41/AMC/NGW	0 / 12	0 / 8	Enet, 10Gb Enet, Fibre Ch, IB, 4X IB, OPM and CPM	1 / 2	2 / 4	2535W (DC -48V)	4 / 4	12U ⁴ rack	Jun 2007
Positioning Description	Leadership High Speed, High Performance, carrier grade blade platform for Next Generation Network applications									
Blade bays	Provides common resources shared by blade servers such as power, system management, cabling, ethernet management and expansion, external storage switching and connectivity, and I/O (USB and video) Supports all blades and Blade Expansion Units / 12 hot-swappable bays / front access									
High Speed Switch Modules	Std: none; max: four/ hot-swap / front access / 10Gb Ethernet / 4X InfiniBand / Copper 4X Pass-thru									
Legacy SwitchModules	Std: none; max: four/ hot-swap / front access / Gb Eth / 10Gb Eth uplink / 4Gb Fibre Channel / 4X InfiniBand uplink / Optical Pass-thru / Copper Pass-thru /									
Advanced Management Modules	Std: one; max: two / hot-swap / front access / comprehensive system management functions / PowerPC®440GP controller / communicates with integrated system management processor on each server blade / complete KVM switch local functionality / ports: DB-15 analog video port, Dual USB 2.0, Serial(RJ45), 10/100 ethernet remote management connection port									
Power Modules	Std: two; max: four / hot-swap / front access / input voltage range -48VDC to -60VDC (Min/Max) / redundant within pair (N+N redundancy) / power modules 1 and 2 support blade bays 1- 6, all legacy switch and bridge modules, upper and lower media trays, both advanced management modules, multiplexer expansion modules and alarm panel module / power modules 3 and 4 support blade bays 7-12 and all High Speed Switch Modules / worldwide / auto-restart / 3 fans per power module									
Fan Modules	Std/max: four / hot-swap / redundant / speed controlled according to ambient air temperature / rear access / front to back airflow									
Mechanical	EIA 19" rack models (12U⁴) x 706mm deep / supported in NetBAY™ Racks with seismic bracing									
Media Tray	Std: one; max: two / two USB 2.0 ports / two internal compact flash slots / Full Light Path Diagnostic panel / customer serviceable / hot swap / front access / shared by all blade servers / requests for USB ports by pressing media select button on server blade front panel									
Keyboard / mouse	None standard / USB / provides KVM console support / requests for keyboard, mouse and video by pressing the display button on server blade front panel									
Ports	Rear: DB-15 telco alarm panel interface and one DB-50 blade serial aggregate for break out cable (both on alarm panel module); Front: two or four USB 2.0 (Media Tray)									
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	Each of the dual integrated gigabit ethernet controllers on each blade connects to an optional <i>GB Ethernet Switch Module</i>									
Systems mgmt	Provides remote console and mgmt / power on/off/reset blades/modules / monitors power status, operating system, temperature, disks, fans, power modules / system diagnostic programs provided through IBM Director software / Remote Deployment Manager									
System LED panel	System LED panel provides power-on, location, Critical, Major and Minor telecom alarm indicators, front and rear of chassis									



- Dimensions: H21" x W17.4" x D27.8"
- Dimensions: H528mm x W441.9mm x D706mm
- Weight: 150 to 350 lb; 62.8 to 159kg
- Power input type: 4x 4-post terminal, -48VDC to -60VDC, 60A per input
- Stealth black color bezel
- Tool-free customer serviceability
- Access Mgmt modules, blade servers, expansion units, I/O modules and power modules from front
- Midplane in rear of system to interface for all system components
- Predictive Failure Analysis® alerts on fans, blade server memory, processor(s), and optional disk(s) with IBM Director
- NEBS Level 3 (Class A) / ETSI Compliant

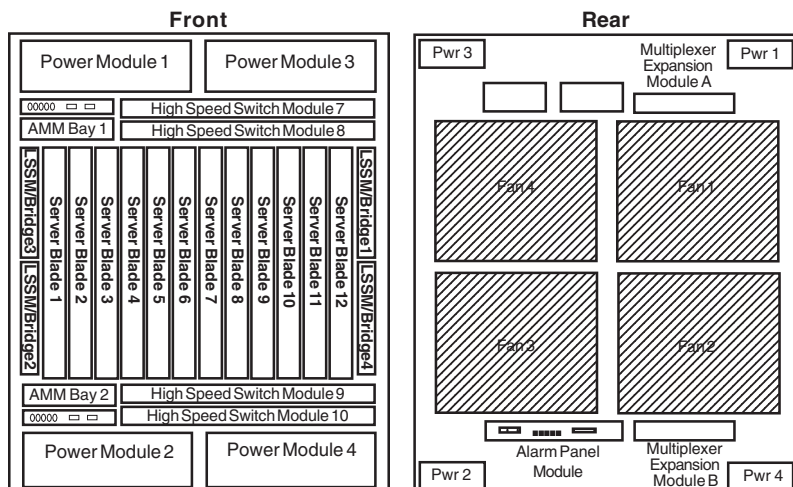
LIMITED WARRANTY³

- 3 year parts and labor
- International Warranty Service³
- On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time⁷
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 - 3 year IOR 24x7, 2 hr avg response (ServicePac® part num 21P2065)
 - 3 year IOR 24x7, 4 hr avg response (ServicePac part num 30L9185)
 - 3 year IOR 9x5, 4 hr avg response (ServicePac part num 41L2736)
 - 5 year IOR 9x5, 4 hr avg response (ServicePac part num 69P9207)
 - 5 year IOR 24x7, 2 hr avg response (ServicePac part num 69P9209)
 - Other ServicePac options at <http://www-1.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- 24x7¹⁴ toll-free support for warranty issues during the warranty

BladeCenterHTDCPowerSupplyModule	42C5279
BladeCenter HT 2-Post Rack mount Kit	42C5281
BladeCenter HT 4-Post Rack mount Kit (for IBM 7014/9308)	42C5284
BladeCenter HT SW/Bridge Interposer Tray	42C5300
BladeCenter HT HSS Interposer w/Thumb Screws	42C5302
BladeCenter HT Advanced Management Module Interposer	42C5315
IBM BladeCenter Advanced Management Module	25R5778
BladeCenter HT RedundantMedia Tray	42C5305
BladeCenter HT Filter (4 pack)	42C5316
BladeCenter HT Bezel w/Air Filter & Cable Mgmt Collar	42C5278
BladeCenter HT Compact Flash 1GB Option	42C5307
BladeCenter HT Compact Flash 4GB Option	42C5310
Cisco Systems Fiber Intelligent Gigabit Ethernet Switch Module	32R1888
Cisco Systems Gigabit Ethernet Switch Module	32R1892
Qlogic 20 Port 4Gb SAN Switch Module	26R0881
Brocade 20 Port 4Gb SAN Switch Module	32R1812

- Other options at ibm.com/products/us
- Solutions available from IBM BladeCenter Alliance program partners

IBM® Type-model	Supported Blades	Blade Servers std / max	Switch modules std / max	Switch modules (type)	Advanced Management modules std / max	Power modules std / max	Power module Wattage	Fan modules std / max	Mechanical	Available date
8750-1RX	HS20/HS21/JS20/JS21/LS20/LS21/LS41/AMC/NGW	0 / 12	0 / 8	Enet, 10Gb Enet, Fibre Ch, IB, 4X IB, OPM and CPM	1 / 2	2 / 4	3160W (AC 240V)	4 / 4	12U ⁴ rack	Jun 2007
Positioning Description	Leadership High Speed, High Performance, carrier grade blade platform for Next Generation Network applications Provides common resources shared by blade servers such as power, system management, cabling, ethernet management and expansion, external storage switching and connectivity, and I/O (USB and video)									
Blade bays	Supports all blades and Blade Expansion Units / 12 hot-swappable bays / front access									
High Speed Switch Modules	Std: none; max: four/ hot-swap / front access / 10Gb Ethernet / 4X InfiniBand / Copper 4X Pass-thru									
Legacy SwitchModules	Std: none; max: four/ hot-swap / front access / Gb Eth / 10Gb Eth uplink / 4Gb Fibre Channel / 4X InfiniBand uplink / Optical Pass-thru / Copper Pass-thru /									
Advanced Management Modules	Std: one; max: two / hot-swap / front access / comprehensive system management functions / PowerPC®440GP controller / communicates with integrated system management processor on each server blade / complete KVM switch local functionality / ports: DB-15 analog video port, Dual USB 2.0, Serial(RJ45), 10/100 ethernet remote management connection port									
Power Modules	Std: two; max: five / hot-swap / front access / input voltage range -48VDC to -60VDC (Min/Max) at 50/60Hz / redundant within pair (N+N redundancy) / power modules 1 and 2 support blade bays 1- 6, all legacy switch and bridge modules, upper and lower media trays, both advanced management modules, multiplexer expansion modules and alarm panel module / power modules 3 and 4 support blade bays 7-12 and all High Speed Switch Modules / worldwide / voltage-sensing / auto-restart / 3 fans per power module									
Fan Modules	Std/max: four / hot-swap / redundant / speed controlled according to ambient air temperature / rear access / front to back airflow									
Mechanical	EIA 19" rack models (12U⁴) x 706mm deep / supported in NetBAY™ Racks with seismic bracing									
Media Tray	Std: one; max: two / two USB 2.0 ports / two internal compact flash slots / Full Light Path Diagnostic panel / customer serviceable / hot swap / front access / shared by all blade servers / requests for USB ports by pressing media select button on server blade front panel									
Keyboard / mouse	None standard / USB / provides KVM console support / requests for keyboard, mouse and video by pressing the display button on server blade front panel									
Ports	Rear: DB-15 telco alarm panel interface and one DB-50 blade serial aggregate for break out cable (both on alarm panel module); Front: two or four USB 2.0 (Media Tray)									
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	Each of the dual integrated gigabit ethernet controllers on each blade connects to an optional <i>GB Ethernet Switch Module</i>									
Systems mgmt	Provides remote console and mgmt / power on/off/reset blades/modules / monitors power status, operating system, temperature, disks, fans, power modules / system diagnostic programs provided through IBM Director software / Remote Deployment Manager									
System LED panel	System LED panel provides power-on, location, Critical, Major and Minor telecom alarm indicators, front and rear of chassis									



- Dimensions: H21" x W17.4" x D27.8"
- Dimensions: H528mm x W441.9mm x D706mm
- Weight: 150 to 350 lb; 62.8 to 159kg
- Power input type: 4x C20, 200-240VAC, 16A per input
- Stealth black color bezel
- Tool-free customer serviceability
- Access Mgmt modules, blade servers, expansion units, I/O modules and power modules from front
- Midplane in rear of system to interface for all system components
- Predictive Failure Analysis® alerts on fans, blade server memory, processor(s), and optional disk(s) with IBM Director
- NEBS Level 3 (Class A) / ETSI Compliant

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 - 5 year IOR 24x7, 2 hr avg response (ServicePac part num 69P9209)
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BladeCenter HT AC Power Supply Module	42C5280
BladeCenter HT 2-Post Rack mount Kit	42C5281
BladeCenter HT 4-Post Rack mount Kit (for IBM 7014/9308)	42C5284
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BladeCenter HT HSS Interposer w/Thumb Screws	42C5302
BladeCenter HT Advanced Management Module Interposer	42C5315
IBM BladeCenter Advanced Management Module	25R5778
BladeCenter HT Redundant Media Tray	42C5305
BladeCenter HT Filter (4 pack)	42C5316
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BladeCenter HT Compact Flash 4GB Option	42C5310
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Brocade 20 Port 4Gb SAN Switch Module	32R1812

• Other options at ibm.com/products/us
 • Solutions available from IBM BladeCenter Alliance program partners

See footnotes for important warranty information

IBM® Type-model	Processor	GHz¹	L2 Core cache	Watts	Memory	Disk	OS	Graphics adapter	Mechanical	Ethernet	Available date
7996-21x 1 x Core™2 Duo E6300	1.86 DC 2MB	65W	1GB 60GB SATA	Vista 64-bit	Quadro® NVS 120M	single slot blade	1 x Gb	Sep 2007			
7996-51x 1 x Core 2 Duo E6700	2.66 DC 4MB	65W	2GB 60GB SATA	Vista 64-bit	Quadro NVs 120M	single slot blade	1 x Gb	Sep 2007			
7996-5Ax 1 x Core 2 Duo E6700	2.66 DC 4MB	65W	2GB 60GB SATA	Vista 64-bit	Quadro FX 1600M	single slot blade	1 x Gb	Sep 2007			
7996-5Bx 1 x Core 2 Duo E6700	2.66 DC 4MB	65W	4GB 60GB SATA	Vista 64-bit	Quadro FX 1600M	single slot blade	1 x Gb	Sep 2007			

Positioning Processor(s)	Flagship Server-Based Computing for workstation customers providing security, lower TCO, manageability, flexibility and availability Intel® Core 2 Duo up to 1.86GHz / 2MB L2 ECC Cache / Core 2 Duo up to 2.66GHz / 4MB L2 ECC Cache / All 1066MHz FSB / All Dual-Core / All optimized for Extended Memory 64 Technology (EM64T)
SMP L2 Cache Implementation	Single Processor, no upgrade 2 or 4MB std and max / at processor speed Systemboard contains one Intel LGA775 socket, four DIMM slots, support for either Intel integrated graphics or one MXM3 form factor graphics connector, one I/O and Graphics transmission adapter connector, one on-board Gigabit ethernet NIC and one Gigabit ethernet connection for remote video
Memory	1, 2 or 4GB std / 8GB ¹³ max / two slots used / two slots available / on base blade / PC2-5300 667MHz un-buffered DDR2-SDRAM DIMMs / non-ECC / DIMMs must be installed in matched pairs [a bank] / dual-channel /
Graphics Controller	Professional 2D: Nvidia® Quadro NVS 120M / 128MB / PCI-Express 16x / UXGA Advanced 3D: Nvidia Quadro FX 1600M / 256MB / PCI-Express 16x / UXGA
SATA disk controller	SATA controller / integrated in ICH8 / 300MB/sec / support for one 2.5" SATA disks
SATA disk bay	One 2.5-inch Small Form Factor (SFF) SATA internal fixed disk bays
External Storage	Support for IBM TotalStorage solutions
Mechanical Architecture/Chipset	Single slot blade / Supported in IBM BladeCenter 8677, 8720, 8730 and 8852 Intel Q965 Express chipset / Graphics Memory Controller Hub provides: integrated graphics and PCI-Express 16x link to MXM3 video adapter / Integrated Controller Hub 8 (ICH8) provides: SATA, USB 2.0, PCI-Express 1x link to I/O and Graphics transmission adapter, PCI-Express x1 link to Broadcom® 5708S, LPC bus to PC87427 for Super I/O
Ethernet	Gigabit Ethernet controller / Broadcom 5708S / full gigabit ethernet MAC and PHY layer functions / chip on blade / PCI-Express / full-duplex / TCP/IP Offload Engine (TOE) / Wake on LAN / Serial over LAN / PXE 2.0 Boot agent / Alert Standard Format 2.0 / controller connects to integrated Broadcom 5389 switch chip / BCM 5389 provides Ethernet and Video Compression interface to I/O Switch Modules
DVD / diskette	Optional via USB at Remote Desktop Appliance / requests for DVD-ROM, diskette and USB port in BladeCenter by pressing media select button on front control panel
Keyboard / mouse	Provided by Remote Desktop Appliance / USB only
Systems Mgmt	IBM Baseboard Management Controller (BMC) / H8S2166 / on blade / provides system and environmental monitoring, event recording, alert capability / RS-485 interface for intermanagement communication with BladeCenter Management module
Security	No security intrusion protection / Power-on password / administrator password / unattended boot / selectable boot
Software ship group	Documentation CD, Broadcom CD, ServerGuide CD
Cooling Fans	Uses cooling from BladeCenter (types 8677, 8720, 8730, 8852) / thermal sensors on each processor and BladeCenter modules and front panel
Power supply(s)	Uses power module(s) in BladeCenter (types 8677, 8720, 8730, 8852)
Prerequisites	Monitor, keyboard, mouse for setup; ethernet switch module, disk, BladeCenter (types 8677, 8720, 8730, 8852)

Server blade (top view)

Bay ① 2.5", 9.5mm, no front access, 2.5-inch SFF SAS 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
- ❖ 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 HC10 blade server provides media select button, keyboard/mouse/video select button, and indicators for blade error, information, location, disk activity, power and power state indication
- ❖ **Preinstalled¹⁷ OS: Windows® Vista Business Blade PC Edition**
- ❖ **Supported¹⁷ OS: Windows XP Professional 64-bit Edition**

1GB (2x512) PC2-5300 CL5 DDR2 667MHz Kit	41Y2822
2GB (2x1GB) PC2-5300 CL5 DDR2 667MHz Kit	41Y2825
4GB (2x2GB) PC2-5300 CL5 DDR2 667MHz Kit	41Y2828
IBM CP20 Workstation Connection Device	3096CDX
Other options at ibm.com/products/us	

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

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

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, 4 hr avg response (ServicePac[®] part num 44T6086)
 - 3 year IOR 9x5, 4 hr avg response (ServicePac part num 44T6087)
 - 3 year IOR 24x7, 4 hr avg response (ServicePac part num 44T6088)
 - 3 year IOR 24x7, 2 hr avg response (ServicePac part num 44T6089)
- ❖ Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- ❖ 24x7¹⁴ toll-free support for warranty issues during the warranty period³

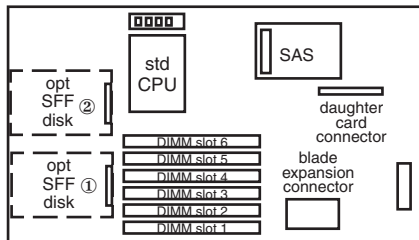
See footnotes for important warranty information

IBM® Type-model	Processor	GHz¹ / Core / L2	FSB MHz	Watts	Memory	Disk controller	Disk bays	Expansion Units	I/O slots	Mechanical	Ethernet	Available date
8014-1Ax	1 x Celeron® 445	1.86/SC/512KB	1066	65W	512MB	SATA	2-fixed	BSE3/PEU3e	up to 2	single slot blade	Dual Gb	May 2008
8014-2Bx	1 x Core™ 2 Duo E6305	1.86/DC/2MB	1066	65W	2GB	SATA	2-fixed	BSE3/PEU3e	up to 2	single slot blade	Dual Gb	May 2008
8014-EBx	1 x Core 2 Duo E6305	1.86/DC/2MB	1066	65W	4GB	SATA	2-fixed	BSE3/PEU3e	up to 2	single slot blade	Dual Gb	May 2008
8028-23x	1 x Xeon™ E6405	2.13/DC/2MB	1066	65W	2GB	SAS	2-hot-swap	BSE3/PEU3e	up to 2	single slot blade	Dual Gb	May 2008
8028-44x	1 x Xeon X3323	2.5/QC/6MB	1333	80W	2GB	SAS	2-hot-swap	BSE3/PEU3e	up to 2	single slot blade	Dual Gb	May 2008
8028-45x	1 x Xeon X3353	2.66/QC/12MB	1066	80W	2GB	SAS	2-hot-swap	BSE3/PEU3e	up to 2	single slot blade	Dual Gb	May 2008
8028-46x	1 x Xeon X3363	2.83/QC/12MB	1066	80W	2GB	SAS	2-hot-swap	BSE3/PEU3e	up to 2	single slot blade	Dual Gb	May 2008
8028-E3x	1 x Xeon E6405	2.13/DC/2MB	1066	65W	4GB	SAS	2-hot-swap	BSE3/PEU3e	up to 2	single slot blade	Dual Gb	May 2008
8028-4Lx	1 x Xeon L5420	2.5/QC/12MB	1333	50W	2GB	SAS	2-hot-swap	BSE3/PEU3e	up to 2	single slot blade	Dual Gb	Sep 2008
Processor(s)	Intel® Xeon up to 2.83GHz with up to 1333MHz FSB / up to 12MB L2 / Quad or Dual-Core / Intel Core 2 Duo at 1.86GHz with 1066MHz FSB / 2MB L2 / Dual-Core / Intel Celeron at 1.86GHz with 1066MHz FSB / 512KB / Single-Core / All EM64T											
Implementation	Systemboard contains one Intel LGA771 socket, six DIMM slots, one High Speed Daughter Card connector, one I/O expansion option connector, integrated graphics, dual Gigabit ethernet and SATA or SAS											
Memory	512MB or 2GB std / 24GB¹³ max / one or two slots used / four or five slots available / on base blade / PC2-5300 667MHz 240-pin ECC DDR2-SDRAM VLP (Very Low-Profile) DIMMs / DIMMs must be installed in matched pairs for optimal performance / dual channel / Error Checking and Correcting (ECC) via 16-bit Checksum Chipkill™ and memory scrubbing											
SAS disk controller	LSI Logic® 1064E SAS controller / two port / 3.0Gb/sec / on interface card / PCI-Express / supports RAID-0 & 1											
SAS Disk bays	Two 2.5-inch Small Form Factor (SFF) hot-swap SAS or hot-swap Solid State Drives / Supports max of three hot-swap SFF SAS disks in optional Storage and I/O Expansion Unit											
SATA disk controller	Integrated into chipset / 3.0 Gb/sec / two port											
SATA Disk bays	Two 2.5-inch Small Form Factor (SFF) SATA internal fixed disk bays / supports HDD and SSD (fixed in 8014, hot-swap in 8028)											
External Storage	Support for IBM TotalStorage™ solutions											
Mechanical	Single-wide(30mm) / full-height / Supported in IBM BladeCenter											
Architecture/Chipset	Intel 5100 chipset / Memory Controller Hub and ICH9 / I/O Controller Hub provides: High Speed Daughter Card connector, BSE connector and LSI 1064E SAS / ICH9 provides: USB (2.0), ATI video, SATA, Legacy Daughter Card connector, Dual GB ethernet, LPC bus to NS PC87427 for Super I/O											
BUS slots	Standard PCI Express HBA slots via PEU3e Expansion Unit											
Ethernet	Dual Gigabit Ethernet controller / Broadcom® 5714S / two full gigabit ethernet MAC and PHY layer functions / chip on blade / PCI-Express / full duplex / Wake on LAN® / iSCSI / Serial over LAN / PXE 2.0 Boot agent / adapter fault tolerance / Load balancing or teaming / one of the dual controllers connects to an optional, supported Ethernet switch or Optical Passthrough Module (the second controller requires a second optional switch or OPM)											
Network Interface	One legacy connector or PCI-Express connector for I/O expansion options / 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)											
DVD / diskette / USB Kymb / video / mouse	None / requests for DVD-ROM, diskette and USB port in BladeCenter by pressing media select button on front control panel											
Graphics controller	None / requests for keyboard, mouse, and video in BladeCenter by pressing the display button on front control panel											
Systems Mgmt	IBM Baseboard Management Controller (BMC) / H8S2166 / on blade / provides system and environmental monitoring, event recording, alert capability / RS-485 interface for intermanagement communication with BladeCenter Management module											
Diagnostics	Light Path Diagnostics™ (LED lights indicate failing component) and diagnostics via ROM based preboot DSA											
Security	No security intrusion protection / Power-on password / administrator password / unattended boot / selectable boot / unattended start mode											
Software ship group	Documentation CD, ServerGuide CD											
Cooling Fans	Uses cooling from BladeCenter / thermal sensors on each processor, BladeCenter modules and front panel											
Power supply(s)	Uses power module(s) in BladeCenter											
Prerequisites	Monitor, keyboard, mouse for setup; ethernet switch module, disk, BladeCenter, operating system											

- IBM 73GB 10K SAS 2.5" SFF Slim-HS HDD 43W7535
- IBM 80GB 7200RPM SATA 2.5" NHS HDD 43W7640
- IBM 15.8GB 2.5" Solid State Drive 43W7614
- IBM 31.4GB 2.5" Solid State Drive 43W7618
- IBM 31.4GB SATA 2.5" SFF Slim-HS SSD 43W7648
- 1GB (2x512) PC2-5300 CL5 ECC DDR2 RDIMM 667MHz Kit 39M5861
- 2GB (2x1GB) PC2-5300 CL5 ECC DDR2 RDIMM 667MHz Kit 39M5864
- 4GB (2x2GB) PC2-5300 CL5 ECC DDR2 RDIMM 667MHz Kit 46C0512

Other options at ibm.com/products/us

Server blade (side view)



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

- ⊖ Stealth black front bezel
- ⊖ H 9.7" x W 1.14" x D 17.6"; H 24.5cm x W 2.9cm x D 44.6cm
- ⊖ 12 lbs; 5.4kg (max configuration)
- ⊖ Configuration/Setup Utility: F1 at startup
- ⊖ Diagnostics: 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 HS12 blade server provides media select button, keyboard/mouse/video 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

LIMITED WARRANTY³

- ⊖ 8014 MT - 1 year parts and labor
- ⊖ 8028 MT - 3 year parts and labor
- ⊖ International Warranty Service³
- ⊖ On site, 8 am-5 pm, Mon-Fri excluding holidays, next business day response time
- ⊖ 8028 MT On site service upgrade options (in eligible locations):⁷
 - 4 year IOR 9x5, NBD response (ServicePac® part num 46V4568)
 - 4 year IOR 9x5, 4 hr avg response (ServicePac part num 46V4569)
 - 4 year IOR 24x7, 4 hr avg response (ServicePac part num 46V4570)
 - 4 year IOR 24x7, 2 hr avg response (ServicePac part num 46V4571)
- ⊖ Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- ⊖ 24x7¹⁴ toll-free support for warranty issues during the warranty period³

Maximum internal disk capacity for each HS12 blade server¹³:
 292GB with two 146GB SAS disks (with BladeCenter Storage Expansion Unit 3 x 146GB for total of 730GB)

IBM® Type-model	Processor	GHz	L2 Core cache	FSB MHz	Watts	Memory	Disk controller	Disk bays	Expansion Units	I/O slots	Mechanical	Ethernet	Available date
8853-L1x 1	x Xeon™ 5110	1.6	DC 4MB	1066	65W	1GB	SAS	2-fixed	MIO/SIO/PCIEU	up to 2	single slot blade	2 x GB	Aug 2006
8853-L2x 1	x Xeon 5120	1.86	DC 4MB	1066	65W	1GB	SAS	2-fixed	MIO/SIO/PCIEU	up to 2	single slot blade	2 x GB	Aug 2006
8853-L3x 1	x Xeon 5130	2.0	DC 4MB	1333	65W	1GB	SAS	2-fixed	MIO/SIO/PCIEU	up to 2	single slot blade	2 x GB	Aug 2006
8853-L4x 1	x Xeon 5140	2.33	DC 4MB	1333	65W	1GB	SAS	2-fixed	MIO/SIO/PCIEU	up to 2	single slot blade	2 x GB	Aug 2006
8853-L5x 1	x Xeon 5150	2.66	DC 4MB	1333	65W	1GB	SAS	2-fixed	MIO/SIO/PCIEU	up to 2	single slot blade	2 x GB	Aug 2006
8853-L6x 1	x Xeon 5160	3.0	DC 4MB	1333	80W	1GB	SAS	2-fixed	MIO/SIO/PCIEU	up to 2	single slot blade	2 x GB	Aug 2006
8853-A1x 1	x Xeon E5310	1.6	QC 8MB	1066	80W	2GB	SAS	2-fixed	MIO/SIO/PCIEU	up to 2	single slot blade	2 x GB	Jan 2007
8853-C1x 1	x Xeon E5320	1.86	QC 8MB	1066	80W	2GB	SAS	2-fixed	MIO/SIO/PCIEU	up to 2	single slot blade	2 x GB	Jan 2007
8853-NTx 1	x Xeon 5138 LV	2.13	DC 4MB	1333	35W	1GB	SAS	2-fixed	MIO/SIO/PCIEU	up to 2	single slot blade	2 x GB	Jan 2007
8853-H1x 1	x Xeon 5148 LV	2.33	DC 4MB	1333	40W	1GB	SAS	2-fixed	MIO/SIO/PCIEU	up to 2	single slot blade	2 x GB	Jan 2007
8853-A2x 1	x Xeon E5335	2.0	QC 8MB	1333	80W	2GB	SAS	2-fixed	MIO/SIO/PCIEU	up to 2	single slot blade	2 x GB	Feb 2007
8853-C2x 1	x Xeon E5345	2.33	QC 8MB	1333	80W	2GB	SAS	2-fixed	MIO/SIO/PCIEU	up to 2	single slot blade	2 x GB	Feb 2007

Processor(s)	1 x Intel® Xeon up to 1.86GHz with 1066MHz FSB / 1 x Intel Xeon up to 3.0GHz with 1333MHz FSB / 4MB L2 ECC Cache / Dual-Core / 1 x Intel Xeon up to 2.33GHz with 1333MHz FSB / 8MB L2 ECC Cache / Quad-Core / All EM64T / NTx and H1x feature Low Voltage processors for reduced heat and power consumption, allowing even greater performance per watt												
SMP - L2 Cache Implementation	2-way SMP / up to two Xeon Processors (same speed/cache size) / 4 or 8MB std and max / at processor speed Systemboard contains two Intel LGA771 sockets, four DIMM slots, one High Speed Daughter Card connector, one I/O expansion option connector, integrated graphics and dual Gigabit ethernet												
Memory	1 or 2GB std / 16GB ¹³ max / two slots used / two slots available / on base blade / PC2-5300 667MHz FBD 240-pin ECC DDR2-SDRAM DIMMs / DIMMs must be installed in matched pairs [a bank] / 2-way memory interleave / dual channel / ECC (corrects any x4 or x8 SDRAM device failure, detects all two wire faults on DIMMs, detects all permutations of two x4 DRAM failures, detects any two bits in error within 8 bytes of data, corrects any single bit error within 8 bytes of data) / memory sparing / Additional memory DIMMs can be added to each base HS21 with the Memory and I/O Expansion Unit, allowing up to 32GB of memory per blade												
SAS disk controller	LSI Logic® 1064E SAS controller / two port / 300MB/sec / on planar / 64-bit PCI-Express / supports RAID-0 & 1 mirroring / two 29-pin SFF SAS cables												
SAS Disk bays	Two 2.5-inch Small Form Factor (SFF) SAS internal fixed disk bays / Supports max of three hot-swap SFF SAS disks in optional Storage and I/O Expansion Unit												
External Storage	Support for IBM TotalStorage™ solutions												
Mechanical Architecture/Chipset	Single slot blade / Supported in IBM BladeCenter 8677, 8720, 8730 and 8852 (L6x only supported in 8852) Intel 5000P chipset / Intel Memory Controller Hub (MCH) provides PCI-Express bridge to Enterprise South Bridge 2(ESB2M), High Speed Daughter Card connector and BSE connector / ESB2M provides: USB (2.0), ATI video, Legacy Daughter Card connector, Dual GB ethernet, LSI 1064E SAS, LPC bus to NS PC87427 for Super I/O												
BUS slots	No PCI or PCI-X slots (expansion via modules or network-interface option connector)												
Ethernet	Dual gigabit 10/100/1000 ethernet controller / Broadcom® 5708S / two full gigabit ethernet MAC and PHY layer functions / chip on blade / PCI-Express / full duplex / TCP/IP Offload Engine (TOE) / Wake on LAN® / iSCSI / Serial over LAN / PXE 2.0 Boot agent / Alert Standard Format 2.0 / Failover, adapter fault tolerance / Load balancing or teaming / one of the dual controllers connects to an optional, supported Ethernet switch or Optical Passthrough Module (the second controller requires a second optional switch or OPM)												
Network Interface	One legacy connector or PCI-Express connector for I/O expansion options / 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)												
DVD / diskette / USB Kybd / video / mouse Graphics controller	None / requests for DVD-ROM, diskette and USB port in BladeCenter by pressing media select button on front control panel None / requests for keyboard, mouse, and video in BladeCenter by pressing the display button on front control panel SVGA / ATI® ES1000 (RN50) on Planar / 16MB DDR std/max / 32-bit 33MHz PCI 2.2 bus												
Systems Mgmt	IBM Baseboard Management Controller (BMC) / H8S2166 / on blade / provides system and environmental monitoring, event recording, alert capability / RS-485 interface for intermanagement communication with BladeCenter Management module												
Diagnostics	Light Path Diagnostics™ (LED lights indicate failing component) and on-board diagnostics (via PC-Doctor in BIOS)												
Security	No security intrusion protection / Power-on password / administrator password / unattended boot / selectable boot / unattended start mode												
Software ship group	Documentation CD, Broadcom CD, ServerGuide CD												
Cooling Fans	Uses cooling from BladeCenter (types 8677, 8720, 8730, 8852) / thermal sensors on each processor and BladeCenter modules and front panel												
Power supply(s) Prerequisites	Uses power module(s) in BladeCenter (types 8677, 8720, 8730, 8852) Monitor, keyboard, mouse for setup; ethernet switch module, disk, BladeCenter (types 8677, 8720, 8730, 8852), operating system												

Server blade (side view)

- memory expansion connector
- opt CPU
- std CPU
- DIMM slot 1
- DIMM slot 2
- DIMM slot 3
- DIMM slot 4
- blade expansion connector
- DIMM expansion connector
- opt SFF disk
- daughter card connector

- 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 HS21 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

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

Maximum internal disk capacity for each HS21 blade server¹³:
292GB with two 146GB SAS disks (with BladeCenter Storage Expansion Unit 3 x 146GB for total of 730GB)

LIMITED WARRANTY³

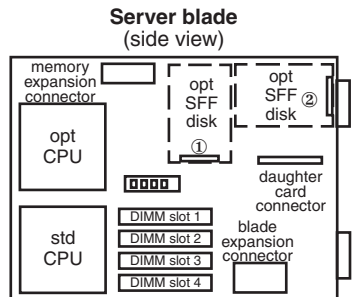
- 3 year parts and labor
- International Warranty Service³
- On site, 8 am-5 pm, Mon-Fri excluding holidays, next business day response time
- On site service upgrade options (in eligible locations):⁷
 - 4 year IOR 9x5, NBD response (ServicePac® part num 69P9520)
 - 4 year IOR 9x5, 4 hr avg response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

See footnotes for important warranty information

IBM® Type-model	Processor	GHz¹	L2 Core	FSB cache	Disk Memory	Disk controller	Disk bays	Expansion Units	I/O slots	Mechanical	Ethernet	Available date		
8853-J1x	1 x Xeon™ L5310	1.6	QC	8MB	1066	50W	2GB	SAS	2-fixed	MIO/SIO/PCIEU	up to 2	single slot blade	2 x GB	Apr 2007
8853-J2x	1 x Xeon L5320	1.86	QC	8MB	1066	50W	2GB	SAS	2-fixed	MIO/SIO/PCIEU	up to 2	single slot blade	2 x GB	Apr 2007
8853-C3x	1 x Xeon X5355	2.66	QC	8MB	1333	120W	2GB	SAS	2-fixed	MIO/SIO/PCIEU	up to 2	single slot blade	2 x GB	Apr 2007
8853-C4x	1 x Xeon X5365	3.0	QC	8MB	1333	120W	2GB	SAS	2-fixed	MIO/SIO/PCIEU	up to 2	single slot blade	2 x GB	Sep 2007
8853-G1x	1 x Xeon E5405	2.0	QC	12MB	1333	80W	2GB	SAS	2-fixed	MIO/SIO/PCIEU	up to 2	single slot blade	2 x GB	Dec 2007
8853-G3x	1 x Xeon E5420	2.5	QC	12MB	1333	80W	2GB	SAS	2-fixed	MIO/SIO/PCIEU	up to 2	single slot blade	2 x GB	Dec 2007
8853-G4x	1 x Xeon E5430	2.66	QC	12MB	1333	80W	2GB	SAS	2-fixed	MIO/SIO/PCIEU	up to 2	single slot blade	2 x GB	Dec 2007
8853-G5x	1 x Xeon E5440	2.83	QC	12MB	1333	80W	2GB	SAS	2-fixed	MIO/SIO/PCIEU	up to 2	single slot blade	2 x GB	Dec 2007
8853-G6x	1 x Xeon E5450	3.0	QC	12MB	1333	80W	2GB	SAS	2-fixed	MIO/SIO/PCIEU	up to 2	single slot blade	2 x GB	Dec 2007
8853-G7x	1 x Xeon X5460	3.16	QC	12MB	1333	120W	2GB	SAS	2-fixed	MIO/SIO/PCIEU	up to 2	single slot blade	2 x GB	Jan 2008
8853-EHx	2 x Xeon E5450	3.0	QC	12MB	1333	80W	4GB	SAS	2-fixed	MIO/SIO/PCIEU	up to 2	single slot blade	2 x GB	Dec 2007
8853-R2x	1 x Xeon X5260	3.33	DC	6MB	1333	80W	2GB	SAS	2-fixed	MIO/SIO/PCIEU	up to 2	single slot blade	2 x GB	Feb 2008

Processor(s)	Intel® Xeon up to 3.33GHz with 1333MHz FSB / 6MB L2 / Dual-Core / Intel Xeon up to 1.86GHz with 1066MHz FSB / 8MB L2 ECC Cache / Quad-Core / Intel Xeon up to 3.16GHz with 1333MHz FSB / 12MB L2 ECC Cache / Quad-Core / All EM64T / J1x and J2x feature Low Voltage processors for reduced heat and power consumption, allowing greater performance per watt											
SMP - L2 Cache Implementation	2-way SMP / up to two Xeon Processors (same speed/cache size) / 6, 8 or 12MB std and max / ecc / at processor speed											
Memory	Systemboard contains two Intel LGA771 sockets, four DIMM slots, one High Speed Daughter Card connector, one I/O expansion option connector, integrated graphics and dual Gigabit ethernet											
SAS disk controller	LSI Logic® 1064E SAS controller / two port / 300MB/sec / on planar / 64-bit PCI-Express / supports RAID-0 & 1 mirroring / two 29-pin SFF SAS cables											
SAS Disk bays	Two 2.5-inch Small Form Factor (SFF) SAS internal fixed disk bays / Supports max of three hot-swap SFF SAS disks in optional Storage and I/O Expansion Unit											
External Storage	Support for IBM TotalStorage™ solutions											
Mechanical Architecture/Chipsset	Single slot blade / Supported in IBM BladeCenter (C3x & C4x supported in 8852, G7x supported in 8852, 8740, 8750 & 8886) Intel 5000P chipset / Intel Memory Controller Hub (MCH) provides PCI-Express bridge to Enterprise South Bridge 2 (ESB2M), High Speed Daughter Card connector and BSE connector / ESB2M provides: USB (2.0), ATI video, Legacy Daughter Card connector, Dual GB ethernet, LSI 1064E SAS, LPC bus to NS PC87427 for Super I/O											
BUS slots	No PCI or PCI-X slots (expansion via modules or network-interface option connector)											
Ethernet	Dual gigabit ethernet controller / Broadcom® 5708S / two full gigabit ethernet MAC and PHY layer functions / chip on blade / PCI-Express / full duplex / TCP/IP Offload Engine (TOE) / Wake on LAN® / iSCSI / Serial over LAN / PXE 2.0 Boot agent / Alert Standard Format 2.0 / Failover, adapter fault tolerance / Load balancing or teaming / one of the dual controllers connects to an optional, supported Ethernet switch or Optical Passthrough Module (the second controller requires a second optional switch or OPM)											
Network Interface	One legacy connector or PCI-Express connector for I/O expansion options / 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)											
DVD / diskette / USB	None / requests for DVD-ROM, diskette and USB port in BladeCenter by pressing media 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 controller	SVGA / ATI® ES1000 (RN50) on Planar / 16MB DDR std/max / 32-bit 33MHz PCI 2.2 bus											
Systems Mgmt	IBM Baseboard Management Controller (BMC) / H8S2166 / on blade / provides system and environmental monitoring, event recording, alert capability / RS-485 interface for intermanagement communication with BladeCenter Management module											
Diagnostics	Light Path Diagnostics™ (LED lights indicate failing component) and on-board diagnostics (via PC-Doctor in BIOS)											
Security	No security intrusion protection / Power-on password / administrator password / unattended boot / selectable boot / unattended start mode											
Software ship group	Documentation CD, Broadcom CD, ServerGuide CD											
Cooling Fans	Uses cooling from BladeCenter / thermal sensors on each processor, BladeCenter modules and front panel											
Power supply(s)	Uses power module(s) in BladeCenter											
Prerequisites	Monitor, keyboard, mouse for setup; ethernet switch module, disk, BladeCenter, operating system											

Xeon L5310	1.6GHz/1066/8MB L2 Cache	EM64T Proc Upg	43W1145
Xeon L5320	1.86GHz/1066/8MB L2 Cache	EM64T Proc Upg	43W6084
Xeon X5355	2.66 GHz/1333/8MB L2 Cache	EM64T Proc Upg	43W6088
Xeon X5365	3.0 GHz/1333/8MB L2 Cache	EM64T Proc Upg	43W6133
Xeon E5405	2.0 GHz/1333/12MB L2 Cache	EM64T Proc Upg	44T1716
Xeon E5420	2.5 GHz/1333/12MB L2 Cache	EM64T Proc Upg	44T1742
Xeon E5430	2.66 GHz/1333/12MB L2 Cache	EM64T Proc Upg	44T1724
Xeon E5440	2.83 GHz/1333/12MB L2 Cache	EM64T Proc Upg	44T1740
Xeon E5450	3.0 GHz/1333/12MB L2 Cache	EM64T Proc Upg	44T1728
Xeon X5460	3.16 GHz/1333/12MB L2 Cache	EM64T Proc Upg	44T1738
Xeon X5260	3.33 GHz/1333/6MB L2 Cache	EM64T Proc Upg	44T1792
1GB (2x512)	PC2-5300 CL5 ECC DDR2	Chipkill FBD 667MHz Kit	39M5782
2GB (2x1GB)	PC2-5300 CL5 ECC DDR2	Chipkill FBD 667MHz Kit	39M5785
4GB (2x2GB)	PC2-5300 CL5 ECC DDR2	Chipkill FBD 667MHz Kit	39M5791
8GB (2x4GB)	PC2-5300 CL5 ECC DDR2	Chipkill FBD 667MHz Kit	39M5797
BladeCenter Storage and I/O Expansion Blade			39R7563
BladeCenter Memory and I/O Expansion Blade			42C1600
BladeCenter SFF Fibre Channel Expansion Card			26K4841
QLogic iSCSI Expansion Card for BladeCenter			32R1923
Other options at ibm.com/products/us			



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

- Stealth black front bezel
- H 9.7" x W 1.14" x D 17.6"; H 24.5cm x W 2.9cm x D 44.6cm
- 12 lbs; 5.4kg (max configuration)
- Configuration/Setup Utility: F1 at startup
- Diagnostics (PC-Doctor™): F2 at startup
- System Partition Boot: ALT+F1 at startup
- Network Boot: F12 at startup
- PXE Boot Agent Utility: Ctrl+S at startup
- Blade control panel on each HS21 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

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

Maximum internal disk capacity for each HS21 blade server¹³:
 292GB with two 146GB SAS disks (with BladeCenter Storage Expansion Unit 3 x 146GB for total of 730GB)

LIMITED WARRANTY³

- 3 year parts and labor
- International Warranty Service³
- On site, 8 am-5 pm, Mon-Fri excluding holidays, next business day response time
- On site service upgrade options (in eligible locations):⁷
 - 4 year IOR 9x5, NBD response (ServicePac® part num 69P9520)
 - 4 year IOR 9x5, 4 hr avg response (ServicePac part num 69P9521)
 - 4 year IOR 24x7, 4 hr avg response (ServicePac part num 69P9522)
 - 4 year IOR 24x7, 2 hr avg response (ServicePac part num 69P9523)
- Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- 24x7¹⁴ toll-free support for warranty issues during the warranty period⁹

IBM® Type-model	Processor	GHz	L2 Core cache	FSB MHz	Watts	Memory	Disk controller	Disk bays	Expansion Units	I/O slots	Mechanical	Ethernet	Available date
7995-L1x 1 x Xeon™	5110	1.6	DC 4MB	1066	65W	1GB	SAS	1-fixed	SIO	up to 2	single slot blade	2 x Gb	Feb 2007
7995-L2x 1 x Xeon	5120	1.86	DC 4MB	1066	65W	1GB	SAS	1-fixed	SIO	up to 2	single slot blade	2 x Gb	Feb 2007
7995-L3x 1 x Xeon	5130	2.0	DC 4MB	1333	65W	1GB	SAS	1-fixed	SIO	up to 2	single slot blade	2 x Gb	Feb 2007
7995-L4x 1 x Xeon	5140	2.33	DC 4MB	1333	65W	1GB	SAS	1-fixed	SIO	up to 2	single slot blade	2 x Gb	Feb 2007
7995-L5x 1 x Xeon	5150	2.66	DC 4MB	1333	65W	1GB	SAS	1-fixed	SIO	up to 2	single slot blade	2 x Gb	Feb 2007
7995-L6x 1 x Xeon	5160	3.0	DC 4MB	1333	80W	1GB	SAS	1-fixed	SIO	up to 2	single slot blade	2 x Gb	Feb 2007
7995-A1x 1 x Xeon	E5310	1.6	QC 8MB	1066	80W	2GB	SAS	1-fixed	SIO	up to 2	single slot blade	2 x Gb	Feb 2007
7995-A2x 1 x Xeon	E5335	2.0	QC 8MB	1333	80W	2GB	SAS	1-fixed	SIO	up to 2	single slot blade	2 x Gb	Feb 2007
7995-C1x 1 x Xeon	E5320	1.86	QC 8MB	1066	80W	2GB	SAS	1-fixed	SIO	up to 2	single slot blade	2 x Gb	Feb 2007
7995-C2x 1 x Xeon	E5345	2.33	QC 8MB	1333	80W	2GB	SAS	1-fixed	SIO	up to 2	single slot blade	2 x Gb	Feb 2007
7995-NTx 1 x Xeon	5138 LV	2.13	DC 4MB	1333	35W	1GB	SAS	1-fixed	SIO	up to 2	single slot blade	2 x Gb	Feb 2007
7995-H1x 1 x Xeon	5148 LV	2.33	DC 4MB	1333	40W	1GB	SAS	1-fixed	SIO	up to 2	single slot blade	2 x Gb	Feb 2007
7995-E2x 2 x Xeon	E5345	2.33	QC 8MB	1333	80W	4GB	SAS	1-fixed	SIO	up to 2	single slot blade	2 x Gb	Feb 2007
7995-E5x 2 x Xeon	5150	2.66	DC 4MB	1333	65W	4GB	SAS	1-fixed	SIO	up to 2	single slot blade	2 x Gb	Feb 2007

Processor(s)	1 x Intel® Xeon up to 1.86GHz with 1066MHz FSB / 1 x Intel Xeon up to 3.0GHz with 1333MHz FSB / 4MB L2 ECC Cache / Dual-Core / 1 x Intel Xeon up to 1.86GHz with 1066MHz FSB / 1 x Intel Xeon up to 2.33GHz with 1333MHz FSB / 8MB L2 ECC Cache / Quad-Core / All EM64T / NTx and H1x feature Low Voltage processors for reduced heat and power consumption												
SMP - L2 Cache Implementation	2-way SMP / up to two Xeon Processors (same speed/cache size) / 4 or 8MB L2 std and max / at processor speed Systemboard contains two Intel LGA771 sockets, eight DIMM slots, one High Speed Daughter Card connector, one I/O expansion option connector, integrated graphics and dual Gigabit ethernet												
Memory	1 or 2GB std / 32GB ¹³ max / two slots used / six slots available / on base blade / PC2-5300 667MHz FBD 240-pin ECC DDR2-SDRAM DIMMs / DIMMs must be installed in matched pairs [a bank] / 2-way memory interleave / dual channel / ECC (corrects any x4 or x8 SDRAM device failure, detects all two bit faults on DIMMs, detects all permutations of two x4 DRAM failures, detects any two bits in error within 8 bytes of data, corrects any single bit error within 8 bytes of data) / memory sparing												
SAS disk controller	LSI Logic® 1064E SAS controller / two port / 300MB/sec / on planar / 64-bit PCI-Express / one 29-pin SFF SAS cable												
SAS Disk bays	One 2.5-inch Small Form Factor (SFF) SAS internal fixed disk bays / Supports max of three hot-swap SFF SAS disks in optional Storage and I/O Expansion Unit / supports RAID 0, 1 and 5												
Flash Storage	Dedicated USB-based slot on system planar for optional USB 2.0 flash memory card (IBM 4GB Modular Flash Drive)												
External Storage	Support for IBM TotalStorage™ solutions												
Mechanical Architecture/Chipset	Single slot blade / Supported in IBM BladeCenter Intel 5000P chipset / Intel Memory Controller Hub (MCH) provides PCI-Express bridge to Enterprise South Bridge 2(ESB2M), High Speed Daughter Card connector and BSE connector / ESB2M provides: USB (2.0), ATI video, Legacy Daughter Card connector, Dual GB ethernet, LSI 1064E SAS, LPC bus to NS PC87427 for Super I/O												
BUS slots	No PCI or PCI-X slots (expansion via modules or network-interface option connector)												
Ethernet	Dual gigabit ethernet controller / Broadcom® 5708S / two full gigabit ethernet MAC and PHY layer functions / chip on blade / PCI-Express / full duplex / TCP/IP Offload Engine (TOE) / Wake on LAN® / iSCSI / Serial over LAN / PXE 2.0 Boot agent / Alert Standard Format 2.0 / Failover, adapter fault tolerance / Load balancing or teaming / one of the dual controllers connects to an optional, supported Ethernet switch or Optical Passthrough Module (the second controller requires a second optional switch or OPM)												
Network Interface	One legacy connector or PCI-Express connector for I/O expansion options / 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)												
DVD / diskette / USB	None / requests for DVD-ROM, diskette and USB port in BladeCenter by pressing media 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 controller	SVGA / ATI® ES1000 (RN50) on Planar / 16MB DDR std/max / 32-bit 33MHz PCI 2.2 bus												
Systems Mgmt	IBM Baseboard Management Controller (BMC) / H8S2166 / on blade / provides system and environmental monitoring, event recording, alert capability / RS-485 interface for intermanagement communication with BladeCenter Management module										Xeon5110 1.6GHz/1066/4MBL2CacheEM64TProcUpg	42C0562	
Diagnostics	Light Path Diagnostics™ (LED lights indicate failing component) and on-board diagnostics (via PC-Doctor in BIOS)										Xeon5120 1.86GHz/1066/4MBL2CacheEM64TProcUpg	40C0563	
											Xeon5130 2.0GHz/1333/4MBL2CacheEM64TProcUpg	40C0564	
Security	No security intrusion protection / Power-on password / administrator password / unattended boot / selectable boot / unattended start mode										Xeon5140 2.33GHz/1333/4MBL2CacheEM64TProcUpg	40C0565	
											Xeon5150 2.66GHz/1333/4MBL2CacheEM64TProcUpg	40C0566	
Software ship group	Documentation CD, Broadcom CD, ServerGuide CD Uses cooling from BladeCenter chassis / thermal sensors on each processor and BladeCenter modules and front panel										Xeon5160 3.0GHz/1333/4MBL2CacheEM64TProcUpg	40C0567	
											Xeon E5310 1.6GHz/1066/8MBL2CacheEM64TProcUpg	43X1002	
Cooling Fans	Uses power module(s) in BladeCenter chassis Prerequisites Monitor, keyboard, mouse for setup; ethernet switch module, disk, BladeCenter chassis, operating system										Xeon E5320 1.86GHz/1066/8MBL2CacheEM64TProcUpg	42C0572	
											Xeon5138 2.13GHz/1333/4MBL2CacheEM64TProcUpg	40C0568	
Power supply(s)											Xeon5148 2.33GHz/1333/4MBL2CacheEM64TProcUpg	40C0569	
											Xeon E5335 2.0GHz/1333/8MBL2CacheEM64TProcUpg	43X1003	
Prerequisites											Xeon E5345 2.33GHz/1333/8MBL2CacheEM64TProcUpg	42C0570	
											1GB (2x512) PC2-5300 CL5 ECC DDR2 Chipkill FBD 667MHz Kit	39M5782	
											2GB (2x1GB) PC2-5300 CL5 ECC DDR2 Chipkill FBD 667MHz Kit	39M5785	
											4GB (2x2GB) PC2-5300 CL5 ECC DDR2 Chipkill FBD 667MHz Kit	39M5791	
											8GB (2x4GB) PC2-5300 CL5 ECC DDR2 Chipkill FBD 667MHz Kit	39M5797	
											BladeCenter Storage and I/O Expansion Blade	39R7563	
											BladeCenter SFF Fibre Channel Expansion Card	26K4841	
											QLogic iSCSI Expansion Card for BladeCenter	32R1923	
											IBM 4GB Modular Flash Device	39R8697	

Server blade (side view)

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

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

- Stealth black front bezel
- H 9.7" x W 1.14" x D 17.6"; H 24.5cm x W 2.9cm x D 44.6cm
- 12 lbs; 5.4kg (max configuration)
- Configuration/Setup Utility: F1 at startup
- Diagnostics (PC-Doctor™): F2 at startup
- System Partition Boot: ALT+F1 at startup
- Network Boot: F12 at startup
- PXE Boot Agent Utility: Ctrl+S at startup
- Blade control panel on each HS21 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

Bay ① 2.5", no front access, optional 2.5-inch SFF SAS disk

Maximum internal disk capacity for each HS21 XM blade server¹³: 146GB with one SAS disk (with BladeCenter Storage Expansion Unit 3 x 146GB for total of 438GB)

LIMITED WARRANTY³

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

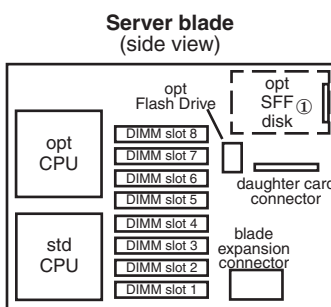
See footnotes for important warranty information

IBM® Type-model	Processor	GHz¹	L2 Core	FSB cache	MHz	Watts	Memory	Disk controller	Disk bays	Expansion Units	I/O slots	Mechanical	Ethernet	Available date
7995-J1x	1 x Xeon™ L5310	1.6	QC	8MB	1333	50W	2GB	SAS	1-fixed	SIO	up to 2	single slot blade	2 x GB	Sep 2007
7995-J2x	1 x Xeon L5320	1.86	QC	8MB	1333	50W	2GB	SAS	1-fixed	SIO	up to 2	single slot blade	2 x GB	Sep 2007
7995-J3x	1 x Xeon L5335	2.0	QC	8MB	1333	50W	2GB	SAS	1-fixed	SIO	up to 2	single slot blade	2 x GB	Sep 2007
7995-G1x	1 x Xeon E5405	2.0	QC	12MB	1333	80W	1GB	SAS	1-fixed	SIO	up to 2	single slot blade	2 x GB	Dec 2007
7995-G3x	1 x Xeon E5420	2.5	QC	12MB	1333	80W	1GB	SAS	1-fixed	SIO	up to 2	single slot blade	2 x GB	Dec 2007
7995-G4x	1 x Xeon E5430	2.66	QC	12MB	1333	80W	1GB	SAS	1-fixed	SIO	up to 2	single slot blade	2 x GB	Dec 2007
7995-G5x	1 x Xeon E5440	2.83	QC	12MB	1333	80W	1GB	SAS	1-fixed	SIO	up to 2	single slot blade	2 x GB	Dec 2007
7995-G6x	1 x Xeon E5450	3.0	QC	12MB	1333	80W	1GB	SAS	1-fixed	SIO	up to 2	single slot blade	2 x GB	Dec 2007
7995-G7x	1 x Xeon X5460	3.16	QC	12MB	1333	120W	2GB	SAS	1-fixed	SIO	up to 2	single slot blade	2 x GB	Jan 2008
7995-EHX	2 x Xeon E5450	3.0	QC	12MB	1333	80W	4GB	SAS	1-fixed	SIO	up to 2	single slot blade	2 x GB	Dec 2007
7995-R2x	1 x Xeon X5260	3.33	DC	6MB	1333	80W	1GB	SAS	1-fixed	SIO	up to 2	single slot blade	2 x GB	Feb 2008

Processor(s)	Intel® Xeon up to 3.33GHz with 1333MHz FSB / 8MB L2 / Dual-Core / Intel Xeon up to 2.0GHz with 1333MHz FSB / 8MB L2 / Quad-Core / Intel Xeon up to 3.16GHz with 1333MHz FSB / 12MB L2 / Quad-Core / All EM64T													
SMP - L2 Cache Implementation	2-way SMP / up to two Xeon Processors (same speed/cache size) / 6, 8 or 12MB std and max / ecc / at processor speed Systemboard contains two Intel LGA771 sockets, four DIMM slots, one High Speed Daughter Card connector, one I/O expansion option connector, integrated graphics and dual Gigabit ethernet													
Memory	1, 2 or 4GB std / 32GB ¹³ max / two slots used / six slots available / on base blade / PC2-5300 667MHz FBD 240-pin ECC DDR2-SDRAM DIMMs / DIMMs must be installed in matched pairs [a bank] / 2-way memory interleave / dual channel / ECC (corrects any x4 or x8 SDRAM device failure, detects all two wire faults on DIMMs, detects all permutations of two x4 DRAM failures, detects any two bits in error within 8 bytes of data, corrects any single bit error within 8 bytes of data) / memory sparing / Additional memory DIMMs can be added to each base HS21 with the Memory and I/O Expansion Unit, allowing up to 32GB of memory per blade													
SAS disk controller	LSI Logic® 1064E SAS controller / two port / 300MB/sec / on planar / 64-bit PCI-Express / supports RAID-0 & 1 mirroring / one 29-pin SFF SAS cable													
SAS Disk bays	One 2.5-inch Small Form Factor (SFF) SAS internal fixed disk bays / Supports max of three hot-swap SFF SAS disks in optional Storage and I/O Expansion Unit													
Flash Storage External Storage	Dedicated USB-based slot on system planar for optional USB 2.0 flash memory card (IBM 4 or 8GB Modular Flash Drive) Support for IBM TotalStorage™ solutions													
Mechanical Architecture/Chipset	Single slot blade / Supported in IBM BladeCenter (G7x supported in 8852, 8740, 8750 & 8886) Intel 5000P chipset / Intel Memory Controller Hub (MCH) provides PCI-Express bridge to Enterprise South Bridge 2(ESB2M), High Speed Daughter Card connector and BSE connector / ESB2M provides: USB (2.0), ATI video, Legacy Daughter Card connector, Dual GB ethernet, LSI 1064E SAS, LPC bus to NS PC87427 for Super I/O													
BUS slots	No PCI or PCI-X slots (expansion via modules or network-interface option connector)													
Ethernet	Dual gigabit ethernet controller / Broadcom® 5708S / two full gigabit ethernet MAC and PHY layer functions / chip on blade / PCI-Express / full duplex / TCP/IP Offload Engine (TOE) / Wake on LAN® / iSCSI / Serial over LAN / PXE 2.0 Boot agent / Alert Standard Format 2.0 / Failover, adapter fault tolerance / Load balancing or teaming / one of the dual controllers connects to an optional, supported Ethernet switch or Optical Passthrough Module (the second controller requires a second optional switch or OPM)													
Network Interface	One legacy connector or PCI-Express connector for I/O expansion options / 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)													
DVD / diskette / USB Kybd / video / mouse Graphics controller	None / requests for DVD-ROM, diskette and USB port in BladeCenter by pressing media select button on front control panel None / requests for keyboard, mouse, and video in BladeCenter by pressing the display button on front control panel SVGA / ATI® ES1000 (RN50) on Planar / 16MB DDR std/max / 32-bit 33MHz PCI 2.2 bus													
Systems Mgmt	IBM Baseboard Management Controller (BMC) / H8S2166 / on blade / provides system and environmental monitoring, event recording, alert capability / RS-485 interface for intermanagement communication with BladeCenter Management module													
Diagnostics	Light Path Diagnostics™ (LED lights indicate failing component) and on-board diagnostics (via PC-Doctor in BIOS)													
Security	No security intrusion protection / Power-on password / administrator password / unattended boot / selectable boot / unattended start mode													
Software ship group	Documentation CD, Broadcom CD, ServerGuide CD													
Cooling Fans	Uses cooling from BladeCenter / thermal sensors on each processor, BladeCenter modules and front panel													
Power supply(s) Prerequisites	Uses power module(s) in BladeCenter Monitor, keyboard, mouse for setup; ethernet switch module, disk, BladeCenter, operating system													

Xeon L5310	1.6GHz/1333/8MB L2 Cache	EM64T Proc Upg	42C0571
Xeon L5320	1.86GHz/1333/8MB L2 Cache	EM64T Proc Upg	43W3917
Xeon L5335	2.0GHz/1333/8MB L2 Cache	EM64T Proc Upg	43W3944
Xeon E5405	2.0 GHz/1333/12MB L2 Cache	EM64T Proc Upg	43W3991
Xeon E5420	2.5 GHz/1333/12MB L2 Cache	EM64T Proc Upg	43W3993
Xeon E5430	2.66 GHz/1333/12MB L2 Cache	EM64T Proc Upg	43W3994
Xeon E5440	2.83 GHz/1333/12MB L2 Cache	EM64T Proc Upg	43W3995
Xeon E5450	3.0 GHz/1333/12MB L2 Cache	EM64T Proc Upg	43W3996
Xeon X5460	3.16 GHz/1333/12MB L2 Cache	EM64T Proc Upg	43W3997
Xeon X5260	3.33 GHz/1333/6MB L2 Cache	EM64T Proc Upg	43W4036
1GB (2x512) PC2-5300 CL5 ECC DDR2	Chipkill FBD 667MHz Kit		39M5782
2GB (2x1GB) PC2-5300 CL5 ECC DDR2	Chipkill FBD 667MHz Kit		39M5785
4GB (2x2GB) PC2-5300 CL5 ECC DDR2	Chipkill FBD 667MHz Kit		39M5791
8GB (2x4GB) PC2-5300 CL5 ECC DDR2	Chipkill FBD 667MHz Kit		39M5797
BladeCenter Storage and I/O Expansion Blade			39R7563
BladeCenter Memory and I/O Expansion Blade			42C1600
BladeCenter SFF Fibre Channel Expansion Card			26K4841
QLogic iSCSI Expansion Card for BladeCenter			32R1923
IBM 4GB Modular Flash Drive			39R8697
IBM 8GB Modular Flash Drive			43W3934

Other options at ibm.com/products/us



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

- ◇ Stealth black front bezel
- ◇ H 9.7" x W 1.14" x D 17.6"; H 24.5cm x W 2.9cm x D 44.6cm
- ◇ 12 lbs; 5.4kg (max configuration)
- ◇ Configuration/Setup Utility: F1 at startup
- ◇ Diagnostics (PC-Doctor™): F2 at startup
- ◇ System Partition Boot: ALT+F1 at startup
- ◇ Network Boot: F12 at startup
- ◇ PXE Boot Agent Utility: Ctrl+S at startup
- ◇ Blade control panel on each HS21 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

Bay ① 2.5", no front access, optional 2.5-inch SFF SAS disk

Maximum internal disk capacity for each HS21 XM blade server^{a3}:
 146GB with one SAS disk (with BladeCenter Storage Expansion Unit 3 x 146GB for total of 438GB)

LIMITED WARRANTY³

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

See footnotes for important warranty information

* Express Models

IBM® Type-model	Processor	GHz¹	Core	L3 cache	Watts	Memory	Disk controller	Disk bays	I/O slots	Mechanical	Ethernet	Available date
7870-D2x	1 x Xeon® E5502	1.86	2C	4MB	80W	2x1GB	SAS	2 hot-swap	up to 2	single slot blade	2 x Gb	Mar 2009
7870-A2x	1 x Xeon E5504	2.0	4C	4MB	80W	2x1GB	SAS	2 hot-swap	up to 2	single slot blade	2 x Gb	Mar 2009
7870-CCx	1 x Xeon E5504	2.0	4C	4MB	80W	2x1GB	SAS	2 hot-swap	up to 2	single slot blade	2 x Gb	Mar 2009
7870-B3x	1 x Xeon E5530	2.4	4C	8MB	80W	2x2GB	SAS	2 hot-swap	up to 2	single slot blade	2 x Gb	Mar 2009
7870-B4x	1 x Xeon E5540	2.53	4C	8MB	80W	2x2GB	SAS	2 hot-swap	up to 2	single slot blade	2 x Gb	Mar 2009
7870-C3x	1 x Xeon X5560	2.8	4C	8MB	95W	2x2GB	SAS	2 hot-swap	up to 2	single slot blade	2 x Gb	Mar 2009
7870-C4x	1 x Xeon X5570	2.93	4C	8MB	95W	2x2GB	SAS	2 hot-swap	up to 2	single slot blade	2 x Gb	Mar 2009
7870-L2x	1 x Xeon L5520	2.26	4C	8MB	60W	2x2GB	SAS	2 hot-swap	up to 2	single slot blade	2 x Gb	Mar 2009

Positioning Processor(s) *Two-socket, four-core high performance blade server for business and distributed enterprises*
Up to two Next Generation Intel® Xeon featuring Quick Path Interconnect(QPI) at up to 2.93GHz with 8MB L3 / 4 Core / with Intel Turbo Boost Technology and Hyper-Threading / up to 2.0GHz with 4MB L3 / 2 or 4 Core / Hyper-Threading
 L3 cache **4 or 8MB** std and max / at processor speed
 SMP **2-way SMP** / up to two Xeon Processors (same speed/cache size)

Implementation Systemboard contains two Socket B (LGA1366) sockets, twelve DIMM slots, one High Speed Daughter Card connector, one I/O expansion option connector, integrated graphics and dual Gigabit ethernet ports

Memory **2 or 4GB** std / **48GB** max per processor(using 8GB DIMMs) / **PC3-10600 1333MHz VLP 240-pin ECC DDR3 SDRAM DIMMs** / twelve slots on base blade / ChipKill / memory mirroring

Disk Controller **LSI Logic® 1064E** SAS controller / **four port** / 300MB/sec / on planar / 64-bit PCI-Express / supports **RAID-0 & 1 / Two 2.5-inch Small Form Factor (SFF)** hot swap disk bays / supports SAS, SATA or SSD SFF disks
 Disk bays Dedicated USB-based slot on systemboard for optional Hypervisor USB key
 Flash Storage Support for IBM TotalStorage™ solutions
 External Storage

Mechanical Single slot blade / Supported in IBM BladeCenter E, S and H

Architecture/Chipset **Intel 5520 chipset** / Intel IO Hub provides PCI-Express bridge to: ICH10 South Bridge, High Speed Daughter Card connector and Legacy Daughter Card connector(CIOv), BCM5709S dual GbE, LSI 1064E SAS / ICH10 South Bridge provides: USB, PCI-Express and LPC bus to VSC452 for video and limited Super I/O
 BUS slots No PCI or PCI-X slots (expansion via modules or network-interface option connector)

Ethernet **Dual** Gigabit Ethernet ports / Broadcom® 5709S / two full gigabit ethernet MAC and PHY layer functions / integrated / PCI-Express / full duplex / TCP/IP Offload Engine (TOE) / Wake on LAN® / iSCSI / Serial over LAN / PXE 2.0 / Failover, adapter fault tolerance / Load balancing / one of the dual controllers connects to an optional, supported Ethernet switch or *Passthrough Module* (the second controller requires a second optional switch or PM)

Network Interface **One legacy connector or PCI-Express connector for I/O expansion options** / 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)

Optical / diskette / USB Kybd / video / mouse Graphics controller None / requests for optical, diskette and USB port in BladeCenter by pressing media select button on front control panel
 None / requests for keyboard, video and mouse in BladeCenter by pressing the display button on front control panel
 SVGA / Matrox® G200e integrated in IMM on systemboard / 16MB DDR2-250MHz SDRAM std/max / 32-bit 33MHzPCI 2.2

Systems Mgmt **Integrated Management Module(IMM)** / VSC452 / H8S2461 / integrated / provides system and environmental monitoring, event recording, alert capability / TPM 1.2 / ASR / SOL / IPMI 2.0 / RS-485 interface for intermanagement communication with BladeCenter Management module / remote supervision and cKVM standard
 Diagnostics **Light Path Diagnostics™** (LED lights indicate failing component) and on-board diagnostics

Security No security intrusion protection / Trusted Platform Module(TPM) / Power-on password / administrator password / unattended boot / selectable boot / unattended start mode

Software ship group Documentation CD, Broadcom CD, ServerGuide CD

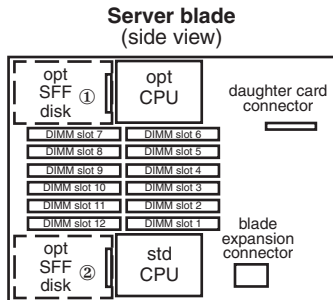
Cooling Uses cooling from BladeCenter / thermal sensors on each processor, BladeCenter modules and front panel

Power supply(s) Uses power module(s) in BladeCenter chassis

Prerequisites Monitor, keyboard, mouse for setup; ethernet switch module, disk, BladeCenter chassis, operating system

Xeon E5502 1.86GHz 80W 4.8GTs Proc Upg	43W5986
Xeon E5504 2.0GHz 80W 4.8GTs Proc Upg	44T1712
Xeon E5506 2.13GHz 80W 4.8GTs Proc Upg	43W5987
Xeon E5520 2.26GHz 80W 5.86GTs Proc Upg	44T1736
Xeon E5530 2.4GHz 80W 5.86GTs Proc Upg	44T1883
Xeon E5540 2.53GHz 80W 5.86GTs Proc Upg	44T1884
Xeon X5550 2.67GHz 95W 6.4GTs Proc Upg	44T1885
Xeon X5560 2.8GHz 95W 6.4GTs Proc Upg	44T1886
Xeon X5570 2.93GHz 95W 6.4GTs Proc Upg	44T1887
Xeon L5520 2.26GHz 60W 5.86GTs Proc Upg	46M0697
1GB (1x1GB) PC3-10600 CL9 ECC DDR3 1333MHz VLP RDIMM	44T1485
2GB (1x2GB) PC3-10600 CL9 ECC DDR3 1333MHz VLP RDIMM	44T1487
4GB (1x4GB) PC3-10600 CL9 ECC DDR3 1333MHz VLP RDIMM	44T1488
IBM 300GB 10K 6Gb SAS 2.5" SFF Slim-HS HDD	42D0637
IBM 31.4GB SSD 2.5" SFF Slim-HS HDD	43W7648
SAS Connectivity Card for IBM BladeCenter	43W4068
Ethernet Expansion Card for IBM BladeCenter	44W4475

Other options at ibm.com/products/us



Bay ① 2.5", hot swap, front access, optional 2.5-inch SFF SAS disk
 Bay ② 2.5", hot swap, front access, optional 2.5-inch SFF SAS disk

A control panel on front of blade has the following LEDs:
 Power
 Activity
 Location
 Information
 Fault

- Stealth black front bezel
- H 9.7" x W 1.14" x D 17.6"; H 24.5cm x W 2.9cm x D 44.6cm
- 12 lbs; 5.4kg (max configuration)
- Configuration/Setup Utility: F1 at startup
- Diagnostics(preboot DSA): 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 HS22 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 disk(s) with IBM Director

LIMITED WARRANTY³

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

Maximum internal disk capacity for each HS22 blade server³: 600GB with two 300GB SAS disks

IBM® Type-model	Processor	GHz ¹	L3 Core cache	Watts	Memory	Disk controller	Disk bays	I/O slots	Mechanical	Ethernet	Available date
7870-EDX* 1 x Xeon®	E5502	1.86	2C 4MB	80W	3x2GB	SAS	2 hot-swap	up to 2	single slot blade	2 x Gb	Mar 2009
7870-EBX* 2 x Xeon	E5530	2.4	4C 8MB	80W	4x2GB	SAS	2 hot-swap	up to 2	single slot blade	2 x Gb	Mar 2009
7870-1Mx* 2 x Xeon	X5560	2.8	4C 8MB	95W	6x4GB	SAS	2 hot-swap	up to 2	single slot blade	2 x Gb	Mar 2009
7870-2Mx* 2 x Xeon	L5520	2.26	4C 8MB	60W	12x4GB	SAS	2 hot-swap	up to 2	single slot blade	2 x Gb	Mar 2009
7870-3Mx* 2 x Xeon	X5570	2.93	4C 8MB	95W	12x4GB	SAS	2 hot-swap	up to 2	single slot blade	2 x Gb	Mar 2009
7870-5Mx* 2 x Xeon	X5560	2.8	4C 8MB	95W	6x4GB	SAS	2 hot-swap	up to 2	single slot blade	2 x Gb	Mar 2009
7870-6Mx* 1 x Xeon	L5520	2.26	4C 8MB	60W	2x4GB	SAS	2 hot-swap	up to 2	single slot blade	2 x Gb	Mar 2009

Positioning Processor(s) **Two-socket, four-core high performance blade server for business and distributed enterprises Up to two Next Generation Intel® Xeon featuring Quick Path Interconnect(QPI) at up to 2.93GHz with 8MB L3 / 4 Core / with Intel Turbo Boost Technology and Hyper-Threading / up to 2.0GHz with 4MB L3 / 2 or 4 Core / Hyper-Threading 4 or 8MB std and max / at processor speed**

L3 cache SMP **2-way SMP / up to two Xeon Processors (same speed/cache size)**

Implementation Systemboard contains two Socket B (LGA1366) sockets, twelve DIMM slots, one High Speed Daughter Card connector, one I/O expansion option connector, integrated graphics and dual Gigabit ethernet ports

Memory **2 or 4GB std / 48GB max per processor(using 8GB DIMMs) / PC3-10600 1333MHz VLP 240-pin ECC DDR3 SDRAM DIMMs / twelve slots on base blade / ChipKill / memory mirroring**

Disk Controller **LSI Logic® 1064E SAS controller / four port / 300MB/sec / on planar / 64-bit PCI-Express / supports RAID-0 & 1 / Two 2.5-inch Small Form Factor (SFF) hot swap disk bays / supports SAS, SATA or SSD SFF disks**

Disk bays **Dedicated USB-based slot on systemboard for optional Hypervisor USB key**

Flash Storage **Support for IBM TotalStorage™ solutions**

External Storage

Mechanical Single slot blade / Supported in IBM BladeCenter E, S and H

Architecture/Chipset **Intel 5520 chipset / Intel IO Hub provides PCI-Express bridge to: ICH10 South Bridge, High Speed Daughter Card connector and Legacy Daughter Card connector(CIOv), BCM5709S dual GbE, LSI 1064E SAS / ICH10 South Bridge provides: USB, PCI-Express and LPC bus to VSC452 for video and limited Super I/O**

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

Ethernet **Dual Gigabit Ethernet ports / Broadcom® 5709S / two full gigabit ethernet MAC and PHY layer functions / integrated / PCI-Express / full duplex / TCP/IP Offload Engine (TOE) / Wake on LAN® / iSCSI / Serial over LAN / PXE 2.0 / Failover, adapter fault tolerance / Load balancing / one of the dual controllers connects to an optional, supported Ethernet switch or *Passthrough Module* (the second controller requires a second optional switch or PM)**

Network Interface **One legacy connector or PCI-Express connector for I/O expansion options / 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)**

Optical / diskette / USB Kybd / video / mouse Graphics controller **None / requests for optical, diskette and USB port in BladeCenter by pressing media select button on front control panel**

None / requests for keyboard, video and mouse in BladeCenter by pressing the display button on front control panel

SVGA / Matrox® G200e integrated in IMM on systemboard / 16MB DDR2-250MHz SDRAM std/max / 32-bit 33MHz PCI 2.2

Systems Mgmt **Integrated Management Module(IMM) / VSC452 / H8S2461 / integrated / provides system and environmental monitoring, event recording, alert capability / TPM 1.2 / ASR / SOL / IPMI 2.0 / RS-485 interface for intermanagement communication with BladeCenter Management module / remote supervision and cKVM standard**

Diagnostics **Light Path Diagnostics™ (LED lights indicate failing component) and on-board diagnostics**

Security **No security intrusion protection / Trusted Platform Module(TPM) / Power-on password / administrator password / unattended boot / selectable boot / unattended start mode**

Software ship group Documentation CD, Broadcom CD, ServerGuide CD

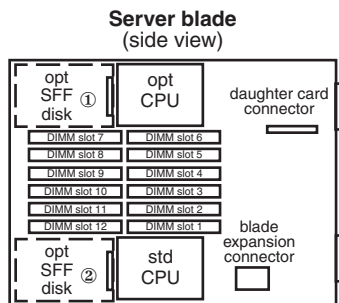
Cooling Uses cooling from BladeCenter / thermal sensors on each processor, BladeCenter modules and front panel

Power supply(s) Uses power module(s) in BladeCenter chassis

Prerequisites Monitor, keyboard, mouse for setup; ethernet switch module, disk, BladeCenter chassis, operating system

Xeon E5502 1.86GHz 80W 4.8GTs Proc Upg	43W5986
Xeon E5504 2.0GHz 80W 4.8GTs Proc Upg	44T1712
Xeon E5506 2.13GHz 80W 4.8GTs Proc Upg	43W5987
Xeon E5520 2.26GHz 80W 5.86Ts Proc Upg	44T1736
Xeon E5530 2.4GHz 80W 5.86Ts Proc Upg	44T1883
Xeon E5540 2.53GHz 80W 5.86Ts Proc Upg	44T1884
Xeon X5550 2.67GHz 95W 6.4GTs Proc Upg	44T1885
Xeon X5560 2.8GHz 95W 6.4GTs Proc Upg	44T1886
Xeon X5570 2.93GHz 95W 6.4GTs Proc Upg	44T1887
Xeon L5520 2.26GHz 60W 5.86GTs Proc Upg	46M0697
1GB (1x1GB) PC3-10600 CL9 ECC DDR3 1333MHz VLP RDIMM	44T1485
2GB (1x2GB) PC3-10600 CL9 ECC DDR3 1333MHz VLP RDIMM	44T1487
4GB (1x4GB) PC3-10600 CL9 ECC DDR3 1333MHz VLP RDIMM	44T1488
8GB (1x8GB) PC3-8500 CL7 ECC DDR3 1066MHz VLP RDIMM	44T1579
IBM 300GB 10K 6Gb SAS 2.5" SFF Slim-HS HDD	42D0637
IBM 31.4GB SSD 2.5" SFF Slim-HS HDD	43W7648
SAS Connectivity Card for IBM BladeCenter	43W4068
Ethernet Expansion Card for IBM BladeCenter	44W4475

Other options at ibm.com/products/us



Bay ① 2.5", hot swap, front access, optional 2.5-inch SFF SAS disk

Bay ② 2.5", hot swap, front access, optional 2.5-inch SFF SAS disk

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

- Power
- Activity
- Location
- Information
- Fault

- Stealth black front bezel
- H 9.7" x W 1.14" x D 17.6"; H 24.5cm x W 2.9cm x D 44.6cm
- 12 lbs; 5.4kg (max configuration)
- Configuration/Setup Utility: F1 at startup
- Diagnostics: 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 HS22 blade server provides media select button, keyboard/mouse/video select button and indicators for blade error, information, location, disk activity and power
- Predictive Failure Analysis³ alerts on memory, processor(s), and disk(s) with IBM Director

LIMITED WARRANTY³

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

Maximum internal disk capacity for each HS22 blade server³: 600GB with two 300GB SAS disks

IBM® Type-model	Qty x Processor	GHz¹	Core	L2 Cache	Memory	Disk	Disk controller	Disk bays	Optional storage expansion unit	Mechanical	Ethernet	Available date
8844-31U	2 x PPC 970MP	2.7*	DC	1MB	2x512MB 400MHz	Open	SAS	2 Fixed	3 Hot Swap SAS***	9.5mm blade	2 x Gigabit	Mar 2006
8844-51U	2 x PPC 970MP	2.5*	DC	2x1MB	2x1GB 400MHz	Open	SAS	2 Fixed	3 Hot Swap SAS***	9.5mm blade	2 x Gigabit	Mar 2006
8844-E3U	2 x PPC 970MP	2.7*	SC	1MB	2x1GB 533MHz	1x73GB	SAS	2 Fixed	3 Hot Swap SAS***	9.5mm blade	2 x Gigabit	Aug 2006
8844-E5U	2 x PPC 970MP	2.5*	DC	2x1MB	2x2GB 533MHz	1x73GB	SAS	2 Fixed	3 Hot Swap SAS***	9.5mm blade	2 x Gigabit	Aug 2006
8844-41U	2 x PPC 970MP	2.3*	DC	2x1MB	2x1GB 533MHz	Open	SAS	2 Fixed	3 Hot Swap SAS***	9.5mm blade	2 x Gigabit	Oct 2006

Positioning	The IBM BladeCenter JS21 blade server delivers exceptional capabilities for AIX 5L™, HPC Linux Clusters, web serving, and server consolidation. With built-in virtualization, the JS21 is equally suitable for building front-end and mid-tier web farms with virtual Linux partitions, saving time and money on setup and deployment, or migrating older UNIX workloads to BladeCenter to reduce maintenance costs. The JS21 is also optimized for scientific research in life sciences and seismic analysis with its integrated vector accelerator. For the needs of SMB and HPC, the JS21 Express models (E3U, E5U) are available pre-configured with faster 533MHz memory and integrated storage for out-of-the-box functionality at a lower price.											
Processor(s) L2 Cache SMP support Implementation	2 x IBM PowerPC™ 970MP up to 2.7GHz* Single-Core / up to 2.5GHz* Dual-Core / 64 bit 1MB L2 Cache per core 2-core or 4-core SMP / two PowerPC Processors (single core or dual core) Server blade contains two IBM PowerPC microprocessors soldered to planar, four DIMM slots, 17X PCI Express, SAS controller, Gigabit Ethernet, Fibre Channel, Myrinet and InfiniBand expansion card support, integrated graphics and dual Gigabit ethernet											
Memory	1, 2 or 4GB std / 16GB ¹³ max / two slots used / two slots available / PC2-3200 400MHz CL3 ECC DDR2-SDRAM DIMMs or PC2-4200 533MHz CL4 ECC DDR2-SDRAM DIMMs / four DIMM gold-conductor slots / DIMMs must be installed in matched pairs [a bank] and banks must match in speed (MHz), though not size / 2-way memory interleave / dual-channel / Chipkill with x4 DIMMs											
SAS Disk controller SAS Disk bays External Storage	One integrated / IBM SAS controller / two port / on planar / 64-bit 133MHz PCI-X / supports RAID-0 & 1 Supports max of two non-hot-swap 2.5" / small form factor (SFF) SAS drives / 3.0GB/s / E3X and E5X include one 73GB drive std Support for IBM TotalStorage™ solutions (including FASiT and NAS family of products)											
Mechanical Architecture/Chipset	Single-wide Blade / Supported in IBM BladeCenter, IBM BladeCenter T** and IBM BladeCenter H IBM U4 Northbridge / BCM5780 PCI Express, PCI-X Bridge and HyperTransport Tunnel for PCIe and Dual Gigabit Ethernet / AMD 8111 Southbridge providing USB1.1 and Video / NS PC87427 Super I/O off LPC interface											
BUS slots	No PCI or PCI-X slots (expansion via modules or network-interface option connector)											
Ethernet Controllers	Dual Gigabit 10/100/1000 ethernet controller / Broadcom® 5780 / two full gigabit ethernet MAC and PHY layer functions / chip on blade / PCI-X 64-bit 133MHz / full duplex / Wake on LAN® / Serial over LAN / PXE 2.0 Boot agent / Alert Standard Format 2.0 / Failover, adapter fault tolerance / Load balancing or teaming / one of the dual controllers connects to an optional, supported Ethernet switch or Optical Passthrough Module (the second controller requires a second optional switch or OPM)											
Network Interface	One legacy connector or PCI-Express connector for I/O expansion options / 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)											
DVD / Diskette / USB Kybd / video / mouse Graphics controller	None / requests for DVD-ROM, diskette drive, and USB port in BladeCenter by pressing media select button on front control panel None / requests for keyboard, mouse, and video in BladeCenter by pressing the display button on front control panel SVGA / ATI® RN50 on Planar / 32MB DDR SDRAM std and max / 15 pin connector											
Systems Mgmt	IBM Integrated Service Processor / H82166 / IPMI 1.5 / on blade / provides system and environmental monitoring, event recording, alert capability / RS-485 interface for intermanagement communication with BladeCenter Management module / Cluster System Management / IBM Active Energy Manager™ / HACMP									1GB (2x512MB) PC2-4200 ECC CL4 DDR2 RDIMM Kit 41Y2707 2GB (2x1GB) PC2-4200 ECC CL4 DDR2 RDIMM Kit 41Y2711 4GB (2x2GB) PC2-4200 ECC CL4 DDR2 RDIMM Kit 41Y2715 8GB (2x4GB) PC2-4200 ECC CL4 DDR2 RDIMM Kit 41Y2703 1GB (2x512MB) PC2-3200 ECC CL3 DDR2 RDIMM Kit 39M5821 2GB (2x1GB) PC2-3200 ECC CL3 DDR2 RDIMM Kit 39M5809 4GB (2x2GB) PC2-3200 ECC CL3 DDR2 RDIMM Kit 39M5812 8GB (2x4GB) PC2-3200 ECC CL3 DDR2 RDIMM Kit 41Y2703 IBM 36GB 10K SAS 2.5" SFF NHD HDD 26K5776 IBM 73GB 10K SAS 2.5" SFF NHD HDD 26K5777 QLogic 4GB SFF Fibre Channel Expansion Card for BladeCenter 26R0890 BladeCenter SFF Gigabit Ethernet Expansion Card for BladeCenter 39R8624 Cisco InfiniBand Expansion Card for BladeCenter 32R1896 Myrinet Expansion Card for BladeCenter 73P6000 Cisco 4X InfiniBand Switch Module for BladeCenter 32R1756 Cisco 4X InfiniBand Expansion Card for BladeCenter 32R1760 Other options at ibm.com/products/us		
Diagnostics	Light Path Diagnostics (LED lights indicate failing component) and on-board diagnostics (via PC-Doctor in BIOS)											
Security	No security intrusion protection / Power-on password / administrator password / unattended boot / selectable boot / unattended start mode											
Software ship group Cooling Fans	Documentation CD, IBM Director CD, Device Driver CD Uses cooling from BladeCenter (types 8677, 8852 and 8720) / thermal sensors on each processor and BladeCenter modules and front panel											
Power supply(s) Prerequisites	Uses power module(s) in BladeCenter (types 8677, 8852 and 8720) Monitor, keyboard, mouse for setup; ethernet switch module, disk, BladeCenter (types 8677, 8852 and 8720), operating system											

Server blade (side view)

- opt SFF disk
- opt SFF disk
- std CPU
- Light Path Diagnostics buttons
- DIMM slot 1
- DIMM slot 2
- DIMM slot 3
- DIMM slot 4
- expansion option connector
- PCIe connector

Bay ① 3.5", 9.5mm, no front access, optional 2.5-inch SFF SAS disk
Bay ② 3.5", 9.5mm, no front access, optional 2.5-inch SFF SAS 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)
- 31U/E3U 2-core 288W / 51U/E5U 4-core 308W
- 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 JS21 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 JS21 blade server¹³:
146GB with two 73GB SCSI disks (with BladeCenter Storage Expansion Unit 3 x 73GB for total of 219GB***)

*Processor frequency is dependent upon which BladeCenter chassis the JS21 is installed:
BladeCenter (8677): 31x, 2.6GHz; 51x, 2.3GHz
BladeCenter H (8852): 31x, 2.7GHz; 51x, 2.5GHz
BladeCenter T (8720): 31x, 2.6GHz; 51x, 2.3GHz
**BladeCenter T NEBS compliance available September 2006
***BladeCenter Storage Expansion Unit support available 2nd Quarter 2007

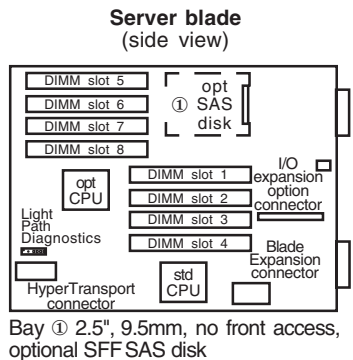
LIMITED WARRANTY³

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

IBM® Type-model	Qty x Processor ¹	Speed/Core	L2 Cache	Watts	Memory	Disk controller	Disk bays	Expansion Units	I/O slots	Mechanical	Ethernet	Available date
7971-31U	1 x Opteron 2212HE	2.0GHz/DC	2MB	68W	1GB	SAS	1 fixed	SIO/PCIEU	up to 2	single slot blade	2 x Gigabit	Oct 2006
7971-3AU	1 x Opteron 2212	2.0GHz/DC	2MB	95W	1GB	SAS	1 fixed	SIO/PCIEU	up to 2	single slot blade	2 x Gigabit	Oct 2006
7971-51U	1 x Opteron 2216HE	2.4GHz/DC	2MB	68W	2GB	SAS	1 fixed	SIO/PCIEU	up to 2	single slot blade	2 x Gigabit	Oct 2006
7971-6AU	1 x Opteron 2218	2.6GHz/DC	2MB	95W	2GB	SAS	1 fixed	SIO/PCIEU	up to 2	single slot blade	2 x Gigabit	Oct 2006
7971-E1U	2 x Opteron 2216HE	2.4GHz/DC	2MB	95W	4GB	SAS	1 fixed	SIO/PCIEU	up to 2	single slot blade	2 x Gigabit	Dec 2006
7971-21U	1 x Opteron 2210HE	1.8GHz/DC	2MB	68W	1GB	SAS	1 fixed	SIO/PCIEU	up to 2	single slot blade	2 x Gigabit	Jan 2007
7971-2TU	1 x Opteron 2210HE	1.8GHz/DC	2MB	45W	1GB	SAS	1 fixed	SIO/PCIEU	up to 2	single slot blade	2 x Gigabit	Feb 2007
7971-7AU	1 x Opteron 2220	2.8GHz/DC	2MB	95W	2GB	SAS	1 fixed	SIO/PCIEU	up to 2	single slot blade	2 x Gigabit	Feb 2007
7971-61U	1 x Opteron 2218HE	2.6GHz/DC	2MB	68W	2GB	SAS	1 fixed	SIO/PCIEU	up to 2	single slot blade	2 x Gigabit	Apr 2007
7971-8AU	1 x Opteron 2222	3.0GHz/DC	2MB	95W	2GB	SAS	1 fixed	SIO/PCIEU	up to 2	single slot blade	2 x Gigabit	Oct 2007

Positioning	Ultra-dense, low power, dual socket, full performance modular computing platform with superior performance											
Processor(s)	Up to 2 x AMD Opteron 2000 Series Dual Core at up to 3.0GHz / simultaneously supports 32-bit and 64-bit computing											
L2 Cache	1MB L2 Cache per core, AMD Direct Connect Architecture ensures lower latency I/O											
SMP support	2-way SMP / up to two Opteron processors (same speed/cache size)											
Implementation	Systemboard contains two LGA 1207-pin sockets, eight DIMM slots, one Legacy Daughter Card connector, one Blade expansion connector, one HyperTransport Expansion connector, integrated graphics and Gigabit ethernet											
Memory	1 or 2GB std / 16GB max ¹³ (32GB max with 4GB DIMMS*) / two slots used / six slots available PC5300 667MHz registered 240-pin ECC DDR2 VLP SDRAM RDIMMs / eight 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), hardware scrubbing											
IDE controller/bays	None											
SAS disk controller	One integrated / LSI Logic® 1064 SAS controller 1.5/3Gb/sec / PCI-X 64-bit/133MHz / on planar / supports RAID-1, 1E & 5 with fully populated Storage and I/O Expansion blade / no cables or external connector											
SAS disk bays	One non hot-swap 2.5" SFF SAS disk / Supports up to three hot-swap SFF SAS disks in optional Storage and I/O Expansion Unit											
External storage	Support for IBM TotalStorage™ solutions											
Mechanical	Single slot blade / Supported in IBM BladeCenter 8677, 8720, 8730 and 8852											
Architecture/Chipsets	ServerWorks™ Chipset / HT2000 HyperTransport System I/O Controller provides: PCI-Express bridge to Legacy Daughter Card connector and Blade Storage Expansion connector, PCI-X bridge to LSI 1064 SAS, HyperTransport bridge to HT1000 South Bridge / HT1000 South Bridge provides: USB(2.0), ATI video, Dual GB ethernet, LPC bus to Winbond PC87427 for Super I/O											
Bus slots	No PCI or PCI-X slots (expansion via modules or network-interface option connector)											
Ethernet controllers	Dual gigabit 10/100/1000 Ethernet controllers / Broadcom® BCM5706S / two full gigabit ethernet MAC and PHY layer functions / chip on blade / PCI-X 64-bit 133MHz bus / full-duplex / TCP/IP OffloadEngine (TOE) / Wake on LAN® / Serial over LAN / Alert Standard Format 1.0 / Load balancing or teaming / Failover, adapter fault tolerance / one of the dual controllers connects to an optional, supported Ethernet switch or <i>Passthrough Module</i> (the second controller requires a second optional switch or PM)											
Network-interface	One legacy connector or PCI-Express connector for I/O expansion options / 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)											
DVD / diskette / USB	None / requests for DVD-ROM, diskette drive, and USB port in BladeCenter by pressing media select button on front control panel											
Kybd / video / mouse	None / requests for keyboard, mouse, and video in BladeCenter by pressing the display button on front control panel											
Graphics	SVGA / ATI® Radeon® RN50 on planar / 16MB DDR std/max / 32-bit 33MHz PCI 2.2 bus											
Systems mgmt	IBM Baseboard Management Controller (BMC) / H8S2166 / on blade / provides system and environmental monitoring, event recording, alert capability / RS-485 interface for intermanagement communication with BladeCenter Management module											
Diagnostics	Light Path Diagnostics™ (LED lights indicate failing component) and on-board diagnostics (via PC-Doctor in BIOS)											
Security	Power-on password / administrator password / unattended boot / selectable boot / unattended start mode											
Software ship group	Documentation CD, Device Driver CD, ServerGuide CD											
Cooling fans	Uses cooling from BladeCenter (types 8677, 8720, 8730, 8852) / thermal sensors on each processor and BladeCenter modules and front panel											
Power supply	Uses power module(s) in BladeCenter (types 8677, 8720, 8730, 8852)											
Prerequisites	Monitor, keyboard, mouse for setup; ethernet switch module, disk, BladeCenter (types 8677, 8720, 8730, 8852), operating system											

Dual Core AMD Opteron Processor Model 2210 HE	40K1263
Dual Core AMD Opteron Processor Model 2212 HE	25F8898
Dual Core AMD Opteron Processor Model 2212	25F8931
Dual Core AMD Opteron Processor Model 2216 HE	25F8899
Dual Core AMD Opteron Processor Model 2218	25F8897
Dual Core AMD Opteron Processor Model 2218 HE	44E5246
Dual Core AMD Opteron Processor Model 2220	40K1264
Dual Core AMD Opteron Processor Model 2222	44F4946
1GB (2x512) PC2-5300 CL5 ECC DDR2 VLP RDIMM Kit	39M5861
2GB (2x1GB) PC2-5300 CL5 ECC DDR2 VLP RDIMM Kit	39M5864
4GB (2x2GB) PC2-5300 CL5 ECC DDR2 VLP RDIMM Kit	39M5867
8GB (2x4GB) PC2-4200 CL4 ECC DDR2 VLP RDIMM Kit*	39M5870
IBM 36GB NHS 2.5" SFF SAS HDD	26K5776
IBM 73GB NHS 2.5" SFF SAS HDD	26K5777
BladeCenter Storage and I/O Expansion Blade	39F7563
BladeCenter SFF Fibre Channel Expansion Card	26K4841
BladeCenter SFF Gigabit Ethernet Expansion Card	39R8624
Other options at ibm.com/pc/us/accessories	



- A control panel on top front of blade has following LEDs:
- Power good
 - Blade location
 - Over temperature
 - Information
 - General fault
- Stealth black front bezel
 - H 9.7" x W 1.14" x D 17.6"
 - H 24.5cm x W 2.9cm x D 44.6cm
 - 11 lbs; 5.0kg (max configuration)
 - Configuration/Setup Utility: F1 at startup
 - Diagnostics (PC-Doctor™): F2 at startup
 - Network Boot: F12 at startup
 - PXE Boot Agent Utility: Ctrl+S at startup
 - Blade control panel on each LS21 blade 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

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 69P5917)
 - 3 year IOR 24x7, 4 hr avg response (ServicePac part num 69P6918)
 - 4 year IOR 9x5, 4 hr avg response (ServicePac part num 69P5921)
 - 4 year IOR 24x7, 4 hr avg response (ServicePac part num 69P5922)
 - 5 year IOR 9x5, 4 hr avg response (ServicePac part num 69P9525)
 - 5 year IOR 24x7, 4 hr avg response (ServicePac part num 69P9526)
 - Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- 24x7¹⁴ toll-free support for warranty issues during the warranty period⁸

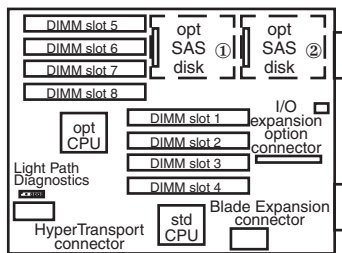
See footnotes for important warranty information

IBM® Type-model	Qty x Processor ¹	Speed/Core	L2 Cache	Watts	Memory	Disk controller	Disk bays	Expansion Units	I/O slots	Mechanical	Ethernet	Available date
7901-3Qx	1 x Opteron 2347 HE	1.9GHz/QC	2MB	79W	2GB	SAS	2 fixed	PCIEU/ PEU2	up to 2	single slot blade	2 x Gb	Sep 2008
7901-CQx	1 x Opteron 2356	2.3GHz/QC	2MB	115W	2GB	SAS	2 fixed	PCIEU/ PEU2	up to 2	single slot blade	2 x Gb	Sep 2008
7901-EDx*	2 x Opteron 2356	2.3GHz/QC	2MB	115W	8GB	SAS	2 fixed	PCIEU/ PEU2	up to 2	single slot blade	2 x Gb	Sep 2008
7901-3Sx	1 x Opteron 2384	2.7GHz/QC	2MB	75W	2GB	SAS	2 fixed	PCIEU/ PEU2	up to 2	single slot blade	2 x Gb	Nov 2008
7901-3Lx	1 x Opteron 2376 HE	2.3GHz/QC	2MB	55W	2GB	SAS	2 fixed	PCIEU/ PEU2	up to 2	single slot blade	2 x Gb	Mar 2009

Positioning Processor(s) L2 Cache SMP support Implementation	Ultra-dense, dual-socket, quad-core, modular computing platform with superior performance Up to 2 x AMD Opteron 2000 Series Quad-Core at up to 2.7GHz / simultaneously supports 32-bit and 64-bit computing 2MB L2 Cache / AMD Direct Connect Architecture ensures lower latency I/O 2-way SMP / up to two Opteron processors (same speed/cache size) Systemboard contains two LGA 1207-pin sockets, eight VLP DIMM slots, one Legacy Daughter Card connector, one Blade Expansion connector, one HyperTransport Expansion connector, integrated graphics, SAS and ethernet	
Memory	2x1GB or 4x2GB std / 64GB max ¹³ / two or four slots used / four or six slots available / PC2-5300 667MHz registered 240-pin ECC DDR2 VLP SDRAM RDIMMs (std) / PC2-6400 800MHz registered 240-pin ECC DDR2 VLP SDRAM RDIMMs (opt) / eight 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), hardware scrubbing	
SAS disk controller SAS disk bays	LSI Logic®1064E SAS controller / 1.5/3.0 Gb/s / PCI-Express / on planar / supports RAID-1 / no cables or external connector Two fixed 2.5" SFF SAS disks	
External storage	Support for IBM TotalStorage™ solutions	
Mechanical Architecture/Chipsets	Single slot blade / Supported in IBM BladeCenter 8677**, 8852 and 8886 ServerWorks™ Chipset / HT2100 HyperTransport System I/O Controller provides: PCI-Express links to Blade Storage Expansion connector and PCI-Express Switch to SAS and Ethernet controllers, HyperTransport bridge to HT1000 South Bridge / HT 1000 South Bridge provides: Legacy Daughter Card connector via 64-bit PCI-X bus, USB, ATI video via 32-bit PCI bus, LPC bus to Winbond PC87427 for Super I/O	
Bus slots	No PCI or PCI-X slots (expansion via modules or network-interface option connector)	
Ethernet controllers	Dual Gigabit Ethernet ports / Broadcom® BCM5709S Gigabit Ethernet controller / two full gigabit ethernet MAC and PHY layer functions / integrated / PCI-Express / full-duplex / TCP/IP Offload Engine (TOE) / PXE 2.0 / Wake on LAN® / iSCSI / Serial over LAN / failover, adapter fault tolerance / load balancing / connects to optional, supported Ethernet switches or <i>Passthrough Modules</i> (requires a second optional switch or PM for failover)	
Network-interface	One legacy connector or PCI-Express connector for I/O expansion options / 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)	
DVD / diskette / USB Kybd / video / mouse Graphics	None / requests for DVD-ROM, diskette drive, and USB port in BladeCenter by pressing media select button on front control panel None / requests for keyboard, mouse, and video in BladeCenter by pressing the display button on front control panel SVGA / ATI® Radeon® RN50 on planar / 16MB DDR std/max / 32-bit 33MHz PCI 2.2 bus	
Systems mgmt	IBM Baseboard Management Controller (BMC) / H8S2166 / on blade / provides system and environmental monitoring, event recording, alert capability / RS-485 interface for intermanagement communication with BladeCenter Management module	Quad Core AMD Opteron Processor Model 2347 HE Quad Core AMD Opteron Processor Model 2356 Quad Core AMD Opteron Processor Model 2376 HE Quad Core AMD Opteron Processor Model 2384
Diagnostics	Light Path Diagnostics™ (LED lights indicate failing component) and on-board diagnostics (via Preboot DSA)	2GB (2x1GB) PC2-5300 CL5 ECC DDR2 VLP RDIMM Kit 4GB (2x2GB) PC2-5300 CL5 ECC DDR2 VLP RDIMM Kit 8GB (2x4GB) PC2-5300 CL4 ECC DDR2 VLP RDIMM Kit 8GB (2x4GB) PC2-6400 CL4 ECC DDR2 VLP RDIMM Kit 16GB (2x8GB) PC2-4200 CL5 ECC DDR2 VLP RDIMM Kit IBM 73GB NHS 2.5" 10K SFF SAS HDD IBM 146GB NHS 2.5" 10K SFF SAS HDD
Security	Power-on password / administrator password / unattended boot / selectable boot / unattended start mode	26K5777 44T1547 26K5777
Software ship group Cooling fans	Documentation CD, Device Driver CD, ServerGuide CD Uses cooling from BladeCenter (types 8677**, 8852 and 8886) / thermal sensors on each processor and BladeCenter modules and front panel	IBM 73GB NHS 2.5" 15K SFF SAS HDD BladeCenter PCI Expansion Unit 2
Power supply Prerequisites	Uses power modules in BladeCenter (types 8677**, 8852 and 8886) Monitor, keyboard, mouse for setup; ethernet switch module, disk, BladeCenter (types 8677**, 8852 and 8886), operating system	BladeCenter PCI-Express I/O Expansion Unit SAS Expansion Card for IBM BladeCenter

Other options at ibm.com/products/us

Server blade (side view)



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

- ◇ Stealth black front bezel
- ◇ H 9.7" x W 1.14" x D 17.6"; H 24.5cm x W 2.9cm x D 44.6cm
- ◇ 11 lbs; 5.0kg (max configuration)
- ◇ Configuration/Setup Utility: F1 at startup
- ◇ Diagnostics: F2 at startup
- ◇ Network Boot: F12 at startup
- ◇ PXE Boot Agent Utility: Ctrl+S at startup
- ◇ Blade control panel on each blade 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 and processor(s)

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

Maximum internal disk capacity for each LS22 blade server¹³:
292GB with two 146GB SAS disks

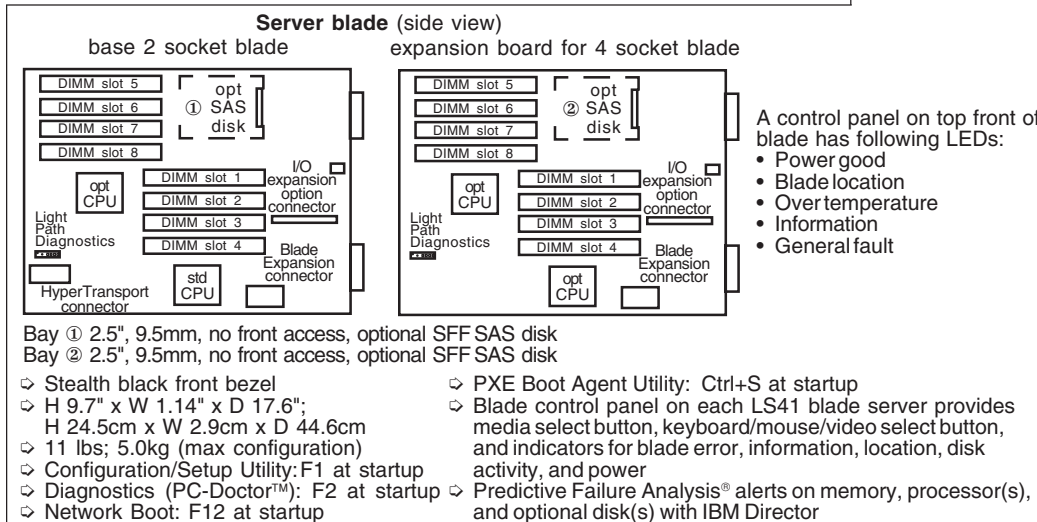
LIMITED WARRANTY³

- ◇ 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):²
 - 3 year IOR 9x5, 4 hr avg response (ServicePac® part num 40Y5980)
 - 3 year IOR 24x7, 4 hr avg response (ServicePac part num 40Y5981)
 - 4 year IOR 9x5, 4 hr avg response (ServicePac part num 40Y5984)
 - 4 year IOR 24x7, 4 hr avg response (ServicePac part num 40Y5985)
 - 5 year IOR 9x5, 4 hr avg response (ServicePac part num 40Y5988)
 - 5 year IOR 24x7, 4 hr avg response (ServicePac part num 40Y5989)
- ◇ Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- ◇ 24x7¹⁴ toll-free support for warranty issues during the warranty period³

See footnotes for important warranty information

** with 2000W power supply upgrade, * Express Models
excludes 115W models

IBM® Type-model	Qty x Processor ¹	Speed/Core	L2 Cache	Watts	Memory	Disk controller	Disk bays	Expansion Units	I/O slots	Mechanical	Ethernet	Available date
7972-31U	1 x Opteron 8212HE	2.0GHz/DC	2MB	68W	1GB	SAS	1 fixed	SIO/PCIEU	up to 2	single slot blade	2 x Gigabit	Oct 2006
7972-32U	2 x Opteron 8212HE	2.0GHz/DC	2MB	68W	2GB	SAS	2 fixed	SIO/PCIEU	up to 2	double slot blade	4 x Gigabit	Oct 2006
7972-3AU	1 x Opteron 8212	2.0GHz/DC	2MB	95W	1GB	SAS	1 fixed	SIO/PCIEU	up to 2	single slot blade	2 x Gigabit	Oct 2006
7972-3BU	2 x Opteron 8212	2.0GHz/DC	2MB	95W	2GB	SAS	2 fixed	SIO/PCIEU	up to 2	double slot blade	4 x Gigabit	Oct 2006
7972-51U	1 x Opteron 8216HE	2.4GHz/DC	2MB	68W	2GB	SAS	1 fixed	SIO/PCIEU	up to 2	single slot blade	2 x Gigabit	Oct 2006
7972-52U	2 x Opteron 8216HE	2.4GHz/DC	2MB	68W	4GB	SAS	2 fixed	SIO/PCIEU	up to 2	double slot blade	4 x Gigabit	Oct 2006
7972-6AU	1 x Opteron 8218	2.6GHz/DC	2MB	95W	2GB	SAS	1 fixed	SIO/PCIEU	up to 2	single slot blade	2 x Gigabit	Oct 2006
7972-6BU	2 x Opteron 8218	2.6GHz/DC	2MB	95W	4GB	SAS	2 fixed	SIO/PCIEU	up to 2	double slot blade	4 x Gigabit	Oct 2006
7972-E2U	4 x Opteron 8216HE	2.4GHz/DC	2MB	68W	16GB	SAS	2 fixed	SIO/PCIEU	up to 2	double slot blade	4 x Gigabit	Dec 2006
Positioning Processor(s)	Ultra-dense, low power, dual or quad socket, full performance modular computing platform with superior performance Up to 4 x AMD Opteron 8000 Series Dual Core at up to 2.6GHz / simultaneously supports 32-bit and 64-bit computing											
L2 Cache	1MB L2 Cache per core, AMD Direct Connect Architecture ensures lower latency I/O											
SMP support Implementation	2 or 4-way SMP / up to four Opteron processors (same speed/cache size) Systemboard contains up to four LGA1207-pin sockets, up to sixteen DIMM slots, up to two Legacy Daughter Card connectors, one Blade expansion connector, one HyperTransport Expansion connector, integrated graphics and Gigabit ethernet											
Memory	1, 2 or 4GB std / 16GB max ¹³ with double socket blade / 32 GB max ¹³ with quad socket blade / (32/64GB max with 4GB DIMMS*) two or four slots used / six or twelve slots available / PC5300 667MHz registered 240-pin ECC DDR2 VLP SDRAM RDIMMs / 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), hardware scrubbing											
SAS disk controller	Up to two integrated / LSI Logic® 1064 SAS controller 1.5/3Gb/sec / PCI-X 64-bit/133MHz / on planar / supports RAID 0, 1 / RAID-1, 1E & 5 with fully populated Storage and I/O Expansion blade / no cables or external connector											
SAS disk bays	Up to two non-hot-swap 2.5" SFF SAS disks / Supports up to three hot-swap SFF SAS disks in optional Storage and I/O Expansion Unit											
External storage	Support for IBM TotalStorage™ solutions											
Mechanical Architecture/Chipsets	Single or double slot blade / Supported in IBM BladeCenter 8677, 8720, 8730 and 8852 ServerWorks™ Chipset / Up to two HT2000 HyperTransport System I/O Controllers providing: PCI-Express bridges to Legacy Daughter Card connectors and Blade Storage Expansion connector, PCI-X bridge to LSI 1064 SAS, HyperTransport bridge to HT1000 South Bridge / HT1000 South Bridge provides: USB(2.0), ATI video, Dual GB ethernet, LPC bus to Winbond PC87427 for Super I/O											
Bus slots	No PCI or PCI-X slots (expansion via modules or network-interface option connector)											
Ethernet controllers	Up to four gigabit Ethernet controllers / dual 10/100/1000 Ethernet controllers on single slot blade / Broadcom® BCM5706S / PCI-X 64-bit 133MHz bus / double socket blade adds Broadcom BCM5708S / dual10/100/1000 Ethernet controllers / PCI-Express / up to four full gigabit ethernet MAC and PHY layer functions / full-duplex / TCP/IP OffloadEngine (TOE) / iSCSI / Wake on LAN® / Serial over LAN / Alert Standard Format 2.0 / Failover, adapter fault tolerance / Remote Direct Memory Access (RDMA)											
Network-interface	Up to two legacy connector or PCI-Express connector for I/O expansion options / 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)											
DVD / diskette / USB Kybd / video / mouse Graphics	None / requests for DVD-ROM, diskette drive, and USB port in BladeCenter by pressing media select button on front control panel None / requests for keyboard, mouse, and video in BladeCenter by pressing the display button on front control panel SVGA / ATI® Radeon® RN50 on planar / 16MB DDR std/max / 32-bit 33MHz PCI 2.2 bus											
Systems mgmt	IBM Baseboard Management Controller (BMC) / H8S2166 / on blade / provides system and environmental monitoring, event recording, alert capability / RS-485 interface for intermanagement communication with BladeCenter Management module											
Diagnostics	Light Path Diagnostics™ (LED lights indicate failing component) and on-board diagnostics (via PC-Doctor in BIOS)											
Security	No security intrusion protection / Power-on password / administrator password / unattended boot / selectable boot / unattended start mode											
Software ship group	Documentation CD, Device Driver CD, ServerGuide CD											
Cooling fans	Uses cooling from BladeCenter (types 8677, 8720, 8730, 8852) / thermal sensors on each processor and BladeCenter modules and front panel											
Power supply Prerequisites	Uses power module(s) in BladeCenter (types 8677, 8720, 8730, 8852) Monitor, keyboard, mouse for setup; ethernet switch module, disk, BladeCenter (types 8677, 8720, 8730, 8852), operating system											
											Dual Core AMD Opteron Processor Model 8212HE 25R8934 Dual Core AMD Opteron Processor Model 8212 25R8932 Dual Core AMD Opteron Processor Model 8216HE 25R8935 Dual Core AMD Opteron Processor Model 8218 25R8933 1GB (2x512) PC2-5300 CL5 ECC DDR2 VLP RDIMM Kit 39M5861 2GB (2x1GB) PC2-5300 CL5 ECC DDR2 VLP RDIMM Kit 39M5864 4GB (2x2GB) PC2-5300 CL5 ECC DDR2 VLP RDIMM Kit 39M5867 8GB (2x4GB) PC2-4200 CL4 ECC DDR2 VLP RDIMM Kit* 39M5870 IBM 36GB NHS 2.5" SFF SAS HDD 26K5776 IBM 73GB NHS 2.5" SFF SAS HDD 26K5777 BladeCenter Storage and I/O Expansion Blade 39R7563 BladeCenter SFF Fibre Channel Expansion Card 26K4841 BladeCenter SFF Gigabit Ethernet Expansion Card 39R8624 QLogic iSCSI Expansion Card for BladeCenter 32R1923 QLogic 4GB SFF Fibre Channel Expansion Card for BladeCenter 26R0890 Emulex 4GB SFF Fibre Channel Expansion Card for BladeCenter 39Y9186	
	Other options at ibm.com/pc/us/accessories											



LIMITED WARRANTY³

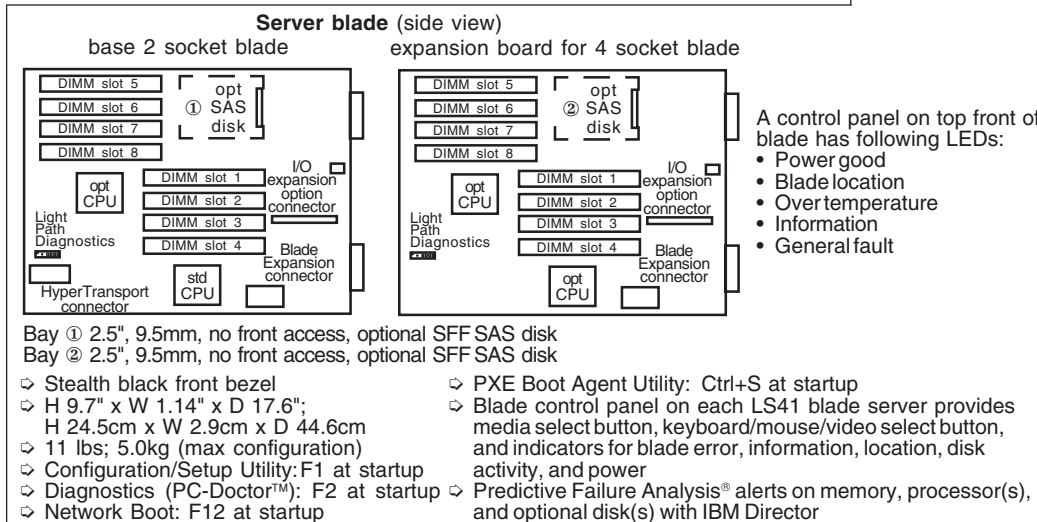
- 3 year parts and labor
- International Warranty Service³
- On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time⁷
- On site service upgrade options (in eligible locations):⁷
 - 3 year IOR 9x5, 4 hr avg response (ServicePac® partnum 12x7014)
 - 3 year IOR 24x7, 4 hr avg response (ServicePac partnum 12x7015)
 - 4 year IOR 9x5, 4 hr avg response (ServicePac partnum 12x7018)
 - 4 year IOR 24x7, 4 hr avg response (ServicePac partnum 12x7019)
 - 5 year IOR 9x5, 4 hr avg response (ServicePac partnum 12x7022)
 - 5 year IOR 24x7, 4 hr avg response (ServicePac partnum 12x7023)
- Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- 24x7¹⁴ toll-free support for warranty issues during the warranty period³

See footnotes for important warranty information

¹⁴4GB DIMMS support available December 2006 (LS41A) © IBM Corp. December 2006

IBM® Type-model	Qty x Processor ¹	Speed/Core	L2 Cache	Watts	Memory	Disk controller	Disk bays	Expansion Units	I/O slots	Mechanical	Ethernet	Available date
7972-4TU	2 x Opteron 8214HE	2.2GHz/DC	2MB	68W	2GB	SAS	2 fixed	SIO/PCIEU	up to 2	double slot blade	4 x Gigabit	Feb 2007
7972-7AU	1 x Opteron 8220	2.8GHz/DC	2MB	95W	2GB	SAS	1 fixed	SIO/PCIEU	up to 2	single slot blade	2 x Gigabit	Feb 2007
7972-7BU	2 x Opteron 8220	2.8GHz/DC	2MB	95W	4GB	SAS	2 fixed	SIO/PCIEU	up to 2	double slot blade	4 x Gigabit	Feb 2007
7972-61U	1 x Opteron 8218HE	2.6GHz/DC	2MB	68W	2GB	SAS	1 fixed	SIO/PCIEU	up to 2	single slot blade	2 x Gigabit	Apr 2007
7972-62U	2 x Opteron 8218HE	2.6GHz/DC	2MB	68W	4GB	SAS	2 fixed	SIO/PCIEU	up to 2	double slot blade	4 x Gigabit	Apr 2007
7972-8BU	2 x Opteron 8222	3.0GHz/DC	2MB	95W	4GB	SAS	2 fixed	SIO/PCIEU	up to 2	double slot blade	4 x Gigabit	Oct 2007

Positioning Processor(s) L2 Cache SMP support Implementation	Ultra-dense, low power, dual or quad socket, full performance modular computing platform with superior performance Up to 4 x AMD Opteron 8000 Series Dual Core at up to 3.0GHz / simultaneously supports 32-bit and 64-bit computing 1MB L2 Cache per core, AMD Direct Connect Architecture ensures lower latency I/O 2 or 4-way SMP / up to four Opteron processors (same speed/cache size) Systemboard contains up to four LGA1207-pin sockets, up to sixteen DIMM slots, up to two Legacy Daughter Card connectors, one Blade expansion connector, one HyperTransport Expansion connector, integrated graphics and Gigabit ethernet											
Memory	1, 2 or 4GB std / 16GB max ¹³ with double socket blade / 32 GB max ¹³ with quad socket blade / (32/64GB max with 4GB DIMMS*) two or four slots used / six or twelve slots available / PC5300 667MHz registered 240-pin ECC DDR2 VLP SDRAM RDIMMs / 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), hardware scrubbing											
SAS disk controller	Up to two integrated / LSI Logic® 1064 SAS controller 1.5/3Gb/sec / PCI-X 64-bit/133MHz / on planar / supports RAID 0, 1 / supports RAID-1, 1E & 5 with fully populated Storage and I/O Expansion blade / no cables or external connector											
SAS disk bays	Up to two non hot-swap 2.5" SFF SAS disks / Supports up to three hot-swap SFF SAS disks in optional Storage and I/O Expansion Unit											
External storage	Support for IBM TotalStorage™ solutions											
Mechanical Architecture/Chipsets	Single or double slot blade / Supported in IBM BladeCenter 8677, 8720, 8730 and 8852 ServerWorks™ Chipset / Up to two HT2000 HyperTransport System I/O Controllers providing: PCI-Express bridges to Legacy Daughter Card connectors and Blade Storage Expansion connector, PCI-X bridge to LSI 1064 SAS, HyperTransport bridge to HT1000 South Bridge / HT1000 South Bridge provides: USB(2.0), ATI video, Dual GB ethernet, LPC bus to Winbond PC87427 for Super I/O											
Bus slots	No PCI or PCI-X slots (expansion via modules or network-interface option connector)											
Ethernet controllers	Up to four gigabit Ethernet controllers / dual 10/100/1000 Ethernet controllers on single slot blade / Broadcom® BCM5706S / PCI-X 64-bit 133MHz bus / double socket blade adds Broadcom BCM5708S / dual10/100/1000 Ethernet controllers / PCI-Express / up to four full gigabit ethernet MAC and PHY layer functions / full-duplex / TCP/IP OffloadEngine (TOE) / iSCSI / Wake on LAN® / Serial over LAN / Alert Standard Format 2.0 / Failover, adapter fault tolerance / Remote Direct Memory Access (RDMA)											
Network-interface	Up to two legacy connector or PCI-Express connector for I/O expansion options / 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)											
DVD / diskette / USB Kybd / video / mouse Graphics	None / requests for DVD-ROM, diskette drive, and USB port in BladeCenter by pressing media select button on front control panel None / requests for keyboard, mouse, and video in BladeCenter by pressing the display button on front control panel SVGA / ATI® Radeon® RN50 on planar / 16MB DDR std/max / 32-bit 33MHz PCI 2.2 bus											
Systems mgmt	IBM Baseboard Management Controller (BMC) / H8S2166 / on blade / provides system and environmental monitoring, event recording, alert capability / RS-485 interface for intermanagement communication with BladeCenter Management module											
Diagnostics	Light Path Diagnostics™ (LED lights indicate failing component) and on-board diagnostics (via PC-Doctor in BIOS)											
Security	No security intrusion protection / Power-on password / administrator password / unattended boot / selectable boot / unattended start mode											
Software ship group	Documentation CD, Device Driver CD, ServerGuide CD											
Cooling fans	Uses cooling from BladeCenter (types 8677, 8720, 8730, 8852) / thermal sensors on each processor and BladeCenter modules and front panel											
Power supply Prerequisites	Uses power module(s) in BladeCenter (types 8677, 8720, 8730, 8852) Monitor, keyboard, mouse for setup; ethernet switch module, disk, BladeCenter (types 8677, 8720, 8730, 8852), operating system											
											40K1265 44E5247 40K1266 44R4951 39M5861 39M5864 39M5867 39M5870 26K5776 26K5777 39R7563 26K4841 39R8624 32R1923 26R0890 39Y9186	
	Other options at ibm.com/pc/us/accessories											



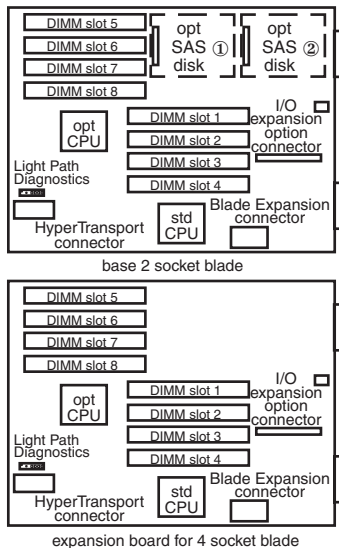
LIMITED WARRANTY³

- 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® partnum 12x7014)
 - 3 year IOR 24x7, 4 hr avg response (ServicePac partnum 12x7015)
 - 4 year IOR 9x5, 4 hr avg response (ServicePac partnum 12x7018)
 - 4 year IOR 24x7, 4 hr avg response (ServicePac partnum 12x7019)
 - 5 year IOR 9x5, 4 hr avg response (ServicePac partnum 12x7022)
 - 5 year IOR 24x7, 4 hr avg response (ServicePac partnum 12x7023)
- Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- 24x7¹⁴ toll-free support for warranty issues during the warranty period³

See footnotes for important warranty information

IBM® Type-model	Qty x Processor ¹	Speed/Core	L2 Cache	Watts	Memory	Disk controller	Disk bays	Expansion Units	I/O slots	Mechanical	Ethernet	Available date
7902-3QU	2 x Opteron 8347HE	1.9GHz/QC	2MB	79W	4GB	SAS	2 fixed	PCIEU/PEU2	up to 2	double slot blade	4 x Gb	Sep 2008
7902-CQU	2 x Opteron 8356	2.3GHz/QC	2MB	115W	4GB	SAS	2 fixed	PCIEU/PEU2	up to 2	double slot blade	4 x Gb	Sep 2008
7902-EDU*	4 x Opteron 8356	2.3GHz/QC	2MB	115W	16GB	SAS	2 fixed	PCIEU/PEU2	up to 2	double slot blade	4 x Gb	Sep 2008
7902-1Sx	2 x Opteron 8380	2.5GHz/QC	2MB	75W	4GB	SAS	2 fixed	PCIEU/PEU2	up to 2	double slot blade	4 x Gb	Nov 2008
7902-3Sx	2 x Opteron 8384	2.7GHz/QC	2MB	75W	4GB	SAS	2 fixed	PCIEU/PEU2	up to 2	double slot blade	4 x Gb	Nov 2008
7902-ESU	2 x Opteron 8384	2.7GHz/QC	2MB	75W	8GB	SAS	2 fixed	PCIEU/PEU2	up to 2	double slot blade	4 x Gb	Nov 2008
7902-EUU	4 x Opteron 8384	2.7GHz/QC	2MB	75W	16GB	SAS	2 fixed	PCIEU/PEU2	up to 2	double slot blade	4 x Gb	Nov 2008

Positioning Processor(s)	Ultra-dense, quad socket, full performance modular computing platform with superior performance	
L2 Cache	Up to 4 x AMD Opteron 8000 Series Quad Core at up to 2.7GHz / simultaneously supports 32-bit and 64-bit computing	
SMP support Implementation	512KB L2 Cache per core, AMD Direct Connect Architecture ensures lower latency I/O 2 or 4-way SMP / up to four Opteron processors (same speed/cache size)	
Memory	Systemboards contain four LGA 1207-pin sockets, sixteen VLP DIMM slots, two Legacy Daughter Card connectors, one Blade Expansion connector, one HyperTransport Expansion connector, integrated graphics, SAS and ethernet	
SAS disk controller	LSI Logic®1064E SAS controller / 1.5/3.0Gb/sec / PCI-Express / on planar / supports RAID-1 / no cables or external connector	
SAS disk bays	Two fixed 2.5" SFF SAS disks	
External storage	Support for IBM TotalStorage™ solutions	
Mechanical Architecture/Chipsets	Single or double slot blade / Supported in IBM BladeCenter 8677**, 8852 and 8886 ServerWorks™ Chipset / HT2100 HyperTransport System I/O Controller provides: PCI-Express links to Blade Storage Expansion connector and PCI-Express Switch to SAS and Ethernet controllers, HyperTransport bridge to HT1000 South Bridge / HT 1000 South Bridge provides: Legacy Daughter Card connector via 64-bit PCI-X bus, USB, ATI video via 32-bit PCI bus, LPC bus to Winbond PC87427 for Super I/O / HT 2000 HyperTransport System I/O Controller provides: Legacy Daughter Card connector via 64-bit PCI-X bus and PCI-Express link to Ethernet controller	
Bus slots	No PCI or PCI-X slots (expansion via modules or network-interface option connector)	
Ethernet controllers	Up to four Gigabit Ethernet ports / up to two Broadcom® BCM5709S Gigabit Ethernet controllers / up to four full gigabit ethernet MAC and PHY layer functions / integrated / PCI-Express / full-duplex / TCP/IP OffloadEngine (TOE) / PXE 2.0 / Wake on LAN® / iSCSI / Serial over LAN / failover, adapter fault tolerance / load balancing / connects to optional, supported Ethernet switches or <i>Passthrough Modules</i> (requires a second optional switch or PM for failover)	
Network-interface	Two legacy connectors for I/O expansion options / 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)	
DVD / diskette / USB Kybd / video / mouse Graphics	None / requests for DVD-ROM, diskette drive, and USB port in BladeCenter by pressing media select button on front control panel None / requests for keyboard, mouse, and video in BladeCenter by pressing the display button on front control panel SVGA / ATI® Radeon® RN50 on planar / 16MB DDR std/max / 32-bit 33MHz PCI 2.2 bus	
Systems mgmt	IBM Baseboard Management Controller (BMC) / H8S2166 / on blade / provides system and environmental monitoring, event recording, alert capability / RS-485 interface for intermanagement communication with BladeCenter Management module	Quad Core AMD Opteron Processor Model 8347HE Quad Core AMD Opteron Processor Model 8356 LS42 Multi Processor Expansion Unit with 2 x 8380 processors LS42 Multi Processor Expansion Unit with 2 x 8384 processors 2GB (2x1GB) PC2-5300 CL5 ECC DDR2 VLP RDIMM Kit 4GB (2x2GB) PC2-5300 CL5 ECC DDR2 VLP RDIMM Kit 8GB (2x4GB) PC2-5300 CL4 ECC DDR2 VLP RDIMM Kit 8GB (2x4GB) PC2-6400 CL4 ECC DDR2 VLP RDIMM Kit IBM 73GB NHS 2.5" 10K SFF SAS HDD IBM 146GB NHS 2.5" 10K SFF SAS HDD IBM 73GB NHS 2.5" 15K SFF SAS HDD BladeCenter PCI Expansion Unit 2 BladeCenter PCI-Express I/O Expansion Unit
Diagnostics	Light Path Diagnostics™ (LED lights indicate failing component) and on-board diagnostics (via Preboot DSA)	44X1552 44R4917 46M6817 44X1685 46C0522 46C0512 46C7524 46C7525 26K5777 42D0421 43X0845 25K8373 43W4391
Security	Power-on password / administrator password / unattended boot / selectable boot / unattended start mode	Other options at ibm.com/products/us
Software ship group	Documentation CD, Device Driver CD, ServerGuide CD	
Cooling fans	Uses cooling from BladeCenter (types 8677**, 8852 and 8886) / thermal sensors on each processor and BladeCenter modules and front panel	
Power supply Prerequisites	Uses power modules in BladeCenter (types 8677**, 8852 and 8886) Monitor, keyboard, mouse for setup; ethernet switch module, disk, BladeCenter (types 8677**, 8852 and 8886), operating system	



- ▷ Stealth black front bezel
 - ▷ H 9.7" x W 2.28" x D 17.6"
 - ▷ H 24.5cm x W 5.8cm x D 44.6cm
 - ▷ 25 lbs; 11kg (max configuration)
 - ▷ Configuration/Setup Utility: F1 at startup
 - ▷ Diagnostics: F2 at startup
 - ▷ Network Boot: F12 at startup
 - ▷ PXE Boot Agent Utility: Ctrl+S at startup
 - ▷ Blade control panel on each blade 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 and processor(s)
- A control panel on top front of blade has following LEDs:
Power good
Blade location
Over temperature
Information

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

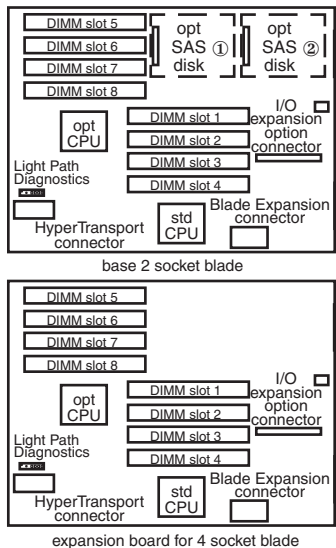
Maximum internal disk capacity for each LS42 blade server³:
292GB with two 146GB SAS disks

LIMITED WARRANTY³

- ▷ 3 year parts and labor
- ▷ International Warranty Service³
- ▷ On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time⁷
- ▷ On site service upgrade options (in eligible locations):⁷
 - 3 year IOR 9x5, 4 hr avg response (ServicePac® part num 40Y5980)
 - 3 year IOR 24x7, 4 hr avg response (ServicePac part num 40Y5981)
 - 4 year IOR 9x5, 4 hr avg response (ServicePac part num 40Y5984)
 - 4 year IOR 24x7, 4 hr avg response (ServicePac part num 40Y5985)
 - 5 year IOR 9x5, 4 hr avg response (ServicePac part num 40Y5988)
 - 5 year IOR 24x7, 4 hr avg response (ServicePac part num 40Y5989)
- Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- ▷ 24x7¹⁴ toll-free support for warranty issues during the warranty period³

IBM® Type-model	Qty x Processor ¹	Speed/Core	L2 Cache	Watts	Memory	Disk controller	Disk bays	Expansion Units	I/O slots	Mechanical	Ethernet	Available date
7902-3Lx	2 x Opteron 8376 HE	2.3GHz/QC	2MB	55W	4GB	SAS	2 fixed	PCI-EU/PEU2	up to 2	single slot blade	2 x Gb	Mar 2009
7902-HVx	4 x Opteron 8384	2.7GHz/QC	2MB	55W	16GB	SAS	2 fixed	PCI-EU/PEU2	up to 2	double slot blade	4 x Gb	Mar 2009
7902-ELx*	2 x Opteron 8376 HE	2.3GHz/QC	2MB	55W	8GB	SAS	2 fixed	PCI-EU/PEU2	up to 2	single slot blade	2 x Gb	Mar 2009
7902-EMx*	4 x Opteron 8376 HE	2.3GHz/QC	2MB	55W	16GB	SAS	2 fixed	PCI-EU/PEU2	up to 2	double slot blade	4 x Gb	Mar 2009

Positioning Processor(s) L2 Cache SMP support Implementation	Ultra-dense, up to 4 socket, full performance modular computing platform with superior performance Up to 4 x AMD Opteron 8000 Series Quad Core at up to 2.7GHz / simultaneously supports 32-bit and 64-bit computing 512KB L2 Cache per core, AMD Direct Connect Architecture ensures lower latency I/O 2 or 4-way SMP / up to four Opteron processors (same speed/cache size) Systemboards contain four LGA 1207-pin sockets, sixteen VLP DIMM slots, two Legacy Daughter Card connectors, one Blade Expansion connector, one HyperTransport Expansion connector, integrated graphics, SAS and ethernet											
Memory	4x1GB or 8x2GB std / 128GB max ¹³ / four or eight slots used / twelve or eight slots available / PC2-5300 667MHz registered 240-pin ECC DDR2 VLP SDRAM RDIMMs (std) / PC2-6400 800MHz registered 240-pin ECC DDR2 VLP SDRAM RDIMMs (opt) / eight DIMM gold-connector slots on systemboard / eight DIMM gold-connector slots on multiprocessor expansion unit / 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), hardware scrubbing											
SAS disk controller	LSI Logic®1064E SAS controller / 1.5/3.0Gb/sec / PCI-Express / on planar / supports RAID-1 / no cables or external connector											
SAS disk bays	Two fixed 2.5" SFF SAS disks											
External storage	Support for IBM TotalStorage™ solutions											
Mechanical Architecture/Chipsets	Single or double slot blade / Supported in IBM BladeCenter 8677**, 8852 and 8886 / single-slot LS42 upgradeable to double-slot via multiprocessor expansion unit (MPE) ServerWorks™ Chipset / HT2100 HyperTransport System I/O Controller provides: PCI-Express links to Blade Storage Expansion connector and PCI-Express Switch to SAS and Ethernet controllers, HyperTransport bridge to HT1000 South Bridge / HT 1000 South Bridge provides: Legacy Daughter Card connector via 64-bit PCI-X bus, USB, ATI video via 32-bit PCI bus, LPC bus to Winbond PC87427 for Super I/O / HT 2000 HyperTransport System I/O Controller provides: Legacy Daughter Card connector via 64-bit PCI-X bus and PCI-Express link to Ethernet controller											
Bus slots	No PCI or PCI-X slots (expansion via modules or network-interface option connector)											
Ethernet controllers	Up to four Gigabit Ethernet ports / up to two Broadcom® BCM5709S Gigabit Ethernet controllers / up to four full gigabit ethernet MAC and PHY layer functions / integrated / PCI-Express / full-duplex / TCP/IP OffloadEngine (TOE) / PXE 2.0 / Wake on LAN® / iSCSI / Serial over LAN / failover, adapter fault tolerance / load balancing / connects to optional, supported Ethernet switches or <i>Passthrough Modules</i> (requires a second optional switch or PM for failover)											
Network-interface	Two legacy connectors for I/O expansion options / 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)											
DVD / diskette / USB Kybd / video / mouse Graphics	None / requests for DVD-ROM, diskette drive, and USB port in BladeCenter by pressing media select button on front control panel None / requests for keyboard, mouse, and video in BladeCenter by pressing the display button on front control panel SVGA / ATI® Radeon® RN50 on planar / 16MB DDR std/max / 32-bit 33MHz PCI 2.2 bus											
Systems mgmt	IBM Baseboard Management Controller (BMC) / H8S2166 / on blade / provides system and environmental monitoring, event recording, alert capability / RS-485 interface for intermanagement communication with BladeCenter Management module											
Diagnostics	Light Path Diagnostics™ (LED lights indicate failing component) and on-board diagnostics (via Preboot DSA)											
Security	Power-on password / administrator password / unattended boot / selectable boot / unattended start mode											
Software ship group	Documentation CD, Device Driver CD, ServerGuide CD											
Cooling fans	Uses cooling from BladeCenter (types 8677**, 8852 and 8886) / thermal sensors on each processor and BladeCenter modules and front panel											
Power supply Prerequisites	Uses power modules in BladeCenter (types 8677**, 8852 and 8886) Monitor, keyboard, mouse for setup; ethernet switch module, disk, BladeCenter (types 8677**, 8852 and 8886), operating system											
											LS42 Multi Processor Expansion Unit with 2 x 8380 processors LS42 Multi Processor Expansion Unit with 2 x 8384 processors LS42 Multi Processor Expansion Unit with 2 x 8374 HE processors LS42 Multi Processor Expansion Unit with 2 x 8376 HE processors 2GB (2x1GB) PC2-5300 CL5 ECC DDR2 VLP RDIMM Kit 4GB (2x2GB) PC2-5300 CL5 ECC DDR2 VLP RDIMM Kit 8GB (2x4GB) PC2-5300 CL4 ECC DDR2 VLP RDIMM Kit 8GB (2x4GB) PC2-6400 CL4 ECC DDR2 VLP RDIMM Kit 16GB (2x8GB) PC2-4200 CL5 ECC DDR2 VLP RDIMM Kit IBM 73GB NHS 2.5" 10K SFF SAS HDD IBM 146GB NHS 2.5" 10K SFF SAS HDD IBM 73GB NHS 2.5" 15K SFF SAS HDD BladeCenter PCI Expansion Unit 2 BladeCenter PCI-Express I/O Expansion Unit	46M6817 44X1685 46M6885 46M6890 46C0522 46C0512 46C7524 46C7525 44T1547 26K5777 42D0421 43X0845 25K8373 43W4391
	Other options at ibm.com/products/us											



- ◇ Stealth black front bezel
 - ◇ H 9.7" x W 2.28" x D 17.6"
 - ◇ H 24.5cm x W 5.8cm x D 44.6cm
 - ◇ 25 lbs; 11kg (max configuration)
 - ◇ Configuration/Setup Utility: F1 at startup
 - ◇ Diagnostics: F2 at startup
 - ◇ Network Boot: F12 at startup
 - ◇ PXE Boot Agent Utility: Ctrl+S at startup
 - ◇ Blade control panel on each blade 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 and processor(s)
- A control panel on top front of blade has following LEDs:
Power good
Blade location
Over temperature
Information

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

Maximum internal disk capacity for each LS42 blade server¹³:
292GB with two 146GB SAS disks

LIMITED WARRANTY³

- ⇒ 3 year parts and labor
- ⇒ International Warranty Service³
- ⇒ On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time⁷
- ⇒ On site service upgrade options (in eligible locations):⁷
 - 3 year IOR 9x5, 4 hr avg response (ServicePac® part num 40Y5980)
 - 3 year IOR 24x7, 4 hr avg response (ServicePac part num 40Y5981)
 - 4 year IOR 9x5, 4 hr avg response (ServicePac part num 40Y5984)
 - 4 year IOR 24x7, 4 hr avg response (ServicePac part num 40Y5985)
 - 5 year IOR 9x5, 4 hr avg response (ServicePac part num 40Y5988)
 - 5 year IOR 24x7, 4 hr avg response (ServicePac part num 40Y5989)
- Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- ⇒ 24x7¹⁴ toll-free support for warranty issues during the warranty period³

IBM® Type-model	Processor	GHz ¹	Core	L2 cache	FSB MHz	Watts	Memory	Disk controller	Disk bays	Expansion Units	I/O slots	Mechanical	Ethernet	Available date
0792-xxx	Cell/B.E.™	3.2GHz	1 PPE 8 SPE	512KB/PPE 256KB/SPE	5GB/ sec	300	2x1GB	N/A	None	None	None	Single-slot blade	Dual Gigabit	October 2007
Positioning Processor(s)	High-performance blade solution for graphics-intensive and single precision floating point high performance computing (HPC) applications Two 64-bit, 3.2 GHz Cell Broadband Engine™ processors. The asymmetric multi-core processor includes a Power Processor Element (PPE) and eight SIMD engines called Synergistic Processor Elements (SPE)													
SMP - L2 Cache Implementation	512 KB per Cell/B.E. Processor, and 256 KB of local store memory for each SPE Server blade contains two Cell Broadband Engine microprocessors soldered to planar, 2GB XDR system memory, four DIMM slots for I/O buffer memory, PCI-X, Serial Attached SCSI (SAS) expansion card option, I/O expansion option, and dual Gigabit Ethernet													
Memory	2 GB (1 GB of error checking and correction (ECC) memory per Cell/B.E. chip) / 4 DIMM slots (2 slots / Cell/B.E. companion chip) for optional special purpose I/O Buffer DDR2 VLP DIMMs. Special purpose I/O buffer memory is unlike "system" memory in that client applications must be written specifically to utilize it.													
Disk Controller	N/A													
Disk bays	None													
External Storage	Support for IBM TotalStorage™ solutions through DS3200 Boot Disk System / Optional Serial Attached SCSI (SAS) daughter card connected via PCI-X (CFFv) which can be used to connect to the BladeCenter Boot Disk System through a SAS switch module in the chassis													
Mechanical Architecture/Chipset BUS slots	Single-wide Blade supported in BladeCenter H Type 8852 and BladeCenter HT Type 8740 and 8750 units Cell Broadband Engine multi-core processor / IBM companion chip No PCI or PCI-X slots (expansion via modules or network-interface option connector)													
Ethernet Network Interface	Dual Gigabit 10/100/1000 ethernet controller / Broadcom® 5704S One connector for I/O expansion option / one connector for Serial Attached SCSI (SAS) option requiring same interface modules in bays 3 and 4 of BladeCenter													
DVD / diskette / USB Kybd / video / mouse Graphics controller	None / requests for DVD-ROM, diskette drive, and USB port in BladeCenter by pressing media select button on front control panel N/A None													
Systems Mgmt	IBM Integrated Baseboard Management Controller (BMC) / BladeCenter Advanced Management Module Web interface / IPMI 1.5 / IBM Active Energy Manager® / IBM Director													
Diagnostics	Light Path Diagnostics (LED lights indicate failing component) and on-board diagnostics (in host firmware)													
Security	No security intrusion protection / Power-on password / administrator password (via AMM) / unattended boot / selectable boot / unattended start mode													
Software ship group	Documentation CD													
Cooling Fans	Uses cooling from BladeCenter chassis / thermal sensors on each processor and BladeCenter modules and front panel											512 MB VLP DIMMs (Qty 2) as I/O Buffer Memory		39M5861
Power supply(s)	Uses power module(s) in BladeCenter chassis											Cisco 4x InfiniBand Adapter		32R1760
Prerequisites	Monitor, keyboard, mouse via rack console for setup; Ethernet switch modules; BladeCenter H Type 8852 or BladeCenter HT Type 8740 or 8750; Red Hat Enterprise Linux 5.1 operating system; storage device (no built-in disk storage)											SAS expansion card for IBM BladeCenter		39Y9190

Server blade

- Raven 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
- 12lbs; 5.44kg (max configuration)
- Cell Broadband Engine 300W
- Configuration/Setup Utility: F1 at startup
- System Partition Boot: ALT+F1 at startup
- Network Boot: F12 at startup
- Blade control panel on each QS21 blade server provides media select button, and indicators for blade error, information, location, and power

LIMITED WARRANTY³

- 1 year parts and labor
- International Warranty Service³
- Customer Replaceable Unit (CRU) and On-site Service*
- **On site, 8 am-5 pm, Mon-Fri excluding holidays, next business day response time**
- **24x7¹⁴ telephone support for warranty issues during the warranty period³**

(*) IBM will determine which type of warranty service is appropriate for the repair

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

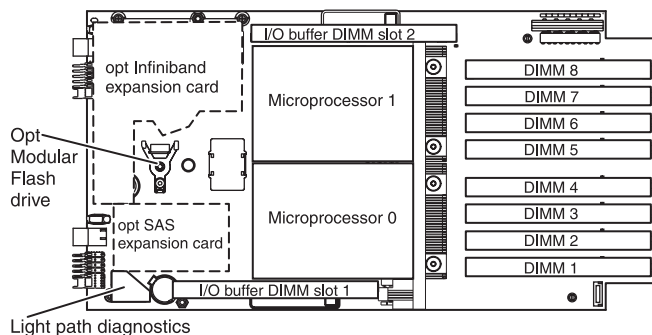
- Power good
- Blade location
- Activity
- Information
- General fault

IBM® Type-model	Processor	GHz ¹	Core	L2 cache	FSB MHz	Watts	Memory	Disk controller	Disk bays	Expansion Units	I/O slots	Mechanical	Ethernet	Available date
0793-38y	PowerXCell™ 8i	3.2 GHz	1 PPE 8 SPE	512KB/ processor	5GB/ sec	250W	8x1GB	N/A	None	None	None	Single-slot blade	Dual Gigabit	June 2008
0793-40y	PowerXCell™ 8i	3.2 GHz	1 PPE 8 SPE	512KB/ processor	5GB/ sec	265W	4x4GB	N/A	None	None	None	Single-slot blade	Dual Gigabit	June 2008

Positioning Processor(s)	Premier blade for high performance computing (HPC) double precision floating point workloads that require a large amount of CPU memory Two IBM PowerXCell 8i processor chips operating at 3.2 GHz / The asymmetric multi-core processor includes a Power Processor Element (PPE) and eight SIMD engines called Synergistic Processor Elements (SPE) with enhanced Double Precision (eDP)
SMP - L2 Cache Implementation	512 KB per IBM PowerXCell 8i / 256 KB of local store memory for each SPE Server blade contains two IBM PowerXCell 8i processors and companion chips soldered to planar, eight DIMM slots for system memory, two DIMM slots for optional special purpose I/O buffer memory, PCI-X, Serial Attached SCSI (SAS) expansion card option, I/O expansion option, dual Gigabit Ethernet, and optional 8 GB Modular Flash Drive for system boot or local storage
Memory	8 DDR2 PC2-6400 VLP DIMM slots (4 slots per IBM PowerXCell 8i) for system memory with error checking and correction capability (1 GB or 4 GB memory modules); 32GB maximum. Additionally, 2 DIMM slots (1 slot per IBM PowerXCell 8i companion chip) for optional special purpose I/O Buffer 1GB DDR2 VLP DIMMs. Special purpose I/O buffer memory is unlike "system" memory in that client applications must be written specifically to utilize it. / optional 8 GB Modular Flash Drive for system boot or local storage
Disk Controller Disk bays External Storage	N/A None Support for IBM TotalStorage™ solutions through DS3200 Boot Disk System / Optional Serial Attached SCSI (SAS) daughter card connected via PCI-X (CFV) which can be used to connect to the BladeCenter Boot Disk System through a SAS switch module in the chassis
Mechanical Architecture/Chipset BUS slots	Single-wide Blade supported in BladeCenter H Type 8852 IBM PowerXCell 8i processor / IBM companion chip No PCI or PCI-X slots (expansion via modules or network-interface option connector)
Ethernet Network Interface	Dual Gigabit 10/100/1000 ethernet controller / Broadcom® 5704S One connector for I/O expansion option / one connector for Serial Attached SCSI (SAS) options requiring the same interface modules in bays 3 and 4 of BladeCenter
DVD / diskette / USB Kybd / video / mouse Graphics controller	None / requests for DVD-ROM, diskette drive, and USB port in BladeCenter by pressing media select button on front control panel N/A None
Systems Mgmt	IBM Integrated Baseboard Management Controller (BMC) / BladeCenter Advanced Management Module Web interface / IPMI 1.5 / IBM Systems Director Active Energy Manager® / IBM Director
Diagnostics	Light Path Diagnostics (LED lights indicate failing component) and on-board diagnostics (in host firmware)
Security	No security intrusion protection / Power-on password / administrator password (via AMM) / unattended boot / selectable boot / unattended start mode
Software ship group	Documentation CD
Cooling Fans Power supply(s) Prerequisites	Uses cooling from BladeCenter chassis / thermal sensors on each processor and BladeCenter modules and front panel Uses power module(s) in BladeCenter chassis Monitor, keyboard, mouse via rack console for setup; Ethernet switch modules; BladeCenter H Type 8852; Red Hat Enterprise Linux 5.2 operating system; storage device (no built-in disk storage)

1GB VLP DDR2 system memory	46C0500
2GB DIMM Kit (2x1GB) VLP DDR2 system memory	46C0501
4GB DIMM VLP DDR2 system memory	46C0504
8GB DIMM Kit (2x4GB) VLP DDR2 system memory	46C0510
2GB DIMM Kit (2x1GB) VLP DDR2 I/O buffer memory	46C0501
High-speed SDR InfiniBand expansion card	32R1760
SAS expansion card	39Y9190
8 GB Modular Flash Drive	43W3934

Server blade



- Raven 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
- 12lbs; 5.44kg (max configuration)
- Two IBM PowerXCell 8i 300W (with 32GB)
- Configuration/Setup Utility: F1 at startup
- System Partition Boot: ALT+F1 at startup
- Network Boot: F12 at startup
- Blade control panel on each QS22 blade server provides media select button, and indicators for blade error, information, location, and power

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

- Power good
- Blade location
- Activity
- Information
- General fault

LIMITED WARRANTY³

- 3 year parts and labor
- International Warranty Service³
- Customer Replaceable Unit (CRU) and On-site Service*
- **On site, 8 am-5 pm, Mon-Fri excluding holidays, next business day response time**
- **24x7¹⁴ telephone support for warranty issues during the warranty period³**

(*) IBM will determine which type of warranty service is appropriate for the repair

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

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

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

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

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

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

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

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

⁸ Subject to conditions.

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

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

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

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

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

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

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

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

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

¹⁸ Diskettes and hard copy documentation available at extra charge.

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

²⁰ Statement of direction and subject to availability.

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

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



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