



## xSeries Reference (xREF)

including

IBM™  
System x™ / xSeries™ / BladeCenter™

October 17, 2006

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| IBM® Machine Type | Model | Processor      | Speed/Core | L2 Cache | FSB MHz | Memory | Disk | Disk controller | Maximum Capacity | Slots x bays | Hard disk bays | Ethernet | Available date |
|-------------------|-------|----------------|------------|----------|---------|--------|------|-----------------|------------------|--------------|----------------|----------|----------------|
| 8486 - E1x        |       | Celeron® D 326 | 2.53GHz    | 256KB    | 533     | 256MB  | 80GB | SATA            | 500GB            | 4 x 5        | 2 fixed        | Gigabit  | Sep 2005       |
| 8486 - E2x        |       | Celeron D 326  | 2.53GHz    | 256KB    | 533     | 512MB  | 80GB | SATA            | 500GB            | 4 x 5        | 2 fixed        | Gigabit  | Sep 2005       |
| 8486 - E3x        |       | Pentium® 4 521 | 2.8GHz/SC  | 1MB      | 800     | 512MB  | 80GB | SATA            | 500GB            | 4 x 5        | 2 fixed        | Gigabit  | Sep 2005       |
| 8486 - E4x        |       | Pentium 4 531  | 3.0GHz/SC  | 1MB      | 800     | 512MB  | 80GB | SATA            | 500GB            | 4 x 5        | 2 fixed        | Gigabit  | Sep 2005       |
| 8486 - E5x        |       | Pentium 4 541  | 3.2GHz/SC  | 1MB      | 800     | 512MB  | 80GB | SATA            | 500GB            | 4 x 5        | 2 fixed        | Gigabit  | Sep 2005       |
| 8486 - E6x        |       | Pentium 4 551  | 3.4GHz/SC  | 1MB      | 800     | 512MB  | 80GB | SATA            | 500GB            | 4 x 5        | 2 fixed        | Gigabit  | Sep 2005       |
| 8486 - E7x        |       | Pentium D 820  | 2.8GHz/DC  | 2x1MB    | 800     | 512MB  | 80GB | SATA            | 500GB            | 4 x 5        | 2 fixed        | Gigabit  | Oct 2005       |

Positioning Processor(s) *Uniprocessor, entry server designed to meet small business needs and budgets*  
**Intel® Pentium 4 up to 3.4GHz Single Core 800MHz FSB / Pentium D 2.8GHz Dual Core 800MHz FSB / Intel Celeron D 2.53GHz 533MHz FSB / All Optimized for Extended Memory 64 Technology (EM64T)**  
 L2 cache **1MB** std on Pentium 4 / **2x1MB** std on Pentium D / **256KB** std and max on Celeron / ECC / full speed  
 Implementation Motherboard contains one LGA-775 socket, four DIMM sockets, four slots(1 PCI Express x8, 1 PCI Express x1, 2 PCI), integrated SATA and Gigabit Ethernet.  
 SMP support No SMP support / no processor upgrade

Memory **256MB or 512MB / 8GB<sup>13</sup> max / four 184-pin gold-plated DIMM sockets / one socket used / PC2-4200 533MHz ECC DDR2-SDRAM / All Error Checking and Correcting (ECC) / DIMMs and ECC memory controller / industry std / unbuffered /**

SCSI disk controller None standard / Ultra320 SCSI controller2 (LVD 320MB/sec) optional for tape backup  
 IDE disk controller Enhanced IDE / ATA-100 / integrated in I/O Controller Hub / one connector on planar  
 SATA disk controller Dual channel SATA controller (1.5GB/sec) / supports 2 drives standard  
 Cables One 2-drop EIDE cables (to CD-ROM) / one 1-drop SATA cable per installed hard disk  
 Disk 80GB SATA / 7,200 rpm / 9.0 ms seek / S.M.A.R.T.  
 RAID Controller None standard / ServeRAID 7t controller optional

Rack support None  
 Bus slots (see below) One PCI E bus / one 64-bit PCI-E x8 slot / one 64-bit PCI-E x1 / two 32-bit 33MHz 5v PCI 2.2 slots  
 Chipset **Intel E7230 chipset** / Memory Controller Hub (MCH) / I/O Controller Hub (ICH-7) for PCI 2.2, ATA-100 EIDE, ethernet MAC, USB, Low Pin Count Interface / Firmware Hub / SMSC® LPC47M192 Super I/O for diskette, parallel, serial, keyboard, mouse

Ethernet 10/100/1000 gigabit / Broadcom 5721 / on planar / full duplex / PHY and MAC layers / Preboot eXecution Environment (PXE) / Wake on LAN®

CD-ROM / diskette *Some: CD-ROM: 48X-20X<sup>6</sup> CD-ROM, IDE; some: CDRW/DVD-ROM Combo:48X/32X/48X/16X<sup>6</sup> / None standard*  
 Ports *Front: two USB (Ver 2.0); Back: two serial (9-pin), parallel, two USB (Ver 2.0), keyboard, mouse, ethernet (RJ-45), monitor (analog DB-15)*

Diagnostics Diagnostic LEDs / error LEDs for fans and memory / server diagnostic programs stored on IBM Enhanced Diagnostics CD  
 Systems mgmt None

Graphics controller AT® RN50(ES1000) / 16MB SDRAM std/max / on planar / analog 15-pin / up to 1024 x 768 x 32 bit @85Hz

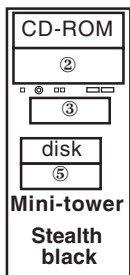
Security Optional U-Bolt support via knockout / power-on password / boot sequence control / operation without keyboard/mouse/display

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

Keyboard / mouse IBM 101 key keyboard / IBM mouse (both black)  
 Cooling fans Three variable speed fans (cpu heatsink, rear, power supply) / not redundant / not hot-swap  
 Power supply 310 watts / universal / manual switching / Automatic Server Restart (ASR) / not hot-swap /no redundancy / cooling fan in power supply (variable speed)

|  |         |
|--|---------|
| 512MB PC2-4200 CL3 ECC DDR2 RoHS                   | 30R5148 |
| 2x1GB PC2-4200 CL3 ECC DDR2 RoHS                   | 30R5149 |
| 2x2GB PC2-4200 CL3 ECC DDR2 RoHS                   | 30R5150 |
| IBM 80GB SATA-150 (7.2K) simple-swap HDD           | 39M4500 |
| IBM 160GB SATA-150 (7.2K) simple-swap HDD          | 39M4504 |
| IBM 250GB SATA-150 (7.2K) simple-swap HDD          | 39M4508 |
| IBM 500GB SATA-150 (7.2K) simple-swap HDD          | 39M4514 |
| 48X/32X/48X/16X Max <sup>6</sup> CD-RW/DVD (black) | 32R2905 |
| IBM Multi-burner Plus                              | 32R2906 |
| IBM USB Portable Diskette Drive                    | 05K9276 |
| 36/72GB DDS/5 Internal Tape Drive                  | 71P9145 |
| VXA-2 Tape Drive                                   | 59P6746 |
| IBM 20/40GB TR7 Internal Tape Drive                | 48P7042 |
| IBM ServeRAID-7t SATA Controller                   | 71P8648 |
| IBM Ultra320 SCSI Controller2                      | 13N2249 |

Other options at [ibm.com/pc/us/accessories](http://ibm.com/pc/us/accessories)



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

Slot 1: fullsize, 64-bit PCI-E x8 (4GBps)  
 Slot 2: fullsize, 64-bit PCI-E x1 (500MBps)  
 Slot 3: fullsize, 32-bit 33MHz, PCI 2.2 (5v)  
 Slot 4: fullsize, 32-bit 33MHz, PCI 2.2 (5v)

- ◇ Removable left side panel
- ◇ Configuration/Setup Utility (in flash memory) invoked by pressing F1 at startup
- ◇ Advanced Configuration Power Interface (ACPI) 1.0
- ◇ Device Drivers and Diagnostics CD-ROM included
- ◇ Four stabilizing feet

- ◇ H 16.8" x W 8" x D 19.4"
- ◇ H 427mm x W 203mm x D 493mm
- ◇ 36 to 45.8 pounds (16.3 to 20.8kg)
- ◇ BTU Output:  
 Minimum: 379 Btu/hr (111 watts)  
 Maximum: 853 Btu/hr (250 watts)

**LIMITED WARRANTY<sup>3</sup>**  
 ⇨ 1 year parts and labor  
 ⇨ International Warranty Service<sup>3</sup>  
 ⇨ On site, 8 am-5 pm, Mon-Fri excluding holidays, next business day response time  
 ⇨ On site service upgrade options (in eligible locations):<sup>7</sup>  
 • 3 year IOR 24x7, 2 hr avg response (ServicePac part num 41W9318)  
 • 3 year IOR 24x7, 4 hr avg response (ServicePac part num 41W9317)  
 • 3 year IOR 9x5, 4 hr avg response (ServicePac part num 41W9316)  
 • 3 year IOR 9x5, NBD response (ServicePac part num 41W9315)  
 ⇨ Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>  
 ⇨ 24x7<sup>14</sup> toll-free support for warranty issues during the warranty period<sup>5</sup>

See footnotes for important warranty information

| IBM® Machine Type | Model | Processor      | Speed/Core | L2 Cache | FSB MHz | Memory | Disk | Disk controller | Maximum Capacity | Slots x bays | Hard disk bays | Ethernet | Available date |
|-------------------|-------|----------------|------------|----------|---------|--------|------|-----------------|------------------|--------------|----------------|----------|----------------|
| 8486 - EAx        |       | Celeron® D 331 | 2.66GHz    | 256KB    | 533     | 512MB  | 80GB | SATA            | 500GB            | 4 x 5        | 2 fixed        | Gigabit  | Feb 2006       |
| 8486 - EBx        |       | Celeron D 331  | 2.66GHz    | 256KB    | 533     | 512MB  | 80GB | SATA            | 500GB            | 4 x 5        | 2 fixed        | Gigabit  | Feb 2006       |
| 8486 - ECx        |       | Pentium® 4 521 | 2.8GHz/SC  | 1MB      | 800     | 512MB  | 80GB | SATA            | 500GB            | 4 x 5        | 2 fixed        | Gigabit  | Feb 2006       |
| 8486 - EDx        |       | Pentium 4 631  | 3.0GHz/SC  | 2MB      | 800     | 512MB  | 80GB | SATA            | 500GB            | 4 x 5        | 2 fixed        | Gigabit  | Feb 2006       |
| 8486 - EEx        |       | Pentium 4 631  | 3.0GHz/SC  | 2MB      | 800     | 512MB  | 80GB | SATA            | 500GB            | 4 x 5        | 2 fixed        | Gigabit  | Feb 2006       |
| 8486 - EFx        |       | Pentium 4 641  | 3.2GHz/SC  | 2MB      | 800     | 512MB  | 80GB | SATA            | 500GB            | 4 x 5        | 2 fixed        | Gigabit  | Feb 2006       |
| 8486 - EGx        |       | Pentium D 920  | 2.8GHz/DC  | 4MB      | 800     | 512MB  | 80GB | SATA            | 500GB            | 4 x 5        | 2 fixed        | Gigabit  | Feb 2006       |
| 8486 - EHx        |       | Pentium D 920  | 2.8GHz/DC  | 4MB      | 800     | 512MB  | 80GB | SATA            | 500GB            | 4 x 5        | 2 fixed        | Gigabit  | Feb 2006       |
| 8486 - EJx        |       | Pentium D 930  | 3.0GHz/DC  | 4MB      | 800     | 512MB  | 80GB | SATA            | 500GB            | 4 x 5        | 2 fixed        | Gigabit  | Feb 2006       |
| 8486 - EKx        |       | Pentium D 930  | 3.0GHz/DC  | 4MB      | 800     | 512MB  | 80GB | SATA            | 500GB            | 4 x 5        | 2 fixed        | Gigabit  | Mar 2006       |

Positioning Processor(s) *Uniprocessor, entry server designed to meet small business needs and budgets*  
**Intel® Pentium 4 up to 3.2GHz Single-Core 800MHz FSB / Pentium D up to 3.0GHz Dual-Core 800MHz FSB / Intel Celeron D 2.66GHz 533MHz FSB / All Optimized for Extended Memory 64 Technology (EM64T)**  
 L2 cache **1 or 2MB** std on Pentium 4 / **4MB** std on Pentium D / **256KB** std and max on Celeron / ECC / full-speed  
 Implementation Motherboard contains one LGA-775 socket, four DIMM sockets, four slots(1 PCI Express x8, 1 PCI Express x1, 2 PCI), integrated SATA and Gigabit Ethernet.  
 SMP support No SMP support / no processor upgrade

Memory **512MB / 8GB<sup>13</sup> max** / four 184-pin gold-plated DIMM sockets / one socket used / **PC2-4200 533MHz ECC DDR2-SDRAM / All Error Checking and Correcting (ECC)** / DIMMs and ECC memory controller / industry std / unbuffered /

SCSI disk controller None standard / Ultra320 SCSI controller2 (LVD 320MB/sec) optional for tape backup  
 IDE disk controller Enhanced IDE / ATA-100 / integrated in I/O Controller Hub / one connector on planar  
 SATA disk controller Dual channel SATA controller (1.5GB/sec) / supports 2 drives standard  
 Cables One 2-drop EIDE cables (to CD-ROM) / one 1-drop SATA cable per installed hard disk  
 Disk 80GB SATA / 7,200 rpm / 9.0 ms seek / S.M.A.R.T.  
 RAID Controller None standard / ServeRAID 7t controller optional

Rack support None  
 Bus slots (see below) One PCI Express® bus / one 64-bit PCIe™ x8 slot / one 64-bit PCIe x1 / two 32-bit 33MHz 5v PCI 2.2 slots  
 Chipset **Intel E7230 chipset** / Memory Controller Hub (MCH) / I/O Controller Hub (ICH-7) for PCI 2.2, ATA-100 EIDE, ethernet MAC, USB, Low Pin Count Interface / Firmware Hub / SMSC® LPC47M192 Super I/O for diskette, parallel, serial, keyboard, mouse

Ethernet 10/100/1000 gigabit / Broadcom® 5721 / on planar / full-duplex / PHY and MAC layers / Preboot eXecution Environment (PXE) / Wake on LAN®  
 CD-ROM / diskette Some: *CD-ROM: 48X-20X<sup>6</sup> CD-ROM, IDE; some: CDRW/DVD-ROM Combo:48X/32X/48X/16X<sup>6</sup> / None standard*  
 Ports *Front: two USB (Ver 2.0); Back: two serial (9-pin), parallel, two USB (Ver 2.0), keyboard, mouse, ethernet (RJ-45), monitor (analog DB-15)*  
 Diagnostics Diagnostic LEDs / error LEDs for fans and memory / server diagnostic programs stored on IBM Enhanced Diagnostics CD  
 Systems mgmt None

Graphics controller AT® RN50(ES1000) / 16MB SDRAM std/max / on planar / analog 15-pin / up to 1024 x 768 x 32 bit @100Hz

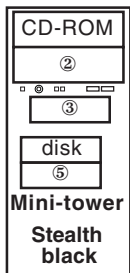
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Keyboard / mouse IBM 101 key keyboard / IBM mouse (both black)  
 Cooling fans Three variable speed fans (cpu heatsink, rear, power supply) / not redundant / not hot-swap  
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Slot 1: fullsize, 64-bit PCI-E x8 (4GBps)  
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- ❖ Removable left side panel
- ❖ Configuration/Setup Utility (in flash memory) invoked by pressing F1 at startup
- ❖ Advanced Configuration Power Interface (ACPI) 1.0
- ❖ Device Drivers and Diagnostics CD-ROM included
- ❖ Four stabilizing feet
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|-------------------|-------|----------------|------------|----------|---------|-----------|-------|-----------------|------------------|--------------|----------------|----------|----------------|
| 8486 - ELX        |       | Pentium® 4 631 | 3.0GHz/SC  | 2MB      | 800     | 1 x 512MB | 160GB | SATA            | 1TB              | 4 x 5        | 2 fixed        | Gigabit  | June 2006      |
| 8486 - EMX        |       | Pentium 4 631  | 3.0GHz/SC  | 2MB      | 800     | 1 x 512MB | 80GB  | SATA            | 1TB              | 4 x 5        | 2 fixed        | Gigabit  | June 2006      |
| 8486 - ENX        |       | Pentium 4 651  | 3.4GHz/SC  | 2MB      | 800     | 1 x 512MB | 80GB  | SATA            | 1TB              | 4 x 5        | 2 fixed        | Gigabit  | June 2006      |
| 8486 - E8X        |       | Pentium D 930  | 3.0GHz/DC  | 4MB      | 800     | 2 x 512MB | 80GB  | SATA            | 1TB              | 4 x 5        | 2 fixed        | Gigabit  | June 2006      |

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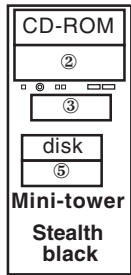
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Ethernet 10/100/1000 gigabit / Broadcom® 5721 / on planar / full-duplex / PHY and MAC layers / Preboot eXecution Environment (PXE) / Wake on LAN®  
 CD-ROM / diskette *Some: CD-ROM: 48X-20X® CD-ROM, IDE; some: CDRW/DVD-ROM Combo:48X/32X/48X/16X® / None standard*  
 Ports *Front: two USB (Ver 2.0); Back: two serial (9-pin), parallel, two USB (Ver 2.0), keyboard, mouse, ethernet (RJ-45), monitor (analog DB-15)*  
 Diagnostics Diagnostic LEDs / error LEDs for fans and memory / server diagnostic programs stored on IBM Enhanced Diagnostics CD  
 Systems mgmt None

Graphics controller **ATI® RN50(ES1000) / 16MB SDRAM std/max / on planar / analog 15-pin / up to 1024 x 768 x 32 bit @100Hz**

Security Optional U-Bolt support via knockout / power-on password / boot sequence control / operation without keyboard/mouse/display

|                  |  |   |   |
|------------------|--|---|---|
| Software         | <b>ServerGuide™</b> (CD-based automated network OS installation and configuration tool) included and IBM Director (system hardware mgmt software) optional | 512MB PC2-4200 CL3 ECC DDR2 RoHS<br>2x1GB PC2-4200 CL3 ECC DDR2 RoHS<br>2x2GB PC2-4200 CL3 ECC DDR2 RoHS<br>IBM 80GB SATA-150 (7.2K) simple-swap HDD<br>IBM 160GB SATA-150 (7.2K) simple-swap HDD<br>IBM 250GB SATA-150 (7.2K) simple-swap HDD<br>IBM 500GB SATA-150 (7.2K) simple-swap HDD<br>48X/32X/48X/16X Max® CD-RW/DVD (black)<br>IBM Multi-burner Plus<br>IBM USB Portable Diskette Drive<br>36/72GB DDS/5 Internal Tape Drive<br>VXA-2 Tape Drive<br>IBM 20/40GB TR7 Internal Tape Drive<br>IBM ServeRAID-7i SATA Controller<br>IBM Ultra320 SCSI Controller2<br>Other options at <a href="http://ibm.com/pc/us/accessories">ibm.com/pc/us/accessories</a> | 30R5148<br>30R5149<br>30R5150<br>39M4500<br>39M4504<br>39M4508<br>39M4514<br>32R2905<br>32R2906<br>40K1692<br>71P9145<br>59P6746<br>48P7042<br>71P8648<br>13N2249 |
| Keyboard / mouse | IBM 101 key keyboard / IBM mouse (both black)  |   |   |
| Cooling fans     | Three variable speed fans (cpu heatsink, rear, power supply) / not redundant / not hot-swap  |   |   |
| Power supply     | 310 watts / universal / manual switching / Automatic Server Restart (ASR) / not hot-swap / no redundancy / cooling fan in power supply (variable speed)    |   |   |



Bay ① 5.25", HH 1.6", access, CD-ROM  
 Bay ② 5.25", HH 1.6", access, open (no disk)  
 Bay ③ 3.5", SL 1", access, open  
 Bay ④ 3.5", SL 1", access, std disk  
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 Slot 1: fullsize, 64-bit PCI-E x8 (4GBps)  
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- ✦ Removable left side panel
- ✦ Configuration/Setup Utility (in flash memory) invoked by pressing F1 at startup
- ✦ Advanced Configuration Power Interface (ACPI) 1.0
- ✦ Device Drivers and Diagnostics CD-ROM included
- ✦ Four stabilizing feet
- ✦ H 17.24" x W 8.07" x D 19.57"
- ✦ H 438mm x W 205mm x D 497mm
- ✦ 30.86 to 37.48 pounds (14 to 17kg)
- ✦ BTU Output:
  - Minimum: 326 Btu/hr (96 watts)
  - Maximum: 1024 Btu/hr (300 watts)

**LIMITED WARRANTY<sup>3</sup>**

- ⇨ 1 year parts and labor
- ⇨ International Warranty Service<sup>3</sup>
- ⇨ On site, 8 am-5 pm, Mon-Fri excluding holidays, next business day response time
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  - 3 year IOR 24x7, 2 hr avg response (ServicePac part num 41W9318)
  - 3 year IOR 24x7, 4 hr avg response (ServicePac part num 41W9317)
  - 3 year IOR 9x5, 4 hr avg response (ServicePac part num 41W9316)
  - 3 year IOR 9x5, NBD response (ServicePac part num 41W9315)
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- ⇨ 24x7<sup>14</sup> toll-free support for warranty issues during the warranty period<sup>5</sup>

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

| IBM® Machine Type | GAV-model | Processor / Speed                  | L2 cache | FSB MHz | Memory  | Disk/Disk controller | Maximum Capacity | PCI slots x bays | Hard disk bays | Power Supply | Ethernet | Available date |
|-------------------|-----------|------------------------------------|----------|---------|---------|----------------------|------------------|------------------|----------------|--------------|----------|----------------|
| 8485/8490         | 10y-10x   | Pentium® 4 531 3.0GHz <sup>1</sup> | 1MB      | 800     | 512MB   | 80GB/SATA            | 1.0TB            | 4 x 7            | 4 fixed        | 1x400W       | Gigabit  | Oct 2005       |
| 8485/8490         | 12y-12x   | Pentium 4 531 3.0GHz               | 1MB      | 800     | 512MB   | None/SATA            | 1.0TB            | 4 x 7            | 4 simple-swap  | 1x400W       | Gigabit  | Oct 2005       |
| 8485/8490         | 1Ay-1Ax   | Pentium 4 630 3.0GHz               | 2MB      | 800     | 512MB   | None/SATA            | 1.0TB            | 4 x 7            | 4 simple-swap  | 1x400W       | Gigabit  | Oct 2005       |
| 8485/8490         | 20y-20x   | Pentium 4 640 3.0GHz               | 2MB      | 800     | 512MB   | 80GB/SATA            | 1.0TB            | 4 x 7            | 4 fixed        | 1x400W       | Gigabit  | Oct 2005       |
| 8485/8490         | 2Ay-2Ax   | Pentium 4 640 3.2GHz               | 2MB      | 800     | 512MB   | None/SATA            | 1.0TB            | 4 x 7            | 4 simple-swap  | 1x400W       | Gigabit  | Oct 2005       |
| 8485/8490         | 3Ay-3Ax   | Pentium 4 650 3.2GHz               | 2MB      | 800     | 2x512MB | None/SAS/SATA        | 1.2TB            | 6 x 7            | 4 hot-swap     | 1x400W       | Gigabit  | Oct 2005       |
| 8485/8490         | 3By-3Bx   | Pentium 4 650 3.2GHz               | 2MB      | 800     | 1GB     | None/SAS/SATA        | 1.2TB            | 6 x 7            | 4 hot-swap     | 2x430W       | Gigabit  | Oct 2005       |
| 8485/8490         | 70y-70x   | Pentium D 820 2.8GHz               | 2x1MB    | 800     | 1GB     | None/SAS/SATA        | 1.2TB            | 6 x 7            | 4 hot-swap     | 2x430W       | Gigabit  | Oct 2005       |
| 8485/8490         | 7Ay-7Ax   | Pentium D 820 2.8GHz               | 2x1MB    | 800     | 512MB   | None/SATA            | 1.0TB            | 4 x 7            | 4 simple-swap  | 1x400W       | Gigabit  | Oct 2005       |
| 8485/8490         | 80y-80x   | Pentium D 830 3.0GHz               | 2x1MB    | 800     | 1GB     | None/SAS/SATA        | 1.2TB            | 6 x 7            | 4 hot-swap     | 2x430W       | Gigabit  | Oct 2005       |
| 8485/8490         | 8Ay-8Ax   | Pentium D 830 3.0GHz               | 2x1MB    | 800     | 512MB   | None/SAS/SATA        | 1.2TB            | 6 x 7            | 4 hot-swap     | 1x400W       | Gigabit  | Oct 2005       |

Positioning Processor(s) *Single socket, entry server for small and medium size business' and distributed enterprises*  
**Intel® Pentium 4 up to 3.4GHz Single Core 800MHz FSB / Pentium D up to 3.0GHz Dual Core 800MHz FSB / All Optimized for Extended Memory 64 Technology (EM64T)**  
 L2 cache **Up to 2MB** std on Pentium 4 / **2x1MB** std on Pentium D  
 Implementation Motherboard contains one LGA-775 socket, four DIMM sockets, some: four slots(1 PCI Express x8, 1 PCI Express x1, 2 PCI) some: six slots(1 PCI Express x8, 1 PCI Express x1, 2 PCI, 2 PCI-X), integrated SATA and Gigabit Ethernet.  
 SMP support No SMP support / no processor upgrade

Memory **512MB or 1GB** std / 8GB<sup>13</sup> max / four 184-pin gold-plated DIMM sockets / one or two socket used / **PC2-4200 533MHz ECC DDR2-SDRAM / All Error Checking and Correcting (ECC)** / DIMMs and ECC memory controller / industry std / unbuffered

SAS disk controller Integrated SAS controller / supports SAS or SATA drives  
 IDE disk controller Enhanced IDE / ATA-100 / integrated in I/O Controller Hub / one connector on planar  
 SATA disk controller Four channel SATA controller (3.0GB/sec) / supports 4 drives standard  
 Cables One 2-drop EIDE cables (to CD-ROM) / one 1-drop SATA cable per installed hard disk  
 Disk Some: 80GB SATA / 7,200 rpm / 9.0 ms seek / S.M.A.R.T.  
 RAID Controller IBM ServeRAID™ 8e (RAID 0, 1) / on planar / supports SATA or SAS interface

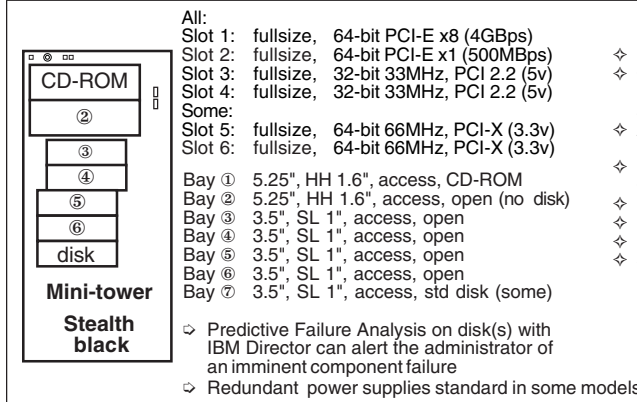
Rack support 5U<sup>4</sup> rack mount support via tower-to-rack kit option  
 Bus slots (see below) All: one PCI-E bus / one 64-bit PCI-E x8 / one 64-bit PCI-E x1/ two 32-bit 33MHz 5v PCI 2.2 slots / some: two 64-bit 66MHz 3.3v PCI-X slots / no hot-swap Active™ PCI slots  
 Chipset **Intel E7230 chipset** / Memory Controller Hub (MCH) / I/O Controller Hub (ICH7R) for PCI 2.2, ATA-100 EIDE, ethernet MAC, USB, Low Pin Count Interface / Firmware Hub / SMSC® LPC47M192 Super I/O for diskette, parallel, serial, keyboard, mouse

Ethernet 10/100/1000 gigabit / Broadcom 5721 / on planar / full duplex / PHY and MAC layers / Preboot eXecution Environment (PXE) / Wake on LAN®  
 CD-ROM / diskette Ports **CD-ROM:** 48X-20X<sup>6</sup> CD-ROM, IDE / None standard  
**Front:** two USB (2.0); **Back:** two serial (9-pin), parallel, two USB (2.0), keyboard, mouse, ethernet (RJ45) and monitor  
 Diagnostics Diagnostic LEDs / error LEDs for fans and memory / server diagnostic programs stored on IBM Enhanced Diagnostics CD  
 Systems mgmt Mini-baseboard management controller / IPMI 1.5 / 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® RN50(ES1000) / 16MB SDRAM std/max / on planar / analog 15-pin / up to 1024x768x32bit@85Hz

Security Mechanical side panel key lock / U-Bolt Tie-down capability/ power-on password / boot sequence control / operation without keyboard/mouse  
 Software **ServerGuide™** (CD-based automated network OS installation and configuration tool), **ServeRAID™** (RAID management), IBM Director (system hardware management software) and many utilities  
 Keyboard / mouse Optional  
 Cooling fans Three fans (fansink, 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)

- 512MB PC2-4200 CL3 ECC DDR2RoHS
- 2GB(2x1GB) PC2-4200 CL3 ECC DDR2 RoHS
- 4GB(2x2GB) PC2-4200 CL3 ECC DDR2 RoHS
- IBM 80GB SATA (7.2K) simple-swap HDD
- IBM 160GB SATA (7.2K) simple-swap HDD
- IBM 250GB SATA (7.2K) simple-swap HDD
- IBM 500GB SATA (7.2K) simple-swap HDD
- 80GB Hot-Swap SATA HDD
- 160GB Hot-Swap SATA HDD
- 250GB Hot-Swap SATA HDD
- 73GB 10K 3.5" SAS Hot-Swap HDD
- 146GB 10K 3.5" SAS Hot-Swap HDD
- 300GB 10K 3.5" SAS Hot-Swap HDD
- 36GB 15K 3.5" SAS Hot-Swap HDD
- 73GB 15K 3.5" SAS Hot-Swap HDD
- 48X/32X/48X/16X Max® CD-RW/DVD-ROM Combo (black)
- IBM Remote Supervisor Adapter II (PCI adapter)
- IBM 5Ux20D Tower-to-Rack Kit
- IBM ServeRAID-7i SATA Integrated Controller
- Other options at [ibm.com/pc/us/accessories](http://ibm.com/pc/us/accessories)



- ◇ Removable left side panel
  - ◇ Configuration/Setup Utility (in flash memory) invoked by pressing F1 at startup
  - ◇ Advanced Configuration Power Interface (ACPI) 1.0
  - ◇ Device Drivers and Diagnostics CD-ROM included
  - ◇ Four stabilizing feet
  - ◇ H 17.25" x W 8.5" x D 21.25"
  - ◇ H 448mm x W 215.9mm x D 539.75mm
  - ◇ 36 to 45.8 pounds (16.3 to 20.8kg)
- Maximum SATA capacity:  
 2TB<sup>13</sup> (4 disks x 500GB)  
 Maximum hot-swap SAS capacity:  
 1.2TB<sup>13</sup> (4 disks x 300GB)

**LIMITED WARRANTY<sup>3</sup>**

- ↪ 1 year parts and labor standard 8485 MTM
- ↪ 3 year parts and labor standard 8490 MTM
- ↪ International Warranty Service<sup>3</sup>
- ↪ On site, 8 am-5 pm, Mon-Fri excluding holidays, next business day response time
- ↪ On site service upgrade options (in eligible locations):<sup>7</sup>
  - 3 year IOR 24x7, 2 hr avg response (ServicePac part num 69P9512)
  - 3 year IOR 24x7, 4 hr avg response (ServicePac part num 69P9511)
  - 3 year IOR 9x5, 4 hr avg response (ServicePac part num 69P9510)
  - 3 year IOR 9x5, NBD response (ServicePac part num 69P9509)
- ↪ Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- ↪ 24x7<sup>14</sup> toll-free support for warranty issues during the warranty period<sup>3</sup>

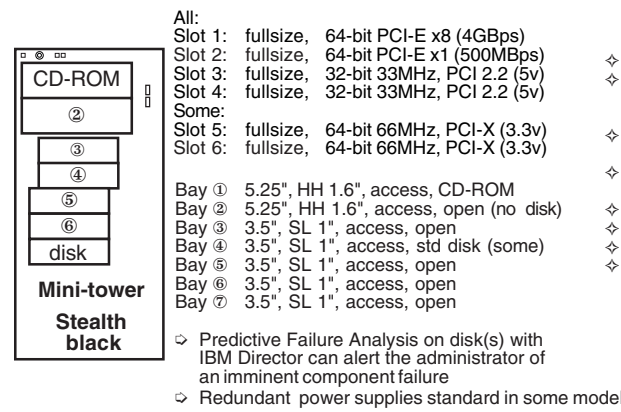
# IBM eServer™ xSeries™ 206m

xREF by eServer Field Skills and Education Team

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

| IBM® Machine Type       | GAV-model  | Processor / Speed | L2 cache            | FSB MHz | Memory | Disk/Disk controller | Maximum PCI slots Capacity | x bays | Hard disk bays | Power Supply  | Ethernet       | Available date |
|-------------------------|--|-------------------|---------------------|---------|--------|----------------------|----------------------------|--------|----------------|---------------|----------------|----------------|
| 8485/8490               | A2y-A2x  | Pentium® 4 521    | 2.8GHz <sup>1</sup> | 1MB     | 800    | 512MB                | None/SATA                  | 1.0TB  | 4 x 7          | 4 simple-swap | 1x400W Gigabit | Feb 2006       |
| 8485/8490               | B2y-B2x  | Pentium 4 631     | 3.0GHz              | 2MB     | 800    | 512MB                | None/SATA                  | 1.0TB  | 4 x 7          | 4 simple-swap | 1x400W Gigabit | Feb 2006       |
| 8485/8490               | G2y-G2x  | Pentium D 920     | 2.8GHz              | 4MB     | 800    | 512MB                | None/SATA                  | 1.0TB  | 4 x 7          | 4 simple-swap | 1x400W Gigabit | Feb 2006       |
| 8485/8490               | H2y-H2x  | Pentium D 930     | 3.0GHz              | 4MB     | 800    | 512MB                | None/SAS/SATA              | 1.0TB  | 6 x 7          | 4 hot-swap    | 1x400W Gigabit | Feb 2006       |
| 8485/8490               | J2y-J2x  | Pentium D 940     | 3.2GHz              | 4MB     | 800    | 2x512MB              | None/SAS/SATA              | 1.0TB  | 6 x 7          | 4 hot-swap    | 1x400W Gigabit | Feb 2006       |
| 8485/8490               | J4y-J4x  | Pentium D 940     | 3.2GHz              | 4MB     | 800    | 2x512MB              | None/SAS/SATA              | 1.2TB  | 6 x 7          | 4 hot-swap    | 1x400W Gigabit | Feb 2006       |
| Positioning             | Single socket, entry server for small and medium size business' and distributed enterprises  |                   |                     |         |        |                      |                            |        |                |               |                |                |
| Processor(s)            | Intel® Pentium 4 up to 3.0GHz Single-Core 800MHz FSB / Pentium D up to 3.2GHz Dual-Core 800MHz FSB / All Optimized for Extended Memory 64 Technology (EM64T)   |                   |                     |         |        |                      |                            |        |                |               |                |                |
| L2 cache Implementation | 1 or 2MB std on Pentium 4 / 4MB std on Pentium D   |                   |                     |         |        |                      |                            |        |                |               |                |                |
| SMP support             | Motherboard contains one LGA-775 socket, four DIMM sockets, some: four slots(1 PCI Express x8, 1 PCI Express x1, 2 PCI) some: six slots(1 PCI Express x8, 1 PCI Express x1, 2 PCI, 2 PCI-X), integrated SATA and Gigabit Ethernet.                 |                   |                     |         |        |                      |                            |        |                |               |                |                |
| Memory                  | 512MB or 1GB std / 8GB <sup>13</sup> max / four 184-pin gold-plated DIMM sockets / one or two socket used / PC2-4200 533MHz ECC DDR2-SDRAM / All Error Checking and Correcting (ECC) / DIMMs and ECC memory controller / industry std / unbuffered |                   |                     |         |        |                      |                            |        |                |               |                |                |
| SAS disk controller     | Integrated SAS controller / supports SAS or SATA drives  |                   |                     |         |        |                      |                            |        |                |               |                |                |
| IDE disk controller     | Enhanced IDE / ATA-100 / integrated in I/O Controller Hub / one connector on planar  |                   |                     |         |        |                      |                            |        |                |               |                |                |
| SATA disk controller    | Four channel SATA controller (3.0GB/sec) / supports 4 drives standard  |                   |                     |         |        |                      |                            |        |                |               |                |                |
| Cables                  | One 2-drop EIDE cables (to CD-ROM) / one 1-drop SATA cable per installed hard disk   |                   |                     |         |        |                      |                            |        |                |               |                |                |
| Disk                    | Some: 80GB SATA / 7,200 rpm / 9.0 ms seek / S.M.A.R.T.   |                   |                     |         |        |                      |                            |        |                |               |                |                |
| RAID Controller         | IBM Server RAID™ 8e (RAID 0, 1) / on planar / supports SATA or SAS interface   |                   |                     |         |        |                      |                            |        |                |               |                |                |
| Rack support            | 5U <sup>4</sup> rack mount support via tower-to-rack kit option  |                   |                     |         |        |                      |                            |        |                |               |                |                |
| Bus slots (see below)   | All: one PCI Express® bus / one 64-bit PCIe™ x8 / one 64-bit PCIe x1/ two 32-bit 33MHz 5v PCI 2.2 slots / some: two 64-bit 66MHz 3.3v PCI-X slots / no hot-swap Active™ PCI slots  |                   |                     |         |        |                      |                            |        |                |               |                |                |
| Chipset                 | Intel E7230 chipset / Memory Controller Hub (MCH) / I/O Controller Hub (ICH7R) for PCI 2.2, ATA-100 EIDE, ethernet MAC, USB, Low Pin Count Interface / Firmware Hub / SMC® LPC47M192 Super I/O for diskette, parallel, serial, keyboard, mouse     |                   |                     |         |        |                      |                            |        |                |               |                |                |
| Ethernet                | 10/100/1000 gigabit / Broadcom® 5721 / on planar / full-duplex / PHY and MAC layers / Preboot eXecution Environment (PXE) / Wake on LAN®   |                   |                     |         |        |                      |                            |        |                |               |                |                |
| CD-ROM / diskette       | CD-ROM: 48X-20X <sup>6</sup> CD-ROM, IDE / None standard   |                   |                     |         |        |                      |                            |        |                |               |                |                |
| Ports                   | Front: two USB (2.0); Back: two serial (9-pin), parallel, two USB (2.0), keyboard, mouse, ethernet (RJ45) and monitor  |                   |                     |         |        |                      |                            |        |                |               |                |                |
| Diagnostics             | Diagnostic LEDs / error LEDs for fans and memory / server diagnostic programs stored on IBM Enhanced Diagnostics CD  |                   |                     |         |        |                      |                            |        |                |               |                |                |
| Systems mgmt            | Mini-baseboard management controller / IPMI 1.5 / 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® RN50(ES1000) / 16MB SDRAM std/max / on planar / analog 15-pin / up to 1024x768x32bit@85Hz   |                   |                     |         |        |                      |                            |        |                |               |                |                |
| Security                | Mechanical side panel key lock / U-Bolt Tie-down capability/ power-on password / boot sequence control / operation without keyboard/mouse  |                   |                     |         |        |                      |                            |        |                |               |                |                |
| Software                | ServerGuide™ (CD-based automated network OS installation and configuration tool), ServeRAID™ (RAID management), IBM Director (system hardware management software) and many utilities  |                   |                     |         |        |                      |                            |        |                |               |                |                |
| Keyboard / mouse        | Optional   |                   |                     |         |        |                      |                            |        |                |               |                |                |
| Cooling fans            | Three fans (fansink, 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)   |                   |                     |         |        |                      |                            |        |                |               |                |                |

|   |         |
|---|---------|
| 512MB PC2-4200 CL3 ECC DDR2RoHS   | 30R5148 |
| 2GB(2x1GB) PC2-4200 CL3 ECC DDR2 RoHS   | 30R5149 |
| 4GB(2x2GB) PC2-4200 CL3 ECC DDR2 RoHS   | 30R5150 |
| IBM 80GB SATA (7.2K) simple-swap HDD  | 39M4500 |
| 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 |
| 80GB Hot-Swap SATA HDD  | 39M4518 |
| 160GB Hot-Swap SATA HDD   | 39M4522 |
| 250GB Hot-Swap SATA HDD   | 39M4526 |
| 73GB 10K 3.5" SAS Hot-Swap HDD  | 40K1039 |
| 146GB 10K 3.5" SAS Hot-Swap HDD   | 40K1040 |
| 300GB 10K 3.5" SAS Hot-Swap HDD   | 40K1041 |
| 36GB 15K 3.5" SAS Hot-Swap HDD  | 40K1042 |
| 73GB 15K 3.5" SAS Hot-Swap HDD  | 40K1043 |
| 48X/32X/48X/16X Max <sup>8</sup> CD-RW/DVD-ROM Combo (black)                              | 32R2905 |
| IBM Remote Supervisor Adapter II (PCI adapter)  | 59P2984 |
| IBM 5Ux20D Tower-to-Rack Kit  | 39R9361 |
| IBM ServeRAID-7i SATA Integrated Controller   | 71P8648 |
| Other options at <a href="http://ibm.com/pc/us/accessories">ibm.com/pc/us/accessories</a> |         |



- Removable left side panel
- Configuration/Setup Utility (in flash memory) invoked by pressing F1 at startup
- Advanced Configuration Power Interface (ACPI) 1.0
- Device Drivers and Diagnostics CD-ROM included
- Four stabilizing feet
- H 17.25" x W 8.5" x D 21.25"
- H 448mm x W 215.9mm x D 539.75mm
- 36 to 45.8 pounds (16.3 to 20.8kg)

Maximum SATA capacity:  
 1TB<sup>13</sup> (4 disks x 250GB)  
 Maximum hot-swap SAS capacity:  
 1.2TB<sup>13</sup> (4 disks x 300GB)

### LIMITED WARRANTY<sup>3</sup>

- 1 year parts and labor standard 8485 MTM
- 3 year parts and labor standard 8490 MTM
- International Warranty Service<sup>3</sup>
- On site, 8 am-5 pm, Mon-Fri excluding holidays, next business day response time
- On site service upgrade options (in eligible locations):<sup>7</sup>
  - 3 year IOR 24x7, 2 hr avg response (ServicePac part num 69P9512)
  - 3 year IOR 24x7, 4 hr avg response (ServicePac part num 69P9511)
  - 3 year IOR 9x5, 4 hr avg response (ServicePac part num 69P9510)
  - 3 year IOR 9x5, NBD response (ServicePac part num 69P9509)
- Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- 24x7<sup>14</sup> toll-free support for warranty issues during the warranty period<sup>3</sup>

See footnotes for important warranty information

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

| IBM® Machine Type | GAV-model | Processor / Speed     | L2 cache | FSB MHz | Memory  | Disk/Disk controller | Maximum Capacity | PCI slots x bays | Hard disk bays | Power Supply | Ethernet       | Available date |
|-------------------|-----------|-----------------------|----------|---------|---------|----------------------|------------------|------------------|----------------|--------------|----------------|----------------|
| 8485/8490         | B4y-B4x   | Pentium® 4 631 3.0GHz | 2MB      | 800     | 1x512MB | 1x160GB/SATA         | 2.0TB            | 4 x 7            | 4              | simple-swap  | 1x400W Gigabit | May 2006       |
| 8485/8490         | B6y-B6x   | Pentium 4 631 3.0GHz  | 2MB      | 800     | 2x512MB | 2x160GB/SATA         | 2.0TB            | 4 x 7            | 4              | simple-swap  | 1x400W Gigabit | May 2006       |
| 8485/8490         | F2y-F2x   | Pentium 4 661 3.6GHz  | 2MB      | 800     | 1x512MB | None/SATA            | 2.0TB            | 4 x 7            | 4              | simple-swap  | 1x400W Gigabit | May 2006       |
| 8485/8490         | F4y-F4x   | Pentium 4 661 3.6GHz  | 2MB      | 800     | 2x512MB | None/SAS/SATA        | 1.2TB            | 6 x 7            | 4              | hot-swap     | 1x400W Gigabit | May 2006       |
| 8485/8490         | H4y-H4x   | Pentium D 930 3.0GHz  | 4MB      | 800     | 2x512MB | 2x250GB/SATA         | 2.0TB            | 4 x 7            | 4              | simple-swap  | 1x400W Gigabit | May 2006       |
| 8485/8490         | H6y-H6x   | Pentium D 930 3.0GHz  | 4MB      | 800     | 2x512MB | None/SAS/SATA        | 1.2TB            | 6 x 7            | 4              | hot-swap     | 2x430W Gigabit | May 2006       |
| 8485/8490         | H8y-H8x   | Pentium D 930 3.0GHz  | 4MB      | 800     | 2x512MB | None/SAS/SATA        | 1.2TB            | 6 x 7            | 4              | hot-swap     | 2x430W Gigabit | May 2006       |
| 8485/8490         | K2y-K2x   | Pentium D 950 3.4GHz  | 4MB      | 800     | 2x512MB | None/SAS/SATA        | 1.2TB            | 6 x 7            | 4              | hot-swap     | 2x430W Gigabit | May 2006       |

Positioning Processor(s) *Single socket, entry server for small and medium size business' and distributed enterprises*  
**Intel® Pentium 4 up to 3.6GHz Single-Core 800MHz FSB / Pentium D up to 3.4GHz Dual-Core 800MHz FSB / All Optimized for Extended Memory 64 Technology (EM64T)**  
 L2 cache **2MB** std on Pentium 4 / **4MB** std on Pentium D  
 Implementation Motherboard contains one LGA-775 socket, four DIMM sockets, some: four slots(1 PCI Express x8, 1 PCI Express x1, 2 PCI) some: six slots(1 PCI Express x8, 1 PCI Express x1, 2 PCI, 2 PCI-X), integrated SATA and Gigabit Ethernet.  
 SMP support No SMP support / no processor upgrade

Memory **512MB or 1GB** std / 8GB<sup>13</sup> max / four 184-pin gold-plated DIMM sockets / one or two socket used / **PC2-4200 533MHz ECC DDR2-SDRAM / All Error Checking and Correcting (ECC)** / DIMMs and ECC memory controller / industry std / unbuffered

SAS disk controller Integrated SAS controller / supports SAS or SATA drives  
 IDE disk controller Enhanced IDE / ATA-100 / integrated in I/O Controller Hub / one connector on planar  
 SATA disk controller Four channel SATA controller (3.0GB/sec) / supports 4 drives standard  
 Cables One 2-drop EIDE cables (to CD-ROM) / one 1-drop SATA cable per installed hard disk  
 Disk Some: 160GB SATA; some: 250GB SATA / 7,200 rpm / 9.0 ms seek / S.M.A.R.T.  
 RAID Controller IBM ServeRAID™ 8e (RAID 0, 1) / on planar / supports SATA or SAS interface

Rack support 5U<sup>4</sup> rack mount support via tower-to-rack kit option  
 Bus slots (see below) All: one PCI Express® bus / one 64-bit PCIe™ x8 / one 64-bit PCIe x1/ two 32-bit 33MHz 5v PCI 2.2 slots / some: two 64-bit 66MHz 3.3v PCI-X slots / no hot-swap Active™ PCI slots  
 Chipset **Intel E7230 chipset** / Memory Controller Hub (MCH) / I/O Controller Hub (ICH7R) for PCI 2.2, ATA-100 EIDE, ethernet MAC, USB, Low Pin Count Interface / Firmware Hub / SMSC® LPC47M192 Super I/O for diskette, parallel, serial, keyboard, mouse

Ethernet 10/100/1000 gigabit / Broadcom® 5721 / on planar / full-duplex / PHY and MAC layers / Preboot eXecution Environment (PXE) / Wake on LAN®  
 CD-ROM / diskette *CD-ROM: 48X-20X<sup>6</sup> CD-ROM, IDE / None standard*  
 Ports *Front: two USB (2.0); Back: two serial (9-pin), parallel, two USB (2.0), keyboard, mouse, ethernet (RJ45) and monitor*  
 Diagnostics Diagnostic LEDs / error LEDs for fans and memory / server diagnostic programs stored on IBM Enhanced Diagnostics CD  
 Systems mgmt Mini-baseboard management controller / IPMI 1.5 / monitors system and processor temperature, fan speed and failure, and voltages / **secure remote power on/off / support for optional Remote Supervisor Adapter II**

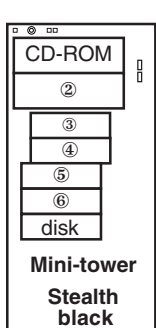
Graphics controller AT® RN50(ES1000) / 16MB SDRAM std/max / on planar / analog 15-pin / up to 1024x768x32bit@85Hz

Security Mechanical side panel key lock / U-Bolt Tie-down capability/ power-on password / boot sequence control / operation without keyboard/mouse  
 Software **ServerGuide™** (CD-based automated network OS installation and configuration tool), **ServeRAID™** (RAID management), IBM Director (system hardware management software) and many utilities

- 512MB PC2-4200 CL3 ECC DDR2RoHS
- 2GB(2x1GB) PC2-4200 CL3 ECC DDR2 RoHS
- 4GB(2x2GB) PC2-4200 CL3 ECC DDR2 RoHS
- IBM 80GB SATA (7.2K) simple-swap HDD
- IBM 160GB SATA (7.2K) simple-swap HDD
- IBM 250GB SATA (7.2K) simple-swap HDD
- IBM 500GB SATA (7.2K) simple-swap HDD
- 80GB Hot-Swap SATA HDD
- 160GB Hot-Swap SATA HDD
- 250GB Hot-Swap SATA HDD
- 73GB 10K 3.5" SAS Hot-Swap HDD
- 146GB 10K 3.5" SAS Hot-Swap HDD
- 300GB 10K 3.5" SAS Hot-Swap HDD
- 36GB 15K 3.5" SAS Hot-Swap HDD
- 73GB 15K 3.5" SAS Hot-Swap HDD
- 48X/32X/48X/16X Max® CD-RW/DVD-ROM Combo (black)
- IBM Remote Supervisor Adapter II (PCI adapter)
- IBM 5Ux20D Tower-to-Rack Kit
- IBM ServeRAID-7L SATA Integrated Controller

Keyboard / mouse Optional  
 Cooling fans Three fans (fansink, 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)

Other options at [ibm.com/pc/us/accessories](http://ibm.com/pc/us/accessories)



- All:
- Slot 1: fullsize, 64-bit PCI-E x8 (4GBps)
  - Slot 2: fullsize, 64-bit PCI-E x1 (500MBps)
  - Slot 3: fullsize, 32-bit 33MHz, PCI 2.2 (5v)
  - Slot 4: fullsize, 32-bit 33MHz, PCI 2.2 (5v)
- Some:
- Slot 5: fullsize, 64-bit 66MHz, PCI-X (3.3v)
  - Slot 6: fullsize, 64-bit 66MHz, PCI-X (3.3v)
- Bay ① 5.25", HH 1.6", access, CD-ROM
  - Bay ② 5.25", HH 1.6", access, open (no disk)
  - Bay ③ 3.5", SL 1", access, 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) 1.0
  - ↳ 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 45.8 pounds (16.3 to 20.8kg)
- Maximum SATA capacity:  
 2TB<sup>13</sup> (4 disks x 500GB)  
 Maximum hot-swap SAS capacity:  
 1.2TB<sup>13</sup> (4 disks x 300GB)

**LIMITED WARRANTY<sup>3</sup>**

- ↳ 1 year parts and labor standard 8485 MTM
- ↳ 3 year parts and labor standard 8490 MTM
- ↳ International Warranty Service<sup>3</sup>
- ↳ On site, 8 am-5 pm, Mon-Fri excluding holidays, next business day response time
- ↳ On site service upgrade options (in eligible locations):<sup>7</sup>
  - 3 year IOR 24x7, 2 hr avg response (ServicePac part num 69P9512)
  - 3 year IOR 24x7, 4 hr avg response (ServicePac part num 69P9511)
  - 3 year IOR 9x5, 4 hr avg response (ServicePac part num 69P9510)
  - 3 year IOR 9x5, NBD response (ServicePac part num 69P9509)
- ↳ Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- ↳ 24x7<sup>14</sup> toll-free support for warranty issues during the warranty period<sup>3</sup>

| IBM® Machine Type | Machine model | Processor / Speed                  | L2 cache | FSB MHz | Memory  | Disk/Disk controller | Maximum Capacity | PCI slots x bays | Hard disk bays | Power Supply | Ethernet | Available date |
|-------------------|---------------|------------------------------------|----------|---------|---------|----------------------|------------------|------------------|----------------|--------------|----------|----------------|
| 8485/8490         | 14U           | Pentium® 4 531 3.0GHz <sup>1</sup> | 1MB      | 800     | 1x512MB | None/SAS/SATA        | 1.2TB            | 6 x 7            | 4 hot-swap     | 1x400W       | Gigabit  | Sep 2006       |
| 8485/8490         | 16U           | Pentium 4 531 3.0GHz               | 1MB      | 800     | 1x512MB | 1x160GB/SATA         | 2.0TB            | 4 x 7            | 4 simple-swap  | 1x400W       | Gigabit  | Sep 2006       |
| 8485/8490         | 72U           | Pentium D 820 2.8GHz               | 2MB      | 800     | 1x512MB | None/SAS/SATA        | 1.2TB            | 6 x 7            | 4 hot-swap     | 1x400W       | Gigabit  | Sep 2006       |
| 8485/8490         | 74U           | Pentium D 820 2.8GHz               | 2MB      | 800     | 2x512MB | 2x250GB/SATA         | 2.0TB            | 4 x 7            | 4 simple-swap  | 1x400W       | Gigabit  | Sep 2006       |
| 8485/8490         | JAU           | Pentium D 945 3.4GHz               | 4MB      | 800     | 2x512MB | None/SAS/SATA        | 1.2TB            | 6 x 7            | 4 hot-swap     | 2x430W       | Gigabit  | Sep 2006       |

Positioning Processor(s) *Single socket, entry server for small and medium size business' and distributed enterprises*  
**Intel® Pentium 4 up to 3.0GHz Single-Core 800MHz FSB / Pentium D up to 3.4GHz Dual-Core 800MHz FSB / All Optimized for Extended Memory 64 Technology (EM64T)**  
 L2 cache **1MB** std on Pentium 4 / **2 or 4MB** std on Pentium D  
 Implementation Motherboard contains one LGA-775 socket, four DIMM sockets, some: four slots(1 PCI Express x8, 1 PCI Express x1, 2 PCI) some: six slots(1 PCI Express x8, 1 PCI Express x1, 2 PCI, 2 PCI-X), integrated SATA and Gigabit Ethernet.  
 SMP support No SMP support / no processor upgrade

Memory **512MB or 1GB** std / 8GB<sup>13</sup> max / four 184-pin gold-plated DIMM sockets / one or two socket used / **PC2-4200 533MHz ECC DDR2-SDRAM / All Error Checking and Correcting (ECC)** / DIMMs and ECC memory controller / industry std / unbuffered

SAS disk controller Integrated SAS controller / supports SAS or SATA drives  
 IDE disk controller Enhanced IDE / ATA-100 / integrated in I/O Controller Hub / one connector on planar  
 SATA disk controller Four channel SATA controller (3.0GB/sec) / supports 4 drives standard  
 Cables One 2-drop EIDE cables (to CD-ROM) / one 1-drop SATA cable per installed hard disk  
 Disk Some: 160GB SATA; some: 250GB SATA / 7,200 rpm / 9.0 ms seek / S.M.A.R.T.  
 RAID Controller IBM ServeRAID™ 8e (RAID 0, 1) / on planar / supports SATA or SAS interface

Rack support 5U<sup>4</sup> rack mount support via tower-to-rack kit option  
 Bus slots (see below) All: one PCI Express® bus / one 64-bit PCIe™ x8 / one 64-bit PCIe x1/ two 32-bit 33MHz 5v PCI 2.2 slots / some: two 64-bit 66MHz 3.3v PCI-X slots / no hot-swap Active™ PCI slots  
 Chipset **Intel E7230 chipset** / Memory Controller Hub (MCH) / I/O Controller Hub (ICH7R) for PCI 2.2, ATA-100 EIDE, ethernet MAC, USB, Low Pin Count Interface / Firmware Hub / SMSC® LPC47M192 Super I/O for diskette, parallel, serial, keyboard, mouse

Ethernet 10/100/1000 gigabit / Broadcom® 5721 / on planar / full-duplex / PHY and MAC layers / Preboot eXecution Environment (PXE) / Wake on LAN®  
 Optical / diskette *Some: 48X-20X<sup>6</sup> CD-ROM, IDE; Some: 48X-32X-48X-16X<sup>6</sup> CD-RW/DVD-ROM, IDE / None standard*  
 Ports *Front: two USB (2.0); Back: two serial (9-pin), parallel, two USB (2.0), keyboard, mouse, ethernet (RJ45) and monitor*  
 Diagnostics Diagnostic LEDs / error LEDs for fans and memory / server diagnostic programs stored on IBM Enhanced Diagnostics CD  
 Systems mgmt Mini-baseboard management controller / IPMI 1.5 / 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 AT® RN50(ES1000) / 16MB SDRAM std/max / on planar / analog 15-pin / up to 1024x768x32bit@85Hz

Security Mechanical side panel key lock / U-Bolt Tie-down capability/ power-on password / boot sequence control / operation without keyboard/mouse  
 Software **ServerGuide™** (CD-based automated network OS installation and configuration tool), **ServeRAID™** (RAID management), IBM Director (system hardware management software) and many utilities

- 30R5148
- 2GB(2x1GB) PC2-4200 CL3 ECC DDR2
- 30R5149
- 4GB(2x2GB) PC2-4200 CL3 ECC DDR2
- 30R5150
- IBM 80GB SATA (7.2K) simple-swap HDD
- 39M4500
- 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
- 80GB Hot-Swap SATA HDD
- 39M4518
- 160GB Hot-Swap SATA HDD
- 39M4522
- 250GB Hot-Swap SATA HDD
- 39M4526
- 73GB 10K 3.5" SAS Hot-Swap HDD
- 40K1039
- 146GB 10K 3.5" SAS Hot-Swap HDD
- 40K1040
- 300GB 10K 3.5" SAS Hot-Swap HDD
- 40K1041
- 36GB 15K 3.5" SAS Hot-Swap HDD
- 40K1042
- 73GB 15K 3.5" SAS Hot-Swap HDD
- 40K1043
- 48X/32X/48X/16X Max<sup>6</sup> CD-RW/DVD-ROM Combo (black)
- 32R2905
- IBM Remote Supervisor Adapter II (PCI adapter)
- 59P2984
- IBM 5Ux20D Tower-to-Rack Kit
- 39R9361
- IBM ServeRAID-7L SATA Integrated Controller
- 71P8648

Keyboard / mouse Optional  
 Cooling fans Three fans (fansink, 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)

Other options at [ibm.com/pc/us/accessories](http://ibm.com/pc/us/accessories)

All:  
 Slot 1: fullsize, 64-bit PCI-E x8 (4GBps)  
 Slot 2: fullsize, 64-bit PCI-E x1 (500MBps)  
 Slot 3: fullsize, 32-bit 33MHz, PCI 2.2 (5v)  
 Slot 4: fullsize, 32-bit 33MHz, PCI 2.2 (5v)  
 Some:  
 Slot 5: fullsize, 64-bit 66MHz, PCI-X (3.3v)  
 Slot 6: fullsize, 64-bit 66MHz, PCI-X (3.3v)

Bay ① 5.25", HH 1.6", access, CD-ROM  
 Bay ② 5.25", HH 1.6", access, open (no disk)  
 Bay ③ 3.5", SL 1", access, 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

Mini-tower  
 Stealth black

- ◇ 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) 1.0
- ◇ 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 45.8 pounds (16.3 to 20.8kg)

Maximum SATA capacity:  
 2TB<sup>13</sup> (4 disks x 500GB)  
 Maximum hot-swap SAS capacity:  
 1.2TB<sup>13</sup> (4 disks x 300GB)

**LIMITED WARRANTY<sup>3</sup>**

- ⇨ 1 year parts and labor standard 8485 MTM
- ⇨ 3 year parts and labor standard 8490 MTM
- ⇨ International Warranty Service<sup>3</sup>
- ⇨ On site, 8 am-5 pm, Mon-Fri excluding holidays, next business day response time
- ⇨ On site service upgrade options (in eligible locations):<sup>7</sup>
  - 3 year IOR 24x7, 2 hr avg response (ServicePac part num 69P9512)
  - 3 year IOR 24x7, 4 hr avg response (ServicePac part num 69P9511)
  - 3 year IOR 9x5, 4 hr avg response (ServicePac part num 69P9510)
  - 3 year IOR 9x5, NBD response (ServicePac part num 69P9509)
- ⇨ Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- ⇨ 24x7<sup>14</sup> toll-free support for warranty issues during the warranty period<sup>3</sup>



| IBM®<br>Type-model | Processor | GHz <sup>1</sup> | L2<br>cache | FSB<br>MHz | Memory | Disk                | Disk<br>controller | Hot-swap<br>disk bays | PCI slots<br>x bays | Power supply<br>number and type | Ethernet  | Available<br>date |          |
|--------------------|-----------|------------------|-------------|------------|--------|---------------------|--------------------|-----------------------|---------------------|---------------------------------|-----------|-------------------|----------|
| 8649-42X           | 1 x Xeon™ | 2.67             | 512KB       | 533        | 512MB  | 36.4GB <sup>2</sup> | Ultra320 10K       | Ultra320              | None (4 fixed)      | 6 x 7                           | One fixed | Gigabit           | Feb 2004 |
| 8649-4AX           | 1 x Xeon  | 2.67             | 512KB       | 533        | 512MB  | None (open-bay)     | Ultra320           | 6 hot-swap            | 6 x 9               | One fixed                       | Gigabit   | Feb 2004          |          |
| 8649-4BX           | 1 x Xeon  | 2.67             | 512KB       | 533        | 512MB  | None (open-bay)     | Ultra320           | 6 hot-swap            | 6 x 9               | Two redundant                   | Gigabit   | Feb 2004          |          |
| 8649-52X           | 1 x Xeon  | 2.8B             | 512KB       | 533        | 512MB  | 36.4GB              | Ultra320 10K       | Ultra320              | None (4 fixed)      | 6 x 7                           | One fixed | Gigabit           | Feb 2004 |
| 8649-5AX           | 1 x Xeon  | 2.8B             | 512KB       | 533        | 512MB  | None (open-bay)     | Ultra320           | 6 hot-swap            | 6 x 9               | One fixed                       | Gigabit   | Feb 2004          |          |
| 8649-5BX           | 1 x Xeon  | 2.8B             | 512KB       | 533        | 512MB  | None (open-bay)     | Ultra320           | 6 hot-swap            | 6 x 9               | Two redundant                   | Gigabit   | Feb 2004          |          |
| 8649-62X           | 1 x Xeon  | 3.06             | 512KB       | 533        | 512MB  | 36.4GB              | Ultra320 10K       | Ultra320              | None (4 fixed)      | 6 x 7                           | One fixed | Gigabit           | Feb 2004 |
| 8649-6AX           | 1 x Xeon  | 3.06             | 512KB       | 533        | 512MB  | None (open-bay)     | Ultra320           | 6 hot-swap            | 6 x 9               | One fixed                       | Gigabit   | Feb 2004          |          |
| 8649-6BX           | 1 x Xeon  | 3.06             | 512KB       | 533        | 512MB  | None (open-bay)     | Ultra320           | 6 hot-swap            | 6 x 9               | Two redundant                   | Gigabit   | Feb 2004          |          |

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

Memory **512MB** std / 8GB<sup>13</sup> max / two slots used / two slots available / **PC2100** 266MHz CL2.5 registered 184-pin ECC DDR-SDRAM DIMMs / four DIMM gold-connector slots on systemboard / DIMMs must be installed in matched pairs [a bank] / 2-way memory interleave / dual channel / **Error Checking and Correcting (ECC)** via **16-bit Checksum Chipkill™** (corrects 1, 2, 3, or 4-bit errors on same chip and detects 2- through 8-bit errors contained in two chips) available on 512MB and greater DIMMs

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

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

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

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

CD-ROM / diskette Ports *CD-ROM:* 48X-20X<sup>6</sup> CD-ROM, IDE / *Diskette:* 3.5" 1.44MB diskette drive  
 Front: two USB (Ver 2.0); Back: two USB (Ver 2.0), two serial (9-pin), parallel, keyboard, mouse, ethernet (RJ-45), monitor (analog DB-15), microphone-in (mono), line-in (stereo), line-out (stereo)

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

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

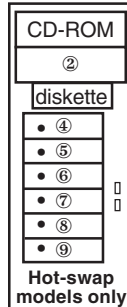
Security Mechanical side panel key lock (locks hot-swap disks on hot-swap models) / optional U-Bolt support via knockout / power-on password / boot sequence control / operation without keyboard/mouse / security slot (for opt cable lock)  
 Xeon 2.67 GHz/533/512KB L2 Cache Proc Upg 24P7861  
 Xeon 2.80 GHz/533/512KB L2 Cache Proc Upg 24P8054  
 Xeon 3.06 GHz/533/512KB L2 Cache Proc Upg 24P8122  
 2x256MB PC2100 CL2.5 ECC non-Chipkill DIMM Kit 73P2868  
 512MB PC2100 CL2.5 ECC DDR-SDRAM 33L5038

Software **ServerGuide™** (CD-based automated network OS installation and configuration tool), IBM Director (system hardware mgmt software) and many utilities  
 1GB PC2100 CL2.5 ECC DDR-SDRAM DIMM 33L5039  
 2GB PC2100 CL2.5 ECC DDR-SDRAM DIMM 33L5040  
 IBM 73.4GB 10K Ultra320 SCSI 68-pin (not hot-swp) 32P0724  
 IBM 146GB 10K Ultra320 SCSI 68-pin (not hot-swp) 32P0725  
 IBM 36.4GB 15K Ultra320 SCSI Hot-Swap SL HDD 06P5776  
 IBM 73GB 10K Ultra320 SCSI Hot-Swap SL HDD 32P0727  
 IBM 146GB 10K Ultra320 SCSI Hot-Swap SL HDD 32P0728  
 40X/12X/40X Max<sup>6</sup> CD-RW internal (black) 22P6976  
 IBM Remote Supervisor Adapter II (PCI adapter) 59P2984  
 IBM 4U Extended Depth Tower-to-Rack Kit 59P4817  
 IBM ServeRAID-5i Controller (adapter for Slot 4) 25P3492  
 IBM ServeRAID-6i Controller (adapter for Slot 4) 71P8595

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

Power supply(s) Other options at [ibm.com/pc/us/accessories](http://ibm.com/pc/us/accessories)

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



Bay ① 5.25", HH 1.6", access, CD-ROM  
 Bay ② 5.25", HH 1.6", access, open  
 Bay ③ 3.5", SL 1", access, diskette  
*Hot-swap models 6AX and 6BX:*  
 Six bays ④ to ⑥ 3.5", SL 1", access, hot-swp  
*Fixed disk models 62X:*  
 Bay ④ 3.5", SL 1", no access, not hot-swap  
 Bay ⑤ 3.5", SL 1", no access, not hot-swap  
 Bay ⑥ 3.5", SL 1", no access, not hot-swap  
 Bay ⑦ 3.5", SL 1", no access, not hot-swap  
 Bay ⑧ 3.5", SL 1", no access, not hot-swap  
 Bay ⑨ 3.5", SL 1", no access, not hot-swap  
 Maximum internal SCSI disk capacity<sup>13</sup>:  
 Fixed: 587.2GB (4 disks x 146.8GB)  
 Hot-swap: 880.8GB (6 disks x 146.8GB)

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

**LIMITED WARRANTY<sup>3</sup>**

- ⇒ 1 year parts and labor
- ⇒ International Warranty Service<sup>3</sup>
- ⇒ On site, 8 am-5 pm, Mon-Fri excluding holidays, next business day response time
- ⇒ On site service upgrade options (in eligible locations):<sup>7</sup>
  - 3 year IOR 9x5, NBD response (ServicePac® part num 96P2248)
  - 3 year IOR 9x5, 4 hr avg response (ServicePac part num 96P2249)
  - 3 year IOR 24x7, 4 hr avg response (ServicePac part num 96P2250)
  - 3 year IOR 24x7, 2 hr avg response (ServicePac part num 96P2251)
- ⇒ Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- ⇒ 24x7<sup>14</sup> toll-free support for warranty issues during the warranty period<sup>3</sup>

See footnotes for important warranty information  
 US models announced January 20, 2004  
 • = Hot-swap bays in some models

| IBM® Type-GAV-model | Processor | L2 GHz <sup>1</sup> cache | FSB MHz | Memory | Disk                        | Disk controller | Hot-swap disk bays | PCI slots x bays | Power supply number and type | Ethernet | Available date |
|---------------------|-----------|---------------------------|---------|--------|-----------------------------|-----------------|--------------------|------------------|------------------------------|----------|----------------|
| 8648-40Y-40x        | 1 x Xeon™ | 3.0 2MB                   | 800     | 512MB  | 80GB <sup>2</sup> SATA 7200 | SATA            | 3 simple-swap      | 6 x 7            | One fixed                    | Gigabit  | Mar 2005       |
| 8648-44Y-44x        | 1 x Xeon  | 3.0 2MB                   | 800     | 512MB  | None (open-bay)             | Ultra320        | 6 hot-swap         | 6 x 9            | One fixed                    | Gigabit  | Mar 2005       |
| 8648-4By-4Bx        | 1 x Xeon  | 3.0 2MB                   | 800     | 512MB  | None (open-bay)             | Ultra320        | 6 hot-swap         | 6 x 9            | Two redundant                | Gigabit  | Mar 2005       |
| 8648-50Y-50x        | 1 x Xeon  | 3.2 2MB                   | 800     | 512MB  | 80GB SATA 7200              | SATA            | 3 simple-swap      | 6 x 7            | One fixed                    | Gigabit  | Mar 2005       |
| 8648-5AY-5Ax        | 1 x Xeon  | 3.2 2MB                   | 800     | 512MB  | None (open-bay)             | Ultra320        | 6 hot-swap         | 6 x 9            | One fixed                    | Gigabit  | Mar 2005       |
| 8648-5BY-5Bx        | 1 x Xeon  | 3.2 2MB                   | 800     | 512MB  | None (open-bay)             | Ultra320        | 6 hot-swap         | 6 x 9            | Two redundant                | Gigabit  | Mar 2005       |
| 8648-60Y-60x        | 1 x Xeon  | 3.4 2MB                   | 800     | 512MB  | 80GB SATA 7200              | SATA            | 3 simple-swap      | 6 x 7            | One fixed                    | Gigabit  | Mar 2005       |
| 8648-6AY-6Ax        | 1 x Xeon  | 3.4 2MB                   | 800     | 512MB  | None (open-bay)             | Ultra320        | 6 hot-swap         | 6 x 9            | One fixed                    | Gigabit  | Mar 2005       |
| 8648-6BY-6Bx        | 1 x Xeon  | 3.4 2MB                   | 800     | 512MB  | None (open-bay)             | Ultra320        | 6 hot-swap         | 6 x 9            | Two redundant                | Gigabit  | Mar 2005       |

Processor(s) SMP - L2 Cache Implementation: **1 x Intel® Xeon up to 3.4 GHz with 800MHz frontside bus (FSB) / EM64T / 2MB L2 ECC Cache / Hyper-Threading technology** / up to two Xeon Processors (same speed/cache size) / **2MB** std and max / at processor speed  
Systemboard contains two Intel 604-pin micro-PGA ZIF sockets, six DIMM slots, six slots (3 PCI-X, 2 PCI, 1 PCI Express x16)

Memory: **512MB** std / 16GB<sup>13</sup> max (16GB maximum can be achieved when 4GB DIMMs are supported, 12GB is the maximum with less than 4GB DIMMs) / two slots used / four slots available / **PC2-3200** 400MHz ECC DDR2-SDRAM DIMMs / Six 240 pin gold-conductor slots on systemboard / DIMMs must be installed in matched pairs [a bank] / 2-way memory interleave / dual channel / **Error Checking and Correcting (ECC)** via **16-bit Checksum Chipkill™** (corrects 1, 2, 3, or 4-bit errors on same chip and detects 2- through 8-bit errors contained in two chips) available on 1GB (2x512) DIMM Kit and greater

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

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

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

Ethernet: One gigabit 10/100/1000 ethernet controller / Broadcom 5721 / full gigabit ethernet MAC and PHY layer functions / chip on planar / PCI-X 64-bit 100MHz / full duplex / Wake on LAN® / Alert Standard Format 2.0 / one rear RJ-45 port  
CD-ROM / diskette Ports: **CD-ROM:** 48X-20X\* CD-ROM, IDE / **Diskette:** 3.5" 1.44MB diskette drive  
*Front:* two USB (Ver 2.0); *Back:* two USB (Ver 2.0), two serial (9-pin), parallel, keyboard, mouse, ethernet (RJ-45), monitor (analog DB-15)

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

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

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

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

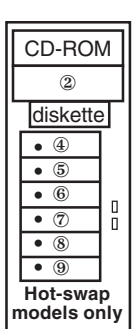
Keyboard / mouse Cooling fans: IBM 101 key keyboard / IBM mouse (both black, 6-pin PS/2)  
Up to six / three for processor(s), memory, and disk bays / two power supply cage fans (three in dual power supply model)  
*All:* not redundant / not hot-swap / all variable speed  
*Some:* one 530 watt std and max / not hot-swap  
*xBx:* two 514 watt std and max / hot-swap / redundant  
*All:* universal / voltage-sensing / Automatic Server Restart (ASR) / cooling fan in power supply(s) (variable spd)

Power supply(s):

|   |         |
|---|---------|
| Xeon 3.0 GHz/800/2MB L2 Cache EM64TProc Upg         | 25R8900 |
| Xeon 3.2 GHz/800/2MB L2 Cache EM64TProc Upg         | 25R8901 |
| Xeon 3.4 GHz/800/2MB L2 Cache EM64TProc Upg         | 13N0676 |
| 512MB (2x256) PC2-3200 ECC DDR2                     | 73P3523 |
| 1GB (2x512) PC2-3200 ECC DDR2                       | 73P3522 |
| 1GB (2x512) PC2-3200 ECC DDR2 ChipK DIMM Kit        | 73P2865 |
| 2GB (2x1GB) PC2-3200 ECC DDR2 DIMM Kit              | 73P2866 |
| IBM 80GB SATA-150 (7.2K) simple-swap HDD            | 73P8002 |
| IBM 160GB SATA-150 (7.2K) simple-swap HDD           | 73P8003 |
| IBM 250GB SATA-150 (7.2K) simple-swap HDD           | 73P8006 |
| IBM 36.4GB 15K Ultra320 SCSI Hot-Swap SL HDD        | 06P5776 |
| IBM 73GB 10K Ultra320 SCSI Hot-Swap SL HDD          | 32P0727 |
| IBM 146GB 10K Ultra320 SCSI Hot-Swap SL HDD         | 32P0728 |
| 40X/12X/40X Max <sup>6</sup> CD-RW internal (black) | 22P6976 |
| IBM Remote Supervisor Adapter II (PCI adapter)      | 59P2984 |
| IBM 4U Extended Depth Tower-to-Rack Kit             | 26K6095 |
| IBM ServeRAID-6i+ controller (adapter for Slot 5)   | 13N2190 |
| IBM ServeRAID 7t SATA controller                    | 71P8648 |

Other options at [ibm.com/pc/us/accessories](http://ibm.com/pc/us/accessories)

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



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

**Hot-swap models:**  
Six bays ④ to ⑧ 3.5", SL 1", access, hot-swap

**Simple-swap models:** 2 std, 2 avail (up to 4 SATA HDDs maybe added with ServeRAID 7t controller)

Bay ④ 3.5", SL 1", simple-swap  
Bay ⑤ 3.5", SL 1", simple-swap  
Bay ⑥ 3.5", SL 1", simple-swap  
Bay ⑦ 3.5", SL 1", fixed

**Maximum internal disk capacity<sup>13</sup>:**  
SATA: 500GB (2 disks x 250GB); 1TB (4 disks x 250GB) w/ ServeRAID 7t  
SCSI: 880.8GB (6 disks x 146.8GB)

- ◆ Raven black color
- ◆ Removable left side panel
- ◆ Configuration/Setup Utility invoked by pressing F1 at startup
- ◆ BIOS Setup Utility via F1 at startup
- ◆ Adaptec Configuration Utility near startup by pressing CTRL+I
- ◆ DMI 2.2-compliant
- ◆ Adv Config Power Interface (ACPI) 1.0a
- ◆ Device Driver and IBM Enhanced Diagnostics CD-ROM included
- ◆ Four stabilizing feet
- ◆ Handle grip on top
- ◆ H 18.4" x W 6.5" x D 25.9"
- ◆ H 467mm x W 165mm x D 658mm
- ◆ 44 to 57 pounds (20 to 25.8kg)
- ◇ Fixed disk models: metal cage for disk bays 4,5,6,7 rotate out of chassis for easy access for cabling
- ◇ Predictive Failure Analysis on disk(s) with IBM Director can alert the administrator of an imminent component failure

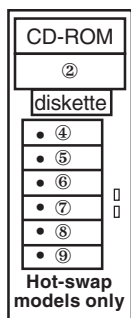
**LIMITED WARRANTY<sup>3</sup>**

- ⇒ 1 year parts and labor
- ⇒ International Warranty Service<sup>3</sup>
- ⇒ On site, 8 am-5 pm, Mon-Fri excluding holidays, next business day response time
- ⇒ On site service upgrade options (in eligible locations):<sup>7</sup>
  - 3 year IOR 9x5, NBD response (ServicePac® part num 96P2248)
  - 3 year IOR 9x5, 4 hr avg response (ServicePac part num 96P2249)
  - 3 year IOR 24x7, 4 hr avg response (ServicePac part num 96P2250)
  - 3 year IOR 24x7, 2 hr avg response (ServicePac part num 96P2251)
- ⇒ Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- ⇒ 24x7<sup>14</sup> toll-free support for warranty issues during the warranty period<sup>3</sup>

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

| IBM® Type-GAV-model                              | Processor  | L2 GHz <sup>1</sup> cache | FSB MHz | Memory | Disk                        | Disk controller | Hot-swap disk bays | PCI slots x bays | Power supply number and type | Ethernet | Available date |
|--|--|---------------------------|---------|--------|-----------------------------|-----------------|--------------------|------------------|------------------------------|----------|----------------|
| 8648-32U-32x                                     | 1 x Xeon™  | 2.8 2MB                   | 800     | 512MB  | 80GB <sup>2</sup> SATA 7200 | SATA            | 4 simple-swap      | 6 x 7            | One fixed                    | Gigabit  | Sep 2005       |
| 8648-34U-34x                                     | 1 x Xeon   | 2.8 2MB                   | 800     | 512MB  | None (open-bay)             | Ultra320        | 6 hot-swap         | 6 x 9            | One fixed                    | Gigabit  | Sep 2005       |
| 8648-36U-36x                                     | 1 x Xeon   | 2.8 2MB                   | 800     | 512MB  | None (open-bay)             | Ultra320        | 6 hot-swap         | 6 x 9            | Two redundant                | Gigabit  | Sep 2005       |
| 8648-E3U-E3x                                     | 1 x Xeon   | 2.8 2MB                   | 800     | 2GB    | None (open-bay)             | Ultra320        | 6 hot-swap         | 6 x 9            | One fixed                    | Gigabit  | Sep 2005       |
| 8648-E5U-E5x                                     | 1 x Xeon   | 2.8 2MB                   | 800     | 2GB    | None (open-bay)             | Ultra320        | 6 hot-swap         | 6 x 9            | Two redundant                | Gigabit  | Sep 2005       |
| 8648-E7U-E7x                                     | 1 x Xeon   | 3.2 2MB                   | 800     | 2GB    | None (open-bay)             | Ultra320        | 6 hot-swap         | 6 x 9            | Two redundant                | Gigabit  | Sep 2005       |
| 8648-B2U-B2x                                     | 1 x Xeon   | 3.0 2MB                   | 800     | 512MB  | 80GB SATA 7200              | SATA            | 4 simple-swap      | 6 x 7            | One fixed                    | Gigabit  | Apr 2006       |
| 8648-B4U-B4x                                     | 1 x Xeon   | 3.0 2MB                   | 800     | 512MB  | None (open-bay)             | Ultra320        | 6 hot-swap         | 6 x 9            | One fixed                    | Gigabit  | Apr 2006       |
| 8648-B6U-B6x                                     | 1 x Xeon   | 3.0 2MB                   | 800     | 512MB  | None (open-bay)             | Ultra320        | 6 hot-swap         | 6 x 9            | Two redundant                | Gigabit  | Apr 2006       |
| Processor(s)<br>SMP - L2 Cache<br>Implementation | 1 x Intel® Xeon up to 3.4 GHz with 800MHz frontside bus (FSB) / EM64T / 2MB L2 ECC Cache / Hyper-Threading technology / 2-way SMP / up to two Xeon Processors (same speed/cache size) / 2MB std and max / at processor speed<br>Systemboard contains two Intel 604-pin micro-PGA ZIF sockets, six DIMM slots, six slots (3 PCI-X, 2 PCI, 1 PCI Express x16)  |                           |         |        |                             |                 |                    |                  |                              |          |                |
| Memory   | 512MB std / 16GB <sup>13</sup> max (16GB maximum can be achieved when 4GB DIMMs are supported, 12GB is the maximum with less than 4GB DIMMs) / two slots used / four slots available / PC2-3200 400MHz ECC DDR2-SDRAM DIMMs / Six 240 pin gold-conductor slots on systemboard / DIMMs must be installed in matched pairs [a bank] / 2-way memory interleave / dual channel / Error Checking and Correcting (ECC) via 16-bit Checksum Chipkill™ (corrects 1, 2, 3, or 4-bit errors on same chip and detects 2- through 8-bit errors contained in two chips) available on 1GB (2x512) DIMM Kit and greater |                           |         |        |                             |                 |                    |                  |                              |          |                |
| SATA disk controller<br>SCSI disk controller     | Dual Channel SATA-150 controller (150MB/sec / two connectors on planar / supports Server RAID™ 7e<br>Adaptec® 7902 / dual channel Ultra320 SCSI controller (LVD 320MB/sec) / on planar / 64-bit 100MHz PCI-X / Serve RAID 7e supports RAID-0 & 1 mirroring / Two 16-bit channels (one internal and one external) / Internal channel: Hot-swap models: one 1-drop 16-bit 68-pin LVD SCSI cable to 6-bay backplane; External channel: cable available as option pn 24P7929 from systemboard to rear external 68-pin connector  |                           |         |        |                             |                 |                    |                  |                              |          |                |
| Cables<br>RAID Controller                        | One SCSI cable (listed above), two one-drop SATA, one 2-drop EIDE cable (to CD-ROM),<br>IBM Serve RAID 7e (RAID 0 Or 1) / on planar / supports SATA or SCSI interface / supports Server RAID 6i+ controller  |                           |         |        |                             |                 |                    |                  |                              |          |                |
| Mechanical<br>Bus slots (see below)<br>Chipset   | 4U <sup>4</sup> Tower (rack mount support via tower-to-rack kit option)<br>One PCI-Express / three 64-bit (one 133MHz, 2 100MHz) PCI-X 1.0 / two 32-bit/33MHz / no hot-swap Active™ PCI slots<br>Intel E7520 chipset / E7525 MCH (Memory Controller Hub) for PCI-Express x16(vid), Broadcom, PXH, ICH5R / PXH BUS A supports Adaptec 7902, 2 64bit/100MHz PCI-X slots (5 & 6), BUS B supports one 64bit/133MHz PCI-X slot (4) / ICH5R for two 32-bit/33MHz PCI slots (slots 2 & 3), video, SATA, 4xUSB(2.0), Low Pin Count Interface / NS PC87366 Super I/O off LPC interface                            |                           |         |        |                             |                 |                    |                  |                              |          |                |
| Ethernet   | One gigabit 10/100/1000 ethernet controller / Broadcom 5721 / full gigabit ethernet MAC and PHY layer functions / chip on planar / PCI-X 64-bit 100MHz / full duplex / Wake on LAN® / Alert Standard Format 2.0 / one rear RJ-45 port  |                           |         |        |                             |                 |                    |                  |                              |          |                |
| CD-ROM / diskette<br>Ports                       | CD-ROM: 48X-20X® CD-ROM, IDE / Diskette: 3.5" 1.44MB diskette drive<br>Front: two USB (Ver 2.0); Back: two USB (Ver 2.0), two serial (9-pin), parallel, keyboard, mouse, ethernet (RJ-45), monitor (analog DB-15)  |                           |         |        |                             |                 |                    |                  |                              |          |                |
| Diagnostics<br>Systems mgmt cntrl                | Diagnostic LEDs / error LEDs for fans and memory / server diagnostic programs stored on IBM Enhanced Diagnostics CD<br>Winbond® W791D / chip on planar / monitors system and processor temperature, fan speed and failure, and voltages / support for optional Remote Supervisor Adapter II (provides continuous health monitoring and control)  |                           |         |        |                             |                 |                    |                  |                              |          |                |
| Graphics controller                              | SVGA / ATI® Radeon™ 7000M on Planar / 16MB SDRAM std and max / 15 pin connector  |                           |         |        |                             |                 |                    |                  |                              |          |                |
| Security   | Mechanical side panel key lock (locks hot-swap disks on hot-swap models) / optional U-Bolt support via knockout / power-on password / boot sequence control / operation without keyboard/mouse / security slot (for opt cable lock)  |                           |         |        |                             |                 |                    |                  |                              |          |                |
| Software   | ServerGuide™ (CD-based automated network OS installation and configuration tool), IBM Director (system hardware mgmt software) and many utilities  |                           |         |        |                             |                 |                    |                  |                              |          |                |
| Keyboard / mouse<br>Cooling fans                 | IBM 101 key keyboard / IBM mouse (both black, 6-pin PS/2)<br>Up to six / three for processor(s), memory, and disk bays / two power supply cage fans (three in dual power supply model)<br>All: not redundant / not hot-swap / all variable speed<br>Some: one 530 watt std and max / not hot-swap<br>Some: two 514 watt std and max / hot-swap / redundant<br>All: universal / voltage-sensing / Automatic Server Restart (ASR) / cooling fan in power supply(s) (variable spd)  |                           |         |        |                             |                 |                    |                  |                              |          |                |
| Power supply(s)                                  | IBM 101 key keyboard / IBM mouse (both black, 6-pin PS/2)<br>Up to six / three for processor(s), memory, and disk bays / two power supply cage fans (three in dual power supply model)<br>All: not redundant / not hot-swap / all variable speed<br>Some: one 530 watt std and max / not hot-swap<br>Some: two 514 watt std and max / hot-swap / redundant<br>All: universal / voltage-sensing / Automatic Server Restart (ASR) / cooling fan in power supply(s) (variable spd)  |                           |         |        |                             |                 |                    |                  |                              |          |                |

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



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

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

Maximum internal disk capacity<sup>13</sup>:  
SATA: 500GB (2 disks x 250GB); 1TB (4 disks x 250GB) w/ Serve RAID 7i  
SCSI: 880.8GB (6 disks x 146.8GB)

Other options at [ibm.com/pc/us/accessories](http://ibm.com/pc/us/accessories)

**LIMITED WARRANTY<sup>3</sup>**

- ⇒ 1 year parts and labor
- ⇒ International Warranty Service<sup>3</sup>
- ⇒ On site, 8 am-5 pm, Mon-Fri excluding holidays, next business day response time
- ⇒ On site service upgrade options (in eligible locations):<sup>7</sup>
  - 3 year IOR 9x5, NBD response (ServicePac® part num 96P2248)
  - 3 year IOR 9x5, 4 hr avg response (ServicePac part num 96P2249)
  - 3 year IOR 24x7, 4 hr avg response (ServicePac part num 96P2250)
  - 3 year IOR 24x7, 2 hr avg response (ServicePac part num 96P2251)
- ⇒ Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- ⇒ 24x7<sup>14</sup> toll-free support for warranty issues during the warranty period<sup>3</sup>

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

| IBM®<br>Type-GAV-model | Processor | L2<br>GHz¹ cache | FSB<br>MHz | Memory | Disk  | Disk<br>controller | Hot-swap<br>disk bays | PCI slots<br>x bays | Power supply<br>number and type | Ethernet      | Available<br>date |
|------------------------|-----------|------------------|------------|--------|-------|--------------------|-----------------------|---------------------|---------------------------------|---------------|-------------------|
| 8488-32U-32x           | 1 x Xeon™ | 2.8              | 2MB        | 800    | 512MB | 80GB² SATA 7200    | SATA                  | 4 simple-swap       | 6 x 7                           | One fixed     | Gigabit Sep 2005  |
| 8488-34U-34x           | 1 x Xeon  | 2.8              | 2MB        | 800    | 512MB | None (open-bay)    | Ultra320              | 6 hot-swap          | 6 x 9                           | One fixed     | Gigabit Sep 2005  |
| 8488-36U-36x           | 1 x Xeon  | 2.8              | 2MB        | 800    | 512MB | None (open-bay)    | Ultra320              | 6 hot-swap          | 6 x 9                           | Two redundant | Gigabit Sep 2005  |
| 8448-B2U-B2x           | 1 x Xeon  | 3.0              | 2MB        | 800    | 512MB | 80GB SATA 7200     | SATA                  | 4 simple-swap       | 6 x 7                           | One fixed     | Gigabit Apr 2006  |
| 8448-B4U-B4x           | 1 x Xeon  | 3.0              | 2MB        | 800    | 512MB | None (open-bay)    | Ultra320              | 6 hot-swap          | 6 x 9                           | One fixed     | Gigabit Apr 2006  |
| 8448-B6U-B6x           | 1 x Xeon  | 3.0              | 2MB        | 800    | 512MB | None (open-bay)    | Ultra320              | 6 hot-swap          | 6 x 9                           | Two redundant | Gigabit Apr 2006  |

Processor(s) **1 x Intel® Xeon up to 3.4 GHz with 800MHz frontside bus (FSB) / EM64T / 2MB L2 ECC Cache / Hyper-Threading technology**  
 SMP - L2 Cache **2-way SMP** / up to two Xeon Processors (same speed/cache size) / **2MB** std and max / at processor speed  
 Implementation Systemboard contains two Intel 604-pin micro-PGA ZIF sockets, six DIMM slots, six slots (3 PCI-X, 2 PCI, 1 PCI Express x16)

Memory **512MB** std / 16GB<sup>13</sup> max (16GB maximum can be achieved when 4GB DIMMs are supported, 12GB is the maximum with less than 4GB DIMMs) / two slots used / four slots available / **PC2-3200** 400MHz ECC DDR2-SDRAM DIMMs / Six 240 pin gold-connector slots on systemboard / DIMMs must be installed in matched pairs [a bank] / 2-way memory interleave / dual channel / **Error Checking and Correcting (ECC)** via **16-bit Checksum Chipkill™** (corrects 1, 2, 3, or 4-bit errors on same chip and detects 2- through 8-bit errors contained in two chips) available on 1GB (2x512) DIMM Kit and greater

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

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

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

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

CD-ROM / diskette *CD-ROM:* 48X-20X<sup>6</sup> CD-ROM, IDE / *Diskette:* 3.5" 1.44MB diskette drive  
 Ports *Front:* two USB (Ver 2.0); *Back:* two USB (Ver 2.0), two serial (9-pin), parallel, keyboard, mouse, ethernet (RJ-45), monitor (analog DB-15)

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

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

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

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

Keyboard / mouse IBM 101 key keyboard / IBM mouse (both black, 6-pin PS/2)  
 Cooling fans Up to six / three for processor(s), memory, and disk bays / two power supply cage fans (three in dual power supply model)

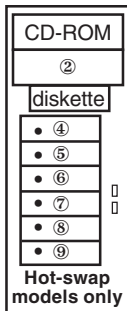
Power supply(s) Not redundant / not hot-swap / all variable speed / One 530 watt std and max / not hot-swap / universal / voltage-sensing / Automatic Server Restart (ASR) / cooling fan in power supply(s) (variable spd)

|   |         |
|---|---------|
| Xeon 2.8 GHz/800/2MB L2 Cache EM64TProc Upg         | 40K2500 |
| Xeon 3.0 GHz/800/2MB L2 Cache EM64TProc Upg         | 40K2515 |
| Xeon 3.2 GHz/800/2MB L2 Cache EM64TProc Upg         | 40K2516 |
| Xeon 3.4 GHz/800/2MB L2 Cache EM64TProc Upg         | 40K2517 |
| 512MB (2x256) PC2-3200 ECC DDR2                     | 73P3523 |
| 1GB (2x512) PC2-3200 ECC DDR2                       | 39M5818 |
| 1GB (2x512) PC2-3200 ECC DDR2 ChipK DIMM Kit        | 39M5821 |
| 2GB (2x1GB) PC2-3200 ECC DDR2 DIMM Kit              | 39M5809 |
| IBM 80GB SATA-150 (7.2K) simple-swap HDD            | 40K6864 |
| IBM 160GB SATA-150 (7.2K) simple-swap HDD           | 40K6868 |
| IBM 250GB SATA-150 (7.2K) simple-swap HDD           | 40K6872 |
| IBM 36.4GB 15K Ultra320 SCSI Hot-Swap SL HDD        | 30R5096 |
| IBM 73GB 10K Ultra320 SCSI Hot-Swap SL HDD          | 40K1023 |
| IBM 146GB 10K Ultra320 SCSI Hot-Swap SL HDD         | 40K1024 |
| 48X/32X/48X Max <sup>6</sup> CD-RW internal (black) | 22P7042 |
| IBM Remote Supervisor Adapter II (PCI adapter)      | 59P2984 |
| IBM 4U Extended Depth Tower-to-Rack Kit             | 26K6095 |
| IBM Serve RAID-6i+ controller (adapter for Slot 5)  | 13N2190 |
| IBM Serve RAID 7t SATA controller                   | 71P8648 |

Other options at [ibm.com/pc/us/accessories](http://ibm.com/pc/us/accessories)

- Slot 1: fullsize, PCI-Express x16 (3.3v)\*
- Slot 2: fullsize, 32-bit/33MHz, PCI (5v)
- Slot 3: fullsize, 32-bit/33MHz, PCI (5v)
- Slot 4: fullsize, 64-bit 133MHz, PCI-X 1.0 (3.3v)
- Slot 5: fullsize, 64-bit 100MHz, PCI-X 1.0 (3.3v)\*\*
- Slot 6: fullsize, 64-bit 100MHz, PCI-X 1.0 (3.3v)

\* support only for x8 adaptors  
 \*\* slot for opt IBM Serve RAID-6i+



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

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

Maximum internal disk capacity<sup>13</sup>:  
 SATA: 500GB (2 disks x 250GB); 1TB (4 disks x 250GB) w/ Serve RAID 7t  
 SCSI: 880.8GB (6 disks x 146.8GB)

- ◇ Raven black color
- ◇ Removable left side panel
- ◇ Configuration/Setup Utility invoked by pressing F1 at startup
- ◇ BIOS Setup Utility via F1 at startup
- ◇ Adaptec Configuration Utility near startup by pressing CTRL+I
- ◇ DMI 2.2-compliant
- ◇ Adv Config Power Interface (ACPI) 1.0a
- ◇ Device Driver and IBM Enhanced Diagnostics CD-ROM included
- ◇ Four stabilizing feet
- ◇ Handle grip on top
- ◇ H 18.4" x W 6.5" x D 25.9"
- ◇ H 467mm x W 165mm x D 658mm
- ◇ 44 to 57 pounds (20 to 25.8kg)
- ◇ Fixed disk models: metal cage for disk bays 4,5,6,7 rotate out of chassis for easy access for cabling
- ◇ Predictive Failure Analysis on disk(s) with IBM Director can alert the administrator of an imminent component failure

**LIMITED WARRANTY<sup>3</sup>**

- ⇒ 1 year parts and labor
- ⇒ International Warranty Service<sup>3</sup>
- ⇒ On site, 8 am-5 pm, Mon-Fri excluding holidays, next business day response time
- ⇒ On site service upgrade options (in eligible locations):<sup>7</sup>
  - 3 year IOR 9x5, NBD response (ServicePac® part num 96P2248)
  - 3 year IOR 9x5, 4 hr avg response (ServicePac part num 96P2249)
  - 3 year IOR 24x7, 4 hr avg response (ServicePac part num 96P2250)
  - 3 year IOR 24x7, 2 hr avg response (ServicePac part num 96P2251)
- ⇒ Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- ⇒ 24x7<sup>14</sup> toll-free support for warranty issues during the warranty period<sup>3</sup>

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

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

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

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

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

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

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

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

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

**Ethernet controller** 10/100/1000 gigabit / Broadcom® BCM 5703 / on planar / PCI-X 64-bit 100MHz / full duplex / Wake on LAN® / Alert Standard Format  
**CD-ROM / diskette** 48X-20X<sup>6</sup> CD-ROM / IDE / 1.6" HH; **Diskette:** 3.5" 1.44MB diskette drive / dust cover  
**Rear ports** **Rear:** two USB (Vers 1.1), keyboard, mouse, parallel, **two** serial (9-pin), graphics (DB-15), ethernet (RJ-45), two RJ-45 (sys mgmt)  
**Front port / graphics** **Front:** one USB (Vers 1.1); **Graphics:** SVGA / ATI® Rage XL / on planar / 8MB SDRAM std/max / 32-bit 33MHz PCI 2.2 Bus

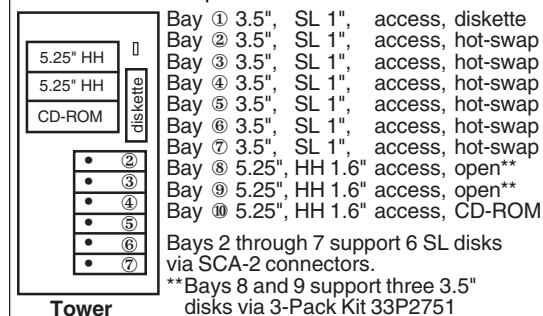
**Security** Power-on password / administrator password / hinged and lockable front door to cover disk bays, power button, and reset button / unattended boot / selectable boot

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

**Keyboard / mouse** IBM 101-key keyboard / IBM mouse (both black)  
**Power supply** **MAX:** std/max: two/two 660 watt  
**M1X:** std/max: one/two 660 watt  
**xAX:** std/max: two/two 560 watt  
**Rest:** std/max: one/two 560 watt  
**Fans** Four fans and two blowers / variable speed / hot-swap / redundant / PFA / fan in each power supply

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

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



- Quick release adapter slots (no screws)
  - Configuration/Setup Utility invoked by pressing F1 at startup
  - LSI Logic Configuration Utility near startup by pressing CTRL+C
  - Diagnostics (PC-Doctor™) by pressing F2 at startup
  - ACPI2.0-compliant
  - Operator Information Panel (in front)
  - Predictive failure analysis on disk options, memory, processors, VRMs, power supplies, and fans in conjunction with IBM Director can alert the system administrator of an imminent component failure
  - Tower: H 17.31" x W 8.5" x D 27.6"
  - 74 to 101 pounds
  - Stealth black color
- All models:* Max int disk capacity: 1.321TB<sup>2</sup> with nine 146.8GB SL disks with 3-Pack Ultra160 Hot-Swap Expansion Kit

**LIMITED WARRANTY<sup>3</sup>**

- **3 year parts and labor**
- **International Warranty Service<sup>3</sup>**
- **On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time<sup>7</sup>**
- **3 year on site warranty service upgrade options (in eligible locations):<sup>7</sup>**
  - **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)**
- **24x7<sup>14</sup> toll-free support for warranty issues during the warranty period<sup>3</sup>**

| IBM® Type-model | Qty x Processor  | L2 cache | Memory | Disk     | SCSI controller | Mechanical | Slots x bays (hot-swap bays) | Power supply      | Ethernet  | Available date |
|-----------------|------------------|----------|--------|----------|-----------------|------------|------------------------------|-------------------|-----------|----------------|
| 8841-05U-05x    | 1 x Xeon® 2.8GHz | 2MB      | 1GB    | None     | 2 x Ultra320    | Tower      | 6x10 (6 hot-swap std; 9 max) | 1 x 670W hot-swap | 2xGigabit | Sep 2005       |
| 8841-15y-15x    | 1 x Xeon 3.0GHz  | 2MB      | 1GB    | None     | 2 x Ultra320    | Tower      | 6x10 (6 hot-swap std; 9 max) | 1 x 670W hot-swap | 2xGigabit | Mar 2005       |
| 8841-25y-25x    | 1 x Xeon 3.2GHz  | 2MB      | 1GB    | None     | 2 x Ultra320    | Tower      | 6x10 (6 hot-swap std; 9 max) | 1 x 670W hot-swap | 2xGigabit | Mar 2005       |
| 8841-35y-35x    | 1 x Xeon 3.4GHz  | 2MB      | 1GB    | None     | 2 x Ultra320    | Tower      | 6x10 (6 hot-swap std; 9 max) | 1 x 670W hot-swap | 2xGigabit | Mar 2005       |
| 8841-45y-45x    | 1 x Xeon 3.6GHz  | 2MB      | 1GB    | None     | 2 x Ultra320    | Tower      | 6x10 (6 hot-swap std; 9 max) | 1 x 670W hot-swap | 2xGigabit | Mar 2005       |
| 8841-16y-16x    | 1 x Xeon 3.0GHz  | 2MB      | 1GB    | None     | 2 x Ultra320    | Tower      | 6x10 (6 hot-swap std; 9 max) | 1 x 670W hot-swap | 2xGigabit | Mar 2005       |
| 8841-E1y-E1x    | 1 x Xeon 3.0GHz  | 2MB      | 1GB    | 3x73.4GB | 2 x Ultra320    | Tower      | 6x10 (6 hot-swap std; 9 max) | 1 x 670W hot-swap | 2xGigabit | Mar 2005       |
| 8841-55U-55x    | 1 x Xeon 3.8GHz  | 2MB      | 1GB    | None     | 2 x Ultra320    | Tower      | 6x10 (6 hot-swap std; 9 max) | 1 x 670W hot-swap | 2xGigabit | Sep 2005       |

|                        |  |  |  |  |  |  |  |  |  |  |
|------------------------|--|--|--|--|--|--|--|--|--|--|
| Positioning            | <i>Universal server; two-way server using the Xeon processor to provide power and performance at an affordable price</i>   |  |  |  |  |  |  |  |  |  |
| Processor              | Up to <b>1 x Intel® Xeon™ Processor 2.8, 3.0, 3.2, 3.4, 3.6, 3.8 GHz</b> with 800MHz frontside bus / <b>Extended Memory 64 Technology (EM64T)</b> / <b>Simultaneous Multi-threading (SMT)</b> / Hyper-Threading technology /   |  |  |  |  |  |  |  |  |  |
| L2 cache               | <b>2MB</b> / all models / on die of processor / at processor speed   |  |  |  |  |  |  |  |  |  |
| SMP support            | <b>2-way SMP</b> / up to two Xeon Processors (same speed/cache size)   |  |  |  |  |  |  |  |  |  |
| Implementation         | Systemboard contains two Intel 604-pin micro-PGA XIF sockets, eight memory gold-connector DIMM slots, six PCI slots (one hot-swap Active™ PCI slots), and integrated SCSI, ethernet, graphics  |  |  |  |  |  |  |  |  |  |
| Memory                 | <b>1GB</b> std / <b>16GB</b> max / two slots used / six slots available / <b>PC2-3200</b> 400MHz registered 240-pin ECC <b>DDR2-SDRAM</b> DIMMs / DIMMs must be installed in matched pairs [a bank] / 2-way memory interleave / dual channel / memory bus runs at 2x200MHz / <b>Error Checking and Correcting (ECC)</b> (corrects 1, 2, 3, or 4-bit errors on same chip and detects 2- through 8-bit errors contained in two chips) / <b>Active Memory™: memory mirroring, online-spare memory</b> |  |  |  |  |  |  |  |  |  |
| SCSI disk controller   | <b>Adaptec AIC 7902 / dual channel Ultra320 SCSI controller</b> (LVD 320MB/sec) / on planar / 64-bit 100MHz PCI-X / <b>HostRAID</b> supports <b>RAID-0, 1 mirroring</b> (with up to one hot-spare disk / optional IBM ServeRAID™-7k Controller for low-cost RAID 0, 1, 1E, 1E0, 5, 00, 10, 50 (installed on internal connector)  |  |  |  |  |  |  |  |  |  |
| SCSI channels          | Two 16-bit channels / <i>SCSI Channel B</i> : 16-bit 68-pin LVD cable from controller to backplane; <i>Channel A</i> : 16-bit 68-pin interface for Bay 8 and 9 (may require a cable) or with optional 3-Pack Kit (cable included); supports external SCSI devices via external SCSI knockout in rear (cable req 24P7973) or via opt ServeRAID adapter with external connector(s)   |  |  |  |  |  |  |  |  |  |
| IDE controller / cable | Enhanced IDE ATA-100 controller in ICH5R South Bridge / one connector on planar / one 1-drop IDE cable (CD-ROM)  |  |  |  |  |  |  |  |  |  |
| Disk - capacity        | None std / supports 7200-15000 rpm disks / one backplane / all disk bays Ultra320-enabled  |  |  |  |  |  |  |  |  |  |
| Disk - bays            | Six hot-swap / 80-pin SCA-2 connectors / three additional hot-swap bays with Kit 33P2751 for up to nine 15K rpm disks  |  |  |  |  |  |  |  |  |  |
| Mechanical             | Tower / conversion to EIA 19" Rack (5U <sup>4</sup> ) via optional kit for support in IBM NetBAY™ Racks (13N0956)  |  |  |  |  |  |  |  |  |  |
| Slots                  | Two PCI-Express (one hot-plug), three PCI-X 64-bit (one 133MHz and two 100MHz), one 32-bit/33MHz slot  |  |  |  |  |  |  |  |  |  |
| Chipset (see below)    | <b>Intel E7520 chipset</b> / Intel E7520 Memory Controller Hub (MCH): PXH, ICH5R, Dual Broadcom ethernet, two PCI-Express x8 slots (slots 2 & 3) / PXH: Bus A, two 64-bit/100MHz PCI-X slots (slots 4 & 5), Adaptec SCSI Bus B, one 64-bit/133MHz Hot-Plug slot (slot 6) / ICH5R: one 32-bit/33MHz slot (slot 1), ATI video, EIDE, USB, SMBus, LPC bus to Super I/O / NS PC87417 Super I/O   |  |  |  |  |  |  |  |  |  |
| Ethernet controller    | <b>Dual 10/100/1000 gigabit</b> / Broadcom® BCM 5721 / on planar / PCI-X 64-bit 100MHz / full duplex / Wake on LAN® / Alert Standard Format (2.0) / IPMI (1.5)   |  |  |  |  |  |  |  |  |  |
| CD-ROM / diskette      | 48X-20X <sup>6</sup> CD-ROM / IDE / 1.6" HH; <i>Diskette</i> : 3.5" 1.44MB diskette drive / dust cover   |  |  |  |  |  |  |  |  |  |
| Rear ports             | <i>Rear</i> : two USB (Vers 2.0), keyboard, mouse, parallel, <b>two</b> serial (9-pin), graphics (DB-15), two ethernet (RJ-45), RJ-45 (sys mgmt)   |  |  |  |  |  |  |  |  |  |
| Front port / graphics  | <i>Front</i> : one USB (Vers 2.0); <i>Graphics</i> : SVGA / ATI® Radeon™ 7000M / on planar / 16MB DDR std/max / 32-bit/33MHz PCI 2.2   |  |  |  |  |  |  |  |  |  |
| Security               | Power-on password / administrator password / hinged and lockable front door to cover disk bays, power button, and reset button / unattended boot / selectable boot   |  |  |  |  |  |  |  |  |  |
| Systems mgmt           | <b>IBM Integrated system management processor (ISMP)</b> / H8S2148 / on planar / provides system and environmental monitoring such as temp, optional disks, fans, power supp / supports opt. Remote Supervisor Adapter II Slimline with 20-pin connector on planar for continuous power ( <b>std on 32y</b> ) (no ext pwr reqd)  |  |  |  |  |  |  |  |  |  |
| Diagnostics            | <b>Light Path Diagnostics™</b> panel providing LED map to failing part (under side cover) / Information LED Panel in front   |  |  |  |  |  |  |  |  |  |
| Software               | <b>ServerGuide™</b> (CD-ROM installation and configuration utilities), IBM Director, others  |  |  |  |  |  |  |  |  |  |
| Keyboard / mouse       | IBM 101-key keyboard / IBM mouse (both black)  |  |  |  |  |  |  |  |  |  |
| Power supply           | std/max: one/two 670 watt / voltage-sensing / auto-restart /   |  |  |  |  |  |  |  |  |  |
| Fans                   | Fan in each std/max: four/six/ two fans (front), two fans on planar, (Opt) two fans (rear) / variable speed / hot-swap / redundant with optional rear fans / PFA / fan in each power supply  |  |  |  |  |  |  |  |  |  |

|   |   |  |
|---|---|--|
| <p>Slot 1: half-length, 32-bit 33MHz 5v PCI 2.2, Bus A<br/>Slot 2: full, PCI-Express x4, Bus B<br/>Slot 3: full, PCI-Express x4, Bus C<br/>Slot 4: full, 64-bit 100MHz 3.3v PCI-X, Bus D<br/>Slot 5: full, 64-bit 100MHz 3.3v PCI-X, Bus D<br/>Slot 6: full, 64-bit 133MHz 3.3v PCI-X, hot-swap, Bus E</p> <p>Bay ① 3.5", SL 1", access, diskette<br/>Bay ② 3.5", SL 1", access, hot-swap<br/>Bay ③ 3.5", SL 1", access, hot-swap<br/>Bay ④ 3.5", SL 1", access, hot-swap<br/>Bay ⑤ 3.5", SL 1", access, hot-swap<br/>Bay ⑥ 3.5", SL 1", access, hot-swap<br/>Bay ⑦ 3.5", SL 1", access, hot-swap<br/>Bay ⑧ 5.25", HH 1.6" access, open**<br/>Bay ⑨ 5.25", HH 1.6" access, open**<br/>Bay ⑩ 5.25", HH 1.6" access, CD-ROM</p> <p>Bays 2 through 7 support 6 SL disks via SCA-2 connectors.<br/>**Bays 8 and 9 support three 3.5" disks via 3-Pack Kit 33P2751</p> <p><b>Tower</b></p> | <ul style="list-style-type: none"> <li>➤ Quick release adapter slots (no screws)</li> <li>➤ Configuration/Setup Utility invoked by pressing F1 at startup</li> <li>➤ Adaptec Configuration Utility near startup by pressing CTRL+I</li> <li>➤ Diagnostics (PC-Doctor™) by pressing F2 at startup</li> <li>➤ ACPI 2.0-compliant</li> <li>➤ Operator Information Panel (in front)</li> <li>➤ 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</li> <li>➤ Tower: H 17.31" x W 8.5" x D 27.6"</li> <li>➤ 74 to 101 pounds</li> <li>➤ Stealth black color</li> </ul> <p>All models: Max int disk capacity: 1.8TB<sup>2</sup> with six 300GB Ultra160 or Ultra320 SCSI hot-swap slimline HDDs</p> | <p><b>LIMITED WARRANTY<sup>3</sup></b></p> <ul style="list-style-type: none"> <li>➤ 3 year parts and labor</li> <li>➤ International Warranty Service<sup>3</sup></li> <li>➤ On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time<sup>7</sup></li> <li>➤ 3 year on site warranty service upgrade options (in eligible locations):<sup>7</sup> <ul style="list-style-type: none"> <li>• 9 hour coverage, Mon-Fri excluding holidays, 4 hour average response (ServicePac® part num 21P2083)</li> <li>• 24 hr x 7 day coverage, 4 hour average response (ServicePac part number 21P2084)</li> <li>• 24 hr x 7 day coverage, 2 hour average response (ServicePac part number 21P2085)</li> </ul> </li> <li>➤ 24x7<sup>14</sup> toll-free support for warranty issues during the warranty period<sup>3</sup></li> </ul> |
|---|---|--|

See footnotes for important warranty information

• = Hot-swap

| IBM® Type-model | Qty x Processor  | L2 cache | Memory | Disk | SCSI controller | Mechanical | Slots x bays (hot-swap bays) | Power supply      | Ethernet  | Available date |
|-----------------|------------------|----------|--------|------|-----------------|------------|------------------------------|-------------------|-----------|----------------|
| 8841-0RU-0Rx    | 1 x Xeon® 2.8GHz | 2MB      | 1GB    | None | 2 x Ultra320    | Tower      | 6x10 (6 hot-swap std; 9 max) | 1 x 670W hot-swap | 2xGigabit | Apr 2006       |
| 8841-1RU-1Rx    | 1 x Xeon 3.0GHz  | 2MB      | 1GB    | None | 2 x Ultra320    | Tower      | 6x10 (6 hot-swap std; 9 max) | 1 x 670W hot-swap | 2xGigabit | Apr 2006       |
| 8841-1SU-1Sx    | 1 x Xeon 3.0GHz  | 2MB      | 1GB    | None | 2 x Ultra320    | Tower      | 6x10 (6 hot-swap std; 9 max) | 1 x 670W hot-swap | 2xGigabit | Apr 2006       |
| 8841-2RU-2Rx    | 1 x Xeon 3.2GHz  | 2MB      | 1GB    | None | 2 x Ultra320    | Tower      | 6x10 (6 hot-swap std; 9 max) | 1 x 670W hot-swap | 2xGigabit | Apr 2006       |
| 8841-3RU-3Rx    | 1 x Xeon 3.4GHz  | 2MB      | 1GB    | None | 2 x Ultra320    | Tower      | 6x10 (6 hot-swap std; 9 max) | 1 x 670W hot-swap | 2xGigabit | Apr 2006       |
| 8841-4RU-4Rx    | 1 x Xeon 3.6GHz  | 2MB      | 1GB    | None | 2 x Ultra320    | Tower      | 6x10 (6 hot-swap std; 9 max) | 1 x 670W hot-swap | 2xGigabit | Apr 2006       |
| 8841-5RU-5Rx    | 1 x Xeon 3.8GHz  | 2MB      | 1GB    | None | 2 x Ultra320    | Tower      | 6x10 (6 hot-swap std; 9 max) | 1 x 670W hot-swap | 2xGigabit | Apr 2006       |

**Positioning** Universal server; two-way server using the Xeon processor to provide power and performance at an affordable price  
**Processor** Up to 1 x Intel® Xeon™ Processor 2.8, 3.0, 3.2, 3.4, 3.6, 3.8 GHz with 800MHz frontside bus / **Extended Memory 64 Technology (EM64T)** / **Simultaneous Multi-threading (SMT)** / Hyper-Threading technology /  
**L2 cache** 2MB / all models / on die of processor / at processor speed  
**SMP support** 2-way SMP / up to two Xeon Processors (same speed/cache size)  
**Implementation** Systemboard contains two Intel 604-pin micro-PGA ZIF sockets, eight memory gold-connector DIMM slots, six PCI slots (one hot-swap Active™ PCI slots), and integrated SCSI, ethernet, graphics

**Memory** 1GB std / 16GB max / two slots used / six slots available / **PC2-3200** 400MHz registered 240-pin ECC **DDR2**-SDRAM DIMMs / DIMMs must be installed in matched pairs [a bank] / 2-way memory interleave / dual channel / memory bus runs at 2x200MHz / **Error Checking and Correcting (ECC)** (corrects 1, 2, 3, or 4-bit errors on same chip and detects 2- through 8-bit errors contained in two chips) / **Active Memory™: memory mirroring, online-spare memory**

**SCSI disk controller** **Adaptec AIC 7902 / dual channel Ultra320 SCSI controller** (LVD 320MB/sec) / on planar / 64-bit 100MHz PCI-X / **HostRAID** supports **RAID-0, 1 mirroring** with up to one hot-spare disk / optional IBM ServeRAID™-7k Controller for low-cost RAID 0, 1, 1E, 1E0, 5, 00, 10, 50 (installed on internal connector)

**SCSI channels** Two 16-bit channels / *SCSI Channel B:* 16-bit 68-pin LVD cable from controller to backplane; *Channel A:* 16-bit 68-pin interface for Bay 8 and 9 (may require a cable) or with optional 3-Pack Kit (cable included); supports external SCSI devices via external SCSI knockout in rear (cable req 24P7973) or via opt ServeRAID adapter with external connector(s)

**IDE controller / cable** Enhanced IDE ATA-100 controller in ICH5R South Bridge / one connector on planar / one 1-drop IDE cable (CD-ROM)

**Disk - capacity** None std / supports 7200-15000 rpm disks / one backplane / all disk bays Ultra320-enabled

**Disk - bays** Six hot-swap / 80-pin SCA-2 connectors / three additional hot-swap bays with Kit 33P2751 for up to nine 15K rpm disks

**Mechanical** Tower / conversion to EIA 19" Rack (5U<sup>4</sup>) via optional kit for support in IBM NetBAY™ Racks (13N0956)

**Slots** Two PCI-Express (one hot-plug), three PCI-X 64-bit (one 133MHz and two 100MHz), one 32-bit/33MHz slot

**Chipset (see below)** **Intel E7520 chipset** / Intel E7520 Memory Controller Hub (MCH): PXH, ICH5R, Dual Broadcom ethernet, two PCI-Express x8 slots (slots 2 & 3) / PXH: Bus A, two 64-bit/100MHz PCI-X slots (slots 4 & 5), Adaptec SCSI Bus B, one 64-bit/133MHz Hot-Plug slot (slot 6) / ICH5R: one 32-bit/33MHz slot (slot 1), ATI video, EIDE, USB, SMBus, LPC bus to Super I/O / NS PC87417 Super I/O

**Ethernet controller** **Dual 10/100/1000 gigabit** / Broadcom® BCM 5721 / on planar / PCI-X 64-bit 100MHz / full duplex / Wake on LAN® / Alert Standard Format (2.0) / IPMI (1.5)

**CD-ROM / diskette** 48X-20X® CD-ROM / IDE / 1.6" HH; *Diskette:* 3.5" 1.44MB diskette drive / dust cover

**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: one USB (Vers 2.0); *Graphics:* SVGA / ATI® Radeon™ 7000M / on planar / 16MB DDR std/max / 32-bit/33MHz PCI 2.2

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

|   |         |
|---|---------|
| Xeon 2.8GHz/2MB L2 Cache Proc Upg             | 40K2503 |
| Xeon 3.0GHz/2MB L2 Cache Proc Upg             | 40K2504 |
| Xeon 3.2GHz/2MB L2 Cache Proc Upg             | 40K2505 |
| Xeon 3.4GHz/2MB L2 Cache Proc Upg             | 40K2506 |
| Xeon 3.6GHz/2MB L2 Cache Proc Upg             | 40K2507 |
| Xeon 3.8GHz/2MB L2 Cache Proc Upg             | 40K2508 |
| 512MB (2x256) PC2-3200 CL3 ECC DDR2 non-Chipk | 73P3523 |
| 1GB (2x512) PC2-3200 CL3 ECC DDR2 non-Chipk   | 39M5818 |
| 1GB (2x512) PC2-3200 CL3 ECC DDR2 RDIMM       | 39M5821 |
| 2GB (2x1GB) PC2-3200 CL3 ECC DDR2 RDIMM       | 39M5809 |
| 73.4GB 10K Ultra320 SCSI Hot-Swap SSL HDD     | 40K1023 |
| 146.4GB 10K Ultra320 SCSI Hot-Swap SSL HDD    | 40K1024 |
| 73.4GB 15K Ultra320 SCSI Hot-Swap SSL HDD     | 30R5097 |
| IBM ServeRAID-7k Controller                   | 71K8642 |
| IBM Remote Supervisor Adapter II Slimline     | 73P9341 |
| 3-Pack Ultra320 Hot-Swap Expansion Kit        | 33P2751 |
| IBM 670W Hot-Swap Power Upgrade Kit (NA)      | 25K9560 |

Other options at [www.ibm.com/pc/us/accessories](http://www.ibm.com/pc/us/accessories)

**Systems mgmt** **IBM Integrated system management processor (ISMP)** / H8S2148 / on planar / provides system and environmental monitoring such as temp, optional disks, fans, power supp / supports opt. Remote Supervisor Adapter II Slimline with 20-pin connector on planar for continuous power (std on 32y) (no ext pwr reqd)

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

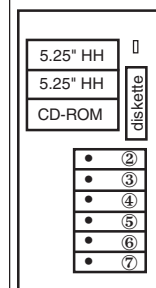
**Software** **ServerGuide™** (CD-ROM installation and configuration utilities), IBM Director, others

**Keyboard / mouse** IBM 101-key keyboard / IBM mouse (both black)

**Power supply** std/max: one/two 670 watt / voltage-sensing / auto-restart /

**Fans** Fan in each std/max: four/six/ two fans (front), two fans on planar, (Opt) two fans (rear) / variable speed / hot-swap / redundant with optional rear fans / PFA / fan in each power supply

- Slot 1: half-length, 32-bit 33MHz 5v PCI 2.2, Bus A
- Slot 2: full, PCI-Express x4, Bus B
- Slot 3: full, PCI-Express x4, Bus C
- Slot 4: full, 64-bit 100MHz 3.3v PCI-X, Bus D
- Slot 5: full, 64-bit 100MHz 3.3v PCI-X, Bus D
- Slot 6: full, 64-bit 133MHz 3.3v PCI-X, hot-swap, Bus E



- Bay ① 3.5", SL 1", access, diskette
- Bay ② 3.5", SL 1", access, hot-swap
- Bay ③ 3.5", SL 1", access, hot-swap
- Bay ④ 3.5", SL 1", access, hot-swap
- Bay ⑤ 3.5", SL 1", access, hot-swap
- Bay ⑥ 3.5", SL 1", access, hot-swap
- Bay ⑦ 3.5", SL 1", access, hot-swap
- Bay ⑧ 5.25", HH 1.6" access, open\*\*
- Bay ⑨ 5.25", HH 1.6" access, open\*\*
- Bay ⑩ 5.25", HH 1.6" access, CD-ROM

Bays 2 through 7 support 6 SL disks via SCA-2 connectors.

\*\*Bays 8 and 9 support three 3.5" disks via 3-Pack Kit 33P2751

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

All models: Max int disk capacity: 1.8TB<sup>2</sup> with six 300GB Ultra160 or Ultra320 SCSI hot-swap slimline HDDs

**LIMITED WARRANTY<sup>3</sup>**

- 3 year parts and labor
- International Warranty Service<sup>3</sup>
- On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time<sup>7</sup>
- 3 year on site warranty service upgrade options (in eligible locations):<sup>7</sup>
  - 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)
- 24x7<sup>14</sup> toll-free support for warranty issues during the warranty period<sup>3</sup>

| IBM® Type-model | Qty x Processor      | L2 cache | Memory       | DIMM slots | Memory Cards | Disks | SCSI controller | Mechanical | Slots x bays | Hot-swap pwr supplies | Warranty (yrs.) | Available date |
|-----------------|----------------------|----------|--------------|------------|--------------|-------|-----------------|------------|--------------|-----------------------|-----------------|----------------|
| 8865-11Y        | 1 x Xeon™ MP 3.16GHz | 1MB      | 2GB(2x1GB)   | 4          | One          | None  | SAS             | Tower      | 6x12         | 2 x775W               | 3               | Sep 2005       |
| 8865-12Y        | 1 x Xeon™ MP 3.16GHz | 1MB      | 1GB(2x512MB) | 4          | One          | None  | SAS             | Tower      | 6x12         | 2 x775W               | 3               | Sep 2005       |
| 8865-1RY        | 1 x Xeon™ MP 3.16GHz | 1MB      | 2GB(2x1GB)   | 4          | One          | None  | SAS             | 7U Rack    | 6x12         | 2 x775W               | 3               | Sep 2005       |
| 8865-1SY        | 1 x Xeon™ MP 3.16GHz | 1MB      | 1GB(2x512MB) | 4          | One          | None  | SAS             | 7U Rack    | 6x12         | 2 x775W               | 3               | Sep 2005       |
| 8865-21Y        | 1 x Xeon™ MP 3.66GHz | 1MB      | 2GB(2x1GB)   | 4          | One          | None  | SAS             | Tower      | 6x12         | 2 x775W               | 3               | Sep 2005       |
| 8865-2RY        | 1 x Xeon™ MP 3.66GHz | 1MB      | 2GB(2x1GB)   | 4          | One          | None  | SAS             | 7U Rack    | 6x12         | 2 x775W               | 3               | Sep 2005       |
| 8865-E1Y        | 2 x Xeon™ MP 3.66GHz | 1MB      | 4GB(4x1GB)   | 8          | Two          | None  | SAS             | Tower      | 6x12         | 2 x775W               | 3               | Sep 2005       |
| 8865-E2Y        | 1 x Xeon™ MP 3.16GHz | 1MB      | 1GB(2x512MB) | 8          | Two          | None  | SAS             | 7U Rack    | 6x12         | 2 x775W               | 3               | Sep 2005       |

|                                       |   |                                       |         |                                     |         |                                    |         |                                      |         |                                    |         |                                     |         |                                     |         |                                     |         |                                       |         |                                       |         |                                       |         |                            |         |                                     |         |                                      |         |                                   |         |                                     |         |
|---------------------------------------|---|---------------------------------------|---------|-------------------------------------|---------|------------------------------------|---------|--------------------------------------|---------|------------------------------------|---------|-------------------------------------|---------|-------------------------------------|---------|-------------------------------------|---------|---------------------------------------|---------|---------------------------------------|---------|---------------------------------------|---------|----------------------------|---------|-------------------------------------|---------|--------------------------------------|---------|-----------------------------------|---------|-------------------------------------|---------|
| Processors                            | <b>One or two 64-bit Intel® Xeon™ Processor MP 3.16 or 3.66GHz<sup>2</sup></b> with 667MHz frontside bus std / <b>NetBurst™ / Extended Memory 64 Technology™ (EM64T)</b> / Hyper-Threading technology   |                                       |         |                                     |         |                                    |         |                                      |         |                                    |         |                                     |         |                                     |         |                                     |         |                                       |         |                                       |         |                                       |         |                            |         |                                     |         |                                      |         |                                   |         |                                     |         |
| L2 cache                              | <b>1MB</b> / on die of processor / at processor speed / <b>Xcel4™</b> Dynamic Server Cache  |                                       |         |                                     |         |                                    |         |                                      |         |                                    |         |                                     |         |                                     |         |                                     |         |                                       |         |                                       |         |                                       |         |                            |         |                                     |         |                                      |         |                                   |         |                                     |         |
| Processor upgrade Implementation      | <b>4-way SMP</b> / up to four Xeon Processors MP (same speed/cache size)<br>System board contains four Intel 604-pin micro-PGA4 ZIF sockets, one memory board slot, six Active™ PCI-X 2.0 slots, integrated Serial Attach SCSI (SAS), ethernet, and graphics  |                                       |         |                                     |         |                                    |         |                                      |         |                                    |         |                                     |         |                                     |         |                                     |         |                                       |         |                                       |         |                                       |         |                            |         |                                     |         |                                      |         |                                   |         |                                     |         |
| Active Memory™                        | Up to <b>4GB</b> std / 64GB max <sup>12,13</sup> (with 4GB DIMMs) using high-capacity memory card / one memory board standard with 4 DIMM gold-connector slots / DIMMs must be installed in matched pairs / PC2-3200 400MHz registered 240-pin DDR2-SDRAM RDIMMs / <b>Error Checking and Correcting (ECC)</b> via <b>16-bit Checksum Chipkill™ / Memory ProteXion™</b> (redundant bit steering) and <b>Memory Mirroring™</b> and Hot-swap (non-OS specific) / Hot-add (supported only with Microsoft® Windows™ Server 2003™)  |                                       |         |                                     |         |                                    |         |                                      |         |                                    |         |                                     |         |                                     |         |                                     |         |                                       |         |                                       |         |                                       |         |                            |         |                                     |         |                                      |         |                                   |         |                                     |         |
| SAS disk controller                   | <b>ALL:</b> Adaptec® AIC-9410 / <b>Dual-channel Serial Attached SCSI (SAS)</b> 3.0GHz (3GB/sec) / 64-bit 266MHz PCI-X 2.0   |                                       |         |                                     |         |                                    |         |                                      |         |                                    |         |                                     |         |                                     |         |                                     |         |                                       |         |                                       |         |                                       |         |                            |         |                                     |         |                                      |         |                                   |         |                                     |         |
| SAS connectors                        | Dual channel Controller wired to dual SAS backplanes  |                                       |         |                                     |         |                                    |         |                                      |         |                                    |         |                                     |         |                                     |         |                                     |         |                                       |         |                                       |         |                                       |         |                            |         |                                     |         |                                      |         |                                   |         |                                     |         |
| SAS cabling                           | Hot-swap bays connect to integrated SAS controller through SAS expander, 1 cable for each of the 2 SAS backplanes   |                                       |         |                                     |         |                                    |         |                                      |         |                                    |         |                                     |         |                                     |         |                                     |         |                                       |         |                                       |         |                                       |         |                            |         |                                     |         |                                      |         |                                   |         |                                     |         |
| IDE controller / cabling              | Enhanced IDE ATA-33 controller in CSB6 South Bridge   |                                       |         |                                     |         |                                    |         |                                      |         |                                    |         |                                     |         |                                     |         |                                     |         |                                       |         |                                       |         |                                       |         |                            |         |                                     |         |                                      |         |                                   |         |                                     |         |
| Disk - capacity                       | Max: 3.6TB-10k / supports up to 15,000 rpm disks  |                                       |         |                                     |         |                                    |         |                                      |         |                                    |         |                                     |         |                                     |         |                                     |         |                                       |         |                                       |         |                                       |         |                            |         |                                     |         |                                      |         |                                   |         |                                     |         |
| Disk - bays                           | <b>Up to Twelve</b> 3.5" hot-swap bays / Six standard converged tray / 80-pin SCA-2 connectors / One FH (or 2 HH) Tape Drive Bays   |                                       |         |                                     |         |                                    |         |                                      |         |                                    |         |                                     |         |                                     |         |                                     |         |                                       |         |                                       |         |                                       |         |                            |         |                                     |         |                                      |         |                                   |         |                                     |         |
| Mechanical                            | <b>EIA 19" rack models (7U<sup>4</sup>)</b> x 28" deep / supported in NetBAY™ Racks (such as NetBAY42 SR, NetBAY42 ER)  |                                       |         |                                     |         |                                    |         |                                      |         |                                    |         |                                     |         |                                     |         |                                     |         |                                       |         |                                       |         |                                       |         |                            |         |                                     |         |                                      |         |                                   |         |                                     |         |
| Chipset                               | <b>IBM XA-64e™ 3rd Generation chipset</b> / IBM Integrated Processor/Memory Controller (improved performance from earlier models) / 2 IBM PCI-X 2.0 Host Bridges / 1 supports adapter PCI 33MHz and 66MHz, slot for optional ServerRAID 8i (inc. graphics), ServerWorks® CSB6 South Bridge (IDE, USB, bus for Super I/O NS 87417 [diskette, keyboard, mouse]), Dual Port Broadcom 5704, and 2 PCI-X 2.0 slots / Host Bridge supports 4 PCI-X 2.0 slots  |                                       |         |                                     |         |                                    |         |                                      |         |                                    |         |                                     |         |                                     |         |                                     |         |                                       |         |                                       |         |                                       |         |                            |         |                                     |         |                                      |         |                                   |         |                                     |         |
| I/O Slots                             | Six total Active™ PCI-X 2.0 64-bit 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, all slots supported up to 266MHz   |                                       |         |                                     |         |                                    |         |                                      |         |                                    |         |                                     |         |                                     |         |                                     |         |                                       |         |                                       |         |                                       |         |                            |         |                                     |         |                                      |         |                                   |         |                                     |         |
| CD-ROM / diskette                     | IBM 24X Max SlimLine CD-ROM, IDE (ATAPI), 1.6" HH, bootable / 3.5" 1.44 MB diskette drive   |                                       |         |                                     |         |                                    |         |                                      |         |                                    |         |                                     |         |                                     |         |                                     |         |                                       |         |                                       |         |                                       |         |                            |         |                                     |         |                                      |         |                                   |         |                                     |         |
| Ethernet                              | Broadcom® 5704 10/100/1000 dual ethernet / on systemboard / 64-bit 266Mhz PCI-X 2.0 / Wake on LAN® / Alert on LAN™ 2  |                                       |         |                                     |         |                                    |         |                                      |         |                                    |         |                                     |         |                                     |         |                                     |         |                                       |         |                                       |         |                                       |         |                            |         |                                     |         |                                      |         |                                   |         |                                     |         |
| Graphics controller                   | SVGA / ATI® Radeon Mobility 7000 / on planar / 16MB SDRAM std/max / 32-bit 33MHz PCI 2.2 bus  |                                       |         |                                     |         |                                    |         |                                      |         |                                    |         |                                     |         |                                     |         |                                     |         |                                       |         |                                       |         |                                       |         |                            |         |                                     |         |                                      |         |                                   |         |                                     |         |
| Ports                                 | Rear: RSA ethernet, RSA serial, two USB (Ver 2.0), keyboard, mouse, analog DB-15 graphics, two ethernet, std. serial, RS-485 / Front: USB (Ver 2.0)   |                                       |         |                                     |         |                                    |         |                                      |         |                                    |         |                                     |         |                                     |         |                                     |         |                                       |         |                                       |         |                                       |         |                            |         |                                     |         |                                      |         |                                   |         |                                     |         |
| Security                              | Power-on and administrator passwords / unattended boot / selectable boot  |                                       |         |                                     |         |                                    |         |                                      |         |                                    |         |                                     |         |                                     |         |                                     |         |                                       |         |                                       |         |                                       |         |                            |         |                                     |         |                                      |         |                                   |         |                                     |         |
| Systems management                    | BMC standard / <b>Remote Supervisor Adapter II</b> slimline (optional) / PCI adapter / includes 10/100 ethernet, RJ-11, and serial connectors / provides remote console and mgmt / power on/off system / monitors power status, op system, temperature, disks, fans, power supplies   |                                       |         |                                     |         |                                    |         |                                      |         |                                    |         |                                     |         |                                     |         |                                     |         |                                       |         |                                       |         |                                       |         |                            |         |                                     |         |                                      |         |                                   |         |                                     |         |
| Diagnostics                           | <b>Drop-down Light Path Diagnostics</b> / 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                              | <b>ServerGuide™</b> (CD-ROM installation and configuration utilities), IBM Director, and others   |                                       |         |                                     |         |                                    |         |                                      |         |                                    |         |                                     |         |                                     |         |                                     |         |                                       |         |                                       |         |                                       |         |                            |         |                                     |         |                                      |         |                                   |         |                                     |         |
| Keyboard / mouse                      | Rack model: none standard / Tower model: IBM 104-key keyboard (PS/2) / IBM 3-button optical mouse (PS/2)  |                                       |         |                                     |         |                                    |         |                                      |         |                                    |         |                                     |         |                                     |         |                                     |         |                                       |         |                                       |         |                                       |         |                            |         |                                     |         |                                      |         |                                   |         |                                     |         |
| Power supplies                        | Std: two 775 watt hot-swap / redundant with three power supplies (N+1) / worldwide / voltage-sensing / auto-restart / rear accessible fans in each power supply / PFA   |                                       |         |                                     |         |                                    |         |                                      |         |                                    |         |                                     |         |                                     |         |                                     |         |                                       |         |                                       |         |                                       |         |                            |         |                                     |         |                                      |         |                                   |         |                                     |         |
| Cooling fans                          | Eight hot-swap, redundant, multi-speed fans / One cooling fan in each power supply filler when power supply is not installed / PFA / failure signals Diagnostic LED and mgmt processor  |                                       |         |                                     |         |                                    |         |                                      |         |                                    |         |                                     |         |                                     |         |                                     |         |                                       |         |                                       |         |                                       |         |                            |         |                                     |         |                                      |         |                                   |         |                                     |         |
| Options                               | <table border="0"> <tr> <td>1GB PC2-3200 CL3 ECC RDIMM (2x512MB)</td> <td>73P2865</td> <td>IBM ServeRAID 6M U320 256MB Adapter</td> <td>02R0988</td> </tr> <tr> <td>2GB PC2-3200 CL3 ECC RDIMM (2x1GB)</td> <td>73P2866</td> <td>IBM 73.4GB 10K 3.5" SAS Hot-swap HDD</td> <td>26K5709</td> </tr> <tr> <td>4GB PC2-3200 CL3 ECC RDIMM (2x2GB)</td> <td>73P2867</td> <td>IBM 146GB 10K 3.5" SAS Hot-Swap HDD</td> <td>26K5710</td> </tr> <tr> <td>Active Memory 4-slot Expansion Card</td> <td>13M7409</td> <td>IBM 300GB 10K 3.5" SAS Hot-Swap HDD</td> <td>26K5711</td> </tr> <tr> <td>Xeon MP 3.16GHz/1MB L2 Cache Proc Upg</td> <td>13N0694</td> <td>Remote Supervisor Adapter II Slimline</td> <td>59P2984</td> </tr> <tr> <td>Xeon MP 3.66GHz/1MB L2 Cache Proc Upg</td> <td>13N0695</td> <td>SAS 3.5" 6-drive Backplane</td> <td>13M7864</td> </tr> <tr> <td>775 watt Hot-Swap Power Supply (WW)</td> <td>13M7415</td> <td>IBM 73.4GB 15K 3.5" SAS Hot-swap HDD</td> <td>26K5698</td> </tr> <tr> <td>IBM ServeRAID™-8i SA-SCSI Adapter</td> <td>13N2227</td> <td>IBM 146GB 15K 3.5" SAS Hot-Swap HDD</td> <td>26K5699</td> </tr> </table> | 1GB PC2-3200 CL3 ECC RDIMM (2x512MB)  | 73P2865 | IBM ServeRAID 6M U320 256MB Adapter | 02R0988 | 2GB PC2-3200 CL3 ECC RDIMM (2x1GB) | 73P2866 | IBM 73.4GB 10K 3.5" SAS Hot-swap HDD | 26K5709 | 4GB PC2-3200 CL3 ECC RDIMM (2x2GB) | 73P2867 | IBM 146GB 10K 3.5" SAS Hot-Swap HDD | 26K5710 | Active Memory 4-slot Expansion Card | 13M7409 | IBM 300GB 10K 3.5" SAS Hot-Swap HDD | 26K5711 | Xeon MP 3.16GHz/1MB L2 Cache Proc Upg | 13N0694 | Remote Supervisor Adapter II Slimline | 59P2984 | Xeon MP 3.66GHz/1MB L2 Cache Proc Upg | 13N0695 | SAS 3.5" 6-drive Backplane | 13M7864 | 775 watt Hot-Swap Power Supply (WW) | 13M7415 | IBM 73.4GB 15K 3.5" SAS Hot-swap HDD | 26K5698 | IBM ServeRAID™-8i SA-SCSI Adapter | 13N2227 | IBM 146GB 15K 3.5" SAS Hot-Swap HDD | 26K5699 |
| 1GB PC2-3200 CL3 ECC RDIMM (2x512MB)  | 73P2865   | IBM ServeRAID 6M U320 256MB Adapter   | 02R0988 |                                     |         |                                    |         |                                      |         |                                    |         |                                     |         |                                     |         |                                     |         |                                       |         |                                       |         |                                       |         |                            |         |                                     |         |                                      |         |                                   |         |                                     |         |
| 2GB PC2-3200 CL3 ECC RDIMM (2x1GB)    | 73P2866   | IBM 73.4GB 10K 3.5" SAS Hot-swap HDD  | 26K5709 |                                     |         |                                    |         |                                      |         |                                    |         |                                     |         |                                     |         |                                     |         |                                       |         |                                       |         |                                       |         |                            |         |                                     |         |                                      |         |                                   |         |                                     |         |
| 4GB PC2-3200 CL3 ECC RDIMM (2x2GB)    | 73P2867   | IBM 146GB 10K 3.5" SAS Hot-Swap HDD   | 26K5710 |                                     |         |                                    |         |                                      |         |                                    |         |                                     |         |                                     |         |                                     |         |                                       |         |                                       |         |                                       |         |                            |         |                                     |         |                                      |         |                                   |         |                                     |         |
| Active Memory 4-slot Expansion Card   | 13M7409   | IBM 300GB 10K 3.5" SAS Hot-Swap HDD   | 26K5711 |                                     |         |                                    |         |                                      |         |                                    |         |                                     |         |                                     |         |                                     |         |                                       |         |                                       |         |                                       |         |                            |         |                                     |         |                                      |         |                                   |         |                                     |         |
| Xeon MP 3.16GHz/1MB L2 Cache Proc Upg | 13N0694   | Remote Supervisor Adapter II Slimline | 59P2984 |                                     |         |                                    |         |                                      |         |                                    |         |                                     |         |                                     |         |                                     |         |                                       |         |                                       |         |                                       |         |                            |         |                                     |         |                                      |         |                                   |         |                                     |         |
| Xeon MP 3.66GHz/1MB L2 Cache Proc Upg | 13N0695   | SAS 3.5" 6-drive Backplane            | 13M7864 |                                     |         |                                    |         |                                      |         |                                    |         |                                     |         |                                     |         |                                     |         |                                       |         |                                       |         |                                       |         |                            |         |                                     |         |                                      |         |                                   |         |                                     |         |
| 775 watt Hot-Swap Power Supply (WW)   | 13M7415   | IBM 73.4GB 15K 3.5" SAS Hot-swap HDD  | 26K5698 |                                     |         |                                    |         |                                      |         |                                    |         |                                     |         |                                     |         |                                     |         |                                       |         |                                       |         |                                       |         |                            |         |                                     |         |                                      |         |                                   |         |                                     |         |
| IBM ServeRAID™-8i SA-SCSI Adapter     | 13N2227   | IBM 146GB 15K 3.5" SAS Hot-Swap HDD   | 26K5699 |                                     |         |                                    |         |                                      |         |                                    |         |                                     |         |                                     |         |                                     |         |                                       |         |                                       |         |                                       |         |                            |         |                                     |         |                                      |         |                                   |         |                                     |         |

|  |  |                     |            |              |            |            |        |            |            |                    |            |            |                     |   |
|--|--|---------------------|------------|--------------|------------|------------|--------|------------|------------|--------------------|------------|------------|---------------------|---|
| <p><b>LIMITED WARRANTY<sup>3</sup></b></p> <ul style="list-style-type: none"> <li>↪ 3 year parts and labor</li> <li>↪ International Warranty Service<sup>3</sup></li> <li>↪ On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time<sup>7</sup></li> <li>↪ On site service upgrade options (in eligible locations):<sup>7</sup> <ul style="list-style-type: none"> <li>• 3 year IOR 24x7, 4 hr avg response (ServicePac part num 96P2253)</li> <li>• 3 year IOR 24x7, 2 hr avg response (ServicePac part num 96P2254)</li> <li>• 4 year IOR 9x5, NBD response (ServicePac part num 96P2255)</li> <li>• 5 year IOR 9x5, NBD response (ServicePac part num 69P2259)</li> </ul> </li> <li>↪ Other ServicePac options at <a href="http://www.ibm.com/services/us/its/pdf/wamomxueu.pdf">http://www.ibm.com/services/us/its/pdf/wamomxueu.pdf</a></li> <li>↪ 24x7<sup>14</sup> toll-free support for warranty issues during the warranty period<sup>3</sup></li> </ul> | <p>Bay ① 3.5", SL 1", access, diskette<br/>                 Bay ② 5.25", HH 1.6" access, CD-ROM<br/>                 Bay ③ 5.25", HH 1.6" access, open*<br/>                 Bay ④ 5.25", HH 1.6" access, open*<br/>                 Bays 5 to 10 (six bays):<br/>                 standard 3.5" SL 1" hot-swap disk bays<br/>                 Bays 11 to 16 (six bays):<br/>                 optional 3.5" SL 1" hot-swap disk bays</p> <div style="border: 1px solid black; padding: 5px; margin: 5px 0;"> <p style="text-align: center;">Light Path Diag <b>7U<sup>4</sup> Rack or Tower</b></p> <p style="text-align: center;">Removable Processor Board Tray</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 25%;">• Opt disk</td> <td style="width: 25%;">• Opt disk</td> <td style="width: 25%;">Floppy Drive</td> </tr> <tr> <td>• Opt disk</td> <td>• Opt disk</td> <td>CD-ROM</td> </tr> <tr> <td>• Opt disk</td> <td>• Opt disk</td> <td>Full High Tape Bay</td> </tr> <tr> <td>• Opt disk</td> <td>• Opt disk</td> <td>or 2 Half High Bays</td> </tr> </table> </div> <ul style="list-style-type: none"> <li>↪ Stealth black color</li> <li>↪ Tool-free serviceability</li> <li>↪ Tower Dimensions: H15.5" x W18.2" x D30"(762mm)</li> <li>↪ Tower Weight: 149 to 180lbs; 67.6 to 81.7Kg</li> <li>↪ Rack Dimensions: H12" x W17.5" x D28.2"</li> <li>↪ Rack Dimensions: H306mm x W444mm x D715mm</li> <li>↪ Rack Weight: 144 to 158lbs; 65.4 to 71.7Kg</li> <li>↪ Access adapters, fans, and memory from top</li> <li>↪ Access processors and systemboard from front</li> <li>↪ Access power supplies from back</li> <li>↪ Setup Program by pressing F1 at startup</li> <li>↪ Diagnostics (PC-Doctor) by pressing F2 at startup</li> <li>↪ SCSISelect by pressing Ctrl+A at startup</li> <li>↪ Drop Down Light Path Diagnostics (level 2 diagnostic panel) for outside view of potential problem without removing cover</li> <li>↪ Predictive Failure Analysis® alerts on disks, power supplies, memory, processors, VRMs, and fans with IBM Director</li> </ul> | • Opt disk          | • Opt disk | Floppy Drive | • Opt disk | • Opt disk | CD-ROM | • Opt disk | • Opt disk | Full High Tape Bay | • Opt disk | • Opt disk | or 2 Half High Bays | <p>BTU Output:<br/>                 Ship Config: 2,006 Btu/hr (588 watts)<br/>                 Full Config: 6,346 Btu/hr (1860 watts)</p> |
| • Opt disk   | • Opt disk   | Floppy Drive        |            |              |            |            |        |            |            |                    |            |            |                     |   |
| • Opt disk   | • Opt disk   | CD-ROM              |            |              |            |            |        |            |            |                    |            |            |                     |   |
| • Opt disk   | • Opt disk   | Full High Tape Bay  |            |              |            |            |        |            |            |                    |            |            |                     |   |
| • Opt disk   | • Opt disk   | or 2 Half High Bays |            |              |            |            |        |            |            |                    |            |            |                     |   |
| <p><b>All models:</b> Maximum internal disk capacity: 3.6TB with 12x 300GB<sup>2</sup> hot-swap SAS disks</p>  |  |                     |            |              |            |            |        |            |            |                    |            |            |                     |   |



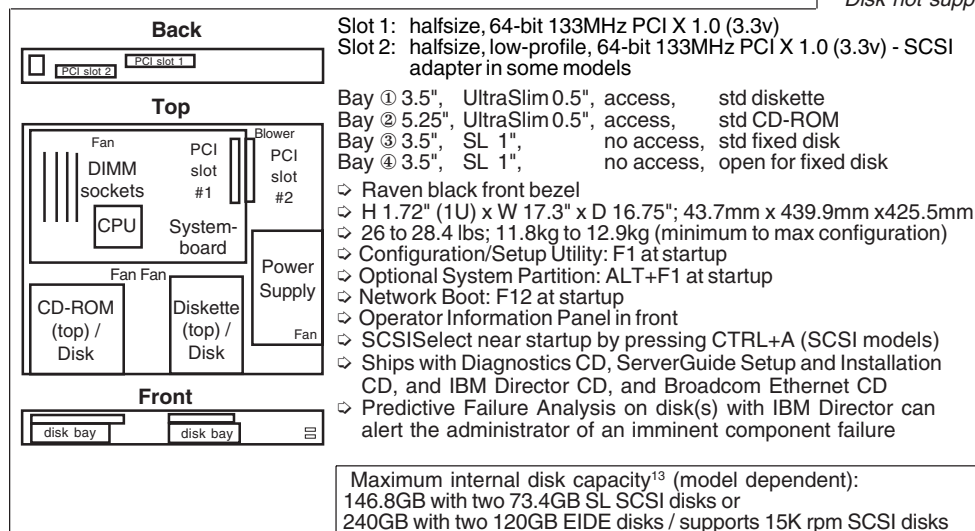
| IBM® Type-model | Qty x Processor      | L2 cache | Memory       | DIMM slots | Memory Cards | Disks | SCSI controller | Mechanical | Slots x bays | Hot-swap pwr supplies | Warranty (yrs.) | Available date |
|-----------------|----------------------|----------|--------------|------------|--------------|-------|-----------------|------------|--------------|-----------------------|-----------------|----------------|
| 8865-11Y        | 1 x Xeon™ MP 3.16GHz | 1MB      | 2GB(2x1GB)   | 4          | One          | None  | SAS             | Tower      | 6x12         | 2 x775W               | 3               | Sep 2005       |
| 8865-12Y        | 1 x Xeon™ MP 3.16GHz | 1MB      | 1GB(2x512MB) | 4          | One          | None  | SAS             | Tower      | 6x12         | 2 x775W               | 3               | Sep 2005       |
| 8865-1RY        | 1 x Xeon™ MP 3.16GHz | 1MB      | 2GB(2x1GB)   | 4          | One          | None  | SAS             | 7U Rack    | 6x12         | 2 x775W               | 3               | Sep 2005       |
| 8865-1SY        | 1 x Xeon™ MP 3.16GHz | 1MB      | 1GB(2x512MB) | 4          | One          | None  | SAS             | 7U Rack    | 6x12         | 2 x775W               | 3               | Sep 2005       |
| 8865-21Y        | 1 x Xeon™ MP 3.66GHz | 1MB      | 2GB(2x1GB)   | 4          | One          | None  | SAS             | Tower      | 6x12         | 2 x775W               | 3               | Sep 2005       |
| 8865-2RY        | 1 x Xeon™ MP 3.66GHz | 1MB      | 2GB(2x1GB)   | 4          | One          | None  | SAS             | 7U Rack    | 6x12         | 2 x775W               | 3               | Sep 2005       |
| 8865-E1Y        | 2 x Xeon™ MP 3.66GHz | 1MB      | 4GB(4x1GB)   | 8          | Two          | None  | SAS             | Tower      | 6x12         | 2 x775W               | 3               | Sep 2005       |
| 8865-E2Y        | 1 x Xeon™ MP 3.16GHz | 1MB      | 1GB(2x512MB) | 8          | Two          | None  | SAS             | 7U Rack    | 6x12         | 2 x775W               | 3               | Sep 2005       |

|                                       |   |                                       |         |                                     |         |                                    |         |                                      |         |                                    |         |                                     |         |                                     |         |                                     |         |                                       |         |                                       |         |                                       |         |                            |         |                                     |         |                                      |         |                                   |         |                                     |         |
|---------------------------------------|---|---------------------------------------|---------|-------------------------------------|---------|------------------------------------|---------|--------------------------------------|---------|------------------------------------|---------|-------------------------------------|---------|-------------------------------------|---------|-------------------------------------|---------|---------------------------------------|---------|---------------------------------------|---------|---------------------------------------|---------|----------------------------|---------|-------------------------------------|---------|--------------------------------------|---------|-----------------------------------|---------|-------------------------------------|---------|
| Processors                            | <b>One or two 64-bit Intel® Xeon™ Processor MP 3.16 or 3.66GHz<sup>2</sup></b> with 667MHz frontside bus std / <b>NetBurst™ / Extended Memory 64 Technology™ (EM64T)</b> / Hyper-Threading technology   |                                       |         |                                     |         |                                    |         |                                      |         |                                    |         |                                     |         |                                     |         |                                     |         |                                       |         |                                       |         |                                       |         |                            |         |                                     |         |                                      |         |                                   |         |                                     |         |
| L2 cache                              | <b>1MB</b> / on die of processor / at processor speed / <b>Xcel4™</b> Dynamic Server Cache  |                                       |         |                                     |         |                                    |         |                                      |         |                                    |         |                                     |         |                                     |         |                                     |         |                                       |         |                                       |         |                                       |         |                            |         |                                     |         |                                      |         |                                   |         |                                     |         |
| Processor upgrade Implementation      | <b>4-way SMP</b> / up to four Xeon Processors MP (same speed/cache size)<br>System board contains four Intel 604-pin micro-PGA4 ZIF sockets, one memory board slot, six Active™ PCI-X 2.0 slots, integrated Serial Attach SCSI (SAS), ethernet, and graphics  |                                       |         |                                     |         |                                    |         |                                      |         |                                    |         |                                     |         |                                     |         |                                     |         |                                       |         |                                       |         |                                       |         |                            |         |                                     |         |                                      |         |                                   |         |                                     |         |
| Active Memory™                        | Up to <b>4GB</b> std / 64GB max <sup>12,13</sup> (with 4GB DIMMs) using high-capacity memory card / one memory board standard with 4 DIMM gold-connector slots / DIMMs must be installed in matched pairs / PC2-3200 400MHz registered 240-pin DDR2-SDRAM RDIMMs / <b>Error Checking and Correcting (ECC)</b> via <b>16-bit Checksum Chipkill™ / Memory ProteXion™</b> (redundant bit steering) and <b>Memory Mirroring™</b> and Hot-swap (non-OS specific) / Hot-add (supported only with Microsoft® Windows™ Server 2003™)  |                                       |         |                                     |         |                                    |         |                                      |         |                                    |         |                                     |         |                                     |         |                                     |         |                                       |         |                                       |         |                                       |         |                            |         |                                     |         |                                      |         |                                   |         |                                     |         |
| SAS disk controller                   | <b>ALL:</b> Adaptec® AIC-9410 / <b>Dual-channel Serial Attached SCSI (SAS)</b> 3.0GHz (3GB/sec) / 64-bit 266MHz PCI-X 2.0   |                                       |         |                                     |         |                                    |         |                                      |         |                                    |         |                                     |         |                                     |         |                                     |         |                                       |         |                                       |         |                                       |         |                            |         |                                     |         |                                      |         |                                   |         |                                     |         |
| SAS connectors                        | Dual channel Controller wired to dual SAS backplanes  |                                       |         |                                     |         |                                    |         |                                      |         |                                    |         |                                     |         |                                     |         |                                     |         |                                       |         |                                       |         |                                       |         |                            |         |                                     |         |                                      |         |                                   |         |                                     |         |
| SAS cabling                           | Hot-swap bays connect to integrated SAS controller through SAS expander, 1 cable for each of the 2 SAS backplanes   |                                       |         |                                     |         |                                    |         |                                      |         |                                    |         |                                     |         |                                     |         |                                     |         |                                       |         |                                       |         |                                       |         |                            |         |                                     |         |                                      |         |                                   |         |                                     |         |
| IDE controller / cabling              | Enhanced IDE ATA-33 controller in CSB6 South Bridge   |                                       |         |                                     |         |                                    |         |                                      |         |                                    |         |                                     |         |                                     |         |                                     |         |                                       |         |                                       |         |                                       |         |                            |         |                                     |         |                                      |         |                                   |         |                                     |         |
| Disk - capacity                       | Max: 3.6TB-10k / supports up to 15,000 rpm disks  |                                       |         |                                     |         |                                    |         |                                      |         |                                    |         |                                     |         |                                     |         |                                     |         |                                       |         |                                       |         |                                       |         |                            |         |                                     |         |                                      |         |                                   |         |                                     |         |
| Disk - bays                           | <b>Up to Twelve</b> 3.5" hot-swap bays / Six standard converged tray / 80-pin SCA-2 connectors / One FH (or 2 HH) Tape Drive Bays   |                                       |         |                                     |         |                                    |         |                                      |         |                                    |         |                                     |         |                                     |         |                                     |         |                                       |         |                                       |         |                                       |         |                            |         |                                     |         |                                      |         |                                   |         |                                     |         |
| Mechanical                            | <b>EIA 19" rack models (7U<sup>4</sup>)</b> x 28" deep / supported in NetBAY™ Racks (such as NetBAY42 SR, NetBAY42 ER)  |                                       |         |                                     |         |                                    |         |                                      |         |                                    |         |                                     |         |                                     |         |                                     |         |                                       |         |                                       |         |                                       |         |                            |         |                                     |         |                                      |         |                                   |         |                                     |         |
| Chipset                               | <b>IBM XA-64e™ 3rd Generation chipset</b> / IBM Integrated Processor/Memory Controller (improved performance from earlier models) / 2 IBM PCI-X 2.0 Host Bridges / 1 supports adapter PCI 33MHz and 66MHz, slot for optional ServerRAID 8i (inc. graphics), ServerWorks® CSB6 South Bridge (IDE, USB, bus for Super I/O NS 87417 [diskette, keyboard, mouse]), Dual Port Broadcom 5704, and 2 PCI-X 2.0 slots / Host Bridge supports 4 PCI-X 2.0 slots  |                                       |         |                                     |         |                                    |         |                                      |         |                                    |         |                                     |         |                                     |         |                                     |         |                                       |         |                                       |         |                                       |         |                            |         |                                     |         |                                      |         |                                   |         |                                     |         |
| I/O Slots                             | Six total Active™ PCI-X 2.0 64-bit 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, all slots supported up to 266MHz   |                                       |         |                                     |         |                                    |         |                                      |         |                                    |         |                                     |         |                                     |         |                                     |         |                                       |         |                                       |         |                                       |         |                            |         |                                     |         |                                      |         |                                   |         |                                     |         |
| CD-ROM / diskette                     | IBM 24X Max SlimLine CD-ROM, IDE (ATAPI), 1.6" HH, bootable / 3.5" 1.44 MB diskette drive   |                                       |         |                                     |         |                                    |         |                                      |         |                                    |         |                                     |         |                                     |         |                                     |         |                                       |         |                                       |         |                                       |         |                            |         |                                     |         |                                      |         |                                   |         |                                     |         |
| Ethernet                              | Broadcom® 5704 10/100/1000 dual ethernet / on systemboard / 64-bit 266Mhz PCI-X 2.0 / Wake on LAN® / Alert on LAN™ 2  |                                       |         |                                     |         |                                    |         |                                      |         |                                    |         |                                     |         |                                     |         |                                     |         |                                       |         |                                       |         |                                       |         |                            |         |                                     |         |                                      |         |                                   |         |                                     |         |
| Graphics controller                   | SVGA / ATI® Radeon Mobility 7000 / on planar / 16MB SDRAM std/max / 32-bit 33MHz PCI 2.2 bus  |                                       |         |                                     |         |                                    |         |                                      |         |                                    |         |                                     |         |                                     |         |                                     |         |                                       |         |                                       |         |                                       |         |                            |         |                                     |         |                                      |         |                                   |         |                                     |         |
| Ports                                 | Rear: RSA ethernet, RSA serial, two USB (Ver 2.0), keyboard, mouse, analog DB-15 graphics, two ethernet, std. serial, RS-485 / Front: USB (Ver 2.0)   |                                       |         |                                     |         |                                    |         |                                      |         |                                    |         |                                     |         |                                     |         |                                     |         |                                       |         |                                       |         |                                       |         |                            |         |                                     |         |                                      |         |                                   |         |                                     |         |
| Security                              | Power-on and administrator passwords / unattended boot / selectable boot  |                                       |         |                                     |         |                                    |         |                                      |         |                                    |         |                                     |         |                                     |         |                                     |         |                                       |         |                                       |         |                                       |         |                            |         |                                     |         |                                      |         |                                   |         |                                     |         |
| Systems management                    | BMC standard / <b>Remote Supervisor Adapter II</b> slimline (optional) / PCI adapter / includes 10/100 ethernet, RJ-11, and serial connectors / provides remote console and mgmt / power on/off system / monitors power status, op system, temperature, disks, fans, power supplies   |                                       |         |                                     |         |                                    |         |                                      |         |                                    |         |                                     |         |                                     |         |                                     |         |                                       |         |                                       |         |                                       |         |                            |         |                                     |         |                                      |         |                                   |         |                                     |         |
| Diagnostics                           | <b>Drop-down Light Path Diagnostics</b> / 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                              | <b>ServerGuide™</b> (CD-ROM installation and configuration utilities), IBM Director, and others   |                                       |         |                                     |         |                                    |         |                                      |         |                                    |         |                                     |         |                                     |         |                                     |         |                                       |         |                                       |         |                                       |         |                            |         |                                     |         |                                      |         |                                   |         |                                     |         |
| Keyboard / mouse                      | None standard (because rack-based)  |                                       |         |                                     |         |                                    |         |                                      |         |                                    |         |                                     |         |                                     |         |                                     |         |                                       |         |                                       |         |                                       |         |                            |         |                                     |         |                                      |         |                                   |         |                                     |         |
| Power supplies                        | Std: two 775 watt hot-swap / redundant with three power supplies (N+1) / worldwide / voltage-sensing / auto-restart / rear accessible fans in each power supply / PFA   |                                       |         |                                     |         |                                    |         |                                      |         |                                    |         |                                     |         |                                     |         |                                     |         |                                       |         |                                       |         |                                       |         |                            |         |                                     |         |                                      |         |                                   |         |                                     |         |
| Cooling fans                          | Eight hot-swap, redundant, multi-speed fans / One cooling fan in each power supply filler when power supply is not installed / PFA / failure signals Diagnostic LED and mgmt processor  |                                       |         |                                     |         |                                    |         |                                      |         |                                    |         |                                     |         |                                     |         |                                     |         |                                       |         |                                       |         |                                       |         |                            |         |                                     |         |                                      |         |                                   |         |                                     |         |
| Options                               | <table border="0"> <tr> <td>1GB PC2-3200 CL3 ECC RDIMM (2x512MB)</td> <td>73P2865</td> <td>IBM ServeRAID 6M U320 256MB Adapter</td> <td>02R0988</td> </tr> <tr> <td>2GB PC2-3200 CL3 ECC RDIMM (2x1GB)</td> <td>73P2866</td> <td>IBM 73.4GB 10K 3.5" SAS Hot-swap HDD</td> <td>26K5709</td> </tr> <tr> <td>4GB PC2-3200 CL3 ECC RDIMM (2x2GB)</td> <td>73P2867</td> <td>IBM 146GB 10K 3.5" SAS Hot-Swap HDD</td> <td>26K5710</td> </tr> <tr> <td>Active Memory 4-slot Expansion Card</td> <td>13M7409</td> <td>IBM 300GB 10K 3.5" SAS Hot-Swap HDD</td> <td>26K5711</td> </tr> <tr> <td>Xeon MP 3.16GHz/1MB L2 Cache Proc Upg</td> <td>13N0694</td> <td>Remote Supervisor Adapter II Slimline</td> <td>59P2984</td> </tr> <tr> <td>Xeon MP 3.66GHz/1MB L2 Cache Proc Upg</td> <td>13N0695</td> <td>SAS 3.5" 6-drive Backplane</td> <td>13M7864</td> </tr> <tr> <td>775 watt Hot-Swap Power Supply (WW)</td> <td>13M7415</td> <td>IBM 73.4GB 15K 3.5" SAS Hot-swap HDD</td> <td>26K5698</td> </tr> <tr> <td>IBM ServeRAID™-8i SA-SCSI Adapter</td> <td>13N2227</td> <td>IBM 146GB 15K 3.5" SAS Hot-Swap HDD</td> <td>26K5699</td> </tr> </table> | 1GB PC2-3200 CL3 ECC RDIMM (2x512MB)  | 73P2865 | IBM ServeRAID 6M U320 256MB Adapter | 02R0988 | 2GB PC2-3200 CL3 ECC RDIMM (2x1GB) | 73P2866 | IBM 73.4GB 10K 3.5" SAS Hot-swap HDD | 26K5709 | 4GB PC2-3200 CL3 ECC RDIMM (2x2GB) | 73P2867 | IBM 146GB 10K 3.5" SAS Hot-Swap HDD | 26K5710 | Active Memory 4-slot Expansion Card | 13M7409 | IBM 300GB 10K 3.5" SAS Hot-Swap HDD | 26K5711 | Xeon MP 3.16GHz/1MB L2 Cache Proc Upg | 13N0694 | Remote Supervisor Adapter II Slimline | 59P2984 | Xeon MP 3.66GHz/1MB L2 Cache Proc Upg | 13N0695 | SAS 3.5" 6-drive Backplane | 13M7864 | 775 watt Hot-Swap Power Supply (WW) | 13M7415 | IBM 73.4GB 15K 3.5" SAS Hot-swap HDD | 26K5698 | IBM ServeRAID™-8i SA-SCSI Adapter | 13N2227 | IBM 146GB 15K 3.5" SAS Hot-Swap HDD | 26K5699 |
| 1GB PC2-3200 CL3 ECC RDIMM (2x512MB)  | 73P2865   | IBM ServeRAID 6M U320 256MB Adapter   | 02R0988 |                                     |         |                                    |         |                                      |         |                                    |         |                                     |         |                                     |         |                                     |         |                                       |         |                                       |         |                                       |         |                            |         |                                     |         |                                      |         |                                   |         |                                     |         |
| 2GB PC2-3200 CL3 ECC RDIMM (2x1GB)    | 73P2866   | IBM 73.4GB 10K 3.5" SAS Hot-swap HDD  | 26K5709 |                                     |         |                                    |         |                                      |         |                                    |         |                                     |         |                                     |         |                                     |         |                                       |         |                                       |         |                                       |         |                            |         |                                     |         |                                      |         |                                   |         |                                     |         |
| 4GB PC2-3200 CL3 ECC RDIMM (2x2GB)    | 73P2867   | IBM 146GB 10K 3.5" SAS Hot-Swap HDD   | 26K5710 |                                     |         |                                    |         |                                      |         |                                    |         |                                     |         |                                     |         |                                     |         |                                       |         |                                       |         |                                       |         |                            |         |                                     |         |                                      |         |                                   |         |                                     |         |
| Active Memory 4-slot Expansion Card   | 13M7409   | IBM 300GB 10K 3.5" SAS Hot-Swap HDD   | 26K5711 |                                     |         |                                    |         |                                      |         |                                    |         |                                     |         |                                     |         |                                     |         |                                       |         |                                       |         |                                       |         |                            |         |                                     |         |                                      |         |                                   |         |                                     |         |
| Xeon MP 3.16GHz/1MB L2 Cache Proc Upg | 13N0694   | Remote Supervisor Adapter II Slimline | 59P2984 |                                     |         |                                    |         |                                      |         |                                    |         |                                     |         |                                     |         |                                     |         |                                       |         |                                       |         |                                       |         |                            |         |                                     |         |                                      |         |                                   |         |                                     |         |
| Xeon MP 3.66GHz/1MB L2 Cache Proc Upg | 13N0695   | SAS 3.5" 6-drive Backplane            | 13M7864 |                                     |         |                                    |         |                                      |         |                                    |         |                                     |         |                                     |         |                                     |         |                                       |         |                                       |         |                                       |         |                            |         |                                     |         |                                      |         |                                   |         |                                     |         |
| 775 watt Hot-Swap Power Supply (WW)   | 13M7415   | IBM 73.4GB 15K 3.5" SAS Hot-swap HDD  | 26K5698 |                                     |         |                                    |         |                                      |         |                                    |         |                                     |         |                                     |         |                                     |         |                                       |         |                                       |         |                                       |         |                            |         |                                     |         |                                      |         |                                   |         |                                     |         |
| IBM ServeRAID™-8i SA-SCSI Adapter     | 13N2227   | IBM 146GB 15K 3.5" SAS Hot-Swap HDD   | 26K5699 |                                     |         |                                    |         |                                      |         |                                    |         |                                     |         |                                     |         |                                     |         |                                       |         |                                       |         |                                       |         |                            |         |                                     |         |                                      |         |                                   |         |                                     |         |

|  |  |  |
|--|--|--|
| <p><b>LIMITED WARRANTY<sup>3</sup></b></p> <ul style="list-style-type: none"> <li>➤ 3 year parts and labor</li> <li>➤ International Warranty Service<sup>3</sup></li> <li>➤ On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time<sup>7</sup></li> <li>➤ On site service upgrade options (in eligible locations):<sup>7</sup> <ul style="list-style-type: none"> <li>• 3 year IOR 24x7, 4 hr avg response (ServicePac partnum 96P2253)</li> <li>• 3 year IOR 24x7, 2 hr avg response (ServicePac partnum 96P2254)</li> <li>• 4 year IOR 9x5, NBD response (ServicePac partnum 96P2255)</li> <li>• 5 year IOR 9x5, NBD response (ServicePac partnum 69P2259)</li> </ul> </li> <li>➤ Other ServicePac options at <a href="http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf">http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf</a></li> <li>➤ 24x7<sup>14</sup> toll-free support for warranty issues during the warranty period<sup>3</sup></li> </ul> | <p>Bay ① 3.5", SL 1", access, diskette<br/>                 Bay ② 5.25", HH 1.6" access, CD-ROM<br/>                 Bay ③ 5.25", HH 1.6" access, open*<br/>                 Bay ④ 5.25", HH 1.6" access, open*<br/>                 Bays 5 to 10 (six bays):<br/>                     standard 3.5" SL 1" hot-swap disk bays<br/>                 Bays 11 to 16 (six bays):<br/>                     optional 3.5" SL 1" hot-swap disk bays</p> | <ul style="list-style-type: none"> <li>➤ Stealth black color</li> <li>➤ Tool-free serviceability</li> <li>➤ Tower Dimensions: H15.5" x W18.2" x D30"(762mm)</li> <li>➤ Tower Weight: 149 to 180lbs; 67.6 to 81.7Kg</li> <li>➤ Rack Dimensions: H12" x W17.5" x D28.2"</li> <li>➤ Rack Dimensions: H306mm x W444mm x D715mm</li> <li>➤ Rack Weight: 144 to 158lbs; 65.4 to 71.7Kg</li> <li>➤ Access adapters, fans, and memory from top</li> <li>➤ Access processors and systemboard from front</li> <li>➤ Access power supplies from back</li> <li>➤ Setup Program by pressing F1 at startup</li> <li>➤ Diagnostics (PC-Doctor) by pressing F2 at startup</li> <li>➤ SCSISelect by pressing Ctrl+A at startup</li> <li>➤ Drop Down Light Path Diagnostics (level 2 diagnostic panel) for outside view of potential problem without removing cover</li> <li>➤ Predictive Failure Analysis® alerts on disks, power supplies, memory, processors, VRMs, and fans with IBM Director</li> </ul> |
|  |  | <p>BTU Output:<br/>                 Ship Config: 2,006 Btu/hr (588 watts)<br/>                 Full Config: 6,346 Btu/hr (1860 watts)</p>  |
| <p><b>All models:</b> Maximum internal disk capacity: 3.6TB with 12x 300GB<sup>2</sup> hot-swap SAS disks</p>  |  |  |

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

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



**LIMITED WARRANTY<sup>3</sup>**

- 1 year parts and labor
- International Warranty Service<sup>3</sup>
- On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time<sup>7</sup>
- On site service upgrade options (in eligible locations):<sup>7</sup>
  - 3 year IOR 9x5, NBD avg response (ServicePac® part num 69P9505)
  - 3 year IOR 9x5, 4 hr avg response (ServicePac part num 69P9506)
  - 3 year IOR 24x7, 4 hr avg response (ServicePac part num 69P9507)
  - 3 year IOR 24x7, 2 hr avg response (ServicePac part num 69P9508)
- Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- 24x7<sup>14</sup> toll-free support for warranty issues during the warranty period<sup>3</sup>

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

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

| IBM® Machine Type | GAV model | Processor / Speed     | L2 cache | FSB MHz | Memory | Disk controller | Disk bays     | Mechanical           | Slots x bays | Ethernet | Ltd warr <sup>3</sup> | Available date |
|-------------------|-----------|-----------------------|----------|---------|--------|-----------------|---------------|----------------------|--------------|----------|-----------------------|----------------|
| 8849/8491         | 10y-10x   | Pentium® 4 531 3.0GHz | 1MB      | 800     | 512MB  | SATA            | 2 simple-swap | 1U <sup>4</sup> rack | 2x3          | Dual Gb  | 1/3yr                 | Oct 2005       |
| 8849/8491         | 1Ay-Ax    | Pentium 4 531 3.0GHz  | 1MB      | 800     | 512MB  | SAS/SATA        | 2 hot-swap    | 1U rack              | 2x3          | Dual Gb  | 1/3yr                 | Oct 2005       |
| 8849/8491         | 20y-20x   | Pentium D 830 3.0GHz  | 2x1MB    | 800     | 1GB    | SAS/SATA        | 2 hot-swap    | 1U rack              | 2x3          | Dual Gb  | 1/3yr                 | Oct 2005       |
| 8849/8491         | 30y-30x   | Pentium 4 640 3.2GHz  | 2MB      | 800     | 512MB  | SATA            | 2 simple-swap | 1U rack              | 2x3          | Dual Gb  | 1/3yr                 | Oct 2005       |
| 8849/8491         | 3Ay-3Ax   | Pentium 4 640 3.2GHz  | 2MB      | 800     | 512MB  | SAS/SATA        | 2 hot-swap    | 1U rack              | 2x3          | Dual Gb  | 1/3yr                 | Oct 2005       |
| 8849/8491         | 40y-40x   | Pentium 4 650 3.4GHz  | 2MB      | 800     | 512MB  | SAS/SATA        | 2 hot-swap    | 1U rack              | 2x3          | Dual Gb  | 1/3yr                 | Oct 2005       |
| 8849/8491         | 50y-50x   | Pentium 4 660 3.6GHz  | 2MB      | 800     | 512MB  | SAS/SATA        | 2 hot-swap    | 1U rack              | 2x3          | Dual Gb  | 1/3yr                 | Oct 2005       |

Positioning *A highly affordable, uni-processor, 1U rack-optimized server*  
 Processor(s) **Intel® Pentium 4 up to 3.6GHz Single Core 800MHz FSB / Pentium D 3.0GHz Dual Core 800MHz FSB / All Optimized for Extended Memory 64 Technology (EM64T)**  
 L2 cache **Up to 2MB std on Pentium 4 / 2x1MB std on Pentium D / ECC / full speed**  
 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 slots: some: (1 PCI Express x8, 1 PCI-X) some: (2 PCI-X)**

Memory **512MB std / 8GB<sup>13</sup> max / four 184-pin gold-plated DIMM sockets / one socket used / PC2-4200 533MHz ECC DDR2-SDRAM / All Error Checking and Correcting (ECC) / DIMMs and ECC memory controller / industry std / unbuffered**

SCSI disk controller **SAS models: Adaptec® 9405 chipset / single channel / on planar / Integrated Raid 8e (Raid 0 or 1)**  
 SATA disk controller **SATA models: Integrated Intel controller / two-channel / on planar / Integrated Raid 8e (Raid 0 or 1)**  
 IDE disk controller **Enhanced IDE busmaster / ATA-100 support / one connector on systemboard**  
 Cables **SAS models: one 1-drop EIDE cable (connected to CD-ROM)**  
**SATA models: two 1-drop SATA cables, one 1-drop EIDE cable (connected to CD-ROM)**  
 Disk **None standard**

Mechanical Architecture / chipsets **EIA 22" Rack (1U<sup>4</sup>) / rack-mount only**  
**Intel E7210 chipset / Memory Controller Hub (MCH) / I/O Controller Hub (ICH-S) for PCI 2.2 and PCI-X bus, ATA-100 EIDE, ethernet MAC, USB, Low Pin Count Interface / Firmware Hub / SMSC® LPC47M192 Super I/O for diskette, parallel, serial, keyboard, mouse**  
 Bus slots **(See below) two available PCI-X 1.0 100MHz or one 64-bit PCI-E x8 and one PCI-X 1.0 100MHz / no hot-swap Active™ PCI slots /**

Ethernet controllers **Dual Gigabit 10/100/1000 ethernet ports / Broadcom 5721 / two full gigabit ethernet MAC and PHY layer functions / integrated / port one is CSA, port two is PCI 2.2 / full duplex / PXE / Wake on LAN® / Rear RJ-45 ports (2)**

CD-ROM / diskette **24X-10X<sup>6</sup> CD-ROM Slim/ IDE; Diskette: none**  
 Rear ports **Rear: serial (9-pin), two ethernet (RJ-45), keyboard, mouse, analog DB-15 monitor / no parallel port / two USB (Vers 2.0)**  
 Front ports / Graphics **Front: two USB (Vers 2.0)**  
**ATI® RN50(ES1000) / 16MB SDRAM std/max / on planar / analog 15-pin / up to 1024x768x32bit@85Hz**

Console interconnects **No system-to-system interconnect cable (separate keyboard, video, mouse ports on back)**  
 Systems mgmt **Mini-baseboard management controller / IPMI 1.5 / 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 Remote Supervisor Adapter II with 20-pin conn on planar for continuous power (no external power required)**

Security **Power-on password / administrator password / unattended boot / selectable boot / unattended start mode / secure remote power on / off via IPMI 1.5**

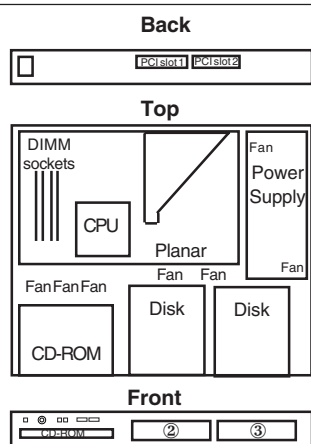
Software **ServerGuide™ (CD-ROM installation and configuration utilities), IBM Director™ and others**

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

Power supply Prerequisites **350 watt / universal / auto-sensing / auto-restart support**  
**Monitor, keyboard, mouse, rack**

- 512MB PC2-4200 CL3 ECC DDR2RoHS 30R5148
- 2GB(2x1GB) PC2-4200 CL3 ECC DDR2 RoHS 30R5149
- 4GB(2x2GB) PC2-4200 CL3 ECC DDR2 RoHS 30R5150
- IBM 80GB SATA (7.2K) simple-swap HDD 39M4500
- IBM 160GB SATA (7.2K) simple-swap HDD 39M4504
- IBM 250GB SATA (7.2K) simple-swap HDD 39M4508
- 80GB Hot-Swap SATA HDD 39M4518
- 160GB Hot-Swap SATA HDD 39M4522
- 250GB Hot-Swap SATA HDD 39M4526
- 73GB 10K 3.5" SAS Hot-Swap HDD 26K5709
- 146GB 10K 3.5" SAS Hot-Swap HDD 26K5710
- 300GB 10K 3.5" SAS Hot-Swap HDD 26K5711
- 36GB 15K 3.5" SAS Hot-Swap HDD 26K5697
- 73GB 15K 3.5" SAS Hot-Swap HDD 26K5698
- 146GB 15K 3.5" SAS Hot-Swap HDD 26K5699
- IBM Remote Supervisor Adapter II (PCI adapter) 59P2984
- IBM ServeRAID-7i SATA Integrated Controller 71P8648

Other options at [ibm.com/pc/us/accessories](http://ibm.com/pc/us/accessories)



- Some:
- Slot 1: 3/4 length, full height, 64-bit 100MHz PCI X 1.0 (3.3v)
  - Slot 2: half length, low-profile, 64-bit 100MHz PCI X 1.0 (3.3v)
- Some:
- Slot 1: 3/4 length, full height, 64-bit 100MHz PCI X 1.0 (3.3v)
  - Slot 2: half length, low-profile, PCI-E x8
- Bay ① 5.25", UltraSlim 0.5", access, std CD-ROM
  - Bay ② 3.5", SL 1", access, open for fixed disk
  - Bay ③ 3.5", SL 1", access, open for fixed disk
- ❖ Raven black front bezel
  - ❖ H 1.75" (1U) x W 17.3" x D 22"; 43mm x 440mm x 559mm
  - ❖ 24.25 to 30 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 capacity<sup>13</sup> (model dependent):  
 600GB with two 300GB SAS disks or 500GB with two 250GB SATA disks

**LIMITED WARRANTY<sup>3</sup>**

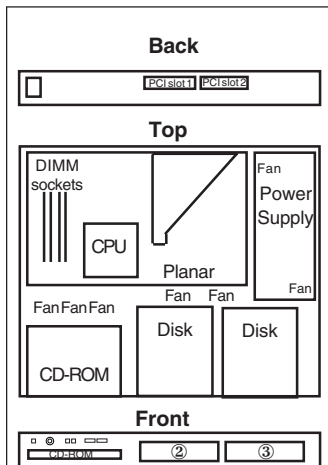
- ❖ 1 year parts and labor standard 8849 MTM
- ❖ 3 year parts and labor standard 8491 MTM
- ❖ International Warranty Service<sup>3</sup>
- ❖ On site, 8 am-5 pm, Mon-Fri excluding holidays, next business day response time
- ❖ On site service upgrade options (in eligible locations):<sup>7</sup>
  - 3 year IOR 9x5, NBD avg response (ServicePac part num 69P9505)
  - 3 year IOR 9x5, 4 hr avg response (ServicePac part num 69P9506)
  - 3 year IOR 24x7, 4 hr avg response (ServicePac part num 69P9507)
  - 3 year IOR 24x7, 2 hr response (ServicePac part num 69P9508)
- ❖ Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- ❖ 24x7<sup>14</sup> toll-free support for warranty issues during the warranty period<sup>3</sup>

See footnotes for important warranty information

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

| IBM® Machine Type                  | GAV model  | Processor / Speed     | L2 cache | FSB MHz | Memory | Disk controller | Disk bays     | Mechanical           | Slots x bays | Ethernet | Ltd warr <sup>3</sup> | Available date |
|------------------------------------|--|-----------------------|----------|---------|--------|-----------------|---------------|----------------------|--------------|----------|-----------------------|----------------|
| 8849/8891                          | B2y-B2x  | Pentium® 4 631 3.0GHz | 2MB      | 800     | 512MB  | SATA            | 2 simple-swap | 1U <sup>4</sup> rack | 2x3          | Dual Gb  | 1/3yr                 | Feb 2006       |
| 8849/8891                          | G2y-G2x  | Pentium D 920 2.8GHz  | 4MB      | 800     | 1GB    | SATA            | 2 simple-swap | 1U rack              | 2x3          | Dual Gb  | 1/3yr                 | Feb 2006       |
| 8849/8891                          | G4y-G4x  | Pentium D 920 2.8GHz  | 4MB      | 800     | 1GB    | SAS/SATA        | 2 hot-swap    | 1U rack              | 2x3          | Dual Gb  | 1/3yr                 | Feb 2006       |
| 8849/8891                          | H2y-H2x  | Pentium D 930 3.0GHz  | 4MB      | 800     | 1GB    | SATA            | 2 simple-swap | 1U rack              | 2x3          | Dual Gb  | 1/3yr                 | Feb 2006       |
| 8849/8891                          | H4y-H4x  | Pentium D 930 3.0GHz  | 4MB      | 800     | 1GB    | SAS/SATA        | 2 hot-swap    | 1U rack              | 2x3          | Dual Gb  | 1/3yr                 | Feb 2006       |
| 8849/8891                          | J2y-J2x  | Pentium D 940 3.2GHz  | 4MB      | 800     | 1GB    | SAS/SATA        | 2 hot-swap    | 1U rack              | 2x3          | Dual Gb  | 1/3yr                 | Feb 2006       |
| Positioning                        | A highly affordable, uni-processor, 1U rack-optimized server   |                       |          |         |        |                 |               |                      |              |          |                       |                |
| Processor(s)                       | Intel® Pentium 4 up to 3.0GHz Single-Core 800MHz FSB / Pentium D up to 3.2GHz Dual-Core 800MHz FSB / All Optimized for Extended Memory 64 Technology (EM64T)   |                       |          |         |        |                 |               |                      |              |          |                       |                |
| L2 cache                           | 2MB std on Pentium 4 / 4MB std on Pentium D / ECC / full speed   |                       |          |         |        |                 |               |                      |              |          |                       |                |
| 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 slots: some: (1 PCI Express® x8, 1 PCI-X) some: (2 PCI-X)   |                       |          |         |        |                 |               |                      |              |          |                       |                |
| Memory                             | 512MB or 1GB std / 8GB <sup>13</sup> max / four 184-pin gold-plated DIMM sockets / one socket used / PC2-4200 533MHz ECC DDR2-SDRAM / All Error Checking and Correcting (ECC) / DIMMs and ECC memory controller / industry std / unbuffered  |                       |          |         |        |                 |               |                      |              |          |                       |                |
| SCSI disk controller               | SAS models: Adaptec® 9405 chipset / single-channel / on planar / Integrated Raid 8e (Raid 0 or 1)  |                       |          |         |        |                 |               |                      |              |          |                       |                |
| SATA disk controller               | SATA models: Integrated Intel controller / two-channel / on planar / Integrated Raid 8e (Raid 0 or 1)  |                       |          |         |        |                 |               |                      |              |          |                       |                |
| IDE disk controller                | Enhanced IDE busmaster / ATA-100 support / one connector on systemboard  |                       |          |         |        |                 |               |                      |              |          |                       |                |
| Cables                             | SAS models: one 1-drop EIDE cable (connected to CD-ROM)  |                       |          |         |        |                 |               |                      |              |          |                       |                |
|                                    | SATA models: two 1-drop SATA cables, one 1-drop EIDE cable (connected to CD-ROM)   |                       |          |         |        |                 |               |                      |              |          |                       |                |
| Disk                               | None standard  |                       |          |         |        |                 |               |                      |              |          |                       |                |
| Mechanical Architecture / chipsets | EIA 22" Rack (1U <sup>4</sup> ) / rack-mount only<br>Intel E7210 chipset / Memory Controller Hub (MCH) / I/O Controller Hub (ICH-S) for PCI 2.2 and PCI-X bus, ATA-100 EIDE, ethernet MAC, USB, Low Pin Count Interface / Firmware Hub / SMSC® LPC47M192 Super I/O for diskette, parallel, serial, keyboard, mouse |                       |          |         |        |                 |               |                      |              |          |                       |                |
| Bus slots                          | (See below) two available PCI-X 1.0 100MHz or one 64-bit PCIe™ x8 and one PCI-X 1.0 100MHz / no hot-swap Active™ PCI slots /   |                       |          |         |        |                 |               |                      |              |          |                       |                |
| Ethernet controllers               | Dual-Gigabit 10/100/1000 ethernet ports / Broadcom® 5721 / two full gigabit ethernet MAC and PHY layer functions / integrated / port one is CSA, port two is PCI 2.2 / full duplex / PXE / Wake on LAN® / Rear RJ-45 ports (2)   |                       |          |         |        |                 |               |                      |              |          |                       |                |
| CD-ROM / diskette                  | 24X-10X <sup>6</sup> CD-ROM Slim/ IDE; Diskette: none  |                       |          |         |        |                 |               |                      |              |          |                       |                |
| Rear ports                         | Rear: serial (9-pin), two ethernet (RJ-45), keyboard, mouse, analog DB-15 monitor / no parallel port / two USB (Vers 2.0)  |                       |          |         |        |                 |               |                      |              |          |                       |                |
| Front ports / Graphics             | Front: two USB (Vers 2.0)<br>ATI® RN50(ES1000) / 16MB SDRAM std/max / on planar / analog 15-pin / up to 1024x768x32bit@85Hz  |                       |          |         |        |                 |               |                      |              |          |                       |                |
| Console interconnects              | No system-to-system interconnect cable (separate keyboard, video, mouse ports on back)   |                       |          |         |        |                 |               |                      |              |          |                       |                |
| Systems mgmt                       | Mini-baseboard management controller / IPMI 1.5 / 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 Remote Supervisor Adapter II with 20-pin conn on planar for continuous power (no external power required)                                    |                       |          |         |        |                 |               |                      |              |          |                       |                |
| Security                           | Power-on password / administrator password / unattended boot / selectable boot / unattended start mode / secure remote power on / off via IPMI 1.5   |                       |          |         |        |                 |               |                      |              |          |                       |                |
| 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                       | 350 watt / universal / auto-sensing / auto-restart support   |                       |          |         |        |                 |               |                      |              |          |                       |                |
| Prerequisites                      | Monitor, keyboard, mouse, rack   |                       |          |         |        |                 |               |                      |              |          |                       |                |

Other options at [ibm.com/pc/us/accessories](http://ibm.com/pc/us/accessories)



- Some:
- Slot 1: 3/4 length, full height, 64-bit 100MHz PCI X 1.0 (3.3v)
  - Slot 2: half length, low-profile, 64-bit 100MHz PCI X 1.0 (3.3v)
- Some:
- Slot 1: 3/4 length, full height, 64-bit 100MHz PCI X 1.0 (3.3v)
  - Slot 2: half length, low-profile, PCIe x8
- Bay ① 5.25", UltraSlim 0.5", access, std CD-ROM
  - Bay ② 3.5", SL 1", access, open for fixed disk
  - Bay ③ 3.5", SL 1", access, open for fixed disk
- ❖ Raven black front bezel
  - ❖ H 1.75" (1U) x W 17.3" x D 22"; 43mm x 440mm x 559mm
  - ❖ 24.25 to 30 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 capacity<sup>13</sup> (model dependent):  
600GB with two 300GB SAS disks or 500GB with two 250GB SATA disks

**LIMITED WARRANTY<sup>3</sup>**

- ❖ 1 year parts and labor standard 8849 MTM
- ❖ 3 year parts and labor standard 8491 MTM
- ❖ International Warranty Service<sup>3</sup>
- ❖ On site, 8 am-5 pm, Mon-Fri excluding holidays, next business day response time
- ❖ On site service upgrade options (in eligible locations):<sup>7</sup>
  - 3 year IOR 9x5, NBD avg response (ServicePac part num 69P9505)
  - 3 year IOR 9x5, 4 hr avg response (ServicePac part num 69P9506)
  - 3 year IOR 24x7, 4 hr avg response (ServicePac part num 69P9507)
  - 3 year IOR 24x7, 2 hr response (ServicePac part num 69P9508)
- ❖ Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- ❖ 24x7<sup>14</sup> toll-free support for warranty issues during the warranty period<sup>3</sup>

See footnotes for important warranty information

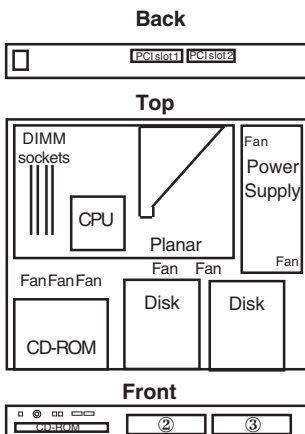
For GAV systems, lowercase "v" should be replaced with a country-specific code.

| IBM® Machine Type | GAV model | Processor / Speed | L2 cache  | FSB MHz | Memory | Disk controller | Disk bays | Mechanical    | Slots x bays         | Ethernet | Ltd warr <sup>3</sup> | Available date |          |
|-------------------|-----------|-------------------|-----------|---------|--------|-----------------|-----------|---------------|----------------------|----------|-----------------------|----------------|----------|
| 8849/8891         | K2y-K2x   | Pentium® D 950    | 3.4GHz/DC | 4MB     | 800    | 2 x 512MB       | SATA      | 2 simple-swap | 1U <sup>4</sup> rack | 2x3      | Dual GB               | 1/3yr          | May 2006 |
| 8849/8891         | K4y-K4x   | Pentium D 950     | 3.4GHz/DC | 4MB     | 800    | 2 x 512MB       | SAS/SATA  | 2 hot-swap    | 1U rack              | 2x3      | Dual GB               | 1/3yr          | May 2006 |
| 8849/8891         | 94y-94x   | Pentium D 960     | 3.6GHz/DC | 4MB     | 800    | 2 x 512MB       | SAS/SATA  | 2 hot-swap    | 1U rack              | 2x3      | Dual GB               | 1/3yr          | May 2006 |

|                                    |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------------|--|--|--|--|--|--|--|--|--|--|--|--|
| Positioning                        | <i>A highly affordable, uni-processor, 1U rack-optimized server</i>  |  |  |  |  |  |  |  |  |  |  |  |
| Processor(s)                       | <b>Intel® Pentium D up to 3.6GHz Dual-Core 800MHz FSB / All Optimized for Extended Memory 64 Technology (EM64T)</b>  |  |  |  |  |  |  |  |  |  |  |  |
| L2 cache                           | 4MB std on Pentium D / ECC / full speed  |  |  |  |  |  |  |  |  |  |  |  |
| 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 slots: some: (1 PCI Express® x8, 1 PCI-X) some: (2 PCI-X)   |  |  |  |  |  |  |  |  |  |  |  |
| Memory                             | <b>1GB std / 8GB<sup>13</sup> max / four 184-pin gold-plated DIMM sockets / two sockets used / PC2-4200 533MHz ECC DDR2-SDRAM / All Error Checking and Correcting (ECC) / DIMMs and ECC memory controller / industry std / unbuffered</b>  |  |  |  |  |  |  |  |  |  |  |  |
| SCSI disk controller               | SAS models: <b>Adaptec® 9405 chipset</b> / single-channel / on planar / Integrated Raid 8e (Raid 0 or 1)   |  |  |  |  |  |  |  |  |  |  |  |
| SATA disk controller               | SATA models: Integrated Intel controller / two-channel / on planar / Integrated Raid 8e (Raid 0 or 1)  |  |  |  |  |  |  |  |  |  |  |  |
| IDE disk controller                | Enhanced IDE busmaster / ATA-100 support / one connector on systemboard  |  |  |  |  |  |  |  |  |  |  |  |
| Cables                             | SAS models: one 1-drop EIDE cable (connected to CD-ROM)  |  |  |  |  |  |  |  |  |  |  |  |
|                                    | SATA models: two 1-drop SATA cables, one 1-drop EIDE cable (connected to CD-ROM)   |  |  |  |  |  |  |  |  |  |  |  |
| Disk                               | None standard  |  |  |  |  |  |  |  |  |  |  |  |
| Mechanical Architecture / chipsets | <b>EIA 22" Rack (1U<sup>4</sup>) / rack-mount only</b><br><b>Intel E7210 chipset</b> / Memory Controller Hub (MCH) / I/O Controller Hub (ICH-S) for PCI 2.2 and PCI-X bus, ATA-100 EIDE, ethernet MAC, USB, Low Pin Count Interface / Firmware Hub / SMSC® LPC47M192 Super I/O for diskette, parallel, serial, keyboard, mouse |  |  |  |  |  |  |  |  |  |  |  |
| Bus slots                          | (See below) two available PCI-X 1.0 100MHz or one 64-bit PCIe™ x8 and one PCI-X 1.0 100MHz / no hot-swap Active™ PCI slots /   |  |  |  |  |  |  |  |  |  |  |  |
| Ethernet controllers               | <b>Dual-Gigabit</b> 10/100/1000 ethernet ports / Broadcom® 5721 / two full gigabit ethernet MAC and PHY layer functions / integrated / port one is CSA, port two is PCI 2.2 / full duplex / PXE / Wake on LAN® / Rear RJ-45 ports (2)  |  |  |  |  |  |  |  |  |  |  |  |
| CD-ROM / diskette                  | 24X-10X <sup>6</sup> CD-ROM Slim/ IDE; <i>Diskette</i> : none  |  |  |  |  |  |  |  |  |  |  |  |
| Rear ports                         | <i>Rear</i> : serial (9-pin), two ethernet (RJ-45), keyboard, mouse, analog DB-15 monitor / no parallel port / two USB (Vers 2.0)  |  |  |  |  |  |  |  |  |  |  |  |
| Front ports / Graphics             | <i>Front</i> : two USB (Vers 2.0)<br>ATI® RN50(ES1000) / 16MB SDRAM std/max / on planar / analog 15-pin / up to 1024x768x32bit@85Hz  |  |  |  |  |  |  |  |  |  |  |  |
| Console interconnects              | No system-to-system interconnect cable (separate keyboard, video, mouse ports on back)   |  |  |  |  |  |  |  |  |  |  |  |
| Systems mgmt                       | Mini-baseboard management controller / IPMI 1.5 / 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 Remote Supervisor Adapter II with 20-pin conn on planar for continuous power (no external power required)  |  |  |  |  |  |  |  |  |  |  |  |
| Security                           | Power-on password / administrator password / unattended boot / selectable boot / unattended start mode / <b>secure remote power on / off via IPMI 1.5</b>  |  |  |  |  |  |  |  |  |  |  |  |
| 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                       | 350 watt / universal / auto-sensing / auto-restart support   |  |  |  |  |  |  |  |  |  |  |  |
| Prerequisites                      | Monitor, keyboard, mouse, rack   |  |  |  |  |  |  |  |  |  |  |  |

|  |         |
|--|---------|
| 512MB PC2-4200 CL3 ECC DDR2RoHS                | 30R5148 |
| 2GB(2x1GB) PC2-4200 CL3 ECC DDR2 RoHS          | 30R5149 |
| 4GB(2x2GB) PC2-4200 CL3 ECC DDR2 RoHS          | 30R5150 |
| IBM 80GB SATA (7.2K) simple-swap HDD           | 39M4500 |
| IBM 160GB SATA (7.2K) simple-swap HDD          | 39M4504 |
| IBM 250GB SATA (7.2K) simple-swap HDD          | 39M4508 |
| 80GB Hot-Swap SATA HDD                         | 39M4518 |
| 160GB Hot-Swap SATA HDD                        | 39M4522 |
| 250GB Hot-Swap SATA HDD                        | 39M4526 |
| 73GB 10K 3.5" SAS Hot-Swap HDD                 | 40K1039 |
| 146GB 10K 3.5" SAS Hot-Swap HDD                | 40K1040 |
| 300GB 10K 3.5" SAS Hot-Swap HDD                | 40K1041 |
| 36GB 15K 3.5" SAS Hot-Swap HDD                 | 40K1042 |
| 73GB 15K 3.5" SAS Hot-Swap HDD                 | 40K1043 |
| 146GB 15K 3.5" SAS Hot-Swap HDD                | 40K1044 |
| IBM Remote Supervisor Adapter II (PCI adapter) | 59P2984 |
| IBM ServeRAID-7i SATA Integrated Controller    | 71P8648 |

Other options at [ibm.com/pc/us/accessories](http://ibm.com/pc/us/accessories)



- Some:
- Slot 1: 3/4 length, full height, 64-bit 100MHz PCI X 1.0 (3.3v)
  - Slot 2: half length, low-profile, 64-bit 100MHz PCI X 1.0 (3.3v)
- Some:
- Slot 1: 3/4 length, full height, 64-bit 100MHz PCI X 1.0 (3.3v)
  - Slot 2: half length, low-profile, PCIe x8
- Bay ① 5.25", UltraSlim 0.5", access, std CD-ROM
  - Bay ② 3.5", SL 1", access, open for fixed disk
  - Bay ③ 3.5", SL 1", access, open for fixed disk
- ❖ Raven black front bezel
  - ❖ H 1.75" (1U) x W 17.3" x D 22"; 43mm x 440mm x 559mm
  - ❖ 24.25 to 30 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 capacity<sup>13</sup> (model dependent):  
600GB with two 300GB SAS disks or 500GB with two 250GB SATA disks

**LIMITED WARRANTY<sup>3</sup>**

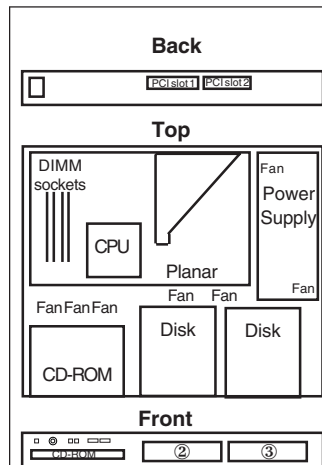
- ❖ 1 year parts and labor standard 8849 MTM
- ❖ 3 year parts and labor standard 8491 MTM
- ❖ International Warranty Service<sup>3</sup>
- ❖ On site, 8 am-5 pm, Mon-Fri excluding holidays, next business day response time
- ❖ On site service upgrade options (in eligible locations):<sup>7</sup>
  - 3 year IOR 9x5, NBD avg response (ServicePac part num 69P9505)
  - 3 year IOR 9x5, 4 hr avg response (ServicePac part num 69P9506)
  - 3 year IOR 24x7, 4 hr avg response (ServicePac part num 69P9507)
  - 3 year IOR 24x7, 2 hr response (ServicePac part num 69P9508)
- ❖ Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- ❖ 24x7<sup>14</sup> toll-free support for warranty issues during the warranty period<sup>3</sup>

| IBM® Machine Type model | Processor / Speed        | L2 cache | FSB MHz | Memory    | Disk controller | Disk bays     | Mechanical           | Slots x bays | Ethernet | Ltd warr <sup>3</sup> | Available date |
|-------------------------|--------------------------|----------|---------|-----------|-----------------|---------------|----------------------|--------------|----------|-----------------------|----------------|
| 8849/8891 FAU           | Pentium® D 915 2.8GHz/DC | 4MB      | 800     | 2 x 512MB | SATA            | 2 simple-swap | 1U <sup>4</sup> rack | 2x3          | Dual GB  | 1/3yr                 | Sep 2006       |
| 8849/8891 JAU           | Pentium D 945 3.4GHz/DC  | 4MB      | 800     | 2 x 512MB | SATA            | 2 simple-swap | 1U rack              | 2x3          | Dual GB  | 1/3yr                 | Sep 2006       |
| 8849/8891 JBX           | Pentium D 945 3.4GHz/DC  | 4MB      | 800     | 2 x 512MB | SAS/SATA        | 2 hot-swap    | 1U rack              | 2x3          | Dual GB  | 1/3yr                 | Sep 2006       |

|                                    |   |  |  |  |  |  |  |  |  |  |  |
|------------------------------------|---|--|--|--|--|--|--|--|--|--|--|
| Positioning                        | <i>A highly affordable, uni-processor, 1U rack-optimized server</i>   |  |  |  |  |  |  |  |  |  |  |
| Processor(s)                       | <b>Intel® Pentium D up to 3.4GHz Dual-Core 800MHz FSB / All Optimized for Extended Memory 64 Technology (EM64T)</b>   |  |  |  |  |  |  |  |  |  |  |
| L2 cache                           | 4MB std on Pentium D / ECC / full speed   |  |  |  |  |  |  |  |  |  |  |
| 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 slots: some: (1 PCI Express® x8, 1 PCI-X) some: (2 PCI-X)  |  |  |  |  |  |  |  |  |  |  |
| Memory                             | <b>1GB std / 8GB<sup>13</sup> max / four 184-pin gold-plated DIMM sockets / two sockets used / PC2-4200 533MHz ECC DDR2-SDRAM / All Error Checking and Correcting (ECC) / DIMMs and ECC memory controller / industry std / unbuffered</b>   |  |  |  |  |  |  |  |  |  |  |
| SCSI disk controller               | SAS models: <b>Adaptec® 9405 chipset</b> / single-channel / on planar / Integrated Raid 8e (Raid 0 or 1)  |  |  |  |  |  |  |  |  |  |  |
| SATA disk controller               | SATA models: Integrated Intel controller / two-channel / on planar / Integrated Raid 8e (Raid 0 or 1)   |  |  |  |  |  |  |  |  |  |  |
| IDE disk controller                | Enhanced IDE busmaster / ATA-100 support / one connector on systemboard   |  |  |  |  |  |  |  |  |  |  |
| Cables                             | SAS models: one 1-drop EIDE cable (connected to CD-ROM)   |  |  |  |  |  |  |  |  |  |  |
|                                    | SATA models: two 1-drop SATA cables, one 1-drop EIDE cable (connected to CD-ROM)  |  |  |  |  |  |  |  |  |  |  |
| Disk                               | None standard   |  |  |  |  |  |  |  |  |  |  |
| Mechanical Architecture / chipsets | <b>EIA 22" Rack (1U<sup>4</sup>) / rack-mount only</b><br><b>Intel E7230 chipset</b> / Memory Controller Hub (MCH) / I/O Controller Hub (ICH-S) for PCI 2.2 and PCI-X bus, ATA-100 EIDE, ethernet MAC, USB, Low Pin Count Interface / Firmware Hub / <b>SMSC® LPC47M192 Super I/O</b> for diskette, parallel, serial, keyboard, mouse |  |  |  |  |  |  |  |  |  |  |
| Bus slots                          | (See below) two available PCI-X 1.0 100MHz or one 64-bit PCIe™ x8 and one PCI-X 1.0 100MHz / no hot-swap Active™ PCI slots /  |  |  |  |  |  |  |  |  |  |  |
| Ethernet controllers               | <b>Dual-Gigabit</b> 10/100/1000 ethernet ports / <b>Broadcom® 5721</b> / two full gigabit ethernet MAC and PHY layer functions / integrated / port one is CSA, port two is PCI 2.2 / full duplex / PXE / Wake on LAN® / Rear RJ-45 ports (2)  |  |  |  |  |  |  |  |  |  |  |
| CD-ROM / diskette                  | 24X-10X <sup>6</sup> CD-ROM Slim/ IDE; <i>Diskette</i> : none   |  |  |  |  |  |  |  |  |  |  |
| Rear ports                         | <i>Rear</i> : serial (9-pin), two ethernet (RJ-45), keyboard, mouse, analog DB-15 monitor / no parallel port / two USB (Vers 2.0)   |  |  |  |  |  |  |  |  |  |  |
| Front ports / Graphics             | <i>Front</i> : two USB (Vers 2.0)<br>ATI® RN50(ES1000) / 16MB SDRAM std/max / on planar / analog 15-pin / up to 1024x768x32bit@85Hz   |  |  |  |  |  |  |  |  |  |  |
| Console interconnects              | No system-to-system interconnect cable (separate keyboard, video, mouse ports on back)  |  |  |  |  |  |  |  |  |  |  |
| Systems mgmt                       | Mini-baseboard management controller / IPMI 1.5 / 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 Remote Supervisor Adapter II with 20-pin conn on planar for continuous power (no external power required)   |  |  |  |  |  |  |  |  |  |  |
| Security                           | Power-on password / administrator password / unattended boot / selectable boot / unattended start mode / <b>secure remote power on / off via IPMI 1.5</b>   |  |  |  |  |  |  |  |  |  |  |
| 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                       | 350 watt / universal / auto-sensing / auto-restart support  |  |  |  |  |  |  |  |  |  |  |
| Prerequisites                      | Monitor, keyboard, mouse, rack  |  |  |  |  |  |  |  |  |  |  |

|  |         |
|--|---------|
| 512MB PC2-4200 CL3 ECC DDR2RoHS                | 30R5148 |
| 2GB(2x1GB) PC2-4200 CL3 ECC DDR2 RoHS          | 30R5149 |
| 4GB(2x2GB) PC2-4200 CL3 ECC DDR2 RoHS          | 30R5150 |
| IBM 80GB SATA (7.2K) simple-swap HDD           | 39M4500 |
| IBM 160GB SATA (7.2K) simple-swap HDD          | 39M4504 |
| IBM 250GB SATA (7.2K) simple-swap HDD          | 39M4508 |
| 80GB Hot-Swap SATA HDD                         | 39M4518 |
| 160GB Hot-Swap SATA HDD                        | 39M4522 |
| 250GB Hot-Swap SATA HDD                        | 39M4526 |
| 73GB 10K 3.5" SAS Hot-Swap HDD                 | 40K1039 |
| 146GB 10K 3.5" SAS Hot-Swap HDD                | 40K1040 |
| 300GB 10K 3.5" SAS Hot-Swap HDD                | 40K1041 |
| 36GB 15K 3.5" SAS Hot-Swap HDD                 | 40K1042 |
| 73GB 15K 3.5" SAS Hot-Swap HDD                 | 40K1043 |
| 146GB 15K 3.5" SAS Hot-Swap HDD                | 40K1044 |
| IBM Remote Supervisor Adapter II (PCI adapter) | 59P2984 |
| IBM ServeRAID-7i SATA Integrated Controller    | 71P8648 |

Other options at [ibm.com/pc/us/accessories](http://ibm.com/pc/us/accessories)



- Some:
- Slot 1: 3/4 length, full height, 64-bit 100MHz PCI X 1.0 (3.3v)
  - Slot 2: half length, low-profile, 64-bit 100MHz PCI X 1.0 (3.3v)
- Some:
- Slot 1: 3/4 length, full height, 64-bit 100MHz PCI X 1.0 (3.3v)
  - Slot 2: half length, low-profile, PCIe x8
- Bay ① 5.25", UltraSlim 0.5", access, std CD-ROM
  - Bay ② 3.5", SL 1", access, open for fixed disk
  - Bay ③ 3.5", SL 1", access, open for fixed disk
- ❖ Raven black front bezel
  - ❖ H 1.75" (1U) x W 17.3" x D 22"; 43mm x 440mm x 559mm
  - ❖ 24.25 to 30 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 capacity<sup>13</sup> (model dependent):  
600GB with two 300GB SAS disks or 500GB with two 250GB SATA disks

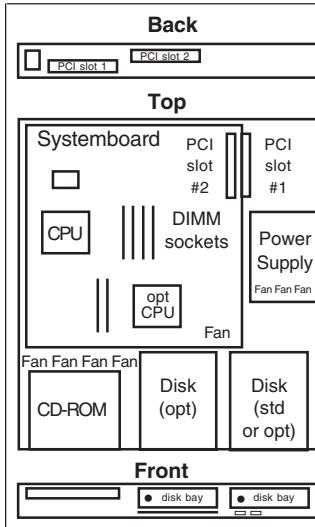
**LIMITED WARRANTY<sup>3</sup>**

- ❖ 1 year parts and labor standard 8849 MTM
- ❖ 3 year parts and labor standard 8491 MTM
- ❖ International Warranty Service<sup>3</sup>
- ❖ On site, 8 am-5 pm, Mon-Fri excluding holidays, next business day response time
- ❖ On site service upgrade options (in eligible locations):<sup>7</sup>
  - 3 year IOR 9x5, NBD avg response (ServicePac part num 69P9505)
  - 3 year IOR 9x5, 4 hr avg response (ServicePac part num 69P9506)
  - 3 year IOR 24x7, 4 hr avg response (ServicePac part num 69P9507)
  - 3 year IOR 24x7, 2 hr response (ServicePac part num 69P9508)
- ❖ Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- ❖ 24x7<sup>14</sup> toll-free support for warranty issues during the warranty period<sup>3</sup>

See footnotes for important warranty information

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

\* Disk not supported in all e325 systems



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

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

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

Maximum internal disk capacity<sup>13</sup> (model dependent):  
293.6GB with two 146.8GB SL SCSI disks or  
240GB with two 120GB EIDE disks

**LIMITED WARRANTY<sup>3</sup>**

- 1 year parts and labor
- International Warranty Service<sup>3</sup>
- On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time<sup>7</sup>
- On site service upgrade options (in eligible locations):<sup>7</sup>
  - 1 year IOR 9x5, 4 hr avg response (ServicePac® part num 69P9399)
  - 2 year IOR 24x7, 4 hr avg response (ServicePac part num 96P2119)
  - 2 year IOR 24x7, 2 hr avg response (ServicePac part num 96P2120)
  - 3 year IOR 24x7, 4 hr avg response (ServicePac part num 69P9507)
  - 3 year IOR 9x5, NBD response (ServicePac part num 69P9506)
- Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- 24x7<sup>14</sup> toll-free support for warranty issues during the warranty period<sup>3</sup>

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

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

Processor(s) **Up to 2 x AMD® Opteron™ 248** with 800Mhz HyperTransport technology / 64-bit x86 Instruction set / 32-bit compatible  
 L2 cache **1MB** / on die of processor / at processor speed (no L3 cache)  
 SMP support **2-way SMP** / up to two Opteron Processors (same speed/cache size required)  
 Implementation Systemboard contains two AMD Socket 940 micro-PGA ZIF sockets, six memory DIMM slots, two 64-bit 100Mhz PCI-X slots, integrated SCSI, ethernet, graphics / AMD Opteron HyperLink bus interface

Memory **1GB** std / 12GB max<sup>13</sup> / four slots enabled with uni-processor, six with dual / two slots used / four slots available / **PC2700** 333MHz registered 184-pin ECC DDR-SDRAM DIMMs / six DIMM gold-connector slots on systemboard / DIMMs must be installed in matched pairs [a bank] / 2-way memory interleave / dual channel / memory bus runs at 2 x 100MHz / **Error Checking and Correcting (ECC)** via **16-bit Checksum Chipkill™** (corrects 1, 2, 3, or 4-bit errors on same chip and detects 2-bit through 8-bit errors contained in two chips)

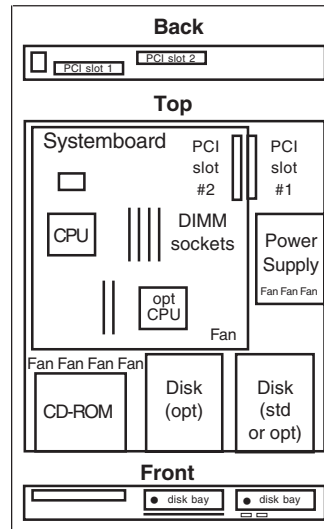
SCSI disk controller *All (not used on EIDE models): LSI Logic® 53C1020 / Ultra320 SCSI controller* (LVD 320MB/sec) / on planar / 64-bit 100MHz PCI-X Bus B / supports **RAID-1 mirroring** (Embedded Mirroring) with two SCSI disks in front bays / one 16-bit internal channel / 16-bit 68-pin LVD cable from systemboard to backplane for two disks / no external connector  
 IDE controller / cable *All: Enhanced IDE ATA-100 controller in CSB5 South Bridge / two connectors on planar / one 1-drop IDE cable (CD-ROM) EIDE models: One 2-drop EIDE cable to two disk bays (primary) / one 1-drop EIDE cable to CD-ROM (secondary)*  
 Disk - capacity *SCSI models: 36.4GB supports up to 15000 rpm disks; EIDE models: 80GB / 7200 rpm / ATA-100 / 8.7ms seek*  
 Disk - bays *SCSI models: two hot-swap / 80-pin SCA-2 connectors / filler panels in each disk bay / all disk bays Ultra320-enabled*

Mechanical **EIA 19" Rack (1U<sup>4</sup>)** / rack-mount only / supported in 26" deep racks such as the IBM NetBAY™ Rack products  
 Architecture / chipsets **AMD® 8131 PCI-X Bridge Chip** providing two PCI-X bridges running at 100Mhz (bridge A for SCSI and Ethernet; bridge B for PCI-X expansion slots) / **8111 I/O HyperTransport Bridge Chip** supporting a 200 Mhz double-pumped HyperTransport clock (PCI, AC '97, Ethernet, SMBus, USB, EIDE, LPC to BIOS and Super I/O) / National Semiconductor® PC87366 Super I/O chip  
 Bus slots (See below) two available PCI-X 1.0 / no hot-swap Active™ PCI slots

Ethernet controllers Two gigabit 10/100/1000 ethernet ports / Broadcom BCM5704 / two full gigabit ethernet MAC and PHY layer functions / on planar / PCI-X 64-bit 100MHz Bus B / full duplex / Wake on LAN® / Alert Standard Format 1.0 / two rear RJ-45 ports  
 CD-ROM/diskette/kbd 24X-10X<sup>6</sup> CD-ROM / IDE / *Diskette and keyboard: none (USB diskette and keyboard optional); legacy not supported*  
 Rear ports *Rear: two USB (Vers 1.1), serial (9-pin), two ethernet (RJ-45) / parallel port not supported*  
 Front ports / graphics *Front: two USB (Vers 1.1); Graphics: SVGA / ATI® Rage XL / on planar / 8MB SDRAM std/max / 32-bit 33MHz PCI 2.2 Bus A*  
 Console interconnects C2T Interconnect™ cabling not supported / NetBay Local Console Manager (LCM), NetBay Remote Console Manager (RCM), and USB Conversion Option (UCO) are supported

|                            |  |   |  |
|----------------------------|--|---|--|
| Systems mgmt               | Standard MS-9549 QLogic system management / connector on planar / Remote Supervisor Adapter II card not supported        | Opteron 248 Processor Upgrade<br>Opteron 250 Processor Upgrade  | 13N0701<br>13N0702   |
| Diagnostics                | Diagnostic LEDs for fans, memory DIMMs and processors only / Light Path Diagnostics not supported                        | 512MB PC2700 CL2.5 ECC DDR-SDRAM RDIMM<br>1GB PC2700 CL2.5 ECC DDR-SDRAM RDIMM<br>2GB PC2700 CL2.5 ECC DDR-SDRAM RDIMM  | 73P2266<br>73P2267<br>73P2268                                  |
| Security                   | Power-on password / administrator password / unattended boot / selectable boot / unattended start mode                   | 80GB ATA-100 EIDE HDD*<br>120GB ATA-100 EIDE HDD*   | 09N4226<br>09N4231   |
| Software                   | <b>ServerGuide™</b> (CD-ROM installation and configuration utilities), IBM Director™, and others                         | 36.4GB 15K Ultra320 SCSI Hot-Swap SL HDD*<br>73.4GB 15K Ultra320 SCSI Hot-Swap SL HDD*<br>IBM TotalStorage FC2-133 Host Bus Adapter<br>IBM ServeRAID-6M SCSI (256MB Cache)<br>USB Portable Diskette Drive<br>NetBAY ACT Local Console Manager (LCM) | 32P0734<br>32P0735<br>24P0960<br>02R0988<br>05K9276<br>1735L04 |
| Cooling fans               | Eight fans (five for system, three inside power supply) / variable speed / not redundant or hot-swap                     | NetBAY Remote Console Manager (RCM)<br>1.5M USB Conversion Option   | 1735R16<br>73P5832   |
| Power supply Prerequisites | 411 watt / universal / auto-sensing / auto-restart support<br>Monitor, keyboard, mouse, rack, disk (some), operating sys |   |  |

\* Disk not supported in all e325 systems



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

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

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

Maximum internal disk capacity<sup>13</sup> (model dependent):  
 293.6GB with two 146.8GB SL SCSI disks or  
 240GB with two 120GB EIDE disks

**LIMITED WARRANTY<sup>3</sup>**

- 1 year parts and labor
- International Warranty Service<sup>3</sup>
- On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time<sup>7</sup>
- On site service upgrade options (in eligible locations):<sup>7</sup>
  - 1 year IOR 9x5, 4 hr avg response (ServicePac® part num 69P9399)
  - 2 year IOR 24x7, 4 hr avg response (ServicePac part num 96P2119)
  - 2 year IOR 24x7, 2 hr avg response (ServicePac part num 96P2120)
  - 3 year IOR 24x7, 4 hr avg response (ServicePac part num 69P9507)
  - 3 year IOR 9x5, NBD response (ServicePac part num 69P9506)
- Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- 24x7<sup>14</sup> toll-free support for warranty issues during the warranty period<sup>3</sup>

See footnotes for important warranty information

• = Hot-swap in some models

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



| IBM® Type-GAV  | Qty x Processor/Core | Speed               | L2 Cache | Memory           | Disk / Controller | Disk bays  | Slots x bays | Ethernet     | Limited warranty <sup>3</sup> | Available date |
|----------------|----------------------|---------------------|----------|------------------|-------------------|------------|--------------|--------------|-------------------------------|----------------|
| 7969 - 46y-46x | 1 x Opteron®265/DC   | 1.8GHz <sup>1</sup> | 2MB      | 2x512MB Chipkill | 80GB/SATA         | 2 fixed    | 2x3          | Dual Gigabit | 1 year                        | Oct 2005       |
| 7969 - 55y-55x | 1 x Opteron 270/DC   | 2.0GHz              | 2MB      | 2x512MB Chipkill | none/Ultra320     | 2 hot-swap | 2x3          | Dual Gigabit | 1 year                        | Oct 2005       |
| 7969 - 56y-56x | 1 x Opteron 270/DC   | 2.0GHz              | 2MB      | 2x512MB Chipkill | 80GB/SATA         | 2 fixed    | 2x3          | Dual Gigabit | 1 year                        | Oct 2005       |
| 7969 - 65y-65x | 1 x Opteron 275/DC   | 2.2GHz              | 2MB      | 2x512MB Chipkill | none/Ultra320     | 2 hot-swap | 2x3          | Dual Gigabit | 1 year                        | Oct 2005       |
| 7969 - 66y-66x | 1 x Opteron 275/DC   | 2.2GHz              | 2MB      | 2x512MB Chipkill | 80GB/SATA         | 2 fixed    | 2x3          | Dual Gigabit | 1 year                        | Oct 2005       |
| 7969 - 67y-67x | 2 x Opteron 275/DC   | 2.2GHz              | 2x2MB    | 4x1GB Chipkill   | 2x36GB/Ultra320   | 2 hot-swap | 2x3          | Dual Gigabit | 1 year                        | Oct 2005       |
| 7969 - 68y-68x | 2 x Opteron 275/DC   | 2.2GHz              | 2x2MB    | 4x1GB Chipkill   | 80GB/SATA         | 2 fixed    | 2x3          | Dual Gigabit | 1 year                        | Oct 2005       |
| 7969 - 75y-75x | 1 x Opteron 280/DC   | 2.4GHz              | 2MB      | 2x512MB Chipkill | none/Ultra320     | 2 hot-swap | 2x3          | Dual Gigabit | 1 year                        | Oct 2005       |
| 7969 - 76y-76x | 1 x Opteron 280/DC   | 2.4GHz              | 2MB      | 2x512MB Chipkill | 80GB/SATA         | 2 fixed    | 2x3          | Dual Gigabit | 1 year                        | Oct 2005       |
| 7969 - 81y-81x | 1 x Opteron 252/SC   | 2.6GHz              | 1MB      | 2x512MB Chipkill | none/Ultra320     | 2 hot-swap | 2x3          | Dual Gigabit | 1 year                        | Oct 2005       |
| 7969 - 82y-82x | 1 x Opteron 252/SC   | 2.6GHz              | 1MB      | 2x512MB Chipkill | 80GB/SATA         | 2 fixed    | 2x3          | Dual Gigabit | 1 year                        | Oct 2005       |
| 7969 - 91y-91x | 1 x Opteron 254/SC   | 2.8GHz              | 1MB      | 2x512MB Chipkill | none/Ultra320     | 2 hot-swap | 2x3          | Dual Gigabit | 1 year                        | Oct 2005       |
| 7969 - 92y-92x | 1 x Opteron 254/SC   | 2.8GHz              | 1MB      | 2x512MB Chipkill | 80GB/SATA         | 2 fixed    | 2x3          | Dual Gigabit | 1 year                        | Oct 2005       |

**Positioning Processor(s)** **Entry 2-way rack server for compute-intensive applications and dual core computing at an attractive price**  
**Up to 2 x AMD® Opteron™ 280 Dual Core or 254 Single Core** / 800Mhz HyperTransport technology / Simultaneously supports 32-bit and 64-bit computing

**L2 cache** **1MB** / per core / at processor speed (no L3 cache)

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

**Implementation** Systemboard contains two AMD Socket 940 micro-PGA ZIF sockets, eight memory DIMM slots, integrated SATA or SCSI, ethernet, graphics, one PCI-E x8 and one 64-bit 133/100MHz PCI-X (option to convert PCI-X slot to second PCI-E x8)

**Memory** **1GB** std / 16GB max<sup>13</sup> / four slots enabled with uni-processor, eight with dual / two slots used / six slots available / **PC3200** registered 184-pin ECC DDR-SDRAM DIMMs / eight DIMM gold-connector slots on systemboard / DIMMs must be installed in matched pairs [a bank] / 2-way memory interleave / dual channel / memory bus runs at 2 x 100MHz / **Chipkill™** supported

**SCSI disk controller** *All (not used on SATA models): LSI Logic® 53C1020 / Ultra320 SCSI controller* (LVD 320MB/sec) / on planar / 64-bit 100MHz PCI-X Bus B / supports **RAID-1 mirroring** (Embedded Mirroring) with two SCSI disks in front bays / one 16-bit internal channel / 16-bit 68-pin LVD cable from systemboard to backplane for two disks / no external connector

**SATA controller/cable** *All: SATA-150 controller / two connectors on planar / two 1-drop cables / 1 IDE*

**Disk - capacity** *SCSI models: some: open some: 36GB; SATA models: 80GB / 7200 rpm / 9.0ms seek*

**Disk - bays** *SCSI models: two hot-swap / 80-pin SCA-2 connectors / filler panels in each disk bay / all disk bays Ultra320-enabled, supports 15k drives*

**Mechanical Architecture/chipsets** **EIA 19" Rack (1U<sup>4</sup>)** / rack-mount only / supported in 26" deep racks such as the IBM NetBAY™ Rack products **ServerWorks HT2000 System I/O controller** connects to the processor sub-system via a 16x Hyper Transport Bus at 1GHz and provides PCI-E, PCI-X and Dual Gigabit Ethernet / **ServerWorks HT1000 South Bridge** interfaces system I/O to the HT2000 via a 8x Hyper Transport bus and provides PCI-X, SATA 2.0, USB 2.0, ATA 100 IDE, SMB, IOAPIC, Event Timer, Watchdog Timer, Interrupt controller and LPCI

**Bus slots** (See detail below) one full-length PCI-X 1.0 and one half length PCI-E x8 / option to convert PCI-X slot to PCI-E x8 / no hot-swap Active™ PCI slots

**Ethernet controllers** Two gigabit 10/100/1000 ethernet ports / Broadcom BCM5780 / two full gigabit ethernet MAC and PHY layer functions / on planar / PCI-X 64-bit 100MHz / full duplex / Wake on LAN® / two rear RJ-45 ports

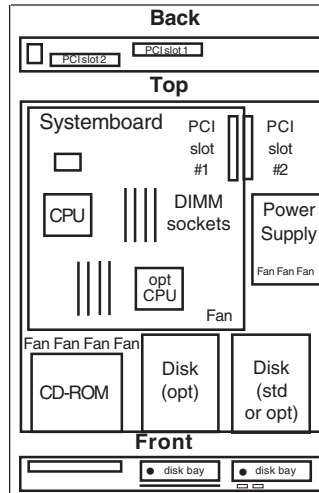
**Optical/diskette/kbd** 24X-10X<sup>6</sup> CD-ROM / IDE / *Diskette and keyboard: none* (USB diskette and keyboard optional); legacy not supported

**Rear ports** *Rear: two USB (Vers 2.0), serial (9-pin), two ethernet (RJ-45) / parallel port not supported*

**Front ports / graphics** *Front: two USB (Vers 2.0); Graphics: SVGA / ATI® RN50b / on planar / 16MB SDRAM std/max / 1024x768x32bit@85Hz*

**Console interconnects** *C2T Interconnect™ cabling not supported / NetBay Local Console Manager (LCM), NetBay Remote Console Manager (RCM), and USB Conversion Option (UCO) are supported*

|                      |  |  |   |
|----------------------|--|--|---|
| <b>Systems mgmt</b>  | Standard MS-9549 QLogic system management / IPMI 1.5 compliant / connector on planar / Remote Supervisor Adapter II optional   | Opteron 252 Processor Upgrade<br>Opteron 254 Processor Upgrade<br>Opteron 265 Processor Upgrade<br>Opteron 270 Processor Upgrade<br>Opteron 275 Processor Upgrade<br>Opteron 280 Processor Upgrade   | 13N0703<br>32R2215<br>32R2021<br>25R8960<br>32R2023<br>25R8966<br>39M5800 |
| <b>Diagnostics</b>   | Diagnostic LEDs for fans, memory DIMMs and processors / PFA / Light Path Diagnostics not supported   | 1GB PC3200 CL3 ECC DDR-SDRAM kit<br>2GB PC3200 CL3 ECC DDR-SDRAM kit<br>80GB SATA-150 7.2k HDD<br>160GB SATA-150 7.2k HDD<br>73GB 15K Ultra320 SCSI Hot-Swap HDD<br>146GB 15K Ultra320 SCSI Hot-Swap HDD<br>146.4GB 10K Ultra320 SCSI Hot-Swap SL HDD<br>300GB 10K Ultra320 SCSI Hot-Swap SL HDD | 39M5803<br>39M4503<br>25R6903<br>90P1319<br>40K1028<br>40K1024<br>40K1025 |
| <b>Security</b>      | Power-on password / administrator password / Secure Power On/Off / unattended boot / selectable boot / unattended start mode / text console redirect via serial over LAN | IBM TotalStorage FC2-133 Host Bus Adaptor<br>IBM ServeRAID-6M SCSI (256MB Cache)<br>USB Portable Diskette Drive  | 24P0960<br>02R0988<br>05K9276   |
| <b>Software</b>      | <b>ServerGuide™</b> (CD-ROM installation and configuration utilities), IBM Director™, and others   |  |   |
| <b>Cooling fans</b>  | Eight fans (five for system, three inside power supply) / Calibrated Vector Cooling™ / variable speed / not redundant / not hot-swap                                     |  |   |
| <b>Power supply</b>  | 411 watt / universal / auto-sensing / auto-restart support   |  |   |
| <b>Prerequisites</b> | Monitor, keyboard, mouse, rack, disk (some), os  |  |   |



Slot 1: full-length, 64-bit 133/100MHz PCI X 1.0 (3.3v) std. / full-length, PCI-E x8 option  
 Slot 2: half-length, PCI-E x8

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

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

Maximum internal disk capacity<sup>13</sup> (model dependent):  
 600GB with two 300GB SL SCSI disks or  
 320GB with two 160GB SATA disks

**LIMITED WARRANTY<sup>3</sup>**

- 1 year parts and labor
- International Warranty Service<sup>3</sup>
- On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time<sup>7</sup>
- On site service upgrade options (in eligible locations):<sup>7</sup>
  - 1 year IOR 9x5, 4 hr avg response (ServicePac® partnum 69P9399)
  - 2 year IOR 24x7, 4 hr avg response (ServicePac partnum 96P2119)
  - 2 year IOR 24x7, 2 hr avg response (ServicePac partnum 96P2120)
  - 3 year IOR 24x7, 4 hr avg response (ServicePac partnum 69P9507)
  - 3 year IOR 9x5, NBD response (ServicePac partnum 69P9505)
- Other ServicePac options at [www.ibm.com/services/us/its/pdf/wamomxeu.pdf](http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf)
- 24x7<sup>14</sup> toll-free support for warranty issues during the warranty period<sup>3</sup>

| IBM® Type-GAV  | Qty x Processor/Core | Speed               | L2 Cache | Memory           | Disk / Controller | Disk bays  | Slots x bays | Ethernet     | Limited warranty <sup>3</sup> | Available date |
|----------------|----------------------|---------------------|----------|------------------|-------------------|------------|--------------|--------------|-------------------------------|----------------|
| 7969 - 85y-85x | 1 x Opteron®285/DC   | 2.6GHz <sup>1</sup> | 2MB      | 2x512MB Chipkill | none/Ultra320     | 2 hot-swap | 2x3          | Dual Gigabit | 1 year                        | Apr 2006       |
| 7969 - 86y-86x | 1 x Opteron 285/DC   | 2.6GHz              | 2MB      | 2x512MB Chipkill | 80GB/SATA         | 2 fixed    | 2x3          | Dual Gigabit | 1 year                        | Apr 2006       |

|                                  |   |  |  |  |  |  |  |  |  |  |
|----------------------------------|---|--|--|--|--|--|--|--|--|--|
| Positioning Processor(s)         | <b>Entry 2-way rack server for compute-intensive applications and dual core computing at an attractive price</b><br>Up to 2 x AMD® Opteron™ 285 Dual Core or 254 Single Core / 800Mhz HyperTransport technology / Simultaneously supports 32-bit and 64-bit computing   |  |  |  |  |  |  |  |  |  |
| L2 cache                         | 1MB / per core / at processor speed (no L3 cache)   |  |  |  |  |  |  |  |  |  |
| SMP support                      | 2-way SMP / up to two Opteron Processors (same speed/cache size required)   |  |  |  |  |  |  |  |  |  |
| Implementation                   | Systemboard contains two AMD Socket 940 micro-PGA ZIF sockets, eight memory DIMM slots, integrated SATA or SCSI, ethernet, graphics, one PCI-E x8 and one 64-bit 133/100Mhz PCI-X (option to convert PCI-X slot to second PCI-E x8)   |  |  |  |  |  |  |  |  |  |
| Memory                           | 1GB std / 16GB max <sup>13</sup> / four slots enabled with uni-processor, eight with dual / two slots used / six slots available / PC3200 registered 184-pin ECC DDR-SDRAM DIMMs / eight DIMM gold-connector slots on systemboard / DIMMs must be installed in matched pairs [a bank] / 2-way memory interleave / dual channel / memory bus runs at 2 x 100MHz / Chipkill™ supported  |  |  |  |  |  |  |  |  |  |
| SCSI disk controller             | All (not used on SATA models): LSI Logic® 53C1020 / Ultra320 SCSI controller (LVD 320MB/sec) / on planar / 64-bit 100MHz PCI-X Bus B / supports RAID-1 mirroring (Embedded Mirroring) with two SCSI disks in front bays / one 16-bit internal channel / 16-bit 68-pin LVD cable from systemboard to backplane for two disks / no external connector   |  |  |  |  |  |  |  |  |  |
| SATA controller/cable            | All: SATA-150 controller / two connectors on planar / two 1-drop cables / 1 IDE   |  |  |  |  |  |  |  |  |  |
| Disk - capacity                  | SCSI models: some: open some: 36GB; SATA models: 80GB / 7200 rpm / 9.0ms seek   |  |  |  |  |  |  |  |  |  |
| Disk - bays                      | SCSI models: two hot-swap / 80-pin SCA-2 connectors / filler panels in each disk bay / all disk bays Ultra320-enabled, supports 15k drives  |  |  |  |  |  |  |  |  |  |
| Mechanical Architecture/chipsets | EIA 19" Rack (1U <sup>4</sup> ) / rack-mount only / supported in 26" deep racks such as the IBM NetBAY™ Rack products<br>ServerWorks HT2000 System I/O controller connects to the processor sub-system via a 16x Hyper Transport Bus at 1GHz and provides PCI-E, PCI-X and Dual Gigabit Ethernet / ServerWorks HT1000 South Bridge interfaces system I/O to the HT2000 via a 8x Hyper Transport bus and provides PCI-X, SATA 2.0, USB 2.0, ATA 100 IDE, SMB, IOAPIC, Event Timer, Watchdog Timer, Interrupt controller and LPC1 |  |  |  |  |  |  |  |  |  |
| Bus slots                        | (See detail below) one full-length PCI-X 1.0 and one half length PCI-E x8 / option to convert PCI-X slot to PCI-E x8 / no hot-swap Active™ PCI slots  |  |  |  |  |  |  |  |  |  |
| Ethernet controllers             | Two gigabit 10/100/1000 ethernet ports / Broadcom BCM5780 / two full gigabit ethernet MAC and PHY layer functions / on planar / PCI-X 64-bit 100MHz / full duplex / Wake on LAN® / two rear RJ-45 ports   |  |  |  |  |  |  |  |  |  |
| Optical/diskette/kbd             | 24X-10X <sup>6</sup> CD-ROM / IDE / Diskette and keyboard: none (USB diskette and keyboard optional); legacy not supported  |  |  |  |  |  |  |  |  |  |
| Rear ports                       | Rear: two USB (Vers 2.0), serial (9-pin), two ethernet (RJ-45) / parallel port not supported  |  |  |  |  |  |  |  |  |  |
| Front ports / graphics           | Front: two USB (Vers 2.0); Graphics: SVGA / ATI® RN50b / on planar / 16MB SDRAM std/max / 1024x768x32bit@85Hz   |  |  |  |  |  |  |  |  |  |
| Console interconnects            | C2T Interconnect™ cabling not supported / NetBay Local Console Manager (LCM), NetBay Remote Console Manager (RCM), and USB Conversion Option (UCO) are supported  |  |  |  |  |  |  |  |  |  |
| Systems mgmt                     | Standard MS-9549 QLogic system management / IPMI 1.5 compliant / connector on planar / Remote Supervisor Adapter II optional  |  |  |  |  | Opteron 254 Processor Upgrade<br>Opteron 265 Processor Upgrade<br>Opteron 275 Processor Upgrade<br>Opteron 285 Processor Upgrade   |  |  |  |  |
| Diagnostics                      | Diagnostic LEDs for fans, memory DIMMs and processors / PFA / Light Path Diagnostics not supported  |  |  |  |  | 1GB PC3200 CL3 ECC DDR-SDRAM kit<br>2GB PC3200 CL3 ECC DDR-SDRAM kit<br>80GB SATA-150 7.2k HDD<br>160GB SATA-150 7.2k HDD  |  |  |  |  |
| Security                         | Power-on password / administrator password / Secure Power On/Off / unattended boot / selectable boot / unattended start mode / text console redirect via serial over LAN  |  |  |  |  | 73GB 15K Ultra320 SCSI Hot-Swap HDD<br>146GB 15K Ultra320 SCSI Hot-Swap HDD<br>146.4GB 10K Ultra320 SCSI Hot-Swap SL HDD<br>300GB 10K Ultra320 SCSI Hot-Swap SL HDD<br>IBM TotalStorage FC2-133 Host Bus Adapter<br>IBM ServeRAID-6M SCSI (256MB Cache)<br>USB Portable Diskette Drive |  |  |  |  |
| Software                         | ServerGuide™ (CD-ROM installation and configuration utilities), IBM Director™, and others   |  |  |  |  | 25R6903<br>90P1319<br>40K1028<br>40K1024<br>40K1025<br>24P0960<br>02R0988<br>05K9276   |  |  |  |  |
| Cooling fans                     | Eight fans (five for system, three inside power supply) / Calibrated Vector Cooling™ / variable speed / not redundant / not hot-swap  |  |  |  |  |  |  |  |  |  |
| Power supply                     | 411 watt / universal / auto-sensing / auto-restart support  |  |  |  |  |  |  |  |  |  |
| Prerequisites                    | Monitor, keyboard, mouse, rack, disk (some), os   |  |  |  |  |  |  |  |  |  |

Slot 1: full-length, 64-bit 133/100MHz PCI X 1.0 (3.3v) std. / full-length, PCI-E x8 option  
Slot 2: half-length, PCI-E x8

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

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

Maximum internal disk capacity<sup>13</sup> (model dependent):  
600GB with two 300GB SL SCSI disks or  
320GB with two 160GB SATA disks

**LIMITED WARRANTY<sup>3</sup>**

- ❖ 1 year parts and labor
- ❖ International Warranty Service<sup>3</sup>
- ❖ On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time<sup>7</sup>
- ❖ On site service upgrade options (in eligible locations):<sup>7</sup>
  - 1 year IOR 9x5, 4 hr avg response (ServicePac® partnum 69P9399)
  - 2 year IOR 24x7, 4 hr avg response (ServicePac partnum 96P2119)
  - 2 year IOR 24x7, 2 hr avg response (ServicePac partnum 96P2120)
  - 3 year IOR 24x7, 4 hr avg response (ServicePac partnum 69P9507)
  - 3 year IOR 9x5, NBD response (ServicePac partnum 69P9505)
- ❖ Other ServicePac options at [www.ibm.com/services/us/its/pdf/wamomxeu.pdf](http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf)
- ❖ 24x7<sup>14</sup> toll-free support for warranty issues during the warranty period<sup>3</sup>

| IBM® Type-GAV-model | Qty x Processor  | L2 cache | Memory | Disk            | Disk controller | Optical | Power Supply | Disk bays   | Slots x bays | Ethernet    | Limited warranty <sup>3</sup> | Available date |
|---------------------|------------------|----------|--------|-----------------|-----------------|---------|--------------|-------------|--------------|-------------|-------------------------------|----------------|
| 8837-15y-15x        | 1 x Xeon® 3.0GHz | 2MB      | 1GB    | None (open 3.5) | Ultra320        | DVD     | 585W         | 2 hot-swap  | 2x3          | 2 x Gigabit | 3 year                        | Mar 2005       |
| 8837-1Vy-1Vx        | 1 x Xeon 3.0GHz  | 2MB      | 1GB    | None (open 2.5) | Ultra320        | None    | 585W         | 4 hot-swap  | 2x4          | 2 x Gigabit | 3 year                        | Mar 2005       |
| 8837-16y-16x        | 1 x Xeon 3.0GHz  | 2MB      | 1GB    | None (open 3.5) | SATA            | DVD     | 585W         | 2 simple-sp | 2x3          | 2 x Gigabit | 3 year                        | Mar 2005       |
| 8837-25y-25x        | 1 x Xeon 3.2GHz  | 2MB      | 1GB    | None (open 3.5) | Ultra320        | DVD     | 585W         | 2 hot-swap  | 2x3          | 2 x Gigabit | 3 year                        | Mar 2005       |
| 8837-35y-35x        | 1 x Xeon 3.4GHz  | 2MB      | 1GB    | None (open 3.5) | Ultra320        | DVD     | 585W         | 2 hot-swap  | 2x3          | 2 x Gigabit | 3 year                        | Mar 2005       |
| 8837-3Vy-3Vx        | 1 x Xeon 3.4GHz  | 2MB      | 1GB    | None (open 2.5) | Ultra320        | None    | 585W         | 4 hot-swap  | 2x4          | 2 x Gigabit | 3 year                        | Mar 2005       |
| 8837-36y-36x        | 1 x Xeon 3.4GHz  | 2MB      | 1GB    | None (open 3.5) | SATA            | DVD     | 585W         | 2 simple-sp | 2x3          | 2 x Gigabit | 3 year                        | Mar 2005       |
| 8837-45y-45x        | 1 x Xeon 3.6GHz  | 2MB      | 1GB    | None (open 3.5) | Ultra320        | DVD     | 585W         | 2 hot-swap  | 2x3          | 2 x Gigabit | 3 year                        | Mar 2005       |
| 8837-E1y-E1x        | 1 x Xeon 3.0GHz  | 2MB      | 2GB    | None (open 3.5) | Ultra320        | DVD     | 585W         | 2 hot-swap  | 2x3          | 2 x Gigabit | 3 year                        | Mar 2005       |
| 8837-E2y-E2x        | 1 x Xeon 3.0GHz  | 2MB      | 2GB    | None (open 2.5) | Ultra320        | None    | 585W         | 4 hot-swap  | 2x4          | 2 x Gigabit | 3 year                        | Mar 2005       |

Positioning Processor(s) Cache SMP support Implementation  
**A highly manageable, ultra-dense 1U, 2-way server that delivers performance computing in space-constrained environments**  
**1 x Intel® Xeon 3.0, 3.2, 3.4, 3.6GHz with 800MHz / 2MB L2 Cache / Extended Memory 64 Technology (EM64T)**  
**2MB L2 cache** on all models / on die of processor / at processor speed / ECC  
**2-way SMP** / up to two Xeon Processors (same speed/cache size)  
 Systemboard contains two Intel 604 pin micro-PGA ZIF sockets, eight DIMM slots, two PCI-X slots (one full length 133MHz, one low-profile 100MHz) and integrated SCSI or SATA, dual GB ethernet, graphics

Memory **1GB** std / 16GB max<sup>13</sup> / 8 slots (6 avail) / **PC2-3200** 400MHz registered 240-pin ECC DDR2-SDRAM DIMMs / eight DIMM gold-connector slots on systemboard / DIMMs must be installed in matched pairs [a bank] / 2-way memory interleave / dual channel / **Active Memory™**: online spare and memory mirror / **Error Checking and Correcting (ECC)**

SCSI disk controller **LSI Logic® 53C1020 / Ultra320 SCSI controller** (LVD 320MB/sec) / on planar / supports **RAID-1 mirroring** (Embedded Mirroring) with two SCSI disks in front bays / one 16-bit internal channel / no external connector  
 SATA disk Controller Enhanced SATA-150 (150MB/sec) controller / two connectors on planar / two one-drop cables  
 IDE controller / cable Disk - MAX capacity one 1-drop EIDE cable to DVD-ROM  
**SCSI 3.5:** 292GB with two 146GB HDD **SCSI 2.5:** four 2.5" 73GB HDD **SATA:** 500GB with two 250GB HDD  
**SCSI:** two hot-swap or four 2.5" hot-swap / 80-pin SCA-2 connectors **SATA:** 2 simple-swap

Mechanical Architecture / chipsets **EIA 19" Rack (1U<sup>4</sup>)** / rack-mount only / supported in 26" deep racks such as the IBM NetBAY™ Rack products  
**Intel E7520** / Intel Memory Controller Hub (MCH) / 3 PCI buses (one 64bit/133MHz PCI-X1.0, one 64bit/100MHz PCI-X1.0, and 32bit/33MHz PCI) / Intel PCI-X Bridge (supports 133MHz PCI-X slots 1 & 2, LSI Logic 53C1020) / ICH5R South Bridge (Thin IMB to Host Bridge for graphics controller, EIDE, USB, SMBus, LPC bus to Super I/O) / National PC87427 Super I/O (supports legacy components; keyboard, mouse, serial)  
 Bus slots (See below) two available PCI-X 1.0 / no hot-swap Active™ PCI slots / optional full-length PCI-Express x8 Riser Avail  
 Ethernet controllers Two gigabit 10/100/1000 ethernet ports / Broadcom BCM5721 / two full gigabit ethernet MAC and PHY layer functions / on planar / PCI-X 64-bit 100MHz / full duplex / Wake on LAN® / Alert Standard Format 2.0 / two rear RJ-45 ports  
**Some:** DVD-ROM / IDE; *Diskette:* none  
 Rear ports **Rear:** Two USB (2.0), serial (9-pin), video, two ethernet (RJ-45), one RJ-45 (sys mgmt) / mouse ps2 / keyboard ps2  
 Graphics SVGA / ATI® 7000m / on planar / 16MB SDRAM std/max / 32-bit 33MHz PCI 2.2 bus

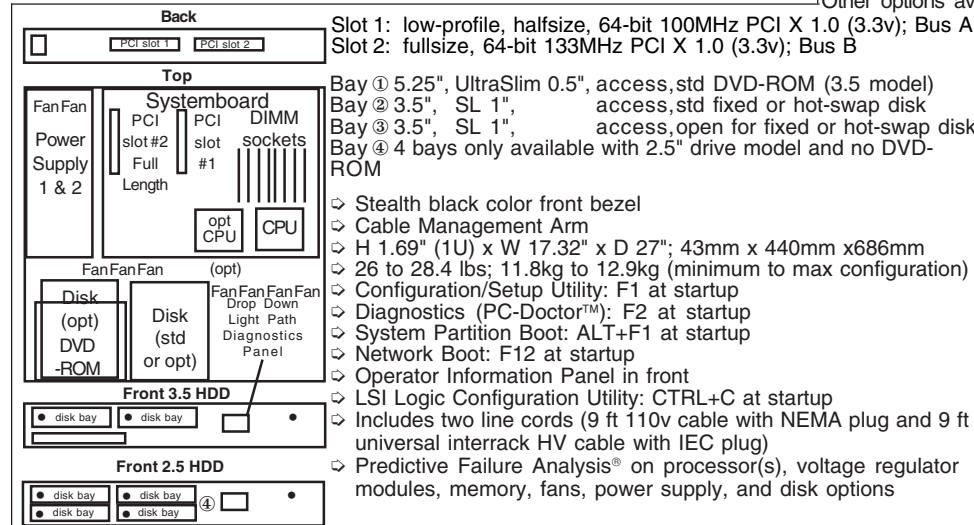
Systems mgmt **IBM Baseboard Management Controller (BMC)** / H8S2168 / on planar / provides system and environmental monitoring such as temp, memory, optional disks, fans, power supply / support for optional Remote Supervisor Adapter II Slimline with 20-pin conn on planar for continuous pwr (no ext pwr req)

Diagnostics **Drop down light path diagnostics** Pull out Front panel (LED lights indicate failing component)

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

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

|   |         |
|---|---------|
| Xeon 3.2GHz/2MB L2 Proc Upg   | 25R8905 |
| Xeon 3.6GHz/2MB L2 Proc Upg   | 13N0667 |
| 512MB (2x256)PC2-3200 CL3 ECC DDR2 RDIMM  | 73P3523 |
| 1GB (2x512)PC2-3200 CL3 ECC DDR2 ChipKill   | 73P2865 |
| 2GB (2x1GB)PC2-3200 CL3 ECC DDR2 ChipKill   | 73P2866 |
| 80GB SATA 7.2K Simple Swap HDD  | 73P8002 |
| 160GB SATA 7.2K Simple Swap HDD   | 73P8003 |
| 73GB 10K Ultra320 SCSI Hot-Swap SL HDD  | 90P1305 |
| 36.4GB 10K Ultra320 SCSI Hot-Swap 2.5" HDD  | 32P0796 |
| ServeRAID 6i+ adaptor   | 13N2190 |
| Remote Supervisor Adapter II slimline   | 73P9341 |
| Second 585W Power supply  | 90P5280 |
| PCI-Express x8 full-length riser card   | 22R9293 |
| Other options available at <a href="http://www.ibm.com/pc/us/accessories">www.ibm.com/pc/us/accessories</a> |         |



**LIMITED WARRANTY<sup>3</sup>**

- 3 year parts and labor
- International Warranty Service<sup>3</sup>
- On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time<sup>7</sup>
- On site service upgrade options (in eligible locations):<sup>7</sup>
  - 3 year IOR 9x5, 4 hr avg response (ServicePac® part num 21P2072)
  - 3 year IOR 24x7, 4 hr avg response (ServicePac part num 21P2073)
  - 3 year IOR 24x7, 2 hr avg response (ServicePac part num 21P2074)
  - 4 year IOR 24x7, 4 hr avg response (ServicePac part num 69P9244)
  - 5 year IOR 9x5, NBD response (ServicePac part num 69P9246)
- Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- 24x7<sup>14</sup> toll-free support for warranty issues during the warranty period<sup>3</sup>

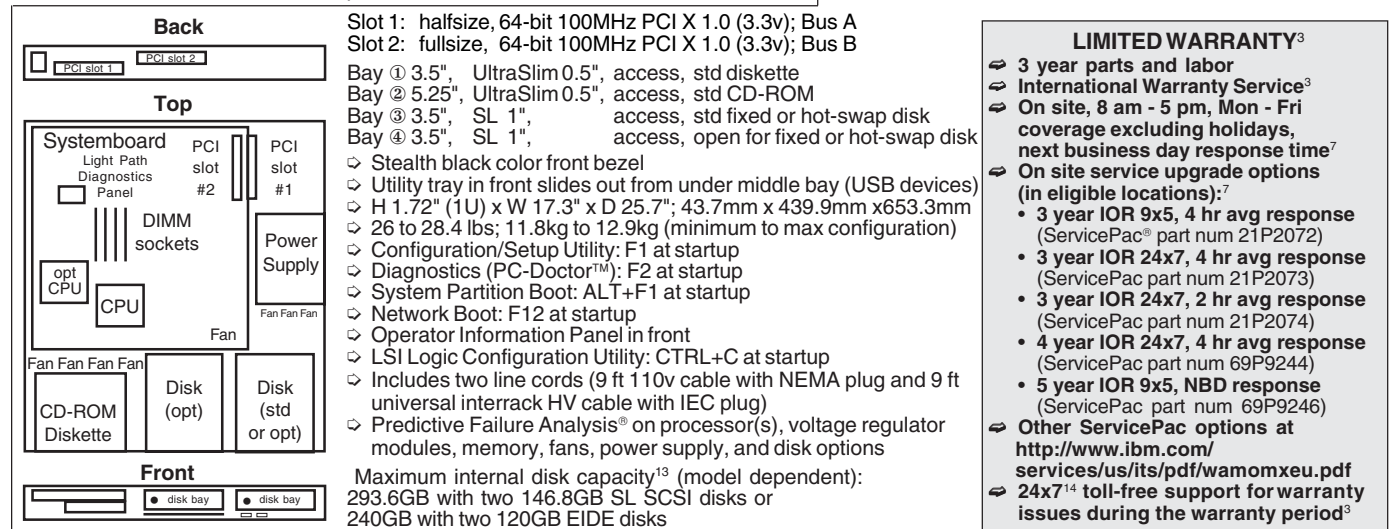
See footnotes for important warranty information  
 • = Hot-swap in some models



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

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

| Positioning  | <i>A highly manageable, ultra-dense 1U, 2-way server that delivers performance computing in space-constrained environments</i>  |         |  |  |  |  |  |  |  |  |  |  |         |  |  |                                      |  |         |                                       |  |         |                                      |  |         |                                      |  |         |  |  |         |                           |  |         |                                      |  |         |  |  |         |                                  |  |         |
|--|---|---------|--|--|--|--|--|--|--|--|--|--|---------|--|--|--------------------------------------|--|---------|---------------------------------------|--|---------|--------------------------------------|--|---------|--------------------------------------|--|---------|--|--|---------|---------------------------|--|---------|--------------------------------------|--|---------|--|--|---------|----------------------------------|--|---------|
| Processor(s)   | <b>1 x Intel® Xeon 2.8BGHz<sup>1</sup></b> with 533MHz frontside bus / Hyper-Threading technology   |         |  |  |  |  |  |  |  |  |  |  |         |  |  |                                      |  |         |                                       |  |         |                                      |  |         |                                      |  |         |  |  |         |                           |  |         |                                      |  |         |  |  |         |                                  |  |         |
| L2 cache   | <b>512KB</b> / on die of processor / at processor speed (no L3 cache)   |         |  |  |  |  |  |  |  |  |  |  |         |  |  |                                      |  |         |                                       |  |         |                                      |  |         |                                      |  |         |  |  |         |                           |  |         |                                      |  |         |  |  |         |                                  |  |         |
| SMP support  | <b>2-way SMP</b> / up to two Xeon Processors (same speed/cache size)  |         |  |  |  |  |  |  |  |  |  |  |         |  |  |                                      |  |         |                                       |  |         |                                      |  |         |                                      |  |         |  |  |         |                           |  |         |                                      |  |         |  |  |         |                                  |  |         |
| Implementation   | Systemboard contains two Intel 603-pin micro-PGA ZIF sockets, four memory DIMM slots, connector for one PCI-X slot, riser for one PCI-X slot, and integrated SCSI, ethernet, graphics   |         |  |  |  |  |  |  |  |  |  |  |         |  |  |                                      |  |         |                                       |  |         |                                      |  |         |                                      |  |         |  |  |         |                           |  |         |                                      |  |         |  |  |         |                                  |  |         |
| Memory   | <b>512MB</b> std / 8GB max <sup>13</sup> / two slots used / two slots available / <b>PC2100</b> 266MHz registered 184-pin ECC DDR-SDRAM DIMMs / four DIMM gold-connector slots on systemboard / DIMMs must be installed in matched pairs [a bank] / 2-way memory interleave / dual channel / memory bus runs at 2 x 100MHz / <b>Error Checking and Correcting (ECC)</b> via <b>16-bit Checksum Chipkill™</b> (corrects 1, 2, 3, or 4-bit errors on same chip and detects 2- through 8-bit errors contained in two chips)  |         |  |  |  |  |  |  |  |  |  |  |         |  |  |                                      |  |         |                                       |  |         |                                      |  |         |                                      |  |         |  |  |         |                           |  |         |                                      |  |         |  |  |         |                                  |  |         |
| SCSI disk controller   | <i>All (not used on EIDE models): LSI Logic® 53C1020 / Ultra320 SCSI controller</i> (LVD 320MB/sec) / on planar / 64-bit 100MHz PCI-X Bus B / supports <b>RAID-1 mirroring</b> (Embedded Mirroring) with two SCSI disks in front bays / one 16-bit internal channel / 16-bit 68-pin LVD cable from systemboard to backplane for two disks / no external connector   |         |  |  |  |  |  |  |  |  |  |  |         |  |  |                                      |  |         |                                       |  |         |                                      |  |         |                                      |  |         |  |  |         |                           |  |         |                                      |  |         |  |  |         |                                  |  |         |
| IDE controller / cable   | <i>All:</i> Enhanced IDE ATA-100 controller in CSB5 South Bridge / two connectors on planar / one 1-drop IDE cable (CD-ROM) <i>EIDE models:</i> One 2-drop EIDE cable to two disk bays / one 1-drop EIDE cable to CD-ROM  |         |  |  |  |  |  |  |  |  |  |  |         |  |  |                                      |  |         |                                       |  |         |                                      |  |         |                                      |  |         |  |  |         |                           |  |         |                                      |  |         |  |  |         |                                  |  |         |
| Disk - capacity  | <i>SCSI models:</i> none standard / supports up to 15000 rpm disks; <i>EIDE models:</i> 40GB / 7200 rpm / ATA-100 / 8.7ms seek  |         |  |  |  |  |  |  |  |  |  |  |         |  |  |                                      |  |         |                                       |  |         |                                      |  |         |                                      |  |         |  |  |         |                           |  |         |                                      |  |         |  |  |         |                                  |  |         |
| Disk - bays  | <i>SCSI models:</i> two hot-swap / 80-pin SCA-2 connectors / filler panels in each disk bay / <b>all disk bays Ultra320-enabled</b>   |         |  |  |  |  |  |  |  |  |  |  |         |  |  |                                      |  |         |                                       |  |         |                                      |  |         |                                      |  |         |  |  |         |                           |  |         |                                      |  |         |  |  |         |                                  |  |         |
| Mechanical Architecture / chipsets   | <b>EIA 19" Rack (1U<sup>4</sup>)</b> / rack-mount only / supported in 26" deep racks such as the IBM NetBAY™ Rack products <b>ServerWorks® Grand Champion™ 4.0 LE</b> / CMIC LE Host Bridge (memory controller and I/O Bridge) / one CIOB-X2 I/O Bridge (IMB2 bus to Host Bridge for PCI-X Bus A with slot 1 and dual ethernet and PCI-X Bus B with slot 2 and Ultra320 / CSB5 South Bridge (Thin IMB to Host Bridge for PCI 2.2 Bus C with graphics controller, EIDE, USB, SMBus, LPC bus to Super I/O) / National Semiconductor® PC87417 Super I/O chip   |         |  |  |  |  |  |  |  |  |  |  |         |  |  |                                      |  |         |                                       |  |         |                                      |  |         |                                      |  |         |  |  |         |                           |  |         |                                      |  |         |  |  |         |                                  |  |         |
| Bus slots  | (See below) two available PCI-X 1.0 / no hot-swap Active™ PCI slots   |         |  |  |  |  |  |  |  |  |  |  |         |  |  |                                      |  |         |                                       |  |         |                                      |  |         |                                      |  |         |  |  |         |                           |  |         |                                      |  |         |  |  |         |                                  |  |         |
| Ethernet controllers   | Two gigabit 10/100/1000 ethernet ports / Broadcom BCM5703 / two full gigabit ethernet MAC and PHY layer functions / on planar / PCI-X 64-bit 100MHz Bus A / full duplex / Wake on LAN® / Alert Standard Format 1.0 / two rear RJ-45 ports   |         |  |  |  |  |  |  |  |  |  |  |         |  |  |                                      |  |         |                                       |  |         |                                      |  |         |                                      |  |         |  |  |         |                           |  |         |                                      |  |         |  |  |         |                                  |  |         |
| CD-ROM / diskette  | 24X-10X <sup>6</sup> CD-ROM / IDE; <i>Diskette:</i> 3.5" 1.44MB diskette drive / dust cover   |         |  |  |  |  |  |  |  |  |  |  |         |  |  |                                      |  |         |                                       |  |         |                                      |  |         |                                      |  |         |  |  |         |                           |  |         |                                      |  |         |  |  |         |                                  |  |         |
| Rear ports   | <i>Rear:</i> one USB (Vers 1.1), C2T in, C2T out, serial (9-pin), two ethernet (RJ-45), one RS-485 (sys mgmt) / no parallel port  |         |  |  |  |  |  |  |  |  |  |  |         |  |  |                                      |  |         |                                       |  |         |                                      |  |         |                                      |  |         |  |  |         |                           |  |         |                                      |  |         |  |  |         |                                  |  |         |
| Front ports / graphics   | <i>Front:</i> two USB (Vers 1.1); <i>Graphics:</i> SVGA / ATI® Rage XL / on planar / 8MB SDRAM std/max / 32-bit 33MHz PCI 2.2 bus   |         |  |  |  |  |  |  |  |  |  |  |         |  |  |                                      |  |         |                                       |  |         |                                      |  |         |                                      |  |         |  |  |         |                           |  |         |                                      |  |         |  |  |         |                                  |  |         |
| Console interconnects  | C2T Interconnect™ cable (10 inch, 245mm) is standard (Keyboard Video Mouse (KVM) chaining cable) / one Cable Chain Technology Cable Kit required at end of chain (a cable with separate keyboard, mouse, monitor connectors)  |         |  |  |  |  |  |  |  |  |  |  |         |  |  |                                      |  |         |                                       |  |         |                                      |  |         |                                      |  |         |  |  |         |                           |  |         |                                      |  |         |  |  |         |                                  |  |         |
| Systems mgmt   | <b>IBM Integrated system management processor (ISMP)</b> / H8S2148 / on planar / provides system and environmental monitoring such as temp, memory, optional disks, fans, power supply / support for optional Remote Supervisor Adapter with 20-pin conn on planar for continuous pwr (no ext pwr req)  |         |  |  |  |  |  |  |  |  |  |  |         |  |  |                                      |  |         |                                       |  |         |                                      |  |         |                                      |  |         |  |  |         |                           |  |         |                                      |  |         |  |  |         |                                  |  |         |
| Diagnostics  | <b>Light Path Diagnostics™</b> (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   | <b>ServerGuide™</b> (CD-ROM installation and configuration utilities), IBM Director™, and others  |         |  |  |  |  |  |  |  |  |  |  |         |  |  |                                      |  |         |                                       |  |         |                                      |  |         |                                      |  |         |  |  |         |                           |  |         |                                      |  |         |  |  |         |                                  |  |         |
| Cooling fans   | Eight fans (five for system, three on power supply) / variable speed / not redundant or hot-swap  |         |  |  |  |  |  |  |  |  |  |  |         |  |  |                                      |  |         |                                       |  |         |                                      |  |         |                                      |  |         |  |  |         |                           |  |         |                                      |  |         |  |  |         |                                  |  |         |
| Power supply   | <b>332 watt (-48 to -60 V dc [direct current])</b> / auto-sensing / supports dual input sources (two power sources) / not redundant / not hot-swap / auto-restart support   |         |  |  |  |  |  |  |  |  |  |  |         |  |  |                                      |  |         |                                       |  |         |                                      |  |         |                                      |  |         |  |  |         |                           |  |         |                                      |  |         |  |  |         |                                  |  |         |
| Prerequisites  | Monitor, keyb., mouse, rack, disk, operating sys, one C2T Kit per chain of servers or NetBAY ACT CAT-5  |         |  |  |  |  |  |  |  |  |  |  |         |  |  |                                      |  |         |                                       |  |         |                                      |  |         |                                      |  |         |  |  |         |                           |  |         |                                      |  |         |  |  |         |                                  |  |         |
|  | <table border="1"> <thead> <tr> <th colspan="3">OPTIONS</th> </tr> </thead> <tbody> <tr> <td>Xeon 2.8BGHz/512KB L2 Cache Proc Upg</td> <td></td> <td>73P6382</td> </tr> <tr> <td>512MB PC2100 CL2.5 ECC DDR-SDRAM DIMM</td> <td></td> <td>33L5038</td> </tr> <tr> <td>1GB PC2100 CL2.5 ECC DDR-SDRAM RDIMM</td> <td></td> <td>33L5039</td> </tr> <tr> <td>2GB PC2100 CL2.5 ECC DDR-SDRAM RDIMM</td> <td></td> <td>33L5040</td> </tr> <tr> <td>36.4GB 15K Ultra320 SCSI Hot-Swap SL HDD</td> <td></td> <td>06P5776</td> </tr> <tr> <td>Remote Supervisor Adapter</td> <td></td> <td>09N7585</td> </tr> <tr> <td>ServeRAID™-4Mx Ultra160 SCSI Adapter</td> <td></td> <td>06P5736</td> </tr> <tr> <td>Cable Chain Technology (C2T) Cable Kit (2 meter breakout cable and 2 meter KVM chaining cable)</td> <td></td> <td>06P4792</td> </tr> <tr> <td>NetBAY ACT Local Console Manager</td> <td></td> <td>1735L04</td> </tr> </tbody> </table> |         |  |  |  |  |  |  |  |  |  |  | OPTIONS |  |  | Xeon 2.8BGHz/512KB L2 Cache Proc Upg |  | 73P6382 | 512MB PC2100 CL2.5 ECC DDR-SDRAM DIMM |  | 33L5038 | 1GB PC2100 CL2.5 ECC DDR-SDRAM RDIMM |  | 33L5039 | 2GB PC2100 CL2.5 ECC DDR-SDRAM RDIMM |  | 33L5040 | 36.4GB 15K Ultra320 SCSI Hot-Swap SL HDD |  | 06P5776 | Remote Supervisor Adapter |  | 09N7585 | ServeRAID™-4Mx Ultra160 SCSI Adapter |  | 06P5736 | Cable Chain Technology (C2T) Cable Kit (2 meter breakout cable and 2 meter KVM chaining cable) |  | 06P4792 | NetBAY ACT Local Console Manager |  | 1735L04 |
| OPTIONS  |   |         |  |  |  |  |  |  |  |  |  |  |         |  |  |                                      |  |         |                                       |  |         |                                      |  |         |                                      |  |         |  |  |         |                           |  |         |                                      |  |         |  |  |         |                                  |  |         |
| Xeon 2.8BGHz/512KB L2 Cache Proc Upg   |   | 73P6382 |  |  |  |  |  |  |  |  |  |  |         |  |  |                                      |  |         |                                       |  |         |                                      |  |         |                                      |  |         |  |  |         |                           |  |         |                                      |  |         |  |  |         |                                  |  |         |
| 512MB PC2100 CL2.5 ECC DDR-SDRAM DIMM  |   | 33L5038 |  |  |  |  |  |  |  |  |  |  |         |  |  |                                      |  |         |                                       |  |         |                                      |  |         |                                      |  |         |  |  |         |                           |  |         |                                      |  |         |  |  |         |                                  |  |         |
| 1GB PC2100 CL2.5 ECC DDR-SDRAM RDIMM   |   | 33L5039 |  |  |  |  |  |  |  |  |  |  |         |  |  |                                      |  |         |                                       |  |         |                                      |  |         |                                      |  |         |  |  |         |                           |  |         |                                      |  |         |  |  |         |                                  |  |         |
| 2GB PC2100 CL2.5 ECC DDR-SDRAM RDIMM   |   | 33L5040 |  |  |  |  |  |  |  |  |  |  |         |  |  |                                      |  |         |                                       |  |         |                                      |  |         |                                      |  |         |  |  |         |                           |  |         |                                      |  |         |  |  |         |                                  |  |         |
| 36.4GB 15K Ultra320 SCSI Hot-Swap SL HDD   |   | 06P5776 |  |  |  |  |  |  |  |  |  |  |         |  |  |                                      |  |         |                                       |  |         |                                      |  |         |                                      |  |         |  |  |         |                           |  |         |                                      |  |         |  |  |         |                                  |  |         |
| Remote Supervisor Adapter  |   | 09N7585 |  |  |  |  |  |  |  |  |  |  |         |  |  |                                      |  |         |                                       |  |         |                                      |  |         |                                      |  |         |  |  |         |                           |  |         |                                      |  |         |  |  |         |                                  |  |         |
| ServeRAID™-4Mx Ultra160 SCSI Adapter   |   | 06P5736 |  |  |  |  |  |  |  |  |  |  |         |  |  |                                      |  |         |                                       |  |         |                                      |  |         |                                      |  |         |  |  |         |                           |  |         |                                      |  |         |  |  |         |                                  |  |         |
| Cable Chain Technology (C2T) Cable Kit (2 meter breakout cable and 2 meter KVM chaining cable) |   | 06P4792 |  |  |  |  |  |  |  |  |  |  |         |  |  |                                      |  |         |                                       |  |         |                                      |  |         |                                      |  |         |  |  |         |                           |  |         |                                      |  |         |  |  |         |                                  |  |         |
| NetBAY ACT Local Console Manager   |   | 1735L04 |  |  |  |  |  |  |  |  |  |  |         |  |  |                                      |  |         |                                       |  |         |                                      |  |         |                                      |  |         |  |  |         |                           |  |         |                                      |  |         |  |  |         |                                  |  |         |



**LIMITED WARRANTY<sup>3</sup>**

- 3 year parts and labor
- International Warranty Service<sup>3</sup>
- On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time<sup>7</sup>
- On site service upgrade options (in eligible locations):<sup>7</sup>
  - 3 year IOR 9x5, 4 hr avg response (ServicePac® part num 21P2072)
  - 3 year IOR 24x7, 4 hr avg response (ServicePac part num 21P2073)
  - 3 year IOR 24x7, 2 hr avg response (ServicePac part num 21P2074)
  - 4 year IOR 24x7, 4 hr avg response (ServicePac part num 69P9244)
  - 5 year IOR 9x5, NBD response (ServicePac part num 69P9246)
- Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- 24x7<sup>14</sup> toll-free support for warranty issues during the warranty period<sup>3</sup>

See footnotes for important warranty information

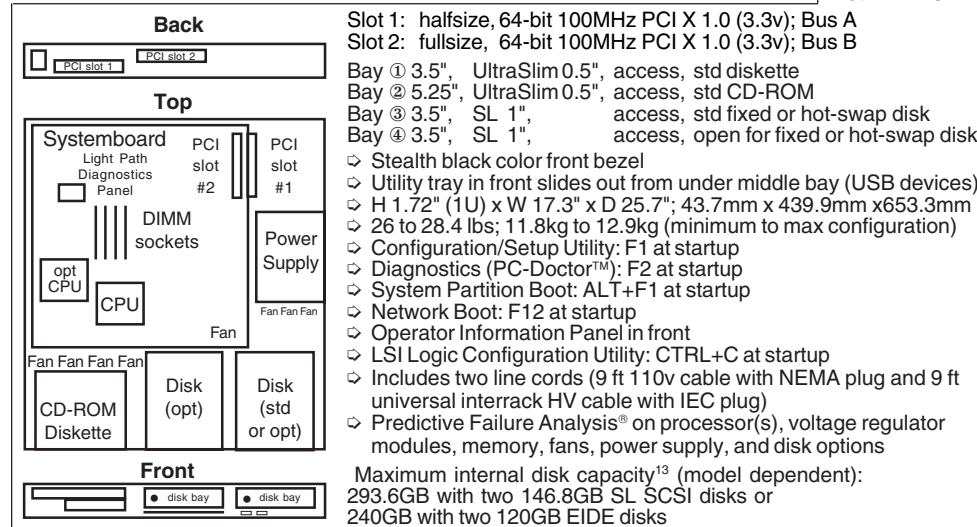
• = Hot-swap

® US models announced February 18, 2003

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

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

|                                    |   |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------------|---|--|--|--|--|--|--|--|--|--|--|--|
| Positioning                        | <i>A highly manageable, ultra-dense 1U, 2-way server that delivers performance computing in space-constrained environments</i>  |  |  |  |  |  |  |  |  |  |  |  |
| Processor(s)                       | <b>1 x Intel® Xeon 2.8BGHz<sup>1</sup></b> with 533MHz frontside bus / Hyper-Threading technology   |  |  |  |  |  |  |  |  |  |  |  |
| L2 cache                           | <b>512KB</b> / on die of processor / at processor speed (no L3 cache)   |  |  |  |  |  |  |  |  |  |  |  |
| SMP support                        | <b>2-way SMP</b> / up to two Xeon Processors (same speed/cache size)  |  |  |  |  |  |  |  |  |  |  |  |
| Implementation                     | Systemboard contains two Intel 603-pin micro-PGA ZIF sockets, four memory DIMM slots, connector for one PCI-X slot, riser for one PCI-X slot, and integrated SCSI, ethernet, graphics   |  |  |  |  |  |  |  |  |  |  |  |
| Memory                             | <b>512MB</b> std / 8GB max <sup>13</sup> / two slots used / two slots available / <b>PC2100</b> 266MHz registered 184-pin ECC DDR-SDRAM DIMMs / four DIMM gold-connector slots on systemboard / DIMMs must be installed in matched pairs [a bank] / 2-way memory interleave / dual channel / memory bus runs at 2 x 100MHz / <b>Error Checking and Correcting (ECC)</b> via <b>16-bit Checksum Chipkill™</b> (corrects 1, 2, 3, or 4-bit errors on same chip and detects 2- through 8-bit errors contained in two chips). Chipkill available on DIMMs of 512MB or greater only. |  |  |  |  |  |  |  |  |  |  |  |
| SCSI disk controller               | <i>All (not used on EIDE models): LSI Logic® 53C1020 / Ultra320 SCSI controller (LVD 320MB/sec) / on planar / 64-bit 100MHz PCI-X Bus B / supports RAID-1 mirroring (Embedded Mirroring) with two SCSI disks in front bays / one 16-bit internal channel / 16-bit 68-pin LVD cable from systemboard to backplane for two disks / no external connector</i>  |  |  |  |  |  |  |  |  |  |  |  |
| IDE controller / cable             | <i>All: Enhanced IDE ATA-100 controller in CSB5 South Bridge / two connectors on planar / one 1-drop IDE cable (CD-ROM) EIDE models: One 2-drop EIDE cable to two disk bays / one 1-drop EIDE cable to CD-ROM</i>   |  |  |  |  |  |  |  |  |  |  |  |
| Disk - capacity                    | <i>SCSI models: none standard / supports up to 15000 rpm disks; EIDE models: 40GB / 7200 rpm / ATA-100 / 8.7ms seek</i>   |  |  |  |  |  |  |  |  |  |  |  |
| Disk - bays                        | <i>SCSI models: two hot-swap / 80-pin SCA-2 connectors / filler panels in each disk bay / all disk bays Ultra320-enabled</i>  |  |  |  |  |  |  |  |  |  |  |  |
| Mechanical Architecture / chipsets | <b>EIA 19" Rack (1U<sup>4</sup>)</b> / rack-mount only / supported in 26" deep racks such as the IBM NetBAY™ Rack products <b>ServerWorks® Grand Champion™ 4.0 LE</b> / CMIC LE Host Bridge (memory controller and I/O Bridge) / one CIOB-X2 I/O Bridge (IMB2 bus to Host Bridge for PCI-X Bus A with slot 1 and dual ethernet and PCI-X Bus B with slot 2 and Ultra320 / CSB5 South Bridge (Thin IMB to Host Bridge for PCI 2.2 Bus C with graphics controller, EIDE, USB, SMBus, LPC bus to Super I/O) / National Semiconductor® PC87417 Super I/O chip                       |  |  |  |  |  |  |  |  |  |  |  |
| Bus slots                          | (See below) two available PCI-X 1.0 / no hot-swap Active™ PCI slots   |  |  |  |  |  |  |  |  |  |  |  |
| Ethernet controllers               | Two gigabit 10/100/1000 ethernet ports / Broadcom BCM5703 / two full gigabit ethernet MAC and PHY layer functions / on planar / PCI-X 64-bit 100MHz Bus A / full duplex / Wake on LAN® / Alert Standard Format 1.0 / two rear RJ-45 ports   |  |  |  |  |  |  |  |  |  |  |  |
| CD-ROM / diskette                  | 24X-10X <sup>6</sup> CD-ROM / IDE; <i>Diskette: 3.5" 1.44MB diskette drive / dust cover</i>   |  |  |  |  |  |  |  |  |  |  |  |
| Rear ports                         | <i>Rear: one USB (Vers 1.1), C2T in, C2T out, serial (9-pin), two ethernet (RJ-45), one RS-485 (sys mgmt) / no parallel port</i>  |  |  |  |  |  |  |  |  |  |  |  |
| Front ports / graphics             | <i>Front: two USB (Vers 1.1); Graphics: SVGA / ATI® Rage XL / on planar / 8MB SDRAM std/max / 32-bit 33MHz PCI 2.2 bus</i>  |  |  |  |  |  |  |  |  |  |  |  |
| Console interconnects              | C2T Interconnect™ cable (10 inch, 245mm) is standard (Keyboard Video Mouse (KVM) chaining cable) / one Cable Chain Technology Cable Kit required at end of chain (a cable with separate keyboard, mouse, monitor connectors)  |  |  |  |  |  |  |  |  |  |  |  |
| Systems mgmt                       | <b>IBM Integrated system management processor (ISMP) / H8S2148</b> / on planar / provides system and environmental monitoring such as temp, memory, optional disks, fans, power supply / support for optional Remote Supervisor Adapter with 20-pin conn on planar for continuous pwr (no ext pwr req)  |  |  |  |  |  |  |  |  |  |  |  |
| Diagnostics                        | <b>Light Path Diagnostics™</b> (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                           | <b>ServerGuide™</b> (CD-ROM installation and configuration utilities), IBM Director™, and others  |  |  |  |  |  |  |  |  |  |  |  |
| Cooling fans                       | Eight fans (five for system, three on power supply) / variable speed / not redundant or hot-swap  |  |  |  |  |  |  |  |  |  |  |  |
| Power supply                       | <b>332 watt (-48 to -60 V dc [direct current])</b> / auto-sensing / supports dual input sources (two power sources) / not redundant / not hot-swap / auto-restart support   |  |  |  |  |  |  |  |  |  |  |  |
| Prerequisites                      | Monitor, keyb., mouse, rack, disk, operating sys, one C2T Kit per chain of servers or NetBAY ACT CAT-5  |  |  |  |  |  |  |  |  |  |  |  |
|                                    | <b>OPTIONS</b>  |  |  |  |  |  |  |  |  |  |  |  |
|                                    | Xeon 2.8BGHz/512KB L2 Cache Proc Upg 73P6382  |  |  |  |  |  |  |  |  |  |  |  |
|                                    | 2x256MB PC2100 CL2.5 non-Chipkill DIMM 73P2868  |  |  |  |  |  |  |  |  |  |  |  |
|                                    | 512MB PC2100 CL2.5 ECC DDR-SDRAM DIMM 33L5038   |  |  |  |  |  |  |  |  |  |  |  |
|                                    | 1GB PC2100 CL2.5 ECC DDR-SDRAM RDIMM 33L5039  |  |  |  |  |  |  |  |  |  |  |  |
|                                    | 2GB PC2100 CL2.5 ECC DDR-SDRAM RDIMM 33L5040  |  |  |  |  |  |  |  |  |  |  |  |
|                                    | 36.4GB 15K Ultra320 SCSI Hot-Swap SL HDD 06P5776  |  |  |  |  |  |  |  |  |  |  |  |
|                                    | Remote Supervisor Adapter 09N7585   |  |  |  |  |  |  |  |  |  |  |  |
|                                    | ServeRAID™-4Mx Ultra160 SCSI Adapter 06P5736  |  |  |  |  |  |  |  |  |  |  |  |
|                                    | Cable Chain Technology (C2T) Cable Kit (2 meter breakout cable and 2 meter KVM chaining cable) 06P4792  |  |  |  |  |  |  |  |  |  |  |  |
|                                    | NetBAY ACT Local Console Manager 1735L04  |  |  |  |  |  |  |  |  |  |  |  |



**LIMITED WARRANTY<sup>3</sup>**

- 3 year parts and labor
- International Warranty Service<sup>3</sup>
- On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time<sup>7</sup>
- On site service upgrade options (in eligible locations):<sup>7</sup>
  - 3 year IOR 9x5, 4 hr avg response (ServicePac® part num 21P2072)
  - 3 year IOR 24x7, 4 hr avg response (ServicePac part num 21P2073)
  - 3 year IOR 24x7, 2 hr avg response (ServicePac part num 21P2074)
  - 4 year IOR 24x7, 4 hr avg response (ServicePac part num 69P9244)
  - 5 year IOR 9x5, NBD response (ServicePac part num 69P9246)
- Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- 24x7<sup>14</sup> toll-free support for warranty issues during the warranty period<sup>3</sup>

See footnotes for important warranty information

• = Hot-swap

US models announced January 20, 2004

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

|  |  |   |
|--|--|---|
| <p>Slot 1: fullsize, 64-bit 33MHz PCI 2.2 (5v), Bus B</p> <p>Slot 2: fullsize, 64-bit 33MHz PCI 2.2 (5v), Bus B</p> <p>Slot 3: fullsize, 64-bit 33MHz PCI 2.2 (5v), Bus B</p> <p>Slot 4: low-profile, 64-bit 66MHz PCI 2.2 (3.3v), Bus C</p> <p>Slot 5: low-profile, 64-bit 66MHz PCI 2.2 (3.3v), Bus C</p> <p>Slot 6: low-profile, 64-bit 66MHz PCI 2.2 (3.3v), Bus C</p> | <p>➤ Raven black color (front bezel)</p> <p>➤ Configuration/Setup Utility invoked by pressing F2 at startup</p> <p>➤ SCSISelect near startup by pressing CTRL+A</p> <p>➤ PC-Doctor™ diagnostics on diskette</p> <p>➤ Several hardcopy publications</p> <p>➤ H 3.5" x W 17.5" x D 20.0"</p> <p>➤ H 89 mm x W 445 mm x D 508 mm</p> <p>➤ 34 to 37 pounds (15.4 to 16.8 kg)</p> <p>➤ IPMI 1.5 and WfM 2.0-compliant</p> | <p><b>LIMITED WARRANTY<sup>3</sup></b></p> <p>↔ 1 year parts and labor</p> <p>↔ International Warranty Service<sup>3</sup></p> <p>↔ On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time<sup>7</sup></p> <p>↔ 1 year on site warranty service upgrade options (in eligible locations):<sup>7</sup></p> <ul style="list-style-type: none"> <li>• 9 hr coverage, Mon-Fri excluding holidays, 4 hr response time (No ServicePac® part number)</li> <li>• 24 hr x 7 day coverage, 4 hour average response time (No ServicePac part number)</li> <li>• 24 hr x 7 day coverage, 2 hour average response time (No ServicePac part number)</li> </ul> <p>↔ 24x7<sup>14</sup> toll-free support for warranty issues during the warranty period<sup>3</sup></p> |
| <p style="text-align: center;"><b>2U Rack</b></p> <p>Bay ① 3.5", 0.5", access, std diskette</p> <p>Bay ② 3.5", 0.5", access, std CD-ROM</p> <p>Bay ③ 3.5", SL 1", no access, std disk</p> <p>Bay ④ 3.5", SL 1", no access, optional disk</p>   |  |   |
| <p>All models: Max int disk capacity: 72.8GB<sup>2</sup> with two 36.4GB SL disks</p>  |  |   |

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

| IBM® Type-model | Qty x Processor          | L2 cache Memory | Ultra320 SCSI disk          | SCSI controller | Mechanical           | Slots x Bays | Disk Bays | Alarm Panel | Power supply | Compliant | Available date |
|-----------------|--------------------------|-----------------|-----------------------------|-----------------|----------------------|--------------|-----------|-------------|--------------|-----------|----------------|
| 8847-14X        | 2 x Pentium® Xeon 2.4GHz | 512KB 1GB       | 1 x 73.4GB <sup>2</sup> 10K | 2 x Ultra320    | 2U <sup>4</sup> rack | 6x3          | 2 HS      | Yes         | DC power     | NEBS-3    | Jul 2004       |
| 8847-24X        | 2 x Pentium Xeon 2.4GHz  | 512KB 2GB       | 1 x 146.8GB 10K             | 2 x Ultra320    | 2U rack              | 6x3          | 2 HS      | Yes         | DC power     | NEBS-3    | Jul 2004       |

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

|                |   |
|----------------|---|
| Positioning    | <i>Network Equipment Building System (NEBS) level 3-compliant for telecommunications carrier-grade environments</i>   |
| Processor(s)   | <b>2 x Intel® Pentium® Xeon 2.4GHz with 533MHz frontside bus</b>  |
| L2 cache       | <b>512KB</b> std and max / ECC / at processor speed / processor and L2 cache in Flip Chip Pin Grid Array (FC-PGA2)  |
| Implementation | Motherboard contains two Intel Socket 604 INT3/FCPGA, six DIMM sockets, two PCI riser connectors, and integrated SMP support  |
| Memory         | <b>Up to 2GB std / 12GB<sup>13</sup> max / 266MHz SDRAM</b> / Six 168-pin sockets / Two sockets used / Four sockets available / ships with two 512 GB or 1GB DIMMs / <b>Error Checking and Correcting (ECC)</b> memory controller / matched pairs required / two-way interleaving / optional 2GB upgrade kit available by special bid |

|                        |  |
|------------------------|--|
| SCSI disk controller   | <b>Adaptec® AIC-7902W / dual channel Wide Ultra320 SCSI controller</b> (LVD 320MB/sec) / on planar / 64-bit PCI  |
| SCSI channels          | <b>SCSI Channel A:</b> external 16-bit .8mm VHDCI 68-pin external connector (no cables)<br><b>SCSI Channel B:</b> one internal 16-bit 68-pin LVD cable from controller to two-bay disk drive carrier |
| SCSI disk              | <b>1 x 73.4GB or 146.8GB</b> Ultra320 SCSI, 10K rpm, 4.9ms read seek, S.M.A.R.T. <sup>5</sup>  |
| SCSI disk bays         | Two fixed disk bays (not hot-swap) in disk drive carrier that slides out from front  |
| IDE controller / cable | EIDE ATA-66 controller in South Bridge / one connector on planar / one 1-drop IDE cable (to CD-ROM)  |

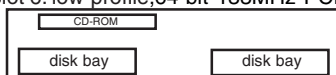
|               |  |
|---------------|--|
| Mechanical    | <b>EIA 19" Rack (2U<sup>4</sup>) x 20-inch deep</b>  |
| Rack support  | Designed for installation in a two-post, 19" rack unit only (not supported in IBM NetBAY™ Racks) / ships with rack mount kit   |
| PCI bus slots | (See below) three full 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       | <b>Intel® E7501 chipset</b> / E7501 MCH North Bridge for CIOB and PCI A 64-bit 33MHz (graphics, ethernet, South Bridge) / P64Hz PCI Bus B (slots, SCSI) and C (slots) / ICH3-S South Bridge for EIDE, USB, LPC bus for Super I/O National Semiconductor PC87417 (serial, keyboard) and Baseboard Management Controller |
| Bays          | (See diagram below): 3 bays / two disk bays (hot-swap) / one CD-ROM bay  |

|                     |  |
|---------------------|--|
| 10/100 ethernet     | 2 x Intel 82546 / on planar / full duplex / supports Wake on LAN®, PXE 2.0 Boot Agent, Adapter Fault Tolerance Failover  |
| CD-ROM / diskette   | 24X-10X <sup>6</sup> CD-ROM / multisession / IDE interface / bootable  |
| Rear ports          | Two USB ports (Version 1.1); RJ-45 serial; PS/2 keyboard; two RJ-45 ethernet; DB-15 graphics; 68-pin SCSI; DB-15 male connector for front panel alarm relay contacts / no parallel port / mouse connects to USB port (or keyboard port with standard Y-splitter cable) |
| Graphics controller | SVGA / PCI bus / ATI® Rage XL (on planar) / 8MB SDRAM std/max / 1600x1280 at 16M colors at 85Hz / 15-pin D-shell   |

|                     |  |
|---------------------|--|
| Security            | Power-on password / admin password / unattended boot / selectable boot / boot without keyboard   |
| Alarm panel         | <b>External alarm panel</b> 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         | <b>Operator Information Panel</b> (in front) / includes switches (NMI, power, reset) and status LEDs (NIC, disk, main power)   |
| Systems mgmt        | <b>Integrated service processor</b> (Baseboard Management Controller) / on planar / failures or thresholds in fans, memory, processors, temperature, voltage, and power supplies activate alarm panel LEDs /                       |
| Diagnostics         | LED diagnostics and on-board diagnostics providing an LED map to a failing component   |
| OS support          | Microsoft Windows 2000, Windows 2003 Advanced Server / Red Hat AS 2.1 / SLES   |
| Software ship group | Resource CD (CD-ROM installation and configuration utilities, Intel Server Control server management software, Product Guide)  |

|                  |   |  |         |
|------------------|---|--|---------|
| Keyboard / mouse | None (since rack-based)   | 2GB PC2100 DDR ECC RDIMM Memory Kit            | 73P4126 |
| Power supply     | Std: one (14X) or two (24X); max: two / accessible from rear<br><b>480 watt (-48 to -60 V dc [direct current])</b> / supports dual input sources (two power sources) / <b>redundant / hot-swap</b> / auto-restart support | <i>Other options available via special Bid</i> |         |

|               |  |
|---------------|--|
| Fans          | Four fans / multispeed / not hot-swap / not redundant / fan failure signals front panel alarm LED / fan in each power supply / fan on each Pentium III processor |
| Prerequisites | Appropriate DC power source and customer supplied wiring, monitor, keyboard, mouse, rack, operating system   |

|  |   |  |
|--|---|--|
| <p>Slot 1: fullsize, 64-bit 64MHz PCI-X (5v), Bus B<br/>                 Slot 2: fullsize, 64-bit 64MHz PCI-X (5v), Bus B<br/>                 Slot 3: fullsize, 64-bit 64MHz PCI-X (5v), Bus B<br/>                 Slot 4: low-profile, 64-bit 133MHz PCI-X (3.3v), Bus C<br/>                 Slot 5: low-profile, 64-bit 133MHz PCI-X (3.3v), Bus C<br/>                 Slot 6: low-profile, 64-bit 133MHz PCI-X (3.3v), Bus C</p>  <p style="text-align: center;"><b>2U Rack</b></p> <p>Bay ② 3.5", 0.5", access, std CD-ROM<br/>                 Bay ③ 3.5", SL 1", no access, std disk<br/>                 Bay ④ 3.5", SL 1", no access, optional disk</p> | <ul style="list-style-type: none"> <li>⇨ Raven black color (front bezel)</li> <li>⇨ Configuration/Setup Utility invoked by pressing F2 at startup</li> <li>⇨ SCSISelect near startup by pressing CTRL+A</li> <li>⇨ PC-Doctor™ diagnostics on diskette</li> <li>⇨ Several hardcopy publications</li> <li>⇨ H 3.45" x W 17.14" x D 20.0"</li> <li>⇨ H 87.6 mm x W 435.3 mm x D 508 mm</li> <li>⇨ 34 to 37 pounds (15.4 to 16.8 kg)</li> </ul> | <p style="text-align: center;"><b>LIMITED WARRANTY<sup>3</sup></b></p> <ul style="list-style-type: none"> <li>⇨ 3/3 year parts and labor</li> <li>⇨ International Warranty Service<sup>3</sup></li> <li>⇨ On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time<sup>7</sup></li> <li>⇨ 2 year on site warranty service upgrade options (in eligible locations):<sup>7</sup> <ul style="list-style-type: none"> <li>• 9 hr coverage, Mon-Fri excluding holidays, 4 hr response time 96P2122</li> <li>• 24 hr x 7 day coverage, 4 hour average response time 96P2123</li> <li>• 24 hr x 7 day coverage, 2 hour average response time 96P2124</li> </ul> </li> <li>⇨ 24x7<sup>14</sup> toll-free support for warranty issues during the warranty period<sup>3</sup></li> </ul> |
| <p><i>All models: Max int disk capacity: 293.6GB<sup>2</sup> with two 146.8GB SL disks</i></p>   |   |  |



| IBM® Type-GAV-model  | Qty x Processor   | L2 Cache Memory                 | Disk     | SCSI controller  | Form Factor     | Slots x bays (hot-swap bays) | Power supply   | Ethernet    | Available date |
|--|---|---------------------------------|----------|--|-----------------|------------------------------|--|-------------|----------------|
| 8840-15y-15U   | 1 x Xeon™ 3.0GHz  | 2MB 1GB                         | None     | 2 x Ultra320   | 2U <sup>4</sup> | 4x8 (6 hot-swap)             | 1 x 625W hot-swap  | 2 x Gigabit | Mar 2005       |
| 8840-16y-16U   | 1 x Xeon 3.0GHz   | 2MB 1GB                         | None     | 2 x Ultra320   | 2U              | 4x8 (6 hot-swap)             | 2 x 625W hot-swap  | 2 x Gigabit | Mar 2005       |
| 8840-25y-25U   | 1 x Xeon 3.2GHz   | 2MB 1GB                         | None     | 2 x Ultra320   | 2U              | 4x8 (6 hot-swap)             | 1 x 625W hot-swap  | 2 x Gigabit | Mar 2005       |
| 8840-35y-35U   | 1 x Xeon 3.4GHz   | 2MB 1GB                         | None     | 2 x Ultra320   | 2U              | 4x8 (6 hot-swap)             | 1 x 625W hot-swap  | 2 x Gigabit | Mar 2005       |
| 8840-36y-36U   | 1 x Xeon 3.4GHz   | 2MB 1GB                         | None     | 2 x Ultra320   | 2U              | 4x8 (6 hot-swap)             | 2 x 625W hot-swap  | 2 x Gigabit | Mar 2005       |
| 8840-45y-45U   | 1 x Xeon 3.6GHz   | 2MB 1GB                         | None     | 2 x Ultra320   | 2U              | 4x8 (6 hot-swap)             | 1 x 625W hot-swap  | 2 x Gigabit | Mar 2005       |
| 8840-E1y-E1U   | 1 x Xeon 3.0GHz   | 2MB 1GB                         | 3x73.4GB | 2 x Ultra320   | 2U              | 4x8 (6 hot-swap)             | 1 x 625W hot-swap  | 2 x Gigabit | Mar 2005       |
| Positioning Processor  | A rack-dense 2-way server delivering high availability, scalability and expandability for application-serving Web environments<br><b>1 x Intel® Xeon™ Processor 2.8, 3.0, 3.2, 3.4, 3.6GHz</b> with 800MHz frontside bus / <b>Optimized for Extended Memory 64 Technology (EM64T)</b> / Hyper-Threading technology / <b>Simultaneous multi-threaded (SMT)</b>   |                                 |          |  |                 |                              |  |             |                |
| L2 cache   | <b>2MB</b> L2 Cache / on die of processor / at processor speed  |                                 |          |  |                 |                              |  |             |                |
| SMP support Implementation   | <b>2-way SMP</b> / up to two Xeon Processors (same speed/cache size)<br>Systemboard contains two Intel PGA604 micro-PGA ZIF sockets, eight memory DIMM slots, two low-profile PCI-X (100MHz) slots, two full-length PCI-X (133MHz) slots, and integrated SCSI, dual GB ethernet, graphics   |                                 |          |  |                 |                              |  |             |                |
| Memory   | <b>1GB</b> std / <b>16GB<sup>13</sup></b> max / two slots used / six slots available / DIMMs / <b>PC2-3200 DDR2</b> 400MHz registered 240-pin ECC DDR2-SDRAM DIMMs / eight DIMM gold-connector slots on systemboard / DIMMs must be installed in matched pairs [a bank] / 2-way memory interleave / dual channel / <b>Active Memory™</b> : Memory mirroring, hot-spare memory / <b>Error Checking and Correcting (ECC)</b> / optional <b>16-bit Checksum Chipkill™</b> corrects 1, 2, 3, or 4-bit errors on same chip and detects 2- through 8-bit errors contained in two chips, |                                 |          |  |                 |                              |  |             |                |
| SCSI disk controller   | <b>Adaptec® AIC-7902 / dual channel Ultra320 SCSI controller</b> (LVD 320MB/sec) / on planar / 64-bit 100MHz PCI-X / supports <b>RAID-0 and 1</b> with up to one hot-spare disk / optional IBM ServeRAID™-7k Adaptor for low-cost RAID 0, 1, 1E, 5, 00, 10, 1E0, 50 (installed on reserved internal connector)  |                                 |          |  |                 |                              |  |             |                |
| SCSI channels  | Two 16-bit channels (one internal and one external) / <i>SCSI Channel B</i> : 16-bit 68-pin LVD cable from systemboard to backplane for six disks; <i>Channel A</i> : 16-bit 68-pin interface to support external SCSI devices via external SCSI 0.8mm VHDCI connector / supports optional ServeRAID adapters with external connector(s) for external devices   |                                 |          |  |                 |                              |  |             |                |
| IDE controller/cable   | Enhanced IDE ATA-100 controller in ICH5 South Bridge / one connector on planar / one 1-drop IDE cable (CD-ROM)  |                                 |          |  |                 |                              |  |             |                |
| Disk - capacity  | None standard / supports 7200-15000 rpm disks / one backplane   |                                 |          |  |                 |                              |  |             |                |
| Disk - bays  | Six hot-swap / 80-pin SCA-2 connectors / filler panels installed in each disk bay / all disk bays Ultra320-enabled  |                                 |          |  |                 |                              |  |             |                |
| Mechanical Chipset   | <b>EIA 19" Rack (2U<sup>4</sup>)</b> / rack-mount only / supported in IBM NetBAY™ Rack products / no rack to tower conversion<br><b>Intel E7520</b> / Memory Controller Hub (MCH) / Intel I/O Controller Hub 5 (ICH5) / Two Intel PCI-X Hubs (133MHz PCI-X slots 3 & 4) / Intel Dodson I/O Processor (supports 100MHz PCI-X slots 1 & 2, Adaptec AIC-7902 and optional ServeRAID 7k Adapter / ICH5 South Bridge (Thin IMB to Host Bridge for graphics controller, EIDE, USB, SMBus, LPC bus to Super I/O) / LPC-SIO 8742x Super I/O   |                                 |          |  |                 |                              |  |             |                |
| Bus slots  | (See below) Four available PCI-X 1.0 / no hot-swap Active™ PCI slots  |                                 |          |  |                 |                              |  |             |                |
| Ethernet controller  | Two gigabit 10/100/1000 ethernet ports / <b>Two Broadcom® 5721</b> / two full gigabit ethernet MAC and PHY layer functions / on planar / PCI-X 64-bit 100MHz / full duplex / Wake on LAN® / Alert Standard Format 2.0 / two RJ-45 ports in rear   |                                 |          |  |                 |                              |  |             |                |
| Optical / diskette   | <b>8X-24X<sup>6</sup></b> DVD-ROM / IDE; <i>Diskette</i> : 3.5" 1.44MB diskette drive / dust cover  |                                 |          |  |                 |                              |  |             |                |
| Front & Rear ports   | <i>Front</i> : one USB (Vers 2.0) <i>Rear</i> : two USB (Vers 2.0), keyboard, mouse, serial (9-pin), graphics (DB-15), two ethernet (RJ-45), two RJ-45 (sys mgmt) / no parallel port  |                                 |          |  |                 |                              |  |             |                |
| Graphics   | SVGA / ATI® Radeon™ 7000m / on planar / 16MB DDR SDRAM std/max / 32-bit 33MHz PCI 2.2 bus   |                                 |          |  |                 |                              |  |             |                |
| Security   | Power-on password / administrator password / unattended boot / selectable boot sequence   |                                 |          |  |                 |                              |  |             |                |
| Systems mgmt   | <b>IBM Baseboard Management Controller (BMC)</b> / H8S2168 / on planar / provides system and environmental monitoring such as temp, optional disks, fans, power supp / supports optional Remote Supervisor Adapter II slimline with reserved connector for continuous power (no ext power reqd)   |                                 |          |  |                 |                              | Xeon 2.8GHz/800MHz/2MBL2ProcUpg  | 25R8908     |                |
|  |   |                                 |          |  |                 |                              | Xeon 3.0GHz/800MHz/2MBL2ProcUpg  | 25R8902     |                |
|  |   |                                 |          |  |                 |                              | Xeon 3.2GHz/800MHz/2MBL2ProcUpg  | 25R8903     |                |
|  |   |                                 |          |  |                 |                              | Xeon 3.4GHz/800MHz/2MBL2ProcUpg  | 13N0686     |                |
|  |   |                                 |          |  |                 |                              | Xeon 3.6GHz/800MHz/2MBL2ProcUpg  | 13N0687     |                |
|  |   |                                 |          |  |                 |                              | Xeon 3.8GHz/800MHz/2MBL2ProcUpg  | 13N0689     |                |
| Diagnosics   | <b>Drop down light path diagnostics</b> panel providing LED map to failing part (located on front panel)  |                                 |          |  |                 |                              | 512MB(2x256)PC2-3200CL3ECCDDR2Non-ChpkKit  | 73P3523     |                |
|  |   |                                 |          |  |                 |                              | 1GB(2x512)PC2-3200CL3ECCDDR2Non-ChpkKit  | 73P3522     |                |
| Software   | <b>ServerGuide™</b> (CD-ROM installation and configuration utilities), IBM Director systems mgmt, others  |                                 |          |  |                 |                              | 2GB(2x1GB)PC2-3200CL3ECCDDR2-SDRAM   | 73P2866     |                |
|  |   |                                 |          |  |                 |                              | IBM ServeRAID-7k Adapter   | 71P8642     |                |
|  |   |                                 |          |  |                 |                              | IBM Remote Supervisor Adapter II Slim  | 73P9341     |                |
| Keyboard / mouse   | None standard (because rack-based)  |                                 |          |  |                 |                              | 73.4GB 10K Ultra320 SCSI Hot-Swap SL HDD   | 90P1305     |                |
| Power supply   | <i>Std/Max</i> : one/two 625 watt hot-swap / rear access / auto restart / redundant with two power supplies / auto-sensing  |                                 |          |  |                 |                              | 146.8GB 10K Ultra320 SCSI Hot-Swap SL HDD  | 90P1306     |                |
|  |   |                                 |          |  |                 |                              | 625W (N. America) Hot-Swap Power Supply  | 26K5097     |                |
| Fans   | <b>Calibrated Vectored Cooling™</b> <i>Std</i> : six fans; <i>Max</i> : twelve (six fans with optional second power supply) / redundant with twelve fans installed; <i>All</i> : variable speed / hot-swap / PFA  |                                 |          |  |                 |                              | NetBAY Local Console Manager   | 1735L04     |                |
|  |   |                                 |          |  |                 |                              | NetBAY Remote Console Manager  | 1735R16     |                |
| Prerequisites  | Monitor, keyboard, mouse, SCSI disk, rack   |                                 |          |  |                 |                              | Other options at <a href="http://ibm.com/pc/us/accessories">ibm.com/pc/us/accessories</a>  |             |                |
| Slot 1:  | low-profile, 64-bit 100MHz 3.3v PCI-X, non hot, Bus A   |                                 |          | Quick release adapter slots (no screws)  |                 |                              | <b>LIMITED WARRANTY<sup>3</sup></b><br>⇨ 3 year parts and labor<br>⇨ International Warranty Service <sup>3</sup><br>⇨ On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time <sup>7</sup><br>⇨ 3 year on site warranty service upgrade options (in eligible locations): <sup>7</sup><br>• 9 hr coverage, Mon-Fri excluding holidays, 4 hr response time (ServicePac® 21P2077)<br>• 24 hr x 7 day coverage, 4 hour average response time (ServicePac 21P2078)<br>• 24 hr x 7 day coverage, 2 hour average response time (ServicePac 21P2093)<br>⇨ Other ServicePac options at <a href="http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf">http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf</a><br>⇨ 24x7 <sup>14</sup> toll-free support for warranty issues during the warranty period <sup>3</sup> |             |                |
| Slot 2:  | low-profile, 64-bit 100MHz 3.3v PCI-X non hot, Bus A  |                                 |          | Configuration/Setup Utility: F1 at startup   |                 |                              |  |             |                |
| Slot 3:  | full, 64-bit 133MHz 3.3v PCI-X, not hot-swap, Bus B*  |                                 |          | Diagnostics (PC-Doctor™): F2 at startup  |                 |                              |  |             |                |
| Slot 4:  | full, 64-bit 133MHz 3.3v PCI-X, not hot-swap, Bus B*  |                                 |          | System Partition Boot: ALT+F1 at startup   |                 |                              |  |             |                |
| *slots 3 & 4 riser may be replaced with PCI-Express riser  |   |                                 |          | Network Boot: F12 at startup   |                 |                              |  |             |                |
|  |   |                                 |          | Front indicators LEDs: Power-on LED, SCSI bus activity LED, system identification LED, information LED, and system-error LED   |                 |                              |  |             |                |
|  |   |                                 |          | Predictive failure analysis on disk options, memory, processors, VRMs, power supplies, and fans in conjunction with IBM Director can alert the system administrator of an imminent component failure |                 |                              |  |             |                |
|  |   |                                 |          | Rack: H 3.36" x W 17.5" x D 27.5" (H 85.4mm x W 443.6mm x D 698mm)   |                 |                              |  |             |                |
|  |   |                                 |          | ⇨ 46.5 to 62 pounds  |                 |                              |  |             |                |
|  |   |                                 |          | ⇨ Stealth black color  |                 |                              |  |             |                |
|  |   |                                 |          | All models: Max int disk capacity: 880.0GB <sup>2</sup> with six 146.8GB SL disks  |                 |                              |  |             |                |
|  |   |                                 |          |  |                 |                              |  |             |                |
| Bay ①  | 3.5", 0.5"  | access, slim diskette           |          |  |                 |                              |  |             |                |
| Bay ②  | 5.25", 0.5"   | access, slim DVD-ROM            |          |  |                 |                              |  |             |                |
| Bay ③  | 3.5", SL 1"   | access, hot-swap, open for disk |          |  |                 |                              |  |             |                |
| Bay ④  | 3.5", SL 1"   | access, hot-swap, open for disk |          |  |                 |                              |  |             |                |
| Bay ⑤  | 3.5", SL 1"   | access, hot-swap, open for disk |          |  |                 |                              |  |             |                |
| Bay ⑥  | 3.5", SL 1"   | access, hot-swap, open for disk |          |  |                 |                              |  |             |                |
| Bay ⑦  | 3.5", SL 1"   | access, hot-swap, open for disk |          |  |                 |                              |  |             |                |
| Bay ⑧  | 3.5", SL 1"   | access, hot-swap, open for disk |          |  |                 |                              |  |             |                |
| Bays 3 through 8 support six SL disks; or 1 DDS5 Tape drive (2 slots used, additional PCI SCSI adaptor req) via SCA-2 connectors |   |                                 |          |  |                 |                              |  |             |                |

See footnotes for important warranty information

• = Hot-swap

| IBM® Type-GAV-model  | Qty x Processor/Core   | L2 Cache | Memory | Disk | SCSI controller | Form Factor   | Slots x bays (hot-swap bays) | Power supply      | Ethernet    | Available date |
|----------------------|--|----------|--------|------|-----------------|---|------------------------------|-------------------|-------------|----------------|
| 8840-05y-05U         | 1 x Xeon™ 2.8GHz/SC  | 2MB      | 1GB    | None | 2 x Ultra320    | 2U <sup>4</sup>   | 4x8 (6 hot-swap)             | 1 x 625W hot-swap | 2 x Gigabit | Sep 2005       |
| 8840-E3y-E3U         | 1 x Xeon 2.8GHz/SC   | 2MB      | 1GB    | None | 2 x Ultra320    | 2U  | 4x8 (6 hot-swap)             | 1 x 625W hot-swap | 2 x Gigabit | Sep 2005       |
| 8840-E4y-E4U         | 1 x Xeon 3.4GHz/SC   | 2MB      | 1GB    | None | 2 x Ultra320    | 2U  | 4x8 (6 hot-swap)             | 2 x 625W hot-swap | 2 x Gigabit | Sep 2005       |
| 8840-55y-55U         | 1 x Xeon 3.8GHz/SC   | 2MB      | 1GB    | None | 2 x Ultra320    | 2U  | 4x8 (6 hot-swap)             | 1 x 625W hot-swap | 2 x Gigabit | Sep 2005       |
| 8840-D1y-D1U         | 1 x Xeon 2.8GHz/DC   | 2x2MB    | 2GB    | None | 2 x Ultra320    | 2U  | 4x8 (6 hot-swap)             | 1 x 625W hot-swap | 2 x Gigabit | Oct 2005       |
| 8840-1Ry-1RU         | 1 x Xeon 3.0GHz/SC   | 2MB      | 1GB    | None | 2 x Ultra320    | 2U  | 4x8 (6 hot-swap)             | 1 x 625W hot-swap | 2 x Gigabit | Apr 2006       |
| Positioning          | A rack-dense 2-way server delivering high availability, scalability and expandability for application-serving Web environments   |          |        |      |                 |   |                              |                   |             |                |
| Processor            | Intel® Xeon™ Processor up to 3.8GHz Single Core 800MHz FSB / Xeon Processor 2.8GHz Dual Core 800MHz FSB / All Optimized for Extended Memory 64 Technology (EM64T) / Hyper-Threading / Simultaneous multi-threaded  |          |        |      |                 |   |                              |                   |             |                |
| L2 cache             | 2MB L2 Cache std on Single Core / 2x2MB L2 Cache std on Dual Core / on die of processor / at processor speed   |          |        |      |                 |   |                              |                   |             |                |
| SMP support          | 2-way SMP / up to two Xeon Processors (same speed/cache size)  |          |        |      |                 |   |                              |                   |             |                |
| Implementation       | Systemboard contains two Intel PGA604 micro-PGA ZIF sockets, eight memory DIMM slots, two low-profile PCI-X (100MHz) slots, two full-length PCI-X (133MHz) slots, and integrated SCSI, dual GB ethernet, graphics  |          |        |      |                 |   |                              |                   |             |                |
| Memory               | 1GB or 2GB std / 16GB <sup>13</sup> max / two slots used / six slots available / DIMMs / PC2-3200 DDR2 400MHz registered 240-pin ECC DDR2-SDRAM DIMMs / eight DIMM gold-connector slots on systemboard / DIMMs must be installed in matched pairs [a bank] / 2-way memory interleave / dual channel / Active Memory™; Memory mirroring, hot-spare memory / Error Checking and Correcting (ECC) / optional 16-bit Checksum Chipkill™ corrects 1, 2, 3, or 4-bit errors on same chip and detects 2- through 8-bit errors contained in two chips. |          |        |      |                 |   |                              |                   |             |                |
| SCSI disk controller | Adaptec® RAID-7902 / dual channel Ultra320 SCSI controller (LVD 320MB/sec) / on planar / 64-bit 100MHz PCI-X / supports RAID-0 and 1 with up to one hot-spare disk / optional IBM ServeRAID™-7k Adaptor for low-cost RAID 0, 1, 1E, 5, 00, 10, 1E0, 50 (installed on reserved internal connector)  |          |        |      |                 |   |                              |                   |             |                |
| SCSI channels        | Two 16-bit channels (one internal and one external) / SCSI Channel B: 16-bit 68-pin LVD cable from systemboard to backplane for six disks; Channel A: 16-bit 68-pin interface to support external SCSI devices via external SCSI 0.8mm VHDCI connector / supports optional ServeRAID adapters with external connector(s) for external devices  |          |        |      |                 |   |                              |                   |             |                |
| IDE controller/cable | Enhanced IDE ATA-100 controller in ICH5 South Bridge / one connector on planar / one 1-drop IDE cable (CD-ROM)   |          |        |      |                 |   |                              |                   |             |                |
| Disk - capacity      | None standard / supports 7200-15000 rpm disks / one backplane  |          |        |      |                 |   |                              |                   |             |                |
| Disk - bays          | Six hot-swap / 80-pin SCA-2 connectors / filler panels installed in each disk bay / all disk bays Ultra320-enabled   |          |        |      |                 |   |                              |                   |             |                |
| Mechanical           | EIA 19" Rack (2U <sup>4</sup> ) / rack-mount only / supported in IBM NetBAY™ Rack products / no rack to tower conversion   |          |        |      |                 |   |                              |                   |             |                |
| Chipset              | Intel E7520 / Memory Controller Hub (MCH) / Intel I/O Controller Hub 5 (ICH5) / Two Intel PCI-X Hubs (133MHz PCI-X slots 3 & 4) / Intel Dodson I/O Processor (supports 100MHz PCI-X slots 1 & 2, Adaptec AIC-7902 and optional ServeRAID 7k Adapter / ICH5 South Bridge (Thin IMB to Host Bridge for graphics controller, EIDE, USB, SMBus, LPC bus to Super I/O) / LPC-SIO 8742x Super I/O  |          |        |      |                 |   |                              |                   |             |                |
| Bus slots            | (See below) Four available PCI-X 1.0 / no hot-swap Active™ PCI slots   |          |        |      |                 |   |                              |                   |             |                |
| Ethernet controller  | Two gigabit 10/100/1000 ethernet ports / Two Broadcom® 5721 / two full gigabit ethernet MAC and PHY layer functions / on planar / PCI-X 64-bit 100MHz / full duplex / Wake on LAN® / Alert Standard Format 2.0 / two RJ-45 ports in rear   |          |        |      |                 |   |                              |                   |             |                |
| Optical / diskette   | 8X-24X <sup>6</sup> DVD-ROM / IDE; Diskette: 3.5" 1.44MB diskette drive / dust cover   |          |        |      |                 |   |                              |                   |             |                |
| Front & Rear ports   | Front: one USB (Vers 2.0) Rear: two USB (Vers 2.0), keyboard, mouse, serial (9-pin), graphics (DB-15), two ethernet (RJ-45), two RJ-45 (sys mgmt) / no parallel port   |          |        |      |                 |   |                              |                   |             |                |
| Graphics             | SVGA / ATI® Radeon™ 7000m / on planar / 16MB DDR SDRAM std/max / 32-bit 33MHz PCI 2.2 bus  |          |        |      |                 |   |                              |                   |             |                |
| Security             | Power-on password / administrator password / unattended boot / selectable boot sequence  |          |        |      |                 |   |                              |                   |             |                |
| Systems mgmt         | IBM Baseboard Management Controller (BMC) / H8S2168 / on planar / provides system and environmental monitoring such as temp, optional disks, fans, power supp / supports optional Remote Supervisor Adapter II slimline with reserved connector for continuous power (no ext power reqd)   |          |        |      |                 | Xeon 2.8GHz SC 800MHz/2MB L2 Proc Upg 40K2503<br>Xeon 2.8GHz DC 800MHz/4MB L2 Proc Upg 40K2502<br>Xeon 3.0GHz SC 800MHz/2MB L2 Proc Upg 40K2504<br>Xeon 3.2GHz SC 800MHz/2MB L2 Proc Upg 40K2505<br>Xeon 3.4GHz SC 800MHz/2MB L2 Proc Upg 40K2506<br>Xeon 3.6GHz SC 800MHz/2MB L2 Proc Upg 40K2507<br>Xeon 3.8GHz SC 800MHz/2MB L2 Proc Upg 40K2508   |                              |                   |             |                |
| Diagnostics          | Drop down light path diagnostics panel providing LED map to failing part (located on front panel)  |          |        |      |                 | 512MB(2x256)/PC2-3200 CL3 ECC DDR2 Non-Chkp Kit 73P3523<br>1GB(2x512)/PC2-3200 CL3 ECC DDR2 Non-Chkp Kit 39M5818<br>2GB(2x1GB)/PC2-3200 CL3 ECC DDR2-SDRAM 39M5809<br>4GB(2x2GB)/PC2-3200 CL3 ECC DDR2-SDRAM 39M5815  |                              |                   |             |                |
| Software             | ServerGuide™ (CD-ROM installation and configuration utilities), IBM Director systems mgmt, others  |          |        |      |                 | IBM ServeRAID-7k Adapter 71P8642<br>IBM Remote Supervisor Adapter II Slim 73P9341<br>73.4GB 10K Ultra320 SCSI Hot-Swap SL HDD 40K1023<br>146.8GB 10K Ultra320 SCSI Hot-Swap SL HDD 40K1024<br>625W (N. America) Hot-Swap Power Supply 26K5097<br>NetBAY Local Console Manager 1735L04<br>NetBAY Remote Console Manager 1735R16<br>Other options at <a href="http://ibm.com/pc/us/accessories">ibm.com/pc/us/accessories</a> |                              |                   |             |                |
| Keyboard / mouse     | None standard (because rack-based)   |          |        |      |                 |   |                              |                   |             |                |
| Power supply         | Std/Max: one/two 625 watt hot-swap / rear access / auto restart / redundant with two power supplies / auto-sensing   |          |        |      |                 |   |                              |                   |             |                |
| Fans                 | Calibrated Vectored Cooling™ Std: six fans; Max: twelve (six fans with optional second power supply) / redundant with twelve fans installed; All: variable speed / hot-swap / PFA  |          |        |      |                 | 73.4GB 10K Ultra320 SCSI Hot-Swap SL HDD 40K1023<br>146.8GB 10K Ultra320 SCSI Hot-Swap SL HDD 40K1024<br>625W (N. America) Hot-Swap Power Supply 26K5097<br>NetBAY Local Console Manager 1735L04<br>NetBAY Remote Console Manager 1735R16   |                              |                   |             |                |
| Prerequisites        | Monitor, keyboard, mouse, SCSI disk, rack  |          |        |      |                 |   |                              |                   |             |                |

|   |   |
|---|---|
| <p>Slot 1: low-profile, 64-bit 100MHz 3.3v PCI-X, non hot, Bus A<br/>Slot 2: low-profile, 64-bit 100MHz 3.3v PCI-X non hot, Bus A<br/>Slot 3: full, 64-bit 133MHz 3.3v PCI-X, not hot-swap, Bus B*<br/>Slot 4: full, 64-bit 133MHz 3.3v PCI-X, not hot-swap, Bus B*<br/>*slots 3 &amp; 4 riser may be replaced with PCI-Express riser</p> <p><b>2U Rack</b></p> <p>Bay ① 3.5", 0.5", access, slim diskette<br/>Bay ② 5.25", 0.5", access, slim DVD-ROM<br/>Bay ③ 3.5", SL 1", access, hot-swap, open for disk<br/>Bay ④ 3.5", SL 1", access, hot-swap, open for disk<br/>Bay ⑤ 3.5", SL 1", access, hot-swap, open for disk<br/>Bay ⑥ 3.5", SL 1", access, hot-swap, open for disk<br/>Bay ⑦ 3.5", SL 1", access, hot-swap, open for disk<br/>Bay ⑧ 3.5", SL 1", access, hot-swap, open for disk<br/>Bays 3 through 8 support six SL disks; or 1 DDS5 Tape drive (2 slots used, additional PCI SCSI adaptor req'd) via SCA-2 connectors</p> | <p> <ul style="list-style-type: none"> <li>Quick release adapter slots (no screws)</li> <li>Configuration/Setup Utility: F1 at startup</li> <li>Diagnostics (PC-Doctor™): F2 at startup</li> <li>System Partition Boot: ALT+F1 at startup</li> <li>Network Boot: F12 at startup</li> <li>Front indicators LEDs: Power-on LED, SCSI bus activity LED, system identification LED, information LED, and system-error LED</li> <li>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</li> <li>Rack: H 3.36" x W 17.5" x D 27.5" (H 85.4mm x W 443.6mm x D 698mm)</li> <li>46.5 to 62 pounds</li> <li>Stealth black color</li> </ul> <p>All models: Max int disk capacity: 1.8TB<sup>2</sup> with six 300GB SL disks</p> </p> |
|---|---|

**LIMITED WARRANTY<sup>3</sup>**

- 3 year parts and labor
- International Warranty Service<sup>3</sup>
- On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time<sup>7</sup>
- 3 year on site warranty service upgrade options (in eligible locations):<sup>7</sup>
  - 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>
- 24x7<sup>14</sup> toll-free support for warranty issues during the warranty period<sup>3</sup>

| IBM® Type-model   | Qty x Processor  | L3 cache | Memory                  | Disks | SCSI controller | Mechanical           | Slots x bays | RXE Exp Ports | Hot-swap pwr supplies | Mgmt adapter | Available date |
|---|--|----------|-------------------------|-------|-----------------|----------------------|--------------|---------------|-----------------------|--------------|----------------|
| 8686-1RQ  | 1 x Xeon™ MP 2.0GHz  | 1MB      | 1GB Chipkill™           | None  | Ultra160        | 3U <sup>4</sup> rack | 6x5          | One           | One (not redund)      | PCI          | Jun 2003       |
| 8686-1SQ  | 2 x Xeon MP 2.0GHz   | 1MB      | 1GB Chipkill            | None  | Ultra160        | 3U rack              | 6x5          | One           | Two redundant         | PCI          | Nov 2003       |
| 8686-1TQ  | 2 x Xeon MP 2.0GHz   | 1MB      | 3GB Chipkill 2 x 36.4GB | 10K   | Ultra160        | 3U rack              | 6x5          | One           | Two redundant         | PCI          | Nov 2003       |
| 8686-2RQ  | 2 x Xeon MP 2.5GHz   | 1MB      | 2GB Chipkill            | None  | Ultra160        | 3U rack              | 6x5          | One           | Two redundant         | PCI          | Jun 2003       |
| 8686-3RQ  | 2 x Xeon MP 2.8GHz   | 2MB      | 2GB Chipkill            | None  | Ultra160        | 3U rack              | 6x5          | One           | Two redundant         | PCI          | Jun 2003       |
| Processors  | 1 or 2 x Intel® Xeon™ Processor MP 2.0, 2.5, or 2.8GHz <sup>1</sup> with 400MHz frontside bus / Hyper-Threading technology   |          |                         |       |                 |                      |              |               |                       |              |                |
| L2 cache  | 512KB / on die of processor / at processor speed   |          |                         |       |                 |                      |              |               |                       |              |                |
| L3 cache  | 1MB or 2MB / on die of processor / at processor speed  |          |                         |       |                 |                      |              |               |                       |              |                |
| Processor upgrade Implementation  | 4-way SMP / up to four Xeon Processors MP (same speed/cache size)<br>Systemboard contains four Intel 603-pin micro-PGA ZIF sockets, one memory board slot, six Active™ PCI-X slots, and integrated SCSI, ethernet, graphics  |          |                         |       |                 |                      |              |               |                       |              |                |
| Memory  | Up to 3GB std / 16GB max <sup>12,13</sup> / two (1GB model), four (2GB models) or six (3GB models) 512MB DIMMs installed / 1.7-inch tall / one memory board standard with 8 DIMM gold-connector slots / DIMMs must be installed in matched pairs / 128-bit simultaneous transfer from two DIMMs / PC1600 200MHz registered 184-pin DDR-SDRAM RDIMMs / <b>Error Checking and Correcting (ECC) via 16-bit Checksum Chipkill™</b> (corrects 1, 2, 3, or 4-bit errors on same chip and detects 2- through 8-bit errors contained in two chips) |          |                         |       |                 |                      |              |               |                       |              |                |
| SCSI disk controller  | Adaptec® AIC-7892 / Wide Ultra160 SCSI (LVD 160MB/sec) / single channel / 64-bit 33MHz PCI / integrated on planar  |          |                         |       |                 |                      |              |               |                       |              |                |
| SCSI connectors   | Controller hard-wired to SCSI backplane (no cable) / no external SCSI connector  |          |                         |       |                 |                      |              |               |                       |              |                |
| SCSI cabling  | One standard 16-bit LVD cable included for attaching an optional ServeRAID adapter to the three-bay backplane; SCSI RAID adapter 68-pin connector on systemboard for this cable to get signals to three-bay backplane  |          |                         |       |                 |                      |              |               |                       |              |                |
| IDE controller / cabling  | Enhanced IDE ATA-33 controller in OSB4 South Bridge  |          |                         |       |                 |                      |              |               |                       |              |                |
| Disk - capacity   | None standard / supports up to 15,000 rpm disks  |          |                         |       |                 |                      |              |               |                       |              |                |
| Disk - bays   | Three hot-swap bays / converged tray / 80-pin SCA-2 connectors   |          |                         |       |                 |                      |              |               |                       |              |                |
| Mechanical  | EIA 19" rack models (3U <sup>4</sup> ) x 28" deep / supported in NetBAY™ Racks (such as NetBAY42 SR, NetBAY42 ER)  |          |                         |       |                 |                      |              |               |                       |              |                |
| Chipset   | IBM XA-32™ chipset / IBM Memory I/O Controller (improved performance from earlier models) with two remote I/O ports (one to IBM PCI-X Host Bridge; one to RXE Expansion Port) / IBM PCI-X Host Bridge provides three peer PCI buses (two PCI-X 1.0, one PCI 2.2) / PCI 2.2 Bus 0 supports SCSI, graphics, ethernet, adapter slot with Remote Supervisor Adapter, and ServerWorks® OSB4 South Bridge (IDE, USB, ISA bus for Super I/O NS PC97317VUL [diskette, keyboard, mouse])  |          |                         |       |                 |                      |              |               |                       |              |                |
| Slots (Active™ PCI-X)   | Six hot-swap PCI-X 1.0 slots <sup>10</sup> available with power and attention indicator lights (optical sensors control power to slot) / <b>hot replace, hot upgrade, hot expansion</b> / separated by insulative plastic dividers   |          |                         |       |                 |                      |              |               |                       |              |                |
| RXE Expansion Port  | One port to support up to 12 additional PCI-X slots via an optional IBM RXE-100 Remote Expansion Enclosure   |          |                         |       |                 |                      |              |               |                       |              |                |
| CD-ROM / diskette   | 24X-10X <sup>6</sup> CD-ROM / 3.5" 1.44MB diskette drive   |          |                         |       |                 |                      |              |               |                       |              |                |
| Ethernet  | Intel 82559 10/100 ethernet controller / on systemboard / full duplex / 32-bit PCI / Wake on LAN® / Alert on LAN™ 2  |          |                         |       |                 |                      |              |               |                       |              |                |
| Graphics controller   | SVGA / S3® Savage4 LT / on systemboard / 8MB SDRAM std/max / up to 1280x1024 at 64K colors at 85Hz   |          |                         |       |                 |                      |              |               |                       |              |                |
| Ports   | Rear: RXE-100 Expansion Port (to connect optional RXE-100), RXE Management Port (to manage optional RXE-100), two USB (Ver 1.1), keyboard, mouse, analog DB-15 graphics, ethernet / no serial or parallel ports / Front: one USB (Ver 1.1)   |          |                         |       |                 |                      |              |               |                       |              |                |
| Security  | Power-on and administrator passwords / unattended boot / selectable boot   |          |                         |       |                 |                      |              |               |                       |              |                |
| Systems management  | Remote Supervisor Adapter / PCI adapter / includes 10/100 ethernet, RJ-11, and serial connectors / provides remote console and mgmt / power on/off system / monitors power status, op system, temperature, disks, fans, power supplies   |          |                         |       |                 |                      |              |               |                       |              |                |
| Diagnostics   | Light Path Diagnostics™ / primary indicator on information panel with LEDs associated with failing components / IBM Real Time Diagnostics (operated through IBM Director) available even while server running  |          |                         |       |                 |                      |              |               |                       |              |                |
| Software  | ServerGuide™ (CD-ROM installation and configuration utilities), IBM Director, and others   |          |                         |       |                 |                      |              |               |                       |              |                |
| Keyboard / mouse  | None standard (because rack-based)   |          |                         |       |                 |                      |              |               |                       |              |                |
| Power supplies  | Std: one or two 370 watt hot-swap; Max: three hot-swap / redundant with two power supplies (some configurations) / worldwide / voltage-sensing / auto-restart / fans in each power supply / PFA  |          |                         |       |                 |                      |              |               |                       |              |                |
| Cooling fans  | Six hot-swap, redundant, multi-speed fans / one additional fan in each power supply / PFA / fan failure signals Diagnostic LED and mgmt processor  |          |                         |       |                 |                      |              |               |                       |              |                |
| Six available 3.3 volt Active PCI-X slots:  |  |          |                         |       |                 |                      |              |               |                       |              |                |
| <ul style="list-style-type: none"> <li>• Bus 2 (B) with two slots supports (slots 1, 2): <ul style="list-style-type: none"> <li>- one fullsize, 64-bit, 133MHz PCI-X, hot-swap</li> <li>- or two fullsize, 64-bit, 100MHz PCI-X, hot-swap</li> <li>- or two fullsize, 64-bit, 66MHz PCI-X, hot-swap</li> <li>- or two fullsize, 64-bit, 66MHz PCI, hot-swap</li> <li>- or two fullsize, 64-bit, 33MHz PCI, hot-swap</li> </ul> </li> <li>• Bus 1 (A) with four slots supports (slots 3, 4, 5, 6): <ul style="list-style-type: none"> <li>- four fullsize, 64-bit, 66MHz PCI-X, hot-swap</li> <li>- or two fullsize, 64-bit, 66MHz PCI, hot-swap</li> <li>- or four fullsize, 64-bit, 33MHz PCI, hot-swap</li> </ul> </li> <li>• Bus 0 with one slot supports: <ul style="list-style-type: none"> <li>- only for standard Remote Supervisor Adapter halfsize, 64-bit, 33MHz PCI, not hot-swap</li> </ul> </li> </ul>   |  |          |                         |       |                 |                      |              |               |                       |              |                |
| <ul style="list-style-type: none"> <li>◇ Dimensions: H5.25" x W17.4" x D27.6"</li> <li>◇ Dimensions: H133.4mm x W442.0mm x D701mm</li> <li>◇ Weight: 58.4 to 70lbs; 24.9 to 31.8kg</li> <li>◇ Stealth black color</li> <li>◇ Tool-free serviceability</li> <li>◇ Access adapters, processors, memory, and systemboard from top</li> <li>◇ Access power supplies and disks from front</li> <li>◇ Setup Program by pressing F1 at startup</li> <li>◇ Diagnostics (PC-Doctor) by pressing F2 at startup</li> <li>◇ SCSISelect by pressing Ctrl+A at startup</li> <li>◇ Top cover Light Path Diagnostics (level 2 diagnostic panel) for outside view of potential problem without removing cover</li> <li>◇ Information LED panel, diagnostic LED panel, and component LEDs give visual indications of system well-being</li> <li>◇ Predictive Failure Analysis® alerts on disks, power supplies, memory, processors, VRMs, and fans with IBM Director</li> </ul>   |  |          |                         |       |                 |                      |              |               |                       |              |                |
| <p style="text-align: center;"><b>3U Rack</b></p>   |  |          |                         |       |                 |                      |              |               |                       |              |                |
| <p>Bay ① 3.5", 0.5", access, diskette<br/>                 Bay ② 3.5", 0.5", access, CD-ROM<br/>                 Bay ③ 3.5", SL 1", access, hot-swap<br/>                 Bay ④ 3.5", SL 1", access, hot-swap<br/>                 Bay ⑤ 3.5", SL 1", access, hot-swap</p>  |  |          |                         |       |                 |                      |              |               |                       |              |                |
| <p><b>All models:</b> Maximum internal disk capacity: 220.2GB with three 73.4GB<sup>2</sup> hot-swap SCSI disks</p>   |  |          |                         |       |                 |                      |              |               |                       |              |                |
| <p><b>LIMITED WARRANTY<sup>3</sup></b></p> <ul style="list-style-type: none"> <li>⇐ 3 year parts and labor</li> <li>⇐ International Warranty Service<sup>3</sup></li> <li>⇐ On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time<sup>7</sup></li> <li>⇐ On site service upgrade options (in eligible locations):<sup>7</sup> <ul style="list-style-type: none"> <li>• 3 year IOR 24x7, 4 hr avg response (ServicePac® part num 96P2253)</li> <li>• 3 year IOR 24x7, 2 hr avg response (ServicePac part num 96P2254)</li> <li>• 4 year IOR 9x5, NBD response (ServicePac part num 96P2255)</li> <li>• 5 year IOR 9x5, NBD response (ServicePac part num 96P2259)</li> </ul> </li> <li>⇐ Other ServicePac options at <a href="http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf">http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf</a></li> <li>⇐ 24x7<sup>14</sup> toll-free support for warranty issues during the warranty period<sup>3</sup></li> </ul> |  |          |                         |       |                 |                      |              |               |                       |              |                |

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

| IBM® Type-model | Qty x Processor          | L2 cache | Memory | DIMM slots | Disks      | SCSI controller | Mechanical           | Slots x bays | Hot-swap pwr supplies | Warranty (yrs.) | Available date |
|-----------------|--------------------------|----------|--------|------------|------------|-----------------|----------------------|--------------|-----------------------|-----------------|----------------|
| 8863-1RY        | 1 x Xeon™ MP 3.16GHz     | 1MB      | 2x1GB  | 4          | None       | SAS             | 3U <sup>4</sup> rack | 6x7          | 1 x 1300              | 3               | Apr 2005       |
| 8863-2RY        | 1 x Xeon MP 3.66GHz      | 1MB      | 2x1GB  | 4          | None       | SAS             | 3U rack              | 6x7          | 1 x 1300              | 3               | Apr 2005       |
| 8863-3RY        | 1 x Xeon MP 7020 2.67GHz | 2x1MB    | 2x1GB  | 4          | None       | SAS             | 3U rack              | 6x7          | 1 x 1300              | 3               | Nov 2005       |
| 8863-4RY        | 1 x Xeon MP 7040 3.0GHz  | 2x2MB    | 2x1GB  | 4          | None       | SAS             | 3U rack              | 6x7          | 1 x 1300              | 3               | Nov 2005       |
| 8863-E1Y        | 2 x Xeon MP 3.66GHz      | 1MB      | 4x1GB  | 8          | 3x36.4-10k | SAS w/ 8i       | 3U rack              | 6x7          | 2 x 1300              | 3               | Jun 2005       |
| 8863-E5Y        | 2 x Xeon MP 3.66GHz      | 1MB      | 2x1GB  | 4          | None       | SAS             | 3U rack              | 6x7          | 2 x 1300              | 3               | Aug 2005       |
| 8863-E6Y        | 2 x Xeon MP 3.16GHz      | 1MB      | 2x1GB  | 4          | None       | SAS             | 3U rack              | 6x7          | 2 x 1300              | 3               | Sep 2005       |
| 8863-E7Y        | 4 x Xeon MP 3.66GHz      | 1MB      | 8x1GB  | 16         | None       | SAS w/ 8i       | 3U rack              | 6x7          | 2 x 1300              | 3               | Sep 2005       |

**Processors** Up to two 64-bit Intel® Xeon™ Processor MP up to 3.66GHz<sup>1</sup> 667MHz FSB Single Core / one 64-bit Intel Xeon Processor MP up to 3.0GHz 667MHz FSB Dual Core / NetBurst™ / Extended Memory 64 Technology™ (EM64T) / Hyper-Threading  
**L2 cache** 1 or 2 MB / per core / at processor speed / Xcel4v™ Dynamic Server Cache  
**Processor upgrade Implementation** 4-way SMP / up to four Xeon Processors MP (same speed/cache size) / Dual Core Capable  
 System board contains four Intel 604-pin micro-PGA4 ZIF sockets, one memory board slot, six Active™ PCI-X 2.0 slots, and integrated SCSI, ethernet, graphics

**Active Memory™** Up to 4GB std / 64GB max using high-capacity memory card / one memory board standard with 4 DIMM gold-connector slots / DIMMs must be installed in matched pairs / PC2-3200 400MHz registered 240-pin DDR2-SDRAM RDIMMs / **Error Checking and Correcting (ECC)** via 16-bit Checksum Chipkill™ / With 16 DIMMs installed: **Memory ProteXion™** (redundant bit steering) and **Memory Mirroring™** and Hot-swap (non-OS specific) / Hot-add (supported only with Microsoft® Windows™ Server 2003™)

**SCSI disk controller** ALL: Adaptec® AIC-9410 / **Serial Attached SCSI (SAS)** 3.0GHz (3GB/sec) / 64-bit 266MHz PCI-X 2.0 E1X: ServeRaid 8i  
**SCSI connectors** Controller wired to SAS backplane  
**SCSI cabling** One standard SAS cable attached to six-bay backplane  
**IDE controller / cabling** Enhanced IDE ATA-33 controller in CSB6 South Bridge  
**Disk - capacity** E1x: 3 x 36.4GB-10k / supports up to 73GB 10K rpm disks  
**Disk - bays** Six 2.5" hot-swap bays / converged tray / 80-pin SCA-2 connectors

**Mechanical** EIA 19" rack models (3U<sup>4</sup>) x 28" deep / supported in NetBAY™ Racks (such as NetBAY42 SR, NetBAY42 ER)  
**Chipset** IBM XA-64e™ 3rd Generation chipset / Integrated Processor and Memory Controller / Supports EM64T / 2 IBM PCI-X 2.0 Host Bridges / Host Bridge One supports video, optional ServeRaid 8i, ServerWorks® CSB6 South Bridge (IDE, USB, bus for Super I/O NS 87417 [diskette, keyboard, mouse]), Dual Port Broadcom 5704, and 2 PCI-X 2.0 slots / Host Bridge Two supports 4 PCI-X 2.0 slots  
**Slots (Active™)** Six total PCI-X 2.0 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, all slots supported up to 266MHz  
**CD-ROM / diskette** 8X<sup>6</sup> Slim DVD-ROM / none  
**Ethernet** Broadcom® 5704 10/100/1000 dual ethernet / on systemboard / 64-bit 266MHz PCI-X 2.0 / Wake on LAN® / Alert on LAN™ 2  
**Graphics controller** SVGA / ATI® 7000m / on planar / 16MB SDRAM std/max / 32-bit 33MHz PCI 2.2 bus  
**Ports** Rear: RSA ethernet, RSA serial, two USB (Ver 2.0), keyboard, mouse, analog DB-15 graphics, two ethernet, std. serial, RS-485 / Front: USB (Ver 2.0)

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

**Systems management** Remote Supervisor Adapter II Slimline (option) / PCI adapter / includes 10/100 ethernet, RJ-11, and serial connectors / provides remote console and mgmt / power on/off system / monitors power status, op system, temperature, disks, fans, power supplies

**Diagnostics** 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 or two 1300 watt hot-swap; Max: two hot-swap / redundant with two power supplies (some configurations) / worldwide / voltage-sensing / auto-restart / PFA

**Cooling fans** Eight hot-swap, redundant, multi-speed fans / one additional fan in each power supply / PFA / fan failure signals Diagnostic LED and mgmt processor

Six available 3.3 volt PCI-X 2.0 slots:  
 Slot 1 - fullsize, 64-bit, 266MHz PCI-X, hot-swap  
 Slot 2 - fullsize, 64-bit, 266MHz PCI-X, hot-swap  
 Slot 3 - fullsize, 64-bit, 266MHz PCI-X, hot-swap  
 Slot 4 - fullsize, 64-bit, 266MHz PCI-X, hot-swap  
 Slot 5 - fullsize, 64-bit, 266MHz PCI-X, hot-swap  
 Slot 6 - fullsize, 64-bit, 266MHz PCI-X, hot-swap  
 \*exclusive slot available for ServeRAID 8i adapter

- 2GB PC2-3200 CL3 ECC RDIMM (2x1GB) 73P2866
- 4GB PC2-3200 CL3 ECC RDIMM (2x2GB) 73P2867
- 8GB PC2-3200 CL3 ECC RDIMM (2x4GB) 30R5145
- Active Memory 4-slot Expansion Card 13M7409
- Xeon MP 3.16GHz/1MB L2 Cache Proc Upg 13N0694
- Xeon MP 3.66GHz/1MB L2 Cache Proc Upg 13N0695
- Xeon MP 7020 2.67GHz/2x1MB L2 Cache Proc Upg 25R8941
- Xeon MP 7040 3.0GHz/2x2MB L2 Cache Proc Upg 25R8942
- 1300 watt Hot-Swap Power Supply (WW) 13M7413
- IBM ServeRAID™-8i SAS-SCSI Adapter 13N2227
- IBM ServeRAID 6M U320 256MB Adapter 02R0988
- IBM 36.4GB 10K 2.5" SAS Hot-swap HDD 26K5654
- IBM 73.4GB 10K 2.5" SAS Hot-Swap HDD 26K5655
- IBM Remote Supervisor Adapter II Slimline 73P9341
- Dual Core X3 upgrade kit (available 12/05) 39Y6580
- Other options at [ibm.com/pc/us/accessories](http://ibm.com/pc/us/accessories)

Dimensions: H5.25" x W17.4" x D27.6"  
 Dimensions: H133.4mm x W442.0mm x D701mm  
 Weight: 63 to 83lbs; 28.6 to 37.6kg  
 Stealth black color  
 Tool-free serviceability  
 Access adapters, power supplies, processors, memory and systemboard from top  
 Setup Program by pressing F1 at startup  
 Diagnostics (PC-Doctor) by pressing F2 at startup  
 SCSISelect by pressing Ctrl+A 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



Light Path Diag

3U Rack

Bay ① 5.25", 0.5", access, std 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  
 Bay ⑥ 2.5", SL 1", access, hot-swap, open  
 Bay ⑦ 2.5", SL 1", access, hot-swap, open

**Max BTU Output:**  
 Ship Configuration: 1,086 Btu/hr (318 watts)  
 Full Configuration: 5,200 Btu/hr (1524 watts)

**All models:** Maximum internal disk capacity: 440.4GB with six 73.4GB<sup>2</sup> hot-swap SAS disks

LIMITED WARRANTY<sup>3</sup>

- ⇐ 3 year parts and labor
- ⇐ International Warranty Service<sup>3</sup>
- ⇐ On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time<sup>7</sup>
- ⇐ On site service upgrade options (in eligible locations):<sup>7</sup>
  - 3 year IOR 24x7, 4 hr avg response 96P2253
  - 3 year IOR 24x7, 2 hr avg response 96P2254
  - 4 year IOR 9x5, NBD response 96P2255
  - 5 year IOR 9x5, NBD response 69P2259
- ⇐ Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- ⇐ 24x7<sup>14</sup> toll-free support for warranty issues during the warranty period<sup>3</sup>

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

| IBM® Type-model        | Qty x Processor  | L3 cache | L4 cache | Memory        | Disk | SCSI controller | Mechanical           | Slots x bays | SMP/RXE Exp Ports | Hot-swap pwr supplies | Mgmt adapter | Available date |
|------------------------|--|----------|----------|---------------|------|-----------------|----------------------|--------------|-------------------|-----------------------|--------------|----------------|
| 8870-1BX               | 2 x Xeon™ MP 2.2GHz  | 2MB      | 64MB     | 0GB Chipkill™ | None | 2xUltra320      | 4U <sup>4</sup> rack | 6x4          | 3/1               | Two redundant         | PCI          | Mar 2004       |
| 8870-2BX               | 2 x Xeon MP 2.7GHz   | 2MB      | 64MB     | 0GB Chipkill  | None | 2xUltra320      | 4U rack              | 6x4          | 3/1               | Two redundant         | PCI          | Mar 2004       |
| 8870-4BX               | 2 x Xeon MP 3.0GHz   | 4MB      | 64MB     | 0GB Chipkill  | None | 2xUltra320      | 4U rack              | 6x4          | 3/1               | Two redundant         | PCI          | Mar 2004       |
| Positioning Processors | Up to 8-way (16-way two chassis) power for high-end databases, server consolidation and mission-critical business applications   |          |          |               |      |                 |                      |              |                   |                       |              |                |
| L3 cache               | 2 x Intel® Xeon™ Processor MP 2.2, 2.7, or 3.0GHz <sup>1</sup> with 400MHz frontside bus / supports Hyper-Threading  |          |          |               |      |                 |                      |              |                   |                       |              |                |
| L4 cache               | 2MB or 4MB each processor / on die of processor / at processor speed   |          |          |               |      |                 |                      |              |                   |                       |              |                |
| Processor upgrade      | 64MB XceL4™ Server Accelerator Cache (up to 128MB with optional SMP Expansion Module) / 64MB in each SMP Expansion Module / ECC / 64-bit 400MHz bus from Cache and Scalability Controller  |          |          |               |      |                 |                      |              |                   |                       |              |                |
| SMP Expansion Module   | SMP Expansion Module standard / ready for adding additional processors (up to 8 total) and memory  |          |          |               |      |                 |                      |              |                   |                       |              |                |
| Additional boards      | One SMP Expansion Module std / two max / each contains four Intel 603-pin micro-PGA ZIF sockets for Xeon MP, 64MB L4 cache, sixteen DIMM sockets, three SMP Expansion Ports (second module connected via one or two SMP Expansion Ports) / each SMP Expansion Module activates one RXE Expansion Port (one RXE Expansion Port supported)   |          |          |               |      |                 |                      |              |                   |                       |              |                |
| Memory                 | One I/O Board (PCI-X Host Bridge, SCSI, ethernet, graphics, South Bridge, Super I/O, slot for Mgmt Adapter), one PCI Board (PCI-X Host Bridge, six PCI-X slots), one Midplane Board (connects SMP Exp Modules, I/O Board, PCI Board)   |          |          |               |      |                 |                      |              |                   |                       |              |                |
| Memory                 | 0GB std / 64GB max <sup>13</sup> (uses standard SMP Expansion Module) / no DIMMs installed / 32 DIMM gold-connector slots / must install two identical DIMMs at same time / 2-way interleaving / PC2100 DDR SDRAM / Error Checking and Correcting (ECC) and Chipkill™ via Memory ProteXion™ (1, 2, 3, or 4-bit errors on same chip; up to two chips at once; redundant bit steering) / Active Memory™ supporting hot-swap and hot-add (OS specific) and Memory Mirroring™ (non-OS specific)  |          |          |               |      |                 |                      |              |                   |                       |              |                |
| SCSI disk controller   | LSI Logic / Wide Ultra320 SCSI (LVD 32MB/sec) / dual channel / 64-bit 66MHz PCI / integrated RAID-1 on I/O Board   |          |          |               |      |                 |                      |              |                   |                       |              |                |
| SCSI implementation    | First channel to internal 2-port SCSI backplane for internal hot-swap disks (16-bit LVD cable to SCSI backplane) / second channel to one external .8mm VHDCI 68-pin connector (16-bit LVD cable from I/O Board to ext connector) / one standard (longer) 16-bit LVD cable included for attaching an optional ServeRAID adapter to the two-bay backplane  |          |          |               |      |                 |                      |              |                   |                       |              |                |
| IDE controller         | Enhanced IDE ATA-100 controller in South Bridge / one one-drop IDE cable to backplane for diskette and CD-ROM  |          |          |               |      |                 |                      |              |                   |                       |              |                |
| Disk - capacity/bays   | No disks standard / supports up to 15K rpm SCSI disks / two hot-swap bays / converged tray / 80-pin SCA-2 connectors   |          |          |               |      |                 |                      |              |                   |                       |              |                |
| Mechanical             | EIA 19" rack models (4U <sup>4</sup> ) x 28" deep / supported in NetBAY™ Racks (such as NetBAY42 SR, NetBAY42 ER)  |          |          |               |      |                 |                      |              |                   |                       |              |                |
| Chipset                | IBM XA-32™ 2nd Generation chipset / IBM Cache and Scalability Controller with L4 cache controller and three SMP Expansion Ports / IBM Memory I/O Controller with two remote I/O ports (each to a IBM PCI-X Host Bridge) / each IBM PCI-X Host Bridge provides three peer PCI buses / PCI 2.2 Bus E supports graphics, adapter slot with Remote Supervisor Adapter, VIA® 82C686B South Bridge (IDE ATA-100, USB, Super I/O PC97317VUL [keyboard, mouse]) / PCI 2.2 Bus F supports SCSI, ethernet / PCI-X Bus A, B, C, D support PCI-X slots / designed to the PCI-X 1.0 specification |          |          |               |      |                 |                      |              |                   |                       |              |                |
| Slots (Active™ PCI-X)  | Six hot-swap PCI-X 1.0 slots <sup>10</sup> available with power and attention indicator lights (optical sensors control power to slot) / hot replace, hot upgrade, hot expansion / separated by insulative plastic dividers  |          |          |               |      |                 |                      |              |                   |                       |              |                |
| RXE Expansion Port     | One RXE-100 Remote Expansion Enclosure can be shared between two x445 4-way, 8-way, or 16-way xSeries 445 servers or attached alone. Both PCI-X 6-packs must be installed to support RIO sharing as each server will access six additional PCI-X slots.  |          |          |               |      |                 |                      |              |                   |                       |              |                |
| CD-ROM / diskette      | 24X-8X <sup>6</sup> DVD-ROM / 3.5" 1.44MB diskette drive / both removable from Ultrabay 2000 bays / supports CD-RW, DVD  |          |          |               |      |                 |                      |              |                   |                       |              |                |
| Ethernet               | Dual Broadcom® 5704 10/100/1000 ethernet controller / on I/O Board / full duplex / 64-bit 66MHz PCI bus / Wake on LAN®   |          |          |               |      |                 |                      |              |                   |                       |              |                |
| Graphics controller    | SVGA / ATI® Rage XL / on I/O Board / 8MB SDRAM std/max / up to 1280x1024 at 85Hz.  |          |          |               |      |                 |                      |              |                   |                       |              |                |
| Ports                  | Rear: RXE-100 Expansion Port (to connect optional RXE-100), RXE Management Port, two USB (Vers 1.1), keyboard, mouse, analog DB-15 graphics, ethernet / no serial or parallel ports / Front: one USB (Vers 1.1)  |          |          |               |      |                 |                      |              |                   |                       |              |                |
| Security               | Power-on and administrator passwords / unattended boot / selectable boot   |          |          |               |      |                 |                      |              |                   |                       |              |                |
| Systems mgmt           | Remote Supervisor Adapter II / PCI adapter / includes 10/100 ethernet, RJ-11, and serial connectors / provides remote console and mgmt / power on/off system / monitors power status, op system, temperature, disks, fans, power supplies  |          |          |               |      |                 |                      |              |                   |                       |              |                |
| Diagnostics            | Light Path Diagnostics™ / primary indicator on information panel with LEDs associated with failing components / IBM Real Time Diagnostics (operated through IBM Director) available even while server running  |          |          |               |      |                 |                      |              |                   |                       |              |                |
| Software               | ServerGuide™ (CD-ROM installation and configuration utilities), IBM Director, and others   |          |          |               |      |                 |                      |              |                   |                       |              |                |
| Keyboard / mouse       | None standard (because rack-based)   |          |          |               |      |                 |                      |              |                   |                       |              |                |
| Power supplies         | Std: two; max: two / hot-swap / 1200 watts at 220v or 600 watts at 110v / redundant at 220v with two power supplies / front access / worldwide / voltage-sensing / auto-restart / fans in each power supply / PFA  |          |          |               |      |                 |                      |              |                   |                       |              |                |
| Cooling fans           | Four hot-swap, redundant, multi-speed fans / one additional fan in each power supply / PFA / fan failure signals Diagnostic LED and mgmt processor   |          |          |               |      |                 |                      |              |                   |                       |              |                |

Six available 3.3 volt Active PCI-X slots:

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

- ↳ Dimensions: H7.0" x W19.0" x D27.5"
- ↳ Dimensions: H178mm x W483mm x D699mm
- ↳ Max weight: 110 lbs; 50kg
- ↳ Stealth black color
- ↳ Tool-free serviceability
- ↳ Access processors, memory, adapters, and SMP Expansion Module from top
- ↳ Access power supplies and disks from front
- ↳ Setup Program by pressing F1 at startup
- ↳ Diagnostics (PC-Doctor) by pressing F2 at startup
- ↳ SCSISelect by pressing Ctrl+A at startup
- ↳ Information LED panel and front-accessible pull-out Light Path panel (1st and 2nd level diagnostics without removing cover)
- ↳ Predictive Failure Analysis® alerts on processors, XceL4 Server Accelerator Cache, memory, fans, power supplies, and optional disks with IBM Director

**4U Rack**

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

**LIMITED WARRANTY<sup>3</sup>**

- ↳ 3 year parts and labor
- ↳ International Warranty Service<sup>3</sup>
- ↳ On site, 9 hr x 5 day coverage, next day response time<sup>7</sup>
- ↳ 1 year on site warranty service upgrade option (in eligible locations):<sup>7</sup>
  - 24 hr x 7 day coverage, 2 hour response time (No ServicePac available)
- ↳ Post warranty maintenance services available
- ↳ Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- ↳ 24x7<sup>14</sup> toll-free support for warranty issues during the warranty period<sup>3</sup>

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

| IBM® Type-model | Qty x Processor          | L2 cache | L3 cache | Memory | DIMM slots | Disks | SCSI controller | Mechanical           | Slots x bays | Hot-swap pwr supplies | Warranty (yrs.) | Available date |
|-----------------|--------------------------|----------|----------|--------|------------|-------|-----------------|----------------------|--------------|-----------------------|-----------------|----------------|
| 8872-1RY        | 2 x Xeon™ MP 2.83GHz     | 1MB      | 4MB      | 2x1GB  | 8          | None  | SAS             | 3U <sup>4</sup> rack | 6x7          | 2 x 1300              | 3               | Jun 2005       |
| 8872-2RY        | 2 x Xeon MP 3.0GHz       | 1MB      | 8MB      | 2x1GB  | 8          | None  | SAS             | 3U rack              | 6x7          | 2 x 1300              | 3               | Jun 2005       |
| 8872-3RY        | 2 x Xeon MP 3.33GHz      | 1MB      | 8MB      | 2x1GB  | 8          | None  | SAS             | 3U rack              | 6x7          | 2 x 1300              | 3               | Jun 2005       |
| 8872-5RY        | 2 x Xeon MP 7020 2.66GHz | 2MB      |          | 2x1GB  | 8          | None  | SAS             | 3U rack              | 6x7          | 2 x 1300              | 3               | Nov 2005       |
| 8872-6RY        | 2 x Xeon MP 7040 3.0GHz  | 2x2MB    |          | 2x1GB  | 8          | None  | SAS             | 3U rack              | 6x7          | 2 x 1300              | 3               | Nov 2005       |

**Processors** Two 64-bit Intel® Xeon™ Processor MP up to 3.33GHz<sup>1</sup> 667MHz FSB Single Core / Two 64-bit Xeon Processor MP up to 3.0GHz 667MHz FSB Dual Core / NetBurst™ / Extended Memory 64 Technology™ (EM64T) / Hyper-Threading technology  
**L2 cache** 1 or 2MB / per core / XceL4v™ Dynamic Server Cache (256MB per 4 CPUs starting at 8-way)  
**L3 cache** 4 or 8MB / integrated / at processor speed  
**Processor upgrade** 4-way SMP / up to four Xeon Processors (same speed/cache/core) per chassis / Dual Core Capable / up to 32-way (eight chassis interconnected)  
**Implementation** System board contains four Intel 604-pin micro-PGA4 ZIF sockets, one memory board slot, six Active™ PCI-X 2.0 slots, and integrated Serial Attached SCSI, ethernet, graphics

**Active Memory™** 2GB std / 64GB max per chassis using high-capacity memory card / 512GB max (eight chassis interconnect) / two memory cards standard (up to four) with 4 DIMM gold-connector slots each / DIMMs must be installed in matched pairs / PC2-3200 400MHz registered 240-pin DDR2-SDRAM RDIMMs / 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™

**SCSI disk controller** ALL: Adaptec® AIC-9410 / Serial Attached SCSI (SAS) 3.0GHz (3GB/sec) / 64-bit 266MHz PCI-X 2.0 / ServeRaid 8i optional with dedicated slot  
**SCSI connectors** Controller wired to SAS backplane  
**SCSI cabling** One standard SAS cable attached to six-bay backplane  
**IDE controller / cabling** Enhanced IDE ATA-33 controller in CSB6 South Bridge  
**Disk - capacity** None / supports up to 73GB 10,000 rpm disks  
**Disk - bays** Six 2.5" hot-swap bays / converged tray / 80-pin SCA-2 connectors  
**Mechanical** EIA 19" rack models (3U<sup>4</sup>) x 28" deep / supported in NetBAY™ Racks (such as NetBAY42 SR, NetBAY42 ER) / connect eight chassis (x460 or MXE-460) to achieve 32-way in 24U

**Chipset** IBM XA-64e™ 3rd Generation chipset / Integrated Processor and Memory Controller / Supports EM64T / Support for external scalability and memory control / 2 IBM PCI-X 2.0 Host Bridges / Host Bridge One supports video, optional ServeRaid 8i, ServerWorks® CSB6 South Bridge (IDE, USB, bus for Super I/O NS 87417 [diskette, keyboard, mouse]), Dual Port Broadcom 5704, and 2 PCI-X 2.0 slots / Host Bridge Two supports 4 PCI-X 2.0 slots

**Slots (Active™)** Six total PCI-X 2.0 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, all slots supported up to 266MHz

**CD-ROM / diskette** 8X<sup>6</sup> Slim DVD-ROM / none  
**Ethernet** Broadcom® 5704 10/100/1000 dual ethernet per chassis / on systemboard / 64-bit 266Mhz PCI-X 2.0 / Wake on LAN® / Alert on LAN™ 2

**Graphics controller** SVGA / ATI® 7000M / on planar / 16MB SDRAM std/max / 32-bit 33MHz PCI 2.2 bus  
**Ports** Rear: Three Scalability ports, RSA ethernet, RSA serial, two USB (Ver 2.0), keyboard, mouse, analog DB-15 graphics, two ethernet, std. serial, RS-485 / Front: One USB (Ver 2.0)

**Security** Power-on and administrator passwords / unattended boot / selectable boot  
**Systems management** Remote Supervisor Adapter II slimline / PCI adapter / includes 10/100 ethernet, RJ-11, and serial connectors / provides remote console and mgmt / power on/off system / monitors power status, op system, temperature, disks, fans, power supplies

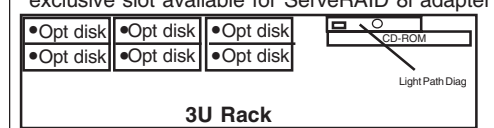
**Diagnostics** Drop down Light Path Diagnostics / primary indicator on information panel with LEDs associated with failing components / IBM Real Time Diagnostics (operated through IBM Director)

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

**Keyboard / mouse** None standard (because rack-based)  
**Power supplies** Std: Two 1300 watt hot-swap; Max: two hot-swap / fully redundant with two power supplies / worldwide / voltage-sensing / auto-restart / rear accessible fans in each power supply / PFA  
**Cooling fans** Eight hot-swap, redundant, multi-speed fans / one additional fan in each power supply / PFA / fan failure signals Diagnostic LED and mgmt processor

- 8W = 2 x XpandOnDemand Scalability kits 2.3m
- 16W = 6 x XpandOnDemand Scalability kits 2.3m
- 32W = 8 x XpandOnDemand Scalability kits 2.3m + 4 x2.9m
- Six available 3.3 volt PCI-X 2.0 slots:
- Slot 1 - fullsize, 64-bit, 266MHzPCI-X, hot-swap
- Slot 2 - fullsize, 64-bit, 266MHzPCI-X, hot-swap
- Slot 3 - fullsize, 64-bit, 266MHzPCI-X, hot-swap
- Slot 4 - fullsize, 64-bit, 266MHzPCI-X, hot-swap
- Slot 5 - fullsize, 64-bit, 266MHzPCI-X, hot-swap
- Slot 6 - fullsize, 64-bit, 266MHzPCI-X, hot-swap

- Dimensions: H5.05" x W17.32" x D28.15"
- Dimensions: H128.35mm x W440.0mm x D715mm
- Weight: 70 to 85lbs; 31.75 to 38.5kg
- 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
- SCSISelect by pressing Ctrl+A 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



**3U Rack**

- Bay ① 5.25", 0.5" access, std CD-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
- Bay ⑥ 2.5", SL 1", access, hot-swap, open
- Bay ⑦ 2.5", SL 1", access, hot-swap, open

**Max BTU Output:**  
 Ship Configuration: 1,262 Btu/hr (370 watts)  
 Full Configuration: 4,094 Btu/hr (1200 watts)

**LIMITED WARRANTY<sup>3</sup>**

- 3 year parts and labor
- International Warranty Service<sup>3</sup>
- On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time<sup>7</sup>
- On site service upgrade options (in eligible locations):<sup>7</sup>
  - 3 year IOR 24x7, 4 hr avg response 96P2688
  - 3 year IOR 24x7, 2 hr avg response 96P2689
  - 4 year IOR 9x5, NBD response 96P2690
  - 5 year IOR 9x5, NBD response 96P2694
- Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- 24x7<sup>14</sup> toll-free support for warranty issues during the warranty period<sup>3</sup>

**All models:** Maximum internal disk capacity: 440.4GB with six 73.4GB<sup>2</sup> hot-swap SAS disks

| IBM® Machine Type | Model         | Processor | Speed¹/Core | L2 Cache  | Memory | Disk | Disk controller | Maximum Capacity | Optical | Slots x bays | Hard disk bays | Ethernet | Available date |
|-------------------|---------------|-----------|-------------|-----------|--------|------|-----------------|------------------|---------|--------------|----------------|----------|----------------|
| 4347 - 22U        | Athlon® 3500+ | 2.2GHz/SC | 512KB       | 1 x 512MB | 80GB   | SATA | 1 TB            | CD-ROM           | 4 x 5   | 2 fixed      | Gigabit        | Oct 2006 |                |
| 4347 - 42U        | Opteron® 1210 | 1.8GHz/DC | 2x1MB       | 1 x 512MB | 80GB   | SATA | 1 TB            | CD-ROM           | 4 x 5   | 2 fixed      | Gigabit        | Oct 2006 |                |
| 4347 - 44U        | Opteron 1210  | 1.8GHz/DC | 2x1MB       | 2 x 512MB | 160GB  | SATA | 1 TB            | CD-ROM           | 4 x 5   | 2 fixed      | Gigabit        | Oct 2006 |                |
| 4347 - 64U        | Opteron 1214  | 2.2GHz/DC | 2x1MB       | 2 x 512MB | 160GB  | SATA | 1 TB            | Combo            | 4 x 5   | 2 fixed      | Gigabit        | Oct 2006 |                |

Positioning Processor(s) *Uniprocessor, entry server designed to meet small business needs and budgets*  
 Single-socket AMD® Opteron 1000 Series Dual-Core processor up to 2.4GHz or one Athlon up to 2.2GHz Single-Core

L2 cache Implementation **2MB** std on Opteron / **512KB** std on Athlon / ECC / full speed  
 Motherboard contains one AM2 socket, four DIMM sockets, four slots(2 PCI Express x8, 2 PCI), integrated SATA and Gigabit Ethernet.

SMP support No SMP support / no processor upgrade

Memory **512MB or 1GB** std / 8GB<sup>13</sup> max / four 184-pin gold-plated DIMM sockets / **PC2-5300 667MHz ECC DDR2-SDRAM / All Error Checking and Correcting (ECC)** / dual-channel / industry std / unbuffered

SCSI disk controller None standard / Ultra320 SCSI controller 2 (LVD 320MB/sec) optional for tape backup  
 IDE disk controller Enhanced IDE / ATA-100 / integrated in I/O Controller Hub / one connector on planar  
 SATA disk controller Dual channel SATA controller (1.5GB/sec) / integrated into I/O Controller Hub / supports up to two HDDs & one GoVault™ drive standard  
 Cables One 2-drop EIDE cable (to optical drive) / one 1-drop SATA cable per installed hard disk  
 Disk 80 or 160GB SATA / 7,200 rpm / 9.0 ms seek / S.M.A.R.T.  
 RAID Controller None standard / IBM SAS HBA Controller optional for RAID 0 & 1

Rack support Bus slots (see below) None  
 Two PCI-E x8 slots / two 32-bit 33MHz 5v PCI 2.2 slots

Chipset **Nvidia® nForce™ Professional 2200 MCP** / I/O Controller Hub provides: two PCI-Express x8 slots, two PCI 2.2 slots, ATA-100 EIDE, SATA, USB, Low Pin Count Interface / SST 49LF004A, 4Mbit Firmware Hub / Winbond® PC8374K Super I/O for diskette, parallel, serial

Ethernet 10/100/1000 gigabit / Broadcom 5721 / on planar / full duplex / PHY and MAC layers / Preboot eXecution Environment (PXE) / Wake on LAN®  
 Optical / diskette Ports *Some: CD-ROM: 48X-20X<sup>6</sup> CD-ROM, IDE; some: CDRW/DVD-ROM Combo: 48X/32X/48X/16X<sup>6</sup>, IDE*  
*Front: two USB(2.0); Back: one serial(9-pin), one parallel, four USB(2.0), ethernet(RJ-45), video(DB-15)*  
 Diagnostics Diagnostic LEDs / error LEDs for fans and memory / server diagnostic programs stored on IBM Enhanced Diagnostics CD  
 Systems mgmt None

Graphics controller ATI® ES1000 / 16MB SDRAM std/max / on planar / analog 15-pin / up to 1024 x 768 x 32 bit @85Hz

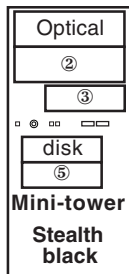
Security Optional U-Bolt support via knockout / power-on password / boot sequence control / operation without keyboard/mouse/display

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

Keyboard / mouse Included / USB only  
 Cooling fans Three variable speed fans (cpu heatsink, front, power supply) / not redundant / not hot-swap  
 Power supply 310 watts / universal / manual switching / Automatic Server Restart (ASR) / not hot-swap /no redundancy / cooling fan in power supply (variable speed)

|  |         |
|--|---------|
| 512MB PC2-5300 CL5 ECC DDR2                        | 41Y2726 |
| 2x1GB PC2-5300 CL5 ECC DDR2                        | 41Y2729 |
| 2x2GB PC2-5300 CL5 ECC DDR2                        | 41Y2732 |
| IBM 80GB SATA-150 (7.2K) simple-swap HDD           | 39M4500 |
| IBM 160GB SATA-150 (7.2K) simple-swap HDD          | 39M4504 |
| IBM 250GB SATA-150 (7.2K) simple-swap HDD          | 39M4508 |
| IBM 500GB SATA-150 (7.2K) simple-swap HDD          | 39M4514 |
| 48X/32X/48X/16X Max <sup>6</sup> CD-RW/DVD (black) | 32R2905 |
| IBM Multi-burner Plus                              | 32R2906 |
| IBM USB Portable Diskette Drive                    | 40K1692 |
| IBM GoVault 80GB (SATA)                            | 25R0006 |
| IBM 400/800GB LT03 Tape Drive (SCSI)               | 39M5657 |
| IBM 160/320GB VXA-3 Tape Drive (SCSI)              | 25R0045 |
| IBM DDS/5 Tape Drive (SCSI)                        | 39M5656 |
| IBM HH LTO2 Tape Drive (SCSI)                      | 39M5658 |
| IBM DLT4 Tape Drive (SATA)                         | 39M5659 |
| IBM SAS HBA Controller (for SATA RAID 0, 1)        | 25R8060 |
| IBM Ultra320 SCSI Controller 2                     | 39R8743 |

Other options at [ibm.com/pc/us/accessories](http://ibm.com/pc/us/accessories)



Bay ① 5.25", HH 1.6", access, optical  
 Bay ② 5.25", HH 1.6", access, open (optical or tape)  
 Bay ③ 3.5", SL 1", access, open  
 Bay ④ 3.5", SL 1", access, std disk  
 Bay ⑤ 3.5", SL 1", access, open

Slot 1: fullsize, PCI-E x8 (4GBps)  
 Slot 2: fullsize, PCI-E x8 (4GBps)  
 Slot 3: fullsize, 32-bit 33MHz, PCI 2.2 (5v)  
 Slot 4: fullsize, 32-bit 33MHz, PCI 2.2 (5v)

- ◇ Removable left side panel
- ◇ Configuration/Setup Utility (in flash memory) invoked by pressing F1 at startup
- ◇ Advanced Configuration Power Interface (ACPI) 1.0
- ◇ Device Drivers and Diagnostics CD-ROM included
- ◇ Four stabilizing feet
- ◇ H 17.2" x W 8.1" x D 19.6"
- ◇ H 438mm x W 205mm x D 497mm
- ◇ 31 to 38 pounds (14 to 17kg)
- ◇ BTU Output:  
 Minimum: 185 Btu/hr (54 watts)  
 Maximum: 853 Btu/hr (250 watts)
- ◇ Maximum internal disk capacity<sup>13</sup>: 1TB with two 500GB SATA disks

**LIMITED WARRANTY<sup>3</sup>**

- ↪ 1 year parts and labor
- ↪ International Warranty Service<sup>3</sup>
- ↪ On site, 8 am-5 pm, Mon-Fri excluding holidays, next business day response time
- ↪ On site service upgrade options (in eligible locations):<sup>7</sup>
  - 3 year IOR 24x7, 2 hr avg response (ServicePac part num 41W9318)
  - 3 year IOR 24x7, 4 hr avg response (ServicePac part num 41W9317)
  - 3 year IOR 9x5, 4 hr avg response (ServicePac part num 41W9316)
  - 3 year IOR 9x5, NBD response (ServicePac part num 41W9315)
- ↪ Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- ↪ 24x7<sup>14</sup> toll-free support for warranty issues during the warranty period<sup>5</sup>

| IBM® Machine Type | model   | Processor / Speed | L2 cache            | FSB MHz | Memory | Disk/Disk controller | Maximum Capacity | slots x bays  | Hard disk bays | Power Supply  | Ethernet      | Available date |          |          |
|-------------------|---------|-------------------|---------------------|---------|--------|----------------------|------------------|---------------|----------------|---------------|---------------|----------------|----------|----------|
| 4362/4363         | 22Y/2BY | Pentium® D 915    | 3.0GHz <sup>1</sup> | 2x2MB   | 800    | 1x512MB              | None/SATA        | 2.0TB         | 5 x 7          | 4 simple-swap | 1x400W        | Gigabit        | Nov 2006 |          |
| 4362/4363         | 24Y/2DY | Pentium D 915     | 3.0GHz              | 2x2MB   | 800    | 2x512MB              | None/SAS/SATA    | 2.0TB         | 5 x 7          | 4 hot-swap    | 1x400W        | Gigabit        | Nov 2006 |          |
| 4362/4363         | 32Y/3BY | Pentium D 945     | 3.4GHz              | 2x2MB   | 800    | 1x512MB              | None/SATA        | 2.0TB         | 5 x 7          | 4 simple-swap | 1x400W        | Gigabit        | Nov 2006 |          |
| 4362/4363         | 42Y/4BY | Xeon®             | 3040                | 1.86GHz | 2MB    | 1066                 | 1x512MB          | None/SATA     | 2.0TB          | 5 x 7         | 4 simple-swap | 1x400W         | Gigabit  | Nov 2006 |
| 4362/4363         | 43Y/4CY | Xeon              | 3040                | 1.86GHz | 2MB    | 1066                 | 2x512MB          | 1x160GB/SATA  | 2.0TB          | 5 x 7         | 4 simple-swap | 1x400W         | Gigabit  | Nov 2006 |
| 4362/4363         | 44Y/4DY | Xeon              | 3040                | 1.86GHz | 2MB    | 1066                 | 2x512MB          | None/SAS/SATA | 2.0TB          | 5 x 7         | 4 hot-swap    | 1x400W         | Gigabit  | Nov 2006 |
| 4362/4363         | 52Y/5BY | Xeon              | 3050                | 2.13GHz | 2MB    | 1066                 | 2x512MB          | None/SATA     | 2.0TB          | 5 x 7         | 4 simple-swap | 1x400W         | Gigabit  | Nov 2006 |
| 4362/4363         | 56Y/5FY | Xeon              | 3050                | 2.13GHz | 2MB    | 1066                 | 2x512MB          | None/SAS/SATA | 2.0TB          | 5 x 7         | 4 hot-swap    | 2x430W         | Gigabit  | Nov 2006 |
| 4362/4363         | 57Y/5GY | Xeon              | 3050                | 2.13GHz | 2MB    | 1066                 | 2x512MB          | 1x160GB/SATA  | 2.0TB          | 5 x 7         | 4 hot-swap    | 2x430W         | Gigabit  | Nov 2006 |
| 4362/4363         | 62Y/6BY | Xeon              | 3060                | 2.4GHz  | 4MB    | 1066                 | 2x512MB          | None/SAS/SATA | 2.0TB          | 5 x 7         | 4 hot-swap    | 1x400W         | Gigabit  | Nov 2006 |
| 4362/4363         | 64Y/6DY | Xeon              | 3060                | 2.4GHz  | 4MB    | 1066                 | 2x512MB          | None/SAS/SATA | 2.0TB          | 5 x 7         | 4 hot-swap    | 2x430W         | Gigabit  | Nov 2006 |

Positioning Processor(s) *Single socket, entry server for small and medium size business' and distributed enterprises*  
**Intel® Pentium D up to 3.4GHz 800MHz FSB / Xeon up to 2.4GHz 1066 MHz FSB / All Dual-Core / All Optimized for Extended Memory 64 Technology (EM64T)**  
 L2 cache Implementation **1MB** per core std on Pentium D / **2 or 4MB** 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 or 1GB** std / 8GB<sup>13</sup> 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**  
 IDE controller Enhanced IDE / ATA-100 / integrated in I/O Controller Hub / one connector on planar  
 SATA controller Four channel SATA controller (3.0GB/sec) / supports 4 drives standard / integrated  
 Cables One 2-drop EIDE cables (to optical) / one 1-drop SATA cable per installed hard disk  
 Disk Some: 160GB SATA / 7,200 rpm / 9.0 ms seek / S.M.A.R.T.

Rack support 5U<sup>4</sup> rack mount support via tower-to-rack kit option  
 Bus slots (see below) One PCI-E x8 / one PCI-E x1 / three 32-bit 33MHz 5v PCI 2.2 slots

Chipset **Intel 3010 chipset** / Memory Controller Hub (MCH) / I/O Controller Hub (ICH7R) for PCI 2.2, ATA-100 EIDE, ethernet MAC, USB, Low Pin Count Interface / Firmware Hub / **SMSC® SCH5017** Super I/O for diskette, parallel, serial, keyboard, mouse

Ethernet 10/100/1000 gigabit / Broadcom® 5721 / on planar / full-duplex / PHY and MAC layers / Preboot eXecution Environment (PXE) / Wake on LAN®  
 Optical / diskette Ports **4362 MTMs:** 48X-20X<sup>6</sup> CD-ROM, IDE; **4363 MTMs:** 48X-32X-48X-16X<sup>6</sup> CD-RW/DVD-ROM, IDE / None standard  
 Front: two USB (2.0); Rear: two serial (9-pin), parallel, four USB (2.0), keyboard, mouse, ethernet (RJ45) and video  
 Diagnostics Diagnostic LEDs / error LEDs for fans and memory / server diagnostic programs stored on IBM Enhanced Diagnostics CD  
 Systems mgmt Mini-baseboard management controller / IPMI 1.5 / 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 SDRAM** std/max / on planar / analog 15-pin / up to 1024x768x32bit@85Hz

Security Chassis 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 Optional  
 Cooling fans Three fans (fansink, 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)

- 41Y2726
- 41Y2729
- 41Y2732
- 39M4500
- 39M4504
- 39M4508
- 39M4514
- 39M4518
- 39M4522
- 39M4526
- 39M4530
- 40K1039
- 40K1040
- 40K1041
- 40K1042
- 40K1043
- 40K1044
- 32R2906
- 39Y9566
- 42C8923
- 42C1312

Slot 1: fullsize, PCI-E x8 (4GBps)  
 Slot 2: fullsize, PCI-E x1 (500MBps)  
 Slot 3: fullsize, 32-bit 33MHz, PCI 2.2 (5v)  
 Slot 4: fullsize, 32-bit 33MHz, PCI 2.2 (5v)  
 Slot 5: fullsize, 32-bit 33MHz, PCI 2.2 (5v)

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) 1.0  
 ➤ 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:  
 2TB<sup>13</sup> (4 disks x 500GB)  
 Maximum hot-swap SAS capacity:  
 1.2TB<sup>13</sup> (4 disks x 300GB)

**LIMITED WARRANTY<sup>3</sup>**  
 ➤ 1 year parts and labor standard 4362 MTM  
 ➤ 3 year parts and labor standard 4363 MTM  
 ➤ International Warranty Service<sup>3</sup>  
 ➤ On site, 8 am-5 pm, Mon-Fri excluding holidays, next business day response time  
 ➤ On site service upgrade options (in eligible locations):<sup>7</sup>  
 • 3 year IOR 24x7, 2 hr avg response (ServicePac part num 69P9512)  
 • 3 year IOR 24x7, 4 hr avg response (ServicePac part num 69P9511)  
 • 3 year IOR 9x5, 4 hr avg response (ServicePac part num 69P9510)  
 • 3 year IOR 9x5, NBD response (ServicePac part num 69P9509)  
 ➤ Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>  
 ➤ 24x7<sup>14</sup> toll-free support for warranty issues during the warranty period<sup>3</sup>



| IBM® Machine Type model | Processor / Speed | L2 cache   | FSB MHz | Memory | Disk controller | Disk bays | Mechanical    | Slots x bays         | Ethernet | Ltd warr <sup>3</sup> | Available date |          |
|-------------------------|-------------------|------------|---------|--------|-----------------|-----------|---------------|----------------------|----------|-----------------------|----------------|----------|
| 4364/4365 12Y/1BY       | Celeron® D 341    | 2.93GHz/DC | 256KB   | 533    | 1 x 512MB       | SATA      | 2 simple-swap | 1U <sup>4</sup> rack | 2x3      | Dual GB               | 1/3yr          | Nov 2006 |
| 4364/4365 22Y/2BY       | Pentium® D 945    | 3.4GHz/DC  | 2x2MB   | 800    | 1 x 512MB       | SATA      | 2 simple-swap | 1U rack              | 2x3      | Dual GB               | 1/3yr          | Nov 2006 |
| 4364/4365 42Y/4BY       | Xeon® 3040        | 1.87GHz/DC | 2MB     | 1066   | 2 x 512MB       | SATA      | 2 simple-swap | 1U rack              | 2x3      | Dual GB               | 1/3yr          | Nov 2006 |
| 4364/4365 44Y/4DY       | Xeon 3040         | 1.87GHz/DC | 2MB     | 1066   | 2 x 512MB       | SAS/SATA  | 2 hot-swap    | 1U rack              | 2x3      | Dual GB               | 1/3yr          | Nov 2006 |
| 4364/4365 52Y/5BY       | Xeon 3050         | 2.13GHz/DC | 2MB     | 1066   | 2 x 512MB       | SAS/SATA  | 2 hot-swap    | 1U rack              | 2x3      | Dual GB               | 1/3yr          | Nov 2006 |
| 4364/4365 54Y/5DY       | Xeon 3050         | 2.13GHz/DC | 2MB     | 1066   | 2 x 512MB       | SAS       | 4 hot-swap    | 1U rack              | 2x5      | Dual GB               | 1/3yr          | Nov 2006 |
| 4364/4365 62Y/6BY       | Xeon 3060         | 2.4GHz/DC  | 4MB     | 1066   | 2 x 512MB       | SAS/SATA  | 2 hot-swap    | 1U rack              | 2x3      | Dual GB               | 1/3yr          | Nov 2006 |
| 4364/4365 64Y/6DY       | Xeon 3060         | 2.4GHz/DC  | 4MB     | 1066   | 2 x 512MB       | SAS       | 4 hot-swap    | 1U rack              | 2x5      | Dual GB               | 1/3yr          | Nov 2006 |

Positioning *Efficient and dense 1U, single-socket, rack-optimized server for web and network infrastructure*  
 Processor(s) **Intel® Celeron at 2.93GHz 533 FSB / Pentium D at 3.4GHz Dual-Core 800MHz FSB / Xeon up to 2.4GHz Dual-Core 1066MHz FSB / All Optimized for Extended Memory 64 Technology (EM64T)**  
 L2 cache **256KB** std on Celeron / **2x2MB** std on Pentium D / **2 or 4MB** on Xeon / ECC / full speed  
 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 **512MB or 1GB** std / 8GB<sup>13</sup> 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) / supports 2 drives standard / integrated into South Bridge  
 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)

Disk None standard  
 Mechanical **EIA 22" Rack (1U<sup>4</sup>)** / rack-mount only  
 Architecture / Intel **3010 chipset** / Memory Controller Hub (MCH) / I/O Controller Hub (ICH7R) for PCI-E, ATA-100 EIDE, ethernet chipsets  
 Bus slots MAC, USB, Low Pin Count Interface / Firmware Hub / **SMSC® SCH5017** Super I/O for serial, keyboard, mouse (See below) two PCI-E™ x8

Ethernet controllers **Dual-Gigabit** 10/100/1000 ethernet ports / Broadcom® 5721 / two full gigabit ethernet MAC and PHY layer functions / integrated / port one is CSA, port two is PCI 2.2 / full duplex / PXE / Wake on LAN® / Rear RJ-45 ports (2)  
 Optical / diskette **4364 MTMs:** 48X-20X<sup>6</sup> CD-ROM, IDE; **4365 MTMs:** 48X-32X-48X-16X<sup>6</sup> CD-RW/DVD-ROM, IDE / *Diskette:* none  
 Ports **Front:** two USB (2.0) / **Rear:** serial (9-pin), two ethernet (RJ-45), keyboard, mouse, video (DB-15), two USB (2.0), one systems management (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 (separate keyboard, video, mouse ports on back)  
 Systems mgmt Mini-baseboard management controller / IPMI 1.5 / 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 / <b>secure remote power on / off via IPMI 1.5</b> | 512MB PC2-5300 ECC DDR2<br>2GB(2x1GB) PC2-5300 ECC DDR2<br>4GB(2x2GB) PC2-5300 ECC DDR2   | 41Y2726<br>41Y2729<br>41Y2732                                  |
| Software      | <b>ServerGuide™</b> (CD-ROM installation and configuration utilities), IBM Director™ and others   | IBM 36GB SFF SAS HDD<br>IBM 73GB SFF SAS HDD<br>IBM 80GB SATA (7.2K) simple-swap HDD<br>IBM 160GB SATA (7.2K) simple-swap HDD<br>IBM 250GB SATA (7.2K) simple-swap HDD<br>IBM 500GB SATA (7.2K) simple-swap HDD | 40K1051<br>40K1052<br>39M4500<br>39M4504<br>39M4508<br>39M4514 |
| Cooling fans  | Seven fans (five fans for system, two on power supply) / variable speed / not redundant or hot-swap   | 80GB Hot-Swap SATA HDD<br>160GB Hot-Swap SATA HDD   | 39M4518<br>39M4522   |
| Power supply  | 351 watt / universal / auto-sensing / auto-restart support  | 250GB Hot-Swap SATA HDD<br>500GB Hot-Swap SATA HDD  | 39M4526<br>39M4530   |
| Prerequisites | Monitor, keyboard, mouse, rack  | 73GB 10K 3.5" SAS Hot-Swap HDD<br>146GB 10K 3.5" SAS Hot-Swap HDD<br>300GB 10K 3.5" SAS Hot-Swap HDD<br>36GB 15K 3.5" SAS Hot-Swap HDD<br>73GB 15K 3.5" SAS Hot-Swap HDD<br>146GB 15K 3.5" SAS Hot-Swap HDD     | 40K1039<br>40K1040<br>40K1041<br>40K1042<br>40K1043<br>40K1044 |

**Rear**  
 PCI slot 1 PCI slot 2

**Top**  
 DIMM sockets CPU Planar Fan Power Supply Fan Fan Fan Fan Fan

**Front**  
 Optical Disk Disk

**or**  
 Optical ① ② ③ ④

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

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

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

- ❖ 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 capacity<sup>13</sup> (model dependent):  
 1TB with two 500GB 3.5" SATA disks, 600GB with two 300GB 3.5" SAS disks or 292GB with four 2.5" 73GB SAS disks

**LIMITED WARRANTY<sup>3</sup>**

- ❖ 1 year parts and labor standard 4364 MTM
- ❖ 3 year parts and labor standard 4365 MTM
- ❖ International Warranty Service<sup>3</sup>
- ❖ On site, 8 am-5 pm, Mon-Fri excluding holidays, next business day response time
- ❖ On site service upgrade options (in eligible locations):<sup>7</sup>
  - 3 year IOR 9x5, NBD avg response (ServicePac part num 69P9505)
  - 3 year IOR 9x5, 4 hr avg response (ServicePac part num 69P9506)
  - 3 year IOR 24x7, 4 hr avg response (ServicePac part num 69P9507)
  - 3 year IOR 24x7, 2 hr response (ServicePac part num 69P9508)
- ❖ Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- ❖ 24x7<sup>14</sup> toll-free support for warranty issues during the warranty period<sup>3</sup>

| IBM®<br>Type-GAV-model | Qty x Processor      | L2<br>Core cache | Memory | Disk<br>controller | Mechanical | Slots x bays<br>(std/max) | Warranty | Power supply      | Ethernet | Available<br>date |
|------------------------|----------------------|------------------|--------|--------------------|------------|---------------------------|----------|-------------------|----------|-------------------|
| 7973/74-42y-42x        | 1x Xeon™ 5110 1.6GHz | DC 4MB           | 1GB    | None 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    | None 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    | None SATA          | Tower      | 6x7 (4/4 SS)              | 1/3yr    | 1 x 670W fixed    | GB       | Aug 2006          |
| 7975/76-42y-42x        | 1x Xeon 5110 1.6GHz  | DC 4MB           | 1GB    | None 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    | None 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    | None 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    | None 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    | None 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    | None SAS/SATA      | Tower      | 6x11 (4/8 HS)             | 1/3yr    | 1 x 835W hot-swap | GB       | Aug 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 1.86 GHz** with 1066MHz FSB Dual Core / up to **1 x Intel® Xeon Processor 2.0 GHz** with 1333MHz FSB Dual Core / **Extended Memory 64 Technology (EM64T)**  
**L2 cache** **4MB** / all models / 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 / **32GB<sup>13</sup>** 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** Some: **Adaptec® AIC-9580W / eight port SAS(300MB/sec) or SATA(150MB/sec) / hot-swap / on planar / PCI-Express / supports RAID 0, 1 & 10 / ServerRAID 8k-i std**; Some: native SATA / on planar / PCI-Express / supports **RAID 0 & 1**

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

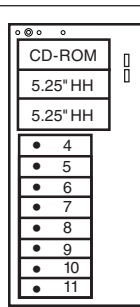
**Mechanical Slots (see below) Chipset** Tower / conversion to EIA 26" Rack (5U<sup>4</sup>) via optional kit 39Y8382  
 Three PCI-Express, two PCI-X 64-bit/133MHz and one PCI 32-bit/33MHz slot  
**Intel 5000P chipset** / Intel Memory Controller Hub (MCH) provides two PCI-Express x8 slots / Enterprise 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)**

**CD-ROM / diskette** 48X<sup>6</sup> 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: 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

|                         |  |   |         |
|-------------------------|--|---|---------|
| <b>Systems mgmt</b>     | <b>IBM Integrated Baseboard Management Controller(BMC) / IPMI 2.0 H8S2166</b> / 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 1.6GHz/1066MHz/4MB L2 Cache Proc Upg   | 40K1231 |
| <b>Diagnosics</b>       | System error LED Panel in front  | Xeon 1.86GHz/1066MHz/4MB L2 Cache Proc Upg  | 40K1232 |
| <b>Software</b>         | <b>ServerGuide™</b> (CD-ROM installation and configuration utilities), IBM Director, others  | Xeon 2.0GHz/1333MHz/4MB L2 Cache Proc Upg   | 40K1233 |
| <b>Keyboard / mouse</b> | Optional   | 1GB Kit (2x512MB DIMM) PC2-5300 DDR2 FBD CL4  | 39M5782 |
| <b>Power supply</b>     | 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 | 2GB Kit (2x1GB DIMM) PC2-5300 DDR2 FBD CL4  | 39M5785 |
| <b>Fans</b>             |  | 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 |
|                         |  | 80GB 7.2K SATA Hot-Swap HDD   | 39M4518 |
|                         |  | 160GB 7.2K SATA Hot-Swap HDD  | 39M4522 |
|                         |  | 250GB 7.2K SATA Hot-Swap HDD  | 39M4526 |
|                         |  | 80GB 7.2K SATA Simple-Swap HDD  | 39M4500 |
|                         |  | 160GB 7.2K SATA Simple-Swap HDD   | 39M4504 |
|                         |  | 250GB 7.2K SATA Simple-Swap HDD   | 39M4508 |
|                         |  | IBM Remote Supervisor Adapter II Slimline   | 39Y9566 |
|                         |  | IBM Redundant Power and Cooling Option(NA)  | 39Y8487 |
|                         |  | Other options at <a href="http://www.ibm.com/po/us/accessories">www.ibm.com/po/us/accessories</a> |         |

**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



Tower

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: 2.4TB<sup>2</sup> with eight 300GB 10K SAS or 4.0TB<sup>2</sup> with eight 500GB SATA hot-swap HDDs  
**Simple-Swap models:** Max internal disk capacity: 1.0TB<sup>2</sup> with four 250GB SATA non-hot-swap HDDs

- ↳ 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

**LIMITED WARRANTY<sup>3</sup>**

- ↳ 1 yr parts and labor 7973/7975 MTM
- ↳ 3 yr parts and labor 7974/7976 MTM
- ↳ International Warranty Service<sup>3</sup>
- ↳ On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time<sup>7</sup>
- ↳ 3 year on site warranty service upgrade options (in eligible locations):<sup>7</sup>
  - 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)
- ↳ 24x7<sup>14</sup> toll-free support for warranty issues during the warranty period<sup>2</sup>

| IBM® Type-model | Qty x Processor    | Speed/Core | L2 Cache | Optical   | Memory  | Disk / Controller | Disk bays | Slots x bays | Ethernet     | Warranty <sup>3</sup> (years) | Available date |
|-----------------|--------------------|------------|----------|-----------|---------|-------------------|-----------|--------------|--------------|-------------------------------|----------------|
| 7984 - 11U      | 1 x Opteron™ 2210  | 1.8GHz/DC  | 2MB      | None      | 2x512MB | 80GB/SATA         | 2 fixed   | 2x3          | Dual Gigabit | 1                             | Sept 2006      |
| 7984 - 31U      | 1 x Opteron 2214   | 2.2GHz/DC  | 2MB      | CD-RW/DVD | 2x512MB | 80GB/SATA         | 2 fixed   | 2x3          | Dual Gigabit | 1                             | Sept 2006      |
| 7984 - 41U      | 1 x Opteron 2216   | 2.4GHz/DC  | 2MB      | None      | 2x512MB | 80GB/SATA         | 2 fixed   | 2x3          | Dual Gigabit | 1                             | Sept 2006      |
| 7984 - 51U      | 1 x Opteron 2218   | 2.6GHz/DC  | 2MB      | None      | 2x512MB | 80GB/SATA         | 2 fixed   | 2x3          | Dual Gigabit | 1                             | Sept 2006      |
| 7984 - 52U      | 2 x Opteron 2216   | 2.6GHz/DC  | 2MB      | None      | 4x512MB | 80GB/SATA         | 2 fixed   | 2x3          | Dual Gigabit | 1                             | Sept 2006      |
| 7984 - 6AU      | 2 x Opteron 2220SE | 2.8GHz/DC  | 2MB      | None      | 4x512MB | 80GB/SATA         | 2 fixed   | 2x3          | Dual Gigabit | 1                             | Sept 2006      |

**Positioning Processor(s)** **Entry 2-way rack server for compute-intensive applications and dual core computing at an attractive price**  
 Up to two AMD® Opteron 2000 Series Dual Core Processors up to 2.8GHz<sup>1</sup> / simultaneously supports 32-bit and 64-bit computing  
**L2 cache** 1MB / per core / at processor speed / Dual Core Capable  
**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** 1 or 2 GB std / 24GB max<sup>13</sup> 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 (1U)<sup>4</sup> / 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** Two gigabit 10/100/1000 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

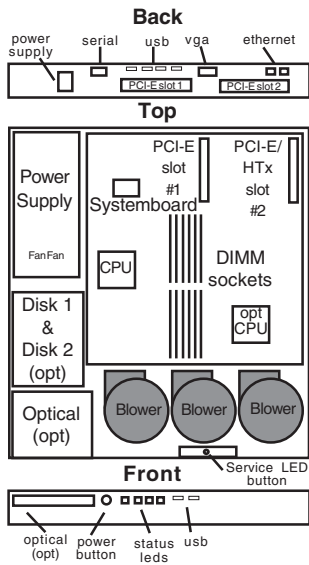
**Diagnostics** Diagnostic LEDs for fans, memory DIMMs and processors / PFA / Light Path Diagnostics not supported

**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

|  |         |
|--|---------|
| Dual Core AMD Opteron Processor Model 2210   | 40K1208 |
| Dual Core AMD Opteron Processor Model 2214   | 40K1215 |
| Dual Core AMD Opteron Processor Model 2216   | 40K1210 |
| Dual Core AMD Opteron Processor Model 2218   | 40K1211 |
| Dual Core AMD Opteron Processor Model 2220SE | 40K1209 |
| 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 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 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 |
| PCI-E x8 Riser Card                          | 32R3288 |
| HTx Riser Card                               | 40K7462 |



Maximum internal disk capacity<sup>13</sup>:  
 1TB with two 500GB SATA disks or  
 600GB with two 300GB SAS disks  
 and optional\* SAS controller

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

Other options at [ibm.com/pc/us/accessories](http://ibm.com/pc/us/accessories)

- 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

**LIMITED WARRANTY<sup>3</sup>**

- 1 year parts and labor
- International Warranty Service<sup>3</sup>
- On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time<sup>7</sup>
- On site service upgrade options (in eligible locations):<sup>7</sup>
  - 1 year IOR 9x5, 4 hr avg response (ServicePac® partnum 69P9399)
  - 2 year IOR 24x7, 4 hr avg response (ServicePac partnum 96P2119)
  - 2 year IOR 24x7, 2 hr avg response (ServicePac partnum 96P2120)
  - 3 year IOR 24x7, 4 hr avg response (ServicePac partnum 69P9507)
  - 3 year IOR 9x5, NBD response (ServicePac partnum 69P9505)
- Other ServicePac options at [www.ibm.com/services/us/its/pdf/wamomxeu.pdf](http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf)
- 24x7<sup>14</sup> toll-free support for warranty issues during the warranty period<sup>3</sup>

\*IBM SAS HBA Controller option required for SAS support

| IBM®<br>Type-GAV-model       | Qty x Processor   | L2<br>Core cache | Memory | Disk<br>controller | Mechanical | Slots x bays<br>(hot-swap bays) | Power supply      | Ethernet  | Available<br>date |         |                                      |          |                                   |          |                                   |   |                                     |   |                                     |   |                                     |   |                                     |   |                                     |   |                                     |    |                                      |    |                                      |
|------------------------------|---|------------------|--------|--------------------|------------|---------------------------------|-------------------|-----------|-------------------|---------|--------------------------------------|----------|-----------------------------------|----------|-----------------------------------|---|-------------------------------------|---|-------------------------------------|---|-------------------------------------|---|-------------------------------------|---|-------------------------------------|---|-------------------------------------|----|--------------------------------------|----|--------------------------------------|
| 7977-12y-12x                 | 1 x Xeon™ 5050 3.0GHz   | DC 4MB           | 1GB    | None SAS / SATA    | Tower      | 6x11 (8 hot-swap std/max)       | 1 x 835W hot-swap | 2xGigabit | Jul 2006          |         |                                      |          |                                   |          |                                   |   |                                     |   |                                     |   |                                     |   |                                     |   |                                     |   |                                     |    |                                      |    |                                      |
| 7977-22y-22x                 | 1 x Xeon 5060 3.2GHz  | DC 4MB           | 1GB    | None SAS / SATA    | Tower      | 6x11 (8 hot-swap std/max)       | 1 x 835W hot-swap | 2xGigabit | Jul 2006          |         |                                      |          |                                   |          |                                   |   |                                     |   |                                     |   |                                     |   |                                     |   |                                     |   |                                     |    |                                      |    |                                      |
| 7977-42y-42x                 | 1 x Xeon 5110 1.6GHz  | DC 4MB           | 1GB    | None SAS / SATA    | Tower      | 6x11 (8 hot-swap std/max)       | 1 x 835W hot-swap | 2xGigabit | Jul 2006          |         |                                      |          |                                   |          |                                   |   |                                     |   |                                     |   |                                     |   |                                     |   |                                     |   |                                     |    |                                      |    |                                      |
| 7977-52y-52x                 | 1 x Xeon 5120 1.86GHz   | DC 4MB           | 1GB    | None SAS / SATA    | Tower      | 6x11 (8 hot-swap std/max)       | 1 x 835W hot-swap | 2xGigabit | Jul 2006          |         |                                      |          |                                   |          |                                   |   |                                     |   |                                     |   |                                     |   |                                     |   |                                     |   |                                     |    |                                      |    |                                      |
| 7977-62y-62x                 | 1 x Xeon 5130 2.0GHz  | DC 4MB           | 1GB    | None SAS / SATA    | Tower      | 6x11 (8 hot-swap std/max)       | 1 x 835W hot-swap | 2xGigabit | Jul 2006          |         |                                      |          |                                   |          |                                   |   |                                     |   |                                     |   |                                     |   |                                     |   |                                     |   |                                     |    |                                      |    |                                      |
| 7977-72y-72x                 | 1 x Xeon 5140 2.33GHz   | DC 4MB           | 1GB    | None SAS / SATA    | Tower      | 6x11 (8 hot-swap std/max)       | 1 x 835W hot-swap | 2xGigabit | Jul 2006          |         |                                      |          |                                   |          |                                   |   |                                     |   |                                     |   |                                     |   |                                     |   |                                     |   |                                     |    |                                      |    |                                      |
| 7977-82y-82x                 | 1 x Xeon 5150 2.66GHz   | DC 4MB           | 1GB    | None SAS / SATA    | Tower      | 6x11 (8 hot-swap std/max)       | 1 x 835W hot-swap | 2xGigabit | Jul 2006          |         |                                      |          |                                   |          |                                   |   |                                     |   |                                     |   |                                     |   |                                     |   |                                     |   |                                     |    |                                      |    |                                      |
| 7977-92y-92x                 | 1 x Xeon 5160 3.0GHz  | DC 4MB           | 1GB    | None SAS / SATA    | Tower      | 6x11 (8 hot-swap std/max)       | 1 x 835W hot-swap | 2xGigabit | Jul 2006          |         |                                      |          |                                   |          |                                   |   |                                     |   |                                     |   |                                     |   |                                     |   |                                     |   |                                     |    |                                      |    |                                      |
| Positioning Processor        | Universal server; two-way server using the Xeon processor to provide power and performance at an affordable price<br>Up to 1 x Intel® Xeon Processor 3.0 GHz with 667MHz FSB Dual Core / Up to 1 x Intel Xeon Processor 3.2 GHz with 1066MHz FSB Dual Core / <b>Extended Memory 64 Technology (EM64T)</b> / Hyper-Threading technology  |                  |        |                    |            |                                 |                   |           |                   |         |                                      |          |                                   |          |                                   |   |                                     |   |                                     |   |                                     |   |                                     |   |                                     |   |                                     |    |                                      |    |                                      |
| L2 cache                     | 2MB / per core / all models / 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 / 48GB <sup>13</sup> 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 / <b>PC2-5300 667MHz FBD 240-pin ECC DDR2-SDRAM DIMMs</b> / DIMMs must be installed in matched pairs [a bank] / <b>Fully Buffered</b> / 2-way memory interleave / dual channel / <b>Error Checking and Correcting (ECC)</b> (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) / <b>Active Memory™</b> : <b>memory mirroring, online-spare memory, Chipkill</b>   |                  |        |                    |            |                                 |                   |           |                   |         |                                      |          |                                   |          |                                   |   |                                     |   |                                     |   |                                     |   |                                     |   |                                     |   |                                     |    |                                      |    |                                      |
| 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 Slots (see below) | Tower / conversion to EIA 26" Rack (5U <sup>4</sup> ) via optional kit 39Y8382<br>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 <sup>6</sup> DVD-ROM / IDE / 1.6" HH; <i>Diskette</i> : 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); <i>Graphics</i> : 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)  |                  |        |                    |            |                                 |                   |           |                   |         |                                      |          |                                   |          |                                   |   |                                     |   |                                     |   |                                     |   |                                     |   |                                     |   |                                     |    |                                      |    |                                      |
| Diagnosics                   | 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  |                  |        |                    |            |                                 |                   |           |                   |         |                                      |          |                                   |          |                                   |   |                                     |   |                                     |   |                                     |   |                                     |   |                                     |   |                                     |    |                                      |    |                                      |
|                              | <table border="1"> <tr> <td>DVD-ROM</td> <td>Bay 1 5.25", HH 1.6" access, DVD-ROM</td> </tr> <tr> <td>5.25" HH</td> <td>Bay 2 5.25", HH 1.6" access, open</td> </tr> <tr> <td>5.25" HH</td> <td>Bay 3 5.25", HH 1.6" access, open</td> </tr> <tr> <td>4</td> <td>Bay 4 3.5", SL 1", access, hot-swap</td> </tr> <tr> <td>5</td> <td>Bay 5 3.5", SL 1", access, hot-swap</td> </tr> <tr> <td>6</td> <td>Bay 6 3.5", SL 1", access, hot-swap</td> </tr> <tr> <td>7</td> <td>Bay 7 3.5", SL 1", access, hot-swap</td> </tr> <tr> <td>8</td> <td>Bay 8 3.5", SL 1", access, hot-swap</td> </tr> <tr> <td>9</td> <td>Bay 9 3.5", SL 1", access, hot-swap</td> </tr> <tr> <td>10</td> <td>Bay 10 3.5", SL 1", access, hot-swap</td> </tr> <tr> <td>11</td> <td>Bay 11 3.5", SL 1", access, hot-swap</td> </tr> </table>                                     |                  |        |                    |            |                                 |                   |           |                   | DVD-ROM | Bay 1 5.25", HH 1.6" access, DVD-ROM | 5.25" HH | Bay 2 5.25", HH 1.6" access, open | 5.25" HH | Bay 3 5.25", HH 1.6" access, open | 4 | Bay 4 3.5", SL 1", access, hot-swap | 5 | Bay 5 3.5", SL 1", access, hot-swap | 6 | Bay 6 3.5", SL 1", access, hot-swap | 7 | Bay 7 3.5", SL 1", access, hot-swap | 8 | Bay 8 3.5", SL 1", access, hot-swap | 9 | Bay 9 3.5", SL 1", access, hot-swap | 10 | Bay 10 3.5", SL 1", access, hot-swap | 11 | Bay 11 3.5", SL 1", access, hot-swap |
| DVD-ROM                      | Bay 1 5.25", HH 1.6" access, DVD-ROM  |                  |        |                    |            |                                 |                   |           |                   |         |                                      |          |                                   |          |                                   |   |                                     |   |                                     |   |                                     |   |                                     |   |                                     |   |                                     |    |                                      |    |                                      |
| 5.25" HH                     | Bay 2 5.25", HH 1.6" access, open   |                  |        |                    |            |                                 |                   |           |                   |         |                                      |          |                                   |          |                                   |   |                                     |   |                                     |   |                                     |   |                                     |   |                                     |   |                                     |    |                                      |    |                                      |
| 5.25" HH                     | Bay 3 5.25", HH 1.6" access, open   |                  |        |                    |            |                                 |                   |           |                   |         |                                      |          |                                   |          |                                   |   |                                     |   |                                     |   |                                     |   |                                     |   |                                     |   |                                     |    |                                      |    |                                      |
| 4                            | Bay 4 3.5", SL 1", access, hot-swap   |                  |        |                    |            |                                 |                   |           |                   |         |                                      |          |                                   |          |                                   |   |                                     |   |                                     |   |                                     |   |                                     |   |                                     |   |                                     |    |                                      |    |                                      |
| 5                            | Bay 5 3.5", SL 1", access, hot-swap   |                  |        |                    |            |                                 |                   |           |                   |         |                                      |          |                                   |          |                                   |   |                                     |   |                                     |   |                                     |   |                                     |   |                                     |   |                                     |    |                                      |    |                                      |
| 6                            | Bay 6 3.5", SL 1", access, hot-swap   |                  |        |                    |            |                                 |                   |           |                   |         |                                      |          |                                   |          |                                   |   |                                     |   |                                     |   |                                     |   |                                     |   |                                     |   |                                     |    |                                      |    |                                      |
| 7                            | Bay 7 3.5", SL 1", access, hot-swap   |                  |        |                    |            |                                 |                   |           |                   |         |                                      |          |                                   |          |                                   |   |                                     |   |                                     |   |                                     |   |                                     |   |                                     |   |                                     |    |                                      |    |                                      |
| 8                            | Bay 8 3.5", SL 1", access, hot-swap   |                  |        |                    |            |                                 |                   |           |                   |         |                                      |          |                                   |          |                                   |   |                                     |   |                                     |   |                                     |   |                                     |   |                                     |   |                                     |    |                                      |    |                                      |
| 9                            | Bay 9 3.5", SL 1", access, hot-swap   |                  |        |                    |            |                                 |                   |           |                   |         |                                      |          |                                   |          |                                   |   |                                     |   |                                     |   |                                     |   |                                     |   |                                     |   |                                     |    |                                      |    |                                      |
| 10                           | Bay 10 3.5", SL 1", access, hot-swap  |                  |        |                    |            |                                 |                   |           |                   |         |                                      |          |                                   |          |                                   |   |                                     |   |                                     |   |                                     |   |                                     |   |                                     |   |                                     |    |                                      |    |                                      |
| 11                           | Bay 11 3.5", SL 1", access, hot-swap  |                  |        |                    |            |                                 |                   |           |                   |         |                                      |          |                                   |          |                                   |   |                                     |   |                                     |   |                                     |   |                                     |   |                                     |   |                                     |    |                                      |    |                                      |
|                              | <p>Other options at <a href="http://www.ibm.com/po/us/accessories">www.ibm.com/po/us/accessories</a></p> <ul style="list-style-type: none"> <li>Quick release adapter slots (no screws)</li> <li>Configuration/Setup Utility invoked by pressing F1 at startup</li> <li>Aurora RAID Configuration Utility near startup by pressing CTRL+A</li> <li>ACPI 2.0-compliant</li> <li>Operator Information Panel (in front)</li> <li>Preventive 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</li> <li>Tower: H 17.3" x W 8.6" x D 29.4"</li> <li>74 to 101 pounds</li> <li>Stealth black color</li> </ul>   |                  |        |                    |            |                                 |                   |           |                   |         |                                      |          |                                   |          |                                   |   |                                     |   |                                     |   |                                     |   |                                     |   |                                     |   |                                     |    |                                      |    |                                      |
|                              | <p><b>LIMITED WARRANTY<sup>3</sup></b></p> <ul style="list-style-type: none"> <li>3 year parts and labor</li> <li>International Warranty Service<sup>3</sup></li> <li>On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time<sup>7</sup></li> <li>3 year on site warranty service upgrade options (in eligible locations):<sup>7</sup> <ul style="list-style-type: none"> <li>9 hour coverage, Mon-Fri excluding holidays, 4 hour average response (ServicePac<sup>®</sup> part num 21P2083)</li> <li>24 hr x 7 day coverage, 4 hour average response (ServicePac part number 21P2084)</li> <li>24 hr x 7 day coverage, 2 hour average response (ServicePac part number 21P2085)</li> </ul> </li> <li>24x7<sup>14</sup> toll-free support for warranty issues during the warranty period<sup>3</sup></li> </ul> |                  |        |                    |            |                                 |                   |           |                   |         |                                      |          |                                   |          |                                   |   |                                     |   |                                     |   |                                     |   |                                     |   |                                     |   |                                     |    |                                      |    |                                      |
|                              | <p>All models: Max internal disk capacity:<br/>2.4TB<sup>2</sup> with eight 300GB 10K SAS or<br/>2.0TB<sup>2</sup> with eight 250GB SATA hot-swap HDDs</p>  |                  |        |                    |            |                                 |                   |           |                   |         |                                      |          |                                   |          |                                   |   |                                     |   |                                     |   |                                     |   |                                     |   |                                     |   |                                     |    |                                      |    |                                      |

| 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 <sup>3</sup> | Available date |
|---------------------|--------------------------|----------|--------|------------|-----------------|---------|---------------|-----------|--------------|----------|-------------------------------|----------------|
| 7978-G5y-G5x        | 1 x Xeon™ 5050 3.0GHz/DC | 4MB      | 1GB    | (open 3.5) | SAS/SATA Combo  | 670W    | 2 hot-swap    | 2x4       | 2 x GB       | 3 year   | July 2006                     |                |
| 7978-G6y-G6x        | 1 x Xeon 5050 3.0GHz/DC  | 4MB      | 1GB    | (open 3.5) | SATA Combo      | 670W    | 2 simple-swap | 2x4       | 2 x GB       | 3 year   | July 2006                     |                |
| 7978-45y-45x        | 1 x Xeon 5080 3.73GHz/DC | 4MB      | 1GB    | (open 3.5) | SAS/SATA Combo  | 670W    | 2 hot-swap    | 2x4       | 2 x GB       | 3 year   | July 2006                     |                |
| 7978-4Sy-4Sx        | 1 x Xeon 5080 3.73GHz/DC | 4MB      | 1GB    | (open 2.5) | SAS/SATA Combo  | 670W    | 4 hot-swap    | 2x4       | 2 x GB       | 3 year   | July 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 / 32GB<sup>13</sup> 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 (1U<sup>4</sup>)** / 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

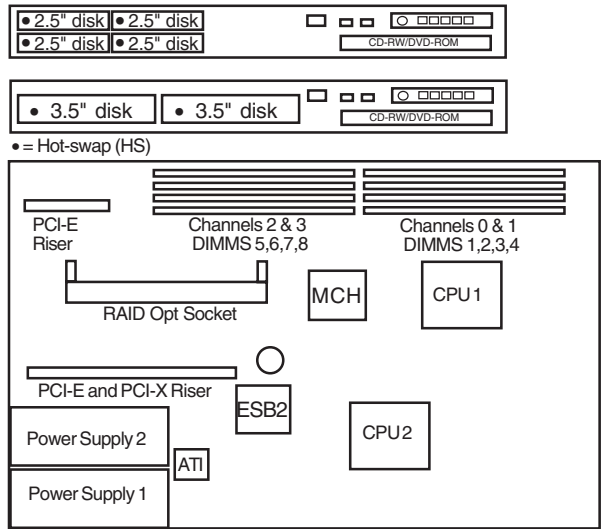
**Optical / diskette Front & Rear ports**  
**8X-24X<sup>6</sup> CD-RW/DVD-ROM / USB only**  
**Front:** two USB (Vers 2.0), graphics (DB-15) **Rear:** four USB (Vers 2.0), serial (9-pin), graphics (DB-15), two ethernet (RJ-45), one RJ-45 (sys mgmt) / no parallel port

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

**Security 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)

|                         |  |   |         |
|-------------------------|--|---|---------|
| <b>Diagnostics</b>      | <b>Drop down Light Path Diagnostics</b> panel providing LED map to failing part (located on front panel)                             | Xeon 3.0GHz/667MHz - 2 x 2MB L2 Cache         | 25R8921 |
| <b>Software</b>         | <b>ServerGuide™</b> (CD-ROM installation and configuration utilities), IBM Director systems mgmt, others                             | Xeon 3.73GHz/1066MHz - 2 x 2MB L2 Cache       | 25R8924 |
| <b>Keyboard / mouse</b> | None standard (because rack-based) / USB only  | 1GB PC2-5300 FBD (2 x 512MB)                  | 39M5782 |
| <b>Power supply</b>     | 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 |
| <b>Fans</b>             | <b>Calibrated Vectored Cooling™</b> Std: ten fans; Max: twelve (two fans with optional second cpu) / variable speed / hot-swap / PFA | 4GB PC2-5300 FBD (2 x 2GB)                    | 39M5791 |
| <b>Prerequisites</b>    | Monitor, keyboard, mouse, SAS/SATA disk, rack, OS  | 8GB PC2-5300 FBD (2 x 4GB) - When available   | 39M5797 |
|                         |  | IBM ServeRAID-8k Adapter                      | 25R8064 |
|                         |  | IBM Remote Supervisor Adapter II Slim         | 73P9341 |
|                         |  | 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/pc/us/accessories](http://ibm.com/pc/us/accessories)



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: 600GB<sup>2</sup> with two 300GB SL disks  
 2.5" SAS models: 292GB<sup>2</sup> with four 73.4GB SFF disks  
 3.5" SATA models: 1TB<sup>2</sup> with two 500GB SL disks

See footnotes for important warranty information

**LIMITED WARRANTY<sup>3</sup>**

- 3 year parts and labor
- International Warranty Service<sup>3</sup>
- On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time<sup>7</sup>
- 3 year on site warranty service upgrade options (in eligible locations):<sup>7</sup>
  - 9 hr coverage, Mon-Fri excluding holidays, 4 hr response time (ServicePac<sup>®</sup> 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>
- 24x7<sup>14</sup> toll-free support for warranty issues during the warranty period<sup>3</sup>

| 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 <sup>3</sup> | Available date |
|---------------------|--------------------------|----------|--------|------------|-----------------|---------|---------------|-----------|--------------|------------|-------------------------------|----------------|
| 7978-21y-21x        | 1 x Xeon™ 5110 1.6GHz/DC | 4MB      | 1GB    | (open 3.5) | SAS/SATA Combo  | 670W    | 2 hot-swap    | 2x4       | 2 x GB       | 3 year Aug | 2006                          |                |
| 7978-22y-22x        | 1 x Xeon 5110 1.6GHz/DC  | 4MB      | 1GB    | (open 3.5) | SATA Combo      | 670W    | 2 simple-swap | 2x4       | 2 x GB       | 3 year Aug | 2006                          |                |
| 7978-31y-31x        | 1 x Xeon 5120 1.86GHz/DC | 4MB      | 1GB    | (open 3.5) | SAS/SATA Combo  | 670W    | 2 hot-swap    | 2x4       | 2 x GB       | 3 year Aug | 2006                          |                |
| 7978-32y-32x        | 1 x Xeon 5120 1.86GHz/DC | 4MB      | 1GB    | (open 3.5) | SATA Combo      | 670W    | 2 simple-swap | 2x4       | 2 x GB       | 3 year Aug | 2006                          |                |
| 7978-3Ay-3Ax        | 1 x Xeon 5120 1.86GHz/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 / 32GB<sup>13</sup> 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

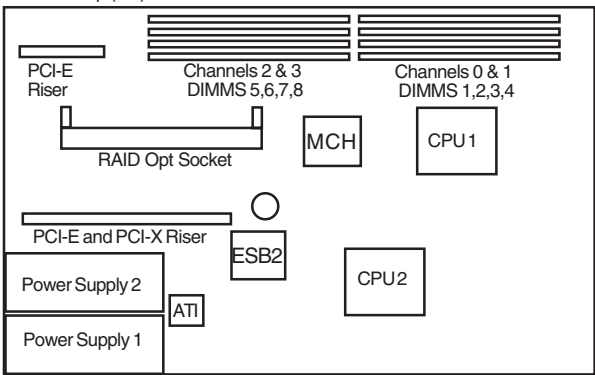
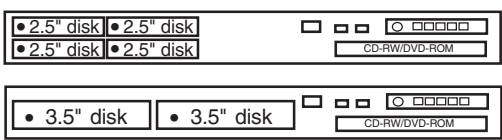
**SAS/SATA controller** **Adaptec® AIC-9580W / dual channel SAS controller / four port SAS or two port SATA** (300MB/sec SATA) / on planar / PCI-Express / some: hot-swap, supports **RAID 0, 1, &10** ; some: simple swap, supports **HostRAID / optional IBM ServeRAID™-8k Adaptor** for low-cost RAID 0, 1, 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 (1U<sup>4</sup>)** / 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** 8X-24X<sup>6</sup> CD-RW/DVD-ROM / USB only  
**Front & Rear ports** Front: two USB (Vers 2.0), graphics (DB-15) Rear: four 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 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)

|                         |  |   |         |
|-------------------------|--|---|---------|
| <b>Diagnostics</b>      | <b>Drop down Light Path Diagnostics</b> panel providing LED map to failing part (located on front panel)                             | Xeon 1.6GHz/1066MHz - 2 x 2MB L2 Cache        | 40K1237 |
| <b>Software</b>         | <b>ServerGuide™</b> (CD-ROM installation and configuration utilities), IBM Director systems mgmt, others                             | Xeon 1.86GHz/1066MHz - 2 x 2MB L2 Cache       | 40K1238 |
| <b>Keyboard / mouse</b> | None standard (because rack-based) / USB only  | 1GB PC2-5300 FBD (2 x 512MB)                  | 39M5782 |
| <b>Power supply</b>     | 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 |
| <b>Fans</b>             | <b>Calibrated Vectored Cooling™</b> Std: ten fans; Max: twelve (two fans with optional second cpu) / variable speed / hot-swap / PFA | 4GB PC2-5300 FBD (2 x 2GB)                    | 39M5791 |
| <b>Prerequisites</b>    | Monitor, keyboard, mouse, SAS/SATA disk, rack, OS  | 8GB PC2-5300 FBD (2 x 4GB) - When available   | 39M5797 |
|                         |  | IBM ServeRAID-8k Adapter                      | 25R8064 |
|                         |  | IBM Remote Supervisor Adapter II Slim         | 73P9341 |
|                         |  | 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 |



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: 600GB<sup>2</sup> with two 300GB SL disks  
 2.5" SAS models: 292GB<sup>2</sup> with four 73.4GB SFF disks  
 3.5" SATA models: 1TB<sup>2</sup> with two 500GB SL disks

See footnotes for important warranty information

Other options at [ibm.com/pc/us/accessories](http://ibm.com/pc/us/accessories)

**LIMITED WARRANTY<sup>3</sup>**

- 3 year parts and labor
- International Warranty Service<sup>3</sup>
- On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time<sup>7</sup>
- 3 year on site warranty service upgrade options (in eligible locations):<sup>7</sup>
  - 9 hr coverage, Mon-Fri excluding holidays, 4 hr response time (ServicePac<sup>®</sup> 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>
- 24x7<sup>14</sup> toll-free support for warranty issues during the warranty period<sup>3</sup>

| 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 <sup>3</sup> | Available date |
|---------------------|--------------------------|----------|--------|------------|-----------------|---------|---------------|-----------|--------------|------------|-------------------------------|----------------|
| 7978-41y-41x        | 1 x Xeon™ 5130 2.0GHz/DC | 4MB      | 1GB    | (open 3.5) | SAS/SATA Combo  | 670W    | 2 hot-swap    | 2x4       | 2 x GB       | 3 year Aug | 2006                          |                |
| 7978-42y-42x        | 1 x Xeon 5130 2.0GHz/DC  | 4MB      | 1GB    | (open 3.5) | SATA Combo      | 670W    | 2 simple-swap | 2x4       | 2 x GB       | 3 year Aug | 2006                          |                |
| 7978-4Ay-4Ax        | 1 x Xeon 5130 2.0GHz/DC  | 4MB      | 1GB    | (open 2.5) | SAS/SATA Combo  | 670W    | 4 hot-swap    | 2x4       | 2 x GB       | 3 year Aug | 2006                          |                |
| 7978-51y-51x        | 1 x Xeon 5140 2.33GHz/DC | 4MB      | 1GB    | (open 3.5) | SAS/SATA Combo  | 670W    | 2 hot-swap    | 2x4       | 2 x GB       | 3 year Aug | 2006                          |                |
| 7978-5Ay-5Ax        | 1 x Xeon 5140 2.33GHz/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 / 32GB<sup>13</sup> 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 (1U<sup>4</sup>)** / 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

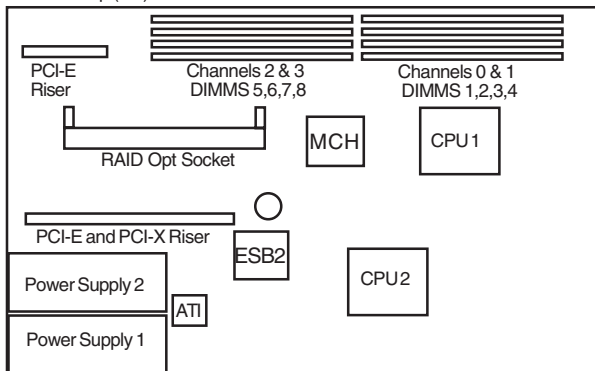
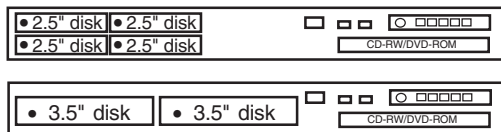
**Ethernet controller** Two gigabit 10/100/1000 ethernet ports / **Two Broadcom® 5708** / two full gigabit ethernet MAC and PHY layer functions / on planar / PCI-X 64-bit 100MHz / full duplex / Wake on LAN® / TCP/IP Offload Engine (TOE) / Alert Standard Format 2.0 / two RJ-45 ports in rear

**Optical / diskette Front & Rear ports** 8X-24X<sup>6</sup> CD-RW/DVD-ROM / USB only  
**Graphics** Front: two USB (Vers 2.0), graphics (DB-15) Rear: four 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)

|                         |  |   |         |
|-------------------------|--|---|---------|
| <b>Diagnostics</b>      | <b>Drop down Light Path Diagnostics</b> panel providing LED map to failing part (located on front panel)                             |   |         |
| <b>Software</b>         | <b>ServerGuide™</b> (CD-ROM installation and configuration utilities), IBM Director systems mgmt, others                             | Xeon 2.0GHz/1333MHz - 2 x 2MB L2 Cache        | 40K1239 |
| <b>Keyboard / mouse</b> | None standard (because rack-based) / USB only  | Xeon 2.33GHz/1333MHz - 2 x 2MB L2 Cache       | 40K1240 |
| <b>Power supply</b>     | 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 |
| <b>Fans</b>             | <b>Calibrated Vectored Cooling™</b> Std: ten fans; Max: twelve (two fans with optional second cpu) / variable speed / hot-swap / PFA | 2GB PC2-5300 FBD (2 x 1GB)                    | 39M5785 |
| <b>Prerequisites</b>    | Monitor, keyboard, mouse, SAS/SATA disk, rack, OS  | 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         | 73P9341 |
|                         |  | 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/pc/us/accessories](http://ibm.com/pc/us/accessories)



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: 600GB<sup>2</sup> with two 300GB SL disks  
 2.5" SAS models: 292GB<sup>2</sup> with four 73.4GB SFF disks  
 3.5" SATA models: 1TB<sup>2</sup> with two 500GB SL disks

See footnotes for important warranty information

**LIMITED WARRANTY<sup>3</sup>**

- 3 year parts and labor
- International Warranty Service<sup>3</sup>
- On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time<sup>7</sup>
- 3 year on site warranty service upgrade options (in eligible locations):<sup>7</sup>
  - 9 hr coverage, Mon-Fri excluding holidays, 4 hr response time (ServicePac<sup>®</sup> 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>
- 24x7<sup>14</sup> toll-free support for warranty issues during the warranty period<sup>3</sup>

| 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 <sup>3</sup> | 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 3.5) | 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 / 32GB<sup>13</sup> 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 (1U<sup>4</sup>)** / 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  
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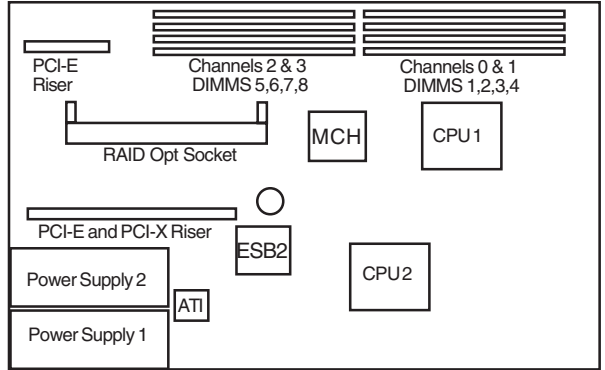
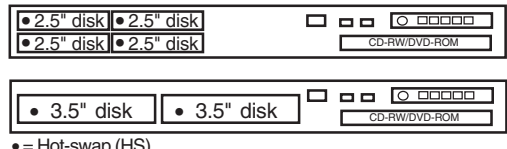
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**Security Systems mgmt**  
 Power-on password / administrator password / unattended boot / selectable boot sequence  
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|                         |  |   |         |
|-------------------------|--|---|---------|
| <b>Diagnostics</b>      | <b>Drop down Light Path Diagnostics</b> panel providing LED map to failing part (located on front panel)                             | Xeon 2.66GHz/1333MHz - 2 x 2MB L2 Cache       | 40K1241 |
| <b>Software</b>         | <b>ServerGuide™</b> (CD-ROM installation and configuration utilities), IBM Director systems mgmt, others                             | Xeon 3.0GHz/1333MHz - 2 x 2MB L2 Cache        | 40K1242 |
| <b>Keyboard / mouse</b> | None standard (because rack-based) / USB only  | 1GB PC2-5300 FBD (2 x 512MB)                  | 39M5782 |
| <b>Power supply</b>     | 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 |
| <b>Fans</b>             | <b>Calibrated Vectored Cooling™</b> Std: ten fans; Max: twelve (two fans with optional second cpu) / variable speed / hot-swap / PFA | 4GB PC2-5300 FBD (2 x 2GB)                    | 39M5791 |
| <b>Prerequisites</b>    | Monitor, keyboard, mouse, SAS/SATA disk, rack, OS  | 8GB PC2-5300 FBD (2 x 4GB) - When available   | 39M5797 |
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|                         |  | 300GB 10K-rpm SAS HS 3.5" (MM carrier) HDD    | 40K1041 |
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Slot 1: PCI-Express x8(x8 Links) half length  
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 3.5" SATA models: 1TB<sup>2</sup> with two 500GB SL disks

See footnotes for important warranty information

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- 3 year parts and labor
- International Warranty Service<sup>3</sup>
- On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time<sup>7</sup>
- 3 year on site warranty service upgrade options (in eligible locations):<sup>7</sup>
  - 9 hr coverage, Mon-Fri excluding holidays, 4 hr response time (ServicePac<sup>®</sup> 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>
- 24x7<sup>14</sup> toll-free support for warranty issues during the warranty period<sup>3</sup>



| IBM®<br>Type-GAV-model | Qty x Processor       | L2<br>Core cache | Memory | Disk | Disk<br>controller | Mechanical | Slots x bays<br>(hot-swap bays) | Power supply      | Ethernet  | Available<br>date |
|------------------------|-----------------------|------------------|--------|------|--------------------|------------|---------------------------------|-------------------|-----------|-------------------|
| 7979-G5y-G5x           | 1 x Xeon™ 5050 3.0GHz | DC 4MB           | 1GB    | None | SAS / SATA         | Rack       | 4x7 (4 or 6 hot-swap)           | 1 x 835W Hot-Swap | 2xGigabit | Jul 2006          |
| 7979-G5y-G5x           | 1 x Xeon 5050 3.0GHz  | DC 4MB           | 1GB    | None | SAS / SATA         | Rack       | 4x10 (8 hot-swap)               | 1 x 835W Hot-Swap | 2xGigabit | Jul 2006          |
| 7979-H5y-H5x           | 1 x Xeon 5063 3.2GHz  | DC 4MB           | 1GB    | None | SAS / SATA         | Rack       | 4x7 (4 or 6 hot-swap)           | 1 x 835W Hot-Swap | 2xGigabit | Jul 2006          |
| 7979-H5y-H5x           | 1 x Xeon 5063 3.2GHz  | DC 4MB           | 1GB    | None | SAS / SATA         | Rack       | 4x10 (8 hot-swap)               | 1 x 835W Hot-Swap | 2xGigabit | Jul 2006          |

**Positioning Processor** A rack-dense 2-way server delivering high availability, scalability and expandability for application-serving Web environments  
Up to **1x Intel® Xeon Processor 3.0 GHz** with 667MHz FSB Dual Core / Up to **1 x Intel Xeon Processor 3.2 GHz** with 1066MHz FSB Dual Core / **Extended Memory 64 Technology (EM64T)** / Hyper-Threading technology / Enhanced Intel Speedstep Technology (EIST)

**L2 cache** **2 MB** / per core / at processor speed

**SMP support Implementation** **2-way SMP** / up to two Xeon Processors (same speed/cache size)  
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 / 48GB<sup>13</sup> 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)

**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 (2U<sup>4</sup>)** / 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

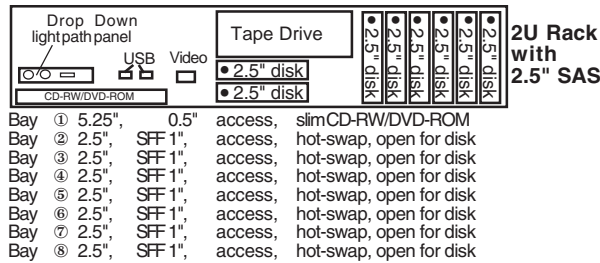
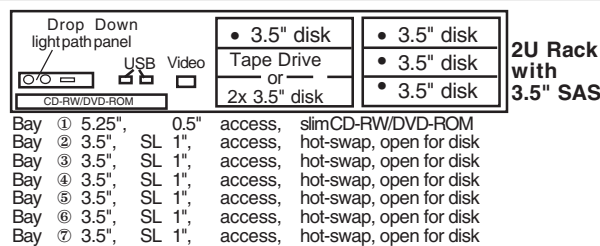
**Optical / diskette Front & Rear ports** 8X-24X<sup>6</sup> CD-RW/DVD-ROM / USB only  
**Front:** two USB (Vers 2.0), graphics (DB-15) **Rear:** four USB (Vers 2.0), serial (9-pin), graphics (DB-15), two ethernet (RJ-45), one RJ-45 (sys mgmt), one SAS / no parallel port

**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)

|                         |  |   |         |
|-------------------------|--|---|---------|
| <b>Diagnostics</b>      | <b>Drop down Light Path Diagnostics</b> panel providing LED map to failing part (located on front panel)   | Xeon 3.0GHz/667MHz - 2 x 2MB L2 Cache         | 25R8926 |
| <b>Software</b>         | <b>ServerGuide™</b> (CD-ROM installation and configuration utilities), IBM Director systems mgmt, others   | Xeon 3.2GHz/1066MHz - 2 x 2MB L2 Cache        | 25R8927 |
| <b>Keyboard / mouse</b> | None standard (because rack-based) / USB only  | 1GB PC2-5300 FBD (2 x 512MB)                  | 39M5782 |
| <b>Power supply</b>     | <b>Std/Max:</b> one/two 835 watt hot-swap / rear access / auto restart / redundant with two power supplies / auto-sensing  | 2GB PC2-5300 FBD (2 x 1GB)                    | 39M5785 |
| <b>Fans</b>             | <b>Calibrated Vectored Cooling™</b> Std: five fans; Max: ten (five fans with optional second power supply) / redundant with ten fans installed; All: variable speed / hot-swap / PFA Monitor, keyboard, mouse, SAS/SATA disk, rack, OS | 4GB PC2-5300 FBD (2 x 2GB)                    | 39M5791 |
| <b>Prerequisites</b>    |  | 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 |
|                         |  | 835 Watt Hot-swap Power Supply Option (WW)    | 40K1906 |
|                         |  | PCI Riser Card PCI-Express Option             | 40K1907 |
|                         |  | PCI Riser Card PCI-X Option                   | 40K1908 |

Other options at [ibm.com/pc/us/accessories](http://ibm.com/pc/us/accessories)



• = 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: 1.8TB<sup>2</sup> with six 300GB SL disks  
2.5" SAS models: 584GB<sup>2</sup> with eight 73.4GB SFF disks

- 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 WARRANTY<sup>3</sup>**

- 3 year parts and labor
- International Warranty Service<sup>3</sup>
- On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time<sup>7</sup>
- 3 year on site warranty service upgrade options (in eligible locations):<sup>7</sup>
  - 9 hr coverage, Mon-Fri excluding holidays, 4 hr response time (ServicePac<sup>®</sup> 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>
- 24x7<sup>14</sup> toll-free support for warranty issues during the warranty period<sup>3</sup>

| 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 |
|---------------------|-----------------------|---------------|--------|------|-----------------|------------|------------------------------|-------------------|-----------|----------------|
| 7979-21y-21x        | 1 x Xeon™ 5110 1.6GHz | DC 4MB        | 1GB    | None | SAS / SATA      | Rack       | 4x7 (4 or 6 hot-swap)        | 1 x 835W Hot-Swap | 2xGigabit | Jul 2006       |
| 7979-2Ay-2Ax        | 1 x Xeon 5110 1.6GHz  | DC 4MB        | 1GB    | None | SAS / SATA      | Rack       | 4x10 (8 hot-swap)            | 1 x 835W Hot-Swap | 2xGigabit | Jul 2006       |
| 7979-31y-31x        | 1 x Xeon 5120 1.86GHz | DC 4MB        | 1GB    | None | SAS / SATA      | Rack       | 4x7 (4 or 6 hot-swap)        | 1 x 835W Hot-Swap | 2xGigabit | Jul 2006       |
| 7979-3Ay-3Ax        | 1 x Xeon 5120 1.86GHz | DC 4MB        | 1GB    | None | SAS / SATA      | Rack       | 4x10 (8 hot-swap)            | 1 x 835W Hot-Swap | 2xGigabit | Jul 2006       |
| 7979-41y-41x        | 1 x Xeon 5130 2.0GHz  | DC 4MB        | 1GB    | None | SAS / SATA      | Rack       | 4x7 (4 or 6 hot-swap)        | 1 x 835W Hot-Swap | 2xGigabit | Jul 2006       |
| 7979-4Ay-4Ax        | 1 x Xeon 5130 2.0GHz  | DC 4MB        | 1GB    | None | SAS / SATA      | Rack       | 4x10 (8 hot-swap)            | 1 x 835W Hot-Swap | 2xGigabit | Jul 2006       |

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 Up to **1x 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)** / 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)  
 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 / 48GB<sup>13</sup> 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)  
**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 (2U<sup>4</sup>)** / 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

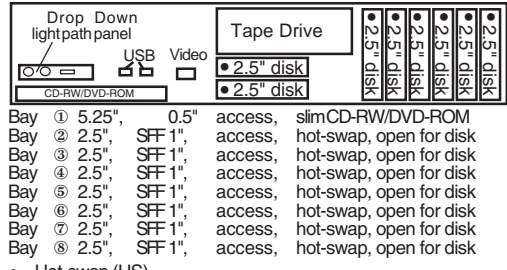
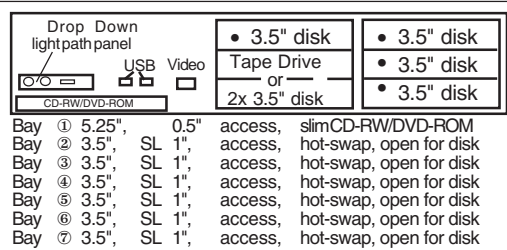
**Ethernet controller** Dual gigabit 10/100/1000 ethernet ports / **Two Broadcom® 5708** / two full gigabit ethernet MAC and PHY layer functions / on planar / PCI-Express / full duplex / Wake on LAN™ / TCP/IP Offload Engine (TOE) / Alert Standard Format 2.0 / two RJ-45 ports in rear  
**Optical / diskette Front & Rear ports** 8X-24X<sup>6</sup> CD-RW/DVD-ROM / USB only  
**Front:** two USB (Vers 2.0), graphics (DB-15) **Rear:** four 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/SATA disk, rack, OS

|   |         |
|---|---------|
| Xeon 1.60GHz/1066MHz - 2 x 2MB L2 Cache       | 40K1231 |
| Xeon 1.86GHz/1066MHz - 2 x 2MB L2 Cache       | 40K1232 |
| Xeon 2.0GHz/1333MHz - 2 x 2MB L2 Cache        | 40K1233 |
| 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](http://ibm.com/pc/us/accessories)



• = 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)  
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 \*slots 1 & 2 riser determines PCI-Express or PCI-X  
 See footnotes for important warranty information

Max internal disk capacity:  
 3.5" SAS models: 1.8TB<sup>2</sup> with six 300GB SL disks  
 2.5: SAS models: 584GB<sup>2</sup> with eight 73.4GB SFF disks

- ⊘ 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 WARRANTY<sup>3</sup>**

- ⊘ 3 year parts and labor
- ⊘ International Warranty Service<sup>3</sup>
- ⊘ On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time<sup>7</sup>
- ⊘ 3 year on site warranty service upgrade options (in eligible locations):<sup>7</sup>
  - 9 hr coverage, Mon-Fri excluding holidays, 4 hr response time (ServicePac<sup>®</sup> 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>
- ⊘ 24x7<sup>14</sup> toll-free support for warranty issues during the warranty period<sup>3</sup>

| 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 / SATA      | Rack       | 4x7 (4 or 6 hot-swap)        | 1 x 835W Hot-Swap | 2xGigabit | Jul 2006       |
| 7979-5Ay-5Ax        | 1 x Xeon 5140 2.33GHz  | DC 4MB        | 1GB    | None | SAS / SATA      | Rack       | 4x10 (8 hot-swap)            | 1 x 835W Hot-Swap | 2xGigabit | Jul 2006       |
| 7979-61y-61x        | 1 x Xeon 5150 2.66GHz  | DC 4MB        | 1GB    | None | SAS / SATA      | Rack       | 4x7 (4 or 6 hot-swap)        | 1 x 835W Hot-Swap | 2xGigabit | Jul 2006       |
| 7979-6Ay-6Ax        | 1 x Xeon 5150 2.66GHz  | DC 4MB        | 1GB    | None | SAS / SATA      | Rack       | 4x10 (8 hot-swap)            | 1 x 835W Hot-Swap | 2xGigabit | Jul 2006       |
| 7979-71y-71x        | 1 x Xeon 5160 3.0GHz   | DC 4MB        | 1GB    | None | SAS / SATA      | Rack       | 4x7 (4 or 6 hot-swap)        | 1 x 835W Hot-Swap | 2xGigabit | Jul 2006       |
| 7979-7Ay-7Ax        | 1 x Xeon 5160 3.0GHz   | DC 4MB        | 1GB    | None | SAS / SATA      | Rack       | 4x10 (8 hot-swap)            | 1 x 835W Hot-Swap | 2xGigabit | Jul 2006       |

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**2 MB** / per core / at processor speed  
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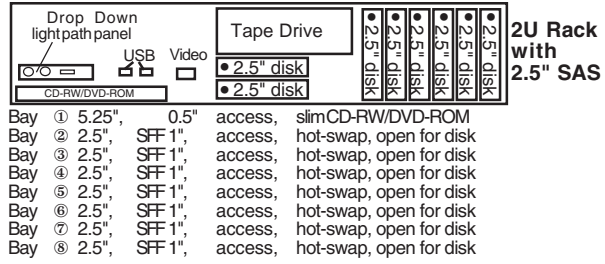
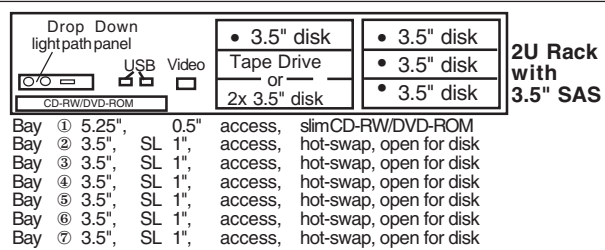
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**Optical / diskette** 8X-24X<sup>6</sup> CD-RW/DVD-ROM / USB only  
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**Keyboard / mouse** None standard (because rack-based) / USB only  
**Power supply** Std/Max: one/two 835 watt hot-swap / rear 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 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](http://ibm.com/pc/us/accessories)



• = 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

Max internal disk capacity:  
 3.5" SAS models: 1.8TB<sup>2</sup> with six 300GB SL disks  
 2.5: SAS models: 584GB<sup>2</sup> with eight 73.4GB SFF disks

See footnotes for important warranty information

**LIMITED WARRANTY<sup>3</sup>**

- 3 year parts and labor
- International Warranty Service<sup>3</sup>
- On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time<sup>7</sup>
- 3 year on site warranty service upgrade options (in eligible locations):<sup>7</sup>
  - 9 hr coverage, Mon-Fri excluding holidays, 4 hr response time (ServicePac<sup>®</sup> 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>
- 24x7<sup>14</sup> toll-free support for warranty issues during the warranty period<sup>3</sup>

| 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 |
|-----------------|------------------|----------|--------|------------------------------|-----------------|----------------------|--------------|-----------|-------------|--------------|-----------|----------------|
| 7980-52X        | 2 x Xeon™ 3.2GHz | 2MB      | 1GB    | Open                         | 2 x Ultra320    | 2U <sup>4</sup> 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 <sup>2</sup> 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    | High performance, carrier grade reliability for providers of the Next Generation Network  |
| 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 | Up to 2GB std / 16GB <sup>13</sup> 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 512 GB or 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<br>SCSI Channel B: external 16-bit 8mm VHDCI 68-pin external connector (no cables) |
| SCSI disk              | Up to two 146.8GB Ultra320 SCSI, 10K rpm, 4.9ms read seek, S.M.A.R.T. <sup>5</sup> / 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 (2U <sup>4</sup> ) 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-10X <sup>6</sup> slim-line CD-DVD ROM / 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<br>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)   | Options available via special Bid |
| 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 |
|---------------|--|

|  |  |  |
|--|--|--|
| <p>Slot 1: fullsize, 64-bit 100MHz PCI-X (5V)</p> <p>Slot 2: fullsize, 64-bit 100MHz PCI-X (5V)</p> <p>Slot 3: fullsize, 64-bit 100MHz PCI-X (5V)</p> <p>Slot 4: low-profile, 64-bit 133MHz PCI-X (3.3V)</p> <p>Slot 5: low-profile, 64-bit 133MHz PCI-X (3.3V)</p> <p>Slot 6: low-profile, 64-bit 133MHz PCI-X (3.3V)</p> | <p>⇒ Raven black color (front bezel)</p> <p>⇒ Configuration/Setup Utility invoked by pressing F2 at startup</p> <p>⇒ SCSISelect near startup by pressing CTRL+A</p> <p>⇒ PC-Doctor™ diagnostics on diskette</p> <p>⇒ Several hardcopy publications</p> <p>⇒ H 3.45" x W 17.14" x D 20.0"</p> <p>⇒ H 87.6 mm x W 435.3 mm x D 508 mm</p> <p>⇒ 34 to 37 pounds (15.4 to 16.8 kg)</p> | <p><b>LIMITED WARRANTY<sup>3</sup></b></p> <p>⇒ 3/3 year parts and labor</p> <p>⇒ International Warranty Service<sup>3</sup></p> <p>⇒ On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time<sup>7</sup></p> <p>⇒ 2 year on site warranty service upgrade options (in eligible locations):<sup>7</sup></p> <ul style="list-style-type: none"> <li>• 9 hr coverage, Mon-Fri excluding holidays, 4 hr response time 96P2122</li> <li>• 24 hr x 7 day coverage, 4 hour average response time 96P2123</li> <li>• 24 hr x 7 day coverage, 2 hour average response time 96P2124</li> </ul> <p>⇒ 24x7<sup>14</sup> toll-free support for warranty issues during the warranty period<sup>3</sup></p> |
|  <p><b>2U Rack</b></p> <p>Bay ② 3.5", 0.5", access, std CD-DVD ROM</p> <p>Bay ③ 3.5", SL 1", access, some std disk</p> <p>Bay ④ 3.5", SL 1", access, some std disk</p>  | <p>All models: Max int disk capacity: 293.6GB<sup>2</sup> with two 146.8GB SL disks</p>  |  |

| IBM® Type-model | Qty x Processor   | Speed/Core | L2 Cache | Optical   | Memory  | Disk / Controller | Disk bays | Slots x bays | Ethernet     | Warranty <sup>3</sup> (years) | Available date |
|-----------------|-------------------|------------|----------|-----------|---------|-------------------|-----------|--------------|--------------|-------------------------------|----------------|
| 7985 - 11U      | 1 x Opteron™ 2210 | 1.8GHz/DC  | 2x1MB    | CD-RW/DVD | 2x512MB | Open/SAS          | 8-2.5"HS  | 4x10         | Dual Gigabit | 3                             | Nov 2006       |
| 7985 - 1AU      | 1 x Opteron 2210  | 1.8GHz/DC  | 2x1MB    | CD-RW/DVD | 2x512MB | Open/SAS/SATA     | 6-3.5"HS  | 4x7          | Dual Gigabit | 3                             | Nov 2006       |
| 7985 - 21U      | 1 x Opteron 2212  | 2.0GHz/DC  | 2x1MB    | CD-RW/DVD | 2x512MB | Open/SAS          | 8-2.5"HS  | 4x10         | Dual Gigabit | 3                             | Nov 2006       |
| 7985 - 2AU      | 1 x Opteron 2212  | 2.0GHz/DC  | 2x1MB    | CD-RW/DVD | 2x512MB | Open/SAS/SATA     | 6-3.5"HS  | 4x7          | Dual Gigabit | 3                             | Nov 2006       |
| 7985 - 41U      | 1 x Opteron 2216  | 2.4GHz/DC  | 2x1MB    | CD-RW/DVD | 2x512MB | Open/SAS          | 8-2.5"HS  | 4x10         | Dual Gigabit | 3                             | Nov 2006       |
| 7985 - 4AU      | 1 x Opteron 2216  | 2.4GHz/DC  | 2x1MB    | CD-RW/DVD | 2x512MB | Open/SAS/SATA     | 6-3.5"HS  | 4x7          | Dual Gigabit | 3                             | Nov 2006       |
| 7985 - 51U      | 1 x Opteron 2218  | 2.6GHz/DC  | 2x1MB    | CD-RW/DVD | 2x512MB | Open/SAS          | 8-2.5"HS  | 4x10         | Dual Gigabit | 3                             | Nov 2006       |
| 7985 - 5AU      | 1 x Opteron 2218  | 2.6GHz/DC  | 2x1MB    | CD-RW/DVD | 2x512MB | Open/SAS/SATA     | 6-3.5"HS  | 4x7          | Dual Gigabit | 3                             | Nov 2006       |

**Positioning**  
**Processor(s)** Rack-optimized, dual-socket, dual-core business performance server  
 Up to two AMD® Opteron 2000 Series Dual Core Processors up to 2.6GHz<sup>1</sup> / simultaneously supports 32-bit and 64-bit computing  
**L2 cache** 1MB / per core / at processor speed  
**SMP support** 2-way SMP / up to two Opteron Processors (same speed/cache size required)  
**Implementation** 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** 1 GB std / 32GB max<sup>13</sup> 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 / **Xcelerated Memory Technology™** / **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** EIA 19" Rack (2U\*) / rack-mount only / supported in IBM NetBAY™ Rack products / no rack to tower conversion  
**Chipset** 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** Two gigabit 10/100/1000 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** 24x/10x/24x/8x CD-RW/DVD / IDE / Diskette none (USB diskette optional)  
**Ports** Front: two USB (Vers 2.0), DB-15 graphics / Rear: four USB (Vers 2.0), serial (9-pin), two ethernet (RJ-45), system management (RJ-45), analog DB-15 graphics / parallel port not supported

**Graphics** SVGA / ATI® ES1000(RN50b) / on planar / 16MB SDRAM std/max  
**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 / PowerExecutive™

**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

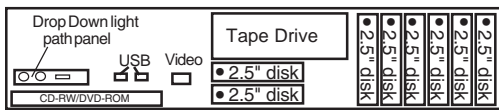
**Fans** Calibrated Vectored Cooling™ Std: five fans; Max: ten (five fans with optional second power supply) / redundant with ten fans installed; All: variable speed / hot-swap / PFA

**Prerequisites** Monitor, keyboard, mouse, disk, rack, OS

|   |         |
|---|---------|
| Dual Core AMD Opteron Processor Model 2210  | 25R8938 |
| Dual Core AMD Opteron Processor Model 2212  | 25R8939 |
| Dual Core AMD Opteron Processor Model 2216  | 25R8940 |
| Dual Core AMD Opteron Processor Model 2218  | 40K1212 |
| 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 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 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 Adaptor    | 41Y4519 |
| 835W Redundant Power Supply (US)            | 40K1905 |

Other options at [ibm.com/pc/us/accessories](http://ibm.com/pc/us/accessories)

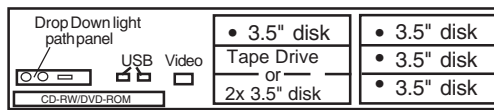
**2U Rack with 2.5" SAS**



|       |              |         |                         |
|-------|--------------|---------|-------------------------|
| 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 for disk |
| Bay ④ | 2.5", SFF 1" | access, | hot-swap, open for disk |
| Bay ⑤ | 2.5", SFF 1" | access, | hot-swap, open for disk |
| Bay ⑥ | 2.5", SFF 1" | access, | hot-swap, open for disk |
| Bay ⑦ | 2.5", SFF 1" | access, | hot-swap, open for disk |
| Bay ⑧ | 2.5", SFF 1" | access, | hot-swap, open for disk |
| Bay ⑨ | 2.5", SFF 1" | access, | hot-swap, open for disk |
| Bay ⑩ | 2.5", SFF 1" | access, | hot-swap, open for disk |

Maximum internal disk capacity<sup>13</sup>:  
 3TB with six 500GB SATA disks or  
 1.8TB with six 300GB SAS disks  
 • = Hot-swap (HS)

**2U Rack with 3.5" SAS/SATA**



|       |             |         |                         |
|-------|-------------|---------|-------------------------|
| Bay ① | 5.25", 0.5" | access, | slim CD-RW/DVD-ROM      |
| Bay ② | 3.5", SL 1" | access, | hot-swap, open for disk |
| 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 |

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 WARRANTY<sup>3</sup>**

- 3 year parts and labor International Warranty Service<sup>3</sup> On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time<sup>7</sup>
- On site service upgrade options (in eligible locations):<sup>7</sup>
  - 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](http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf)
- 24x7 toll-free support for warranty issues during the warranty period<sup>3</sup>

| IBM® Type-model | Qty x Processor     | Speed/Core | L2 cache | CPU/Memory Watts | 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 <sup>4</sup> 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       |

**Positioning** *Up to 4-way, high performance server with maximum memory availability and superior performance per watt*  
**Processors** One AMD® Opteron 8000 Series Dual Core Processor up to 2.8GHz<sup>1</sup> / 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 or 2GB 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 (4U<sup>4</sup>)** / 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 Ethernet** 8X<sup>6</sup> Slim DVD-ROM / none  
 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 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 / **PowerExecutive™ / 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

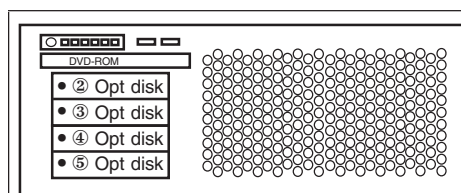
**Software** **ServerGuide™** (CD-ROM installation and configuration utilities), IBM Director

**Keyboard / mouse Power supplies** None standard (because rack-based)  
*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 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

|  |         |
|--|---------|
| Dual Core AMD Opteron Processor Model 8212   | 40K1200 |
| Dual Core AMD Opteron Processor Model 8214   | 40K1201 |
| Dual Core AMD Opteron Processor Model 8218   | 40K1202 |
| Dual Core AMD Opteron Processor Model 8220SE | 40K1203 |
| 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 |
| IBM RSA II slimline                          | 39Y9566 |

Other options at [ibm.com/pc/us/accessories](http://ibm.com/pc/us/accessories)



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

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

- ⇒ 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 300GB<sup>2</sup> hot-swap SAS disks

**LIMITED WARRANTY<sup>3</sup>**

- ⇒ 3 year parts and labor
- ⇒ International Warranty Service<sup>3</sup>
- ⇒ On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time<sup>7</sup>
- ⇒ On site service upgrade options (in eligible locations):<sup>7</sup>
  - 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>
- ⇒ 24x7<sup>14</sup> toll-free support for warranty issues during the warranty period<sup>3</sup>

| IBM®<br>Type-model | Qty x Processor          | L2<br>Core cache | Memory       | DIMM<br>slots | Memory<br>Cards | Disks | Disk<br>Controller | Mechanical | Slots x<br>bays | Hot-swap<br>pwr supplies | Warranty<br>(yrs.) | Available<br>date |
|--------------------|--------------------------|------------------|--------------|---------------|-----------------|-------|--------------------|------------|-----------------|--------------------------|--------------------|-------------------|
| 8865-13U           | 1 x Xeon™ MP 3.16GHz     | SC 1MB           | 1GB(2x512MB) | 4             | One             | None  | SAS                | Tower      | 6x12            | 2 x775W                  | 3                  | May 2006          |
| 8865-1TU           | 1 x Xeon MP 3.16GHz      | SC 1MB           | 1GB(2x512MB) | 4             | One             | None  | SAS                | 7U Rack    | 6x12            | 2 x775W                  | 3                  | May 2006          |
| 8865-22U           | 1 x Xeon MP 3.66GHz      | SC 1MB           | 2GB(2x1GB)   | 4             | One             | None  | SAS                | Tower      | 6x12            | 2 x775W                  | 3                  | May 2006          |
| 8865-2TU           | 1 x Xeon MP 3.66GHz      | SC 1MB           | 2GB(2x1GB)   | 4             | One             | None  | SAS                | 7U Rack    | 6x12            | 2 x775W                  | 3                  | May 2006          |
| 8865-32U           | 1 x Xeon MP 7020 2.67GHz | DC 2MB           | 2GB(2x1GB)   | 4             | One             | None  | SAS                | Tower      | 6x12            | 2 x775W                  | 3                  | May 2006          |
| 8865-3TU           | 1 x Xeon MP 7020 2.67GHz | DC 2MB           | 2GB(2x1GB)   | 4             | One             | None  | SAS                | 7U Rack    | 6x12            | 2 x775W                  | 3                  | May 2006          |
| 8865-42U           | 1 x Xeon MP 7040 3.0GHz  | DC 4MB           | 2GB(2x1GB)   | 4             | One             | None  | SAS                | Tower      | 6x12            | 2 x775W                  | 3                  | May 2006          |
| 8865-4TU           | 1 x Xeon MP 7040 3.0GHz  | DC 4MB           | 2GB(2x1GB)   | 4             | One             | None  | SAS                | 7U Rack    | 6x12            | 2 x775W                  | 3                  | May 2006          |

**Processors** One 64-bit Intel® Xeon™ Processor MP up to 3.66GHz<sup>1</sup> 667MHz FSB Single Core / one 64-bit Intel Xeon Processor MP up to 3.0GHz 667MHz FSB Dual Core / NetBurst™ / Extended Memory 64 Technology™ (EM64T) / Hyper-Threading  
**L2 cache** 1 or 2MB / per core / on die of processor / at processor speed / XceL4v™ Dynamic Server Cache  
**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, six Active™ PCI-X 2.0 slots, integrated Serial Attach SCSI (SAS), ethernet, and graphics

**Active Memory™** 1 or 2GB std / 64GB max per chassis using high-capacity memory card / one memory card standard (up to four) with 4 DIMM gold-connector slots each / DIMMs must be installed in matched pairs / PC2-3200 400MHz registered 240-pin DDR2-SDRAM RDIMMs / 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** ALL: Adaptec® AIC-9410 / Dual-channel Serial Attached SCSI (SAS) 3.0GHz (3GB/sec) / 64-bit 266MHz PCI-X 2.0  
**SAS connectors** Dual-channel controller wired to dual SAS backplanes  
**SAS cabling** Hot-swap bays connect to integrated SAS controller through SAS expander, 1 cable for each of the 2 SAS backplanes  
**IDE controller / cabling** Enhanced IDE ATA-33 controller in CSB6 South Bridge  
**Disk - capacity** Max: 3.6TB-10k / supports up to 15,000 rpm disks  
**Disk - bays** Up to Twelve 3.5" hot-swap bays / Six standard converged tray / 80-pin SCA-2 connectors / One FH (or 2 HH) Tape Drive Bays  
**Mechanical** EA 19" rack models (7U) x 28" deep / supported in NetBAY™ Racks (such as NetBAY42 SR, NetBAY42 ER)

**Chipset** IBM XA-64e™ 3rd Generation chipset / Integrated Processor and Memory Controller / Supports EM64T / 2 IBM PCI-X 2.0 Host Bridges / Host Bridge One supports video, optional ServeRaid 8i, ServerWorks® CSB6 South Bridge (IDE, USB, bus for Super I/O NS 87417 [diskette, keyboard, mouse]), Dual Port Broadcom 5704, and 2 PCI-X 2.0 slots / Host Bridge Two supports 4 PCI-X 2.0 slots  
**I/O Slots** Six total Active™ PCI-X 2.0 64-bit 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, all slots support up to 266MHz

**DVD-ROM / diskette** IBM SlimLine DVD-ROM, IDE (ATAPI), 1.6" HH, bootable / 3.5" 1.44 MB diskette drive  
**Ethernet** Broadcom® 5704 10/100/1000 dual ethernet / on systemboard / 64-bit 266MHz PCI-X 2.0 / Wake on LAN® / Alert on LAN™ 2  
**Graphics controller** SVGA / ATI® Radeon Mobility 7000 / on planar / 16MB SDRAM std/max / 32-bit 33MHz PCI 2.2 bus  
**Ports** Rear: RSA ethernet, RSA serial, two USB (Ver 2.0), keyboard, mouse, analog DB-15 graphics, two ethernet, std. serial, RS-485 / Front: USB (Ver 2.0)

**Security** Power-on and administrator passwords / unattended boot / selectable boot  
**Systems management** BMC standard / IPMI 2.0 / Remote Supervisor Adapter II slimline (optional) / PCI adapter / includes 10/100 ethernet, RJ-11, and serial connectors / provides remote console and mgmt / power on/off system / monitors power status, op system, temperature, disks, fans, power supplies

**Diagnostics** 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, and others

**Keyboard / mouse** Rack model: none standard / Tower model: IBM 104-key keyboard (PS/2) / IBM 3-button optical mouse (PS/2)  
**Power supplies** Std: two 775 watt hot-swap / redundant with three power supplies (N+1) / worldwide / voltage-sensing / auto-restart / rear accessible fans in each power supply / PFA

**Cooling fans** Eight hot-swap, redundant, multi-speed fans / One cooling fan in each power supply filler when power supply is not installed / PFA / failure signals Diagnostic LED and mgmt processor

|         |   |         |                                       |         |
|---------|---|---------|---------------------------------------|---------|
| Options | 1GB PC2-3200 CL3 ECC RDIMM (2x512MB)        | 39M5821 | IBM ServeRAID™-8i SA-SCSI Adapter     | 39R8729 |
|         | 2GB PC2-3200 CL3 ECC RDIMM (2x1GB)          | 39M5809 | IBM ServeRAID 6M U320 256MB Adapter   | 02R0988 |
|         | 4GB PC2-3200 CL3 ECC RDIMM (2x2GB)          | 39M5812 | IBM 73.4GB 10K 3.5" SAS Hot-swap HDD  | 40K1039 |
|         | Active Memory 4-slot Expansion Card         | 41Y5000 | IBM 146GB 10K 3.5" SAS Hot-Swap HDD   | 40K1040 |
|         | Xeon MP 3.16GHz/1MB L2 Cache Proc Upg       | 40K2521 | IBM 300GB 10K 3.5" SAS Hot-Swap HDD   | 40K1041 |
|         | Xeon MP 3.66GHz/1MB L2 Cache Proc Upg       | 40K2520 | Remote Supervisor Adapter II Slimline | 39Y9566 |
|         | Xeon MP 7020 2.67GHz Proc Upg               | 40K2522 | SAS 3.5" 6-drive Backplane            | 41Y5003 |
|         | Xeon MP 7040 3.0GHz Proc Upg                | 40K2523 | IBM 73.4GB 15K 3.5" SAS Hot-swap HDD  | 40K1043 |
|         | Dual Core X3 Upgrade kit(no procs included) | 41Y5005 | IBM 146GB 15K 3.5" SAS Hot-Swap HDD   | 40K1044 |
|         | 775 watt Hot-Swap Power Supply (WW)         | 41Y5002 |                                       |         |

**LIMITED WARRANTY<sup>3</sup>**

- ↪ 3 year parts and labor
- ↪ International Warranty Service<sup>3</sup>
- ↪ On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time<sup>7</sup>
- ↪ On site service upgrade options (in eligible locations):<sup>7</sup>
  - 3 year IOR 24x7, 4 hr avg response (ServicePac part num 96P2253)
  - 3 year IOR 24x7, 2 hr avg response (ServicePac part num 96P2254)
  - 4 year IOR 9x5, NBD response (ServicePac part num 96P2255)
  - 5 year IOR 9x5, NBD response (ServicePac part num 69P2259)
- ↪ Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- ↪ 24x7<sup>14</sup> toll-free support for warranty issues during the warranty period<sup>3</sup>

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

Light Path Diag **7U<sup>4</sup> Rack or Tower**

Removable Processor Board Tray

|            |            |                     |
|------------|------------|---------------------|
| • Opt disk | • Opt disk | Floppy Drive        |
| • Opt disk | • Opt disk | CD-ROM              |
| • Opt disk | • Opt disk | Full High Tape Bay  |
| • Opt disk | • Opt disk | or 2 Half High Bays |
| • Opt disk | • Opt disk |                     |

- ↪ Stealth black color
- ↪ Tool-free serviceability
- ↪ Tower Dimensions: H15.5" x W18.2" x D30"(762mm)
- ↪ Tower Weight: 149 to 180lbs; 67.6 to 81.7Kg
- ↪ Rack Dimensions: H12" x W17.5" x D28.2"
- ↪ Rack Dimensions: H306mm x W444mm x D715mm
- ↪ Rack Weight: 144 to 158lbs; 65.4 to 71.7Kg
- ↪ Access adapters, fans, and memory from top
- ↪ Access processors and systemboard from front
- ↪ Access power supplies from back
- ↪ Setup Program by pressing F1 at startup
- ↪ Diagnostics (PC-Doctor) by pressing F2 at startup
- ↪ SCSISelect by pressing Ctrl+A at startup
- ↪ Drop Down Light Path Diagnostics (level 2 diagnostic panel) for outside view of potential problem without removing cover
- ↪ Predictive Failure Analysis® alerts on disks, power supplies, memory, processors, VRMs, and fans with IBM Director

**All models:** Maximum internal disk capacity: 3.6TB with 12x 300GB<sup>2</sup> hot-swap SAS disks

BTU Output:  
 Ship Config: 1,170 Btu/hr (343 watts)  
 Full Config: 6,142 Btu/hr (1800 watts)

| IBM® Type-model | Qty x Processor           | Core | L2 cache | Memory | DIMM slots | Memory Cards | RSA II | Disk Controller | Mechanical | Slots x bays | Power Supplies | Warranty (yrs.) | Available date |
|-----------------|---------------------------|------|----------|--------|------------|--------------|--------|-----------------|------------|--------------|----------------|-----------------|----------------|
| 8866-11U        | 1 x Xeon™ MP 7110N 2.5GHz | DC   | 2x1MB    | 2x1GB  | 4          | One          | Opt    | SAS             | Tower      | 6x12         | 2 x775W        | 3               | Nov 2006       |
| 8866-1RU        | 1 x Xeon MP 7110N 2.5GHz  | DC   | 2x1MB    | 2x1GB  | 4          | One          | Opt    | SAS             | 7U Rack    | 6x12         | 2 x775W        | 3               | Nov 2006       |
| 8866-21U        | 1 x Xeon MP 7120N 3.0GHz  | DC   | 2x1MB    | 2x1GB  | 4          | One          | Opt    | SAS             | Tower      | 6x12         | 2 x775W        | 3               | Nov 2006       |
| 8866-2RU        | 1 x Xeon MP 7120N 3.0GHz  | DC   | 2x1MB    | 2x1GB  | 4          | One          | Opt    | SAS             | 7U Rack    | 6x12         | 2 x775W        | 3               | Nov 2006       |
| 8866-31U        | 1 x Xeon MP 7130N 3.16GHz | DC   | 2x1MB    | 2x1GB  | 4          | One          | Opt    | SAS             | Tower      | 6x12         | 2 x775W        | 3               | Nov 2006       |
| 8866-3RU        | 1 x Xeon MP 7130N 3.16GHz | DC   | 2x1MB    | 2x1GB  | 4          | One          | Opt    | SAS             | 7U Rack    | 6x12         | 2 x775W        | 3               | Nov 2006       |
| 8866-41U        | 2 x Xeon MP 7140N 3.30GHz | DC   | 2x1MB    | 2x2GB  | 8          | Two          | Std    | SAS             | Tower      | 6x12         | 3 x775W        | 3               | Nov 2006       |
| 8866-4RU        | 2 x Xeon MP 7140N 3.30GHz | DC   | 2x1MB    | 2x2GB  | 8          | Two          | Std    | SAS             | 7U Rack    | 6x12         | 3 x775W        | 3               | Nov 2006       |

**Processors** Up to two 64-bit Intel® Xeon™ Processor MP up to 3.30GHz<sup>1</sup> 667MHz FSB Dual Core / one 64-bit Intel Xeon Processor MP up to 3.0GHz 667MHz FSB Dual Core / NetBurst™ / Extended Memory 64 Technology™ (EM64T) / Hyper-Threading 1MB / per core / on die of processor / at processor speed / Xcel4v™ Dynamic Server Cache

**L2 cache** 4MB on 7110N & 7120N / 8MB on 7130N / 16MB on 7140N

**L3 cache** 4MB on 7110N & 7120N / 8MB on 7130N / 16MB on 7140N

**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, four Active™ PCI-E x8 slots, two Active™ PCI-X 2.0 slots, integrated Serial Attach SCSI (SAS), ethernet, and graphics

**Active Memory™** 2 or 4GB std / 64GB max per chassis using high-capacity memory card / up to two memory cards standard (max of four) with 4 DIMM gold-connector slots each / DIMMs must be installed in matched pairs / PC2-3200 400MHz registered 240-pin DDR2-SDRAM RDIMMs / 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** All: Adaptec® AIC-9410 / Dual-channel Serial Attached SCSI (SAS) 3.0GHz (3GB/sec) / 64-bit 266MHz PCI-X 2.0 / Some: ServeRAID™ 8i / RAID 0,1, 10, 5, 6, 60, 1E & 5EE / std on 41U & 4RU / dedicated slot / 64-bit 133MHz PCI-X / optional on others

**SAS connectors** Dual-channel controller wired to dual SAS backplanes

**SAS cabling** Hot-swap bays connect to integrated SAS controller through SAS expander, 1 cable for each of the 2 SAS backplanes

**IDE controller / cabling** Enhanced IDE ATA-33 controller in CSB6 South Bridge

**Disk - capacity** Max: 3.6TB-10k / supports up to 15,000 rpm disks

**Disk - bays** Up to Twelve 3.5" hot-swap bays / Six standard converged tray / 80-pin SCA-2 connectors / One FH (or 2 HH) Tape Drive Bays

**Mechanical** EA 19" rack models (7U<sup>4</sup>) x 28" deep / supported in NetBAY™ Racks (such as NetBAY42 SR, NetBAY42 ER)

**Chipset** IBM XA-64e™ 3rd Generation chipset / Integrated Processor and Memory Controller / Supports EM64T / 2 IBM PCI-X 2.0 Host Bridges / Host Bridge One supports video, optional ServeRaid 8i, ServerWorks® CSB6 South Bridge (IDE, USB, bus for Super I/O NS 87417 [diskette, keyboard, mouse]), Dual Port Broadcom 5704, and 2 PCI-X 2.0 slots / Host Bridge Two supports 4 PCI-E x8 slots

**I/O Slots** Four Active™ PCI-E x8 slots / full height, full length / Two Active™ PCI-X 2.0 64-bit slots available with power and attention indicator lights (optional sensors control power to slot) / hot replace, hot upgrade, hot expansion / separated by insulative plastic dividers

**DVD-ROM / diskette** IBM SlimLine DVD-ROM, IDE (ATAPI), 1.6" HH, bootable / 3.5" 1.44 MB diskette drive

**Ethernet** Broadcom® 5704 10/100/1000 dual ethernet / on systemboard / 64-bit 266MHz PCI-X 2.0 / Wake on LAN® / Alert on LAN™ 2

**Graphics controller** SVGA / ATI® Radeon Mobility 7000 / on planar / 16MB SDRAM std/max / 32-bit 33MHz PCI 2.2 bus

**Ports** Rear: RSA ethernet, RSA serial, two USB(2.0), kybd, mouse, DB-15 graphics, two ethernet, std. serial, RS-485 / Front: USB (2.0)

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

**Systems management** BMC standard / IPMI 2.0 / Remote Supervisor Adapter II slimline (std on 41U & 4RU) / PCI adapter / includes 10/100 ethernet, RJ-11, and serial connectors / provides remote console and mgmt / power on/off system / monitors power status, op system, temperature, disks, fans, power supplies / optional on others

**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, and others

**Keyboard / mouse** Rack model: none standard / Tower model: IBM 104-key keyboard (PS/2) / IBM 3-button optical mouse (PS/2)

**Power supplies** Some: two; some: three / 775 watt hot-swap / redundant with three power supplies (N+1) / worldwide / voltage-sensing / auto-restart / rear accessible fans in each power supply / PFA

**Cooling fans** Eight hot-swap, redundant, multi-speed fans / One cooling fan in each power supply filler when power supply is not installed / PFA / failure signals Diagnostic LED and mgmt processor

| Options                                  | Part Number | Part Number                           | Part Number |
|--|-------------|---------------------------------------|-------------|
| 1GB PC2-3200 CL3 ECC RDIMM (2x512MB)     | 39M5821     | IBM ServeRAID 8i SAS Adapter          | 39R8729     |
| 2GB PC2-3200 CL3 ECC RDIMM (2x1GB)       | 39M5809     | IBM ServeRAID 6M U320 256MB Adapter   | 39R8816     |
| 4GB PC2-3200 CL3 ECC RDIMM (2x2GB)       | 39M5812     | IBM 73.4GB 10K 3.5" SAS Hot-swap HDD  | 40K1039     |
| Active Memory 4-slot Expansion Card      | 41Y5000     | IBM 146GB 10K 3.5" SAS Hot-swap HDD   | 40K1040     |
| Xeon 7110N 2.5GHz/4MB L3/Dual Core Proc  | 40K1259     | IBM 300GB 10K 3.5" SAS Hot-swap HDD   | 40K1041     |
| Xeon 7120N 3.0GHz/4MB L3/Dual Core Proc  | 40K1260     | Remote Supervisor Adapter II Slimline | 39Y9566     |
| Xeon 7130N 3.16GHz/8MB L3/Dual Core Proc | 40K1261     | SAS 3.5" 6-drive Backplane            | 41Y5003     |
| Xeon 7140N 3.3GHz/16MB L3/Dual Core Proc | 40K1262     | IBM 73.4GB 15K 3.5" SAS Hot-swap HDD  | 40K1043     |
| 775 watt Hot-Swap Power Supply (WW)      | 41Y5002     | IBM 146GB 15K 3.5" SAS Hot-swap HDD   | 40K1044     |

**LIMITED WARRANTY<sup>3</sup>**

- ↪ 3 year parts and labor
- ↪ International Warranty Service<sup>3</sup>
- ↪ On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time<sup>7</sup>
- ↪ On site service upgrade options (in eligible locations):<sup>7</sup>
  - 3 year IOR 24x7, 4 hr avg response (ServicePac part num 30L9187)
  - 3 year IOR 24x7, 2 hr avg response (ServicePac part num 31L2723)
  - 4 year IOR 9x5, NBD response (ServicePac part num 69P9218)
  - 5 year IOR 9x5, NBD response (ServicePac part num 69P9222)
- ↪ Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- ↪ 24x7<sup>14</sup> toll-free support for warranty issues during the warranty period<sup>3</sup>

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

Light Path Diag **7U<sup>4</sup> Rack or Tower**

Removable Processor Board Tray

|            |            |                     |
|------------|------------|---------------------|
| • Opt disk | • Opt disk | Floppy Drive        |
| • Opt disk | • Opt disk | CD-ROM              |
| • Opt disk | • Opt disk | Full High Tape Bay  |
| • Opt disk | • Opt disk | or 2 Half High Bays |
| • Opt disk | • Opt disk |                     |
| • Opt disk | • Opt disk |                     |

- ↪ Stealth black color
- ↪ Tool-free serviceability
- ↪ Tower Dimensions: H15.5" x W18.2" x D30"(762mm)
- ↪ Tower Weight: 149 to 180lbs; 67.6 to 81.7Kg
- ↪ Rack Dimensions: H12" x W17.5" x D28.2"
- ↪ Rack Dimensions: H306mm x W444mm x D715mm
- ↪ Rack Weight: 144 to 158lbs; 65.4 to 71.7Kg
- ↪ Access adapters, fans, and memory from top
- ↪ Access processors and systemboard from front
- ↪ Access power supplies from back
- ↪ Setup Program by pressing F1 at startup
- ↪ Diagnostics (PC-Doctor) by pressing F2 at startup
- ↪ SCSISelect by pressing Ctrl+A at startup
- ↪ Drop Down Light Path Diagnostics (level 2 diagnostic panel) for outside view of potential problem without removing cover
- ↪ Predictive Failure Analysis® alerts on disks, power supplies, memory, processors, VRMs, and fans with IBM Director

**All models:** Maximum internal disk capacity: 3.6TB with 12x 300GB<sup>2</sup> hot-swap SAS disks

BTU Output:  
 Ship Config: 1,170 Btu/hr (343 watts)  
 Full Config: 6,142 Btu/hr (1800 watts)



| IBM® Type-model | Qty x Processor          | Core | L2 cache | Memory | DIMM slots | Memory cards | Disks | Disk controller | Mechanical           | Slots x bays | Hot-swap pwr supplies | Warranty (yrs.) | Available date |
|-----------------|--------------------------|------|----------|--------|------------|--------------|-------|-----------------|----------------------|--------------|-----------------------|-----------------|----------------|
| 8863-1SY        | 1 x Xeon™ MP 3.16GHz     | SC   | 1MB      | 2x1GB  | 4          | One          | None  | SAS             | 3U <sup>4</sup> rack | 6x7          | 1 x 1300              | 3               | May 2006       |
| 8863-2SY        | 1 x Xeon MP 3.66GHz      | SC   | 1MB      | 2x1GB  | 4          | One          | None  | SAS             | 3U rack              | 6x7          | 1 x 1300              | 3               | May 2006       |
| 8863-3SY        | 1 x Xeon 7020 MP 2.67GHz | DC   | 2x1MB    | 2x1GB  | 4          | One          | None  | SAS             | 3U rack              | 6x7          | 1 x 1300              | 3               | May 2006       |
| 8863-4SY        | 1 x Xeon 7040 MP 3.0GHz  | DC   | 2x2MB    | 2x1GB  | 4          | One          | None  | SAS             | 3U rack              | 6x7          | 1 x 1300              | 3               | May 2006       |
| 8863-E8Y        | 2 x Xeon MP 3.66GHz      | SC   | 1MB      | 2x1GB  | 4          | One          | None  | SAS             | 3U rack              | 6x7          | 2 x 1300              | 3               | May 2006       |
| 8863-E9Y        | 1 x Xeon MP 3.16GHz      | SC   | 1MB      | 2x1GB  | 4          | One          | None  | SAS             | 3U rack              | 6x7          | 2 x 1300              | 3               | May 2006       |
| 8863-EAY        | 4 x Xeon 7020 MP 2.67GHz | DC   | 2x1MB    | 8x1GB  | 16         | Four         | None  | SAS             | 3U rack              | 6x7          | 2 x 1300              | 3               | May 2006       |

**Processors** Up to two 64-bit Intel® Xeon™ Processor MP up to 3.66GHz<sup>1</sup> 667MHz FSB Single Core / Up to four 64-bit Intel Xeon Processor MP up to 3.0GHz 667MHz FSB Dual Core / NetBurst™ / Extended Memory 64 Technology™ (EM64T) / Hyper-Threading

**L2 cache** 1 or 2 MB / per core / at processor speed / Xcel4v™ Dynamic Server Cache

**Processor upgrade Implementation** 4-way SMP / up to four Xeon Processors MP (same speed/cache size) / Dual Core Capable

System board contains four Intel 604-pin micro-PGA4 ZIF sockets, four memory board slots, six Active™ PCI-X 2.0 slots, and integrated SCSI, ethernet, graphics

**Active Memory™** 2GB std / 64GB max per chassis using high-capacity memory card / one memory card standard (up to four) with 4 DIMM gold-connector slots each / DIMMs must be installed in matched pairs / PC2-3200 400MHz registered 240-pin DDR2-SDRAM RDIMMs / 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** Some: Adaptec® AIC-9410 / Serial Attached SCSI (SAS) 3.0GHz (3GB/sec) / 64-bit 266MHz PCI-X 2.0 / ServeRaid 8i std on E8Y & EAY / optional on others

**SAS connectors** Dual channel controller wired to SAS backplane

**SAS cabling** Two standard SAS cables attached to six-bay backplane

**IDE controller / cabling** Enhanced IDE ATA-33 controller in CSB6 South Bridge

**Disk - capacity** Supports up to 73GB 10K rpm disks

**Disk - bays** Six 2.5" hot-swap bays / converged tray / 80-pin SCA-2 connectors

**Mechanical** EIA 19" rack models (3U<sup>4</sup>) x 28" deep / supported in NetBAY™ Racks (such as NetBAY42 SR, NetBAY42 ER)

**Chipset** IBM XA-64e™ 3rd Generation chipset / Integrated Processor and Memory Controller / Supports EM64T / 2 IBM PCI-X 2.0 Host Bridges / Host Bridge One supports video, optional ServeRaid 8i, ServerWorks® CSB6 South Bridge (IDE, USB, bus for Super I/O NS 87417 [diskette, keyboard, mouse]), Dual Port Broadcom 5704, and 2 PCI-X 2.0 slots / Host Bridge Two supports 4 PCI-X 2.0 slots

**Slots (Active™)** Six total PCI-X 2.0 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, all slots support up to 266MHz

**DVD-ROM / diskette** 8X<sup>6</sup> Slim DVD-ROM / none

**Ethernet** Broadcom® 5704 10/100/1000 dual ethernet / on systemboard / 64-bit 266MHz PCI-X 2.0 / Wake on LAN® / Alert on LAN™ 2

**Graphics controller** SVGA / ATI® 7000m / on planar / 16MB SDRAM std/max / 32-bit 33MHz PCI 2.2 bus

**Ports** Rear: RSA ethernet, RSA serial, two USB (Ver 2.0), keyboard, mouse, analog DB-15 graphics, two ethernet, std. serial RS-485 / Front: USB (Ver 2.0)

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

**Systems management** BMC standard / IPMI 2.0 / Remote Supervisor Adapter II Slimline std on E8Y & EAY / optional on others / 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)

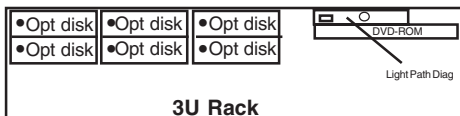
**Power supplies** Std: one 1300 watt hot-swap(240 VAC); Max: two hot-swap / redundant with two power supplies (some configurations) / worldwide / voltage-sensing / auto-restart / PFA

**Cooling fans** Eight hot-swap, redundant, multi-speed fans / one additional fan in each power supply / PFA / fan failure signals Diagnostic LED and mgmt processor

|   |         |
|---|---------|
| 2GB PC2-3200 CL3 ECC RDIMM (2x1GB)  | 39M5809 |
| 4GB PC2-3200 CL3 ECC RDIMM (2x2GB)  | 39M5812 |
| 8GB PC2-3200 CL3 ECC RDIMM (2x4GB)  | 30R5145 |
| Active Memory 4-slot Expansion Card   | 41Y5000 |
| Xeon MP 3.16GHz/1MB L2 Cache Proc Upg   | 40K2521 |
| Xeon MP 3.66GHz/1MB L2 Cache Proc Upg   | 40K2520 |
| Xeon MP 7020 2.67GHz/2x1MB L2 Cache Proc Upg  | 40K2522 |
| Xeon MP 7040 3.0GHz/2x2MB L2 Cache Proc Upg   | 40K2523 |
| 1300 watt Hot-Swap Power Supply (WW)  | 41Y5001 |
| IBM ServeRAID™-8i SAS-SCSI Adapter  | 39R8729 |
| IBM ServeRAID 6M U320 256MB Adapter   | 02R0988 |
| IBM 36.4GB 10K 2.5" SAS Hot-swap HDD  | 40K1051 |
| IBM 73.4GB 10K 2.5" SAS Hot-swap HDD  | 40K1052 |
| IBM Remote Supervisor Adapter II Slimline   | 39Y9566 |
| Dual Core X3 upgrade kit  | 41Y5005 |
| Other options at <a href="http://ibm.com/pc/us/accessories">ibm.com/pc/us/accessories</a> |         |

Six available 3.3 volt PCI-X 2.0 slots:

- Slot 1 - fullsize, 64-bit, 266MHz PCI-X, hot-swap
  - Slot 2 - fullsize, 64-bit, 266MHz PCI-X, hot-swap
  - Slot 3 - fullsize, 64-bit, 266MHz PCI-X, hot-swap
  - Slot 4 - fullsize, 64-bit, 266MHz PCI-X, hot-swap
  - Slot 5 - fullsize, 64-bit, 266MHz PCI-X, hot-swap
  - Slot 6 - fullsize, 64-bit, 266MHz PCI-X, hot-swap
- \*exclusive slot available for ServeRAID 8i adapter



- Bay ① 5.25", 0.5", access, std 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
- Bay ⑥ 2.5", SL 1", access, hot-swap, open
- Bay ⑦ 2.5", SL 1", access, hot-swap, open

**Max BTU Output:**  
 Ship Configuration: 1,086 Btu/hr (318 watts)  
 Full Configuration: 5,200 Btu/hr (1524 watts)

- ↳ Dimensions: H5.25" x W17.4" x D27.6"
- ↳ Dimensions: H133.4mm x W442.0mm x D701mm
- ↳ Weight: 63 to 83lbs; 28.6 to 37.6kg
- ↳ Stealth black color
- ↳ Tool-free serviceability
- ↳ Access processors from front
- ↳ Access adapters, power supplies, memory and systemboard from top
- ↳ Setup Program by pressing F1 at startup
- ↳ Diagnostics (PC-Doctor) by pressing F2 at startup
- ↳ SCSISelect by pressing Ctrl+A 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: 440.4GB with six 73.4GB<sup>2</sup> hot-swap SAS disks

**LIMITED WARRANTY<sup>3</sup>**

- ↳ 3 year parts and labor
- ↳ International Warranty Service<sup>3</sup>
- ↳ On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time<sup>7</sup>
- ↳ On site service upgrade options (in eligible locations):<sup>7</sup>
  - 3 year IOR 24x7, 4 hr avg response 96P2253
  - 3 year IOR 24x7, 2 hr avg response 96P2254
  - 4 year IOR 9x5, NBD response 96P2255
  - 5 year IOR 9x5, NBD response 69P2259
- ↳ Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- ↳ 24x7<sup>14</sup> toll-free support for warranty issues during the warranty period<sup>3</sup>

| IBM®<br>Type-model | Qty x Processor    | Core    | L2<br>cache | Memory | DIMM<br>slots | Memory<br>cards | RSA II | Disk<br>controller | Mechanical               | Slots x<br>bays | Hot-swap<br>pwr supplies | Warranty<br>(yrs.) | Available<br>date |
|--------------------|--------------------|---------|-------------|--------|---------------|-----------------|--------|--------------------|--------------------------|-----------------|--------------------------|--------------------|-------------------|
| 8864-1RU           | 1 x Xeon™ MP 7110N | 2.5GHz  | DC          | 2x1MB  | 2x1GB         | 4               | One    | Opt                | SAS 3U <sup>4</sup> rack | 6x7             | 1 x 1300                 | 3                  | Oct 2006          |
| 8864-2RU           | 2 x Xeon MP 7120N  | 3.0GHz  | DC          | 2x1MB  | 2x1GB         | 4               | One    | Std                | SAS 3U rack              | 6x7             | 1 x 1300                 | 3                  | Oct 2006          |
| 8864-3RU           | 2 x Xeon MP 7130N  | 3.16GHz | DC          | 2x1MB  | 2x1GB         | 4               | One    | Std                | SAS 3U rack              | 6x7             | 1 x 1300                 | 3                  | Oct 2006          |
| 8864-4RU           | 2 x Xeon MP 7140N  | 3.3GHz  | DC          | 2x1MB  | 2x2GB         | 8               | Two    | Std                | SAS 3U rack              | 6x7             | 2 x 1300                 | 3                  | Oct 2006          |

**Processors** Up to two 64-bit Intel® Xeon™ Processor MP up to 3.3GHz/667MHz FSB Dual Core / NetBurst™ / Extended Memory 64 Technology™ (EM64T) / Hyper-Threading  
**L2 cache** 1 MB / per core / at processor speed / Xcel4v™ Dynamic Server Cache  
**L3 cache** 4MB on 7110N & 7120N / 8MB on 7130N / 16MB on 7140N  
**Processor upgrade Implementation** 4-way SMP / up to four Xeon Processors MP (same speed/cache size) / Dual Core Capable  
 System board contains four Intel 604-pin micro-PGA4 ZIF sockets, four memory board slots, four Active™ PCI-E x8 slots, two Active™ PCI-X 2.0 slots and integrated SCSI, ethernet, graphics

**Active Memory™** 2 or 4GB std / 64GB max per chassis using high-capacity memory card / one memory card standard (up to four) with 4 DIMM gold-connector slots each / DIMMs must be installed in matched pairs / PC2-3200 400MHz registered 240-pin DDR2-SDRAM RDIMMs / 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** Some: Adaptec® AIC-9410 / **Serial Attached SCSI (SAS)** 3.0GHz (3GB/sec) / 64-bit 266MHz PCI-X 2.0  
 Some: **ServeRAID™ 8i / RAID 0, 1, 10, 5, 6, 60, 1E & 5EE** / std on 4RU / dedicated slot / 64-bit 133MHz PCI-X  
**SAS connectors** Dual channel controller wired to SAS backplane  
**SAS cabling** Two standard SAS cables attached to six-bay backplane  
**IDE controller / cabling** Enhanced IDE ATA-33 controller in CSB6 South Bridge  
**Disk - capacity** Supports up to 73GB 10K rpm disks  
**Disk - bays** Six 2.5" hot-swap bays / converged tray / 80-pin SCA-2 connectors  
**Mechanical** EIA 19" rack models (3U<sup>4</sup>) x 28" deep / supported in NetBAY™ Racks (such as NetBAY42 SR, NetBAY42 ER)

**Chipset** IBM XA-64e™ 3rd Generation chipset / Integrated Processor and Memory Controller / Supports EM64T / 2 IBM PCI-X 2.0 Host Bridges / Host Bridge One supports video, optional ServeRaid 8i, ServerWorks® CSB6 South Bridge (IDE, USB, bus for Super I/O NS 87417 [diskette, keyboard, mouse]), Dual Port Broadcom 5704, and 2 PCI-X 2.0 slots / Host Bridge Two supports 4 PCI-E x8 slots  
**Slots (Active™)** Four Active™ PCI-E x8 slots / full height, full length / Two Active™ PCI-X 2.0 64-bit 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  
**DVD-ROM / diskette** 8X<sup>6</sup> Slim DVD-ROM / none  
**Ethernet** Broadcom® 5704 10/100/1000 dual ethernet / on systemboard / 64-bit 266Mhz PCI-X 2.0 / Wake on LAN® / Alert on LAN™ 2  
**Graphics controller** SVGA / AT™ 7000m / on planar / 16MB SDRAM std/max / 32-bit 33MHz PCI 2.2 bus  
**Ports** Rear: RSA ethernet, RSA serial, two USB (2.0), kybd, mouse, DB-15 graphics, two ethernet, std. serial RS-485 / Front: USB (2.0)

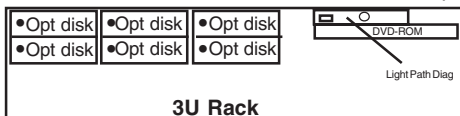
**Security** Power-on and administrator passwords / unattended boot / selectable boot  
**System management** BMC standard / IPMI 2.0 / **PowerExecutive™ / Remote Supervisor Adapter II Slimline** std on 2RU, 3RU & 4RU / optional on 1RU / PCI adapter / includes 10/100 ethernet and serial connectors / 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** Some: one; some: two / 1300 watt hot-swap(240 VAC); Max: two hot-swap / redundant with two power supplies (some configurations) / worldwide / voltage-sensing / auto-restart / PFA  
**Cooling fans** Eight hot-swap, redundant, multi-speed fans / one additional fan in each power supply / PFA / fan failure signals Diagnostic LED and mgmt processor

|   |         |
|---|---------|
| 2GB PC2-3200 CL3 ECC RDIMM (2x1GB)        | 39M5809 |
| 4GB PC2-3200 CL3 ECC RDIMM (2x2GB)        | 39M5812 |
| 8GB PC2-3200 CL3 ECC RDIMM (2x4GB)        | 30R5145 |
| Active Memory 4-slot Expansion Card       | 41Y5000 |
| Xeon 7110N 2.5GHz/4MB L3/Dual Core Proc   | 40K1259 |
| Xeon 7120N 3.0GHz/4MB L3/Dual Core Proc   | 40K1260 |
| Xeon 7130N 3.16GHz/8MB L3/Dual Core Proc  | 40K1261 |
| Xeon 7140N 3.3GHz/16MB L3/Dual Core Proc  | 40K1262 |
| 1300 watt Hot-Swap Power Supply (WW)      | 41Y5001 |
| IBM ServeRAID™-8i SAS Adapter             | 39R8729 |
| IBM ServeRAID 6M U320 256MB Adapter       | 39R8816 |
| IBM 36.4GB 10K 2.5" SAS Hot-swap HDD      | 40K1051 |
| IBM 73.4GB 10K 2.5" SAS Hot-Swap HDD      | 40K1052 |
| IBM Remote Supervisor Adapter II Slimline | 39Y9566 |

Other options at [ibm.com/pc/us/accessories](http://ibm.com/pc/us/accessories)

Two available 3.3 volt PCI-X 2.0 slots:  
 Slot 1 - fullsize, 64-bit, 266MHzPCI-X, hot-swap  
 Slot 2 - fullsize, 64-bit, 266MHzPCI-X, hot-swap  
 Four available PCI-E x8 slots:  
 Slot 3 - full-height, full-length, PCI-E x8  
 Slot 4 - full-height, full-length, PCI-E x8  
 Slot 5 - full-height, full-length, PCI-E x8  
 Slot 6 - full-height, full-length, PCI-E x8  
 \*exclusive slot available for ServeRAID 8i adapter



Bay ① 5.25", 0.5", access, std 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  
 Bay ⑥ 2.5", SL 1", access, hot-swap, open  
 Bay ⑦ 2.5", SL 1", access, hot-swap, open

**Max BTU Output:**  
 Ship Configuration: 1,086 Btu/hr (318 watts)  
 Full Configuration: 5,200 Btu/hr (1524 watts)

- ⇨ Dimensions: H5.25" x W17.4" x D27.6"
- ⇨ Dimensions: H133.4mm x W442.0mm x D701mm
- ⇨ Weight: 63 to 83lbs; 28.6 to 37.6kg
- ⇨ Stealth black color
- ⇨ Tool-free serviceability
- ⇨ Access processors from front
- ⇨ Access adapters, power supplies, memory and systemboard from top
- ⇨ Setup Program by pressing F1 at startup
- ⇨ Diagnostics (PC-Doctor) by pressing F2 at startup
- ⇨ SCSISelect by pressing Ctrl+A 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: 440.4GB with six 73.4GB<sup>2</sup> hot-swap SAS disks

**LIMITED WARRANTY<sup>3</sup>**

- ⇨ 3 year parts and labor
- ⇨ International Warranty Service<sup>3</sup>
- ⇨ On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time<sup>7</sup>
- ⇨ On site service upgrade options (in eligible locations):<sup>7</sup>
  - 3 year IOR 24x7, 4 hr avg response 96P2253
  - 3 year IOR 24x7, 2 hr avg response 96P2254
  - 4 year IOR 9x5, NBD response 96P2255
  - 5 year IOR 9x5, NBD response 69P2259
- ⇨ Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- ⇨ 24x7<sup>14</sup> toll-free support for warranty issues during the warranty period<sup>3</sup>

# IBM System x3950 (8872)

xREF by STG Field Skills and Education Team

| IBM® Type-model | Qty x Processor   | Core    | L2 cache | Memory | DIMM slots | Memory cards | Disks | Disk controller | Mechanical           | Slots x bays | Hot-swap pwr supplies | Warranty (yrs.) | Available date |
|-----------------|-------------------|---------|----------|--------|------------|--------------|-------|-----------------|----------------------|--------------|-----------------------|-----------------|----------------|
| 8872-7RY        | 2 x Xeon™ MP 7020 | 2.66GHz | DC 2x1MB | 2x1GB  | 8          | Two          | None  | SAS             | 3U <sup>4</sup> rack | 6x7          | 2 x 1300              | 3               | May 2006       |
| 8872-8RY        | 2 x Xeon MP 7040  | 3.0GHz  | DC 2x2MB | 2x1GB  | 8          | Two          | None  | SAS             | 3U rack              | 6x7          | 2 x 1300              | 3               | May 2006       |

**Processors** Two 64-bit Intel® Xeon™ Processor MP up to 3.0GHz<sup>1</sup> 667MHz FSB Dual Core / NetBurst™ / Extended Memory 64 Technology™ (EM64T) / Hyper-Threading technology  
**L2 cache** 1 or 2MB / per core / Xcel4™ Dynamic Server Cache (256MB per 4 CPUs starting at 8-way)  
**L3 cache** None  
**Processor upgrade** 4-way SMP / up to four Xeon Processors (same speed/cache/core) per chassis / Dual Core Capable / up to 32-way (eight chassis interconnected)  
**Implementation** System board contains four Intel 604-pin micro-PGA4 ZIF sockets, four memory board slots, six Active™ PCI-X 2.0 slots, and integrated Serial Attached SCSI, ethernet, graphics

**Active Memory™** 2GB std / 64GB max per chassis using high-capacity memory card / 512GB max (eight chassis interconnect) / two memory cards standard (up to four) with 4 DIMM gold-connector slots each / DIMMs must be installed in matched pairs / PC2-3200 400MHz registered 240-pin DDR2-SDRAM RDIMMs / **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** ALL: Adaptec® AIC-9410 / **Serial Attached SCSI (SAS)** 3.0GHz (3GB/sec) / 64-bit 266MHz PCI-X 2.0 / ServeRaid 8i optional with dedicated slot  
**SAS connectors** Dual channel controller wired to SAS backplane  
**SAS cabling** Two standard SAS cables attached to six-bay backplane  
**IDE controller / cabling** Enhanced IDE ATA-33 controller in CSB6 South Bridge  
**Disk - capacity** None / supports up to 73GB 10,000 rpm disks  
**Disk - bays** Six 2.5" hot-swap bays / converged tray / 80-pin SCA-2 connectors  
**Mechanical** **EIA 19" rack models (3U<sup>4</sup>)** x 28" deep / supported in NetBAY™ Racks (such as NetBAY42 SR, NetBAY42 ER) / connect eight chassis (x3950 or x3950 E) to achieve 32-way in 24U

**Chipset** **IBM XA-64e™ 3rd Generation chipset** / Integrated Processor and Memory Controller / Supports EM64T / Support for external scalability and memory control / 2 IBM PCI-X 2.0 Host Bridges / Host Bridge One supports video, optional ServeRaid 8i, ServerWorks® CSB6 South Bridge (IDE, USB, bus for Super I/O NS 87417 [diskette, keyboard, mouse]), Dual Port Broadcom 5704, and 2 PCI-X 2.0 slots / Host Bridge Two supports 4 PCI-X 2.0 slots  
**Slots (Active™)** Six total PCI-X 2.0 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, all slots support up to 266MHz

**DVD-ROM / diskette** 8X<sup>6</sup> Slim DVD-ROM / none  
**Ethernet** Broadcom® 5704 10/100/1000 dual ethernet per chassis / on systemboard / 64-bit 266Mhz PCI-X 2.0 / Wake on LAN® / Alert on LAN™ 2

**Graphics controller** SVGA / ATI® 7000M / on planar / 16MB SDRAM std/max / 32-bit 33MHz PCI 2.2 bus  
**Ports** Rear: Three Scalability ports, RSA ethernet, RSA serial, two USB (Ver 2.0), keyboard, mouse, analog DB-15 graphics, two ethernet, std. serial RS-485 / Front: One USB (Ver 2.0)

**Security** Power-on and administrator passwords / unattended boot / selectable boot  
**Systems management** **Remote Supervisor Adapter II slimline** / PCI adapter / includes 10/100 ethernet, RJ-11, and serial connectors / provides remote console and mgmt / power on/off system / monitors power status, op system, temperature, disks, fans, power supplies / BMC / IMPI 2.0 /

**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)

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

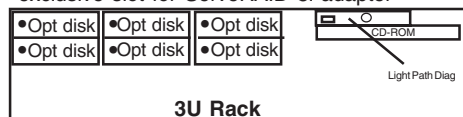
**Keyboard / mouse** None standard (because rack-based)  
**Power supplies** Std: Two 1300 watt hot-swap(240 VAC); Max: two hot-swap / fully redundant with two power supplies /worldwide / voltage-sensing / auto-restart / rear accessible fans in each power supply / PFA

**Cooling fans** Eight hot-swap, redundant, multi-speed fans / one additional fan in each power supply / PFA / fan failure signals Diagnostic LED and mgmt processor

|   |          |
|---|----------|
| 2GB PC2-3200 CL3 ECC RDIMM (2x1GB)  | 39M5809  |
| 4GB PC2-3200 CL3 ECC RDIMM (2x2GB)  | 39M5812  |
| 8GB PC2-3200 CL3 ECC RDIMM (2x4GB)  | 30R5145  |
| Active Memory 4-slot Expansion Card   | 41Y5000  |
| Xeon MP 7020 2.66GHz/2x1MB L2 Proc Upg  | 40K2522  |
| Xeon MP 7040 3.0GHz/2x2MB L2 Proc Upg   | 40K2523  |
| IBM ServeRAID™-8i SAS-SCSI Adapter  | 39R8729  |
| IBM ServeRAID 6M U320 256MB Adapter   | 02R0988  |
| IBM 36.4GB 10K 2.5" SAS Hot-swap HDD  | 40K1051  |
| IBM 73.4GB 10K 2.5" SAS Hot-Swap HDD  | 40K1052  |
| XpandOnDemand™ Scalability Cable - 2.3M   | 13M7414  |
| XpandOnDemand™ Scalability Cable - 2.9M   | 13M7416  |
| x3950 Scalability Enablement Memory Adapter   | 41Y5004  |
| x3950 E Modular Expansion Enclosure   | 8874-3RY |
| Dual Core X3 upgrade kit  | 41Y5005  |
| Other options at <a href="http://ibm.com/pc/us/accessories">ibm.com/pc/us/accessories</a> |          |

8W = 2 x XpandOnDemand Scalability kits 2.3m  
 16W = 6 x XpandOnDemand Scalability kits 2.3m  
 32W = 8 x XpandOnDemand Scalability kits 2.3m + 4 x2.9m  
 Six available 3.3 volt PCI-X 2.0 slots:

Slot 1 - fullsize, 64-bit, 266MHzPCI-X, hot-swap  
 Slot 2 - fullsize, 64-bit, 266MHzPCI-X, hot-swap  
 Slot 3 - fullsize, 64-bit, 266MHzPCI-X, hot-swap  
 Slot 4 - fullsize, 64-bit, 266MHzPCI-X, hot-swap  
 Slot 5 - fullsize, 64-bit, 266MHzPCI-X, hot-swap  
 Slot 6 - fullsize, 64-bit, 266MHzPCI-X, hot-swap  
 \*exclusive slot for ServeRAID 8i adapter



**3U Rack**  
 Bay ① 5.25", 0.5", access, std CD-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  
 Bay ⑥ 2.5", SL 1", access, hot-swap, open  
 Bay ⑦ 2.5", SL 1", access, hot-swap, open

**Max BTU Output:**  
 Ship Configuration: 1,325 Btu/hr (388 watts)  
 Full Configuration: 5,200 Btu/hr (1524 watts)

- ⇨ Dimensions: H5.05" x W17.32" x D28.15"
- ⇨ Dimensions: H128.35mm x W440.0mm x D715mm
- ⇨ Weight: 70 to 85lbs; 31.75 to 38.5kg
- ⇨ 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
- ⇨ SCSISelect by pressing Ctrl+A 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: 440.4GB with six 73.4GB<sup>2</sup> hot-swap SAS disks

### LIMITED WARRANTY<sup>3</sup>

- ⇨ 3 year parts and labor
- ⇨ International Warranty Service<sup>3</sup>
- ⇨ On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time<sup>7</sup>
- ⇨ On site service upgrade options (in eligible locations):<sup>7</sup>
  - 3 year IOR 24x7, 4 hr avg response 96P2688
  - 3 year IOR 24x7, 2 hr avg response 96P2689
  - 4 year IOR 9x5, NBD response 96P2690
  - 5 year IOR 9x5, NBD response 96P2694
- ⇨ Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- ⇨ 24x7<sup>14</sup> toll-free support for warranty issues during the warranty period<sup>3</sup>

See footnotes for important warranty information

• = Hot-swap

| IBM®<br>Type-model | Qty x Processor    | Core    | L2<br>cache | Memory | DIMM<br>slots | Memory<br>cards | Disks | Disk<br>controller | Mechanical           | Slots x<br>bays | Hot-swap<br>pwr supplies | Warranty<br>(yrs.) | Available<br>date |
|--------------------|--------------------|---------|-------------|--------|---------------|-----------------|-------|--------------------|----------------------|-----------------|--------------------------|--------------------|-------------------|
| 8878-1RY           | 2 x Xeon™ MP 7110N | 2.5GHz  | DC 2x1MB    | 2x1GB  | 8             | Two             | None  | SAS                | 3U <sup>4</sup> rack | 6x7             | 2 x 1300                 | 3                  | Nov 2006          |
| 8878-2RY           | 2 x Xeon MP 7120N  | 3.0GHz  | DC 2x1MB    | 2x2GB  | 8             | Two             | None  | SAS                | 3U rack              | 6x7             | 2 x 1300                 | 3                  | Nov 2006          |
| 8878-3RY           | 2 x Xeon MP 7130N  | 3.16GHz | DC 2x1MB    | 2x2GB  | 8             | Two             | None  | SAS                | 3U rack              | 6x7             | 2 x 1300                 | 3                  | Nov 2006          |
| 8878-4RY           | 2 x Xeon MP 7140N  | 3.3GHz  | DC 2x1MB    | 2x2GB  | 16            | Four            | None  | SAS                | 3U rack              | 6x7             | 2 x 1300                 | 3                  | Nov 2006          |

**Processors** Two 64-bit Intel® Xeon™ Processor MP up to 3.0GHz<sup>1</sup> 667MHz FSB Dual Core / NetBurst™ / Extended Memory 64 Technology™ (EM64T) / Hyper-Threading technology  
**L2 cache** 1MB / per core / Xcel4v™ Dynamic Server Cache (256MB per 4 CPUs starting at 8-way)  
**L3 cache** 4MB on 7110N & 7120N / 8MB on 7130N / 16MB on 7140N  
**Processor upgrade** 4-way SMP / up to four Xeon Processors (same speed/cache/core) per chassis / Dual Core Capable / up to 32-way (eight chassis interconnected)  
**Implementation** System board contains four Intel 604-pin micro-PGA4 ZIF sockets, four memory board slots, six Active™ PCI-X 2.0 slots, and integrated Serial Attached SCSI, ethernet, graphics

**Active Memory™** 2GB std / 64GB max per chassis using high-capacity memory card / 512GB max (eight chassis interconnect) / two memory cards standard (up to four) with 4 DIMM gold-connector slots each / DIMMs must be installed in matched pairs / PC2-3200 400MHz registered 240-pin DDR2-SDRAM RDIMMs / **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** ALL: Adaptec® AIC-9410 / **Serial Attached SCSI (SAS)** 3.0GHz (3GB/sec) / 64-bit 266MHz PCI-X 2.0 / **ServeRAID™ 8i / RAID 0,1, 10, 5, 6, 60, 1E & 5EE** / standard on 2RY, 3RY & 4RY / dedicated slot / 64-bit 133MHz PCI-X / optional on others  
**SAS connectors** Dual channel controller wired to SAS backplane  
**SAS cabling** Two standard SAS cables attached to six-bay backplane  
**IDE controller / cabling** Enhanced IDE ATA-33 controller in CSB6 South Bridge  
**Disk - capacity** None / supports up to 73GB 10,000 rpm disks  
**Disk - bays** Six 2.5" hot-swap bays / converged tray / 80-pin SCA-2 connectors  
**Mechanical** **EIA 19" rack models (3U)** x 28" deep / supported in NetBAY™ Racks (such as NetBAY42 SR, NetBAY42 ER) / connect eight chassis (x3950 or x3950 E) to achieve 32-way in 24U

**Chipset** **IBM XA-64e™ 3rd Generation chipset** / Integrated Processor and Memory Controller / Supports EM64T / Support for external scalability and memory control / 2 IBM PCI-X 2.0 Host Bridges / Host Bridge One supports video, optional ServeRaid 8i, ServerWorks® CSB6 South Bridge (IDE, USB, bus for Super I/O NS 87417 [diskette, keyboard, mouse]), Dual Port Broadcom 5704, and 2 PCI-X 2.0 slots / Host Bridge Two supports 4 PCI-X 2.0 slots  
**Slots (Active™)** Six total PCI-X 2.0 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, all slots support up to 266MHz

**DVD-ROM / diskette** 8X<sup>6</sup> Slim DVD-ROM / none  
**Ethernet** Broadcom® 5704 10/100/1000 dual ethernet per chassis / on systemboard / 64-bit 266Mhz PCI-X 2.0 / Wake on LAN® / Alert on LAN™ 2  
**Graphics controller** SVGA / ATI® 7000M / on planar / 16MB SDRAM std/max / 32-bit 33MHz PCI 2.2 bus  
**Ports** Rear: Three Scalability ports, RSA ethernet, RSA serial, two USB (Ver 2.0), keyboard, mouse, analog DB-15 graphics, two ethernet, std. serial RS-485 / Front: One USB (Ver 2.0)

**Security** Power-on and administrator passwords / unattended boot / selectable boot  
**System management** **Remote Supervisor Adapter II slimline** / PCI adapter / includes 10/100 ethernet, RJ-11, and serial connectors / provides remote console and mgmt / power on/off system / monitors power status, op system, temperature, disks, fans, power supplies / BMC / IMPI 2.0 / **PowerExecutive™**

**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)

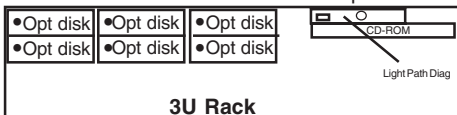
**Software** **ServerGuide™** (CD-ROM installation and configuration utilities), IBM Director

**Keyboard / mouse** None standard (because rack-based)  
**Power supplies** Std: Two 1300 watt hot-swap(240 VAC); Max: two hot-swap / fully redundant with two power supplies / worldwide / voltage-sensing / auto-restart / rear accessible fans in each power supply / PFA  
**Cooling fans** Eight hot-swap, redundant, multi-speed fans / one additional fan in each power supply / PFA / fan failure signals Diagnostic LED and mgmt processor

|   |          |
|---|----------|
| 2GB PC2-3200 CL3 ECC RDIMM (2x1GB)  | 39M5809  |
| 4GB PC2-3200 CL3 ECC RDIMM (2x2GB)  | 39M5812  |
| 8GB PC2-3200 CL3 ECC RDIMM (2x4GB)  | 30R5145  |
| Active Memory 4-slot Expansion Card   | 41Y5000  |
| Xeon 7110N 2.5GHz/4MB L3/Dual Core Proc   | 40K1259  |
| Xeon 7120N 3.0GHz/4MB L3/Dual Core Proc   | 40K1260  |
| Xeon 7130N 3.16GHz/8MB L3/Dual Core Proc  | 40K1261  |
| Xeon 7140N 3.3GHz/16MB L3/Dual Core Proc  | 40K1262  |
| IBM ServeRAID™-8i Adapter   | 39R8729  |
| IBM ServeRAID 6M U320 256MB Adapter   | 39R8816  |
| IBM 36.4GB 10K 2.5" SAS Hot-swap HDD  | 40K1051  |
| IBM 73.4GB 10K 2.5" SAS Hot-Swap HDD  | 40K1052  |
| XpandOnDemand™ Scalability Cable - 2.3M   | 13M7414  |
| XpandOnDemand™ Scalability Cable - 2.9M   | 13M7416  |
| x3950 Scalability Enablement Memory Adapter   | 41Y5004  |
| x3950 E Modular Expansion Enclosure   | 8874-3RY |
| Dual Core X3 upgrade kit  | 41Y5005  |
| Other options at <a href="http://ibm.com/pc/us/accessories">ibm.com/pc/us/accessories</a> |          |

8W = 2 x XpandOnDemand Scalability kits 2.3m  
 16W = 6 x XpandOnDemand Scalability kits 2.3m  
 32W = 8 x XpandOnDemand Scalability kits 2.3m + 4 x2.9m  
 Six available 3.3 volt PCI-X 2.0 slots:

Slot 1 - fullsize, 64-bit, 266MHzPCI-X, hot-swap  
 Slot 2 - fullsize, 64-bit, 266MHzPCI-X, hot-swap  
 Slot 3 - fullsize, 64-bit, 266MHzPCI-X, hot-swap  
 Slot 4 - fullsize, 64-bit, 266MHzPCI-X, hot-swap  
 Slot 5 - fullsize, 64-bit, 266MHzPCI-X, hot-swap  
 Slot 6 - fullsize, 64-bit, 266MHzPCI-X, hot-swap  
 \*exclusive slot for ServeRAID 8i adapter



Bay ① 2.5", 0.5", access, std CD-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  
 Bay ⑥ 2.5", SL 1", access, hot-swap, open  
 Bay ⑦ 2.5", SL 1", access, hot-swap, open

Max BTU Output:  
 Ship Configuration: 1,325 Btu/hr (388 watts)  
 Full Configuration: 5,200 Btu/hr (1524 watts)

- ⊗ Dimensions: H5.05" x W17.32" x D28.15"
- ⊗ Dimensions: H128.35mm x W440.0mm x D715mm
- ⊗ Weight: 70 to 85lbs; 31.75 to 38.5kg
- ⊗ 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
- ⊗ SCSISelect by pressing Ctrl+A 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: 440.4GB with six 73.4GB<sup>2</sup> hot-swap SAS disks

**LIMITED WARRANTY<sup>3</sup>**

- ⊕ 3 year parts and labor
- ⊕ International Warranty Service<sup>3</sup>
- ⊕ On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time<sup>7</sup>
- ⊕ On site service upgrade options (in eligible locations):<sup>7</sup>
  - 3 year IOR 24x7, 4 hr avg response 96P2688
  - 3 year IOR 24x7, 2 hr avg response 96P2689
  - 4 year IOR 9x5, NBD response 96P2690
  - 5 year IOR 9x5, NBD response 96P2694
- ⊕ Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- ⊕ 24x7<sup>14</sup> toll-free support for warranty issues during the warranty period<sup>3</sup>

| 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 |
|--|--|-------------------------|--------------------------|---------------------------------|------------------------------|-------------------------|----------------------|--------------------------|----------------------|----------------|
| 8677-3XX                                   | HS20/HS40/JS20/JS21/LS20   | 0 / 14                  | 0 / 4                    | Enet, Fibre Ch, IB, OPM and CPM | 1 / 2                        | 2 / 4                   | 2000W                | 2 / 2                    | 7U <sup>4</sup> rack | Oct 2004       |
| 8677-3RX                                   | HS20/HS40/JS20/JS21/LS20   | 0 / 14                  | 0 / 4                    | Enet, Fibre Ch, IB, OPM and CPM | 1 / 2                        | 2 / 4                   | 2000W                | 2 / 2                    | 7U rack              | Mar 2006       |
| Positioning Description                    | <b>Flexible, innovative design provides investment protection and reduces deployment costs</b><br>Provides common resources shared by blade servers such as power, system management, cabling, ethernet management and expansion, external Fibre Channel storage switching and connectivity, and I/O (diskette drive, optical drive, and ports for USB, keyboard, video, mouse)  |                         |                          |                                 |                              |                         |                      |                          |                      |                |
| Blade bays                                 | <b>Supports all blades HS20/HS40/JS20/JS21/LS20</b> and SCSI Storage Expansion Units / 14 hot-pluggable 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 (8677-3RX only) | Std: one on 3RX; 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 14 blade servers   |                         |                          |                                 |                              |                         |                      |                          |                      |                |
| Management Module (8677-3XX only)          | Std: one on 3XX; max: one or two / hot-swap / rear access / comprehensive system management functions / PowerPC® 401 controller / communicates with integrated system management processor on each server blade / multiplexor for console connectivity / ports: DB-15 analog video port, PS/2 keyboard port, PS/2 mouse port, 10/100 ethernet remote management connection port / all ports shared by up to 14 blade servers   |                         |                          |                                 |                              |                         |                      |                          |                      |                |
| Power modules                              | Std: two in bays 1 and 2 (two 9ft IEC 320-C13 to C14 or two IEC 320-C19 to C20 cables for intrarack power distribution); max: four / hot-swap / rear access / 2000 watts at 220v / both redundant to each other (N+N redundancy) / two std modules supply power to all modules and blade bays 1 through 6 / power for bays 7 through 14 requires two additional power modules in bays 3 and 4 (redundant to each other) / worldwide / voltage-sensing / auto-restart / no fans power module(s) |                         |                          |                                 |                              |                         |                      |                          |                      |                |
| Blower modules                             | Std: two; 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            | <b>EIA 19" rack models (7U<sup>4</sup>)</b> x 28" deep / supported in NetBAY™ Racks (such as NetBAY42 ER, NetBAY42 SR)<br>3XX/3RX: 8X-24X <sup>6</sup> DVD-ROM / 3.5" 1.44MB diskette drive / one USB port (Version 1.1) / all USB interface / not removable / front access / shared by up to 14 blade servers / requests for CD-ROM, diskette drive, and USB port by pressing CD select button on server blade front panel  |                         |                          |                                 |                              |                         |                      |                          |                      |                |
| Keyboard / mouse                           | None standard / provides KVM console support / requests for keyboard, mouse, and video by pressing the display button on server blade front panel / supports NetBAY ACT CAT5 chaining solutions  |                         |                          |                                 |                              |                         |                      |                          |                      |                |
| Ports                                      | Rear: keyboard (PS/2), mouse (PS/2), analog DB-15 graphics (on standard mgmt module) / no serial or parallel ports / Front: one USB (Version 1.1)  |                         |                          |                                 |                              |                         |                      |                          |                      |                |
| 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 <b>GB Ethernet Switch Module</b> (the second ethernet controller requires a second optional <b>GB Ethernet Switch Module</b> )  |                         |                          |                                 |                              |                         |                      |                          |                      |                |
| Systems mgmt                               | Provides remote console and mgmt / power on/off blades/modules / monitors power status, operating system, temperature, disks, blowers, power modules / system diagnostic programs provided through IBM Director software   |                         |                          |                                 |                              |                         |                      |                          |                      |                |
| System LED panel                           | System LED panel provides power-on, location, over-temperature, information, and system-error conditions   |                         |                          |                                 |                              |                         |                      |                          |                      |                |

|  |         |   |         |
|--|---------|---|---------|
| 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 |
| NetBAY25 Standard Rack Cabinet                                 | 9306250 | APC Smart-UPS 5000RMB (208V)  | 37L6861 |
| IBM 2000W Power Supply Module (includes two modules)           | 26K4816 | • Other options at <a href="http://ibm.com/pc/us/accessories">ibm.com/pc/us/accessories</a> |         |

**Front**

LED panel Bay 1 Bay 2

USB DVD-ROM USB Diskette

B 1 B 2 B 3 B 4 B 5 B 6 B 7 B 8 B 9 B 10 B 11 B 12 B 13 B 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 Power modules (both std) Management module (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 bay | Switch module function  |
|-------------------|---|
| 1                 | Ethernet link 1 for all blade servers   |
| 2                 | Ethernet link 2 for all blade servers   |
| 3                 | Network connection 1 for all blade server I/O expansion options (Fibre Channel) |
| 4                 | Network connection 2 for all blade server I/O expansion options (Fibre Channel) |

**LIMITED WARRANTY<sup>3</sup>**

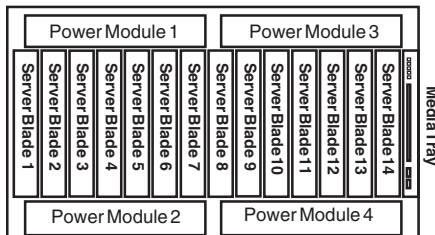
- ↳ 3 year parts and labor
- ↳ International Warranty Service<sup>3</sup>
- ↳ On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time<sup>7</sup>
- ↳ On site service upgrade options (in eligible locations):<sup>7</sup>
  - 3 year IOR 24x7, 2 hr avg response (ServicePac® 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.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- ↳ 24x7<sup>14</sup> 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)           | Advanced Management modules std / max | Power modules std / max | Power Module Wattage | Blower modules std / max | Mechanical           | Available date |
|-----------------------------|---|-------------------------|--------------------------|---------------------------------|---------------------------------------|-------------------------|----------------------|--------------------------|----------------------|----------------|
| 8852-4XX                    | HS20/HS40/JS20/JS21/LS20  | 0 / 14                  | 0 / 10                   | Enet, Fibre Ch, IB, OPM and CPM | 1 / 2                                 | 2 / 4                   | 2900W                | 2 / 2                    | 9U <sup>4</sup> rack | Mar 2006       |
| Positioning Description     | <b>Revolutionary design provides the most efficient infrastructure building block for adding scale and capacity</b><br>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                  | <b>Supports all blades: HS20/HS40/JS20/JS21/LS20</b> 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       | <b>EIA 19" rack models (9U<sup>4</sup>) x 29" deep</b> / supported in NetBAY™ Racks (such as NetBAY42 ER)<br>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  |                         |                          |                                 |                                       |                         |                      |                          |                      |                |

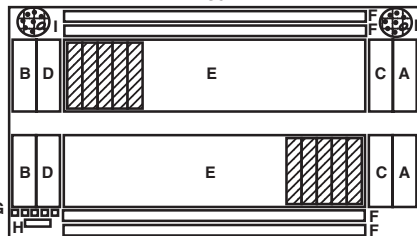
|  |         |  |         |
|--|---------|--|---------|
| 1U 17" Flat Panel Monitor Console Kit (with kybd/monitor)      | 17231UX | BladeCenter H 2900W Power Module pair with Fan Packs             | 31R3335 |
| 2U 17" Flat Panel Monitor Console Kit (with kybd/monitor)      | 17232UX | IBM Advanced Management 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                         | 25R5806 |
| 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](http://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 WARRANTY<sup>3</sup>

- ⇨ 3 year parts and labor
- ⇨ International Warranty Service<sup>3</sup>
- ⇨ On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time<sup>7</sup>
- ⇨ On site service upgrade options (in eligible locations):<sup>7</sup>
  - 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>
- ⇨ 24x7<sup>14</sup> toll-free support for warranty issues during the warranty

| IBM® Type-model | Processor GHz¹ | L2 cache  | FSB MHz | Memory | Disk controller | Disk controller | Disk bays | SCSI Support with optional stor exp unit | slots x bays | Mechanical | Ethernet    | Available date |
|-----------------|----------------|-----------|---------|--------|-----------------|-----------------|-----------|--|--------------|------------|-------------|----------------|
| 8843-L1y-L1x    | 1 x Xeon™2     | 8LV1MB    | 800     | 512MB  | None            | Ultra320        | 2-fixed   | 2 Hot-swap Ultra320                      | 0 x 2        | 7U blade   | 2 x Gigabit | Feb 2005       |
| 8843-J1y-J1x    | 1 x Xeon       | 2.8LV 2MB | 800     | 1GB    | None            | Ultra320        | 2-fixed   | 2 Hot-swap Ultra320                      | 0 x 2        | 7U blade   | 2 x Gigabit | Feb 2005       |
| 8843-M5y-M5x    | 1 x Xeon       | 3.0LV 2MB | 800     | 1GB    | None            | Ultra320        | 2-fixed   | 2 Hot-swap Ultra320                      | 0 x 2        | 7U blade   | 2 x Gigabit | Feb 2005       |
| 8843-25y-25x    | 1 x Xeon       | 3.2 2MB   | 800     | 1GB    | None            | Ultra320        | 2-fixed   | 2 Hot-swap Ultra320                      | 0 x 2        | 7U blade   | 2 x Gigabit | Mar 2005       |
| 8843-E2y-E2x    | 1 x Xeon       | 3.2 2MB   | 800     | 2GB    | 36GB            | Ultra320        | 2-fixed   | 2 Hot-swap Ultra320                      | 0 x 2        | 7U blade   | 2 x Gigabit | Mar 2005       |
| 8843-35y-35x    | 1 x Xeon       | 3.4 2MB   | 800     | 1GB    | None            | Ultra320        | 2-fixed   | 2 Hot-swap Ultra320                      | 0 x 2        | 7U blade   | 2 x Gigabit | Mar 2005       |
| 8843-45y-45x    | 1 x Xeon       | 3.6 2MB   | 800     | 1GB    | None            | Ultra320        | 2-fixed   | 2 Hot-swap Ultra320                      | 0 x 2        | 7U blade   | 2 x Gigabit | Mar 2005       |
| 8843-25y-25x    | 1 x Xeon       | 3.2 2MB   | 800     | 1GB    | None            | Ultra320        | 2-fixed   | 2 Hot-swap Ultra320                      | 0 x 2        | 7U blade   | 2 x Gigabit | Mar 2005       |
| 8843-05y-05x    | 1 x Xeon       | 2.8 2MB   | 800     | 1GB    | 36GB            | Ultra320        | 2-fixed   | 2 Hot-swap Ultra320                      | 0 x 2        | 7U blade   | 2 x Gigabit | Sep 2005       |
| 8843-55y-55x    | 1 x Xeon       | 3.8 2MB   | 800     | 1GB    | None            | Ultra320        | 2-fixed   | 2 Hot-swap Ultra320                      | 0 x 2        | 7U blade   | 2 x Gigabit | Sep 2005       |
| 8843-E7y-E7x    | 1 x Xeon       | 2.8 2MB   | 800     | 512MB  | None            | Ultra320        | 2-fixed   | 2 Hot-swap Ultra320                      | 0 x 2        | 7U blade   | 2 x Gigabit | Sep 2005       |
| 8843-E9y-E9x    | 2 x Xeon       | 3.8 2x2MB | 800     | 4GB    | None            | Ultra320        | 2-fixed   | 2 Hot-swap Ultra320                      | 0 x 2        | 7U blade   | 2 x Gigabit | Sep 2005       |

|  |   |  |
|--|---|--|
| Processor(s)   | 1 or 2 x Intel® Xeon up to 3.8GHz with 800MHz frontside bus (FSB) / EM64T / 1-2MB L2 ECC Cache / Hyper-Threading technology / LIU, J1U and M5U: Features Low Voltage Processor for reduced heat output allowing greater rack population   |  |
| SMP - L2 Cache Implementation                                | 2-way SMP / up to two Xeon Processors (same speed/cache size) / 1 or 2MB std and 4MB max / at processor speed   |  |
| Memory   | 512MB/1GB std / 16GB <sup>13</sup> max / two slots used / two slots available / PC2-3200 400MHz CL2.5 ECC DDR2-SDRAM DIMMs / four 240 pin gold-conductor slots on systemboard / DIMMs must be installed in matched pairs [a bank] / 2-way memory interleave / dual channel / Chipkill™  |  |
| SCSI disk controller   | LSI Logic® 53C1020 SCSI controller / Single channel Ultra320 SCSI controller (LVD 320MB/sec) / on planar / 64-bit 100MHz PCI-X / supports RAID-1 & 1E mirroring / One 16-bit channel (one internal) / Internal channel: one 2-drop 16-bit 68-pin LVD SCSI cable   |  |
| SCSI Disk bays   | Two 2.5-inch Small Form Factor (SFF) Ultra320 internal fixed disk bays / Supports max of two hot-swap 3.5" SL Ultra320 SCSI disks in optional SCSI Storage Expansion Unit (80-pin SCA-2 connectors; all SCSI bays Ultra320-enabled) / Support for IBM TotalStorage™ solutions (including FASTT and NAS family of products)  |  |
| External Storage   |   |  |
| Mechanical Architecture/Chipset                              | 7U <sup>4</sup> Blade / Supported in IBM BladeCenter 8677-3XX or 8677-1XX/2XX (requires upgrade to 2000W power supply option 26K4816) Intel E7520 chipset / E7525 MCH (Memory Controller Hub) for PCI-Express bridge to PXH, ICH5R / PXH BUS supports PCI-X BUS / ICH5R supports USB (1.0) / LSI 1020 / Dual Broadcom 5704S / Low Pin Count Interface / NS PC87366 Super I/O off LPC interface  |  |
| BUS slots  | No PCI or PCI-X slots (expansion via modules or network-interface option connector)   |  |
| Ethernet   | Dual gigabit 10/100/1000 ethernet controller / Broadcom 5704S / two full gigabit ethernet MAC and PHY layer functions / chip on blade / PCI-X 64-bit 100MHz / full duplex / Wake on LAN® / PXE 2.0 Boot agent / Alert Standard Format 2.0 / Failover, adapter fault tolerance / Load balancing or teaming / one of the dual controllers connects to an optional, supported Ethernet switch or Optical Passthrough Module (the second controller requires a second optional switch or OPM) |  |
| Network Interface  | One connector for I/O expansion option / requires same interface modules in bays 3 and 4 of BladeCenter / all blades in a single BladeCenter must contain the same expansion card (or no expansion card) / ethernet and serial I/O expansion cards planned for future release <sup>20</sup>   |  |
| CD / Diskette / USB Kybd / video / mouse Graphics controller | None / requests for CD-ROM, diskette drive, and USB port in BladeCenter by pressing CD select button on front control panel / None / requests for keyboard, mouse, and video in BladeCenter by pressing the display button on front control panel / SVGA / ATI® Radeon™ 7000M on Planar / 16MB SDRAM std and max / 15 pin connector   |  |
| Systems Mgmt   | IBM Baseboard Management Controller (BMC) / H8S2168 / on blade / provides system and environmental monitoring, event recording, alert capability / RS-485 interface for intermanagement communication with BladeCenter Management module  | Xeon 2.8GHz/800/2MB L2 Cache EM64T Proc Upg 25R8878<br>Xeon 3.0GHz/800/2MB L2 Cache EM64T Proc Upg 25R8876<br>Xeon 3.2GHz/800/2MB L2 Cache EM64T Proc Upg 25R8877<br>Xeon 3.4GHz/800/2MB L2 Cache EM64T Proc Upg 13N0660<br>Xeon 3.6GHz/800/2MB L2 Cache EM64T Proc Upg 13N0696<br>Xeon 3.8GHz/800/2MB L2 Cache EM64T Proc Upg 13N0697 |
| Diagnostics  | Light Path Diagnostics™ (LED lights indicate failing component) and on-board diagnostics (via PC-Doctor in BIOS)  | 512MB (2x256) PC2-3200 ECC DDR2 73P3523<br>1GB (2x512) PC2-3200 CL3 ECC DDR2 39M5818<br>2GB (2x1GB) PC2-3200 CL3 ECC DDR2 RDIMM Kit 39M5809<br>4GB (2x2GB) PC2-3200 CL3 ECC DDR2 RDIMM Kit 39M5812<br>8GB (2x4GB) PC2-3200 CL3 ECC DDR2 RDIMM Kit 30R5145  |
| Security   | No security intrusion protection / Power-on password / administrator password / unattended boot / selectable boot / unattended start mode   | IBM 36.4GB 10K Ultra320 SCSI 2.5" SFF NHS HDD 40K1037<br>IBM 73GB 10K Ultra320 SCSI 2.5" SFF NHS HDD 40K1038<br>BladeCenter SCSI Storage Exp Unit 26K4817<br>BladeCenter SFF Fibre Channel Exp Card 26K4841<br>BladeCenter SFF Gigabit Ethernet Exp Card 26K4842   |
| Software ship group  | Documentation CD, Broadcom CD   |  |
| Cooling Fans   | 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   |  |

Other options at [ibm.com/pc/us/accessories](http://ibm.com/pc/us/accessories)

**Server blade (side view)**

- SCASI expansion connector
- opt CPU
- std CPU
- DIMM slot 1
- DIMM slot 2
- DIMM slot 3
- DIMM slot 4
- I/O expansion option connector

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

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

Maximum internal disk capacity for each HS20 blade server<sup>13</sup>:  
146GB with two 73GB SCSI disks (with BladeCenter SCSI Storage Expansion Unit 2 x 300GB for total of 746GB)

**LIMITED WARRANTY<sup>3</sup>**

- 3 year parts and labor
- International Warranty Service<sup>3</sup>
- On site, 8 am-5 pm, Mon-Fri excluding holidays, next business day response time
- On site service upgrade options (in eligible locations):<sup>7</sup>
  - 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>
- 24x7<sup>14</sup> toll-free support for warranty issues during the warranty period<sup>3</sup>

See footnotes for important warranty information

| IBM® Type-model | Processor | L2 cache | FSB MHz | Memory | Disk controller | Diskbays      | SCSI Support with optional stor exp unit | slots x bays | Mechanical        | Ethernet | Available date |             |          |
|-----------------|-----------|----------|---------|--------|-----------------|---------------|--|--------------|-------------------|----------|----------------|-------------|----------|
| 8843-0Ry-0Rx    | 1 x Xeon™ | 2.8      | 2MB     | 800    | 1GB             | 36GB Ultra320 | 2-fixed                                  | 2            | Hot-swap Ultra320 | 0 x 2    | 7U blade       | 2 x Gigabit | Mar 2006 |
| 8843-2Ry-2Rx    | 1 x Xeon  | 3.2      | 2MB     | 800    | 1GB             | None Ultra320 | 2-fixed                                  | 2            | Hot-swap Ultra320 | 0 x 2    | 7U blade       | 2 x Gigabit | Mar 2006 |
| 8843-3Ry-3Rx    | 1 x Xeon  | 3.4      | 2MB     | 800    | 1GB             | None Ultra320 | 2-fixed                                  | 2            | Hot-swap Ultra320 | 0 x 2    | 7U blade       | 2 x Gigabit | Mar 2006 |
| 8843-4Ry-4Rx    | 1 x Xeon  | 3.6      | 2MB     | 800    | 1GB             | None Ultra320 | 2-fixed                                  | 2            | Hot-swap Ultra320 | 0 x 2    | 7U blade       | 2 x Gigabit | Mar 2006 |
| 8843-5Ry-5Rx    | 1 x Xeon  | 3.8      | 2MB     | 800    | 1GB             | None Ultra320 | 2-fixed                                  | 2            | Hot-swap Ultra320 | 0 x 2    | 7U blade       | 2 x Gigabit | Mar 2006 |

|  |   |  |
|--|---|--|
| Processor(s)   | <b>1 or 2 x Intel® Xeon up to 3.8GHz with 800MHz frontside bus (FSB) / EM64T / 1-2MB L2 ECC Cache / Hyper-Threading technology / L1U, J1U and M5U:</b> Features <b>Low Voltage Processor</b> for reduced heat output allowing greater rack population   |  |
| SMP - L2 Cache Implementation                                | <b>2-way SMP</b> / up to two Xeon Processors (same speed/cache size) / <b>2MB</b> std and max / at processor speed  |  |
| Memory   | <b>512MB/1GB</b> std / <b>16GB</b> <sup>13</sup> max / two slots used / two slots available / <b>PC2-3200</b> 400MHz CL2.5 ECC DDR2-SDRAM DIMMs / four 240 pin gold-connector slots on systemboard / DIMMs must be installed in matched pairs [a bank] / 2-way memory interleave / dual-channel / Chipkill™   |  |
| SCSI disk controller   | <b>LSI Logic® 53C1020</b> SCSI controller / <b>Single channel Ultra320 SCSI controller</b> (LVD 320MB/sec) / on planar / 64-bit 100MHz PCI-X / supports <b>RAID-1 &amp; 1E mirroring</b> / One 16-bit channel (one internal) / <i>Internal channel:</i> one 2-drop 16-bit 68-pin LVD SCSI cable   |  |
| SCSI Disk bays   | <b>Two 2.5-inch Small Form Factor (SFF)</b> Ultra320 internal fixed disk bays / Supports max of two hot-swap 3.5" SL Ultra320 SCSI disks in optional SCSI Storage Expansion Unit (80-pin SCA-2 connectors; <b>all SCSI bays Ultra320-enabled</b> ) /  |  |
| External Storage   | Support for IBM TotalStorage™ solutions (including FAST and NAS family of products)   |  |
| Mechanical Architecture/Chipset                              | 7U <sup>4</sup> Blade / Supported in IBM BladeCenter 8677-3XX or 8677-1XX/2XX (requires upgrade to 2000W power supply option 26K4816) <b>Intel E7520 chipset</b> / E7525 MCH (Memory Controller Hub) for PCI-Express bridge to PXH, ICH5R / PXH BUS supports PCI-X BUS / ICH5R supports USB (1.0) / LSI 1020 / Dual Broadcom 5704S / Low Pin Count Interface / NS PC87366 Super I/O of LPC interface  |  |
| BUS slots  | No PCI or PCI-X slots (expansion via modules or network-interface option connector)   |  |
| Ethernet   | <b>Dual</b> gigabit 10/100/1000 ethernet controller / Broadcom 5704S / two full gigabit ethernet MAC and PHY layer functions / chip on blade / PCI-X 64-bit 100MHz / full duplex / Wake on LAN® / PXE 2.0 Boot agent / Alert Standard Format 2.0 / Failover, adapter fault tolerance / Load balancing or teaming / one of the dual controllers connects to an optional, supported Ethernet switch or <i>Optical Passthrough Module</i> (the second controller requires a second optional switch or OPM) |  |
| Network Interface  | <b>One connector for I/O expansion option</b> / requires same interface modules in bays 3 and 4 of BladeCenter / all blades in a single BladeCenter must contain the same expansion card (or no expansion card) / ethernet and serial I/O expansion cards planned for future release <sup>20</sup>  |  |
| CD / Diskette / USB Kybd / video / mouse Graphics controller | None / requests for CD-ROM, diskette drive, and USB port in BladeCenter by pressing CD select button on front control panel / requests for keyboard, mouse, and video in BladeCenter by pressing the display button on front control panel / SVGA / ATI® Radeon™ 7000M on Planar / 16MB SDRAM std and max / 15 pin connector  |  |
| Systems Mgmt   | <b>IBM Baseboard Management Controller (BMC)</b> / H8S2168 / on blade / provides system and environmental monitoring, event recording, alert capability / RS-485 interface for intermanagement communication with BladeCenter Management module   | Xeon 2.8GHz/800/2MB L2 Cache EM64T Proc Upg<br>Xeon 3.0GHz/800/2MB L2 Cache EM64T Proc Upg<br>Xeon 3.2GHz/800/2MB L2 Cache EM64T Proc Upg<br>Xeon 3.4GHz/800/2MB L2 Cache EM64T Proc Upg<br>Xeon 3.6GHz/800/2MB L2 Cache EM64T Proc Upg<br>Xeon 3.8GHz/800/2MB L2 Cache EM64T Proc Upg |
| Diagnostics  | <b>Light Path Diagnostics™</b> (LED lights indicate failing component) and on-board diagnostics (via PC-Doctor in BIOS)   | 13N0660<br>13N0696<br>13N0697  |
| Security   | No security intrusion protection / Power-on password / administrator password / unattended boot / selectable boot / unattended start mode   | 73P3523<br>39M5818<br>39M5809<br>39M5812<br>30R5145  |
| Software ship group  | Documentation CD, Broadcom CD   | IBM 36.4GB 10K Ultra320 SCSI 2.5" SFF NHS HDD<br>IBM 73GB 10K Ultra320 SCSI 2.5" SFF NHS HDD   |
| Cooling Fans   | Uses cooling from BladeCenter (types 8677, 8852 and 8720) / thermal sensors on each processor and BladeCenter modules and front panel   | BladeCenter SCSI Storage Exp Unit<br>BladeCenter SFF Fibre Channel Exp Card<br>BladeCenter SFF Gigabit Ethernet Exp Card   |
| 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  | 26K4817<br>26K4841<br>26K4842  |

Other options at [ibm.com/pc/us/accessories](http://ibm.com/pc/us/accessories)

**Server blade (side view)**

- SCSi expansion connector
- opt CPU
- std CPU
- DIMM slot 1
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- DIMM slot 4
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- Stealth black front bezel
- H 9.7" x W 1.14" x D 17.6"; H 24.5cm x W 2.9cm x D 44.6cm
- 12 lbs; 5.4kg (max configuration)
- Configuration/Setup Utility: F1 at startup
- Diagnostics (PC-Doctor™): F2 at startup
- System Partition Boot: ALT+F1 at startup
- Network Boot: F12 at startup
- PXE Boot Agent Utility: Ctrl+S at startup
- Blade control panel on each HS20 blade server provides media select button, keyboard/mouse/video select button, and indicators for blade error, information, location, disk activity, and power
- Predictive Failure Analysis® alerts on memory, processor(s), and optional disk(s) with IBM Director

*Maximum internal disk capacity for each HS20 blade server<sup>13</sup>:*  
146GB with two 73GB SCSI disks (with BladeCenter SCSI Storage Expansion Unit 2 x 300GB for total of 746GB)

**LIMITED WARRANTY<sup>3</sup>**

- 3 year parts and labor
- International Warranty Service<sup>3</sup>
- On site, 8 am-5 pm, Mon-Fri excluding holidays, next business day response time
- On site service upgrade options (in eligible locations):<sup>7</sup>
  - 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>
- 24x7<sup>14</sup> toll-free support for warranty issues during the warranty period<sup>3</sup>

See footnotes for important warranty information



# IBM BladeCenter® HS20 (7981)

xREF by STG Field Skills and Education Team

| IBM® Type-model | Processor | GHz <sup>1</sup> | L2 cache | FSB MHz | Memory | Disk | Disk controller | Disk bays | SCSI Support w/ opt. storage exp unit | slots x bays | Mechanical   | Ethernet    | Available date |
|-----------------|-----------|------------------|----------|---------|--------|------|-----------------|-----------|---------------------------------------|--------------|--------------|-------------|----------------|
| 7981-2Fy        | 1 x Xeon™ | 1.67             | 2MB      | 667     | 1GB    | Open | SAS             | 2-fixed   | Not Supported                         | 1 x 2        | single blade | 2 x Gigabit | Mar 2006       |
| 7981-3Fy        | 1 x Xeon  | 2.0              | 2MB      | 667     | 1GB    | Open | SAS             | 2-fixed   | Not Supported                         | 1 x 2        | single blade | 2 x Gigabit | Mar 2006       |

|   |  |  |  |  |  |  |  |  |  |  |   |  |   |
|---|--|--|--|--|--|--|--|--|--|--|---|--|---|
| Processor(s)                              | <b>1 or 2 x Dual-Core Intel® Xeon LV up to 2.0 GHz with 667 MHz frontside bus (FSB) / 2MB L2 ECC Shared Advanced Transfer Cache Architecture / Features Ultra Low Voltage Processor (31 watt) with Enhanced Intel SpeedStep® Technology for reduced power consumption and heat output allowing greater rack population</b>   |  |  |  |  |  |  |  |  |  |   |  |   |
| SMP - L2 Cache Implementation             | <b>2-way SMP / up to two Xeon LV Processors (same speed/cache size) / 2MB cache std and max / at processor speed</b><br>Systemboard contains two Intel 478-pin micro-FCPGA ZIF sockets, four DIMM slots, one SCSI expansion connector, one I/O expansion option connector, integrated graphics and dual Gigabit ethernet   |  |  |  |  |  |  |  |  |  |   |  |   |
| Memory                                    | <b>1GB std / 16GB<sup>13</sup> max / two slots used / two slots available / PC2-3200 400MHz CL2.5 ECC DDR2-SDRAM RDIMMs / four 240 pin gold-connector slots on systemboard / 2-way memory interleave / DIMMs must be installed in matched pairs [a bank] / dual-channel / Chipkill / hot-spare Memory and Memory Mirroring support</b>   |  |  |  |  |  |  |  |  |  |   |  |   |
| Disk controller                           | <b>LSI Logic® 1064 SAS controller on planar (3.0Gb/sec) / Dual Internal channels / supports RAID-0 &amp; 1 mirroring</b>   |  |  |  |  |  |  |  |  |  |   |  |   |
| Disk bays                                 | <b>Two 2.5-inch Small Form Factor (SFF) SAS internal fixed disk bays / 0GB Std / 146.8GB max</b>   |  |  |  |  |  |  |  |  |  |   |  |   |
| External Storage                          | Support for IBM TotalStorage™ solutions (including DS and NAS family of products)  |  |  |  |  |  |  |  |  |  |   |  |   |
| Mechanical Architecture/Chipset           | Single slot blade / Supported in IBM BladeCenter 8677, 8720, 8730, and 8852<br><b>Intel E7520 chipset</b> / MCH (Memory Controller Hub) for high-speed memory and PCI-Express / PXH-V BUS supports PCI-E to PCI-X Bridge, dual GB Ethernet and 1 PCI-X bus segment for daughter card / ICH-S supports USB (1.0), on-blade service processor, PCI-X Bus Interface to LSI1064 and ATI Radeon 7000M / Dual Broadcom 5704S   |  |  |  |  |  |  |  |  |  |   |  |   |
| BUS slots                                 | No external PCI or PCI-X slots (expansion via modules or network-interface option connector)   |  |  |  |  |  |  |  |  |  |   |  |   |
| Ethernet                                  | <b>Dual gigabit 10/100/1000 ethernet controller / Broadcom 5704S / two full gigabit ethernet MAC and PHY layer functions / chip on blade / PCI-X 64-bit 133MHz / full duplex / Wake on LAN® / PXE 2.0 Boot agent / Alert Standard Format 2.0 / Failover, adapter fault tolerance / Load balancing or teaming / one of the dual controllers connects to an optional, supported Ethernet switch or Optical Passthrough Module (the second controller requires a second optional switch or OPM)</b> |  |  |  |  |  |  |  |  |  |   |  |   |
| Network Interface                         | <b>One connector for I/O expansion option / requires same interface modules in bays 3 and 4 of BladeCenter / all blades in a single BladeCenter must contain the same expansion card (or no expansion card) / ethernet and serial I/O expansion cards planned for future release<sup>20</sup></b>  |  |  |  |  |  |  |  |  |  |   |  |   |
| DVD / Diskette / USB Kybd / video / mouse | None / requests for DVD-ROM, diskette drive, and USB port in BladeCenter by pressing 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<br>SVGA / ATI® Radeon™ 7000M on Planar / 16MB SDRAM std and max / 15 pin connector   |  |  |  |  |  |  |  |  |  |   |  |   |
| Systems Mgmt                              | <b>IBM Baseboard Management Controller (BMC) / H8S2168 / on blade / provides system and environmental monitoring, event recording, alert capability / RS-485 interface for intermanagement communication with BladeCenter Management module</b>  |  |  |  |  |  |  |  |  |  | Dual-Core Intel Xeon Processor LV 1.67 GHz Proc Upg 25F8887 |  | 25F8888   |
| Diagnostics                               | <b>Light Path Diagnostics™</b> (LED lights indicate failing component) and on-board diagnostics (via PC-Doctor in BIOS)  |  |  |  |  |  |  |  |  |  | Dual-Core Intel Xeon Processor LV 2.0 GHz Proc Upg 25R8888  |  | 39M5818   |
|   |  |  |  |  |  |  |  |  |  |  | 1GB (2x512MB Kit) PC2-3200 CL3 ECC DDR2 SDRAM RDIMM 39M5809 |  | 39M5812   |
|   |  |  |  |  |  |  |  |  |  |  | 2GB (2x1GB Kit) PC2-3200 CL3 ECC DDR2 SDRAM RDIMM 39M5812   |  | 30R5145   |
|   |  |  |  |  |  |  |  |  |  |  | 4GB (2x2GB Kit) PC2-3200 CL3 ECC DDR2 SDRAM RDIMM 26K5776   |  | 26K5777   |
|   |  |  |  |  |  |  |  |  |  |  | 8GB (2x4GB Kit) PC2-3200 CL3 ECC DDR2 SDRAM RDIMM 39R5812   |  | 39R5824   |
| Security                                  | No security intrusion protection / Power-on password / administrator password / unattended boot / selectable boot / unattended start mode  |  |  |  |  |  |  |  |  |  | BladeCenter SFF Fibre Channel Exp Card 26K4841              |  | IBM BladeCenter SFF Gigabit Ethernet Expansion Card 39R8624 |
| Software ship group                       | Documentation CD, Broadcom CD  |  |  |  |  |  |  |  |  |  | IBM BladeCenter SFF Gigabit Ethernet Expansion Card 26K4842 |  |   |
| 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) operating system  |  |  |  |  |  |  |  |  |  |   |  |   |

**Server blade (side view)**

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

Bay ★ 2.5", 6.35cm, no front access  
Bay ♀ 2.5", 6.35cm, no front access

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

*Maximum internal disk capacity for each HS20 LV blade server<sup>13</sup>:*  
146GB with two 73GB SAS disks

**LIMITED WARRANTY<sup>3</sup>**

**3 year parts and labor International Warranty Service<sup>3</sup>**  
On site, 8 am-5 pm,  
**Mon-Fri excluding holidays, next business day response time**  
On site service upgrade options (in eligible locations):<sup>7</sup>

- **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>  
**24x7<sup>14</sup> toll-free support for warranty issues during the warranty period<sup>3</sup>**

See footnotes for important warranty information

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| IBM® Type-model  | Processor  | GHz <sup>1</sup> | L2 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      | 4MB     | 1067  | 65W    | 1GB             | SAS       | 2-fixed         | MIO/SIO/PCIE/U | up to 2   | single slot blade | 2 x Gigabit    | Aug 2006 |
| 8853-L2x   | 1 x Xeon   | 5120             | 1.86     | 4MB     | 1067  | 65W    | 1GB             | SAS       | 2-fixed         | MIO/SIO/PCIE/U | up to 2   | single slot blade | 2 x Gigabit    | Aug 2006 |
| 8853-L3x   | 1 x Xeon   | 5130             | 2.0      | 4MB     | 1333  | 65W    | 1GB             | SAS       | 2-fixed         | MIO/SIO/PCIE/U | up to 2   | single slot blade | 2 x Gigabit    | Aug 2006 |
| 8853-L4x   | 1 x Xeon   | 5140             | 2.33     | 4MB     | 1333  | 65W    | 1GB             | SAS       | 2-fixed         | MIO/SIO/PCIE/U | up to 2   | single slot blade | 2 x Gigabit    | Aug 2006 |
| 8853-L5x   | 1 x Xeon   | 5150             | 2.66     | 4MB     | 1333  | 65W    | 1GB             | SAS       | 2-fixed         | MIO/SIO/PCIE/U | up to 2   | single slot blade | 2 x Gigabit    | Aug 2006 |
| 8853-L6x   | 1 x Xeon   | 5160             | 3.0      | 4MB     | 1333  | 80W    | 1GB             | SAS       | 2-fixed         | MIO/SIO/PCIE/U | up to 2   | single slot blade | 2 x Gigabit    | Aug 2006 |
| Processor(s)   | 1 x Intel® Xeon up to 1.6GHz with 1067MHz FSB / 1 x Intel Xeon up to 3.0GHz with 1333MHz FSB / EM64T / 4MB L2 ECC Cache / Dual Core / Hyper-Threading technology   |                  |          |         |       |        |                 |           |                 |                |   |                   |                |          |
| SMP - L2 Cache Implementation                                | 2-way SMP / up to two Xeon Processors (same speed/cache size) / 4MB std and max / at processor speed<br>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   | 1GB std / 16GB <sup>13</sup> 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 2.5-inch 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)<br>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® / 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<br>None / requests for keyboard, mouse, and video in BladeCenter by pressing the display button on front control panel<br>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   |                  |          |         |       |        |                 |           |                 |                | Xeon 1.6GHz/1066/4MB L2 Cache EM64T ProcUpg 40K1225<br>Xeon 1.86GHz/1066/4MB L2 Cache EM64T ProcUpg 40K1226<br>Xeon 2.0GHz/1333/4MB L2 Cache EM64T ProcUpg 40K1227<br>Xeon 2.33GHz/1333/4MB L2 Cache EM64T ProcUpg 40K1228<br>Xeon 2.66GHz/1333/4MB L2 Cache EM64T ProcUpg 40K1230<br>Xeon 3.0GHz/1333/4MB L2 Cache EM64T ProcUpg 40K1229   |                   |                |          |
| 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  |                  |          |         |       |        |                 |           |                 |                | IBM 36GB NHS 2.5" SFF SAS HDD 26K5776<br>IBM 73GB NHS 2.5" SFF SAS HDD 26K5777<br>BladeCenter Storage and I/O Expansion Blade 39R7563<br>BladeCenter Memory and I/O Expansion Blade 42C1600<br>BladeCenter SFF Fibre Channel Expansion Card 26K4841<br>BladeCenter SFF Gigabit Ethernet Expansion Card 39R8624<br>QLogic iSCSI Expansion Card for BladeCenter 32R1923<br>Cisco 4X InfiniBand Switch Module for BladeCenter 32R1756<br>Cisco 4X InfiniBand Expansion Card for BladeCenter 32R1760<br>QLogic 4GB SFF Fibre Channel Expansion Card for BladeCenter 26R0890<br>Emulex 4GB SFF Fibre Channel Expansion Card for BladeCenter 39Y9186<br>Other options at <a href="http://ibm.com/pcl/us/accessories">ibm.com/pcl/us/accessories</a> |                   |                |          |
| 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)<br>Monitor, keyboard, mouse for setup; ethernet switch module, disk, BladeCenter (types 8677, 8720, 8730, 8852), operating system   |                  |          |         |       |        |                 |           |                 |                |   |                   |                |          |

**Server blade (side view)**

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

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

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

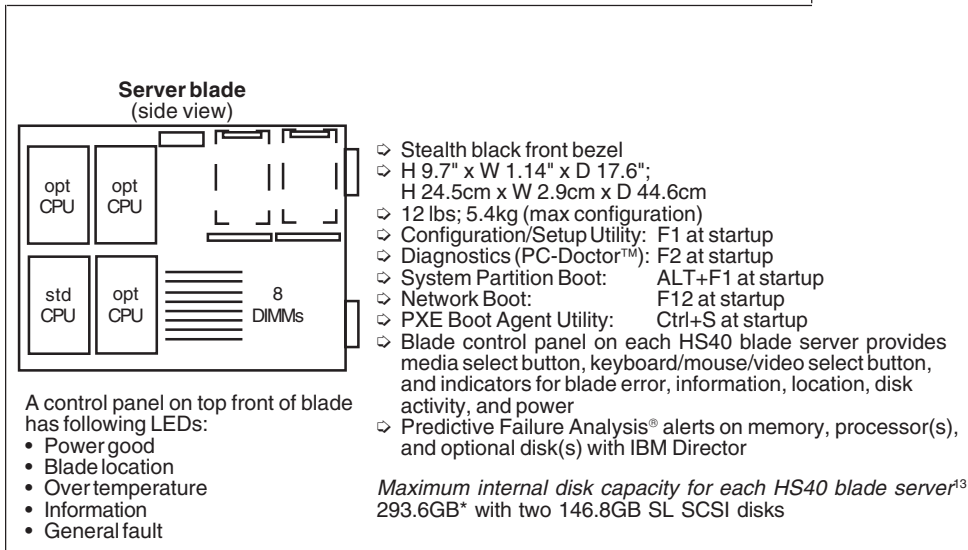
- Stealth black front bezel
- H 9.7" x W 1.14" x D 17.6"; H 24.5cm x W 2.9cm x D 44.6cm
- 12 lbs; 5.4kg (max configuration)
- Configuration/Setup Utility: F1 at startup
- Diagnostics (PC-Doctor™): F2 at startup
- System Partition Boot: ALT+F1 at startup
- Network Boot: F12 at startup
- PXE Boot Agent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

Maximum internal disk capacity for each HS21 blade server<sup>13</sup>:  
146GB with two 73GB SAS disks (with BladeCenter Storage Expansion Unit 3 x 146GB for total of 584GB)

**LIMITED WARRANTY<sup>3</sup>**

- 3 year parts and labor
- International Warranty Service<sup>3</sup>
- On site, 8 am-5 pm, Mon-Fri excluding holidays, next business day response time
- On site service upgrade options (in eligible locations):<sup>7</sup>
  - 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>
- 24x7<sup>14</sup> toll-free support for warranty issues during the warranty period<sup>3</sup>

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



**LIMITED WARRANTY<sup>3</sup>**

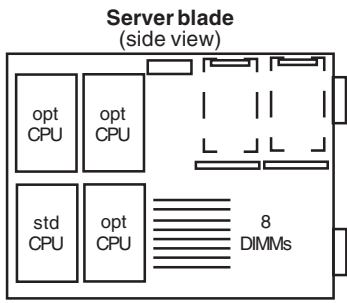
- 3 year parts and labor
- International Warranty Service<sup>3</sup>
- On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time<sup>7</sup>
- On site service upgrade options (in eligible locations):<sup>7</sup>
  - 3 year IOR 24x7, 2 hr avg response (ServicePac® part num 69P9519)
  - 3 year IOR 24x7, 4 hr avg response (ServicePac part num 69P9518)
  - 3 year IOR 9x5, 4 hr avg response (ServicePac part num 69P9517)
  - 5 year IOR 9x5, 4 hr avg response (ServicePac part num 69P9525)
  - 5 year IOR 24x7, 2 hr avg response (ServicePac part num 69P9527)
  - Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- 24x7<sup>14</sup> toll-free support for warranty issues during the warranty period<sup>5</sup>

See footnotes for important warranty information

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

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

|   |  |  |  |  |  |   |  |  |  |  |
|---|--|--|--|--|--|---|--|--|--|--|
| Positioning Processor(s) L2/L3 cache SMP support Implementation | <i>Ultra-dense, highly manageable modular computing platform with superior 4-way performance</i><br><b>1 x Intel® Xeon MP up to 3.0GHz</b> with 400MHz frontside bus / Hyper-Threading technology / NetBurst™ microarchitecture<br><b>512KB L2 Cache / Up to 4MB L3 Cache</b> / on die of processor / at processor speed<br><b>4-way SMP</b> / up to four Xeon MP Processors (same speed/cache size)<br>Server blade contains four Intel 604-pin micro-PGA ZIF sockets, eight memory DIMM slots, one SCSI expansion unit connector, two I/O expansion option connectors, integrated graphics and four ethernet ports |  |  |  |  |   |  |  |  |  |
| Memory  | <b>Up to 2GB</b> std / 16GB max <sup>13</sup> / 51X: two slots used 61X/71X: four slots used / eight total slots<br><b>PC2100</b> 266MHz registered 184-pin ECC DDR-SDRAM DIMMs / eight DIMM gold-connector slots on systemboard / DIMMs must be installed in matched pairs [a bank] / 2-way memory interleave / dual channel / memory bus runs at 2 x 100MHz / <b>Error Checking and Correcting (ECC)</b> via <b>16-bit Checksum Chipkill™</b> (corrects 1, 2, 3, or 4-bit errors on same chip and detects 2- through 8-bit errors contained in two chips) / memory can be mixed                                    |  |  |  |  |   |  |  |  |  |
| SCSI disk controller  | None / <b>supports optional SCSI Storage Expansion Unit</b> (a blade occupying adjacent blade slot / connects to HS40 via one connector / LSI Logic® 53C1020 Ultra320 SCSI controller [LVD 320MB/sec] / 64-bit 133MHz PCI-X Bus B from CIOB-ES I/O Bridge (IMB2 bus to Host Bridge) / supports <b>RAID-1 mirroring</b> [Embedded Mirroring] with two hot-swap 3.5" one-inch high SL SCSI disks in front bays / one 16-bit internal channel / no cables or external connector)  |  |  |  |  |   |  |  |  |  |
| SCSI disk bays  | Supports max of two hot-swap 3.5" SL Ultra320 SCSI disks in optional SCSI Storage Expansion Unit / 80-pin SCA-2 connectors / <b>all SCSI bays Ultra320-enabled</b>   |  |  |  |  |   |  |  |  |  |
| External storage  | Support for IBM TotalStorage™ solutions (including FASiT and NAS family of products)   |  |  |  |  |   |  |  |  |  |
| Mechanical Architecture / chipsets                              | Supported in IBM BladeCenter (type 8677) / BladeCenter supported in 28" deep racks such as the IBM NetBAY™ Rack products <b>ServerWorks® Grand Champion™ 4.0 LE</b> / CMIC-LE5 Host Bridge (memory controller and I/O Bridge) / double slot one CIOB-X2 I/O Bridge (IMB2 bus to Host Bridge) for two PCI-X Buses with Bus A for ethernet and Bus B for ethernet and the I/O expansion option connector / CSB6 South Bridge (Thin IMB to Host Bridge) for EIDE, USB, LPC bus to Super I/O, and PCI 2.2 Bus C with graphics controller / National Semiconductor® PC87417 Super I/O chip                                |  |  |  |  |   |  |  |  |  |
| Bus slots   | No PCI or PCI-X slots (expansion via modules or network-interface option connector)  |  |  |  |  |   |  |  |  |  |
| Ethernet controllers  | Four gigabit 10/100/1000 ethernet controllers / Intel 82545GM/82546EB / on blade / two PCI-X 64-bit 100MHz buses / full duplex / Wake on LAN® / Alert Standard Format 1.0 / teaming and failover support / one of the controllers connects to an optional 4-port GB Ethernet Switch Module (the second controller requires a second optional Ethernet Switch Module)   |  |  |  |  |   |  |  |  |  |
| Network-interface   | <b>One connector for I/O expansion option</b> / requires same interface modules in bays 3 and 4 of BladeCenter / all blades in a single BladeCenter must contain the same expansion card (or no expansion card)  |  |  |  |  |   |  |  |  |  |
| CD / diskette / USB   | None / requests for CD-ROM, diskette drive, and USB port in BladeCenter by pressing CD select button on front control panel  |  |  |  |  |   |  |  |  |  |
| Kybd / video / mouse Graphics                                   | None / requests for keyboard, mouse, and video in BladeCenter by pressing the display button on front control panel<br>SVGA / ATI® Radeon 7000 / on blade / 8MB SDRAM std/max / 32-bit 33MHz PCI 2.2 bus   |  |  |  |  |   |  |  |  |  |
| Systems mgmt  | <b>Intel integrated Baseboard Management Controller (BMC)</b> / on blade / provides system and environmental monitoring, event recording, alert capability / RS-485 interface for communication with BladeCenter management module   |  |  |  |  |   |  |  |  |  |
| Diagnostics   | <b>Light Path Diagnostics™</b> (LED lights indicate failing component) and on-board diagnostics (via PC-Doctor in BIOS)  |  |  |  |  |   |  |  |  |  |
| Security  | Power-on password / administrator password / unattended boot / selectable boot / unattended start mode   |  |  |  |  |   |  |  |  |  |
| Software ship group   | Documentation CD, IBM Director 4.1 CD, Device Driver CD  |  |  |  |  |   |  |  |  |  |
| Cooling fans  | Uses cooling from BladeCenter (types 8677, 8852 and 8720) / thermal sensors on each processor and BladeCenter modules and front panel  |  |  |  |  |   |  |  |  |  |
| Power supply Prerequisites                                      | Uses power module(s) in BladeCenter (types 8677, 8852 and 8720)<br>Monitor, keyboard, mouse for setup; ethernet switch module, disk, BladeCenter (types 8677, 8852 and 8720), operating system   |  |  |  |  |   |  |  |  |  |
|   |  |  |  |  |  | Xeon 2.2Ghz/2MB L3 Cache Proc Upg 13N0656<br>Xeon 2.7Ghz/2MB L3 Cache Proc Upg 13N0655<br>Xeon 3.0Ghz/4MB L3 Cache Proc Upg 13N0654<br>512MB PC2100 CL2.5 ECC DDR-SDRAM DIMM 33L5038<br>1GB PC2100 CL2.5 ECC DDR-SDRAM RDIMM 33L5039<br>2GB PC2100 CL2.5 ECC DDR-SDRAM RDIMM 33L5040<br>IBM HS40 SCSI Storage Expansion Unit (blade) 26K4847<br>IBM HS40 Fibre Channel Expansion Card (with two ports; each port requires a FC Switch Module) 48P7061<br>36.4GB 15K Ultra160 SCSI Hot-Swap SL HDD* 06P5768<br>36.4GB 15K Ultra320 SCSI Hot-Swap SL HDD* 06P5776<br>73.4GB 10K Ultra160 SCSI Hot-Swap SL HDD* 06P5756<br>146.8GB 10K Ultra320 SCSI Hot-Swap SL HDD* 32P0728<br>* Disk requires SCSI Storage Expansion Unit |  |  |  |  |



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

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

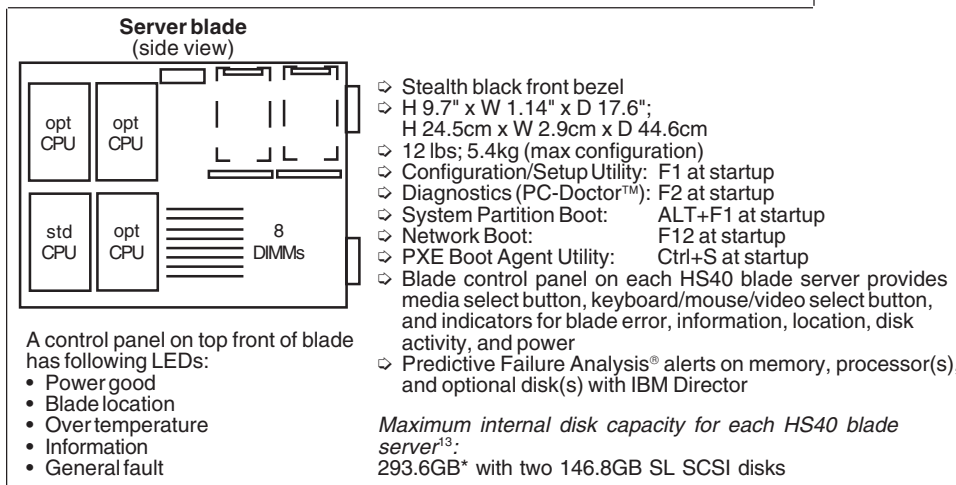
- ▷ Stealth black front bezel
  - ▷ H 9.7" x W 1.14" x D 17.6"; H 24.5cm x W 2.9cm x D 44.6cm
  - ▷ 12 lbs; 5.4kg (max configuration)
  - ▷ Configuration/Setup Utility: F1 at startup
  - ▷ Diagnostics (PC-Doctor™): F2 at startup
  - ▷ System Partition Boot: ALT+F1 at startup
  - ▷ Network Boot: F12 at startup
  - ▷ PXE Boot Agent Utility: Ctrl+S at startup
  - ▷ Blade control panel on each HS40 blade server provides media select button, keyboard/mouse/video select button, and indicators for blade error, information, location, disk activity, and power
  - ▷ Predictive Failure Analysis® alerts on memory, processor(s), and optional disk(s) with IBM Director
- Maximum internal disk capacity for each HS40 blade server<sup>13</sup>: 600GB\* with two 300GB SL SCSI disks

**LIMITED WARRANTY<sup>3</sup>**

- ↪ 3 year parts and labor
- ↪ International Warranty Service<sup>3</sup>
- ↪ On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time<sup>7</sup>
- ↪ On site service upgrade options (in eligible locations):<sup>7</sup>
  - 3 year IOR 24x7, 2 hr avg response (ServicePac® part num 69P9519)
  - 3 year IOR 24x7, 4 hr avg response (ServicePac part num 69P9518)
  - 3 year IOR 9x5, 4 hr avg response (ServicePac part num 69P9517)
  - 5 year IOR 9x5, 4 hr avg response (ServicePac part num 69P9525)
  - 5 year IOR 24x7, 2 hr avg response (ServicePac part num 69P9527)
  - Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- ↪ 24x7<sup>14</sup> toll-free support for warranty issues during the warranty period<sup>5</sup>

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

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



**LIMITED WARRANTY<sup>3</sup>**

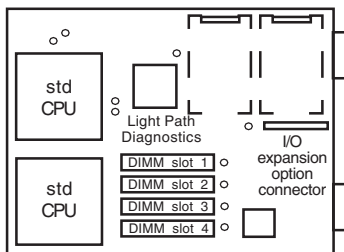
- 3 year parts and labor
- International Warranty Service<sup>3</sup>
- On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time<sup>7</sup>
- On site service upgrade options (in eligible locations):<sup>7</sup>
  - 3 year IOR 24x7, 2 hr avg response (ServicePac® part num 69P9519)
  - 3 year IOR 24x7, 4 hr avg response (ServicePac part num 69P9518)
  - 3 year IOR 9x5, 4 hr avg response (ServicePac part num 69P9517)
  - 5 year IOR 9x5, 4 hr avg response (ServicePac part num 69P9525)
  - 5 year IOR 24x7, 2 hr avg response (ServicePac part num 69P9527)
  - Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- 24x7<sup>14</sup> toll-free support for warranty issues during the warranty period<sup>5</sup>

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

| IBM® Type-model | Qty x Processor   | GHz¹ Core | L2 cache | Memory | Disk | Disk bays | Optional storage expansion unit | slots x bays | Mechanical  | Ethernet    | NEBS | Available date |
|-----------------|-------------------|-----------|----------|--------|------|-----------|---------------------------------|--------------|-------------|-------------|------|----------------|
| 8842-RTU        | 2 x PowerPC 970FX | 2.2       | SC 512KB | 2GB    | N/A  | None      | None                            | 0 x 0        | 9.5mm blade | 2 x Gigabit | Yes  | May 2006       |

|   |  |  |  |  |  |  |  |  |  |   |  |  |
|---|--|--|--|--|--|--|--|--|--|---|--|--|
| Positioning Processor(s)<br>L2 Cache<br>SMP support<br>Implementation | <b>The IBM BladeCenter server for reliability in mission-critical telecommunications environments</b><br>2 x IBM PowerPC™ 970FX up to 2.2GHz Single-Core / 64 bit<br>512KB L2 Cache<br>2-way SMP / with two PowerPC Processors (same speed/cache size)<br>Server blade contains two IBM PowerPC microprocessors soldered to planar, four DIMM slots, PCI-X, EIDE controller, Fibre Channel expansion card support and dual Gigabit ethernet  |  |  |  |  |  |  |  |  |   |  |  |
| Memory  | 2GB std (2x1GB) / 8GB <sup>13</sup> max / two slots used / two slots available / PC-2700 333MHz CL2.5 ECC DDR-SDRAM DIMMs / four DIMM gold-connector slots / DIMMs must be installed in matched pairs [a bank] / 2-way memory interleave / dual-channel  |  |  |  |  |  |  |  |  |   |  |  |
| IDE controller<br>Disk bays<br>External Storage                       | Enhanced IDE ATA-100 controller in AMD 8111 South Bridge<br>None (HDDs not supported in NEBS environment)<br>Support for IBM TotalStorage™ solutions (including FASTt and NAS family of products)  |  |  |  |  |  |  |  |  |   |  |  |
| Mechanical  | Single-wide Blade / NEBS Support in IBM BladeCenter T  |  |  |  |  |  |  |  |  |   |  |  |
| Architecture/Chipset  | IBM U3 Northbridge / AMD 8131 HyperTransport Tunnel and PCI-X Bridge / AMD 8111 Southbridge providing USB1.1 and IDE / Broadcom 5704S / NS PC87417 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® 5704S / two full gigabit ethernet MAC and PHY layer functions / chip on blade / PCI-X 64-bit 133MHz / full duplex / Wake on LAN™ / PXE 2.0 Boot agent / Alert Standard Format 2.0 / Failover, adapter fault tolerance / Load balancing or teaming / one of the dual controllers connects to an optional, supported Ethernet switch or Optical Passthrough Module (the second controller requires a second optional switch or OPM) |  |  |  |  |  |  |  |  |   |  |  |
| Network Interface   | One connector for I/O expansion option (Fibre Channel Expansion Card) / requires same interface modules in bays 3 and 4 of BladeCenter / all blades in a single BladeCenter must contain the same expansion card (or no expansion card)  |  |  |  |  |  |  |  |  |   |  |  |
| DVD / Diskette / USB<br>Kybd / video / mouse<br>Graphics controller   | None / requests for DVD-ROM, diskette drive, and USB port in BladeCenter by pressing media select button on front control panel<br>None<br>None  |  |  |  |  |  |  |  |  |   |  |  |
| Systems Mgmt  | IBM Integrated Service Processor / H82148 / 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  |  |  |  |  |  | 1GB PC-2700 ECC CL2.5 DDR RDIMM<br>2GB PC-2700 ECC CL2.5 DDR RDIMM<br>IBM BladeCenter T Advanced Management Module<br>IBM BladeCenter T Chassis (AC Version)<br>IBM BladeCenter T Chassis (DC Version)<br>IBM 1300W AC Power Supply (x2)<br>IBM 1300W DC Power Supply (x2) |  |  | 39M5839<br>39M5843<br>32R0835<br>87301RX<br>87201RX<br>32R0834<br>32R0833 |  |  |
| 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, IBM Director CD, Device Driver CD  |  |  |  |  |  | Other options at <a href="http://ibm.com/pc/us/accessories">ibm.com/pc/us/accessories</a>  |  |  |   |  |  |
| Cooling Fans  | Uses cooling from BladeCenter T (types 8730 and 8720) / thermal sensors on each processor and BladeCenter modules and front panel  |  |  |  |  |  |  |  |  |   |  |  |
| Power supply(s)<br>Prerequisites                                      | Uses power module(s) in BladeCenter T (types 8730 and 8720)<br>Monitor, keyboard, mouse for setup; ethernet switch module, FCC expansion card, BladeCenter T(types 8730 and 8720), operating system  |  |  |  |  |  |  |  |  |   |  |  |

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)
- ⇨ RTU 2-core 250W
- ⇨ 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 JS20 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

**LIMITED WARRANTY<sup>3</sup>**

- ⇨ 3 year parts and labor
- ⇨ International Warranty Service<sup>3</sup>
- ⇨ On site, 8 am-5 pm, Mon-Fri excluding holidays, next business day response time
- ⇨ On site service upgrade options (in eligible locations):<sup>7</sup>
  - 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>
- ⇨ 24x7<sup>14</sup> toll-free support for warranty issues during the warranty period<sup>3</sup>

| IBM® Type-model | Qty x Processor | GHz <sup>1</sup> | 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*             | SC   | 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       |

|   |   |  |  |  |  |  |  |  |  |   |  |  |
|---|---|--|--|--|--|--|--|--|--|---|--|--|
| 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)<br>L2 Cache<br>SMP support<br>Implementation           | 2 x IBM PowerPC™ 970MP up to 2.7GHz* Single-Core / up to 2.5GHz* Dual-Core / 64 bit<br>1MB L2 Cache per core<br>2-core or 4-core SMP / two PowerPC Processors (single core or dual core)<br>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 <sup>13</sup> 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-connector 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<br>SAS Disk bays<br>External Storage            | One integrated / IBM SAS controller / two port / on planar / 64-bit 133MHz PCI-X / supports RAID-0 & 1<br>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<br>Support for IBM TotalStorage™ solutions (including FASiT and NAS family of products)   |  |  |  |  |  |  |  |  |   |  |  |
| Mechanical<br>Architecture/Chipset<br>BUS slots                     | Single-wide Blade / Supported in IBM BladeCenter, IBM BladeCenter T** and IBM BladeCenter H<br>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<br>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® / 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<br>Kybd / video / mouse<br>Graphics controller | None / requests for DVD-ROM, diskette drive, and USB port in BladeCenter by pressing media select button on front control panel<br>None / requests for keyboard, mouse, and video in BladeCenter by pressing the display button on front control panel<br>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 PowerExecutive™ / HACMP   |  |  |  |  |  |  |  |  | 1GB (2x512MB) PC2-4200 ECC CL4 DDR2 RDIMM Kit 41Y2703<br>2GB (2x1GB) PC2-4200 ECC CL4 DDR2 RDIMM Kit 41Y2707<br>4GB (2x2GB) PC2-4200 ECC CL4 DDR2 RDIMM Kit 41Y2711<br>8GB (2x4GB) PC2-4200 ECC CL4 DDR2 RDIMM Kit 41Y2723<br>1GB (2x512MB) PC2-3200 ECC CL3 DDR2 RDIMM Kit 39M5821<br>2GB (2x1GB) PC2-3200 ECC CL3 DDR2 RDIMM Kit 39M5809<br>4GB (2x2GB) PC2-3200 ECC CL3 DDR2 RDIMM Kit 39M5812<br>8GB (2x4GB) PC2-3200 ECC CL3 DDR2 RDIMM Kit 41Y2703<br>IBM 36GB 10K SAS 2.5" SFF NHD HDD 26K5776<br>IBM 73GB 10K SAS 2.5" SFF NHD HDD 26K5777<br>QLogic 4GB SFF Fibre Channel Expansion Card for BladeCenter 26R0890<br>BladeCenter SFF Gigabit Ethernet Expansion Card for BladeCenter 39R8624<br>Cisco InfiniBand Expansion Card for BladeCenter 32R1896<br>Myrinet Expansion Card for BladeCenter 73P6000<br>Cisco 4X InfiniBand Switch Module for BladeCenter 32R1756<br>Cisco 4X InfiniBand Expansion Card for BladeCenter 32R1760<br>Other options at <a href="http://ibm.com/pc/us/accessories">ibm.com/pc/us/accessories</a> |  |  |
| 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<br>Cooling Fans                                 | Documentation CD, IBM Director CD, Device Driver CD<br>Uses cooling from BladeCenter (types 8677, 8852 and 8720) / thermal sensors on each processor and BladeCenter modules and front panel  |  |  |  |  |  |  |  |  |   |  |  |
| Power supply(s)<br>Prerequisites                                    | Uses power module(s) in BladeCenter (types 8677, 8852 and 8720)<br>Monitor, keyboard, mouse for setup; ethernet switch module, disk, BladeCenter (types 8677, 8852 and 8720), operating system  |  |  |  |  |  |  |  |  |   |  |  |

**Server blade (side view)**

- 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
- opt SFF disk

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

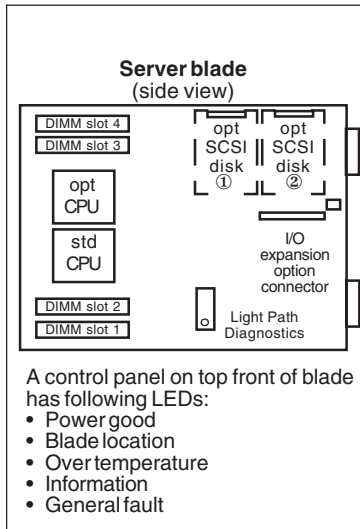
**Maximum internal disk capacity for each JS21 blade server<sup>13</sup>:**  
146GB with two 73GB SCSI disks (with BladeCenter Storage Expansion Unit 3 x 73GB for total of 219GB\*\*\*)

\*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 WARRANTY<sup>3</sup>**

- 3 year parts and labor
- International Warranty Service<sup>3</sup>
- On site, 8 am-5 pm, Mon-Fri excluding holidays, next business day response time
- On site service upgrade options (in eligible locations):<sup>7</sup>
  - 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>
- 24x7<sup>14</sup> toll-free support for warranty issues during the warranty period<sup>3</sup>

| IBM® Type-model  | Qty x Processor <sup>1</sup>   | Speed/Core | L2 Memory Cache | Disk controller | Disk bays | SCSI support  | Slots x bays | Mechanical            | Required chassis | Available date |
|--|--|------------|-----------------|-----------------|-----------|---|--------------|-----------------------|------------------|----------------|
| 8850-51U   | 1 x Opteron 246  | 2.0 GHz/SC | 1GB 1MB         | 0MB SCSI        | 2 fixed   | Two 2.5-inch SFF  | 0x2          | 7U <sup>4</sup> blade | BladeCenter      | Apr 2005       |
| 8850-55U   | 1 x Opteron 270  | 2.0 GHz/DC | 1GB 1MB         | 0MB SCSI        | 2 fixed   | Two 2.5-inch SFF  | 0x2          | 7U blade              | BladeCenter      | Apr 2005       |
| 8850-65U   | 1 x Opteron 275  | 2.2 GHz/DC | 1GB 1MB         | 0MB SCSI        | 2 fixed   | Two 2.5-inch SFF  | 0x2          | 7U blade              | BladeCenter      | Jul 2005       |
| 8850-71U   | 1 x Opteron 250  | 2.4 GHz/SC | 1GB 1MB         | 0MB SCSI        | 2 fixed   | Two 2.5-inch SFF  | 0x2          | 7U blade              | BladeCenter      | Apr 2005       |
| 8850-81U   | 1 x Opteron 252  | 2.6 GHz/SC | 2GB 1MB         | 0MB SCSI        | 2 fixed   | Two 2.5-inch SFF  | 0x2          | 7U blade              | BladeCenter      | Apr 2005       |
| Positioning Processor(s)<br>L2/L3 Cache<br>SMP support<br>Implementation | <b>Ultra-dense, low power, full performance modular computing platform with superior performance</b><br>Up to 2 x AMD® Opteron / 280 Dual Core 2.4GHz / 254 Single Core 2.8GHz / simultaneously supports 32-bit and 64-bit computing<br><b>1MB L2 Cache per core, AMD Direct Connect Architecture</b> ensures lower latency I/O<br><b>2-way SMP</b> / up to two Opteron processors (same speed/cache size)<br>Server blade contains two AMD 940 micro PGA ZIF sockets, four memory DIMM slots, two SCSI connectors, Myrinet and InfiniBand expansion card support, integrated graphics and dual ethernet |            |                 |                 |           |   |              |                       |                  |                |
| Memory   | <b>1 or 2GB std / 16GB max<sup>13</sup> / two slots used / two slots available</b><br><b>PC3200</b> 266MHz registered 184-pin ECC DDR VLP SDRAM RDIMMs / four DIMM gold-connector slots on systemboard<br>DIMMs must be installed in matched pairs [a bank] / 2-way memory interleave / dual channel<br><b>Error Checking and Correcting (ECC)</b> via <b>16-bit Checksum Chipkill™</b> (corrects 1, 2, 3, or 4-bit errors on same chip and detects 2- through 8-bit errors contained in two chips)  |            |                 |                 |           |   |              |                       |                  |                |
| IDE controller/bays<br>SCSI disk controller                              | None<br>One integrated / LSI Logic® 53C1020 Ultra320 SCSI controller [LVD 320MB/sec] / 64-bit 133MHz PCI-X Bus B / on planar / supports <b>RAID-1 mirroring</b> [Embedded Mirroring] with two non-hot-swap 2.5" / small form factor (SFF) drives / one 16-bit internal channel / no cables or external connector)  |            |                 |                 |           |   |              |                       |                  |                |
| SCSI disk bays   | Supports max of two not hot-swap 2.5" SL Ultra320 SCSI disks<br>40-pin SCA-2 connectors / <b>all SCSI bays Ultra320-enabled</b>  |            |                 |                 |           |   |              |                       |                  |                |
| Other controllers<br>External storage                                    | Support for SFF or legacy Ethernet or Fibre Channel I/O cards, Myrinet or InfiniBand Expansion cards<br>Support for IBM TotalStorage™ solutions (including FASTT and NAS family of products)   |            |                 |                 |           |   |              |                       |                  |                |
| Mechanical Architecture / chipsets                                       | Supported in IBM BladeCenter / BladeCenter supported in 28" deep racks such as the IBM NetBAY™ Rack products / <b>Alert 8131 PCI-X Bridge Chip</b> providing two PCI-X buses running at 600Mhz (bus A for SCSI and Ethernet, bus B for PCI-X expansion slots) / <b>AMD 8111 HyperTransport Bridge Chip</b> supporting a 200 Mhz double-pumped HyperTransport clock (PCI, SMBus, USB, LPC to BIOS and Super I/O) / National Semiconductor® PC87417 Super I/O chip   |            |                 |                 |           |   |              |                       |                  |                |
| Bus slots  | No PCI or PCI-X slots (expansion via modules or network-interface option connector)  |            |                 |                 |           |   |              |                       |                  |                |
| Ethernet controllers   | Two gigabit Ethernet controllers / Broadcom® BCM5704S / on blade / two PCI-X 64-bit 133MHz buses / full-duplex / Wake on LAN® / Alert Standard Format 1.0 / teaming and failover support / one of the dual controllers connects to an optional, supported Ethernet switch or <i>Passthrough Module</i> (the second controller requires a second optional switch or PM)   |            |                 |                 |           |   |              |                       |                  |                |
| Network-interface  | <b>One connector for I/O expansion option</b> (Fibre Channel Expansion Card) / requires same interface modules in bays 3 and 4 of BladeCenter / all blades in a single BladeCenter must contain the same expansion card (or no expansion card) / ethernet and serial I/O expansion cards planned for future release <sup>20</sup>  |            |                 |                 |           |   |              |                       |                  |                |
| DVD / diskette / USB<br>Kybd / video / mouse<br>Graphics                 | None / requests for DVD-ROM, diskette drive, and USB port in BladeCenter by pressing media select button on front control panel<br>None / requests for keyboard, mouse, and video in BladeCenter by pressing the display button on front control panel<br>SVGA / ATI® Radeon Mobility 7000M / on blade / 16MB SDRAM std/max / 32-bit 33MHz PCI 2.2 bus   |            |                 |                 |           |   |              |                       |                  |                |
| Systems mgmt   | <b>IBM integrated system management processor (ISMP) / H8S2148</b> / on blade / provides system and environmental monitoring, event recording, alert capability / RS-485 interface for communication with BladeCenter management module  |            |                 |                 |           | Low Power Opteron 246 Processor Upgrade 25R8891<br>Low Power Opteron 250 Processor Upgrade 25R8892<br>Low Power Opteron 252 Processor Upgrade 25R8893<br>Low Power Opteron 254 Processor Upgrade 25R8937<br>Low Power Opteron 270 Processor Upgrade 25R8894<br>Low Power Opteron 275 Processor Upgrade 25R8895<br>Low Power Opteron 280 Processor Upgrade 25R8896   |              |                       |                  |                |
| Diagnostics  | <b>Light Path Diagnostics™</b> (LED lights indicate failing component) and on-board diagnostics (via PC-Doctor in BIOS)  |            |                 |                 |           | 2GB (2x1GB kit) DDR-SDRAM VLP RDIMM 39M5849<br>4GB (2x2GB kit) DDR-SDRAM VLP RDIMM 39M5852<br>8GB (2x4GB kit) DDR-SDRAM VLP RDIMM 41Y2756<br>IBM 36.4GB SFF Non-hot-swap 10K SCSI HD 40K1037<br>IBM 73.4GB SFF Non-hot-swap 10K SCSI HD 40K1038<br>AMD Opteron LS20 Low Profile Handle 25R7748<br>BladeCenter SCSI Storage Exp Unit 26K4817<br>IBM SFF Fibre Channel Expansion Card 26K4841<br>IBM SFF Gigabit Ethernet Expansion Card 26K4842<br>IBM HS20 Fibre Channel Expansion Card 48P7061 |              |                       |                  |                |
| Security   | Power-on password / administrator password / unattended boot / selectable boot / unattended start mode   |            |                 |                 |           | Other options at <a href="http://ibm.com/pc/us/accessories">ibm.com/pc/us/accessories</a>   |              |                       |                  |                |
| Software ship group  | Documentation CD, IBM Director CD, Device Driver CD  |            |                 |                 |           |   |              |                       |                  |                |
| Cooling fans   | Uses cooling from BladeCenter (types 8677, 8852 and 8720) / thermal sensors on each processor and BladeCenter modules and front panel  |            |                 |                 |           |   |              |                       |                  |                |
| Power supply<br>Prerequisites  | Uses power module(s) in BladeCenter (types 8677, 8852 and 8720)<br>Monitor, keyboard, mouse for setup; ethernet switch module, disk, BladeCenter (types 8677, 8852 and 8720), operating system   |            |                 |                 |           |   |              |                       |                  |                |



- Bay ① 2.5", 9.5mm, no front access, optional SFF SCSI disk
  - Bay ② 2.5", 9.5mm, no front access, optional SFF SCSI 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
  - 11 lbs; 5.0kg (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 LS20 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 LS20 blade server<sup>13</sup>: 146GB with two 73.4GB SFF SCSI disks*

**LIMITED WARRANTY<sup>3</sup>**

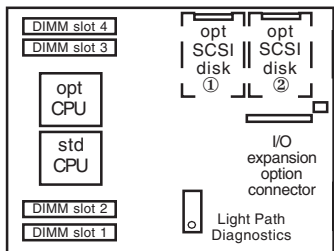
- 3 year parts and labor
- International Warranty Service<sup>3</sup>
- On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time<sup>7</sup>
- On site service upgrade options (in eligible locations):<sup>7</sup>
  - 3 year IOR 9x5, 4 hr avg response (ServicePac® part num 41C5906)
  - 3 year IOR 24x7, 4 hr avg response (ServicePac part num 41C5907)
  - 4 year IOR 9x5, 4 hr avg response (ServicePac part num 41C5908)
  - 4 year IOR 24x7, 4 hr avg response (ServicePac part num 41C5909)
  - 5 year IOR 9x5, 4 hr avg response (ServicePac part num 41C5910)
  - 5 year IOR 24x7, 4 hr avg response (ServicePac part num 41C5911)
  - Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- 24x7<sup>14</sup> toll-free support for warranty issues during the warranty period<sup>3</sup>

See footnotes for important warranty information  
US models announced May 3, 2005 and July 12, 2005



| IBM® Type-model   | Qty x Processor <sup>1</sup>  | Speed/Core | L2 Memory Cache | Disk controller | Disk bays | SCSI support     | Slots x bays | Mechanical | Required chassis   | Available date |
|---|---|------------|-----------------|-----------------|-----------|------------------|--------------|------------|--|----------------|
| 8850-56U  | 1 x Opteron 270   | 2.0 GHz/DC | 1GB 1MB         | 0MB SCSI        | 2 fixed   | Two 2.5-inch SFF | 0x2          | 7U blade   | BladeCenter  | Mar 2006       |
| 8850-66U  | 1 x Opteron 275   | 2.2 GHz/DC | 1GB 1MB         | 0MB SCSI        | 2 fixed   | Two 2.5-inch SFF | 0x2          | 7U blade   | BladeCenter  | Mar 2006       |
| 8850-72U  | 1 x Opteron 250   | 2.4 GHz/SC | 1GB 1MB         | 0MB SCSI        | 2 fixed   | Two 2.5-inch SFF | 0x2          | 7U blade   | BladeCenter  | Mar 2006       |
| 8850-76U  | 1 x Opteron 280   | 2.4 GHz/DC | 1GB 1MB         | 0MB SCSI        | 2 fixed   | Two 2.5-inch SFF | 0x2          | 7U blade   | BladeCenter  | Mar 2006       |
| 8850-82U  | 1 x Opteron 250   | 2.6 GHz/SC | 2GB 1MB         | 0MB SCSI        | 2 fixed   | Two 2.5-inch SFF | 0x2          | 7U blade   | BladeCenter  | Mar 2006       |
| 8850-92U  | 1 x Opteron 254   | 2.8 GHz/SC | 2GB 1MB         | 0MB SCSI        | 2 fixed   | Two 2.5-inch SFF | 0x2          | 7U blade   | BladeCenter  | Mar 2006       |
| Positioning Processor(s) L2/L3 Cache SMP support Implementation | <b>Ultra-dense, low power, full performance modular computing platform with superior performance</b><br>Up to 2 x AMD® Opteron / 280 Dual Core 2.4GHz / 254 Single Core 2.8GHz / simultaneously supports 32-bit and 64-bit computing<br><b>1MB L2 Cache per core, AMD Direct Connect Architecture</b> ensures lower latency I/O<br><b>2-way SMP</b> / up to two Opteron processors (same speed/cache size)<br>Server blade contains two AMD 940 micro PGA ZIF sockets, four memory DIMM slots, two SCSI connectors, Myrinet and InfiniBand expansion card support, integrated graphics and dual ethernet  |            |                 |                 |           |                  |              |            |  |                |
| Memory  | <b>1 or 2GB std</b> / 16GB max <sup>13</sup> / two slots used / two slots available<br><b>PC3200</b> 266MHz registered 184-pin ECC DDR VLP SDRAM RDIMMs / four DIMM gold-connector slots on systemboard<br>DIMMs must be installed in matched pairs [a bank] / 2-way memory interleave / dual channel<br><b>Error Checking and Correcting (ECC)</b> via <b>16-bit Checksum Chipkill™</b> (corrects 1, 2, 3, or 4-bit errors on same chip and detects 2- through 8-bit errors contained in two chips)  |            |                 |                 |           |                  |              |            |  |                |
| IDE controller/bays SCSI disk controller                        | None<br>One integrated / LSI Logic® 53C1020 Ultra320 SCSI controller [LVD 320MB/sec] / 64-bit 133MHz PCI-X Bus B / on planar / supports <b>RAID-1 mirroring</b> [Embedded Mirroring] with two non-hot-swap 2.5" / small form factor (SFF) drives / one 16-bit internal channel / no cables or external connector)   |            |                 |                 |           |                  |              |            |  |                |
| SCSI disk bays  | Supports max of two not hot-swap 2.5" SL Ultra320 SCSI disks<br>40-pin SCA-2 connectors / <b>all SCSI bays Ultra320-enabled</b>   |            |                 |                 |           |                  |              |            |  |                |
| Other controllers External storage                              | Support for SFF or legacy Ethernet or Fibre Channel I/O cards, Myrinet or InfiniBand Expansion cards<br>Support for IBM TotalStorage™ solutions (including FASiT and NAS family of products)  |            |                 |                 |           |                  |              |            |  |                |
| Mechanical Architecture / chipsets                              | Supported in IBM BladeCenter / BladeCenter supported in 28" deep racks such as the IBM NetBAY™ Rack products<br><b>AMD 8131 PCI-X Bridge Chip</b> providing two PCI-X buses running at 600Mhz (bus A for SCSI and Ethernet, bus B for PCI-X expansion slots) / <b>AMD 8111 HyperTransport Bridge Chip</b> supporting a 200 Mhz double-pumped HyperTransport clock (PCI, SMBus, USB, LPC to BIOS and Super I/O) / National Semiconductor® PC87417 Super I/O chip   |            |                 |                 |           |                  |              |            |  |                |
| Bus slots   | No PCI or PCI-X slots (expansion via modules or network-interface option connector)   |            |                 |                 |           |                  |              |            |  |                |
| Ethernet controllers  | Two gigabit Ethernet controllers / Broadcom® BCM5704S / on blade / two PCI-X 64-bit 133MHz buses / full-duplex / Wake on LAN® / Alert Standard Format 1.0 / teaming and failover support / one of the dual controllers connects to an optional, supported Ethernet switch or <i>Passthrough Module</i> (the second controller requires a second optional switch or PM)  |            |                 |                 |           |                  |              |            |  |                |
| Network-interface   | <b>One connector for I/O expansion option</b> (Fibre Channel Expansion Card) / requires same interface modules in bays 3 and 4 of BladeCenter / all blades in a single BladeCenter must contain the same expansion card (or no expansion card) / ethernet and serial I/O expansion cards planned for future release <sup>20</sup>   |            |                 |                 |           |                  |              |            |  |                |
| 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<br>None / requests for keyboard, mouse, and video in BladeCenter by pressing the display button on front control panel<br>SVGA / ATI® Radeon Mobility 7000M / on blade / 16MB SDRAM std/max / 32-bit 33MHz PCI 2.2 bus  |            |                 |                 |           |                  |              |            |  |                |
| Systems mgmt  | <b>IBM integrated system management processor (ISMP)</b> / H8S2148 / on blade / provides system and environmental monitoring, event recording, alert capability / RS-485 interface for communication with BladeCenter management module   |            |                 |                 |           |                  |              |            |  |                |
| Diagnostics   | <b>Light Path Diagnostics™</b> (LED lights indicate failing component) and on-board diagnostics (via PC-Doctor in BIOS)   |            |                 |                 |           |                  |              |            |  |                |
| Security  | Power-on password / administrator password / unattended boot / selectable boot / unattended start mode  |            |                 |                 |           |                  |              |            |  |                |
| Software ship group   | Documentation CD, IBM Director CD, Device Driver CD   |            |                 |                 |           |                  |              |            |  |                |
| Cooling fans  | Uses cooling from BladeCenter (types 8677, 8852 and 8720) / thermal sensors on each processor and BladeCenter modules and front panel   |            |                 |                 |           |                  |              |            |  |                |
| Power supply Prerequisites                                      | Uses power module(s) in BladeCenter (types 8677, 8852 and 8720)<br>Monitor, keyboard, mouse for setup; ethernet switch module, disk, BladeCenter (types 8677, 8852 and 8720), operating system  |            |                 |                 |           |                  |              |            |  |                |
|   | Low Power Opteron 250 Processor Upgrade<br>Low Power Opteron 252 Processor Upgrade<br>Low Power Opteron 254 Processor Upgrade<br>Low Power Opteron 270 Processor Upgrade<br>Low Power Opteron 275 Processor Upgrade<br>Low Power Opteron 280 Processor Upgrade<br>2GB (2x1GB kit) DDR-SDRAM VLP RDIMM<br>4GB (2x2GB kit) DDR-SDRAM VLP RDIMM<br>8GB (2x4GB kit) DDR-SDRAM VLP RDIMM<br>IBM 36.4GB SFF Non-hot-swap 10K SCSI HD<br>IBM 73.4GB SFF Non-hot-swap 10K SCSI HD<br>AMD Opteron LS20 Low Profile Handle<br>BladeCenter SCSI Storage Exp Unit<br>IBM SFF Fibre Channel Expansion Card<br>IBM SFF Gigabit Ethernet Expansion Card<br>IBM HS20 Fibre Channel Expansion Card |            |                 |                 |           |                  |              |            | 25R8892<br>25R8893<br>25R8937<br>25R8894<br>25R8895<br>25R8896<br>39M5849<br>39M5852<br>41Y2756<br>40K1037<br>40K1038<br>25R7748<br>26K4817<br>26K4841<br>26K4842<br>48P7061 |                |
|   | Other options at <a href="http://ibm.com/pc/us/accessories">ibm.com/pc/us/accessories</a>   |            |                 |                 |           |                  |              |            |  |                |

**Server blade**  
(side view)



Bay ① 2.5", 9.5mm, no front access, optional SFF SCSI disk  
Bay ② 2.5", 9.5mm, no front access, optional SFF SCSI 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
- 11 lbs; 5.0kg (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 LS20 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 LS20 blade server<sup>13</sup>:  
146GB with two 73.4GB SFF SCSI disks

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

### LIMITED WARRANTY<sup>3</sup>

- 3 year parts and labor
- International Warranty Service<sup>3</sup>
- On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time<sup>7</sup>
- On site service upgrade options (in eligible locations):<sup>7</sup>
  - 3 year IOR 9x5, 4 hr avg response (ServicePac® part num 41C5906)
  - 3 year IOR 24x7, 4 hr avg response (ServicePac part num 41C5907)
  - 4 year IOR 9x5, 4 hr avg response (ServicePac part num 41C5908)
  - 4 year IOR 24x7, 4 hr avg response (ServicePac part num 41C5909)
  - 5 year IOR 9x5, 4 hr avg response (ServicePac part num 41C5910)
  - 5 year IOR 24x7, 4 hr avg response (ServicePac part num 41C5911)
- Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- 24x7<sup>14</sup> toll-free support for warranty issues during the warranty period<sup>3</sup>

| IBM® Type-model | Qty x Processor <sup>1</sup> | 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       |

**Positioning Processor(s)** *Ultra-dense, low power, dual socket, full performance modular computing platform with superior performance*  
 Up to 2 x AMD Opteron 2000 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-way SMP / up to two Opteron processors (same speed/cache size)*  
 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<sup>13</sup> (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 Architecture/Chipsets** Single slot blade / Supported in IBM BladeCenter 8677, 8720, 8730 and 8852  
**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 *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)

**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  
 Dual Core AMD Opteron Processor Model 2212HE 25R8898  
 Dual Core AMD Opteron Processor Model 2212 25R8931  
 Dual Core AMD Opteron Processor Model 2218HE 25R8899  
 Dual Core AMD Opteron Processor Model 2218 25R8897  
 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  
 Cisco 4X InfiniBand Switch Module for BladeCenter 32R1756  
 Cisco 4X InfiniBand Expansion Card for BladeCenter 32R1760  
 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/p/pc/us/accessories](http://ibm.com/p/pc/us/accessories)

**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

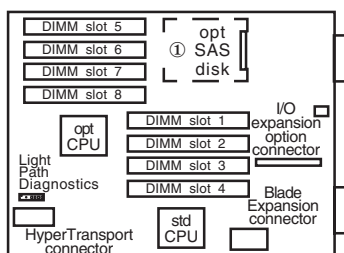
**Cooling fans** Uses cooling from BladeCenter (types 8677, 8720, 8730, 8852) / thermal sensors on each processor and BladeCenter modules and front panel  
 Uses power module(s) in BladeCenter (types 8677, 8720, 8730, 8852)

**Power supply Prerequisites** Monitor, keyboard, mouse for setup; ethernet switch module, disk, BladeCenter (types 8677, 8720, 8730, 8852), operating system

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

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

Server blade (side view)



Bay ① 2.5", 9.5mm, no front access, optional 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
- ⊖ 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 WARRANTY<sup>3</sup>**

- ⊖ 3 year parts and labor
- ⊖ International Warranty Service<sup>3</sup>
- ⊖ On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time<sup>7</sup>
- ⊖ On site service upgrade options (in eligible locations):<sup>7</sup>
  - 3 year IOR 9x5, 4 hr avg response (ServicePac® part num 69P9517)
  - 3 year IOR 24x7, 4 hr avg response (ServicePac part num 69P9918)
  - 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>
- ⊖ 24x7<sup>14</sup> toll-free support for warranty issues during the warranty period<sup>3</sup>

See footnotes for important warranty information

\*4GB DIMMS support available December 2006

| IBM® Type-model                                    | Qty x Processor <sup>1</sup>   | 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       |
| Positioning Processor(s)                           | <b>Ultra-dense, low power, dual or quad socket, full performance modular computing platform with superior performance</b>  |            |          |       |        |                 |   |                 |           |                   |             |                |
| L2 Cache   | Up to 4 x AMD Opteron 8000 Series Dual Core at up to 2.6GHz / simultaneously supports 32-bit and 64-bit computing  |            |          |       |        |                 |   |                 |           |                   |             |                |
| SMP support Implementation                         | <b>1MB L2 Cache per core, AMD Direct Connect Architecture</b> ensures lower latency I/O<br><b>2 or 4-way SMP</b> / up to four Opteron processors (same speed/cache size)   |            |          |       |        |                 |   |                 |           |                   |             |                |
| Memory   | 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  |            |          |       |        |                 |   |                 |           |                   |             |                |
| SAS disk controller                                | Up to two integrated / LSI Logic® 1064 SAS controller 1.5/3Gb/sec / PCI-X 64-bit/133MHz / on planar / supports <b>RAID 0, 1 / RAID-1, 1E &amp; 5</b> 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<br><b>ServerWorks™ Chipset</b> / Up to two <b>HT2000 HyperTransport System I/O Controllers</b> 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 / <b>HT1000 South Bridge</b> 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 / dual 10/100/1000 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                                  | <b>Up to two legacy connector or PCI-Express connector for I/O expansion options</b> / 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<br>None / requests for keyboard, mouse, and video in BladeCenter by pressing the display button on front control panel<br>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   |            |          |       |        |                 | Dual Core AMD Opteron Processor Model 8212 HE   |                 |           | 25R8934           |             |                |
|  |  |            |          |       |        |                 | Dual Core AMD Opteron Processor Model 8212  |                 |           | 25R8932           |             |                |
|  |  |            |          |       |        |                 | Dual Core AMD Opteron Processor Model 8216 HE   |                 |           | 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           |             |                |
|  |  |            |          |       |        |                 | Cisco 4X InfiniBand Switch Module for BladeCenter   |                 |           | 32R1756           |             |                |
|  |  |            |          |       |        |                 | Cisco 4X InfiniBand Expansion Card for BladeCenter  |                 |           | 32R1760           |             |                |
|  |  |            |          |       |        |                 | QLogic 4GB SFF Fibre Channel Expansion Card for BladeCenter                               |                 |           | 26R0890           |             |                |
|  |  |            |          |       |        |                 | Emulex 4GB SFF Fibre Channel Expansion Card for BladeCenter                               |                 |           | 39Y9186           |             |                |
|  |  |            |          |       |        |                 | Other options at <a href="http://ibm.com/po/us/accessories">ibm.com/po/us/accessories</a> |                 |           |                   |             |                |
| Diagnostics  | <b>Light Path Diagnostics™</b> (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  |            |          |       |        |                 |   |                 |           |                   |             |                |

**Server blade (side view)**

base 2 socket blade

expansion board for 4 socket blade

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

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

Bay ① 2.5", 9.5mm, no front access, optional SFF SAS disk  
Bay ② 2.5", 9.5mm, no front access, optional 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
- ⇨ 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 LS41 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

**LIMITED WARRANTY<sup>3</sup>**

- ⇨ 3 year parts and labor
- ⇨ International Warranty Service<sup>3</sup>
- ⇨ On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time<sup>7</sup>
- ⇨ On site service upgrade options (in eligible locations):<sup>7</sup>
  - 3 year IOR 9x5, 4 hr avg response (ServicePac<sup>3</sup> 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 12x7022)
  - 5 year IOR 9x5, 4 hr avg response (ServicePac partnum 12x7023)
  - 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>
- ⇨ 24x7<sup>14</sup> toll-free support for warranty issues during the warranty period<sup>3</sup>

See footnotes for important warranty information

<sup>14</sup>4GB DIMMS support available December 2006

| 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                   | All: HS20/HS40/JS20/JS21/LS20   | 0 / 8                   | 0 / 4                    | Enet, Fibre Ch, IB, OPM and CPM | 1 / 2                        | 2 / 4                   | 1300W                | 4 / 4                    | 8U <sup>4</sup> rack | Jul 2004       |
| 8720-2RX                   | All: HS20/HS40/JS20/JS21/LS20   | 0 / 8                   | 0 / 4                    | Enet, Fibre Ch, IB, OPM and CPM | 1 / 2                        | 2 / 4                   | 1300W                | 4 / 4                    | 8U rack              | Mar 2006       |
| Positioning Description    | <b>Flexible, innovative design provides investment protection and reduces deployment costs for NEBS environments</b><br>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                 | <b>Supports all blades HS20/HS40/JS20/JS21/LS20</b> 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 Vecteded Cooling / hot-swap / redundant / variable speed / rear access / 330 cubic ft per min (CFM) / front to back airflow; filtered air intake  |                         |                          |                                 |                              |                         |                      |                          |                      |                |
| Mechanical Optical / USB   | <b>EIA 19" rack models (8U<sup>4</sup>) x 20" deep</b> / designed for EIA-310D and UTF Four Post Racks<br>24X-10X-24X-8X <sup>6</sup> 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 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 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 |  |         |

• Other options at [ibm.com/pc/us/accessories](http://ibm.com/pc/us/accessories)  
• Solutions available from IBM BladeCenter Alliance program partners

**Front**

**Rear**

- ◊ 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

| 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) |

**LIMITED WARRANTY<sup>3</sup>**

- ↔ 3 year parts and labor
- ↔ International Warranty Service<sup>3</sup>
- ↔ On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time<sup>7</sup>
- ↔ On site service upgrade options (in eligible locations):<sup>7</sup>
  - 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>
- ↔ 24x7<sup>14</sup> toll-free support for warranty issues during the warranty period<sup>3</sup>

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

• = Hot-swap

# IBM BladeCenter® T 8730 (AC power)

xREF by eServer 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 |
|---|--|--|--------------------------|---------------------------------|------------------------------|-------------------------|----------------------|--------------------------|----------------------|----------------|
| 8730-1RX All: HS20/HS40/JS20/JS21/LS20  |  | 0 / 8  | 0 / 4                    | Enet, Fibre Ch, IB, OPM and CPM | 1 / 2                        | 2 / 4                   | 1300W                | 4 / 4                    | 8U <sup>4</sup> rack | Jul 2004       |
| 8730-2RX All: HS20/HS40/JS20/JS21/LS20  |  | 0 / 8  | 0 / 4                    | Enet, Fibre Ch, IB, OPM and CPM | 1 / 2                        | 2 / 4                   | 1300W                | 4 / 4                    | 8U rack              | Mar 2006       |
| Positioning Description   | <b>Flexible, innovative design provides investment protection and reduces deployment costs for NEBS environments</b><br>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  | <b>Supports all blades HS20/HS40/JS20/JS21/LS20</b> 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 Vektored Cooling / hot-swap / redundant / variable speed / rear access / 330 cubic ft per min (CFM) / front to back airflow; filtered air intake   |  |                          |                                 |                              |                         |                      |                          |                      |                |
| Mechanical Optical / USB  | <b>EIA 19" rack models (8U<sup>4</sup>) x 20"</b> deep / designed for EIA-310D (types A & C) and UTF four post racks<br>24X-10X-24X-8X <sup>6</sup> 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<br>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  |  |                          |                                 |                              |                         |                      |                          |                      |                |
| <ul style="list-style-type: none"> <li>• Other options at <a href="http://ibm.com/products/us">ibm.com/products/us</a></li> <li>• Solutions available from IBM BladeCenter Alliance program partners</li> </ul> |  |  |                          |                                 |                              |                         |                      |                          |                      |                |

**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 WARRANTY<sup>3</sup>**

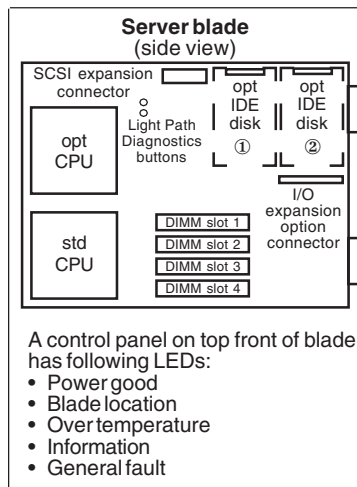
- ↔ **3 year parts and labor**
- ↔ **International Warranty Service<sup>3</sup>**
- ↔ **On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time<sup>7</sup>**
- ↔ **On site service upgrade options (in eligible locations):<sup>7</sup>**
  - **3 year IOR 24x7, 2 hr avg 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>**
- ↔ **24x7<sup>14</sup> toll-free support for warranty issues during the warranty period<sup>3</sup>**

See footnotes for important warranty information • = Hot-swap

(BC1TA) © IBM Corp. February 2006

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

|  |   |   |
|--|---|---|
| Positioning Processor(s)<br>L2/L3 Cache<br>SMP support<br>Implementation | <i>Ultra-dense, highly manageable modular computing platform with superior performance</i><br><b>1 x Intel® Xeon 2.5 HGz or 3.2GHz</b> with 533MHz frontside bus / Hyper-Threading technology / NetBurst™ architecture<br><b>512KB L2 Cache / 0 - 2MB L3 Cache</b> / on die of processor / at processor speed<br><b>2-way SMP</b> / up to two Xeon Processors (same speed/cache size)<br>Server blade contains two Intel 604-pin micro-PGA ZIF sockets, four memory DIMM slots, two IDE connectors, one SCSI expansion connector, one I/O expansion option connector, and integrated graphics and dual ethernet |   |
| Memory   | <b>1GB</b> std / 8GB max <sup>13</sup> / two slots used / two slots available / <b>PC2100</b> 266MHz registered 184-pin ECC DDR-SDRAM DIMMs / four DIMM gold-connector slots on systemboard / DIMMs must be installed in matched pairs [a bank] / 2-way memory interleave / dual channel / memory bus runs at 2 x 100MHz / <b>Error Checking and Correcting (ECC)</b> via <b>16-bit Checksum Chipkill™</b> (corrects 1, 2, 3, or 4-bit errors on same chip and detects 2- through 8-bit errors contained in two chips)  |   |
| IDE controller/bays  | Enhanced IDE ATA-100 controller in CSB6-U South Bridge / two connectors/buses on planar / each supports one 2.5" IDE disk / no cable as IDE disk attaches to riser card and tray (included with option kit) / Supports max of two IDE disks / space for only one IDE disk if an I/O expansion option installed [Fibre Channel] / <b>RAID-1 mirroring</b> standard   |   |
| SCSI disk controller   | None / <b>supports optional SCSI Storage Expansion Unit</b> (a blade occupying adjacent blade slot / connects to HS20 via one connector / LSI Logic® 53C1020 Ultra320 SCSI controller [LVD 320MB/sec] / 64-bit 133MHz PCI-X Bus B from CIOB-ES I/O Bridge (IMB2 bus to Host Bridge) / supports <b>RAID-1 mirroring</b> [Embedded Mirroring] with two hot-swap 3.5" one-inch high SL SCSI disks in front bays / one 16-bit internal channel / no cables or external connector)   |   |
| SCSI disk bays   | Supports max of two hot-swap 3.5" SL Ultra320 SCSI disks in optional SCSI Storage Expansion Unit / 80-pin SCA-2 connectors / <b>all SCSI bays Ultra320-enabled</b>  |   |
| External storage   | Support for IBM TotalStorage™ solutions (including FASTT and NAS family of products)  |   |
| Mechanical Architecture / chipsets                                       | Supported in IBM BladeCenter (type 8677) / BladeCenter supported in 28" deep racks such as the IBM NetBAY™ Rack products <b>ServerWorks® Grand Champion™ 4.0 LE</b> / CMIC LE Host Bridge (memory controller and I/O Bridge) / single slot one CIOBE-S I/O Bridge (IMB2 bus to Host Bridge) for two PCI-X Buses with Bus A for ethernet and Bus B for ethernet and the I/O expansion option connector / CSB6-U South Bridge (Thin IMB to Host Bridge) for EIDE, USB, LPC bus to Super I/O, and PCI 2.2 Bus C with graphics controller / National Semiconductor® PC87417 Super I/O chip                          |   |
| Bus slots  | No PCI or PCI-X slots (expansion via modules or network-interface option connector)   |   |
| Ethernet controllers   | Two gigabit Ethernet controllers / Broadcom® BCM5704S / on blade / two PCI-X 64-bit 133MHz buses / full duplex / Wake on LAN® / Alert Standard Format 1.0 / teaming and failover support / one of the dual controllers connects to an optional, supported Ethernet switch or <i>Optical Passthrough Module</i> (the second controller requires a second optional switch or OPM)   |   |
| Network-interface  | <b>One connector for I/O expansion option</b> (Fibre Channel Expansion Card) / requires same interface modules in bays 3 and 4 of BladeCenter / all blades in a single BladeCenter must contain the same expansion card (or no expansion card) / ethernet and serial I/O expansion cards planned for future release <sup>20</sup>   |   |
| CD / diskette / USB  | None / requests for CD-ROM, diskette drive, and USB port in BladeCenter by pressing CD select button on front control panel   |   |
| Kybd / video / mouse   | None / requests for keyboard, mouse, and video in BladeCenter by pressing the display button on front control panel   |   |
| Graphics   | SVGA / ATI® Rage XL / on blade / 8MB SDRAM std/max / 32-bit 33MHz PCI 2.2 bus   |   |
| Systems mgmt   | <b>IBM integrated system management processor (ISMP)</b> / HS2148 / on blade / provides system and environmental monitoring, event recording, alert capability / RS-485 interface for communication with BladeCenter management module  | Xeon 3.2Ghz/512KB L2 / 1MB L3 Cache<br>Proc Upg<br>13N0650  |
| Diagnostics  | <b>Light Path Diagnostics™</b> (LED lights indicate failing component) and on-board diagnostics (via PC-Doctor in BIOS)   | 512MB PC2100 CL2.5 ECC DDR-SDRAM DIMM 33L5038<br>1GB PC2100 CL2.5 ECC DDR-SDRAM RDIMM 33L5039<br>2GB PC2100 CL2.5 ECC DDR-SDRAM RDIMM 33L5040<br>IBM HS20 SCSI Storage Expansion Unit (blade) 48P7058<br>IBM HS20 Fibre Channel Expansion Card (with two ports; each port requires a FC Switch Module) 48P7061<br>IBM HS20 40GB <sup>2</sup> 5400 rpm ATA-100 HDD 48P7063<br>36.4GB 15K Ultra160 SCSI Hot-Swap SL HDD* 06P5768<br>36.4GB 15K Ultra320 SCSI Hot-Swap SL HDD* 06P5776<br>73.4GB 10K Ultra160 SCSI Hot-Swap SL HDD* 06P5756<br>146.8GB 10K Ultra320 SCSI Hot-Swap SL HDD* 32P0728<br>* Disk requires SCSI Storage Expansion Unit |
| Security   | Power-on password / administrator password / unattended boot / selectable boot / unattended start mode  |   |
| Software ship group  | Documentation CD, IBM Director 4.1 CD, Device Driver CD   |   |
| Cooling fans   | Uses cooling from BladeCenter (type 8720/30) / thermal sensors on each processor and BladeCenter modules and front panel  |   |
| Power supply   | Uses power module(s) in BladeCenter (type 8677)   |   |
| Prerequisites  | Monitor, keyboard, mouse for setup; ethernet switch module, disk, BladeCenter (type 8677), operating system   |   |



- Bay ① 3.5", 9.5mm, no front access, optional ThinkPad® IDE disk
  - Bay ② 3.5", 9.5mm, no front access, optional ThinkPad IDE disk
  - Stealth black front bezel
  - H 9.7" x W 1.14" x D 17.6"
  - H 24.5cm x W 2.9cm x D 44.6cm
  - 12 lbs; 5.4kg (max configuration)
  - Configuration/Setup Utility: F1 at startup
  - Diagnostics (PC-Doctor™): F2 at startup
  - System Partition Boot: ALT+F1 at startup
  - Network Boot: F12 at startup
  - PXE Boot Agent Utility: Ctrl+S at startup
  - Blade control panel on each HS20 blade server provides media select button, keyboard/mouse/video select button, and indicators for blade error, information, location, disk activity, and power
  - Predictive Failure Analysis® alerts on memory, processor(s), and optional disk(s) with IBM Director
- Maximum internal disk capacity for each HS20 blade server<sup>13</sup>:*  
80GB with two 40GB EIDE disks or  
293.6GB\* with two 146.8GB SL SCSI disks

**LIMITED WARRANTY<sup>3</sup>**

- 3 year parts and labor
- International Warranty Service<sup>3</sup>
- On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time<sup>7</sup>
- On site service upgrade options (in eligible locations):<sup>7</sup>
  - 3 year IOR 24x7, 2 hr avg response (ServicePac® part num 69P9519)
  - 3 year IOR 24x7, 4 hr avg response (ServicePac part num 69P9518)
  - 3 year IOR 9x5, 4 hr avg response (ServicePac part num 69P9517)
  - 5 year IOR 9x5, 4 hr avg response (ServicePac part num 69P9525)
  - 5 year IOR 24x7, 2 hr avg response (ServicePac part num 69P9527)
  - Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- 24x7<sup>14</sup> toll-free support for warranty issues during the warranty period<sup>5</sup>

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

# IBM eServer BladeCenter™ HS20 Low Profile Handle

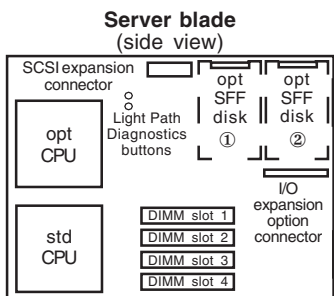
(8843) January 2005

xREF by eServer Field Skills and Education Team

| IBM® Type-GAV | Processor | GHz¹ | L2 cache | FSB MHz | Memory | Disk controller | Disk controller | Diskbays | SCSI Support with optional stor exp unit | slots x bays | Mechanical | Ethernet | Available date |           |             |          |
|---------------|-----------|------|----------|---------|--------|-----------------|-----------------|----------|--|--------------|------------|----------|----------------|-----------|-------------|----------|
| 8843-LTy      | 1 x Xeon™ | 2.8  | Low Volt | 1MB     | 800    | 512MB           | None            | Ultra320 | 2-fixed                                  | 2            | Hot-swap   | Ultra320 | 0 x 2          | 7U⁴ blade | 2 x Gigabit | Feb 2005 |
| 8843-4Ty      | 1 x Xeon  | 3.6  | GHz      | 1MB     | 800    | 1GB             | None            | Ultra320 | 2-fixed                                  | 2            | Hot-swap   | Ultra320 | 0 x 2          | 7U⁴ blade | 2 x Gigabit | Feb 2005 |

|  |   |  |  |  |  |  |  |  |  |  |  |  |  |
|--|---|--|--|--|--|--|--|--|--|--|--|--|--|
| Processor(s)   | 1 x Intel® Xeon 2.8 Low Voltage or 3.6 GHz with 800MHz frontside bus (FSB) / EM64T / 1MB L2 ECC Cache / Hyper-Threading technology / Low Voltage Processors reduce heat output for increased rack density without increased cooling capacity  |  |  |  |  |  |  |  |  |  |  |  |  |
| SMP - L2 Cache Implementation                                | 2-way SMP / up to two Xeon Processors (same speed/cache size) / 1MB std and max / at processor speed  |  |  |  |  |  |  |  |  |  |  |  |  |
| Memory   | Systemboard contains two Intel 604-pin micro-PGA ZIF sockets, four DIMM slots, one SCSI expansion connector, one I/O expansion option connector, integrated graphics and dual Gigabit ethernet  |  |  |  |  |  |  |  |  |  |  |  |  |
| SCSI disk controller   | 512MB/1GB std / 8GB¹³ max / two slots used / two slots available / PC2-3200 400MHz CL2.5 ECC DDR2-SDRAM DIMMs / four 240 pin gold-connector slots on systemboard / DIMMs must be installed in matched pairs [a bank] / 2-way memory interleave / dual channel /   |  |  |  |  |  |  |  |  |  |  |  |  |
| SCSI Disk bays   | LSI Logic® 53C1020 SCSI controller / Single channel Ultra320 SCSI controller (LVD 320MB/sec) / on planar / 64-bit 100MHz PCI-X / supports RAID-1 & 1E mirroring (supported in 32-bit legacy mode only) / One 16-bit channel (one internal) / Internal channel: one 2-drop 16-bit 68-pin LVD SCSI cable  |  |  |  |  |  |  |  |  |  |  |  |  |
| External Storage   | Two 2.5-inch Small Form Factor (SFF) Ultra320 internal fixed disk bays / Supports max of two hot-swap 3.5" SL Ultra320 SCSI disks in optional SCSI Storage Expansion Unit (80-pin SCA-2 connectors; all SCSI bays Ultra320-enabled) / Support for IBM TotalStorage™ solutions (including FASTT and NAS family of products)  |  |  |  |  |  |  |  |  |  |  |  |  |
| Mechanical Architecture/Chipset                              | 7U Blade / Supported in IBM BladeCenter T 8720-1XX or 8730-1XX  |  |  |  |  |  |  |  |  |  |  |  |  |
| BUS slots  | Intel E7520 chipset / E7525 MCH (Memory Controller Hub) for PCI-Express bridge to PXH, ICH5R / PXH BUS supports PCI-X BUS / ICH5R supports USB (1.0) / LSI 1020 / Dual Broadcom 5704S / Low Pin Count Interface / NS PC87366 Super I/O off LPC interface  |  |  |  |  |  |  |  |  |  |  |  |  |
| Ethernet   | No PCI or PCI-X slots (expansion via modules or network-interface option connector)   |  |  |  |  |  |  |  |  |  |  |  |  |
| Network Interface  | Dual gigabit 10/100/1000 ethernet controller / Broadcom 5704S / two full gigabit ethernet MAC and PHY layer functions / chip on blade / PCI-X 64-bit 100MHz / full duplex / Wake on LAN® / PXE 2.0 Boot agent / Alert Standard Format 2.0 / Failover, adapter fault tolerance / Load balancing or teaming / one of the dual controllers connects to an optional, supported Ethernet switch or Optical Passthrough Module (the second controller requires a second optional switch or OPM) |  |  |  |  |  |  |  |  |  |  |  |  |
| CD / Diskette / USB Kybd / video / mouse Graphics controller | One connector for I/O expansion option (Fibre Channel Expansion Card) / requires same interface modules in bays 3 and 4 of BladeCenter / all blades in a single BladeCenter must contain the same expansion card (or no expansion card) / ethernet and serial I/O expansion cards planned for future release²⁰  |  |  |  |  |  |  |  |  |  |  |  |  |
| Systems Mgmt   | None / requests for CD-ROM, diskette drive, and USB port in BladeCenter by pressing CD select button on front control panel   |  |  |  |  |  |  |  |  |  |  |  |  |
| Diagnostics  | None / requests for keyboard, mouse, and video in BladeCenter by pressing the display button on front control panel   |  |  |  |  |  |  |  |  |  |  |  |  |
| Security   | SVGA / ATI® Radeon™ 7000M on Planar / 16MB SDRAM std and max / 15 pin connector   |  |  |  |  |  |  |  |  |  |  |  |  |
| Software ship group  | IBM Baseboard Management Controller (BMC) / H8S2168 / on blade / provides system and environmental monitoring, event recording, alert capability / RS-485 interface for intermanagement communication with BladeCenter Management module  |  |  |  |  |  |  |  |  |  |  |  |  |
| Cooling Fans   | Light Path Diagnostics™ (LED lights indicate failing component) and on-board diagnostics (via PC-Doctor in BIOS)  |  |  |  |  |  |  |  |  |  |  |  |  |
| Power supply(s) Prerequisites                                | No security intrusion protection / Power-on password / administrator password / unattended boot / selectable boot / unattended start mode   |  |  |  |  |  |  |  |  |  |  |  |  |
|  | Documentation CD, Broadcom CD   |  |  |  |  |  |  |  |  |  |  |  |  |
|  | Uses cooling from BladeCenter T (type 8720/30) / thermal sensors on each processor and BladeCenter modules and front panel  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | BladeCenter SCSI Storage Exp Unit   |  |  |  |  |  |  |  |  |  |  |  |  |
|  | BladeCenter SFF Fibre Channel Exp Card  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | BladeCenter SFF Gigabit Ethernet Exp Card   |  |  |  |  |  |  |  |  |  |  |  |  |
|  | BladeCenter Optical Pass-thru Module  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | BladeCenter SCSI Storage Expansion Unit   |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 17-inch Flat Panel Monitor Console Kit w/ US Kybd   |  |  |  |  |  |  |  |  |  |  |  |  |
|  | Other options at <a href="http://ibm.com/pc/us/accessories">ibm.com/pc/us/accessories</a>   |  |  |  |  |  |  |  |  |  |  |  |  |

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



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

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

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

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

### LIMITED WARRANTY³

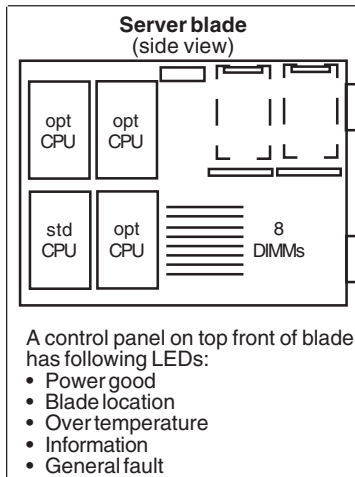
- ⇒ 3 year parts and labor
- ⇒ International Warranty Service³
- ⇒ On site, 8 am-5 pm, Mon-Fri excluding holidays, next business day response time
- ⇒ On site service upgrade options (in eligible locations):⁷
  - 4 year IOR 9x5, NBD response (ServicePac® part num 69P9520)
  - 4 year IOR 9x5, 4 hr avg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

See footnotes for important warranty information

(HS20Tb) © IBM Corp. January 2005

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

|   |  |  |  |  |  |  |  |  |  |  |                                   |         |                                       |         |                                      |         |                                      |         |  |         |   |         |   |         |   |         |   |         |   |         |  |         |
|---|--|--|--|--|--|--|--|--|--|--|-----------------------------------|---------|---------------------------------------|---------|--------------------------------------|---------|--------------------------------------|---------|--|---------|---|---------|---|---------|---|---------|---|---------|---|---------|--|---------|
| Positioning Processor(s) L2/L3 cache SMP support Implementation                               | <i>Ultra-dense, highly manageable modular computing platform with superior 4-way performance</i><br>Up to 1 x Intel® Xeon 2.8GHz MP with 400MHz frontside bus / Hyper-Threading technology / NetBurst™ microarchitecture<br><b>512KB L2 Cache / 2MB L3 Cache</b> / on die of processor / at processor speed<br><b>4-way SMP</b> / up to four Xeon MP Processors (same speed/cache size)<br>Server blade contains four Intel 604-pin micro-PGA ZIF sockets, four memory DIMM slots, one SCSI expansion connector, two I/O expansion option connector, integrated graphics and four ethernet ports   |  |  |  |  |  |  |  |  |  |                                   |         |                                       |         |                                      |         |                                      |         |  |         |   |         |   |         |   |         |   |         |   |         |  |         |
| Memory  | <b>2GB</b> std / 16GB max <sup>13</sup> / two slots used / six slots available / eight total slots<br><b>PC2100</b> 266MHz registered 184-pin ECC DDR-SDRAM DIMMs / four DIMM gold-connector slots on systemboard / DIMMs must be installed in matched pairs [a bank] / 2-way memory interleave / dual channel / memory bus runs at 2 x 100MHz / <b>Error Checking and Correcting (ECC)</b> via <b>16-bit Checksum Chipkill™</b> (corrects 1, 2, 3, or 4-bit errors on same chip and detects 2- through 8-bit errors contained in two chips) / memory can be mixed   |  |  |  |  |  |  |  |  |  |                                   |         |                                       |         |                                      |         |                                      |         |  |         |   |         |   |         |   |         |   |         |   |         |  |         |
| SCSI disk controller  | None / <b>supports optional SCSI Storage Expansion Unit</b> (a blade occupying adjacent blade slot / connects to HS20 via one connector / LSI Logic® 53C1020 Ultra320 SCSI controller [LVD 320MB/sec] / 64-bit 133MHz PCI-X Bus B from CIOB-ES I/O Bridge (IMB2 bus to Host Bridge) / supports <b>RAID-1 mirroring</b> [Embedded Mirroring] with two hot-swap 3.5" one-inch high SL SCSI disks in front bays / one 16-bit internal channel / no cables or external connector)  |  |  |  |  |  |  |  |  |  |                                   |         |                                       |         |                                      |         |                                      |         |  |         |   |         |   |         |   |         |   |         |   |         |  |         |
| SCSI disk bays  | Supports max of two hot-swap 3.5" SL Ultra320 SCSI disks in optional SCSI Storage Expansion Unit / 80-pin SCA-2 connectors / <b>all SCSI bays Ultra320-enabled</b>   |  |  |  |  |  |  |  |  |  |                                   |         |                                       |         |                                      |         |                                      |         |  |         |   |         |   |         |   |         |   |         |   |         |  |         |
| External storage  | Support for IBM TotalStorage™ solutions (including FASiT and NAS family of products)   |  |  |  |  |  |  |  |  |  |                                   |         |                                       |         |                                      |         |                                      |         |  |         |   |         |   |         |   |         |   |         |   |         |  |         |
| Mechanical  | Supported in IBM BladeCenter (type 8677) / BladeCenter supported in 28" deep racks such as the IBM NetBAY™ Rack products <b>ServerWorks® Grand Champion™ 4.0 LE</b> / CMIC-LE5 Host Bridge (memory controller and I/O Bridge) /  |  |  |  |  |  |  |  |  |  |                                   |         |                                       |         |                                      |         |                                      |         |  |         |   |         |   |         |   |         |   |         |   |         |  |         |
| Architecture / chipsets   | one CIOB-X2 I/O Bridge (IMB2 bus to Host Bridge) for two PCI-X Buses with Bus A for ethernet and Bus B for ethernet and the I/O expansion option connector / CSB6 South Bridge (Thin IMB to Host Bridge) for EIDE, USB, LPC bus to Super I/O, and PCI 2.2 Bus C with graphics controller / National Semiconductor® PC87417 Super I/O chip  |  |  |  |  |  |  |  |  |  |                                   |         |                                       |         |                                      |         |                                      |         |  |         |   |         |   |         |   |         |   |         |   |         |  |         |
| Bus slots   | No PCI or PCI-X slots (expansion via modules or network-interface option connector)  |  |  |  |  |  |  |  |  |  |                                   |         |                                       |         |                                      |         |                                      |         |  |         |   |         |   |         |   |         |   |         |   |         |  |         |
| Ethernet controllers  | Four gigabit 10/100/1000 ethernet controllers / Intel 82545GM/82546EB / on blade / two PCI-X 64-bit 100MHz buses / full duplex / Wake on LAN® / Alert Standard Format 1.0 / teaming and failover support / one of the controllers connects to an optional 4-port GB Ethernet Switch Module (the second controller requires a second optional Ethernet Switch Module)   |  |  |  |  |  |  |  |  |  |                                   |         |                                       |         |                                      |         |                                      |         |  |         |   |         |   |         |   |         |   |         |   |         |  |         |
| Network-interface   | <b>Two connectors for I/O expansion option</b> (Fibre Channel Expansion Card) / requires same interface modules in bays 3 and 4 of BladeCenter / all blades in a single BladeCenter must contain the same expansion card (or no expansion card) / ethernet and serial I/O expansion cards planned for future release <sup>20</sup>   |  |  |  |  |  |  |  |  |  |                                   |         |                                       |         |                                      |         |                                      |         |  |         |   |         |   |         |   |         |   |         |   |         |  |         |
| CD / diskette / USB Kybd / video / mouse Graphics   | None / requests for CD-ROM, diskette drive, and USB port in BladeCenter by pressing CD select button on front control panel<br>None / requests for keyboard, mouse, and video in BladeCenter by pressing the display button on front control panel<br>SVGA / ATI® Radeon 7000 / on blade / 16MB SDRAM std/max / 32-bit 33MHz PCI 2.2 bus   |  |  |  |  |  |  |  |  |  |                                   |         |                                       |         |                                      |         |                                      |         |  |         |   |         |   |         |   |         |   |         |   |         |  |         |
| Systems mgmt  | <b>Intel integrated Baseboard Management Controller (BMC)</b> / on blade / provides system and environmental monitoring, event recording, alert capability / RS-485 interface for communication with BladeCenter management module   |  |  |  |  |  |  |  |  |  |                                   |         |                                       |         |                                      |         |                                      |         |  |         |   |         |   |         |   |         |   |         |   |         |  |         |
| Diagnostics   | <b>Light Path Diagnostics™</b> (LED lights indicate failing component) and on-board diagnostics (via PC-Doctor in BIOS)  |  |  |  |  |  |  |  |  |  |                                   |         |                                       |         |                                      |         |                                      |         |  |         |   |         |   |         |   |         |   |         |   |         |  |         |
| Security  | Power-on password / administrator password / unattended boot / selectable boot / unattended start mode   |  |  |  |  |  |  |  |  |  |                                   |         |                                       |         |                                      |         |                                      |         |  |         |   |         |   |         |   |         |   |         |   |         |  |         |
| Software ship group   | Documentation CD, IBM Director 4.1 CD, Device Driver CD  |  |  |  |  |  |  |  |  |  |                                   |         |                                       |         |                                      |         |                                      |         |  |         |   |         |   |         |   |         |   |         |   |         |  |         |
| Cooling fans  | Uses cooling from BladeCenter (type 8677) / thermal sensors on each processor and BladeCenter modules and front panel  |  |  |  |  |  |  |  |  |  |                                   |         |                                       |         |                                      |         |                                      |         |  |         |   |         |   |         |   |         |   |         |   |         |  |         |
| Power supply Prerequisites  | Uses power module(s) in BladeCenter (type 8677)<br>Monitor, keyboard, mouse for setup; ethernet switch module, disk, BladeCenter (type 8677), operating system   |  |  |  |  |  |  |  |  |  |                                   |         |                                       |         |                                      |         |                                      |         |  |         |   |         |   |         |   |         |   |         |   |         |  |         |
|   | <table border="0"> <tr> <td>Xeon 2.8Ghz/2MB L3 Cache Proc Upg</td> <td>13N0653</td> </tr> <tr> <td>512MB PC2100 CL2.5 ECC DDR-SDRAM DIMM</td> <td>33L5038</td> </tr> <tr> <td>1GB PC2100 CL2.5 ECC DDR-SDRAM RDIMM</td> <td>33L5039</td> </tr> <tr> <td>2GB PC2100 CL2.5 ECC DDR-SDRAM RDIMM</td> <td>33L5040</td> </tr> <tr> <td>IBM HS40 SCSI Storage Expansion Unit (blade)</td> <td>26K4847</td> </tr> <tr> <td>IBM HS40 Fibre Channel Expansion Card (with two ports; each port requires a FC Switch Module)</td> <td>48P7061</td> </tr> <tr> <td>IBM HS40 40GB<sup>2</sup> 5400 rpm ATA-100 HDD</td> <td>48P7063</td> </tr> <tr> <td>36.4GB 15K Ultra160 SCSI Hot-Swap SL HDD*</td> <td>06P5768</td> </tr> <tr> <td>36.4GB 15K Ultra320 SCSI Hot-Swap SL HDD*</td> <td>06P5776</td> </tr> <tr> <td>73.4GB 10K Ultra160 SCSI Hot-Swap SL HDD*</td> <td>06P5756</td> </tr> <tr> <td>146.8GB 10K Ultra320 SCSI Hot-Swap SL HDD*</td> <td>32P0728</td> </tr> </table> <p>* Disk requires SCSI Storage Expansion Unit</p> |  |  |  |  |  |  |  |  |  | Xeon 2.8Ghz/2MB L3 Cache Proc Upg | 13N0653 | 512MB PC2100 CL2.5 ECC DDR-SDRAM DIMM | 33L5038 | 1GB PC2100 CL2.5 ECC DDR-SDRAM RDIMM | 33L5039 | 2GB PC2100 CL2.5 ECC DDR-SDRAM RDIMM | 33L5040 | IBM HS40 SCSI Storage Expansion Unit (blade) | 26K4847 | IBM HS40 Fibre Channel Expansion Card (with two ports; each port requires a FC Switch Module) | 48P7061 | IBM HS40 40GB <sup>2</sup> 5400 rpm ATA-100 HDD | 48P7063 | 36.4GB 15K Ultra160 SCSI Hot-Swap SL HDD* | 06P5768 | 36.4GB 15K Ultra320 SCSI Hot-Swap SL HDD* | 06P5776 | 73.4GB 10K Ultra160 SCSI Hot-Swap SL HDD* | 06P5756 | 146.8GB 10K Ultra320 SCSI Hot-Swap SL HDD* | 32P0728 |
| Xeon 2.8Ghz/2MB L3 Cache Proc Upg   | 13N0653  |  |  |  |  |  |  |  |  |  |                                   |         |                                       |         |                                      |         |                                      |         |  |         |   |         |   |         |   |         |   |         |   |         |  |         |
| 512MB PC2100 CL2.5 ECC DDR-SDRAM DIMM   | 33L5038  |  |  |  |  |  |  |  |  |  |                                   |         |                                       |         |                                      |         |                                      |         |  |         |   |         |   |         |   |         |   |         |   |         |  |         |
| 1GB PC2100 CL2.5 ECC DDR-SDRAM RDIMM  | 33L5039  |  |  |  |  |  |  |  |  |  |                                   |         |                                       |         |                                      |         |                                      |         |  |         |   |         |   |         |   |         |   |         |   |         |  |         |
| 2GB PC2100 CL2.5 ECC DDR-SDRAM RDIMM  | 33L5040  |  |  |  |  |  |  |  |  |  |                                   |         |                                       |         |                                      |         |                                      |         |  |         |   |         |   |         |   |         |   |         |   |         |  |         |
| IBM HS40 SCSI Storage Expansion Unit (blade)  | 26K4847  |  |  |  |  |  |  |  |  |  |                                   |         |                                       |         |                                      |         |                                      |         |  |         |   |         |   |         |   |         |   |         |   |         |  |         |
| IBM HS40 Fibre Channel Expansion Card (with two ports; each port requires a FC Switch Module) | 48P7061  |  |  |  |  |  |  |  |  |  |                                   |         |                                       |         |                                      |         |                                      |         |  |         |   |         |   |         |   |         |   |         |   |         |  |         |
| IBM HS40 40GB <sup>2</sup> 5400 rpm ATA-100 HDD   | 48P7063  |  |  |  |  |  |  |  |  |  |                                   |         |                                       |         |                                      |         |                                      |         |  |         |   |         |   |         |   |         |   |         |   |         |  |         |
| 36.4GB 15K Ultra160 SCSI Hot-Swap SL HDD*   | 06P5768  |  |  |  |  |  |  |  |  |  |                                   |         |                                       |         |                                      |         |                                      |         |  |         |   |         |   |         |   |         |   |         |   |         |  |         |
| 36.4GB 15K Ultra320 SCSI Hot-Swap SL HDD*   | 06P5776  |  |  |  |  |  |  |  |  |  |                                   |         |                                       |         |                                      |         |                                      |         |  |         |   |         |   |         |   |         |   |         |   |         |  |         |
| 73.4GB 10K Ultra160 SCSI Hot-Swap SL HDD*   | 06P5756  |  |  |  |  |  |  |  |  |  |                                   |         |                                       |         |                                      |         |                                      |         |  |         |   |         |   |         |   |         |   |         |   |         |  |         |
| 146.8GB 10K Ultra320 SCSI Hot-Swap SL HDD*  | 32P0728  |  |  |  |  |  |  |  |  |  |                                   |         |                                       |         |                                      |         |                                      |         |  |         |   |         |   |         |   |         |   |         |   |         |  |         |



- Stealth black front bezel
  - H 9.7" x W 1.14" x D 17.6"; H 24.5cm x W 2.9cm x D 44.6cm
  - 12 lbs; 5.4kg (max configuration)
  - Configuration/Setup Utility: F1 at startup
  - Diagnostics (PC-Doctor™): F2 at startup
  - System Partition Boot: ALT+F1 at startup
  - Network Boot: F12 at startup
  - PXE Boot Agent Utility: Ctrl+S at startup
  - Blade control panel on each HS40 blade server provides media select button, keyboard/mouse/video select button, and indicators for blade error, information, location, disk activity, and power
  - Predictive Failure Analysis® alerts on memory, processor(s), and optional disk(s) with IBM Director
- Maximum internal disk capacity for each HS40 blade server<sup>13</sup>: 293.6GB\* with two 146.8GB SL SCSI disks

**LIMITED WARRANTY<sup>3</sup>**

- 3 year parts and labor
- International Warranty Service<sup>3</sup>
- On site, 8 am - 5 pm, Mon - Fri coverage excluding holidays, next business day response time<sup>7</sup>
- On site service upgrade options (in eligible locations):<sup>7</sup>
  - 3 year IOR 24x7, 2 hr avg response (ServicePac® part num 69P9519)
  - 3 year IOR 24x7, 4 hr avg response (ServicePac part num 69P9518)
  - 3 year IOR 9x5, 4 hr avg response (ServicePac part num 69P9517)
  - 5 year IOR 9x5, 4 hr avg response (ServicePac part num 69P9525)
  - 5 year IOR 24x7, 2 hr avg response (ServicePac part num 69P9527)
- Other ServicePac options at <http://www.ibm.com/services/us/its/pdf/wamomxeu.pdf>
- 24x7<sup>14</sup> toll-free support for warranty issues during the warranty period<sup>5</sup>



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

<sup>2</sup> 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.

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<sup>4</sup> A single "U", or rack unit, is 1.75" or 44.45mm.

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

<sup>6</sup> CD and DVD drives speeds are variable and are often less than the maximum.

<sup>7</sup> 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.

<sup>8</sup> Subject to conditions.

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

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

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

<sup>12</sup> 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.

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

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

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<sup>17</sup> 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.

<sup>18</sup> Diskettes and hard copy documentation available at extra charge.

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

<sup>20</sup> Statement of direction and subject to availability.

<sup>21</sup> 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.

<sup>22</sup> 16GB Memory max with PC2700 DIMMs, 8GB Max with PC3200 DIMMs



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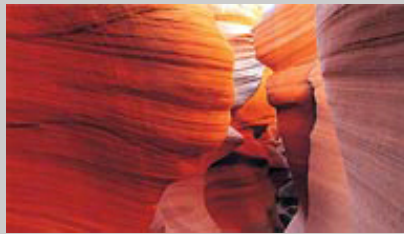
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