New IBM IntelliStation Z Pro models deliver up to 3.8 GHz Intel Xeon processors with new PCI Express graphics

Overview
Take advantage of the multitasking, multithreaded application power of the IntelliStation® Z Pro models featuring PCI Express for improved graphics performance.

New Intel® technologies offer EM64T support for 64-bit computing. The IntelliStation Z Pro models are ideal for high-end digital content creation, finance, engineering, petroleum/chemical, life sciences, high-end computing segments, and for UNIX® clients who want compelling price to performance and 64-bit support.

Solid performance
- SMP-capable Intel Xeon microprocessors up to 3.8 GHz with 2 MB L2 cache
- PC2-3200 ECC DDR2 SDRAM RDIMM memory
- Dual Ultra320 SCSI with HostRAID support and SATA HDD subsystems
- Choice of S.M.A.R.T. HDDs
  - 73 GB 10,000 or 15,000 rpm
  - Ultra320 SCSI
  - 160 GB 7,200 rpm SATA

Compelling graphics
- PCI Express graphics for top performance
  - NVIDIA Quadro NVS 285 for performance 2D
  - NVIDIA Quadro FX 1400 for advanced 3D
  - NVIDIA Quadro FX 3500 for high advanced 3D
  - NVIDIA Quadro FX 4500 for extreme 3D

Outstanding support
The highly reliable IntelliStation Z Pro systems feature a three-year limited warranty on parts and on-site labor.

Planned availability date
April 28, 2006

At a glance
New IntelliStation Z Pro models deliver scalable multiprocessor performance, with performance-driven technologies, graphics, and outstanding service and support.

- Intel Xeon single or dual processors up to 3.8 GHz¹ with Intel Extended Memory 64 Technology (EM64T)
- Support for 16 GB² of PC2-3200 ECC double data rate (DDR2) SDRAM RDIMM memory using 4 GB DIMMs
- Choice of advanced PCI Express graphics adapters ranging from performance 2D to high advanced 3D
- HDDs
  - Integrated Ultra320 and Serial-ATA (SATA) support
  - High-performance 10,000 and 15,000 rpm Ultra320 SCSI or 7,200 rpm SATA HDDs with S.M.A.R.T.
- CD-RW/DVD-ROM combination drive
- Integrated Gigabit Ethernet, mirroring, and IEEE 1394
- Rack-mountable tower system with six slots, six bays, five fans, and 530-watt power supply with power factor correction (PFC)
- Microsoft® Windows® XP Professional 32- and 64-bit or Red Hat Enterprise Linux® WS 4 (models 6Dx, 7Cx)
- System hardware warranty — Three-year warranty³ on parts and on-site⁴ labor

For ordering, contact:
Your IBM representative or the Americas Call Centers at 800-IBM-CALL

Reference: SE001

¹06-242

This announcement is provided for your information only. For additional information, contact your IBM representative, call 800-IBM-4YOU, or visit the IBM home page at: http://www.ibm.com.
Description

The new IntelliStation Z Pro systems deliver leadership technology, advanced industrial design, and IBM quality, service, and support.

System features

- Intel Xeon microprocessor with 800 MHz (4 x 200) FSB speed, streaming SIMD extensions, and EM64T
- 2 MB full-speed on-board L2 cache
- Six DIMM sockets that support 16 GB of PC2-3200 ECC DDR2 SDRAM RDIMM memory
- Supports 512 MB, 1 and 2 GB, and 4 GB memory DIMMs
- PCI Express x16 graphics slot on system board that supports the following dual-head-compatible adapters:
  - NVIDIA Quadro NVS 285 with 64 MB video memory
  - NVIDIA Quadro FX 1400 with 128 MB video memory
  - NVIDIA Quadro FX 3500 with 256 MB video memory
  - NVIDIA Quadro FX 4500 with 512 MB video memory
- Supports 512 MB, 1 and 2 GB, and 4 GB memory DIMMs
- PCI Express x16 graphics slot
- Integrated IDE ATA-100 controller and two SATA ports
- Integrated dual-channel Ultra320 with integrated mirroring support
- Six PCI slots
  - Two PCI-X 64-bit/100 MHz (full-length)
  - One PCI-X 64-bit/133 MHz (full-length)
  - Two PCI 32-bit/33 MHz (half-length)
  - One PCI Express x16 graphics slot
- CD-RW/DVD-ROM combination drive
- Choice of S.M.A.R.T. HDDs
  - 73 GB 10,000 and 15,000 rpm Ultra320 SCSI
  - 160 GB 7,200 rpm SATA
- Integrated Gigabit Ethernet with RJ-45 port
- 530-watt, voltage-sensing power supply with PFC
- Rack-mountable tower with six slots, six bays, and five fans
- Two 9-pin serial ports, one 25-pin parallel port, six USB ports, and two IEEE 1394 ports
- AC’97 audio
  - Line in/out jacks and microphone-in on rear
  - Microphone-in and headphone-out on front
- IBM 104-key keyboard and three-button PS/2® mouse
- Preloaded operating system
- Plug-and-play capability as supported by operating system

Advanced industrial design

Rack-mountable tower

Expansion bays

Six expansion bays

- Two accessible 5.25-inch half-high bays (one with CD-ROM)
- One accessible 3.5-inch slim bay (for diskette drive option)
- Three internal 3.5-inch slim bays (one with HDD)

Expansion slots

Six expansion card slots

- One PCI Express x16 graphics slot with graphics adapter
- Two PCI-X 64-bit/100 MHz (full-length)
- One PCI-X 64-bit/133 MHz (full-length)
- Two PCI 32-bit/33 MHz (half-length)

Fans

Five speed-controlled fans

- One fan with power supply
- Two in front
- One PCI I/O
- One HDD

Refer to the Limitations section for slot availability and card length restrictions.

System software

All models run Microsoft Windows XP Professional or Red Hat Enterprise Linux WS 4 and are shipped with the following:

- Preload image on the HDD
- Device drives CD-ROM that includes selected device drivers for Windows XP and Red Hat Enterprise Linux WS 4
- Diskette copies and hardcopy publications available for an additional charge.

Note: Applications and device drivers may vary from the retail version and may not include all functions and documentation. Not all applications are available separately; titles are subject to change. IBM makes no representation or warranties regarding non-IBM products. For non-IBM software, applicable vendor software licenses may apply.

Refer to the Software information section for a full list of software shipped with the IntelliStation Z Pro workstation.

Compatibility, service, and support

- Compatibility
  - PCI
  - IDE, SCSI, SATA
  - PCI Express
  - USB
  - Serial and parallel ports
  For the latest information on software and hardware compatibility testing and third-party certifications, visit http://www4.pc.ibm.com/pwscompat
- Manufactured to meet high-quality IBM standards
- Service and support: Three-year parts and labor, IBM on-site repair (IOR)

Accessibility by people with disabilities

The following features support use by people with disabilities:

- Controls and latches operable with one hand and minimal dexterity
- Keys discernible by touch without activating them
- Ports and connectors support connection of industry-standard devices
Product positioning

The latest IntelliStation Z Pro workstation represents a new level of high performance with the customer-driven design, latest technologies, and tuned architecture and features that can help you achieve high levels of graphical and computational productivity and creativity. You can now easily transition from 32-bit to 64-bit computing on your schedule.

IntelliStation Z Pro models provide a migration path for users who want the latest Xeon processors. Those who are currently using the UNIX operating system will find the IntelliStation Z Pro system provides computational power and 64-bit support with an advantageous price/performance. New technologies include:

- Intel Xeon processors up to 3.8 GHz
- 2 MB L2 cache
- 800 MHz system bus
- Intel EM64T support
- PCI Express x16 graphics slot
- Integrated dual channel U320 SCSI and SATA
- Gigabit Ethernet
- PCI-X for optimum system performance

The price and performance advantages and manageability of the IntelliStation platform can help you migrate from UNIX workstations to Intel-based workstations with Windows XP Professional and Red Hat Enterprise Linux operating systems. The 64-bit support prepares you for the future of 64-bit computing.

You can run 32-bit applications on a 32-bit operating system for a compelling price-to-performance ratio. You can also transition to a 64-bit operating system when they are available and run both 32-bit and 64-bit applications.

Help protect your current investment in 32-bit applications, but make the transition at your own speed to 64-bit applications. The IntelliStation workstations are part of the IBM eServer xSeries server family and benefit from joint development in the areas of management and design. IntelliStation systems are highly manageable with the award-winning IBM Director systems management application. They are easily integrated into whatever enterprise systems manager you use. The new IntelliStation design also incorporates technologies that have already been used in the server arena such as diagnostic LEDs, integrated mirroring, and PCI-X. Joint development helps to enable even higher reliability and dependability of the latest IntelliStation workstations.

From its sleek elegant exterior design to its interior layout, the system is designed for easy tool-less upgrade and scalability in a minitower form factor. A powerful 530-watt power supply delivers power to spare for the most robust configurations. All models use one of the six slots for a PCI Express graphics adapter. They have four open DIMM slots for additional memory upgrades, supporting 16 GB of memory.

Reference information

1 GHz measures only microprocessor internal clock speed, not application performance. Many factors affect application performance.

2 GB equals 1,000,000,000 bytes when referring to HDD or memory capacity; actual capacity may be different.

3 For information on the IBM Statement of Limited Warranty, call 800-IBM-SERV (426-7378) or contact your IBM representative or reseller. Copies are available upon request.

4 You may be asked certain diagnostic questions before a technician is sent or you may be sent a CRU. The information in IBM announcement letters is subject to change without notice, consult the IBM Sales Manual, or your IBM representative or reseller, for the most current information.

Trademarks

IntelliStation, PS/2, xSeries, and eServer are registered trademarks of International Business Machines Corporation in the United States or other countries or both.

Intel is a registered trademark of Intel Corporation.

Microsoft and Windows are trademarks of Microsoft Corporation.

UNIX is a registered trademark of the Open Company in the United States and other countries.

Linux is a trademark of Linus Torvalds in the United States, other countries or both.

Other company, product, and service names may be trademarks or service marks of others.
Additional product attributes

• Processor: In a dual-processor environment, the system supports the same type and clock-speed processors.

• Memory
  - IntelliStation® Z Pro systems support only PC2-3200 ECC DDR2 SDRAM RDIMM. These memory DIMMs are installed in pairs. There are six memory sockets.
  - To achieve maximum memory capacities, standard memory replacement may be required with the currently supported memory DIMMs available from IBM, which offer the largest capacity.

• HDDs
  - Maximum of four internally mounted Ultra320 SCSI or SATA HDDs are supported when using the IBM ServeRAID™ 7t SATA controller.
  - Maximum internal HDD capacities assume the replacement of any standard HDDs and the population of maximum allowed HDD bays with the largest currently supported HDDs available from IBM.
  - The maximum internal HDD capacities are supported via the following configurations:
    -- 1.2 TB with four 300 GB 10,000 rpm Ultra320 SCSI HDDs; refer to the Limitations section
    -- 1 TB with four 250 GB 7,200 rpm SATA HDDs using the ServeRAID 7t SATA controller
  - Systems support one diskette drive option.
  - IDE and Ultra320 controllers are standard.
  - Subject to bay usage limitations; refer to the Limitations section.

• Graphics: Systems have one PCI Express x16 graphics slot, which supports only compliant graphics accelerators. Models of the IntelliStation Z Pro 6223 are shipped with NVIDIA Quadro NVS 285, NVIDIA Quadro FX 1400, NVIDIA Quadro FX 3500, or NVIDIA Quadro FX 4500 adapters.

• Operating system: Windows™ XP Professional and Red Hat Enterprise Linux™ WS 4 are supported on the IntelliStation Z Pro system.
  For additional details on Linux support, visit http://www.ibm.com

• Power management: Advanced Configuration and Power Interface (ACPI) support depends on the installed operating system.

• Miscellaneous: To use the IntelliStation Z Pro system as a rack-mounted system, an IBM rack-mount kit is required.

Advanced manageability and security information

ACPI: ACPI is an open industry specification that defines a flexible and extensible hardware interface for the system board. Software designers use this specification to integrate power management features throughout a computer system, including hardware, the operating system, and application software. This integration enables Windows to determine which applications are active and handle all of the power management resources for computer subsystems and peripherals.

IBM manageability tools

Desktop Management Interface (DMI) Service Provider: This tool can help administrators manage and control hardware and software products on desktop computers and servers. Each DMI-compliant component registers its configuration information in a management information format file that follows an industry-standard format. The IntelliStation system is DMI specification 2.0-compliant. Support documentation is built into the help system.

• DMI BIOS Instrumentation: Retrieves information from the system BIOS, such as memory configuration, BIOS version and date, and microprocessor and cache information.

• PC System Monitor Instrumentation: Monitors system-board temperatures, system voltages, and fan speed, and detects removal of the computer cover. Data is reported to the DMI service layer. Systems management software, such as IBM Director Agent, can then be used to send an alert to the user or the system administrator if a problem occurs.

IBM Director Agent

IBM Director Agent, a client management application for networked computers, centralizes control of your computer systems to potentially help lower the total cost of ownership. View, monitor, and control your networked computers with IBM Director Agent.

With IBM Director Agent, you can:

• Learn detailed inventory information about your computers, including the operating system, memory, network cards, and hardware.

• Track your computers proactively with features such as power management, event log, and system monitoring.

• Upwardly integrate with Tivoli® Enterprise, Tivoli NetView®, Computer Associates Unicenter, HP OpenView, Microsoft™ SMS, BMC Patrol, and NetIQ AppManager.
Because IBM Director Agent uses some of the latest systems management standards, including Common Information Model, Web-Based Enterprise Management, and XML, it is typically compatible with the enterprise management software you already have.

IBM Director Agent can also be used with the complete IBM Director product for more comprehensive workgroup management:

- Managing groups of systems
- Performing tasks on those groups
- Responding to alerts with automated action plans

The IntelliStation workstation is designed to support IBM Director. The software versions, features, and functions of IBM Director Agent may change as new releases become available or may be discontinued at any time. To see if your computer is supported, visit


**IBM deployment tools**

Remote Deployment Manager™, System Migration Assistant™, and Software Delivery Assistant make deploying, managing, maintaining, and repurposing your Windows operating systems easier than ever. These tools help you configure a new system including the hardware and operating system, loading software, and handling the unique software requirements of your company’s different business groups. These powerful deployment and migration software tools work together to help facilitate and expedite the deployment of your Windows operating systems, settings, data files, and applications.

**Technology enablers**

IBM technology enablers are the supporting hardware designed into IBM products to help enable comprehensive systems management.

- Pre-boot eXecution Environment (PXE) is firmware located on the network interface card that allows a networked PC to find a configuration server on the network before loading any operating system.
- S.M.A.R.T. HDDs offer early warning of some failures so that critical data can be protected. S.M.A.R.T. HDDs are the industry-standard reliability indicator for both Ultra SCSI and Serial-ATA HDDs.
- Wake on LAN®, a product of the IBM and Intel® Advanced Manageability Alliance, enables administrators to remotely power on a networked client system from a powered-off state.

**Alert Standard Format 2.0 (ASF):** Enhance your ability to monitor PCs locally or remotely with remote secure power-on capability. ASF notifies you immediately of system events such as chassis intrusion, client disconnect from the network, or system startup errors, regardless of the power state of the system. ASF helps provide both systems management and asset protection. Systems management notifies you of configuration changes during power-on self-test (POST), system errors during POST, and operating system hangs or errors.

Asset protection tracks the system presence via monitoring of a LAN connection and tracking intrusion regardless of whether the system is fully powered on, or whether the system is off but still plugged into the outlet. Also, ASF notifies you when certain environmental conditions, such as the temperature, are abnormal.

**Hardware and software information**

**Hardware information**

**Monitors:** IBM monitors supported by the IntelliStation Z Pro workstation will be reflected in the compatibility report to be made available to marketing and support channels when testing is complete.

**Performance 2D graphics**

**NVIDIA Quadro NVS 285 PCI Express video adapter:** This 2D class video adapter is used in high-performance 2D models.

This adapter includes:

- NVIDIA NV44NVS video chip
- 64 MB of 200 MHz DDR SDRAM
- Dual 350 MHz RAMDACs integrated into the video chip
- Flashable video BIOS
- DDC2B monitor connector

The NVIDIA NV44NVS chip is a 100% compatible superset of the VGA function, supports all VGA modes, and contains all of the following advanced features.

**Technical capabilities**

- 64-bit, 200 MHz DDR SDRAM interface
- 350 MHz internal RAMDAC supporting analog resolution up to 2048 x 1536 in single- and dual-monitor mode
- NVIDIA nView display technology allows a single PCI Express adapter to independently support any two of the following displays:
  - Analog CRT monitor
  - Digital CRT monitor (with optional DMS59-to-Dual DVI-I cable)
  - Analog flat panel
  - Digital flat panel (with optional DMS59-to-Dual DVI-I cable)
- x16 PCI Express support
- Flashable video BIOS
- VESA VBE V2.0 and DDC2B compliance
- Display power management signaling (DPMS)
- Complete plug-and-play support

**Software information**

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- Flashable video BIOS
- VESA VBE V2.0 and DDC2B compliance
- Display power management signaling (DPMS)
- Complete plug-and-play support
Display modes: The NVIDIA Quadro NVS 285 (NV44NVS) supports the following screen resolutions and refresh rates:

<table>
<thead>
<tr>
<th>Resolution</th>
<th>Color Bits</th>
<th>Refresh Rate (Hz)</th>
</tr>
</thead>
<tbody>
<tr>
<td>320 x 200</td>
<td>8, 16, 32</td>
<td>60, 70, 75</td>
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<tr>
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<td>60, 70, 75</td>
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<tr>
<td>400 x 300</td>
<td>8, 16, 32</td>
<td>60, 70, 75</td>
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<tr>
<td>480 x 360</td>
<td>8, 16, 32</td>
<td>60, 70, 75</td>
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<tr>
<td>512 x 384</td>
<td>8, 16, 32</td>
<td>60, 70, 75</td>
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<tr>
<td>640 x 400</td>
<td>8, 16, 32</td>
<td>60, 70, 75, 75, 85, 100, 120</td>
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<tr>
<td>640 x 480</td>
<td>8, 16, 32</td>
<td>60, 70, 75, 85, 100, 120</td>
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<tr>
<td>800 x 600</td>
<td>8, 16, 32</td>
<td>60, 70, 75, 85, 100, 120</td>
</tr>
<tr>
<td>1024 x 768</td>
<td>8, 16, 32</td>
<td>60, 70, 75, 85, 100, 120</td>
</tr>
<tr>
<td>1152 x 864</td>
<td>8, 16, 32</td>
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</tr>
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<td>1280 x 960</td>
<td>8, 16, 32</td>
<td>60, 70, 75, 85, 100, 120</td>
</tr>
<tr>
<td>1280 x 1024</td>
<td>8, 16, 32</td>
<td>60, 70, 72, 75, 85, 100, 120</td>
</tr>
<tr>
<td>1600 x 900</td>
<td>8, 16, 32</td>
<td>60, 70, 75, 85, 100, 120</td>
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<tr>
<td>1600 x 1200</td>
<td>8, 16, 32</td>
<td>60, 70, 72, 75, 85, 100</td>
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<tr>
<td>1792 x 1344</td>
<td>8, 16, 32</td>
<td>60, 70, 72, 75, 85</td>
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<td>1856 x 1392</td>
<td>8, 16, 32</td>
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<td>2048 x 1536</td>
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</table>

Analog Digital resolution resolution

Single-head 2048 x 1536 1280 x 1024 (24 Hz)
Dual-head 2048 x 1536 each 1280 x 1024 each (12 Hz)

Advanced 3D graphics

NVIDIA Quadro FX 1400 128 MB PCI Express video adapter

This adapter includes:

- NVIDIA NV41GL graphics processing unit
- Full support for Shader Model 3.0 / DirectX 9.1
- Next-generation cinematic graphics with full programmability
- Full 128-bit floating-point precision graphics pipeline
- Outputs: Two DVI-I connectors and one VESA three-pin sync connector
- x16 PCI Express bus interface

Additional features

- Optimized and certified by NVIDIA for all leading workstation applications
- Hardware-accelerated anti-aliased points and lines
- Hardware OpenGL overlay planes
- Hardware accelerated two-sided lighting
- OpenGL quad-buffered stereo
- Highest precision pixel shading: native, optimized FP32 processing
- Broad operating system support, including Windows XP, Windows 2000, and Linux
- Advanced multiview desktop and application management seamlessly integrated into Microsoft Windows operating system

NVIDIA nView display technology allows a single PCI Express adapter to independently support any two of the following displays:

- Analog CRT monitor
- Digital CRT monitor
- Analog flat panel
- Digital flat panel

Technical capabilities

- 128 MB of 256-bit DDR SDRAM memory interface
- Dual 400 MHz RAMDACs supporting a primary display and a secondary analog display resolution up to 2048 x 1536 at 85 MHz per display
- 12-bit sub-pixel precision
- Eight pixels per clock rendering engine/eight graphics pipelines
- 16x full-scene anti-aliasing (FSAA)

Display modes: The NVIDIA Quadro FX 1400 supports the following screen resolutions and refresh rates:

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</tr>
<tr>
<td>3840 x 2400</td>
<td>8, 16, 32</td>
<td>13, 20, 24, 25</td>
</tr>
</tbody>
</table>

High advanced 3D graphics

NVIDIA Quadro FX 3500 256 MB PCI Express video adapter

This adapter includes:

- NVIDIA G71GL video chip
- Full 128-bit floating-point precision graphics pipeline
- OpenGL quad-buffered stereo (3-pin sync connector)
- x16 PCI Express support
- Optimized and certified, by third parties, for leading workstation applications
- Hardware accelerated anti-aliased points and lines
- Hardware OpenGL overlay planes
- Hardware accelerated two-sided lighting
- High-performance OpenGL hardware accelerated pixel readback
- Full support for shader model 3.0/DirectX 9.1
- Comprehensive Microsoft DirectX 9.1 (and lower) and OpenGL 2.0 (and earlier) support
• Broad operating system support including Windows XP 64- and 32-bit, Windows 2000, and Linux 64- and 32-bit
• Advanced multidisplay desktop and application management seamlessly integrated into Microsoft Windows

NVIDIA nView display technology allows a single PCI Express adapter to independently support any two of the following displays:
• Analog CRT monitor
• Digital CRT monitor
• Analog flat panel
• Digital flat panel

Technical capabilities
• 256 MB of 256-bit, GDDR3 SDRAM memory interface
• Dual 400 MHz RAMDACs supporting a primary display and a secondary analog display resolution up to 2048 x 1536 at 85 MHz per display
• 8 pixels per clock rendering engine
• 16 textures per pixel
• 16x full-scene anti-aliasing (FSAA)
• 12-bit subpixel precision

Display modes
The NVIDIA Quadro FX 3500 PCIe supports the following screen resolutions and refresh rates:

<table>
<thead>
<tr>
<th>Resolution</th>
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<th>Refresh rate (Hz)</th>
</tr>
</thead>
<tbody>
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<td>320 x 200</td>
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<td>512 x 384</td>
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<td>60, 70, 75</td>
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<td>640 x 400</td>
<td>8, 16, 32</td>
<td>60, 70, 72, 75, 85, 100, 120</td>
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<td>640 x 480</td>
<td>8, 16, 32</td>
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<td>800 x 600</td>
<td>8, 16, 32</td>
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<tr>
<td>1024 x 768</td>
<td>8, 16, 32</td>
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<tr>
<td>1152 x 864</td>
<td>8, 16, 32</td>
<td>60, 70, 72, 75, 85, 100, 120</td>
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<tr>
<td>1280 x 720</td>
<td>8, 16, 32</td>
<td>60, 70, 75, 85, 100, 120</td>
</tr>
<tr>
<td>1280 x 960</td>
<td>8, 16, 32</td>
<td>60, 70, 75, 85, 100, 120</td>
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<td>1280 x 1024</td>
<td>8, 16, 32</td>
<td>60, 70, 72, 75, 85, 100, 120</td>
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<tr>
<td>1600 x 900</td>
<td>8, 16, 32</td>
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</tr>
<tr>
<td>1600 x 1200</td>
<td>8, 16, 32</td>
<td>60, 70, 72, 75, 85, 100</td>
</tr>
<tr>
<td>1792 x 1344</td>
<td>8, 16, 32</td>
<td>60, 75</td>
</tr>
<tr>
<td>1856 x 1392</td>
<td>8, 16, 32</td>
<td>60, 75</td>
</tr>
<tr>
<td>1920 x 1080</td>
<td>8, 16, 32</td>
<td>60, 70, 72, 75, 85, 100</td>
</tr>
<tr>
<td>1920 x 1200</td>
<td>8, 16, 32</td>
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<tr>
<td>1920 x 1400</td>
<td>8, 16, 32</td>
<td>60, 70, 72, 75, 85</td>
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<tr>
<td>2048 x 1536</td>
<td>8, 16, 32</td>
<td>60, 70, 72, 75, 85</td>
</tr>
<tr>
<td>3840 x 2400</td>
<td>8, 16, 32</td>
<td>13, 20, 24, 25</td>
</tr>
</tbody>
</table>

Maximum analog resolution
Maximum digital resolution

Single-head: 2048 x 1536
Dual-head: 2048 x 1536 each

Extreme 3D graphics

NVIDIA Quadro FX 4500 512 MB PCI Express video adapter

This adapter includes:
• NVIDIA G70GL video chip
• Full 128-bit floating-point precision graphics pipeline
• OpenGL quad-buffered stereo (three-pin sync connector)
• x16 PCI Express support
• Optimized and certified, by third parties, for leading workstation applications
• Hardware accelerated anti-aliased points and lines
• Hardware OpenGL overlay planes
• Hardware accelerated two-sided lighting
• High-performance OpenGL hardware accelerated pixel readback
• Full support for shader model 3.0/DirectX 9.1
• Comprehensive Microsoft DirectX 9.0c (and lower) and OpenGL 1.5 (and earlier) support
• Broad operating system support including Windows XP 64- and 32-bit, Windows 2000, and Linux 64- and 32-bit
• Advanced multidisplay desktop and application management seamlessly integrated into Microsoft Windows

NVIDIA nView display technology allows a single PCI Express adapter to independently support any two of the following displays:
• Analog CRT monitor
• Digital CRT monitor
• Analog flat panel
• Digital flat panel

Technical capabilities
• 512 MB of 256-bit, GDDR3 SDRAM memory interface
• Dual 400 MHz RAMDACs supporting a primary display and a secondary analog display resolution up to 2048 x 1536 at 85 MHz per display
• 8 pixels per clock rendering engine
• 16 textures per pixel
• 16x full-scene anti-aliasing (FSAA)
• 12-bit subpixel precision

Display modes
The NVIDIA Quadro FX 4500 PCIe supports the following screen resolutions and refresh rates:

<table>
<thead>
<tr>
<th>Resolution</th>
<th>Color bits</th>
<th>Refresh rate (Hz)</th>
</tr>
</thead>
<tbody>
<tr>
<td>320 x 200</td>
<td>8, 16, 32</td>
<td>60, 70, 75</td>
</tr>
<tr>
<td>320 x 240</td>
<td>8, 16, 32</td>
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<tr>
<td>2048 x 1536</td>
<td>8, 16, 32</td>
<td>60, 70, 72, 75, 85</td>
</tr>
<tr>
<td>3840 x 2400</td>
<td>8, 16, 32</td>
<td>13, 20, 24, 25</td>
</tr>
</tbody>
</table>
### Software information

The new IntelliStation Z Pro models were tested for compatibility with the Windows XP Professional and Red Hat Enterprise Linux WS 4 operating system.

Depending on the model, the following types of software are included with the system:

- Operating system preloaded or DOS 2k license
- Select device drivers on CD-ROM or diskette
- Software license for specific licensed software available from IBM

**Microcode:** The IntelliStation Z Pro system uses flash BIOS, which supports the following features:

- PCI BIOS Specification V2.2
- Plug-and-play BIOS Specification V1.0A
- DMI BIOS Specification V2.0

**Preload image recovery:** Selected models are preloaded with Windows XP Professional. Preload image recovery is enabled through disk-to-disk recovery or the product recovery CD.

**Disk-to-disk product recovery:** The new IntelliStation Z Pro systems preinstalled with operating systems have a unique partition on the HDD for product recovery. If the preload image is corrupted, the original image can be retrieved from the recovery partition.

**Product recovery CD:** Product recovery CDs are available as field-replaceable units (FRUs) for systems preloaded with Windows XP Professional. They offer the option to fully recover and restore the original preload image of the operating system, including most original device drivers and all applications after formatting the HDD.

<table>
<thead>
<tr>
<th>Maximum analog resolution</th>
<th>Maximum digital resolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single-head 2728 x 1536</td>
<td>3840 x 2400 (48 Hz)</td>
</tr>
<tr>
<td>Dual-head 2728 x 1536 each</td>
<td>3840 x 2400 each (24 Hz)</td>
</tr>
<tr>
<td>Description</td>
<td>Preload software</td>
</tr>
<tr>
<td>-------------------</td>
<td>------------------</td>
</tr>
<tr>
<td>BIOS</td>
<td></td>
</tr>
<tr>
<td>Flash BIOS</td>
<td></td>
</tr>
<tr>
<td>Operating system</td>
<td></td>
</tr>
<tr>
<td>Windows XP Prof.</td>
<td></td>
</tr>
<tr>
<td>Red Hat Enterprise</td>
<td></td>
</tr>
<tr>
<td>DOS 2k</td>
<td></td>
</tr>
<tr>
<td>Online books</td>
<td></td>
</tr>
<tr>
<td>User’s Guide</td>
<td></td>
</tr>
<tr>
<td>Utilities</td>
<td></td>
</tr>
<tr>
<td>Set up your</td>
<td></td>
</tr>
<tr>
<td>Network icon</td>
<td></td>
</tr>
<tr>
<td>IBM Director Agent</td>
<td></td>
</tr>
<tr>
<td>(Win 32-bit only)</td>
<td></td>
</tr>
<tr>
<td>Tivoli Mgmt Agent</td>
<td></td>
</tr>
<tr>
<td>(TMA)</td>
<td></td>
</tr>
<tr>
<td>Applications(5)</td>
<td></td>
</tr>
<tr>
<td>IBM Product Regs.</td>
<td></td>
</tr>
<tr>
<td>(Intelliquest/N Aviant)</td>
<td></td>
</tr>
<tr>
<td>Acrobat Reader</td>
<td></td>
</tr>
<tr>
<td>(Win 32-bit only)</td>
<td></td>
</tr>
<tr>
<td>PC Doctor for Win.</td>
<td></td>
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<tr>
<td>Norton Antivirus</td>
<td></td>
</tr>
<tr>
<td>(Windows models)</td>
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</tr>
<tr>
<td>IBM Record Now</td>
<td></td>
</tr>
<tr>
<td>(CDRW only)</td>
<td></td>
</tr>
<tr>
<td>IBM Drive Letter Access</td>
<td></td>
</tr>
<tr>
<td>(CDRW only)</td>
<td></td>
</tr>
<tr>
<td>Device drivers(5)</td>
<td></td>
</tr>
<tr>
<td>Analog Devices 1885</td>
<td></td>
</tr>
<tr>
<td>SoundMAX audio CODEC</td>
<td></td>
</tr>
<tr>
<td>Broadcom Ethernet</td>
<td></td>
</tr>
<tr>
<td>IBM PS/2(R) 3-button</td>
<td></td>
</tr>
<tr>
<td>Mouse (Multilingual)</td>
<td></td>
</tr>
<tr>
<td>Intel INF file</td>
<td></td>
</tr>
<tr>
<td>Adaptec SCSI 7902</td>
<td></td>
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<tr>
<td>Ultra320 Dual CH</td>
<td></td>
</tr>
<tr>
<td>NVIDIA Quadro NVS 285</td>
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<tr>
<td>NVIDIA Quadro FX 1400</td>
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<td>NVIDIA Quadro FX 3500</td>
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<tr>
<td>NVIDIA Quadro FX 4500</td>
<td></td>
</tr>
<tr>
<td>All drivers</td>
<td></td>
</tr>
</tbody>
</table>

5 Applications and device drivers may vary from the retail version and may not include all functions and documentation. Not all applications are available separately; titles are subject to change.
Application descriptions

IBM Product Registration: Users can register with IBM.

Acrobat Reader (Windows models only): View .pdf files, a common format for text and Web documentation.

Diagnostics (PC-Doctor, Inc. Windows 32-bit only): Test hardware in the Windows environment.

Norton AntiVirus for IBM (OEM Version) (Win 32-bit only): Detect and remove viruses from your computer.

IBM Record Now (CD-RW/combination models only) (Windows models only): Create a CD or CD image from a selected set of files.

IBM Driver Letter Access (CD-RW/combination models only) (Windows models only): Copy files from a writable CD through Windows Explorer.

Plug-and-play support: Plug-and-play specifications make it easier for users to install, upgrade, and make changes to their PCs. Systems that use plug-and-play adapter cards are self-configuring.

PC-Doctor Diagnostics (PC-Doctor, Inc./IBM): These diagnostic tools for isolating problems also provide information about your computer operating system environment and installed features. Support documentation is built into the help system.

Education support

No self-study or classroom courses are available specifically for the IBM IntelliStation Z Pro workstation.

Call IBM Education and Training at 800-IBM-TEACH (426-8322) for education catalogs, schedules, and enrollments.

Publications

The following publications are shipped with the IntelliStation Z Pro system:

<table>
<thead>
<tr>
<th>Title</th>
<th>Part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>IntelliStation Installation Guide</td>
<td>88P9871</td>
</tr>
<tr>
<td>IntelliStation Device Driver CD</td>
<td>31R2180</td>
</tr>
<tr>
<td>IntelliStation Documentation CD</td>
<td>31R1988</td>
</tr>
</tbody>
</table>

The Windows XP Professional software documentation (32P4672) is shipped with models that have Windows XP Professional preinstalled.

The IBM Publications Center Portal


The Publications Center is a worldwide central repository for IBM product publications and marketing material with a catalog of 70,000 items. Extensive search facilities are provided, as well as payment options via credit card. A large number of publications are available online in various file formats, which can currently be downloaded free of charge.

The publications, in U.S. English, IntelliStation User’s Guide and Hardware Maintenance Manual, are available from

http://www.pc.ibm.com/support

Click workstations, then the workstation family, then Online Publications.

Services

IBM Integrated Technology Services

IBM services include business consulting, outsourcing, hosting services, applications, and other technology management.

These services help you learn about, plan, install, manage, or optimize your IT infrastructure to be an On Demand Business. They can help you integrate your high-speed networks, storage systems, application servers, wireless protocols, and an array of platforms, middleware, and communications software for IBM and many non-IBM offerings. IBM is your one-stop shop for IT support needs.

For details on available services, contact your IBM representative or visit

http://www.ibm.com/services/

For details on available IBM Business Continuity and Recovery Services, contact your IBM representative or visit

http://www.ibm.com/services/continuity

For details on education offerings related to specific products, visit


Select your country, and then select the product as the category.

Technical information

Physical specifications

HDD specifications

<table>
<thead>
<tr>
<th>Capacity</th>
<th>73 GB</th>
<th>160 GB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interface</td>
<td>Ultra320 SCSI</td>
<td>SATA</td>
</tr>
</tbody>
</table>

Formatted capacity 73.4 GB 160 GB
Average read seek time 4.7 ms 9.0 ms
Average latency 2.99 ms 4.17 ms
S.M.A.R.T. Enabled Enabled
rpm 10,000 7,200

Note: GB equals 1,000,000,000 bytes when referring to HDD capacity; accessible capacity may be less.

48x-24x-48x max CD-RW specifications

Formatted capacity 700 MB
Average access time 100 ms
Data transfer rate (read) 3000-7200 KB/s
Data transfer rate (CD-R write) 3000-7200 KB/s
Data transfer rate (CD-RW write) 1500-3600 KB/s
Technology CAV
Interface IDE
Buffer 2 MB
48x-32x-48x-16x max CD-RW/DVD-ROM combination drive specifications

• Sustained data transfer rates
  - DVD-ROM (6.5x-16x CAV, 4.7 GB DVD-ROM read): 8.7 to 22.1 MB/s
  - DVD-ROM (3.3x-8x CAV, 8.5 GB dual-layer read): 4.4 to 11.0 MB/s
  - DVD-R (2.5x-6x CAV, 4.7 GB DVD-R read): 3.3 to 8.1 MB/s
  - DVD-R (2.5x-5x CAV, 3.95 GB DVD-R read): 3.3 to 6.7 MB/s
  - DVD-RAM (2x CLV, 2.6 GB DVD-RAM read): 2.7 MB/s
  - DVD-RAM (2x — 4.6 CAV 4.7 GB DVD-RAM read): 2.7 to 6.2 MB/s
  - DVD-RW (2.5x-6x CAV, 4.7 GB DVD-RW read): 3.3 to 8.1 MB/s
  - CD-ROM (20x-48x CAV, CD-ROM read): 3.0 to 7.2 MB/s
  - CD-R/RW (18x-40x CAV, CD-R/RW read): 2.7 to 6.0 MB/s
• Max burst data transfer rate: Ultra DMA Mode 2: 33 MB/s
• Average access times
  - DVD-ROM including latency, single layer: 120 ms
  - CD-ROM including latency: 110 ms
  - CD-RW including latency: 110 ms
  - 2 MB data buffer

Note: Variable read rate. Actual playback speed will vary and is often less than the maximum possible.

Mechanical specifications

• Height: 441 mm (17.375 in); optional handle adds 28.8 mm (1.125 in)
• Width: 215.9 mm (8.5 in)
• Depth: 492 mm (19.375 in)
• Weight: 16.3 kg (36.0 lb) (depending on configuration)

Electrical power specifications

• 530-watt supply continuous
• 110 V ac or 220 V ac operation controlled by an auto-sense design
• Built-in overload and surge protection
• 100 to 127 (nominal) V ac; 50 or 60 Hz; 8.0 A (maximum)
• 200 to 240 (nominal) V ac; 50 or 60 Hz; 4.0 A (maximum)

Ambient air temperature specifications

• System on: 10° to 35°C (50° to 95°F) at 0 to 2,134 m (0 to 7,000 ft)
• System off: -40° to 60°C (-40° to 140°F) at 0 to 2,134 m (0 to 7,000 ft)

Shipping specifications

Approximate shipping dimensions and weight

Software requirements

Operating system software: The new IntelliStation Z Pro models were tested for compatibility with Windows XP Professional and Red Hat Enterprise Linux WS 4.

Systems compatibility report: The IntelliStation Z Pro workstation has been tested for compatibility with numerous devices.

To view IntelliStation compatibility reports, visit


For software not included in the compatibility test report, contact the manufacturer or place of purchase to validate compatibility.

Limitations

• Memory
To achieve 8 GB of system memory, you can add a 2 GB PC2-3200 ECC DDR2 SDRAM RDIMM in the first two DIMM slots and a 1 GB PC2-3200 ECC DDR2 SDRAM RDIMM in the last four slots. To achieve 16 GB of system memory, you can add a 4 GB PC2-3200 ECC DDR2 SDRAM RDIMM in the first four slots. All supported system memory is addressable through direct memory access.

PC2-3200 ECC DDR2 SDRAM RDIMM memory must be installed in pairs.

Note: Maximum memory may require replacement of standard memory with optional maximum memory modules.

- The 32-bit/33 MHz PCI slot does not support a 64-bit PCI adapter due to physical limitations.
- Full-length PCI cards with daughter cards attached do not fit and are not supported in PCI slot 5.
- Wake on LAN is not supported, if systems are improperly shut down.
- Graphics
  - The NVIDIA Quadro FX 3500 and NVIDIA Quadro FX 4500 require external PCI Express power direct from the power supply.
  - Slot 2 will not be available when using the NVIDIA Quadro FX 4500 graphics adapter.
- HDD
  - The base system supports four SCSI HDDs or two SATA HDDs. Two additional SATA HDDs are supported using the IBM ServeRAID 7t SATA controller.
  
  Note: The number of devices per system may be limited, therefore highly complex configurations may not be supported. To confirm a configuration is supported, check with your IBM sales representative.

- 5.25-inch bays do not support 10,000 rpm, or faster, HDDs.
- SCSI cable is required when installing SCSI HDDs in models with SATA HDD.
- Power supply: The IntelliStation workstation uses an optimum power supply to meet most configuration requirements for this class of system. Certain very rich configurations may exceed available power. Clients are responsible to ensure that adequate power is available for all your configured devices including drives, memory, and adapter cards.

<table>
<thead>
<tr>
<th>Slot</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>PCI Express x16 Occupied with graphics adapter</td>
</tr>
<tr>
<td>2</td>
<td>32-bit 33 MHz PCI Open slot (half)</td>
</tr>
<tr>
<td>3</td>
<td>32-bit 33 MHz PCI Open slot (half)</td>
</tr>
<tr>
<td>4</td>
<td>64-bit 133 MHz PCI-X Open slot (full)</td>
</tr>
<tr>
<td>5</td>
<td>64-bit 100 MHz PCI-X Open slot (full)</td>
</tr>
<tr>
<td>6</td>
<td>64-bit 100 MHz PCI-X Open slot (full)</td>
</tr>
</tbody>
</table>

6 Slot 2 is not available when using the NVIDIA Quadro FX 4500 graphics adapter.

Planning information

Customer responsibilities: The IntelliStation Z Pro system is designated as customer setup (CSU). CSU allowance is one day.

Cable orders: Except for system power, keyboard, and mouse connections, there are no cabling requirements. All cables are provided with the system unit, and the instructions are provided as part of initial setup.

Some SCSI models require a cable (24P7973) to connect external SCSI devices.

All SCSI models have internal SCSI cable to enable the installation of internal Ultra320 SCSI HDD. This is a three-drop SCSI cable. This SCSI cable is not included with the IDE models.

Installability: The IntelliStation system is designed to function in a vertical position. Proper installation requires the feet to be deployed to help prevent the tower from tipping over.

Following the setup instructions, attach the keyboard and peripherals. Turn on the power. Setup is run after the computer has successfully completed its initial self-tests.

The setup utility resides in ROM. In some instances, you will be prompted to run this utility, or you can invoke it by pressing the F1 key during memory POST.

The IntelliStation Z Pro workstation has a universal power supply that operates with either 115 or 230 V ac. The power supply has an auto-sense design that automatically determines the correct operating voltage. All power supplies have built-in overload protection and surge protection.

Packaging

<table>
<thead>
<tr>
<th>Product</th>
<th>Packaging</th>
</tr>
</thead>
<tbody>
<tr>
<td>IntelliStation Z Pro</td>
<td>System unit carton</td>
</tr>
<tr>
<td></td>
<td>Hardware assembly package</td>
</tr>
<tr>
<td></td>
<td>Power cord (U.S. and Canada -- 110 V ac)</td>
</tr>
<tr>
<td></td>
<td>Keyboard, mouse</td>
</tr>
<tr>
<td></td>
<td>Hardware publications CD</td>
</tr>
<tr>
<td></td>
<td>Software publications package</td>
</tr>
<tr>
<td></td>
<td>Operating system package</td>
</tr>
<tr>
<td></td>
<td>Operating system</td>
</tr>
</tbody>
</table>

Security, auditability, and control

Improved asset protection: The IntelliStation Z Pro systems have two key focus areas: better system security and better data protection. The IntelliStation Z Pro workstation is equipped with a range of features that address both of these focus areas.

System security includes theft deterrence and detection of system tampering. The IntelliStation Z Pro workstation has the following security attributes:

- ASF 2.0
- Asset control and monitoring: IBM Director Agent, the chassis intrusion switch, and ASF help notify network administrators when an IntelliStation Z Pro workstation is opened without authorization. The administrator
can then take appropriate action to prevent system tampering or theft.

Data protection helps provide data integrity and prevent its loss. The IntelliStation Z Pro workstation has the following data protection attributes:

- Error checking and correction.
- S.M.A.R.T. analysis: All models have S.M.A.R.T. HDDs to warn users and network administrators when an HDD failure may be imminent by measuring parameters such as rotation speed and head wear. In the case of predictable failures, you can avoid costly data loss by backing up data and replacing the HDD.
- Virus protection: Each IntelliStation Z Pro workstation preloaded with Windows XP Professional is shipped with Norton AntiVirus for IBM (OEM Version) software.

The IntelliStation Z Pro workstation supports the following security features:

- Cover key lock
- U-bolt anchoring option
- Security slot (for attachment of optional cable lock such as Kensington cable lock)
- Cover tamper detect switch
- Secure fixed DASD
- Power-on password
- Setup utility password (administrator password)
- Keyboard/mouse password
- Boot sequence control
- Boot without keyboard or mouse
- Diskette boot inhibit
- Disable mouse
- Diskette write-protect
- Diskette I/O control
- HDD I/O control
- Serial port I/O control
- Parallel port I/O control
- Secure access openings (vents, louvers)
- Vital product data stored in on-board flash ROM
- Write protection control circuit for flash ROM

To assist in security, systems management, and asset management, the following system identifiers (vital product data) are delivered:

- Machine type and model
- System serial number
- Manufacturing identifier

The customer is responsible for evaluation, selection, and implementation of security features, administrative procedures, and appropriate controls in application systems and communications facilities.

### Terms and conditions

**IBM Global Financing:** Yes

To obtain copies of the IBM Statement of Limited Warranty, contact your reseller or IBM.

In the United States, call 800-IBM-SERV (426-7378), or write to

Warranty Information
P.O. Box 12195
Research Triangle Park, NC 27709
Attn: Dept JDJA/B203

**Warranty period**

- System hardware — Three years
- Optional features — One year

Optional IBM features initially installed in an IBM system carry the same warranty period as the system. If installed after the initial system installation, they carry the balance of the system warranty or the optional feature warranty, whichever is greater.

**Warranty service:** If required, IBM provides repair or exchange service depending on the type of warranty service specified for the machine. IBM will attempt to resolve your problem over the telephone or electronically by access to an IBM Web site. You must follow the problem determination and resolution procedures that IBM specifies. Scheduling of service will depend upon the time of your call and is subject to parts availability. Service levels are response time objectives and are not guaranteed. The specified level of warranty service may not be available in all worldwide locations. Additional charges may apply outside IBM’s normal service area.

Contact your local IBM representative or your reseller for country- and location-specific information.

Customer replaceable unit (CRU) (keyboard, mouse, speaker, memory, HDD), and on-site service for other selected parts.

**CRU service:** IBM provides replacement CRUs to you for you to install. CRU information and replacement instructions are shipped with your machine and are available from IBM at any time on your request. CRUs are designated as being either a Tier 1 or a Tier 2 CRU. Installation of Tier 1 CRUs is your responsibility. If IBM installs a Tier 1 CRU, at your request, you will be charged for the installation. You may install a Tier 2 CRU yourself or request IBM to install it, at no additional charge under the type of warranty service specified, on-site service.

Based upon availability, CRUs will be shipped for next-business-day delivery. IBM specifies in the materials shipped with a replacement CRU whether a defective CRU must be returned to IBM. When return is required, return instructions and a container are shipped with the replacement CRU, and you may be charged for the replacement CRU if IBM does not receive the defective CRU within 30 days of your receipt of the replacement.

The following parts have been designated as Tier 1 CRUs:

- Battery
- CD-ROM drive
- DVD-ROM drive
- Lift handle kit
- Memory DIMM
- Memory expansion card
- PCI adapters
- PCI divider
- Power cord
- Service label
- System labels
- Top cover
- Voltage regulator module
**On-site service:** IBM on-site repair (IOR), 9 hours per day, Monday through Friday excluding holidays, next-business-day response. IBM will repair the failing machine at your location and verify its operation. You must provide a suitable working area to allow disassembly and reassembly of the IBM machine. The area must be clean, well-lit, and suitable for the purpose.

On-site service is not available in all countries, and some countries have kilometer or mileage limitations from an IBM service center. In those locations where on-site service is not available, the normal in-country service delivery is used.

Call IBM at 800-IBM-SERV (426-7378), to assist with problem isolation for hardware to determine if warranty service is required. Telephone support may be subject to additional charges, even during the limited warranty period.

**International Warranty Service (IWS):** IWS is available during the warranty period to customers who travel or relocate to countries where their computer is sold and serviced by IBM or IBM resellers authorized to perform warranty service. Eligible IBM computers are identified by their four-digit machine type.

You can obtain IWS through the method of service, such as CRU, depot, carry-in, or on-site, provided in the servicing country. Service methods and procedures vary by country, and some service or parts may not be available in all countries. Service centers in certain countries may not be able to service all models of a particular machine type. In addition, some countries may have fees and restrictions that apply at the time of service.

To determine the eligibility of your computer and to view a list of countries where service is available, visit


For more information on IWS, refer to Services Announcement 601-034, dated September 25, 2001.

**Note:** Due to the earth’s magnetic field, CRT monitors are manufactured to work in northern, southern, and equatorial regions of the earth and may not produce a satisfactory image when moved between them. Any required adjustment (if possible) is not covered under IWS. The magnetic field does not affect flat-panel LCD monitors.

**Licensing:** Programs included with this product are licensed under the terms and conditions of the License Agreements that are shipped with the system.

**Maintenance services — ServiceElect and ServiceSuite™**

ServiceElect and ServiceSuite provide hardware warranty service upgrades, maintenance, and selected support services in one agreement.

**Warranty service upgrade:** During the warranty period, warranty service upgrades provide an enhanced level of on-site service for an additional charge. A warranty service upgrade must be purchased during the warranty period and is for a fixed term (duration). It is not refundable or transferable and may not be prorated. If required, IBM will provide the warranty service upgrade enhanced level of on-site service acquired by the customer. Service levels are response time objectives and are not guaranteed.

IBM will attempt to resolve your problem over the telephone or electronically by access to an IBM Web site. You must follow the problem determination and resolution procedures that IBM specifies. Scheduling of service will depend upon the time of your call and is subject to parts availability.

CRUs will be provided as part of the machine’s standard warranty CRU service except that you may install a Tier 1 CRU yourself or request IBM installation, at no additional charge, under one of the on-site service levels specified.

IBM will repair the failing machine at your location and verify its operation. You must provide a suitable working area to allow disassembly and reassembly of the IBM machine. The area must be clean, well-lit, and suitable for the purpose.

The following Warranty Service Upgrade options are available:

- **IOR, 9 hours per day, Monday through Friday excluding holidays, 4-hour average response**
- **IOR, 24 hours per day, 7 days a week, 4-hour average response**

**Maintenance service:** If required, IBM provides repair or exchange service depending on the type of maintenance service specified for the machine. An IBM technician will attempt to resolve your problem over the telephone. You must follow IBM’s problem determination and resolution procedures. Scheduling of service will depend upon the time of your call and is subject to parts availability. Service levels are response time objectives and are not guaranteed.

**CRU service:** If your problem can be resolved with a CRU (keyboard, mouse, speaker, memory, HDD), IBM will ship the CRU to you for you to install. CRU information and replacement instructions are shipped with your machine and are available from IBM at any time on your request.

IBM specifies in the materials shipped with a replacement CRU whether a defective CRU must be returned to IBM. When required is returned, return instructions and a container are shipped with the replacement CRU, and you may be charged for the replacement CRU if IBM does not receive the defective CRU within 30 days of your receipt of the replacement.

**On-site service:** IOR. IBM will repair the failing machine at your location and verify its operation. You must provide a suitable working area to allow disassembly and reassembly of the IBM machine. The area must be clean, well-lit, and suitable for the purpose.

The following on-site service options are available:

- **IOR, 9 hours per day, Monday through Friday excluding holidays, next-business-day response**
- **IOR, 9 hours per day, Monday through Friday excluding holidays, 4-hour average response**
- **IOR, 24 hours per day, 7 days a week, 4-hour average response**

**Maintenance service (ICA)**

Maintenance services are available for ICA legacy contracts. The preferred go-to-market offerings are ServiceElect. However, ICA legacy contracts will still be available for current customers until they are withdrawn.
Alternative service (Warranty service upgrades): During the warranty period, warranty service upgrades provides an enhanced level of on-site service for an additional charge. A warranty service upgrade must be purchased during the warranty period and is for a fixed term (duration). It is not refundable or transferable and may not be prorated. If required, IBM will provide the warranty service upgrade enhanced level of on-site service acquired by the customer. Service levels are response time objectives and are not guaranteed.

IBM will attempt to resolve your problem over the telephone or electronically by access to an IBM Web site. You must follow the problem determination and resolution procedures that IBM specifies. Scheduling of service will depend upon the time of your call and is subject to parts availability.

CRUs will be provided as part of the machine’s standard warranty CRU Service except that you may install a Tier 1 CRU yourself or request IBM to install it, at no additional charge under the type of warranty service specified, on-site service.

IBM will repair the failing machine at your location and verify its operation. You must provide a suitable working area to allow disassembly and reassembly of the IBM machine. The area must be clean, well-lit, and suitable for the purpose.

The following Warranty Service Upgrade option is available: IOR, 24 hours per day, 7 days a week, 4-hour average response.

Maintenance service: If required, IBM provides repair or exchange service depending on the type of maintenance service specified for the machine. An IBM technician will attempt to resolve your problem over the telephone. You must follow IBM’s problem determination and resolution procedures. Scheduling of service will depend upon the time of your call and is subject to parts availability. Service levels are response time objectives and are not guaranteed.

CRU service: If your problem can be resolved with a CRU (keyboard, mouse, speaker, memory, HDD, IBM will ship the CRU to you for you to install. CRU information and replacement instructions are shipped with your machine and are available from IBM at any time on your request.

IBM specifies in the materials shipped with a replacement CRU whether a defective CRU must be returned to IBM. When return is required, return instructions and a container are shipped with the replacement CRU, and you may be charged for the replacement CRU if IBM does not receive the defective CRU within 30 days of your receipt of the replacement.

On-site service: IOR. IBM will repair the failing machine at your location and verify its operation. You must provide a suitable working area to allow disassembly and reassembly of the IBM machine. The area must be clean, well-lit, and suitable for the purpose.

The following on-site service options are available:

- IOR, 9 hours per day, Monday through Friday excluding holidays, next-business-day response
- IOR, 24 hours per day, 7 days a week, same-day response

Non-IBM parts support

Warranty service: IBM is now shipping machines with selected non-IBM parts that contain an IBM field replaceable unit (FRU) part number label. These parts are to be serviced during the IBM machine warranty period. IBM is covering the service on these selected non-IBM parts as an accommodation to their customers, and normal warranty service procedures for the IBM machine apply.

Warranty service upgrades and maintenance services: Under certain conditions, IBM Integrated Technology Services repairs selected non-IBM parts at no additional charge for machines that are covered under warranty service upgrades or maintenance services.

IBM service provides hardware problem determination on non-IBM parts (adapter cards, PCMCIA cards, disk drives, memory, and so forth) installed within IBM systems covered under warranty service upgrades or maintenance services and provides the labor to replace the failing parts at no additional charge.

If IBM has a Technical Service Agreement with the manufacturer of the failing part, or if the failing part is an accommodations part (a part with an IBM FRU label), IBM may also source and replace the failing part at no additional charge. For all other non-IBM parts, customers are responsible for sourcing the parts. Installation labor is provided at no additional charge, if the machine is covered under a warranty service upgrade or a maintenance service.

IBM hourly service rate classification: One

ServicePac® offerings

Warranty and maintenance options: The announced products may be eligible for ServicePacs for Warranty and Maintenance Options, convenient prepackaged offerings for warranty service upgrades and maintenance services.

Installation services: The announced products may be eligible for ServicePacs for Installation Services, convenient prepackaged offerings for installation services. Refer to the Prices section for information on the availability of ServicePac offerings.

For additional ServicePac information, visit


Field-installable features: Yes

Model conversions: No

Machine installation: Customer setup. Customers are responsible for installation according to the instructions IBM provides with the machine.

Graduated Program License Charges apply: No. This product does not contain licensed internal code or licensed machine code.

Educational allowance: None
### Express models

<table>
<thead>
<tr>
<th>Description</th>
<th>Part number</th>
<th>Machine type/model</th>
<th>IBM list price(7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.0 GHz 2 MB L2, 2x512 MB MEM, 160 GB 7.2K S/S SATA, DVD-CD RW, No FDD, ENET, 1394, WIN XP32, NVIDIA Quadro FX 1400</td>
<td>62233BU 6223-3BU</td>
<td>2,329</td>
<td></td>
</tr>
<tr>
<td>3.2 GHz 2 MB L2, 2x1024 MB MEM, 160 GB 7.2K S/S SATA, DVD-CD RW, No FDD, ENET, 1394, WIN XP32, NVIDIA Quadro NVS 285</td>
<td>62234BU 6223-4BU</td>
<td>2,359</td>
<td></td>
</tr>
<tr>
<td>3.4 GHz 2 MB L2, 2x1024 MB MEM, 160 GB 7.2K S/S SATA, DVD-CD RW, No FDD, ENET, 1394, WIN XP64, NVIDIA Quadro FX 1400</td>
<td>62235BU 6223-5BU</td>
<td>2,889</td>
<td></td>
</tr>
<tr>
<td>3.6 GHz 2 MB L2, 2x1024 MB MEM, 73 GB 10K SCSI, DVD-CD RW, No FDD, ENET, 1394, RHEL4-64, NVIDIA Quadro FX 1400</td>
<td>62236BU 6223-6BU</td>
<td>2,749</td>
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<tr>
<td>3.8 GHz 2 MB L2, 2x1024 MB MEM, 73 GB 10K SCSI, DVD-CD RW, No FDD, ENET, 1394, RHEL4-64, NVIDIA Quadro FX 1400</td>
<td>62237BU 6223-7BU</td>
<td>3,919</td>
<td></td>
</tr>
<tr>
<td>3.8 GHz 2 MB L2, 2x1024 MB MEM, 73 GB 10K SCSI, DVD-CD RW, No FDD, ENET, 1394, RHEL4-64, NVIDIA Quadro FX 1400</td>
<td>62237CU 6223-7CU</td>
<td>4,049</td>
<td></td>
</tr>
<tr>
<td>2x3.4 GHz 2 MB L2, 2x1024 MB MEM, 73 GB 10K SCSI, DVD-CD RW, No FDD, ENET, 1394, RHEL4-64, NVIDIA Quadro FX 4500</td>
<td>62237DU 6223-7DU</td>
<td>6,119</td>
<td></td>
</tr>
<tr>
<td>3.6 GHz 800 MHz 2MB L2 Cache Xeon Processor</td>
<td>40K251B</td>
<td>999</td>
<td></td>
</tr>
<tr>
<td>3.8 GHz 800 MHz 2MB L2 Cache Xeon Processor</td>
<td>40K2519</td>
<td>1,249</td>
<td></td>
</tr>
</tbody>
</table>

7 IBM list price does not include tax or shipping and is subject to change without notice. Reseller prices may vary.

To order direct, call IBM at 877-999-7115 and select option 4.

For the name of the nearest IBM representative or Business Partner, call 800-IBM-4YOU (426-4968).

### ServicePac for warranty and maintenance

The offerings apply to all models of machine type 6223. The models are 1xx, 2xx, 3xx, 4xx, 5xx, and 6xx.

<table>
<thead>
<tr>
<th>Larger systems (more than 4 bays 4 slots)</th>
<th>Part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-year IOR 9 x 5</td>
<td>4112735</td>
</tr>
<tr>
<td>4-hour average response</td>
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</tr>
<tr>
<td>3-year IOR 24 x 7</td>
<td>4112741</td>
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<tr>
<td>4-hour average response</td>
<td></td>
</tr>
<tr>
<td>4-year IOR 9 x 5 NBD</td>
<td>6981964</td>
</tr>
<tr>
<td>4-year IOR 24 x 7</td>
<td>6981965</td>
</tr>
<tr>
<td>4-year average response</td>
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</tr>
<tr>
<td>4-year IOR 24x7</td>
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<tr>
<td>4-hour average response</td>
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</tbody>
</table>

### ServicePac for post warranty

The offerings apply to all models of machine type 6223.

<table>
<thead>
<tr>
<th>Larger systems (more than 4 bays 4 slots)</th>
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</thead>
<tbody>
<tr>
<td>1-year IOR 9 x 5 NBD</td>
<td>6983953</td>
</tr>
<tr>
<td>1-year IOR 9 x 5 x 4</td>
<td>6983954</td>
</tr>
<tr>
<td>1-year IOR 24 x 7</td>
<td>6983955</td>
</tr>
<tr>
<td>2-year IOR 9 x 5 NBD</td>
<td>96P2135</td>
</tr>
<tr>
<td>2-year IOR 9 x 5 x 4</td>
<td>96P2136</td>
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<tr>
<td>2-year IOR 24 x 7 x 4</td>
<td>96P2224</td>
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</table>

### ServicePac for installation services

<table>
<thead>
<tr>
<th>Larger systems (more than 4 bays 4 slots)</th>
<th>Part number</th>
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</thead>
<tbody>
<tr>
<td>Basic Install 1 to 25 Units</td>
<td>21P2001</td>
</tr>
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</table>


### Maintenance service charges (Legacy)(IOR)

<table>
<thead>
<tr>
<th>Alternative service (Warranty service upgrades)</th>
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</tr>
</thead>
<tbody>
<tr>
<td>IOR</td>
<td>24 x 7</td>
</tr>
<tr>
<td>$249</td>
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</table>

### Maintenance service

<table>
<thead>
<tr>
<th>IOR</th>
<th>9 x 5</th>
<th>24 x 7</th>
</tr>
</thead>
<tbody>
<tr>
<td>$480</td>
<td>$720</td>
<td></td>
</tr>
</tbody>
</table>

For ServiceElect (ESA) Maintenance Service Charges, contact IBM Global Services at 888-IBM-4343 (426-4343).

**IBM Global Financing:** IBM Global Financing offers competitive financing to credit-qualified customers to assist them in acquiring IT solutions. Our offerings include financing for IT acquisition, including hardware, software, and services, both from IBM and other manufacturers or vendors. Offerings (for all customer segments: small, medium, and large enterprise), rates, terms, and availability can vary by country. Contact your local IBM Global Financing organization or visit the Web at [http://www.ibm.com/financing](http://www.ibm.com/financing)
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Order now

To order, contact the Americas Call Centers or your local IBM representative.

To identify your local IBM representative, call 800-IBM-4YOU (426-4968).

Phone: 800-IBM-CALL (426-2255)
Fax: 800-2IBM-FAX (242-6329)
Internet: callserv@ca.ibm.com
Mail: IBM Americas Call Centers
Dept. Teleweb Customer Support, 9th floor
105 Moatfield Drive
North York, Ontario
Canada M3B 3R1

Reference: SE001

The Americas Call Centers, our national direct marketing organization, can add your name to the mailing list for catalogs of IBM products.

Note: Shipments will begin after the planned availability date.

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