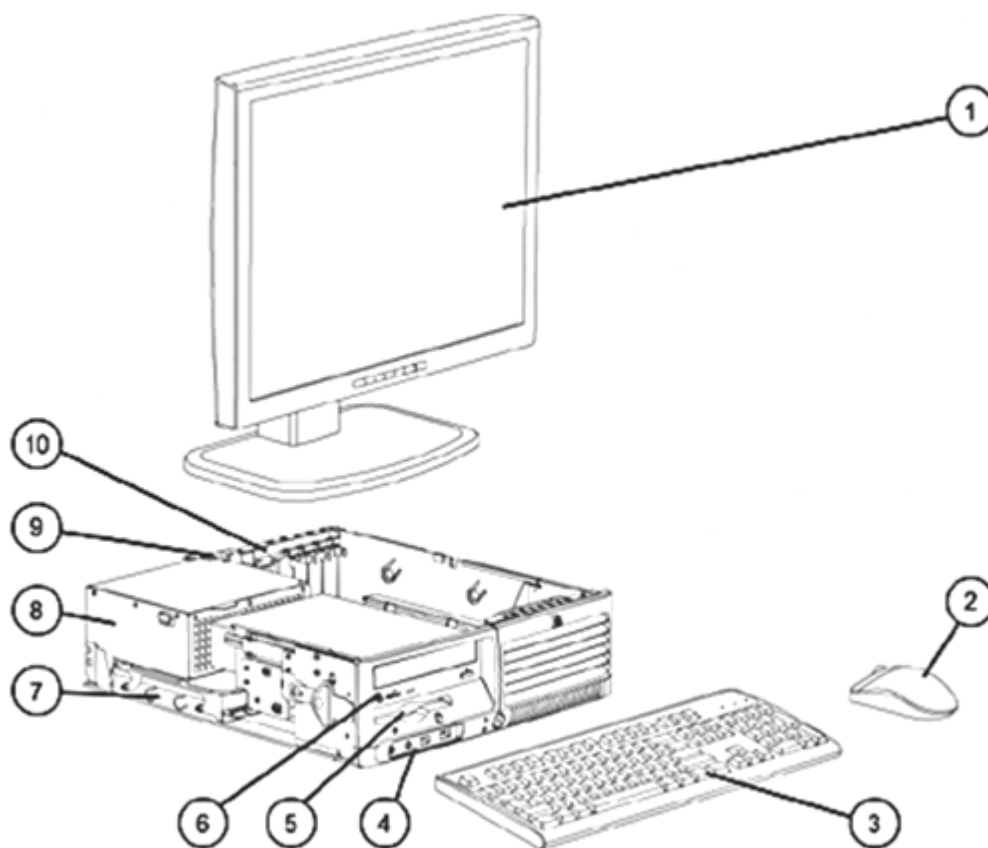


### Overview



1. Monitor (sold separately)
2. Optical Scroll Mouse (USB)
3. HP Standard Keyboard (USB)
4. Front I/O: (2) USB 2.0, headphone and microphone
5. Not applicable with this model
6. Not applicable with this model
7. Not applicable with this model
8. 240-watt Active Power Factor Correction (PFC) power supply
9. Rear I/O: (6) USB 2.0, (1) standard serial port, (1) parallel port, (2) PS/2, (1) RJ-45, (1) VGA, audio in/out
10. (2) low profile PCI slots, (1) low profile PCI Express x1 slot, (1) low profile PCI Express x16 slot standard

### At A Glance

- Designed for long-term, networked deployment within medium and large organizations in commercial business, finance and public sector industries
- Created using industry leading Design for Environment standards. Recyclable and energy efficient
  - " Long purchase lifecycles and image stability for demanding enterprise environments
- Support for new Intel technologies introduced in 2006: Intel® Q965 Express chipset
- Value-added software
  - HP Remote Graphics Software (Receiver module)
  - Altiris Deployment Solution Agent
- HP BIOS for better security, manageability and software image stability
- Tool-less serviceability features for easier maintenance and repairs

**NOTE:** HP dc72 Blade Workstation Client is a factory preconfigured model. Vacant bays and slots found internally in the systems are not supported for use with the preinstalled embedded operating system.

### Standard Features

**Operating System** HP Blade Workstation Client embedded OS

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**Value-added Software** HP Remote Graphics Software  
Altiris Deployment Solution Agent

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**Value-added Services and Features** HP Global Series Services  
Tool-less Serviceability

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**Service and Support** On-site Warranty and Service<sup>1</sup> : This three-year (3-3-3), limited warranty and service offering delivers three years of parts, labour and on-site repair. Response time is next business-day<sup>2</sup> and includes free telephone support<sup>3</sup> 24 x 7. Global coverage<sup>2</sup> ensures that any product purchased in one country and transferred to another non-restricted country will remain fully covered under the original warranty and service offering. Some countries/regions do not offer one year onsite and labour.

**NOTE 1:** Certain restrictions and exclusions apply.

**NOTE 2:** On-site service may be provided pursuant to a service contract between HP and an authorized HP third-party provider, and is not available in certain countries. Global service response times are based on commercially reasonable best effort and may vary by country.

**NOTE 3:** Technical telephone support applies only to HP-configured, HP and HP-qualified, third-party hardware and software.

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<b>Dimensions</b>	<b>Chassis Dimensions</b> (H x W x D)	3.95 x 13.3 x 14.9 in (10.03 x 33.78 x 37.85 cm)
	<b>System weight</b>	17.18 lb (7.79 kg)
	<b>System volume</b>	12.8 liters
	<b>Shipping weight</b>	25.10 lb (11.39 kg)
	<b>Maximum supported weight</b> (desktop orientation)	77.1 lb (35 kg)
	<b>Shipping box dimensions</b> (H x W x D)	12.63 x 18.75 x 20 in (32.08 x 47.63 x 50.8 cm)

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**Power Supply** 240W power supply - Active PFC

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### Standard Features

Ports	USB 2.0	8 (2 front, 6 rear)
	Serial	1 standard
	Parallel	1
	PS/2	1 keyboard, 1 mouse
	Video	analog for integrated graphics (not available)
	DVI output	via PCI-E x16 card and PCI card
	Multi-Monitor Support	via PCI-E x16 card and PCI card
	Audio	Front - mic and headphone Rear - line in, line out
NIC (RJ-45)	Integrated Intel 82566DM Gigabit Network Connection Ethernet	

Chipset Intel Q965 Express chipset

Processor and Speed Intel Celeron D 347 Processor (3.06-GHz, 512K L2 cache, 533-MHz FSB)

Installed Memory\* Supports 512-MB of DDR2 SYNCH DRAM.  
**NOTE:** Slot 1 is black and must always be populated.

DIMM Size	Slot			
	Channel A		Channel B	
	1 (black)	2 (white)	3 (white)	4 (white)
512-MB (single-channel)	512-MB	Empty	Empty	Empty

**\*NOTE:** The Intel Q965 Express chipset includes a built-in Management Engine (ME), which allocates memory for manageability functions. Management Engine memory is shared with system memory. 8 MB of memory is pre-allocated for it at system startup. This memory is not made available to the operating system, just as pre-allocated video memory is not available.

Memory Configurations 512-MB DDR2 Synch Dram PC2-5300 (667-MHz) Non ECC (1 x 512)

Hard Drive 512-MB SATA Flash Disk-On-Memory (DOM)

Security  
Serial, Parallel, USB Enable/Disable (via BIOS)  
Removable Media Write/Boot Control  
Power-On Password (via BIOS)  
Setup Password (via BIOS)  
Solenoid Hood Lock / Sensor

NIC Intel 82566DM Gigabit Network Connection (integrated on system board)

### Standard Features

<b>Graphics</b>	NVIDIA Quadro NVS 280 (64MB DH) PCI Graphics Card* NVIDIA Quadro NVS 285 (128MB DH) PCIe x16 Graphics Card* <b>*NOTE:</b> NVIDIA Quadro NVS 285 and NVS 280 graphics cards are combined to provide support for four monitors.
<b>Audio</b>	Integrated High Definition audio with Realtek 4-channel ALC262 codec (all ports are stereo) Microphone and Headphone front ports Line-out and Line-In rear ports* Internal Speaker <b>*NOTE:</b> Rear audio ports are re-taskable as Line-in, Line-out, or Microphone-in. External speakers must be powered externally.
<b>Keyboard</b> (one of following)	HP PS/2 Standard Keyboard HP USB Standard Keyboard
<b>Mouse</b> (one of following)	HP PS/2 2-Button Scroll Mouse HP PS/2 2-Button Optical Scroll Mouse HP USB 2-Button Optical Scroll Mouse
<b>Miscellaneous</b>	Tower stand

### Models (factory preconfigured)

HP dc72 Blade  
Workstation Client  
RW853AW#ABA

<b>OS</b>	HP Blade Workstation Client Embedded OS
<b>Base unit</b>	HP dc72 Blade Workstation Client base unit
<b>Localization kit</b>	HP Blade Workstation Client country kit
<b>Processor</b>	Intel Celeron D 347 Processor (3.06-GHz, 512K L2 cache, 533-MHz FSB)
<b>Memory</b>	512-MB DDR2 Synch Dram PC2-5300 (667-MHz) Non ECC (1 x 512)
<b>Hard Drive</b>	None
<b>Flash card</b>	512MB SATA Flash Disk-On-Memory (DOM)
<b>Controller</b>	NA
<b>Optical Drive</b>	None
<b>Graphics 1</b>	NVIDIA Quadro NVS 285 (128MB dual-head) PCIe x16
<b>Graphics 2</b>	NVIDIA Quadro NVS 280 (64MB dual-head) PCI
<b>Floppy Drive</b>	NA
<b>Keyboard</b>	HP USB standard keyboard
<b>Mouse</b>	HP USB optical scroll mouse
<b>Application software</b>	HP Remote Graphics Software (Receiver)

After-Market Options (availability may vary by region)

<b>Graphics</b>	<b>Multi head solution</b>	
	NVIDIA Quadro NVS 280 PCI Graphics Card (DMS59 DVI Dual-head Connector Cable)	DY599A
	NVIDIA Quadro NVS 285 (128MB DH) PCIe x16 Graphics Card	RD069AA
	HP DMS59 DVI Dual-head Connector Cable*	DL139A
<b>NOTE:</b> * Requires NVIDIA Quadro NVS 280 PCI Graphics		

<b>Input/Output Devices</b>	<b>Keyboards*</b>	
	HP PS/2 Standard Keyboard	DT527A
	HP USB Standard Keyboard	DT528A
	<b>Pointing Devices*</b>	
	HP PS/2 2-Button Scroll Mouse	DD440B
	HP PS/2 2-Button Optical Scroll Mouse	EY703AA
	HP USB 2-Button Optical Scroll Mouse	DC172B
<b>NOTE:</b> Embedded OS requires both keyboard and pointing device to be same I/O interface. Both USB or PS/2. May not mix USB & PS/2 together.		

<b>Memory (DIMMs)</b>	<b>PC2-5300 (DDR2, 667 MHz) DIMMs Non-ECC</b>	
	HP 512 MB PC2-5300 (DDR2-667) DIMM*	PX975AA
	<b>NOTE:</b> * For replacement purpose only.	

<b>Monitors</b>	<b>TFTs</b>	
	HP L1506 15 TFT Flat Panel Monitor - Analog only	PX848AA#ABA
	HP L1706 17 TFT Flat Panel Monitor - Analog only	PX849AA#ABA
	HP L1740 17 TFT Flat Panel Display - Analog/Digital	PL766AA#ABA
	HP L1755 17 TFT Flat Panel Display - Analog/Digital	PL777AA#ABA
	HP L1906 19 TFT Flat Panel Display - Analog only	PX850AA#ABA
	HP L1940T 19 TFT Flat Panel Display - Analog/Digital	EM869AA#ABA
	HP L1955 19 TFT Flat Panel Display - Analog/Digital	PD974AA#ABA
	HP L2065 20 TFT Flat Panel Display - Analog/Digital	EF227A4#ABA
	HP LP2465 24 TFT Widescreen Flat Panel Display - Analog/Digital	EF224A4#ABA
	<b>CRTs</b>	
	HP s7540 17 (16.0 vis) CRT Monitor	PF997AA#ABA
	HP v7650 17 (16.0 vis) Flat-face CRT Monitor	PF996AA#ABA

<b>Removable Storage</b>	<b>Drive Key Options</b>	
	HP 512MB USB 2.0 Drive Key	ED516AA
	HP 1GB USB 2.0 Drive Key	AG382AA

### After-Market Options (availability may vary by region)

<b>Security</b>	Kensington Lock	PC766A
	HP Business PC Security Lock	PV606AA
	HP (SFF) Wall Mount Security Sleeve*	PA717A
	<b>*NOTES:</b> Dimensions (W x H x L): 13.5 x 4.4 x 14.4 inches; Weight: 5.9 lb	

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### Service and Support

#### Offerings (HP Care Pack Services)

The HP Care Pack service part numbers below covers the HP dc72 Blade Workstation Client hardware only. Display hardware is not included. Software Technical Support for client embedded OS and administrative software tools are provided through HP Blade Workstation Care Pack services.

#### Hardware Services On-site Service Upgrade

HP 3-years, 4-hour response, 9x5 Blade Client Appliance only, onsite, hardware support. Excludes monitors.. U4863E

HP 3-years, 4-hour response, 24x7 Blade Client Appliance only, onsite, hardware support. Excludes monitors. H4493E

### Technical Specifications

Unit Environment and Operating Conditions	
General Unit Operating Guidelines	
<ul style="list-style-type: none"> <li>Keep the computer away from excessive moisture, direct moisture and the extremes of heat and cold, to ensure that unit is operated within the specified operating range.</li> <li>Leave a 10.2 cm (4 in) clearance on all vented sides of the computer to permit the required airflow.</li> <li>Never restrict airflow into the computer by blocking any vents or air intakes.</li> <li>Do not stack computers on top of each other or place computers so near each other that they are subject to each other's re-circulated or preheated air.</li> <li>Occasionally clean the air vents on the front, back, and any other vented side of the computer. Lint, dust and other foreign matter can block the vents and limit the airflow.</li> <li>If the computer is to be operated within a separate enclosure, intake and exhaust ventilation must be provided on the enclosure, and the same operating guidelines listed above will still apply.</li> </ul>	
Temperature Range	Operating: 50° to 95° F (10° to 35° C)* Non-operating: -22° to 140° F (-30° to 60° C)
Relative Humidity	Operating: 10% to 90% (non-condensing at ambient) Non-operating: 5% to 95% (non-condensing at ambient)
Maximum Altitude (unpressurized)	Operating: 10,000 ft (3048 m) Non-operating: 30,000 ft (9144 m)
<p><b>*NOTE:</b> Operating temperature is de-rated 1.0 deg C per 300 m (1000 ft) to 3000 m (10,000 ft) above sea level, no direct sustained sunlight. Maximum rate of change is 10 deg C/Hr. The upper limit may be limited by the type and number of options installed.</p>	

Power Supply	
Power Supply	240 watt custom power supply - Active PFC
Operating Voltage Range	90 - 264 VAC
Rated Voltage Range	100 - 240 VAC
Rated Line Frequency	50/60 Hz
Operating Line Frequency Range	47 - 63 Hz
Rated Input Current	5A
System Heat Dissipation	Typical 340 btu/hr (86 kg-cal/hr) Maximum 1260 btu/hr (318 kg-cal/hr)
Power Supply Fan	80mm variable speed
Energy Star 3.0 Compliant	X
FEMP Standby Power Compliant (<2W in S5 - Power Off)**	X
Power Consumption in ES Mode - Suspend to RAM (S3) (Instantly Available PC)	< 3W
Environmental and Mechanical Engineering Support Centre (EMESC) - Intranet Web Site only	<a href="http://env-webserver.ccm.cpqcorp.net/EMESC/default.htm">http://env-webserver.ccm.cpqcorp.net/EMESC/default.htm</a>
<p><b>**NOTE:</b> Power consumption in the Off/Apparent Off mode is measured and reported with the network interface controller "Wake on LAN" feature disabled in F10 Setup (default is "enabled").</p>	



### Technical Specifications

#### ROM BIOS Information

Key features of the HP BIOS in the HP dc72 Blade Workstation Client include:

- Deployment and manageability - HP BIOS provides several technologies that help integrate the HP Blade Workstation Client into the enterprise, such as PXE, remote configuration, remote control, and F10 Setup support for 12 languages.
- Stability - HP BIOS supports the HP stable product roadmap by releasing only critical BIOS changes to the factory and advanced change notification.
- Thermal and power management - The HP BIOS provides and enables thermal and power management technologies to assist in operating the HP Business Desktop computer in any enterprise environment.
- Serviceability - HP BIOS provides diagnostic and detailed service information.

#### Additional HP BIOS Features

- Power-On password - Helps prevent an unauthorized user from powering on the system.
- Administrator password - Also known as the setup password, this helps prevent unauthorized changes to the system configuration. If the administrator password is not known, the BIOS version cannot be changed and changes cannot be made to BIOS settings using F10 setup or under the OS.
- Advanced Configuration and Power Interface (ACPI) - Represents a significant innovation in power and configuration management, allowing operating systems and applications to manage power based on activity and usage.

#### Other Features

ACPI-Ready Hardware	Advanced Configuration and Power Management Interface (ACPI). <ul style="list-style-type: none"> <li>• Allows the system to wake from a low power mode.</li> <li>• Controls system power consumption, making it possible to place individual cards and peripherals in a low-power or powered-off state without affecting other elements of the system.</li> </ul>
SMBIOS Ver. 2.4	System Management BIOS, previously known as DMI BIOS, for system management information
Wired for Management Support	Intel-driven, industry-wide initiative to make Intel architecture-based PCs, servers and mobile computers more inherently manageable right out of the box and over the network
Dual-State Power Button	Power button acts as both an on/off button and suspend-to-sleep button

#### Serviceability Features of System

Dual Colour Power LED on Front of Computer (Indicates Normal Operations and Fault Conditions)

Diagnostic LED Explanation Table	Number of 1-second red LED blinks followed by 2-second pause, then repeats: 2-processor thermal protection activated 3-processor not installed 4-power supply failure 5-memory error 6-video error 7-PCA failure (ROM detected failure prior to video) 8-invalid ROM, bootblock recover mode	
SMBIOS Ver. 2.4	System Management BIOS, previously known as DMI BIOS, for system management information	
Wired for Management Support	Intel-driven, industry-wide initiative to make Intel architecture-based PCs, servers and mobile computers more inherently manageable right out of the box and over the network	
Dual-State Power Button	Power button acts as both an on/off button and suspend-to-sleep button	
<ul style="list-style-type: none"> <li>• System/Emergency ROM</li> </ul>	<ul style="list-style-type: none"> <li>• Flash ROM</li> </ul>	<ul style="list-style-type: none"> <li>• CMOS Battery Holder for easy Replacement</li> </ul>

### Technical Specifications

<ul style="list-style-type: none"> <li>Flash Recovery with Video Configuration Record SW</li> </ul>	<ul style="list-style-type: none"> <li>5 Aux Power LED on System PCA</li> </ul>	<ul style="list-style-type: none"> <li>Processor ZIF Socket for easy Upgrade</li> </ul>
<ul style="list-style-type: none"> <li>Over-Temp Warning on Screen (Requires IM Agents)</li> </ul>	<ul style="list-style-type: none"> <li>Clear Password Jumper</li> </ul>	<ul style="list-style-type: none"> <li>DIMM Connectors for easy Upgrade</li> </ul>
<ul style="list-style-type: none"> <li>HP Backup and Recovery Manager</li> </ul>	<ul style="list-style-type: none"> <li>Clear CMOS Button</li> </ul>	<ul style="list-style-type: none"> <li>NIC LEDs (integrated) (Green &amp; Amber)</li> </ul>

### Serviceability Features of Chassis

<ul style="list-style-type: none"> <li>Dual Colour Power and HD LED - To Indicate Normal Operations and Fault Conditions</li> </ul>	<ul style="list-style-type: none"> <li>Colour coordinated cables and connectors</li> </ul>	<ul style="list-style-type: none"> <li>Tool-less Hood Removal</li> </ul>
<ul style="list-style-type: none"> <li>Front power switch</li> </ul>	<ul style="list-style-type: none"> <li>System memory can be upgraded without removing the system board or any internal components</li> </ul>	<ul style="list-style-type: none"> <li>Tool-less Hard Drive, CD &amp; Diskette Removal</li> </ul>
<ul style="list-style-type: none"> <li>Green Pull Tabs, and Quick Release Latches for easy Identification</li> </ul>		<ul style="list-style-type: none"> <li>Tool-less System Board Removal</li> </ul>

Feature	
ASF 2.0 support (Alert Standard Format)	Industry-standard specification for network alerting in operating system-absent environments
Tower	Product can be oriented as a tower (in addition to desktop orientation)
Drive Lock*	Implementation of the industry standard ATA Security feature set. When enabled, it prevents software access to user data on the drive until one or two user-defined passwords are provided.
Drive Self Tests (DPS)*	<ul style="list-style-type: none"> <li>Drive Protection System</li> <li>A diagnostic hard drive self test. It scans critical physical components and every sector of the hard drive for physical faults and then reports any faults to the user.</li> <li>Running independently of the operating system, it can be accessed through a Windows-based diagnostics utility or through the computer's setup procedure. It produces an evaluation on whether the hard drive is the source of the problem and needs to be replaced.</li> <li>The system expands on the Self-Monitoring, Analysis, and Reporting Technology (SMART), a continuously running systems diagnostic that alerts the user to certain types of failures.</li> </ul>
DPS Access through F10 Setup during Boot	

### Technical Specifications - Audio

High Definition Audio	Type	Integrated
	High Definition Stereo Codec	Yes - Realtek ALC262, 4-channel
	Audio Jacks*	Microphone-In (64-K ohm Input Impedance); front and rear stereo analog microphone ports available except for USDT and SFF, which has front stereo microphone only Line-In (64-K ohm Input Impedance) Line-Out ** (200 ohms Output Impedance, expects at least a 10-K ohm load) Headphone-Out (1 Ohm Output Impedance, expects at least a 32 ohm load)

**NOTE:** \*Microphone-in, Line-In not supported by embedded OS. \*\*Internal Speaker Amplifier is for Internal Speaker only. External Speakers need to be powered externally. Rear audio ports are re-taskable as Line-in, Line-out, or Microphone-in.

Sampling	8 kHz - 192 kHz
Wavetable Syntheses (software)	Yes - Uses OS soft wavetable
Analog Audio	Yes
Number of Channels on Line-Out (mono/stereo)	Stereo (Left & Right channels)
Internal Audio Speaker Power Rating	1.5 W
Internal Speaker	Yes
External Speaker Jack (Line-Out)	Yes

### Technical Specifications - Communications

<b>Integrated Intel 82566DM Connector</b>	RJ-45
<b>Gigabit Network Connection</b>	<b>Controller</b> Intel Nineveh Gigabit platform LAN Connect Networking Controller
	<b>Memory</b> Integrated 96KbB on chip buffer memory
	<b>Data rates supported</b> 10/100/1000 Mbps
	<b>Compliance</b> IEEE 802.1P, 802.1Q, 802.2, 802.3, 802.3 ab and 802.3u compliant,
	<b>Bus architecture</b> GLCI, LCI interface. Intel specific MAC to PHY interface
	<b>Data transfer mode</b> At gigabit GLCI (802.3 serdes) is for Data, LCI (parallel bus)for MDIO, at 10/100 LCI for both data and MDIO, GLCI is idle.
	<b>Hardware certifications</b> FCC, B, CE, TUV- cTUVus Mark Canada and United States, TUV- GS Mark for European Union
	<b>Power requirement</b> Require 3.3Vaux, 1.8V and 1.0V or just 3.3V with integrated regulators Power consumption 1.16 Watts for 82566, whole LOM 2.53 Watts
	<b>ACBS</b> Intel Auto Connect Battery Saving feature
	<b>Boot ROM support</b> Yes
	<b>Network transfer mode</b> Full-duplex Half-duplex (not available for the 1000BASE-T transceiver)
	<b>Network transfer rate</b> 10BASE-T (half-duplex) 10 Mbps 10BASE-T (full-duplex) 20 Mbps 100BASE-TX (half-duplex) 100 Mbps 100BASE-TX (full-duplex) 200 Mbps 1000BASE-T (full-duplex) 2000 Mbps
<b>Environmental</b>	<b>Operating temperature</b> 32° to 131°F (0° to 55° C) To 70° C for external regulator
	<b>Operating humidity</b> 85% at 131° F (55° C)
<b>Management capabilities</b>	WOL, auto MDI crossover, PXE, Multi-port teaming, RSS, Advanced cable diagnostic.
<b>Alerting</b>	ASF 2.0 support

### Technical Specifications - Graphics adapter

<b>NVIDIA Quadro NVS 280 (64MB DH) PCI Dual-display Graphics Card</b>	<b>Form Factor</b> <b>Graphic Controller</b> <b>Bus type</b> <b>RAMDAC</b> <b>Memory</b> <b>Connector</b> <b>Dimensions</b> <b>Controller clock speed</b> <b>Colour depth</b> <b>Overlay planes</b> <b>Maximum vertical refresh rate</b> <b>Multi-monitor support</b> <b>Dual DVI Support</b> <b>High-definition Video Processor (HDVP)</b>	Low profile (both ATX and low profile brackets included) Integrated Quadro 280 2-D graphics processor unit (GPU) PCI Dual 350 MHz 64 MB DDR with frame buffer and Texture storage Single High-density Flex Connector Low-profile, 2.586 x 6.6 in (6.57 x 16.76 cm) 250 MHz 32-bits/pixel max One 16-bit Video overlay plane 85 Hz Dual analog or digital monitors Yes (with kit DL139A, included) Full-screen, full-frame video playback of HDTV and DVD content DVD-ready motion compensation for MPEG-2 Independent hardware colour controls for video overlay Hardware colour-space conversion (YUV 4:2:2 and 4:2:0) IDCT motion compensation
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**Resolution**

Analog Resolution*	Maximum Colors Supported	Maximum Refresh Rate
800 x 600	16.7 M	240 Hz
1024 x 768	16.7 M	200 Hz
1600 x 1200	16.7 M	170 Hz
1600 x 1200	16.7 M	150 Hz
1600 x 1200	16.7 M	100 Hz
Digital Resolution*	Maximum Colors Supported	Maximum Refresh Rate
800 x 600	16.7 M	75 Hz
1024 x 768	16.7 M	75 Hz
1280 x 1024	16.7 M	60 Hz
1600 x 1200	16.7 M	60 Hz (primary only)

**NOTE:** \* Supported resolution is determined by the combination of HP Blade Workstation graphics driver, HP Blade Workstation Client administration software and client graphics driver. When used with multiple displays, orientation can be set in combinations of 1x2, 2x1, 1x3, 3x1, 1x4, 4x1, or 2x2 placement, each in landscape or portrait mode.

### Technical Specifications - Graphics adapter

<p>NVIDIA Quadro NVS 285 (128MB DH) PCIe x16 Dual-display Graphics Card</p>	<p><b>Form Factor</b> <b>Graphic Controller</b> <b>Bus type</b> <b>Memory</b>  <b>Connector</b> <b>Dimensions</b> <b>Multi-monitor support</b> <b>RAMDAC</b> <b>Maximum Pixel Clock</b> <b>Overlay Planes</b> <b>High-definition Video Processor (HDVP)</b></p>	<p>Low profile, both ATX and low profile brackets included Integrated Quadro 285 2D graphics processor unit (GPU) PCI-Express 128 MB DDR (64 MB local frame buffer plus 64 MB of system memory via TurboCache) DMS-59 to dual-DVI Y-cable or dual-VGA Y-cable Low-profile, 2.586 x 6.6 in (6.57 x 16.76 cm) Dual analog or digital monitors Dual 350 MHz (integrated) 350 MHz One 16-bit Video overlay plane Full screen, full frame video playback of HDTV and DVD content DVD-ready motion compensation for MPEG-2 Independent hardware colour controls for video overlay Hardware colour-space conversion (YUV 4:2:2 and 4:2:0) IDCT motion compensation 5-tap horizontal by 3-tap vertical filtering 8:1 up/down scaling</p>
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Resolution	Resolution		
	Analog Resolution*	Maximum Colors Supported	Maximum Refresh Rate
	800 x 600	16.7 M	240 Hz
	1024 x 768	16.7 M	240 Hz
	1280 x 1024	16.7 M	150 Hz
	1600 x 1200	16.7 M	100 Hz
	Digital Resolution*	Maximum Colors Supported	Maximum Refresh Rate
	800 x 600	16.7 M	75 Hz
	1024 x 768	16.7 M	75 Hz
	1280 x 1024	16.7 M	60 Hz
	1600 x 1200	16.7 M	60 Hz

**NOTE:** \* Supported resolution is determined by the combination of HP Blade Workstation graphics driver, HP Blade Workstation Client administration software and client graphics driver. When used with multiple displays, orientation can be set in combinations of 1x2, 2x1, 1x3, 3x1, 1x4, 4x1, or 2x2 placement, each in landscape or portrait mode.

### Technical Specifications - Input/Output Devices

USB Standard Keyboard	Physical characteristics	Keys	104, 105, 106, 107, 109 layout (depending upon country)
		Dimensions (L x W x H)	18.0 x 6.4 x 0.98 in (45.8 x 16.3 x 2.5 cm)
		Weight	2 lb (0.9 kg) minimum
	Electrical	Operating voltage	+ 5VDC $\pm$ 5%
		Power consumption	50-mA maximum (with three LEDs ON)
		System interface	USB Type A plug connector
		ESD	CE level 4, 15-kV air discharge
		EMI - RFI	Conforms to FCC rules for a Class B computing device
	Mechanical	Microsoft PC 99 - 2001	Functionally compliant
		Languages	38 available
		Keycaps	Low-profile design
		Switch actuation	55-g nominal peak force with tactile feedback
		Switch life	20 million keystrokes (using Hasco modified tester)
		Switch type	Contamination-resistant switch membrane
		Key-leveling mechanisms	For all double-wide and greater-length keys
		Cable length	6 ft (1.8 m)
		Microsoft PC 99 - 2001	Mechanically compliant
		Acoustics	43-dBA maximum sound pressure level
	Environmental	Operating temperature	50° to 122° F (10° to 50° C)
		Non-operating temperature	-22° to 140° F (-30° to 60° C)
		Operating humidity	10% to 90% (non-condensing at ambient)
		Non-operating humidity	20% to 80% (non-condensing at ambient)
		Operating shock	40 g, six surfaces
		Non-operating shock	80 g, six surfaces
		Operating vibration	2-g peak acceleration
		Non-operating vibration	4-g peak acceleration
	Approvals	Drop (out of box)	26 in (66 cm) on carpet, six-drop sequence
		Drop (in box)	42 in (107 cm) on concrete, 16-drop sequence
	Ergonomic compliance	UL, CSA, FCC, CE Mark, TUV, TUV GS, VCCI, BSMI, C-Tick, MIC	
	Kit contents	ANSI HFS 100, ISO 9241-4, and TUVGS	
		Keyboard, installation guide, warranty card, safety and comfort guide	

### Technical Specifications - Input/Output Devices

PS/2 Standard Keyboard	Physical characteristics	Keys	104, 105, 106, 107, 109 layout (depending upon country)
		Dimensions (L x W x H)	18.0 x 6.4 x 0.98 in (45.8 x 16.3 x 2.5 cm)
Electrical		Weight	2 lb (0.9 kg) minimum
		Operating voltage	+ 5VDC $\pm$ 5%
		Power consumption	50-mA maximum (with three LEDs ON)
		System interface	PS/2 6-pin mini din connector
		ESD	CE level 4, 15-kV air discharge
		EMI - RFI	Conforms to FCC rules for a Class B computing device
		Microsoft PC 99 - 2001	Functionally compliant
Mechanical		Languages	38 available
		Keycaps	Low-profile design
		Switch actuation	55-g nominal peak force with tactile feedback
		Switch life	20 million keystrokes (using Hasco modified tester)
		Switch type	Contamination-resistant switch membrane
		Key-leveling mechanisms	For all double-wide and greater-length keys
		Cable length	6 ft (1.8 m)
Environmental		Microsoft PC 99 - 2001	Mechanically compliant
		Acoustics	43-dBA maximum sound pressure level
		Operating temperature	50° to 122° F (10° to 50° C)
		Non-operating temperature	-22° to 140° F (-30° to 60° C)
		Operating humidity	10% to 90% (non-condensing at ambient)
		Non-operating humidity	20% to 80% (non-condensing at ambient)
		Operating shock	40 g, six surfaces
		Non-operating shock	80 g, six surfaces
		Operating vibration	2-g peak acceleration
		Non-operating vibration	4-g peak acceleration
		Drop (out of box)	26 in (66 cm) on carpet, six-drop sequence
Drop (in box)	42 in (107 cm) on concrete, 16-drop sequence		
Approvals	UL, CSA, FCC, CE Mark, TUV, TUV GS, VCCI, BSMI, C-Tick, MIC		
Ergonomic compliance	ANSI HFS 100, ISO 9241-4, and TUVGS		
Kit contents	Keyboard, keyboard software media, installation guide, warranty card, safety and comfort guide		



### Technical Specifications - Input/Output Devices

HP PS/2 Scroll Mouse	Dimensions	3.8 x 6.3 x 11.6 cm (1.5 x 2.5 x 4.6 in)	
	Weight	4.44 oz (126 g)	
	Environmental	Operating temperature	50° to 122° F (10° to 50° C)
		Non-operating temperature	-22° to 140° F (-30° to 60° C)
		Operating humidity	10% to 90% (non-condensing at ambient)
		Non-operating humidity	20% to 80% (non-condensing at ambient)
		Operating shock	40 g, 6 surfaces
		Non-operating shock	80 g, 6 surfaces
		Operating vibration	2 g peak acceleration
		Non-operating vibration	4 g peak acceleration
		Drop (out-of-box)	26 in (66 cm) on carpet, 6-drop sequence
		Drop (out-of-box)	1 m on asphalt tile over concrete, 6-drop sequence
	Electrical	Operating voltage	5 VDC $\pm$ 10%
		Power consumption	15 mA
System consumption		PS/2 mini-din connector	
ESD		CE level 4, 15 kV air discharge	
EMI-RFI		Conforms to FCC rules for a Class B computing device	
Microsoft PC99 - 2001		Functionally compliant	
Mechanical	Resolution	400 $\pm$ 20% DPI	
	Tracking speed	10 in/s maximum	
	Acceleration	100 in/s	
	Switch actuation	65 g nominal peak force	
	Switch life	1,000,000 operations (using Hasco modified tester)	
	Switch type	Low force micro-switches	
	Tracking mechanism life	155 mi (250 km) at average speed of 10 in/s	
	Cable length	6 ft (1.8 m)	
	Microsoft PC99 - 2001	Mechanically compliant	
	Scroll wheel	Width	8 mm
Diameter		0.99 in (25.2 mm)	
Maximum rotation speed		30 mm/s	
Switch type		Light force micro-switch	
Switch life		1 million operations	
Mechanical life		Minimum 200,000 revolutions	
Regulatory approvals	Compliant	UL, CSA, FCC, CE Mark, TUV, TUV GS, VCCI, BSMI, C-Tick, MIC	

### Technical Specifications - Input/Output Devices

HP PS/2 Optical Scroll Mouse	Dimensions	3.95 x 6.21 x 11.7 cm (1.56 x 2.44 x 4.61 in)	
	Weight	4.44 oz (126 g)	
	Environmental	Operating temperature	-32° to 104°F (0° to 40° C)
		Non-operating temperature	-4° to 140°F (-20° to 60° C)
		Operating humidity	10% to 90% (non-condensing at ambient)
		Non-operating humidity	10% to 90% non condensing
		Operating shock	40 g, 6 surfaces
		Non-operating shock	80 g, 6 surfaces
		Operating vibration	2 g peak acceleration
		Non-operating vibration	4 g peak acceleration
		Drop (out-of-box)	80 cm height onto asphalt tile over concrete or equivalent, 5-drop in 5 direction except the cable face
		Electrical	Operating voltage
	Power consumption		100mA
	System consumption		PS/2 mini-din connector
ESD	CE level 4, 15 kV air discharge		
EMI-RFI	Conforms to FCC rules for a Class B computing device		
Mechanical	Microsoft PC99 - 2001	Functionally compliant	
	Resolution	400 ± 20% DPI	
	Tracking speed	10 in/s maximum	
	Acceleration	100 in/s	
	Switch actuation	61 g nominal peak force	
	Switch life	3,000,000 operations (using Hasco modified tester)	
	Switch type	Low force micro-switches	
	Tracking mechanism life	155 mi (250 km) at average speed of 10 in/s	
	Cable length	6 ft (1.8 m)	
	Microsoft PC99 - 2001	Mechanically compliant	
Scroll wheel	Width	8 mm	
	Diameter	1.01 in (25.6 mm)	
	Maximum rotation speed	48 rats/sec	
	Switch type	Light force micro-switch	
	Switch life	1 million operations	
	Mechanical life	Minimum 200,000 revolutions	
Regulatory approvals	Compliant	UL, CSA, FCC, CE Mark, TUV, TUV GS, VCCI, BSMI, C-Tick, MIC	

## Technical Specifications - Input/Output Devices

HP USB Optical Scroll Mouse	Dimensions (H x L x W)	1.5 x 4.5 x 2.5 in (3.8 x 11.6 x 6.3 cm)
	Weight	0.27 lb (0.12 kg)
	Cable length	72.8 in (185 cm)
	System requirements	Available USB port

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### Technical Specifications - Environmental Data

**Eco-Label Certifications and declarations** This product has received or is in the process of being certified to the following approvals and may be labeled with one or more of these marks:

- US Energy Star
- US Federal Energy Management Program (FEMP)
- Taiwan Green Mark
- China Energy Conservation Program
- IT ECO declaration
- EPEAT Rated - SILVER
- Korea Eco-label
- EPEAT
- Japan PC Green label\*

**\*NOTE:** This product conforms to the examination standards (2003 version) under JEITA's 'PC Green Label System.'

**System Configuration** The configuration used for the Energy Consumption and Declared Noise Emissions data for the Small Form Factor Desktop model is based on a typically configured product.

#### Energy Consumption

	115 VAC	230 VAC	100 VAC
Normal Operation	99.0 W	94.0 W	99.5 W
Sleep (Energy Star low power mode)	2.64 W	2.87 W	2.62 W
Off	1.68 W	1.87 W	1.67 W

#### Heat Dissipation\*

	115 VAC	230 VAC	100 VAC
Normal Operation	337.8 BTU/hr	320.7 BTU/hr	339.5 BTU/hr
Sleep	9.0 BTU/hr	9.8 BTU/hr	8.9 BTU/hr
Off	5.7 BTU/hr	6.4 BTU/hr	5.7 BTU/hr

**\*NOTE:** Heat dissipation is calculated based on the measured watts, assuming the service level is attained for one hour.

This product is in compliance with US executive order 13221, WOL (wake on LAN) disabled.

#### Declared Noise Emissions

(in accordance with ISO 7779 and ISO 9296)

	Sound Power (LWAd, bels)	Sound Pressure (LpAm, decibels)
System Fan Off		
Idle	4.0	29
Fixed Disk (random writes)	4.0	29
Optical Drive (sequential reads)	5.1	41

### Technical Specifications - Environmental Data

**Longevity and Upgrading** This product can be upgraded, possibly extending its useful life by several years. Upgradeable features and/or components contained in the product may include:

- Intel LGA775 processor socket
- 8 USB ports
- 2 empty PCI slots (2 low profile or 2 full-height with optional riser)
- 1 empty PCIe x1 slot
- 1 empty PCIe x16 slot
- 1 internal drive bay
- 1 SATA optical drive bay
- 1 3.5-inch external drive bay
- 4 memory slots
- 1 second Serial port (optional)

Spare parts are available throughout the warranty period and or for up to 5 years after the end of production.

### Batteries

This product complies with ISO standards:

- EU Directive 91/ 157/ EEC
- EU Directive 93/ 86/ EEC
- EU Directive 98/ 101/ EEC

Batteries used in the product do not contain:

- Mercury greater the 5ppm by weight
- Cadmium greater than 10ppm by weight
- Lead greater than 4000ppm by weight.

Battery size: CR2032 (coin cell)

Battery type: Lithium

### Additional Information

- This product is in compliance with the Restrictions of Hazardous Substances (RoHS) directive – 2002/95/EC.
- This product is in compliance with California Proposition 65 (State of California; Safe Drinking Water and Toxic Enforcement Act of 1986).
- This HP product is designed to comply with the Waste Electrical and Electronic Equipment (WEEE) Directive – 2002/96/EC.
- This product is in compliance with the IEEE 1680 (EPEAT) standard at the Silver level (see <http://www.epeat.net>)
- Plastics parts weighing over 25 grams used in the product are marked per ISO 11469 and ISO1043.
- This product contains 0% recycled materials (by wt.)
- This product is 92% recyclable when properly disposed of at end of life.

<b>Packaging Materials</b>	Corrugated Paper	1600 g
	EPE Foam	20 g
	LDPE Bag	52 g

- The EPE foam packaging material is made from 30 to 60% recycled content.
- The corrugated paper packaging materials contains at least 80% recycled content.

### RoHS Compliance

Hewlett-Packard is committed to compliance with all applicable environmental laws and regulations, including the European Union Restriction of Hazardous Substances (RoHS) Directive. HP's goal is to exceed compliance obligations by meeting the requirements of the RoHS Directive on a worldwide basis. From July 1, 2006, RoHS substances will be virtually eliminated (virtually = to levels below legal limits) for all HP electronic products subject to the RoHS Directive, except where it is widely recognized that there is no technically feasible alternative (as indicated by an exemption under the EU RoHS Directive).

### Technical Specifications - Environmental Data

#### Material Usage

This product does not contain any of the following substances in excess of regulatory limits (refer to the HP General Specification for the Environment at [http://www.hp.com/hpinfo/globalcitizenship/environment/supplychain/gen\\_specifications.html](http://www.hp.com/hpinfo/globalcitizenship/environment/supplychain/gen_specifications.html)):

- Asbestos
- Certain Azo Colorants
- Certain Brominated Flame Retardants - may not be used as flame retardants in plastics
- Cadmium
- Chlorinated Hydrocarbons
- Chlorinated Paraffins
- Formaldehyde
- Halogenated Diphenyl Methanes
- Lead carbonates and sulfates
- Lead and Lead compounds
- Mercuric Oxide Batteries
- Nickel - finishes must not be used on the external surface designed to be frequently handled or carried by the user.
- Ozone Depleting Substances
- Polybrominated Biphenyls (PBBs)
- Polybrominated Biphenyl Ethers (PBBEs)
- Polybrominated Biphenyl Oxides (PBBOs)
- Polychlorinated Biphenyl (PCB)
- Polychlorinated Terphenyls (PCT)
- Polyvinyl Chloride (PVC) - except for wires and cables, and certain retail packaging has been voluntarily removed from most applications.
- Radioactive Substances
- Tributyl Tin (TBT), Triphenyl Tin (TPT), Tributyl Tin Oxide (TBTO)

#### Packaging

HP follows these guidelines to decrease the environmental impact of product packaging:

- Eliminate the use of heavy metals such as lead, chromium, mercury and cadmium in packaging materials.
- Eliminate the use of ozone-depleting substances (ODS) in packaging materials.
- Design packaging materials for ease of disassembly.
- Maximize the use of post-consumer recycled content materials in packaging materials.
- Use readily recyclable packaging materials such as paper and corrugated materials.
- Reduce size and weight of packages to improve transportation fuel efficiency.
- Plastic packaging materials are marked according to ISO 11469 and DIN 6120 standards.

#### End-of-life Management and Recycling

Hewlett-Packard offers end-of-life HP product return and recycling programs in many geographic areas. To recycle your product, please go to: <http://www.hp.com/recycle> or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner.

The EU WEEE directive (2002/95/EC) requires manufacturers to provide treatment information for each product type for use by treatment facilities. This information (product disassembly instructions) is posted on the Hewlett Packard web site at: <http://www.hp.com/go/recyclers>. These instructions may be used by recyclers and other WEEE treatment facilities as well as HP OEM customers who integrate and re-sell HP equipment.

## Technical Specifications - Environmental Data

Hewlett-Packard  
Corporate  
Environmental  
Information

For more information about HP's commitment to the environment:

[link to new HP white paper now in progress]

Global Citizenship Report

<http://www.hp.com/hpinfo/globalcitizenship/gcreport/index.html>

Eco-label certifications

<http://www.hp.com/hpinfo/globalcitizenship/environment/productdesign/ecolabels.html>

ISO 14001 certificates:

<http://www.hp.com/hpinfo/globalcitizenship/environment/operations/envmanagement.html>

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