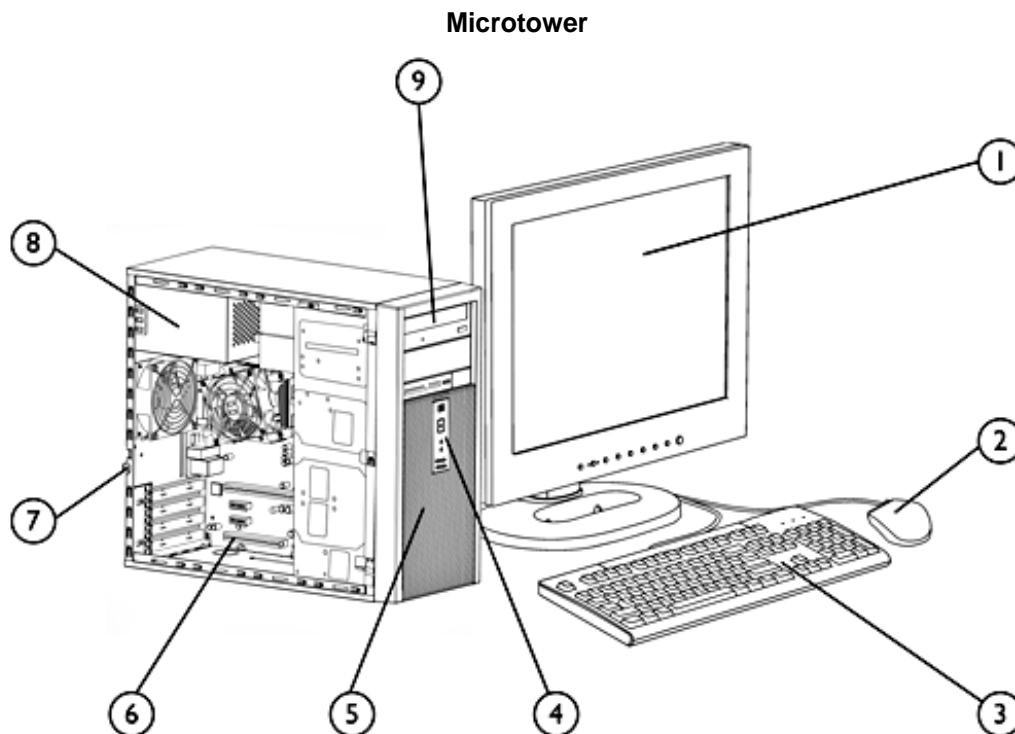


### Overview

**HP recommends Windows®  
Vista™ Business**



1. Monitor (sold separately)

2. PS/2 Scroll Mouse

3. HP Standard Keyboard

4. (2) USB 2.0 ports, audio ports

5. (2) internal 3.5" drive bays

6. (1) full-height PCI 2.3 slot, (2) PCIe x1 slots,  
(1) PCIe x16 slot

7. (4) USB 2.0 ports, (1) serial port, (1) optional second  
serial port, (1) parallel port, (2) PS/2, (1) RJ-45, (1) VGA,  
(1) audio in – (1) audio out – (1) MIC

8. 250-watt max power supply

9. (2) external 5.25" drive bays for optional optical drives; (1)  
external 3.5" drive bay for optional media reader or  
diskette drive

### Overview

#### At A Glance

- Intel® Core™ 2 Duo processors, Intel Pentium® D processors, Intel Pentium 4 processors, or Intel Celeron® D processors
- Choice of operating systems:
  - Genuine Windows Vista Business 32
  - Genuine Windows Vista Home Basic 32
  - Genuine Windows XP Professional
  - Genuine Windows XP Home
  - Red Flag Linux (China Only)
  - FreeDOS
- Intel 946GZ Express Chipset
- Intel I/O Controller Hub 7 (ICH7)
- Intel Graphics Media Accelerator 3000
- PCI Express I/O bus
- Serial ATA controller
- Intel PRO/100 VE Network Connection
- Choice of hard drives and optical drives
- DDR2 SDRAM system memory
- Protected by HP Services. Terms and conditions vary by country. Certain restrictions and exclusions apply.



### Standard Features and Configurable Components

#### Processor and Speed

One of the following

##### Intel Celeron D Processors

Intel Celeron D 331 Processor (2.66-GHz, 256-KB L2 cache, 533-MHz FSB)  
Intel Celeron D 336 Processor (2.80-GHz, 256-KB L2 cache, 533-MHz FSB)  
Intel Celeron D 347 Processor (3.06-GHz, 512-KB L2 cache, 533-MHz FSB)  
Intel Celeron D 352 Processor (3.20-GHz, 512-KB L2 cache, 533-MHz FSB)  
Intel Celeron D 356 Processor (3.33-GHz, 512-KB L2 cache, 533-MHz FSB)  
Intel Celeron D 360 Processor (3.46-GHz, 512-KB L2 cache, 533-MHz FSB)

##### Intel Pentium 4 Processors

Intel Pentium 4 531 Processor (3.00-GHz, 1-MB L2 cache, 800-MHz FSB)  
Intel Pentium 4 541 Processor (3.20-GHz, 1-MB L2 cache, 800-MHz FSB)  
Intel Pentium 4 631 Processor (3.00-GHz, 2-MB L2 cache, 800-MHz FSB)  
Intel Pentium 4 641 Processor (3.20-GHz, 2-MB L2 cache, 800-MHz FSB)  
Intel Pentium 4 651 Processor (3.40-GHz, 2-MB L2 cache, 800-MHz FSB)

##### Intel Pentium D Processors

Intel Pentium D 915 Processor (2.80-GHz, 4-MB L2 cache, 800-MHz FSB)  
Intel Pentium D 925 Processor (3.00-GHz, 4-MB L2 cache, 800-MHz FSB)  
Intel Pentium D 935 Processor (3.20-GHz, 4-MB L2 cache, 800-MHz FSB)  
Intel Pentium D 945 Processor (3.40-GHz, 4-MB L2 cache, 800-MHz FSB)

##### Intel Core 2 Duo Processors

Intel Core 2 Duo E4300 Processor (1.80-GHz, 2-MB L2 cache, 800-MHz FSB)  
Intel Core 2 Duo E6300 Processor (1.86-GHz, 2-MB L2 cache, 1066-MHz FSB)  
Intel Core 2 Duo E6400 Processor (2.13-GHz, 2-MB L2 cache, 1066-MHz FSB)  
Intel Core 2 Duo E6600 Processor (2.40-GHz, 4-MB L2 cache, 1066-MHz FSB)  
Intel Core 2 Duo E6700 Processor (2.66-GHz, 4-MB L2 cache, 1066-MHz FSB)

**\*NOTE:** Intel processor numbers are not a measure of performance. Processor numbers differentiate features within each processor family, not across different processor families.

#### Operating Systems and Application Software

(availability varies by region)

Genuine Windows Vista Business 32\*  
Genuine Windows Vista Home Basic 32\*  
Genuine Windows XP Professional SP2  
Genuine Windows XP Home SP2  
Red Flag Linux (China Only)  
Free DOS

**\* NOTE:** Certain Windows Vista product features require advanced or additional hardware. See <http://www.microsoft.com/windowsvista/getready/hardwarereqs.mspx> and <http://www.microsoft.com/windowsvista/getready/capable.mspx> for details. Windows Vista Upgrade Advisor can help you determine which features of Windows Vista will run on your computer. To download the tool, visit <http://www.windowsvista.com/upgradeadvisor>.

Microsoft Office 2007 Basic  
Microsoft Office 2007 Small Business  
Microsoft Office 2007 Professional  
Microsoft Works 8.5



### Standard Features and Configurable Components

Roxio Easy Media Creator 9.1\*\*  
Intervideo WinDVD Player\*\*  
Symantec AntiVirus 10  
Sun Java Runtime Environment  
Google Toolbar

\*\* Supporting software available with certain optical drive configurations

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#### Hard Drives

80-GB Serial ATA 3.0-Gb/s Hard Drive (7200 rpm)  
160-GB Serial ATA 3.0-Gb/s Hard Drive (7200 rpm)  
250-GB Serial ATA 3.0-Gb/s Hard Drive (7200 rpm)

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#### System Memory

256-MB DDR2 Synch DRAM PC2-5300 (667-MHz) Non-ECC (1 x 256-MB)  
**NOTE:** 256-MB configurations not supported by Windows Vista  
512-MB DDR2 Synch DRAM PC2-5300 (667-MHz) Non-ECC (1 x 512-MB)  
1-GB DDR2 Synch DRAM PC2-5300 (667-MHz) Non-ECC (1 x 1-GB)  
2-GB DDR2 Synch DRAM PC2-5300 (667-MHz) Non-ECC (2 x 1-GB)

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#### Storage –

One or more of the following (see Storage section below)

##### Diskette Drive

1.44-MB Diskette Drive

##### Media Reader

HP 16-in-1 Media Reader and additional USB 2.0 port

##### Optical Drives (Serial ATA)

SATA CD-ROM drive (available in APJ only; not supported by Windows Vista)

SATA DVD-ROM Drive

SATA CD-RW/DVD-ROM Combo Drive (not supported by Windows Vista)

SATA DVD+/-RW (DL/DF) LightScribe Drive

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#### Keyboard –

One of the following

HP PS/2 Standard Keyboard

HP USB Standard Keyboard

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#### Mouse –

One of the following

PS/2 2-Button Scroll Mouse

PS/2 2-Button Optical Scroll Mouse

USB 2-Button Optical Scroll Mouse

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#### Input Devices

##### Keyboard – One of the following

HP PS/2 Standard Keyboard

HP USB Standard Keyboard

##### Mouse – One of the following

PS/2 2-Button Scroll Mouse

PS/2 2-Button Optical Scroll Mouse

USB 2-Button Optical Scroll Mouse



### *Standard Features and Configurable Components*

<b>Audio</b>	Realtek ALC888 High Definition audio codec 3D audio compliant with AC'97 Rev. 2.3 and HD Audio compatible Internal PC speaker
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<b>Communication</b>	Intel PRO/1000 PT Gigabit PCIe Adapter (full height) Intel PRO/100 VE Network Connection Agere 56K PCI Modem
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<b>Graphics</b>	Intel Graphics Media Accelerator 3000 ATI Radeon X1300 (256MB SH) PCIe Graphics ATI Radeon X1300 Pro (256MB DH) PCIe Graphics
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<b>Miscellaneous</b>	HP FireWire / IEEE 1394 PCI Card (full height)
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### System Details

#### Base Unit

- Micro ATX microtower chassis, including power supply and front bezel
- Five (5) drive bays and four expansion slots
- Microsoft operating system CD
- Active type heatsink
- 92 x 92 x 25 mm chassis fan
- System board with Intel 946GZ Express chipset, Intel I/O Controller Hub 7 (ICH7), Intel PRO/100 VE Network Connection, Intel GMA 3000 graphics, and Realtek audio, 1 full-height PCI 2.3 slot, 2 PCI Express x1 slots, 1 PCI Express x16 slot, 2 DDR2 DIMM memory slots
- (4) Serial ATA data connectors
- Product documentation on CD
- HP system restore CD
- Power cord

<b>Slots</b>	<b>PCI</b>	One (1) full-height PCI 2.3 slot on PCA Two (2) full-height PCI Express x1 slots on PCA One (1) full-height PCI Express x16 slot on PCA (for graphic cards)
	<b>Memory Expansion</b>	Two (2) DDR2 SDRAM DIMM slots (2 GB maximum memory support)

<b>Bays</b>	<b>Internal</b>	Two (2) 3.5"
	<b>External</b>	Two (2) 5.25" One (1) 3.5"

<b>USB Support</b>	EHCI high-speed USB 2.0 controller	
	Two (2) front ports; Four (4) rear ports, Two (2) internal ports on motherboard	

<b>Interfaces (Legacy)</b>	One (1) parallel port	
	One (1) serial port	
	One (1) optional second serial port	
	One (1) PS/2 keyboard port	
	One (1) PS/2 mouse port	
	One (1) analog VGA video port	
	One (1) line in; one (1) line out; one (1) mic in	
	One (1) RJ45 network port	

<b>Weight &amp; Dimensions</b>	<b>Chassis Dimensions</b>	13.90 x 6.89 x 16.38 in (353 x 175 x 416 mm) (H x W x D)
	<b>Packaged Dimensions</b>	22.25 x 19.63 x 16.31 in (565.15 x 498.5 x 414.3 mm) (NA) (L x W x H) 21.10 x 19.53 x 15.008 in (536.0 x 496.0 x 383.0 mm) (EMEA)
	<b>System Weight</b>	21.16 lb (9.6 kg)
	<b>Shipping Weight</b>	30.86 lb (14.0 kg)



### System Details

<b>Technology and Features</b>	<b>Memory Type</b>	<ul style="list-style-type: none"> <li>PC2-5300 DDR2 SDRAM (667-MHz) non-ECC</li> <li>2 GB maximum system memory</li> </ul>
	<b>Hard Drive Interfaces Supported</b>	<ul style="list-style-type: none"> <li>Serial ATA</li> </ul>
<b>Chassis</b>	<b>Front Panel</b>	<ul style="list-style-type: none"> <li>Power button</li> <li>Power On LED</li> <li>HDD Activity LED</li> </ul>
	<b>Cooling Solutions Supported</b>	<ul style="list-style-type: none"> <li>Power Supply Fan (variable speed)</li> <li>Active heatsink (variable speed)</li> <li>Chassis fan (variable speed)</li> </ul>
	<b>Slots Supported</b>	Four (4) full-height expansion slots
	<b>Front I/O</b>	Two (2) USB 2.0 ports
	<b>Rear I/O</b>	Standard Micro ATX I/O connectors, including four (4 ) USB 2.0 ports
	<b>Drive Bays</b>	<ul style="list-style-type: none"> <li>Two (2) 5-1/4" external</li> <li>One (1) 3-1/2" external</li> <li>Two (2) 3-1/2" internal</li> </ul>
	<b>Internal Speaker</b>	Standard
	<b>Security</b>	Padlock loop Kensington Lock Support
	<b>Power Supply</b>	250-watt ATX Power Supply – PFC/non-PFC with a 115v/230v line switch (varies by country/region)

### Unit Environment and Operating Conditions

#### General Unit Operating Guidelines

- 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.
- Leave a 4 in (10.2 cm) clearance on all vented sides of the computer to permit the required airflow.
- Never restrict airflow into the computer by blocking any vents or air intakes.
- 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.
- 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.
- 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.

#### 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 (9000 m)

**NOTE:** Operating temperature is de-rated 1.0 deg C per 1000 ft (300 m) to 10,000 ft (3000 m) 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.

### System Board

#### Processor

- Socket T; LGA775 industry standard Micro ATX form factor



### System Details

	<ul style="list-style-type: none"><li>• Support single Intel Core 2 Duo, Pentium D, Pentium 4 or Celeron D</li></ul>
<b>PWM</b>	<ul style="list-style-type: none"><li>• Intersil 6312 3 phase</li></ul>
<b>Chipset</b>	<ul style="list-style-type: none"><li>• Intel 946GZ Express</li><li>• Intel I/O Controller Hub 7 (ICH7)</li></ul>
<b>Super I/O</b>	<ul style="list-style-type: none"><li>• W83627DHG</li></ul>
<b>Front Side Bus Frequency</b>	<ul style="list-style-type: none"><li>• 533/800 MHz</li></ul>
<b>Memory</b>	<ul style="list-style-type: none"><li>• DDR2 SDRAM</li><li>• 2 x DIMM slots</li></ul>
<b>Clock Generator</b>	<ul style="list-style-type: none"><li>• CY505YC56DT</li></ul>
<b>Integrated Graphics</b>	<ul style="list-style-type: none"><li>• Intel Graphics Media Accelerator (GMA) 3000</li></ul>
<b>Audio</b>	<ul style="list-style-type: none"><li>• Realtek ALC888 HD Audio compatible codec with two channel audio 3D audio compliant with AC'97 rev. 2.3</li></ul>
<b>LOM</b>	<ul style="list-style-type: none"><li>• Intel PRO/100 VE Network Connection</li></ul>
<b>IDE</b>	<ul style="list-style-type: none"><li>• Support all PIO modes</li><li>• 1 x IDE ports support up to 2 devices</li><li>• Support Ultra ATA 33/66/100</li></ul>
<b>Serial</b>	<ul style="list-style-type: none"><li>• Four Serial ATA interfaces</li></ul>
<b>Expansion Slots</b>	<ul style="list-style-type: none"><li>• 1 x PCI 2.3 slot</li><li>• 2 x PCI Express x1 slots</li><li>• 1 x PCI Express x16 slot</li></ul>
<b>BIOS</b>	<ul style="list-style-type: none"><li>• LPC EEPROM</li></ul>
<b>Industrial Standard</b>	<ul style="list-style-type: none"><li>• PCI 2.3 compliant</li><li>• USB 2.0</li></ul>
<b>Rear Side I/O Ports</b>	<ul style="list-style-type: none"><li>• 1 x PS/2 keyboard port</li><li>• 1 x PS/2 mouse port</li><li>• 4 x USB 2.0 ports</li><li>• 1 x RJ-45 10/100 port</li><li>• 1 x serial port</li><li>• 1 x optional second serial port</li><li>• 1 x parallel port</li><li>• 1 x DB 15 pin analog VGA port</li><li>• 3 x audio ports</li></ul>
<b>On Board I/O Interfaces</b>	<ul style="list-style-type: none"><li>• 1 x ATX power connector</li><li>• 1 x +12V power connector</li><li>• 1 x Floppy connector</li><li>• 1 x Front panel connector, Switch, LED (ON/Flash/OFF)</li><li>• 2 x Fan headers for CPU, chassis, with voltage/fan speed control</li><li>• 1 x header to support 2 USB 2.0 ports at front side</li><li>• 1 x header to support USB media reader</li><li>• 1 x serial header to support optional second serial port</li></ul>
<b>Board Size</b>	<ul style="list-style-type: none"><li>• Micro-ATX, PCB Size: 9.6 x 9.0 in (24.38 x 22.86 cm)</li><li>• 4-layer PCB with green color</li></ul>



### System Details

#### Additional Features

- Bootable without keyboard, mouse or monitor
- Keyboard/mouse/USB wake up
- Support S1, S3, S4 and S5
- ACPI status
- Hardware monitor capability
- CPU fan speed control

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#### Network Interface

##### Hardware Highlights Features

##### Intel PRO/100 VE Network Connection

- PCI interfaces
- 10-Mbps and 100-Mbps operation

##### Hardware Highlights Features

##### Intel PRO/1000 PT Gigabit PCIe Adapter

- PCI Express interface
- 10-Mbps, 100-Mbps and 1000-Mbps operation

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#### Wireless

Wireless A+G PCI Card (full height bracket)

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#### Power Supply

- ATX Power Supply – Passive PFC/non-PFC with a 115v/230v line switch
- Passive Power Factor Correction (PFC) – with line switch set to 230V – No PFC in 115V line switch position
- 90 to 140VAC, or 180 to 264VAC operating voltage range
- 100 to 127VAC, or 200 to 240VAC rated voltage range
- 50–60 Hz rated line frequency
- 47–63 Hz operating line frequency range
- 250 watt maximum rated power
- 80-mm power supply fan – variable speed for optimum acoustics

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#### Power Conservation 'Energy Saver'

- APM 1.2 support
- Screen blanking
- Hard drive 'Idle' mode
- System Idle mode
- ~2 watt power consumption in ES mode – suspend to RAM (S3) (instantly available PC)
- Processor/Cache memory power-down (S3)



### System Details

#### System Environmental Specs

- Values are subject to change without notification and are for reference only.
- Performance of system, options, and ancillary equipment will vary depending on the system configuration.
- Levels presented do not account for non-HP/Compaq installed hardware.

<b>Ambient Air Temperature</b>	<b>Operating</b>	50° to 95°F (10° to 35°C) at sea level with an altitude de-rating of 1.0°C per every 1000 ft (300 m) above sea level to a maximum of 8000 ft (2500 m), no direct sustained sunlight. Maximum rate of change is 77°F/Hr (25°C/Hr). The upper limit may be limited by the type and number of options installed.
	<b>Storage</b>	-22° to 140°F (-30° to 60°C) – Maximum rate of change: 410°F/Hr (210°C/Hr).
<b>Humidity</b>	<b>Operating</b>	10% to 90% relative humidity (Rh), 86°F (30°C) maximum wet bulb temperature, non-condensing
	<b>Storage</b>	10% to 95% relative humidity (Rh), 101.66°F (38.7°C) maximum wet bulb temperature, non-condensing
<b>Altitude</b>	<b>Operating</b>	0 to 10,000 feet (0 to 3048 meters) – This value may be limited by the type and number of options installed. Maximum allowable altitude change rate is 1,000 ft/min (304.8 m/min).
	<b>Non-Operating</b>	0 to 30,000 feet (0 to 9,144 meters) – Maximum allowable altitude change rate is 1200 ft/min (365.76 m/min).
<b>Shock</b>	Listed are the levels of shock the product can withstand with NO damage being incurred. The values represent peak input acceleration during an 2~3 ms half-sine shock pulse, 11 ms trapezoidal shock pulse.	
	<b>Non-Operating</b>	35G's (Half-sine Shock) 35G's (Trapezoidal Shock)
<b>Vibration</b>	Listed are the levels of vibration the product can withstand with NO damage being incurred. The values represent a flat random vibration input acceleration profile across the given frequency range.	
	<b>Operating</b>	Random vibration at 5Hz@0.00025G <sup>2</sup> /Hz, 10Hz@0.01G <sup>2</sup> /Hz, 100Hz@0.01G <sup>2</sup> /Hz, 300Hz@0.00001G <sup>2</sup> /Hz 5Hz to 300Hz, (0.25G's nominal).
	<b>Non-Operating</b>	Random vibration at 0.008G <sup>2</sup> /Hz, 10Hz to 500Hz, (2 Grms nominal).



### System Details

#### Acoustic Noise

Listed are the declared A-WEIGHTED SOUND POWER LEVELS (LWAd) and declared average desktop seated operator position A-WEIGHTED SOUND PRESSURE LEVELS (LpAm) when the product is operating in a 73.4°F (23°C) ambient environment. Noise emissions were measured in accordance with ISO 7779 (ECMA 74) and declared in accordance with ISO 9296 (ECMA 109).

<b>IDLE</b> (Fixed disk drive spinning)	LWAd = 4.3 Bels, Desktop Average LpAm = 32 dBA
<b>FIXED DISK</b> (Random write)	LWAd = 4.8 Bels, Desktop Average LpAm = 37dBA
<b>CD-ROM</b> (Sequential Reads)	LWAd = 5.0 Bels, Deskside Average LpAm = 39dBA

#### Service and Support

On-site Warranty <sup>Note 1</sup>: One-year (1-1-1) limited warranty delivers one year of on-site, next business-day <sup>Note 2</sup> service for parts and labor and includes free telephone support <sup>Note 3</sup> 24 x 7. Global coverage <sup>Note 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. One-year onsite and labor are not available in all countries.

**NOTE 1:** Terms and conditions may vary by country. Certain restrictions and exclusions apply. Other warranty variations may be offered in your region.

**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 Compaq and third-party HP-qualified hardware and software. Toll-free calling and 24 x 7 support may not be available in some countries.



### After-Market Options

Communications	<b>NICs</b>	
	Intel PRO/1000 PT Gigabit PCIe Adapter (full height)	EH352AA
	<b>Wireless LAN</b>	
	HP Wireless A+G PCI Card (North America only)	EA118AA
	HP Wireless A+G PCI Card (WW except North America)	PZ928AA
	<b>Modems</b>	
	Agere 2006 PCI High-Speed 56K International SoftModem	EK694AA
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Hard Disk Drives	HP 250-GB SATA 3.0-Gb/s Hard Drive	PY278AA
	HP 160-GB SATA 3.0-Gb/s Hard Drive	PY277AA
	HP 80-GB SATA 3.0-Gb/s Hard Drive	PY276AA
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Removable Storage Devices	<b>Diskette Drive</b>	
	HP 1.44-MB Internal Diskette Drive	AG295AA
	HP 1.44-MB USB Diskette Drive – External	DC141B
	16-in-1 Media Reader	EM718AA
	<b>USB Drive Key</b>	
	HP 1-GB Drive Key II Flash Drive	AG382AA
	HP (APJ) 512-MB Drive Key II Flash Drive	ED516AA
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Input Devices	<b>Keyboards</b>	
	HP PS/2 Standard Keyboard	DT527A
	HP USB Standard Keyboard	DT528A
	<b>Mice</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
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Memory	HP 1-GB PC2-5300 (DDR2-667 MHz) DIMM	PX976AA
	HP 512-MB PC2-5300 (DDR2-667 MHz) DIMM	PX975AA
	HP 256-MB PC2-5300 (DDR2-667 MHz) DIMM	PX974AA
	<b>NOTE:</b> The HP Compaq dx2300 Microtower memory frequency is clocked at 630 MHz.	
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Audio	HP Satellite Speakers	ZD929AA
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Graphics	ATI Radeon X1300 Pro (256MB DH) PCIe Graphics	AH050AT
	ATI Radeon X1300 (256MB SH) PCIe Graphics	AG392AA



### After-Market Options

<b>Optical Drives</b>	HP SATA CD-ROM Drive (available in Asia Pacific and Japan only)	AH045AA
	HP SATA CD-RW/DVD-ROM Combo Drive	AH046AA
	HP SATA DVD-ROM Drive	AH047AA
	HP SATA DVD+/-RW (DL/DF) LightScribe Drive	AH048AA

<b>Security</b>	HP Business PC Security Lock Kit	PV606AA
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<b>Miscellaneous Accessories</b>	HP FireWire / IEEE 1394 PCI Card	PA997A
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### Monitors

#### CRTs

HP s7540 17" (16.0" vis) CRT Monitor	PF997AA#XXX
HP v7650 17" (16.0" vis) Flat-face CRT Monitor	PF996AA#XXX

#### TFTs

HP L1506 15" TFT Flat Panel Monitor – Analog only	PX848AA#XXX
HP L1706 17" TFT Flat Panel Monitor – Analog only	PX849AA#XXX
HP L1740 17" TFT Flat Panel Display – Analog/Digital	PL766AA#XXX
HP L1755 17" TFT Flat Panel Display – Analog/Digital	PL777AA#XXX
HP L1906 19" TFT Flat Panel Display – Analog only	PX850AA#XXX
HP L1940T 19" TFT Flat Panel Display – Analog/Digital	EM869AA#XXX
HP L1955 19" TFT Flat Panel Display – Analog/Digital	PD974AA#XXX
HP L2065 20" TFT Flat Panel Display – Analog/Digital	EF227A4#XXX
HP LP2465 24" TFT Widescreen Flat Panel Display – Analog/Digital	EF224A4#XXX

#### GSA Monitors

HP L717g 17" GSA Flat Panel Monitor	EE191AA#ABA
HP L919g 19" GSA Flat Panel Monitor	EE192AA#ABA

#### Options

HP Flat Panel Speaker Bar	EE418AA
HP CRT Monitor Multimedia Base	PM552AA



### Memory

#### DDR SYNCH DRAM NON-ECC MEMORY

The Intel 946GZ Express chipset supports non-ECC DDR2 memory up to PC2-5300 (667-MHz). Memory upgrades are accomplished by adding single or multiple DIMMs of the same or varied sizes. This chart does not represent all possible memory configurations.

**CAUTION:** You must shut down the computer **and disconnect the power cord** before adding or removing memory modules. Regardless of the power-on state, voltage is always supplied to the memory modules as long as the computer is plugged in to an active AC outlet. Adding or removing memory modules while voltage is present may cause irreparable damage to the memory modules or system board.

#### HP recommends dual-channel symmetric configurations for maximum performance.

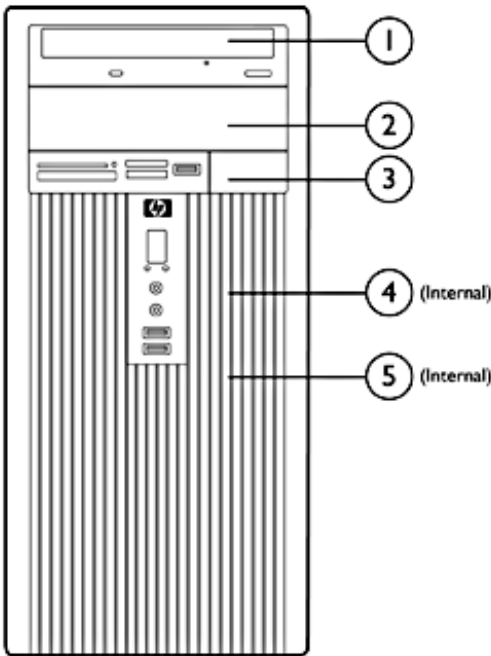
For best performance, add the same amount of total memory to each channel and do not mix speeds. For dual-channel symmetric performance, the total amount of memory in each channel must be equal. If speeds are mixed, speed will default to the slowest DIMM.

#### MAXIMUM MEMORY

Supports up to 2-GB of DDR2 SYNCH DRAM. Not all memory configurations possible are represented below.

DIMM Size	Slot 1	Slot 2
256-MB	256-MB	
512-MB	512-MB	
512-MB (dual-channel symmetric)	256-MB	256-MB
1-GB	1-GB	
1-GB (dual-channel symmetric)	512-MB	512-MB
2-GB (dual-channel symmetric)	1-GB	1-GB

### Storage



### HP Compaq dx2300 Microtower Business PC

	Maximum Quantity Supported	Position Supported	Controller
<b>Drive Support</b>			
Diskette Drives	1	3	SIO
Media Reader	1	3	Internal USB 2.0 port
CD-ROM Drives	2	1, 2	IDE ATAPI
DVD-ROM Drives	2	1, 2	IDE ATAPI
CD-RW/Combo Drives	2	1, 2	IDE ATAPI
DVD+/-RW Drives	2	1, 2	IDE ATAPI
3.5" Serial ATA Hard Drives	2	4,5	SATA



### Technical Specifications - Audio

Integrated Realtek ALC888 Audio	Type	Integrated
	HD Audio compatible codec	Yes
	Sampling	Supports 48/96 KHz
	Audio Jacks	Mic-In
		Line-In
		Line-Out / Headphone Out
	Power Support	Digital: 3.3V Analog: 5V
Other		Meets performance requirements for audio on PC99/2001 systems High-performance DACs with 97dB SNR(A-Weighting) ADCs with 90dB NR(A-Weighting)





### Technical Specifications - Communications

<b>Intel PRO/1000 PT PCIe Gigabit NIC</b>	<b>Connector</b>	RJ-45
	<b>Controller</b>	Intel 82572EI Gigabit Ethernet Controller
	<b>Memory</b>	Integrated Dual 48K configurable transmit receive FIFO Buffers
	<b>Data rates supported</b>	10/100/1000 Mbps
	<b>Compliance</b>	IEEE 802.1P, 802.1Q, 802.2, 802.3, 802.3AB and 802.3u compliant, 802.3x flow control
	<b>Bus architecture</b>	PCI Express 1.0a
	<b>Data transfer mode</b>	Bus-master DMA
	<b>Hardware certifications</b>	FCC, B, CE, TUV- cTUVus Mark Canada and United States, TUV- GS Mark for European Union
	<b>Power requirement</b>	Aux 3.3V, 3.0 Watts in 1000base-T and 2.0 Watts in 100Base-T
	<b>Boot ROM support</b>	Yes
	<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 (actual rate limited by PCI Bus)
	<b>Environmental</b>	<b>Operating temperature</b> 32° to 131°F (0° to 55° C)
		<b>Operating humidity</b> 85% at 131° F (55° C)
	<b>Dimensions</b>	6.4 x 2.6 x 0.8 in (16.3 x 6.6 x 1.9 cm)
	<b>Management capabilities</b>	ASF, WOL, PXE, DMI, WFM 2.0.

<b>HP Wireless A+G PCI</b>	<b>Dimensions</b>	4.99 x 2.54 x 0.71 in (126.8 x 64.4 x 18.0 mm)
	<b>Weight</b>	0.268 lb (65 g)
	<b>Controller</b>	Atheros AR5414X chipset
	<b>system interface</b>	PCI Spec 2.2
	<b>Network standard</b>	IEEE 802.11a/b/g
	<b>Frequency band</b>	5.1500 to 5.8500 GHz
		2.4000 to 2.4835 GHz
		2.4465 to 2.4835 GHz (Europe, Middle East, Asia and Asia Pacific – excluding Japan)
		2.4000 to 2.4697 GHz (Japan)
	<b>Operating temperature</b>	32° to 140° F (0° to 60° C), operating
	<b>Storage temperature</b>	-4° to 176° F (-20° to 80° C), non-operating
	<b>Humidity</b>	10% to 85% non-condensing
	<b>Operating voltage</b>	5V ± 5%
	<b>Power consumption</b>	Tx/Rx peak 560/250mA @ 3.3V (max.)
	<b>Output power</b> (approximately)	15 dBm ±2dB
	<b>Receive sensitivity</b>	-90dBm at 11 Mbps (typical)
	<b>Data transfer rate</b>	Standard rates of 1, 2, 5.5, 11, 6, 9, 12, 18, 24, 48, 54 and Super AG Mode108-Mbps



### Technical Specifications - Communications

<b>Spreading</b>	DSSS (Direct Sequence Spread Spectrum)
<b>Security</b>	64(40h) bit, 128(104h) bit, WPA, IEEE802.1X, AES-OCB, AES-CCM, Microsoft PEAP, TKIP, WEP
<b>Antenna</b>	External 5dBi antenna
<b>Throughput</b>	<b>108 Mbps</b> (only with 200 ft (60.96 m) – Indoor Belkin 54G or above router that supports 108 Mbps speed) <b>54 Mbps</b> 200 ft (60.96 m) – Indoor <b>11 Mbps</b> 200 ft (60.96 m) – Indoor
<b>Certifications</b>	Wi-Fi certified
<b>Certifications for use by country</b>	North America: United States, Canada Europe: Austria, Belgium, Cyprus, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Liechtenstein, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom Australia New Zealand

<b>Agere 56K PCI Modem</b>	<b>Data Transmission</b>	56,000 Kbps maximum downstream data <b>NOTE:</b> 56 Kbps technology refers to download speeds only and requires compatible modems at server sites. Other conditions may limit modem speed. FCC limitations allow a maximum of 53 Kbps during download transmissions.
	<b>Data Speeds</b>	(Upload only) 33,600/31,200/28,800/26,400/21,600/19,200/16,800/14,400/ 12,000/9,600/7,200/4,800/2,400/1,200/300
	<b>Data Standards</b>	ITU-T V.90, ITU-T, ITU-T V.34, V.44, V.42, V.42bis21, V.32bis, Bell 212A, and Bell 103
	<b>Fax Speeds</b>	14,400/12,000/9,600/7,200/4,800/2,400/300 b/s
	<b>Fax Mode Capabilities</b>	ITU-T T.31 class 1 FAX, V. 17, V.29, V.27ter, and V.21 Channel 2
	<b>Error Correction and Data Compression</b>	V.44, 42bis, V.42 and MNP2-5
	<b>Power Management</b>	ACPI; PPML 1.1 and wake support with PME and Vaux; meets PCI 2.3 requirements and PC 2001 requirements
	<b>Upgradeability</b>	Driver upgradeable for future enhancements
	<b>Video</b>	ITU-T V.80 video ready interface
	<b>Other</b>	TIA/EIA 602 standard AT command set Integrated DTE interface with speeds of up to 115.2 Kbps, parallel 16550a UART-compatible interface Optional ring wakeup signal
	<b>Operating Temperature</b>	32° to 158° F (0° to 70° C)
	<b>Operating Humidity</b>	20% to 90%, non-condensing
	<b>Power</b>	Requires a 3.3-V auxiliary power rail on PCI bus Uses only one PCI load (i.e., one grant/request pair), one shared IRQ, one electrical load



### Technical Specifications - Communications

<b>Chipset</b>	Agere Systems SV92PL – Integrated PCI interface with 5-V tolerant buffers and CardBus support
<b>Dimensions (L X H)</b>	Complies with PCI low profile specifications-6.7 x 2.3 in (17.0 x 5.8 cm) and supports high- and low-profile brackets
<b>Connection</b>	Single RJ-11 connector
<b>Other Features</b>	Digital line protection, call progress monitoring via on-board piezo device, support for high profile and low profile brackets, PnP ID support
<b>Safety</b>	UL recognized to UL 1950, 3rd edition (U.S. and Canada); IEC 950 (TUV, NEMKO, DEMKO, SEMKO); CE Mark, EC 950 (TUV, NEMKO, DEMKO, SEMKO, CE mark
<b>EMC</b>	FCC Part 15, IC ES003, EN 55022, 3rd edition, EN 55024, annex A, EN 61000-4-6, EN 61000-4-8
<b>Telecom</b>	FCC Part 68, IC-CS-03 (Canada); Worldwide PTT approvals Not available in Korea or the Republic of South Africa.
<b>Health</b>	Bare PCB material compliant to 94V-0 or better (marked as such)
<b>Other</b>	PC 2001 compliant, PCI version 2.3, WHQL approved; ACPI compliant



### Technical Specifications - Graphics

<b>Integrated Graphics Media Accelerator 3000</b>	<b>3D/2D Controller</b>	Microsoft DirectX® 9 based with support for Pixel Shader 2.0, 4:1 anisotropic filtering, Gaussian texture filtering, shadow maps, volumetric textures, double-sided stencil buffers, and 4 pixel pipes.
	<b>VGA Controller</b>	Integrated
	<b>Bus Type</b>	PCI Express™ x16 (If an external graphics card is installed in a PCI slot, the internal graphics can be enabled or disabled using the system's BIOS setup utility. If an external graphics card is installed in the PCI Express™ slot, the internal graphics cannot be enabled).
	<b>RAMDAC</b>	Integrated, 400 MHz
	<b>Memory</b>	Graphics memory is shared with system memory. Graphics memory usage varies depending on the amount of system memory installed and system load. 8 MB is pre-allocated for graphics use at system boot time. Additional memory is allocated for graphics as needed using Intel's Dynamic Video Memory Technology (DVMT), to provide an optimal balance between graphics and system memory use.
		<b>System memory equal or greater than 512 MB</b> 8 MB pre-allocated + 248 MB DVMT = max frame buffer of 256 MB
	<b>Controller Clock Speed</b>	400 MHz
	<b>Overlay Planes</b>	Single overlay support with 5x3 filtering
	<b>Maximum Color Depth</b>	32 bits/pixel
	<b>Maximum Vertical Refresh Rate</b>	85 Hz at up to 1920x1440, 85 Hz at 2048x1536. Varies with mode and configuration. See table below.
	<b>Multi-display Support</b>	Support for one CRT via the motherboard's VGA connector. Support for an additional DVI-D display via the optional DVI ADD2 card. Dual independent displays and dual synchronous (Twin or Clone mode) displays are supported.
	<b>Graphics/Video API Support</b>	Microsoft DirectX®9, DirectXVA®, VMR9, GDI/GDI+; OpenGL® 1.4.

Resolutions Supported <sup>1</sup>	Resolution	Maximum Refresh Rate (Hz)	
		Analog Monitor	Digital Monitor
	640 x 480	85	60
	800 x 600	85	60
	1024 x 768	85	60
	1280 x 1024	85	60
	1600 x 1200	85	60
	1920 x 1080	85	60
	1920 x 1200	85	60
	1920 x 1440	85	60
	2048 x 1536	85	60

<sup>1</sup> Modes listed are supported with a single active display. The supported mode list for multiple active displays is a subset of this list. Not all modes will support video playback and some supported modes may use software MC (motion compensation) rather than hardware MC. Not all modes will support 3D acceleration depending on the system configuration (e.g., resolution selected, size of frame buffer, number of installed memory modules, etc.).

**NOTE:** Other resolutions and refresh rates may be selectable but are not recommended.



### Technical Specifications - Graphics

**ATI Radeon X1300  
(256MB SH) PCIe  
Graphics Card  
(256 MB)**

<b>Bus type</b>	PCI Express (x16 lanes)										
<b>Maximum vertical refresh rate</b>	85 Hz										
<b>Display support</b>	Integrated 400 MHz RAMDAC										
<b>Display max resolution</b>	2048 x 1536										
<b>Board display options</b>	DVI-I + TV DVI-I supports analog CRT or flat panel or digital flat panel (using DVI-A, DVI-D or DVI-I connector) DVI-I supports analog CRT or flat panel (with VGA connector and DVI-I to VGA dongle) TV connector is a 4-pin mini-DIN S-video connector										
<b>Board configuration</b>	<table> <tr> <th>Specification</th><th>Description</th></tr> <tr> <td>Graphics Chip</td><td>RV515</td></tr> <tr> <td>Core clock</td><td>450 MHz</td></tr> <tr> <td>Memory clock</td><td>250 MHz</td></tr> <tr> <td>Frame buffer</td><td>256 MB DDR2</td></tr> </table>	Specification	Description	Graphics Chip	RV515	Core clock	450 MHz	Memory clock	250 MHz	Frame buffer	256 MB DDR2
Specification	Description										
Graphics Chip	RV515										
Core clock	450 MHz										
Memory clock	250 MHz										
Frame buffer	256 MB DDR2										
<b>Languages supported</b>	24 languages: English, Arabic, Chinese Simplified, Chinese Traditional, Czechoslovakian, Danish, Dutch, Finnish, French, German, Greek, Hebrew, Hungarian, Italian, Japanese, Korean, Norwegian, Polish, Portuguese, Russian, Spanish, Swedish, Thai, Turkish										
<b>Core power</b>	25 W (Max board power)										
<b>Option kit contents</b>	<ul style="list-style-type: none"> <li>• ATI RADEON X1300 PCIe graphics card with full height bracket attached</li> <li>• Low profile bracket</li> <li>• DVI-to-VGA Adapter</li> <li>• Software CD with graphics drivers</li> <li>• Warranty documentation</li> </ul>										
<b>Compliance standards</b>	<p><b>EMC Emissions:</b></p> <p>a) FCC Part 15, Subpart B – Unintentional Radiators, Class B Computing Devices for Home &amp; Office Use</p> <p>b) CISPR22: 1997/EN 55022:1998 – Class B – Limits and methods of measurement of radio disturbance characteristics of Information Technology Equipment</p> <p>c) Canadian Standard ICES-003 is equivalent to CISPR22</p> <p>d) Taiwanese Standard BSMI</p> <p>e) Japanese VCCI</p> <p>f) Australian C-Tick</p> <p><b>EMC Immunity:</b></p> <p>CISPR 24:1997/EN 55024:1998 – Information Technology Equipment – Immunity Characteristics – Limits and Methods of Measurement.</p> <p><b>Safety:</b></p> <p>UL 60950 (USA) &amp; EN 60950 (EU): Safety of Information Technology Equipment, Including Electrical Business Equipment. All boards meet UL PCB flammability requirements.</p>										



### Technical Specifications - Graphics

ATI Radeon X1300 Pro (256MB DH) PCIe Graphics Card	Bus Type	PCI Express (x16 lanes)	
	Maximum Vertical Refresh Rate	85 Hz	
	Display Support	Integrated 400 MHz RAMDAC	
	Display Max Resolution	2048 x 1536	
	Board Display Options	Supports 2 displays via included DMS-59 to dual VGA cable or 2 DVI monitors via optional DMS-59 to dual DVI monitor kit #DL139A. Support TV connection via 7 pin mini Din S-video connector	
	Board Configuration	Specification	Description
	128 MB Frame Buffer	Graphics Chip	RV516
		Core clock	600 MHz
		Memory clock	400 MHz
		Frame buffer	256 MB DDR2 (128 bits wide)
Languages supported	24 languages: English, Arabic, Chinese Simplified, Chinese Traditional, Czechoslovakian, Danish, Dutch, Finnish, French, German, Greek, Hebrew, Hungarian, Italian, Japanese, Korean, Norwegian, Polish, Portuguese, Russian, Spanish, Swedish, Thai, Turkish		
Core Power	25 W (Max board power)		
Option kit contents	<ul style="list-style-type: none"><li>• ATI Radeon X1300 Pro (256MB DH) PCIe Graphics Card with full height bracket attached</li><li>• DMS-59 Dual VGA</li><li>• <b>NOTE:</b> The Optional DMS-59 DVI cable can be ordered with HP Option Kit #DL139A</li><li>• Software CD with graphics drivers</li><li>• Low profile bracket to convert the card for using in a low profile chassis</li><li>• Warranty documentation</li></ul>		
Compliance standards	<b>EMC Emissions:</b> a) FCC Part 15, Subpart B – Unintentional Radiators, Class B Computing Devices for Home & Office Use b) CISPR22: 1997/EN 55022:1998 – Class B – Limits and methods of measurement of radio disturbance characteristics of Information Technology Equipment c) Canadian Standard ICES-003 is equivalent to CISPR22 d) Taiwanese Standard BSMI e) Japanese VCCI f) Australian C-Tick g) Korean (MIC)  <b>EMC Immunity:</b> CISPR 24:1997/EN 55024:1998 – Information Technology Equipment – Immunity Characteristics – Limits and Methods of Measurement.  <b>Safety:</b> UL 60950 (USA) & EN 60950 (EU): Safety of Information Technology Equipment, Including Electrical Business Equipment. All boards meet UL PCB flammability requirements.		



### Technical Specifications - Input Devices

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



### Technical Specifications - Input Devices

<b>HP 2-Button Scroll Mouse (PS/2)</b>	<b>Scroll Wheel</b>	8 mm
	<b>Maximum Rotation Speed</b>	30 mm/s
	<b>Switch Type</b>	Light force micro-switch
	<b>Switch Life</b>	1 million operations
	<b>Mechanical Life</b>	Minimum 200,000 revolutions
	<b>Environmental</b>	<b>Operating Temperature</b> 50° to 122° F (10° to 50° C)
		<b>Non-operating Temperature</b> -22° to 140° F (-30° to 60° C)
		<b>Operating Humidity</b> 10% to 90% (non condensing at ambient)
		<b>Non-operating Humidity</b> 20% to 80% (non condensing at ambient)
		<b>Operating Shock</b> 40 g, 6 surfaces
		<b>Non-operating Shock</b> 80 g, 6 surfaces
		<b>Operating Vibration</b> 2 g peak acceleration
		<b>Non-operating Vibration</b> 4 g peak acceleration
	<b>Electrical</b>	<b>Operating Voltage</b> + 5VDC $\pm$ 10%
		<b>Power Consumption</b> 15mA
		<b>System Consumption</b> PS/2 mini-din connector
		<b>ESD</b> CE level 4, 15 kV air discharge
		<b>EMI-RFI</b> Conforms to FCC rules for a Class B computing device
<b>Mechanical</b>	<b>PC98</b>	Functionally compliant
	<b>Resolution</b>	400 $\pm$ 20% DPI
	<b>Tracking Speed</b>	10 in/s maximum
	<b>Acceleration</b>	100 in/s
	<b>Switch Actuation</b>	85 g nominal peak force
	<b>Switch Life</b>	1,000,000 operations (using Hasco modified tester)
	<b>Cable Length</b>	2 m
<b>Regulatory Approvals</b>	<b>PC98-99</b>	Mechanically compliant
	UL, CSA, FCC, CE Mark, TUV, TUV GS, VCCI, BCIQ, C-Tick	



### Technical Specifications - Hard Drives

#### Serial ATA Hard Drives 80 GB (7200 rpm)

<b>Capacity</b>	80,026,361,856 bytes
<b>Height</b>	1 in (2.6 cm)
<b>Width</b>	Media diameter: 3.5 in (8.9 cm) Physical size: 4 in (10.2 cm)
<b>Interface</b>	Serial ATA
<b>Synchronous Transfer Rate (Maximum)</b>	1.5 Gb/s
<b>Buffer</b>	8 MB
<b>Seek Time</b> (typical reads, includes controller overhead, including settling)	<b>Single Track</b> 1.0 ms <b>Average</b> 8.5 ms <b>Full-Stroke</b> 18 ms
<b>Rotational Speed</b>	7,200 rpm
<b>Logical Blocks</b>	156,301,488
<b>Operating Temperature</b>	32° to 140° F (0° to 60° C)

#### 160 GB

<b>Capacity</b>	160,041,885,696 bytes
<b>Height</b>	1 in (2.6 cm)
<b>Width</b>	Media diameter: 3.5 in (8.9 cm) Physical size: 4 in (10.2 cm)
<b>Interface</b>	Serial ATA
<b>Synchronous Transfer Rate (Maximum)</b>	1.5 Gb/s
<b>Buffer</b>	8 MB
<b>Seek Time</b> (typical reads, includes controller overhead, including settling)	<b>Single Track</b> 1.0 ms <b>Average</b> 8.5 ms <b>Full-Stroke</b> 18 ms
<b>Rotational Speed</b>	7,200 rpm
<b>Logical Blocks</b>	312,581,808
<b>Operating Temperature</b>	32° to 140° F (0° to 60° C)

### Technical Specifications - Hard Drives

250 GB	<b>Capacity</b>	250,059,350,016 bytes	
	<b>Height</b>	1 in (2.6 cm)	
	<b>Width</b>	Media diameter: 3.5 in (8.9 cm) Physical size: 4 in (10.2 cm)	
	<b>Interface</b>	Serial ATA	
	<b>Synchronous Transfer Rate (Maximum)</b>	1.5 Gb/s	
	<b>Buffer</b>	8 MB	
	<b>Seek Time</b> (typical reads, includes controller overhead, including settling)	<b>Single Track</b>	0.8 ms
		<b>Average</b>	<9.0 ms
		<b>Full-Stroke</b>	=17 ms
	<b>Rotational Speed</b>	7,200 rpm	
	<b>Logical Blocks</b>	488,397,168	
	<b>Operating Temperature</b>	41° to 131° F (5° to 55° C)	



### Technical Specifications - Optical Storage

SATA DVD-ROM Drive	Height	5.25-inch, half-height, tray-load			
	Orientation	Either horizontal or vertical			
	Interface type	SATA/ATAPI			
	Disc capacity	Single layer: Up to 4.7 GB (6 times capacity of CD-ROM) Double layer: Up to 8.5 GB (12 times capacity of CD-ROM)			
	Dimensions (W x H x D)	5.9 x 1.7 x 8.0 in (15.0 x 4.4 x 20.3 cm)			
	Weight (max)	2.6 lb (1.2 kg)			
	Read speeds	DVD+R/-R/+RW/-RW/+R DL /-R DL	Up to 8X		
		DVD-ROM	Up to 16X		
		DVD-RAM	Up to 4X		
		CD-ROM, CD-R	Up to 48X		
		CD-RW	Up to 32X		
	Removable Storage - Media Compatibility - DVD-ROM	Media	Read	Write	
		CD-ROM	Yes	No	
		CD-R	Yes	No	
		CD-RW	Yes	No	
		DVD-ROM	Yes	No	
		DVD-ROM DL	Yes	No	
		DVD-RAM	Yes	No	
		DVD+R	Yes	No	
		DVD+R DL	Yes	No	
		DVD+RW	Yes	No	
		DVD-R	Yes	No	
		DVD-RW	Yes	No	
DVD-R DL		Yes	No		
Access times (typical reads, including setting)		Random	DVD: < 140 ms (typical), CD: < 125 ms (typical)		
		Full Stroke	DVD: < 250 ms (seek), CD: < 210 ms (seek)		
		Cache Buffer	2 MB (minimum)		
		Data Transfer Modes	ATA PIO mode 4 (16.7 MB/s); ATA Multi-word DMA mode 2 (16.7 MB/s); ATA UltraDMA Mode 3 (44.4 MB/s -default)		
Power		Source	SATA DC power receptacle		
	DC Power Requirement	5 VDC ± 5%-100 mV ripple p-p 12 VDC ± 5%-200 mV ripple p-p			
	DC Current	5 VDC - <1000 mA typical, < 1600 mA maximum 12 VDC -< 600 mA typical, < 1400 mA maximum			
Environmental (all conditions non-condensing)	Temperature	41° to 122° F (5° to 50° C)			
	Relative Humidity	10% to 90%			
	Maximum Wet Bulb Temperature	86° F (30° C)			



### Technical Specifications - Optical Storage

<b>SATA CD-RW/DVD-ROM Combo Drive</b>	<b>Height</b>	5.25-inch, half-height, tray-load
	<b>Orientation</b>	Either horizontal or vertical
	<b>Interface type</b>	SATA/ATAPI
	<b>Disc capacity</b>	Single layer: Up to 4.7 GB (6 times capacity of CD-ROM) Double layer: Up to 8.5 GB (12 times capacity of CD-ROM)
	<b>Dimensions (W x H x D)</b>	5.9 x 1.7 x 8.0 in (15.0 x 4.4 x 20.3 cm)
	<b>Weight (max)</b>	2.6 lb (1.2 kg)
	<b>Write speeds</b>	<b>CD-R</b> Up to 48X
		<b>CD-RW</b> Up to 32X
	<b>Read speeds</b>	<b>DVD+R/-R/+RW/-RW/+R DL /-R DL</b> Up to 8X
		<b>DVD-ROM</b> Up to 16X
		<b>CD-ROM, CD-R</b> Up to 48X
		<b>CD-RW</b> Up to 32X
	<b>Access times</b> (typical reads, including setting)	<b>Random</b> DVD: < 140 ms (typical), CD: < 125 ms (typical)
		<b>Full Stroke</b> DVD: < 250 ms (typical), CD: < 210 ms (typical)
	<b>Power</b>	<b>Source</b> SATA DC power receptacle
		<b>DC Power Requirement</b> 5 VDC $\pm$ 5%-100 mV ripple p-p 12 VDC $\pm$ 5%-200 mV ripple p-p
		<b>DC Current</b> 5 VDC - <1000 mA typical, < 1600 mA maximum 12 VDC - < 600 mA typical, < 1400 mA maximum
	<b>Environmental</b> (all conditions non-condensing)	<b>Temperature</b> 41° to 122° F (5° to 50° C)
		<b>Relative Humidity</b> 10% to 90%
		<b>Maximum Wet Bulb Temperature</b> 86° F (30° C)

### Technical Specifications - Optical Storage

<b>SATA DVD+/-RW LightScribe Drive</b>	<b>Height</b>	5.25-inch, half-height, tray-load
	<b>Orientation</b>	Either horizontal or vertical
	<b>Interface type</b>	SATA/ATAPI
	<b>Disc capacity</b>	Single layer: Up to 4.7 GB (6 times capacity of CD-ROM) Double layer: Up to 8.5 GB (12 times capacity of CD-ROM)
	<b>Dimensions (W x H x D)</b>	5.9 x 1.7 x 8.0 in (15.0 x 4.4 x 20.3 cm)
	<b>Weight (max)</b>	2.6 lb (1.2 kg)
	<b>Write speeds</b>	<b>DVD+R</b> Up to 16X
		<b>DVD+RW</b> Up to 8X
		<b>DVD+R DL</b> Up to 8X
		<b>DVD-R DL</b> Up to 4X
		<b>DVD-R</b> Up to 16X
		<b>DVD-RW</b> Up to 6X
		<b>CD-R</b> Up to 48X
		<b>CD-RW</b> Up to 32X
		<b>DVD-RAM</b> Up to 4X
		<b>DVD+R/-R/+RW/ -RW/+R DL /-R DL</b> Up to 8X
	<b>Read speeds</b>	<b>DVD-ROM</b> Up to 16X
		<b>CD-ROM, CD-R</b> Up to 48X
		<b>CD-RW</b> Up to 32X
		<b>Random</b> DVD: < 130 ms (typical), CD: < 120 ms (typical)
		<b>Full Stroke</b> DVD: < 240 ms (seek), CD: < 200 ms (seek)
	<b>Access times (typical reads, including setting)</b>	<b>Source</b> SATA DC power receptacle
		<b>DC Power Requirement</b> 5 VDC $\pm$ 5%-100 mV ripple p-p 12 VDC $\pm$ 5%-200 mV ripple p-p
		<b>DC Current</b> 5 VDC - <1000 mA typical, < 1600 mA maximum 12 VDC - < 600 mA typical, < 1400 mA maximum
	<b>Power</b>	<b>Temperature</b> 41° to 122° F (5° to 50° C)
		<b>Relative Humidity</b> 10% to 90%
		<b>Maximum Wet Bulb Temperature</b> 86° F (30° C)
	<b>Environmental (all conditions non-condensing)</b>	

### Technical Specifications - Removable Storage

<b>HP 1.44-MB Diskette Drive</b>	<b>Size</b>	3.5 in (8.89 cm)
	<b>LED Indicators</b> (front panel)	Green
	<b>Read/Write Capacity per Diskette</b> (high/low)	1.44 MB/720 KB
	<b>Drive Height</b>	One-third
	<b>Drive Rotation</b>	300 rpm
	<b>Transfer Rate</b> (high/low)	500/250 KB/s
	<b>Bytes/Sector</b>	512
	<b>Sectors/Track</b> (high/low)	18/9
	<b>Tracks/Side</b> (high/low)	80/80
	<b>Access Times</b>	Track-to-Track (high/low) 3/6 ms
		Average (high/low) 94/173 ms
		Settling Time 15 ms
		Latency Average 100 ms
	<b>Cylinders</b> (high/low)	80/80
	<b>Read/Write Heads</b>	Two

<b>HP 16-in-1 Media Card Reader</b>	<b>USB interface</b>	USB 2.0 High-speed device via PCI card or pass -through via internal USB port of system board	
	<b>Advance protocol support</b>	<ul style="list-style-type: none"> <li>• Supports hardware ECC (Error Correction Code) function</li> <li>• Supports hardware CRC (Cyclic Redundancy Check) function</li> <li>• Supports MS 4-bit parallel transfer mode</li> <li>• Supports MS-PRO 4-bit parallel transfer mode</li> <li>• Supports SD 4-bit parallel transfer mode</li> <li>• Supports high-speed 50 MHz SD 4-bit card (version 1.1)</li> <li>• Support high-speed 52 MHz MMC 8-bit card (version 4.x)</li> </ul>	
	<b>Supported media types</b>	<ul style="list-style-type: none"> <li>• Supports CompactFlash Card Type I (CF I), CompactFlash Card Type II (CF II), MicroDrive (MD)</li> <li>• Supports 3.3V SmartMedia Card (SM), SmartMedia ROM (SM ROM), xD-Picture Card (xD)</li> <li>• Supports Secure Digital Card (SD), Secure Digital ROM Card (SD ROM), miniSD, MultiMediaCard (MMC), Secure MultiMediaCard (Secure MMC), ROM Type MultiMediaCard (MMC ROM), Reduced Size MultiMediaCard (RS MMC), MultiMediaCard 4.0 (MMC Plus), Reduced Size MultiMediaCard 4.0 (MMC Mobile)</li> <li>• Support Memory Stick (MS), Memory Stick ROM (MS ROM), MagicGate Memory Stick (MG), Memory Stick Select, Memory Stick Duo (MS Duo), Memory Stick PRO (MS-PRO), Memory Stick PRO Duo (MS PRO Duo)</li> </ul>	
<b>Mechanical</b>	<b>Length</b> (3.5")	124.7 cm	
	<b>Width</b> (3.5")	101.6 cm	
	<b>Height</b> (3.5")	25.4 cm	
	<b>Length</b> (5.25")	171.6 cm	
	<b>Width</b> (5.25")	148.9 cm	
	<b>Height</b> (5.25")	42.7 cm	



### Technical Specifications - Removable Storage

#### Environmental

#### Operational environmental extremes

Test Parameters/Conditions - Power applied, unit operating on system  $\pm 5\%$  nominal supply voltage.  
 10°C 10% R.H. = 24 hours  
 10°C 90% R.H. = 24 hours  
 20°C 90% R.H. = 24 hours  
 30°C 90% R.H. = 24 hours  
 40°C 90% R.H. = 24 hours  
 50°C 90% R.H. = 24 hours  
 50°C 10% R.H. = 24 hours

#### Storage environmental extremes

Test Parameters/Conditions  
 60°C @ 80% R.H. for 96 hours  
 -30°C @ 20% R.H. for 48 hours  
 No power applied  
 Delta °C < 1.0°C/min  
 Delta % R.H. < 1.5% R.H./min

#### Approvals

USB-IF, WHQL, Compliant with USB Mass Storage Class Bulk only  
 Transport Specification Rev. 1.0, Compliant Intel Front Panel I/O  
 Connectivity Design Guide V. 1.2  
 FCC, CE, BSMI, C-Tick, VCCI, MIC, cUL, TUV-T

### Technical Specifications - Environmental Data

#### Eco-Label Certifications & 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
- Korea Ecolabel

\* Compliant with Energy Star 3.0; not compliant with Energy Star 4.0 when those requirements take effect

#### Longevity and Upgrading

This product is designed to be upgraded, possibly extending its useful life by several years. Spare parts are available throughout the warranty period and for up to 15 months after the end of production. Upgradeability features contained in the product include:

- 6 external USB ports
- 2 internal USB ports
- 2 external 5.25" drive bays
- 2 internal 3.5" drive bays
- 1 external 3.5" drive bay
- 1 empty standard PCI slot
- 2 empty standard PCIe x1 slots
- 1 empty standard PCIe x16 slot
- 2 memory slots
- 1 Serial port
- 1 Optional second serial port
- 1 Parallel port

Spare parts are available throughout the warranty period and 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



### Technical Specifications - Environmental Data

#### 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 >90% recyclable when properly disposed of at end of life.

#### Packaging Materials

- Corrugated Paper – TBD g
- EPE Foam – TBD g
- LDPE Bag –TBD g

The EPE foam packaging material is made from 30–60% 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. By 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).

#### 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.



### Technical Specifications - Environmental Data

- 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.

#### Hewlett-Packard Corporate Environmental Information

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

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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