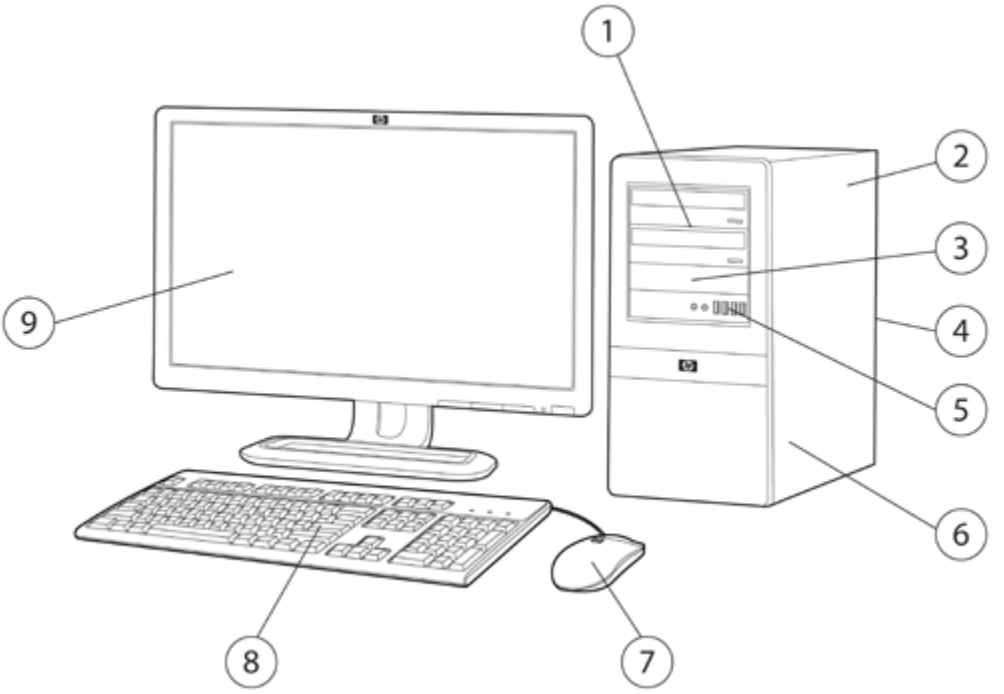
Overview

HP recommends Windows Vista® Business

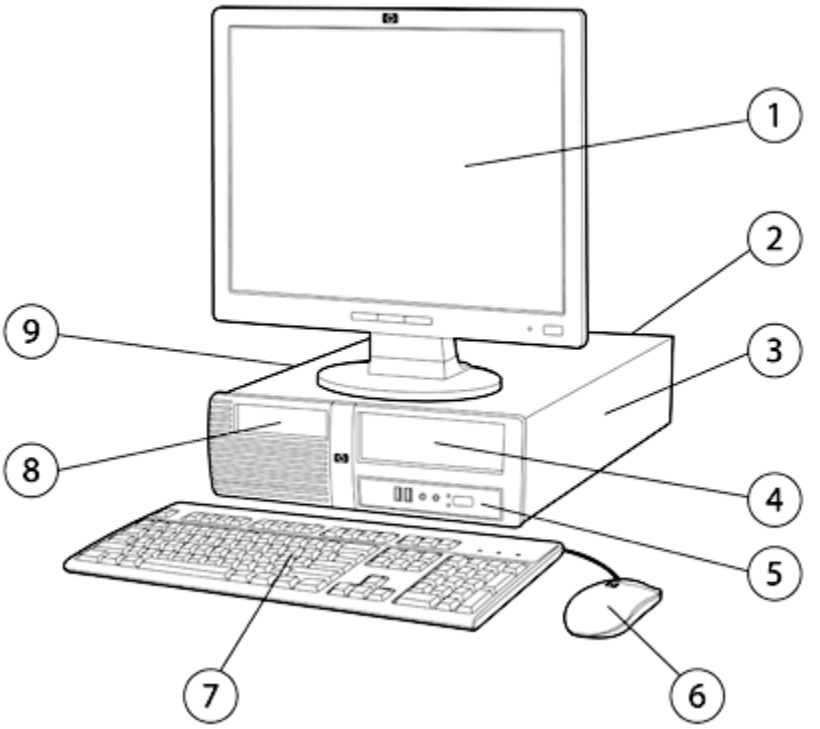
Microtower



1. (2) external 5.25” drive bays for optional optical drives; (2) internal 3.5” hard drive drive bays
2. 300 watt PFC and non-PFC power supply
3. (1) external 3.5” drive bay for optional media reader or diskette drive
4. Rear I/O: (4) USB 2.0 ports, (2) PS/2, (1) RJ-45, (1) 1394, (1) VGA, (1) DVI, (1) SPDIF in – (1) SPDIF out, (1) audio in – (1) audio out – (1) MIC
5. Front I/O: (3) USB 2.0 ports, (1MIC – (1) audio out (Headphone), (1) 1394
6. (3) PCIe x1 slots, (1) PCIe x16 slot
7. PS/2 Scroll Mouse
8. HP Standard Keyboard
9. Monitor (sold separately)

Small Form Factor

Overview



1. Monitor (sold separately)
2. Rear I/O: (4) USB 2.0 ports, (2) PS/2, (1) RJ-45, (1) 1394, (1) VGA, (1) DVI, (1) SPDIF in – (1) SPDIF out, (1) audio in – (1) audio out – (1) MIC
3. 250 watt PFC power supply
4. (1) external 5.25” drive bay for optional optical drives; (1) internal 3.5” drive bay
5. Front I/O: (2) USB 2.0 ports, (1) audio in – (1) audio out
6. PS/2 Scroll Mouse
7. HP Standard Keyboard
8. (1) external 3.5” drive bay for optional media reader or diskette drive
9. (3) PCIe x1 slots, (1) PCIe x16 slot

At A Glance

- Support for Intel® Core™ 2 Duo and Core™ 2 Quad processors, Intel Pentium® dual-core processors, Intel Celeron® processors
- Choice of operating systems:
  - Genuine Windows Vista Business 32
  - Genuine Windows Vista Business 64
  - Genuine Windows Vista Home Basic
  - Genuine Windows Vista Ultimate 32 (English only)
  - Genuine Windows Vista Business with downgrade to Windows XP Professional custom installed
  - FreeDOS (not available in China)
- Intel G45 Express Chipset
- Integrated dual monitor support with VGA and DVI-D connectors
- Integrated 1394 port
- Intel I/O Controller Hub 10 (ICH10R)
- Intel Graphics Media Accelerator X4500HD with DX10 support
- PCI Express I/O bus
- Serial ATA controller
- Intel Integrated WG82567V Gigabit Network Connection
- Choice of hard drives and optical drives
- Can be configured with multiple hard drives in a RAID array
- 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 Processors:
Intel Celeron 430 Processor (1.8-GHz, 512-KB L2 cache, 800-MHz FSB)
Intel Celeron 440 Processor (2.0-GHz, 512-KB L2 cache, 800-MHz FSB)
Intel Celeron 450 Processor (2.2-GHz, 512-KB L2 cache, 800-MHz FSB)
Intel Celeron Dual-Core Processors
Intel Celeron E1200 Processor (1.6-GHz, 512K L2 cache, 800-MHz FSB)
Intel Celeron E1400 Processor (2.0-GHz, 512K L2 cache, 800-MHz FSB)
Intel Celeron E1500 Processor (2.2-GHz, 512K L2 cache, 800-MHz FSB)
Intel Pentium Dual-Core Processors:
Intel Pentium E2200 Processor (2.2-GHz, 1-MB L2 cache, 800-MHz FSB)
Intel Pentium E2220 Processor (2.4-GHz, 1-MB L2 cache, 800-MHz FSB)
Intel Pentium E5200 Processor (2.5-GHz, 2-MB L2 cache, 800-MHz FSB)
Intel Pentium E5300 Processor (2.6-GHz, 2MB L2 cache, 800-MHz FSB)
Intel Core 2 Duo Processors:
Intel Core 2 Duo E7300 Processor (2.66-GHz, 3 MB L2 cache, 1066-MHz FSB)
Intel Core 2 Duo E7400 Processor (2.8-GHz, 3 MB L2 cache, 1066-MHz FSB)
Intel Core 2 Duo E8400 Processor (3.0-GHz, 6 MB L2 cache, 1333-MHz FSB)
Intel Core 2 Duo E8500 Processor (3.16-GHz, 6-MB L2 cache, 1333-MHz FSB)
Intel Core 2 Duo E8600 Processor (3.33-GHz, 6 MB L2 cache, 1333-MHz FSB)
Intel Core 2 Quad Processors:
Intel Core 2 Quad Q6600 Processor (2.4-GHz, 8 MB L2 cache, 1066-MHz FSB)
Intel Core 2 Quad Q8200 Processor (2.33-GHz, 4 MB L2 cache, 1333-MHz FSB)
Intel Core 2 Quad Q8300 Processor (2.50-GHz, 4 MB L2 cache, 1333-MHz FSB)
Intel Core 2 Quad Q9400 Processor (2.66-GHz, 6 MB L2 cache, 1333-MHz FSB)
Intel Core 2 Quad Q9550 Processor (2.83-GHz, 12 MB L2 cache, 1333-MHz FSB)
Intel Core 2 Quad Q9650 Processor (3.0-GHz, 12 MB L2 cache, 1333-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 Business 64*
Genuine Windows Vista Home Basic*
Genuine Windows Vista Ultimate 32* (English only)
Genuine Windows Vista Business downgrade to Windows XP Professional custom installed*†
Free DOS (not available in China)

* 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.
† Windows Vista Business disk may be included for future upgrade if desired. To qualify for this downgrade an end user must be a business (including governmental or educational institutions) and is expected to order annually at least 25 customer systems with the same custom image.

Microsoft Office 2007 Basic
Microsoft Office 2007 Small Business
Microsoft Office 2007 Professional
HP Backup and Recovery Manager
Intel Matrix Storage Manager

Mozilla Firefox for HP Virtual Solutions
Roxio Easy Media Creator 10**
Intervideo WinDVD 8**
McAfee Total Protection Anti-Virus***
PDF Complete
AOL Toolbar

** Supporting software available with certain optical drive configurations
*** 60 day trial period for McAfee Total Protection for Small Business software. Internet access required to receive updates. First update included. Subscription required for updates thereafter.

Hard Drives (SATA)

80 GB Hard Drive
8MB cache, 7,200 RPM, 3.0 GB/s, NCQ, Smart IV

160 GB Hard Drive
8MB cache, 7,200 RPM, 3.0 GB/s, NCQ, Smart IV

250 GB Hard Drive
8MB cache, 7,200 RPM, 3.0 GB/s, NCQ, Smart IV

320 GB Hard Drive
8MB cache, 7,200 RPM, 3.0 GB/s, NCQ, Smart IV

500 GB Hard Drive
16MB cache, 7,200 RPM, 3.0 GB/s, NCQ, Smart IV

250-GB Pocket Media Drive

System Memory

512-MB DDR2 Synch DRAM PC2-6400 (800-MHz) Non-ECC (1 x 512MB)
1-GB DDR2 Synch DRAM PC2-6400 (800-MHz) Non-ECC (1 x 1GB)
2-GB DDR2 Synch DRAM PC2-6400 (800-MHz) Non-ECC (2 x 1GB)
3-GB DDR2 Synch DRAM PC2-6400 (800-MHz) Non-ECC (3 x 1GB)
4-GB DDR2 Synch DRAM PC2-6400 (800-MHz) Non-ECC (4 x 1GB)
4-GB DDR2 Synch DRAM PC2-6400 (800-MHz) Non-ECC (1 x 4GB)
4-GB DDR2 Synch DRAM PC2-6400 (800-MHz) Non-ECC (2 x 2GB)
8-GB DDR2 Synch DRAM PC2-6400 (800-MHz) Non-ECC (4 x 2GB)
8-GB DDR2 Synch DRAM PC2-6400 (800-MHz) Non-ECC (2 x 4GB)
16-GB DDR2 Synch DRAM PC2-6400 (800-MHz) Non-ECC (4 x 4GB)

NOTE: For systems configured with more than 3 GB of memory and a 32-bit operating system, all memory may not be available due to system resource requirements. Addressing memory above 4 GB requires a 64-bit operating system.

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

Diskette Drive

1.44-MB Diskette Drive

Media Reader

HP 22-in-1 Media Reader and additional USB 2.0 port

Optical Drives (Serial ATA)

SATA DVD-ROM Drive

SATA SuperMulti LightScribe DVD Writer Drive

Standard Features and Configurable Components

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 Optical Scroll Mouse USB 2-Button Optical Scroll Mouse USB 2-Button Laser Mouse
Audio	Realtek ALC888S High Definition audio codec 3D audio compliant with AC'97 Rev. 2.3 and HD Audio compatible Internal PC speaker
Communication	Integrated Intel WG82567V Gigabit Network Connection Intel Gigabit CT Desktop NIC LSI PCIe x1 56K International SoftModem HP Wireless 802.11 b/g/n PCIe x1 Card (full height)
Graphics	Intel Graphics Media Accelerator X4500HD ATI Radeon HD 2400XT 256MB Dual Head graphics adapter (PCIe x16) ATI Radeon HD 3470 256MB Single Head graphics adapter (PCIe x16) ATI Radeon HD 3650 512MB Dual Head graphics adapter (PCIe x16) (MT only) DisplayPort to DVI-D adapter (for use with ATI Radeon HD 3470 and 3650)
Miscellaneous	Belkin USB to serial adapter

System Details

Base Unit

- MT: Micro ATX Microtower chassis, including power supply and front bezel; five (5) drive bays and four expansion slots
- SFF: Micro ATX Small Form Factor chassis, including power supply and front bezel; three (3) drive bays and four expansion slots
- Active type heatsink
- 92 x 92 x 25 mm chassis fan for Microtower chassis
- No chassis fan for Small Form Factor chassis
- System board with Intel G45 Express chipset, Intel I/O Controller Hub 10R (ICH10R), Intel WG82567V Ethernet controller, Intel GMA X4500HD graphics, and Realtek audio, (3) PCI Express x1 slots, (1) PCI Express x16 slot, (4) DDR2 DIMM memory slots, (4) Serial ATA data connectors, (10) USB Ports (see USB support below), 1394 Firewire, SPDIF coaxial In/Out
- Power cord

Slots

PCI

PCI Express x1 slots
MT: (3) full-height (4.34”), length (6.6”), Max power per slot 10W
SFF: (3) low-profile (2.73”), length (6.6”), Max power per slot 10W
PCI Express x16 slot (for graphic cards)
MT: (1) full-height (4.34”), length (9.5”), Max power per slot 75W
SFF: (1) low-profile (2.73”), length (6.6”), Max power per slot 25W

Memory Expansion

Four (4) DDR2 SDRAM DIMM slots (16 GB maximum memory support)

NOTE: For systems configured with more than 3 GB of memory and a 32-bit operating system, all memory may not be available due to system resource requirements. Addressing memory above 4 GB requires a 64-bit operating system.

Bays

Internal

MT: Two (2) 3.5-inch
SFF: One (1) 3.5-inch

External

MT: Two (2) 5.25-inch; One (1) 3.5-inch
SFF: One (1) 5.25-inch; One (1) 3.5-inch

USB Support

EHCI high-speed USB 2.0 controller

MT: Three (3) front ports; four (4) rear ports, three (3) internal ports on system board
SFF: Two (2) front ports; four (4) rear ports, four (4) internal ports on system board

Other Ports

Front:
MT: (1) audio out; (1) microphone in, (1) 1394 port
SFF: (1) audio out; (1) microphone in
Rear:
(2) PS/2 ports (keyboard and mouse)
(1) analog VGA video port
(1) DVI port
(1) SPDIF coaxial input
(1) SPDIF coaxial output
(1) audio in, (1) audio out; (1) microphone in
(1) RJ-45 network port
(1) 1394 port

System Details

Weight & Dimensions (MT)	**Chassis Dimensions** (H x W x D)	15.14 x 7.27 x 16.36 in 385 x 185 x 416 mm
	Packaged Dimensions (L x W x H)	19.13 x 21.875 x 10.13 in 490 x 556 x 257 mm
	System Weight	22.4 lb (10.2 kg)
	Shipping Weight	30.8 lb (14.0 kg)
Weight & Dimensions (SFF)	**Chassis Dimensions** (H x W x D)	3.98 x 13.35 x 15.24 in 101 x 339 x 387 mm
	Packaged Dimensions (L x W x H)	23.38 x 19.68 x 9.0 in 593.8 x 500.0 x 228.6 mm
	System Weight	14.96 lb (6.79 kg)
	Shipping Weight	23.00 lb (10.43 kg)
Technology and Features	**Memory Type**	PC2-6400 DDR2 SDRAM (800MHz) non-ECC Up to 16 GB system memory standard
	NOTE: For systems configured with more than 3 GB of memory and a 32-bit operating system, all memory may not be available due to system resource requirements. Addressing memory above 4 GB requires a 64-bit operating system.	
	Hard Drive Interfaces Supported	Serial ATA

RAID

Redundant Array of Independent Drives
RAID 0,1 are the RAID configurations that HP Compaq dx7500 Business PC products offer as factory configurations. The pre-configured systems:

- Are only available on the MT form factor. The SFF does not support RAID, as it does not allow for more than one hard disk drive.
- Are complete RAID systems and have both drives installed.
- Have the necessary Option ROM configuration.
- Are pre-loaded and pre-installed with all required Intel software.
- Include a preinstalled operating system that is in mirrored mode out of the box.

SMART Technology* (Self-Monitoring, Analysis and Reporting Technology)

Allows hard drives to monitor their own health and to raise flags if imminent failures were predicted

- Predicts failures before they occur. Tracks fault prediction and failure indication parameters such as re-allocated sector count, spin retry count, calibration retry count
- By avoiding actual hard drive failures, SMART hard drives act as "insurance" against unplanned user downtime and potential data loss from hard drive failure
- IOEDC: I/O Error Detection Circuitry
- Detects errors in Read/Write buffers on HDD cache RAM
- Interface in F10 setup provides confirmation of SMART support.

* This feature is inoperable when a RAID configuration is enabled.

System Details

Chassis	**Front Panel**	Power button Power On LED HDD Activity LED
	Cooling Solutions Supported	Power Supply Fan (variable speed) Active heatsink (variable speed) Chassis fan (variable speed) (MT only)
	Slots Supported	(3) PCI Express x1 slots, (1) PCI Express x16 slot
	Front I/O	MT: Three (3) USB 2.0 ports, 1394, Headphone, Mic SFF: Two (2) USB 2.0 ports, Headphone, Mic
	Rear I/O	Standard Micro ATX I/O connectors, including four (4) USB 2.0 ports
	Drive Bays (MT)	Two (2) 5.25-inch (13.335 cm) half height external One (1) 3.5-inch (8.89 cm) half height external Two (2) 3.5-inch (8.89 cm) half height internal
	Drive Bays (SFF)	One (1) 5.25-inch (13.335 cm) half height external One (1) 3.5-inch (8.89 cm) half height external One (1) 3.5-inch (8.89 cm) half height internal
	Internal Speaker	Standard
	Security	Padlock loop Kensington Lock Support Optional USB Port Disable at factory (user configurable via BIOS)
	Power Supply	MT: 300-watt ATX Power Supply – PFC/non-PFC with a 115v/230v line switch (varies by country/region) SFF: 250-watt Power Supply – PFC with a 115/230v line switch.

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 (MT)	**Operating**	41° to 95° F (5° to 35° C)
	Non-operating	–22° to 140° F (–30° to 60° C)
Relative Humidity (MT)	**Operating**	15% to 80% (non-condensing at ambient)
	Non-operating	90% (non-condensing at ambient)
Maximum Altitude (MT) (unpressurized)	**Operating**	7500 ft (2286 m)
	Non-operating	15,000 ft (4572 m)
Temperature Range (SFF)	**Operating**	50° to 95° F (10° to 35° C)
	Non-operating	–22° to 140° F (–30° to 60° C)
Relative Humidity (SFF)	**Operating**	10% to 90% (non-condensing at ambient)
	Non-operating	5% to 95% (non-condensing at ambient)
Maximum Altitude (SFF) (unpressurized)	**Operating**	10,000 ft (3048 m)
	Non-operating	30,000 ft (9000 m)

System Details

NOTE: Operating temperature is de-rated 1.0 deg C per 1000 ft (300 m) to 7500 ft (2286 m) for MT and 10000 ft (3000m) for SFF above sea level, no direct sustained sunlight. Maximum rate of change is 7.5 deg C/Hr for MT and 10 deg C/Hr for SFF. 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
		Support single Intel Core 2 Duo and Core 2 Quad, Pentium dual-core, or Celeron processors
	PWM	ON – NCP5362 – 3 phase
	Chipset	Intel G45 Express Intel I/O Controller Hub 10 (ICH10R)
	Super I/O	Fintek F8000
	Front Side Bus Frequency	800/1066/1333 MHz
	Memory	DDR2 SDRAM
		4 x DIMM slots
	Clock Generator	SLG8XP549T
	Integrated Graphics	Intel Graphics Media Accelerator (GMA) X4500HD
	Audio	Realtek ALC888S HD Audio compatible codec with two channel audio 3D audio compliant with AC'97 rev. 2.3
	LOM	Intel WG82567V PHY, Integrated MAC in ICH10R
	Storage	Four Serial ATA interfaces
	Expansion Slots	3 x PCI Express x1 slots
		1 x PCI Express x16 slot
	BIOS	SPI FLASH ROM
	Industrial Standard	PCIe compliant
		USB 2.0
	Rear Side I/O Ports	1 x PS/2 keyboard port
		1 x PS/2 mouse port
		4 x USB 2.0 ports
		1 x RJ-45 10/100 port
		1 x DVI-D port
		1 x 1394 port
		1 x SPDIF coaxial input port; 1 SPDIF coaxial output port
		1 x DB 15-pin analog VGA port
		3 x audio ports
	On Board I/O Interfaces	1 x ATX power connector
		1 x +12V power connector
		1 x Floppy connector
		1 x Front panel connector, Switch, LED (ON/Flash/OFF)
		2 x Fan headers for CPU, chassis, with voltage/fan speed control
		2 x header (1 -2x5, 1-1x5) to support 3 USB 2.0 ports at front side
		1 x header (1 - 2x5) to support USB Card Media Reader
		1 x header (1 -1x5) to support an additional USB device
		1 x header to support 2 front (Headphone/Mic) audio ports
	Board Size	Micro-ATX, PCB Size: 9.6 x 9.0 in (24.38 x 22.86 cm)
		4-layer PCB with green color
	Additional Features	Bootable without keyboard, mouse or monitor
		Keyboard/mouse/USB wake up

System Details

	Support S3, S4 and S5 ACPI status Hardware monitor capability CPU fan speed control
Network Interface	Integrated Intel WG82567LM Gigabit Network Connection Intel Gigabit CT Desktop NIC (optional)
Wireless	MT: Wireless 802.11b/g/n PCIe Card (full height bracket) SFF: Wireless 802.11b/g/n PCIe Card (half height bracket)
Power Supply	• MT: ATX Power Supply – Passive PFC • SFF: Custom Power Supply – Passive PFC • Passive Power Factor Correction (PFC/NPFC) – 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 • MT: 300 watt maximum rated power • SFF: 250 watt maximum rated power • 80-mm power supply fan – variable speed for optimum acoustics
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 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.

Ambient Air Temperature	**Operating**	MT: Operating 41° to 95°F (5 to 35°C) (Test 0 to 104°F (40°C)); SFF: 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 10000 ft (3000 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.
	Storage	MT: Storage: 90% RH @ 60°C for 12 hours (Non-condensing) SFF: –22° to 140°F (–30° to 60°C) – Maximum rate of change: 410°F/Hr (210°C/Hr).
Humidity	**Operating**	MT: 15% to 80% relative humidity (Rh), 35°C non-condensing SFF: 10% to 90% relative humidity (Rh), 86°F (30°C) maximum wet bulb temperature, non-

		condensing
	Storage	MT: 90% relative humidity (Rh), 60°C for 12 hours, non-condensing SFF: 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).
Altitude	**Operating**	MT: 0 to 7,500 feet (0 to 2286 meters) – This value may be limited by the type and number of options installed. SFF: 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).
	Non-Operating	MT: 0 to 15,,000 feet (0 to 4572 meters) SFF: 0 to 30,000 feet (0 to 9,144 meters) – Maximum allowable altitude change rate is 1200 ft/min (365.76 m/min).
Shock	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.	
	Non-Operating	MT: 35G's (Half-sine Shock) 35G's (Trapezoidal Shock) SFF: 35G's (Half-sine Shock) 40G's (Trapezoidal Shock)
Vibration	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.	
	Operating	MT: Random Operating: ~0.21Grms (5-500 Hz) Swept Sine: 0.5g (5-500Hz) 5 min. dwell at 4 resonance's 5Hz to 300Hz, (0.25G's nominal). SFF: Random vibration at 5Hz@0.00025G2/Hz, 10Hz@0.01G2/Hz, 100Hz@0.01G2/Hz, 300Hz@0.00001G2/Hz 5Hz to 300Hz, (0.25G's nominal).
	Non-Operating	MT: ~2.09Grms (5-500Hz), Non-Operational SFF: Random vibration at 0.008G²/Hz, 10Hz to 500Hz, (2 Grms nominal).
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).	
	MT: IDLE (Fixed disk drive spinning)	LWAd = 3.7 Bels, Desktop Average LpAm = 25 dBA
	SFF: IDLE (Fixed disk drive spinning)	LWAd = 4.3 Bels, Desktop Average LpAm = 32 dBA

System Details

MT: FIXED DISK (Random write)	LWAd = 4.0 Bels, Desktop Average LpAm = 30 dBA
SFF: FIXED DISK (Random write)	LWAd = 4.8 Bels, Desktop Average LpAm = 37dBA
MT: CD-ROM (Sequential Reads)	LWAd = 5.2 Bels, Deskside Average LpAm = 42 dBA
SFF: CD-ROM (Sequential Reads)	LWAd = 5.2 Bels, Deskside Average LpAm = 41dBA

Service and Support

On-site Warranty[1]: One-year (1-1-1) limited warranty delivers one year of on-site, next business-day[2] service for parts and labor and includes free telephone support[3] 24 x 7. Global coverage[2] 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.

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

[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.

[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	**NICs**	
	I Intel Gigabit CT Desktop NIC (GbE PCIe x1 NIC)	FH969AA
	Wireless LAN	
	HP Wireless 802.11/b/g/n PCIe x1	FH971AA
	Modems	
	LSI PCIe x1 56K International SoftModem	FH970AA
Hard Disk Drives	HP 500-GB SATA 3.0-Gb/s Hard Drive	PV943A
	HP 320-GB SATA 3.0-Gb/s Hard Drive	FH963AA
	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
Removable Storage Devices	**Diskette Drive**	
	HP 1.44-MB Internal Diskette Drive	AG295AA
	HP 1.44-MB USB Diskette Drive – External	DC141B
	22-in-1 Media Reader	FX273AA
Input Devices	HP PS/2 Standard Keyboard	DT527A
	HP USB Standard Keyboard	DT528A
	HP 2.4 GHz Wireless Keyboard and Mouse	NB896AA#xxx
	HP PS/2 2-Button Optical Scroll Mouse	EY703AA
	HP USB 2-Button Optical Scroll Mouse	DC172B
	HP USB 2-Button Laser Mouse	GW405AA
Memory	HP 1-GB PC2-6400 (DDR2 800-MHz) DIMM	AH058AA
	HP 512-MB PC2-6400 (DDR2 800-MHz) DIMM	AH056AA
	HP 2-GB PC2-6400 (DDR2 800-MHz) DIMM	AH060AA
	HP 4-GB PC2-6400 (DDR2 800-MHz) DIMM	FH977AA
Audio	HP Satellite Speakers	ZD929AA
Graphics	ATI Radeon HD 2400 XT 256MB DH PCIe x16 Graphics Card	KD060AA
	ATI Radeon HD 3470 256MB SH PCIe x16 Graphics Card	FH972AA
	ATI Radeon HD 3650 512MB DH PCIe x16 Graphics Card (MT Only)	KS505AA
	HP DisplayPort To DVI-D Adapter	FH973AA
	* 1GB of system memory required. Graphics cards use part of the total system memory to enhance graphics performance.	
Optical Drives	HP SATA DVD-ROM Drive	AH047AA
	HP SATA SuperMulti LightScribe DVD Writer Drive	GF343AA

After-Market Options

Security	HP Business PC Security Lock Kit	PV606AA
	Security Cable with Kensington Lock	PC766A
Miscellaneous Accessories	Belkin Serial to USB adapter	EM449AA

Memory

DDR SYNCH DRAM NON-ECC MEMORY
The Intel G45 Express chipset supports non-ECC DDR2 memory up to PC2-6400 (800-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.

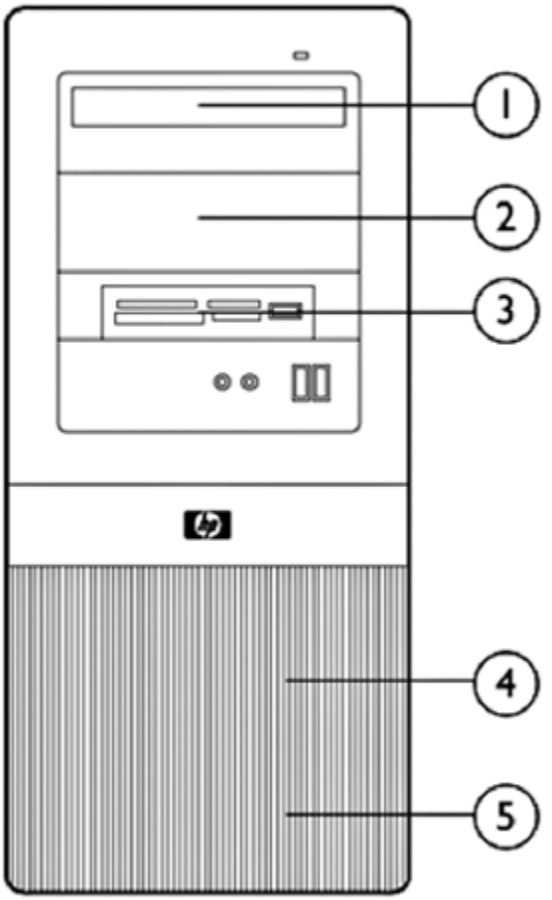
HP recommends dual-channel symmetric configurations for maximum performance.
For best performance, add the same amount of total memory to each channel and do not mix speeds. For dual-channel symmetric performance, the total amount of memory in each channel must be equal. If speeds are mixed, speed will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

STANDARD MEMORY
512-MB, 1-GB, 2-GB or 4GB DDR2 SYNCH DRAM

OPTIONAL MEMORY UPGRADES
Supports up to 16-GB of DDR2 SYNCH DRAM. Not all memory configurations possible are represented below.
NOTE: For systems configured with more than 3 GB of memory and a 32-bit operating system, all memory may not be available due to system resource requirements. Addressing memory above 4 GB requires a 64-bit operating system.

DIMM Size	Slot 1 (Blue)	Slot 2 (Black)	Slot 3 (Blue)	Slot 4 (Black)
512-MB	512-MB			
1-GB	1-GB			
2-GB (dual-channel symmetric)	1-GB	1-GB		
4-GB (dual-channel symmetric)	1-GB	1-GB	1-GB	1-GB
4-GB (dual-channel symmetric)	2-GB	2-GB		
8-GB (dual-channel symmetric)	2-GB	2-GB	2-GB	2-GB
16-GB (dual-channel symmetric)	4-GB	4-GB	4-GB	4-GB

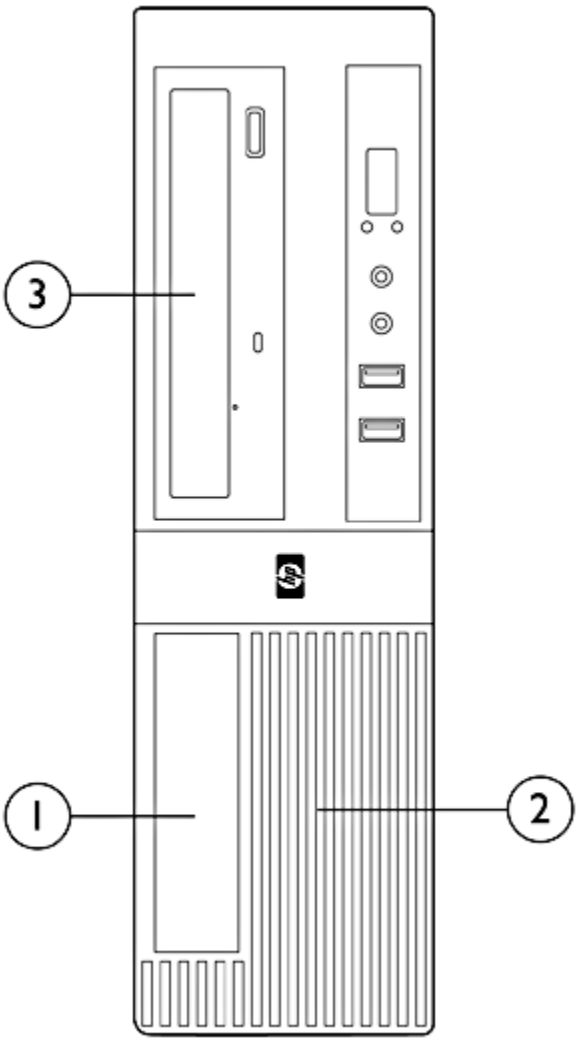
Storage



HP Compaq dx7500 Microtower Business PC

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

Storage



HP Compaq dx7500 Small Form Factor Business PC

	Maximum Quantity Supported	Position Supported	Controller
Drive Support			
Diskette Drives	1	1	SIO
Media Reader	1	1	Internal USB 2.0 port
CD-ROM Drives	1	3	SATA
DVD-ROM Drives	1	3	SATA
DVD+/-RW Drives	1	3	SATA
3.5” Serial ATA Hard Drives	1	2	SATA

Technical Specifications - Audio

Integrated Realtek ALC888S Audio	**Type**	Integrated	2-channel
	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

Integrated Intel WG82567V Gigabit Network Connection	**Connector**	RJ-45
	Controller	Intel WG82567V and ICH10R integrated MAC
	Memory	Large 96kb receive and 8kb transmit on chip buffer
	Data rates supported	10/100/1000 Mbps
	Compliance	IEEE 802.3 compliant, 802.3x flow control
	Bus architecture	PCI Express 1.1
	Data transfer mode	Bus-master DMA
	Hardware certifications	FCC, B, CE, TUV- cTUVus Mark Canada and United States, TUV- GS Mark for European Union
	Power requirement	Aux 3.3V, 1.234 Watts in 1000base-T and 0.641 Watts in 100Base-T
	Boot ROM support	Yes
	Network transfer rate	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)
	Environmental	**Operating temperature** 32° to 120°F (0° to 48.89° C)
		Operating humidity 85% at 120°F (48.89° C)
	Dimensions	68Pin QFN (10mm x 10mm x 0.85mm)
	Management capabilities	WOL, PXE, (WOL supported from S1, S3, S4 states only. Not supported from S5 state).
Intel Gigabit CT Desktop NIC	**Connector**	RJ-45
	Controller	Intel WG82574L Gigabit Ethernet Controller
	Memory	Integrated Dual 48K configurable transmit receive FIFO Buffers
	Data rates supported	10/100/1000 Mbps
	Compliance	IEEE 802.1P, 802,1Q, 802.2, 802.3, 802.3AB and 802.3u compliant, 802.3x flow control
	Bus architecture	PCI-E 1.0a
	Data path width	X1, 250 MB/s, Bi-directional interface
	Data transfer mode	Bus-master DMA
	Hardware certifications	FCC, B, CE, TUV- cTUVus Mark Canada and United States, TUV- GS Mark for European Union
	Power requirement	Aux 3.3V, 3.0 Watts in 1000base-T and 2.0 Watts in 100Base-T
	Boot ROM support	Yes
	Network transfer rate	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)
	Environmental	**Operating temperature** 32° to 131°F (0° to 55° C)
		Operating humidity 85% at 131° F (55° C)
	Dimensions	4.75 x 2.25 x 0.8 in (12.1 x 5.7 x 2.0 cm)
	Management capabilities	WOL, PXE, DMI, WFM 2.0
HP Wireless 802.11b/g/n PCIe	**Dimensions (LxH)**	3.3 x 4.7 inches (8.5 x 12 cm)
	Weight	0.08 pounds (40 g)

Technical Specifications - Communications

Controller	Ralink RT2790		
System interface	PCIExpress x1		
Network standard	802.11 b/g/n		
Frequency band	2.400 - 2.497 GHz		
Operating temperature	14° to 149°F, operating (-10° to 65°C, operating)		
Storage temperature	-40° to 176°F, non-operating (-40° to 80°C, non-operating)		
Humidity	10-90% operating 5-95% non-operating		
Operating voltage	3.3V +/- 9% 12V +/- 8%		
Power consumption	Platform/WLAN Mode	Power Consumption	
	Maximum Power Consumption	10 Watts	
	Transmit Only	4 Watts maximum averaged power over 1 second	
	Transmit Packet or Active Scanning	1000 mA peak current for 100 microseconds or longer	
	Receive Only Mode or Idle without IEEE PSP mode enabled	3 Watts maximum averaged over 1 second	
	Idle, with IEEE PSP mode enabled	1.0 Watts maximum averaged over 1 second	
	Transmit Disabled (turned off in software)	50 mW maximum, averaged over 1 second	
	Platform in S3 or S4 (power removed from Low Profile PCI Express Card)	5 mW maximum, averaged over 1 second	
Output power (approximately)	**802.11b modes**	**802.11g modes**	**EWC modes**
	+19 dBm +/- 1.0 dB maximum	+17 dBm +/- 1.0 dB maximum	+17 dBm +/- 1.0 dB maximum (total power in all transmit chains)
Receive sensitivity	**Mode**	**Data rate**	**Sensitivity**
	802.11b	1 Mbps	-94 dBm
	802.11b	11 Mbps	-85 dBm
	802.11g	6 Mbps	-91 dBm
	802.11g	18 Mbps	-85 dBm
	802.11g	48 Mbps	-75 dBm
	802.11g	54 Mbps	-72 dBm
	EWC (2.4 GHz)	6.5 Mbps	-87 dBm
	EWC (2.4 GHz)	54 Mbps	-82 dBm
	EWC (2.4 GHz)	81 Mbps	-78 dBm
	EWC (2.4 GHz)	162 Mbps	-74 dBm
	EWC (2.4 GHz)	270 Mbps	-68 dBm
	EWC (2.4 GHz)	300 Mbps	-64 dBm
Data transfer rate	**Data Rate (MCS)**	**Minimum Throughput**	
	1 Mbps (802.11 b)	700 kbps	
	2 Mbps (802.11 b)	1.4 Mbps	
	5.5 Mbps (802.11 b)	3.5 Mbps	
	11 Mbps (802.11 b)	5.9 Mbps	

	12 Mbps (802.11 g)	6 Mbps
	18 Mbps (802.11 g)	9 Mbps
	24 Mbps (802.11 g)	12 Mbps
	36 Mbps (802.11 g)	18 Mbps
	48 Mbps (802.11 g)	21 Mbps
	54 Mbps (802.11 g)	22.5 Mbps
	6.5 Mbps (20 MHz EWC)	4.5 Mbps
	13 Mbps (20 MHz EWC)	9 Mbps
	19.5 Mbps (20 MHz EWC)	13.5 Mbps
	26 Mbps (20 MHz EWC)	18 Mbps
	39 Mbps (20 MHz EWC)	27 Mbps
	52 Mbps (20 MHz EWC)	36 Mbps
	58.5 Mbps (20 MHz EWC)	40 Mbps
	65 Mbps (20 MHz EWC)	45 Mbps
	78 Mbps (20 MHz EWC)	54 Mbps
	104 Mbps (20 MHz EWC)	72 Mbps
	117 Mbps (20 MHz EWC)	81 Mbps
	130 Mbps (20 MHz EWC)	91 Mbps
	13.5 Mbps (40 MHz EWC)	8 Mbps
	27 Mbps (40 MHz EWC)	16 Mbps
	40.5 Mbps (40 MHz EWC)	24 Mbps
	54 Mbps (40 MHz EWC)	32 Mbps
	81 Mbps (40 MHz EWC)	48 Mbps
	108 Mbps (40 MHz EWC)	64 Mbps
	121.5 Mbps (40 MHz EWC)	72 Mbps
	135 Mbps (40 MHz EWC)	81 Mbps

Security	• IEEE and WiFi compliant 64 / 128 bit WEP encryption • AES: CCM • 802.1x authentication • WPA: 802.1x. WPA-PSK and TKIP • WPA2 certification • IEEE 802.11i • Cisco Certified Extensions, all versions through V5
Antenna	HP part number 497792-001
Certifications	Wi-Fi certified
Certifications for use by country	United States, Canada, Peru, Taiwan

Technical Specifications - Communications

LSI PCIe x1 56K International SoftModem	**Data Transmission**	Technology speeds: 56,000 Kbps maximum downstream data, controllerless **NOTE:** 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.
	Data Speeds	(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
	Data Standards	ITU-T V.90, ITU-T, ITU-T V.34, V.44, V.42, V.42bis21, V.32bis, Bell 212A, and Bell 103
	Fax Speeds	14,400/12,000/9,600/7,200/4,800/2,400/1,200/300 b/s
	Fax Mode Capabilities	ITU-T T.31 class 1 FAX, V. 17, V.29, V.27ter, and V.21 Channel 2
	Error Correction and Data Compression	V.44, 42bis, V.42 and MNP2-5
	Power Management	PCI Bus Power Management Interface Specification (PCI-PM) Revision 1.2, Appendix A. D0, D3hot, and D3cold. Wake on Ring state when in D3cold. If the power management event (PME) feature is enabled in D3cold, a modem can wake the system via WAKE# (WAKEN) or beacon. Meets PCI Express 1.1 standard.
	Upgradeability	Driver upgradeable for future enhancements
	Video	ITU-T V.80 video ready interface
	Other	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
	Operating Temperature	32° to 158° F (0° to 70° C)
	Operating Humidity	20% to 90%, non-condensing
	Power	Requires a 3.3-V auxiliary power rail on PCI express bus Uses only one PCI express load (i.e., one grant/request pair), one shared IRQ, one electrical load
	Chipset	LSI SV92EX - Integrated PCI interface with 3.3-V tolerant buffers and CardBus support
	Dimensions (L X H)	Complies with PCI express low profile specifications-6.7 x 2.3 in (17.0 x 5.8 cm) and supports high- and low-profile brackets
	Connection	Single RJ-11 connector
	Other Features	Digital line protection, call progress monitoring via on-board piezo device, support for high profile and low profile brackets, PnP ID support
	Safety	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
	EMC	FCC Part 15, IC ES003, EN 55022, 3rd edition, EN 55024, annex A, EN 61000-4-6, EN 61000-4-8
	Telecom	FCC Part 68, IC-CS-03 (Canada); Worldwide PTT approvals Not available in Korea or the Republic of South Africa.
	Other	The SV92EX device is packaged in a 32-pin micro leadless chip carrier (MLCC). The SV92EX is fully compliant with the PCI Express revision 1.1 specification. WHQL approved; ASPM compliant.

Integrated Intel Graphics Media Accelerator X4500HD

3D/2D Controller	Microsoft DirectX® 10 based with support for Pixel Shader 3.0
VGA Controller	Integrated
DVI	Integrated
Bus Type	PCI Express™ x16
RAMDAC	Integrated, 350 MHz
Graphics Engine Clock	667 MHz
Memory	Graphics memory is shared with system memory. Graphics memory usage varies depending on the amount of system memory installed, BIOS settings, operating system, and system load. 32 MB is pre-allocated for graphics use at system boot time. Additional memory can be allocated at boot time by the BIOS for PAVP (Protected Audio Video Playback) support for playback of protected video content. For Vista, use of PAVP heavy mode pre-allocates an additional 96MB. 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.

Windows XP Memory Usage:

Total System Memory (GB)	Total Graphics memory (MB)	Pre-Allocated (MB)	DVMT (MB)
0.5	128	32	96
	256	32	224
1	512	32	480
1.5	768	32	736
=>2.0	1024	32	992

Windows Vista Memory Usage:
Support for DVMT 5.0. The graphics driver will determine DVMT memory.
DVMT memory = Total GFX memory – Pre-allocated size and fixed memory = Pre-allocated memory.

HW Video Decode	Full Hardware Accelerated decode for MPEG2 encrypted video; support for PAVP Lite (default) and Heavy (or Paranoid) modes. Full H.264 and VC1 Variable Length Decode Acceleration and Intel Clear Video Technology Support.
Maximum Color Depth	32 bits/pixel
Maximum Vertical Refresh Rate	85 Hz at up to 1920x1440, 75 Hz at 2048x1536. Varies with mode and configuration. See table below.
Multi-display Support	Dual Independent monitor support facilitated via one VGA port and one DVI integrated on the back plane of the system board and presented as part of the rear I/O set of interfaces.
Graphics/Video API Support	Microsoft DirectX® 10, OpenGL® 1.5 (OpenGL® 2.0 available in a driver update)

Resolutions Supported

NOTE: Other resolutions may be available but are not recommended as the may not have been tested and qualified by HP.

Technical Specifications - Graphics

	Maximum Refresh Rate (Hz)	
Resolution	**Analog Connection**	**Digital Connection**
640x480	85	60
800x600	85	60
1024x768	85	60
1280x720	85	60
1280x1024	85	60
1440x900	75	60
1600x1200	85	60
1680x1050	75	60
1920x1080	85	60-R
1920x1200	85	60-R
1920x1440	85	N/A
2048x1536	75	N/A
2560x1600	N/A	60*

* Only supported when using a DisplayPort connection
NOTE: 60-R denotes reduced blanking timings are used on single-link DVI connections and may be used with other digital connections

ATI Radeon HD 2400XT (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	1920 x 1200 digital, 2048 x 1536 analog
Board display options	Supports two displays via included DMS-59 to dual VGA cable or 2 DVI monitors via optional DMS-59 to dual DVI cable kit part number: DL139A. 4-pin mini-DIN S-video connector for TV output

Board configuration	**Specification**	**Description**
	Graphics Chip	RV610
	Core clock	650 MHz
	Memory clock	500 MHz
	Frame buffer	256 MB DDR2, 128 bit 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 21 W

Compliance standards EMC Emissions:

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)

EMC Immunity:
CISPR 24:1997/EN 55024:1998 - Information Technology Equipment - Immunity Characteristics - Limits and Methods of Measurement.

Technical Specifications - Graphics

ATI Radeon HD 2400XT (256MB DH) PCIe Graphics Card display resolutions and refresh rates

NOTE: Other resolutions may be available but are not recommended as the may not have been tested and qualified by HP

	Maximum Refresh Rate (Hz)	
	Analog Resolution	Digital Connection
Resolution	85	60
640x480	85	60
800x600	85	60
1024x768	85	60
1280x720	85	60
1280x1024	85	60
1440x900	75	60
1600x1200	85	60
1680x1050	75	60
1920x1080	85	60-R
1920x1200	85	60-R
1920x1440	85	N/A
2048x1536	75	N/A
2560x1600	N/A	60*

* Only supported when using a dual-link DVI or DP connection

NOTE: 60-R denotes reduced blanking timings are used on single-link DVI connections and may be used with other digital connections

ATI Radeon HD 3650 (512MB DH) PCIe x16 Graphics Card

Bus type	PCI Express (x16 lanes)	
Maximum vertical refresh rate	85 Hz	
Display support	Integrated 400 MHz RAMDAC	
Display max resolution	2560 x 1600 digital, 2048 x 1536 analog	
Board display options	Supports two displays via included two DisplayPort and one Dual Link DVI-I connectors.	
Board configuration	**Specification**	**Description**
	Graphics Chip	RV635
	Core clock	600 MHz
	Memory clock	500 MHz
	Frame buffer	512 MB DDR2, 128 bit 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	56 W	
Compliance standards	EMC Emissions:	

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)

EMC Immunity:
CISPR 24:1997/EN 55024:1998 - Information Technology Equipment -

Immunity Characteristics - Limits and Methods of Measurement.

ATI Radeon HD 3650 (512MB DH) PCIe x16 Graphics Card display resolutions and refresh rates

NOTE:Other resolutions may be available but are not recommended as the may not have been tested and qualified by HP

	Maximum Refresh Rate (Hz)	
	Analog Resolution	**Digital Connection**
Resolution	85	60
640x480	85	60
800x600	85	60
1024x768	85	60
1280x720	85	60
1280x1024	85	60
1440x900	75	60
1600x1200	85	60
1680x1050	75	60
1920x1080	85	60-R
1920x1200	85	60-R
1920x1440	85	N/A
2048x1536	75	N/A
2560x1600	N/A	60*

* Only supported when using a dual-link DVI or DisplayPort connection

NOTE: 60-R denotes reduced blanking timings are used on single-link DVI connections and may be used with other digital connections

ATI Radeon HD 3470 (256 SH) PCIe Graphics Card

Bus type	PCI Express (x16 lanes)	
Maximum vertical refresh rate	85 Hz	
Display support	Integrated 400 MHz RAMDAC	
Display max resolution	2560 x 1600 digital, 2048 x 1536 analog	
Board display options	Supports two displays via the DisplayPort and DVI connectors	
Board configuration	**Specification**	**Description**
	Graphics Chip	RV620
	Core clock	750 MHz
	Memory clock	500 MHz
	Frame buffer	256 MB DDR2, 128 bit 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	22	
Dimmensions	2.71 in x 6.60 in (68.90 mm x 167.65 mm)	
Compliance standards	EMC Emissions:	

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)

EMC Immunity:

CISPR 24:1997/EN 55024:1998 - Information Technology Equipment - Immunity Characteristics - Limits and Methods of Measurement.

ATI Radeon HD 3470 (256MB SH) PCIe Graphics Card display resolutions and refresh rates

NOTE: Other resolutions may be available but are not recommended as they may not have been tested and qualified by HP

	Maximum Refresh Rate (Hz)	
	Analog Resolution	**Digital Connection**
Resolution	85	60
640x480	85	60
800x600	85	60
1024x768	85	60
1280x720	85	60
1280x1024	85	60
1440x900	75	60
1600x1200	85	60
1680x1050	75	60
1920x1080	85	60-R
1920x1200	85	60-R
1920x1440	85	N/A
2048x1536	75	N/A
2560x1600	N/A	60*

* Only supported when using a dual-link DVI or DisplayPort connection

NOTE: 60-R denotes reduced blanking timings are used on single-link DVI connections and may be used with other digital connections

Technical Specifications - Input Devices

HP PS/2 or 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 ± 5%
		Power consumption	50-mA maximum (with three LEDs ON)
		ESD	CE level 4, 15-kV air discharge
		EMI – RFI	Conforms to FCC rules for a Class B computing device
		MicrosoftPC 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)
		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
		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	

Technical Specifications - Input Devices

HP 2-Button Scroll Mouse (PS/2)	**Scroll Wheel**	8 mm	
	Maximum Rotation Speed	30 mm/s	
	Switch Type	Light force micro-switch	
	Switch Life	1 million operations	
	Mechanical Life	Minimum 200,000 revolutions	
	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
	Electrical	**Operating Voltage**	+ 5VDC ± 10%
		Power Consumption	15mA
		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
		PC98	Functionally compliant
	Mechanical	**Resolution**	400 ± 20% DPI
		Tracking Speed	10 in/s maximum
		Acceleration	100 in/s
		Switch Actuation	85 g nominal peak force
		Switch Life	1,000,000 operations (using Hasco modified tester)
		Cable Length	2 m
		PC98-99	Mechanically compliant
	Regulatory Approvals	UL, CSA, FCC, CE Mark, TUV, TUV GS, VCCI, BCIQ, C-Tick	

Serial ATA Hard Drives (7200 rpm)	**80 GB**	**Capacity**	80,026,361,856 bytes
		Height	1 in (2.54 cm)
		Width	Media diameter: 3.5 in (8.9 cm) Physical size: 4 in (10.2 cm)
		Interface	Serial ATA (3.0 Gb/s)
		Synchronous Transfer Rate (Maximum)	Up to 3 Gb/s
		Buffer	8 MB
		Seek Time (typical reads, includes controller overhead, including settling)	**Single Track** 2.0 ms **Average** 11 ms **Full-Stroke** 21 ms
		Rotational Speed	7,200 rpm
		Logical Blocks	156,301,488
		Operating Temperature	32° to 140° F (0° to 60° C)
	160 GB	**Capacity**	160,041,885,696 bytes
		Height	1 in (2.54 cm)
		Width	Media diameter: 3.5 in (8.9 cm) Physical size: 4 in (10.2 cm)
		Interface	Serial ATA (3.0 Gb/s)
		Synchronous Transfer Rate (Maximum)	Up to 3 Gb/s
		Buffer	8 MB
		Seek Time (typical reads, includes controller overhead, including settling)	**Single Track** 2.0 ms **Average** 11 ms **Full-Stroke** 21 ms
		Rotational Speed	7,200 rpm
		Logical Blocks	312,581,808
		Operating Temperature	32° to 140° F (0° to 60° C)
	250 GB	**Capacity**	250,059,350,016 bytes
		Height	1 in (2.54 cm)
		Width	Media diameter: 3.5 in (8.9 cm) Physical size: 4 in (10.2 cm)
		Interface	Serial ATA (3.0 Gb/s)
		Synchronous Transfer Rate (Maximum)	Up to 3 Gb/s
		Buffer	8 MB
		Seek Time (typical reads, includes controller overhead, including settling)	**Single Track** 2.0 ms **Average** 11 ms **Full-Stroke** 21 ms
		Rotational Speed	7,200 rpm
		Logical Blocks	488,397,168
		Operating Temperature	41° to 131° F (5° to 55° C)

Technical Specifications - Hard Drives

320 GB	**Capacity**	320,072,933,376 bytes	
	Height	1 in (2.54 cm)	
	Width	Media diameter: 3.5 in (8.9 cm) Physical size: 4 in (10.2 cm)	
	Interface	Serial ATA (3.0 Gb/s)	
	Synchronous Transfer Rate (Maximum)	Up to 3 Gb/s	
	Buffer	8 MB	
	Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	2.0 ms
		Average	11 ms
		Full-Stroke	21 ms
	Rotational Speed	7,200 rpm	
	Logical Blocks	625,142,448	
	Operating Temperature	41° to 131° F (5° to 55° C)	
500 GB	**Capacity**	500,107,862,016 bytes	
	Height	1 in (2.54 cm)	
	Width	Media diameter: 3.5 in (8.89 cm) Physical size: 4 in (10.2 cm)	
	Interface	Serial ATA (3.0 Gb/s)	
	Synchronous Transfer Rate (Maximum)	Up to 3 Gb/s	
	Buffer	8 MB	
	Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	2.0 ms
		Average	11 ms
		Full-Stroke	21 ms
	Rotational Speed	7,200 rpm	
	Logical Blocks	976,773,168	
	Operating Temperature	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

SATA DVD+/-RW LightScribe 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)	
	Write speeds	**DVD+R**	Up to 16X
		DVD+RW	Up to 8X
		DVD+R DL	Up to 8X
		DVD-R DL	Up to 4X
		DVD-R	Up to 16X
		DVD-RW	Up to 6X
		CD-R	Up to 48X
		CD-RW	Up to 32X
	Read speeds	**DVD-RAM**	Up to 4X
		DVD+R/-R/+RW/ -RW/+R DL /-R DL	Up to 8X
		DVD-ROM	Up to 16X
		CD-ROM, CD-R	Up to 48X
		CD-RW	Up to 32X
	Access times (typical reads, including setting)	**Random**	DVD: < 130 ms (typical), CD: < 120 ms (typical)
		Full Stroke	DVD: < 240 ms (seek), CD: < 200 ms (seek)
	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 - Removable Storage

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

HP 22-in-1 Media Card Reader	**USB interface**	USB 2.0 High-speed device via PCI card or pass -through via internal USB port of system board	
	Advance protocol support	• Supports hardware ECC (Error Correction Code) function • Supports hardware CRC (Cyclic Redundancy Check) function • Supports MS 4-bit parallel transfer mode • Supports MS-PRO 4-bit parallel transfer mode • Supports SD 4-bit parallel transfer mode • Supports high-speed 50 MHz SD 4-bit card (version 1.1) • Support high-speed 52 MHz MMC 8-bit card (version 4.x)	
	Supported media types	• Supports CompactFlash Card Type I (CF I), CompactFlash Card Type II (CF II), MicroDrive (MD) • Supports 3.3V SmartMedia Card (SM), SmartMedia ROM (SM ROM), xD-Picture Card (xD) • 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) • 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)	
	Mechanical	**Length** (3.5”)	124.7 cm
		Width (3.5”)	101.6 cm
		Height (3.5”)	25.4 cm
		Length (5.25”)	171.6 cm
		Width (5.25”)	148.9 cm
		Height (5.25”)	42.7 cm
	Environmental	**Operational**	Test Parameters/Conditions – Power applied,

	environmental extremes	unit operating on system ±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

Eco 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

- IT ECO declaration
- Korea Eco-label

Microtower

System Configuration

The configuration used for the Energy Consumption data for the Microtower model is based on a typically configured product.

Energy Consumption (in accordance with US Energy Star test method)	115VAC, 60Hz	230VAC, 50Hz	100VAC, 60Hz
Normal Operation	57.89W	57.53W	56.08W
Sleep	4.53W	4.73W	4.73W
Off	1.33W	1.12W	1.15W

Heat Dissipation*	115VAC, 60Hz	230VAC, 50Hz	100VAC, 60Hz
Normal Operation	198 BTU/hr	197 BTU/hr	192 BTU/hr
Sleep	16 BTU/hr	16 BTU/hr	16 BTU/hr
Off	5 BTU/hr	4 BTU/hr	4 BTU/hr

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

Additional Information

This product is in compliance with the Restrictions of Hazardous Substances (RoHS) directive – 2002/95/EC.

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 California Proposition 65 (State of California; Safe Drinking Water and Toxic Enforcement Act of 1986).

Plastics parts weighing over 25 grams used in the product are marked per ISO 11469 and ISO1043.

Display meets the requirement for low frequency electromagnetic fields per MPR-II and prEN50279 A/B/C

This product contains 0% recycled materials (by wt.)

This product is 93.0% recycle-able when properly disposed of at end of life.

Packaging Materials

- External:
  - Corrugated 2260g
  - Wood 13000g
  - Polyethylene low density 130g
- Internal:

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):

- 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/go/reuse-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.
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