Overview
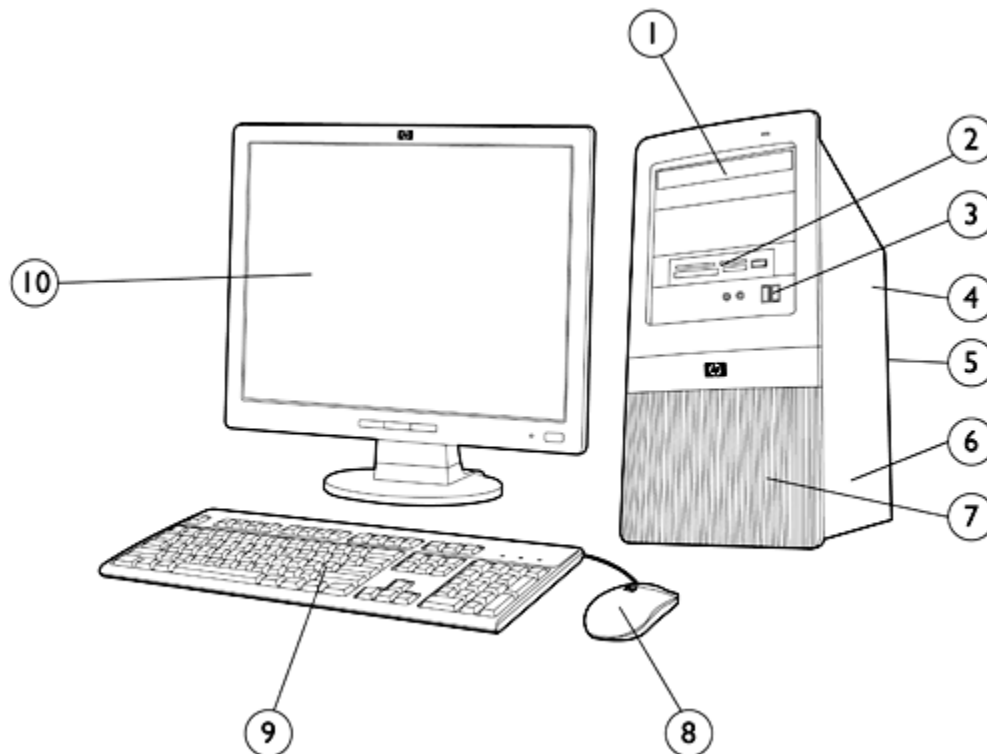
**HP recommends
Windows Vista® Business**

Microtower

1. (2) external 5.25" drive bays for optional optical drives

2. (1) external 3.5" drive bay for optional media reader\

3. (2) USB 2.0 ports, audio ports

4. 300-watt max power supply

5. (4) USB 2.0 ports, (2) PS/2, (1) RJ-45, (1) VGA, (1) audio in – (1) audio out – (1) MIC

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

7. (2) internal 3.5" drive bays

8. HP USB 2-Button Optical Scroll Mouse

9. HP USB Value Standard Keyboard

10. Monitor (sold separately)

Overview

At A Glance

- Intel® Core™ 2 processors, Intel Pentium® processors, or Intel Celeron® processors
- Choice of operating systems:
  - Genuine Windows Vista Business 32
  - Genuine Windows Vista Home Premium 32
  - Genuine Windows Vista Home Basic 32
  - Genuine Windows Vista Business with downgrade to Windows XP Professional custom installed
  - FreeDOS
- Intel G31 Express Chipset
- Intel I/O Controller Hub 7 (ICH7)
- Intel Graphics Media Accelerator
- PCI and PCI Express I/O buses
- Serial ATA controller
- USB 2.0 support
- Realtek RTL8101E 10/100 Fast Ethernet controller
- 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 Processors**
	Intel Celeron 430 Processor (1.80-GHz, 512-KB L2 cache, 800-MHz FSB)
	Intel Celeron 440 Processor (2.00-GHz, 512-KB L2 cache, 800-MHz FSB)
	Intel Celeron 450 Processor (2.2-GHz, 512K L2 cache, 800-MHz FSB)
	Intel Celeron Dual-Core Processors
	Intel Celeron Dual Core E1200 Processor (1.60-GHz, 512-KB L2 cache, 800-MHz FSB)
	Intel Celeron Dual Core E1400 Processor (2.00 GHz, 512 KB L2 cache, 800 MHz FSB)
	Intel Celeron Dual Core E1500 Processor (2.2-GHz, 512K L2 cache, 800-MHz FSB)
	Intel Pentium Dual-Core Processors
	Intel Pentium Dual Core E2220 Processor (2.40 GHz, 1 MB L2 cache, 800 MHz FSB)
	Intel Pentium Dual Core E5200 processor (2.50 GHz, 2 MB L2 cache, 800 MHz FSB)
	Intel Pentium Dual Core E5300 Processor (2.6-GHz, 2MB L2 cache, 800-MHz FSB)
	Intel Pentium Dual Core E5400 Processor (2.7 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 (2.80-GHz, 3 MB L2 cache, 1066-Mhz FSB)
	Intel Core 2 Duo E7500 Processor (2.93 GHz, 3 MB L2 cache, 1066 Mhz FSB)
	Intel Core 2 Duo E8400 Processor (3.00-GHz, 6-MB L2 cache, 1333MHz FSB)
	Intel Core 2 Duo E8500 Processor (3.16-GHz, 6-MB L2 cache, 1333MHz FSB)
	Intel Core 2 Duo E8600 processor (3.33 GHz, 6 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 Home Premium 32*
	Genuine Windows Vista Home Basic 32*
	Genuine Windows Vista Business with downgrade to Windows XP Professional custom installed
	Free DOS
	* 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
	Mozilla Firefox for HP Virtual Solutions
	HP Credential Manager
	HP Power Manager 2.0 HP Total Care Advisor HP Backup and Recovery Manager
	Roxio Easy Media Creator 10**
	Intervideo WinDVD 8**
	McAfee Total Protection Anti-Virus*** PDF Complete
	Sun Java Runtime Environment

Standard Features and Configurable Components

** 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	80-GB Serial ATA 3.0-Gb/s Hard Drive (7200 rpm)
	160-GB Serial ATA 3.0-Gb/s Hard Drive (7200 rpm)
	320-GB Serial ATA 3.0-Gb/s Hard Drive (7200 rpm)
	500-GB Serial ATA 3.0-Gb/s Hard Drive (7200 rpm)
System Memory	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)
	2-GB DDR2 Synch DRAM PC2-6400 (800-MHz) Non-ECC (1 x 2GB)
	3-GB DDR2 Synch DRAM PC2-6400 (800-MHz) Non-ECC (1 x 2GB, 1 x 1GB)
	4-GB DDR2 Synch DRAM PC2-6400 (800-MHz) Non-ECC (2 x 2GB)
Storage – One or more of the following (see Storage section below)	**Media Reader** HP 22-in-1 Media Card Reader **Optical Drives (Serial ATA)** SATA DVD-ROM Drive SATA SuperMulti LightScribe DVD Writer Drive
Input Devices	**Keyboard** HP USB Value Standard Keyboard **Mouse** HP USB 2-Button Optical Scroll Mouse
Audio	Realtek ALC662 High Definition audio codec 3D audio compliant and HD Audio compatible
Communication	Integrated Realtek 8101E 10/100 Ethernet Controller
Graphics	Intel Graphics Media Accelerator – integrated ATI Radeon HD 2400XT (256MB DH) PCIe x16 – optional ATI Radeon HD 4650 512MB PCIe x16 – optional
Miscellaneous	HP Serial/Parallel PCI Card (full height)

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 – optional
		• Active type heatsink
		• 92 x 92 x 25 mm chassis fan
		• System board with Intel G31 Express chipset, Intel I/O Controller Hub 7 (ICH7), Realtek RTL8101E 10/100 Ethernet controller, Intel GMA 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 – optional
		• Power cord

Slots	**PCI**	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)
	Memory Expansion	Two (2) DDR2 SDRAM DIMM slots (4 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**	Two (2) 3.5"
	External	Two (2) 5.25"
		One (1) 3.5"

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

Interfaces (Legacy)	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

Weight & Dimensions	**Chassis Dimensions** (H x W x D)	14.38 x 6.50 (7.09 w/bezel) x 14.69 in
		365 x 165 (180 w/bezel) x 373 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)

System Details

Technology and Features	**Memory Type**	PC2-6400 DDR2 SDRAM (800MHz) non-ECC Up to 4-GB maximum system memory supported
	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

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
	Slots Supported	Four (4) full-height expansion slots
	Front I/O	Two (2) USB 2.0 ports
	Rear I/O	Standard Micro ATX I/O connectors, including four (4) USB 2.0 ports
	Drive Bays	Two (2) 5-1/4" external One (1) 3-1/2" external Two (2) 3-1/2" internal
	Internal Speaker	N/A
	Security	Padlock loop Kensington Lock Support Optional USB Port Disable at factory (user configurable via BIOS)
	Power Supply	300-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 Details

System Board	**Processor**	Socket T; LGA775 industry standard Micro ATX form factor Support single Intel Core 2 Duo, Celeron 4xx or Dual Core
	PWM	ISL6312 – 3 Phase
	Chipset	Intel G31 Express Intel I/O Controller Hub 7 (ICH7)
	Super I/O	Fintek F71882FG
	Front Side Bus Frequency	800/1066/1333 MHz
	Memory	DDR2 SDRAM 2 x DIMM slots
	Clock Generator	RTM 876-665
	Integrated Graphics	Intel Graphics Media Accelerator (GMA)
	Audio	Realtek ALC662 HD Audio compatible codec with two channel audio 3D audio
	LOM	Realtek RTL8101E 10/100 Fast Ethernet controller
	Storage	Four Serial ATA interfaces
	Expansion Slots	1 x PCI 2.3 slot 2 x PCI Express x1 slots 1 x PCI Express x16 slot
	BIOS	SPI EEPROM
	Industrial Standard	PCI 2.3 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 D-sub 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 1 x header to support 2 USB 2.0 ports at front side 1 x header to support 2 front (Headphone/Mic) audio ports 1 x header to support USB media reader
	Board Size	Micro-ATX, PCB Size: 9.6 x 8.5 in (24.38 x 21.86 cm) 4-layer PCB with green color
	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

System Details

Network Interface	**Integrated Realtek 8101E 10/100 Fast Ethernet Controller**	**Hardware Highlights Features**	PCIe x1 interface 10-Mbps and 100-Mbps operation Crossover detection and auto-correction Wake-on-Lan and remote Wake-up (Wake-on-LAN supported from S1, S3, S4 only. Not supported from S5)

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
- 300 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**	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.
	Storage	-22° to 140°F (-30° to 60°C) – Maximum rate of change: 410°F/Hr (210°C/Hr).
Humidity	**Operating**	10% to 90% relative humidity (Rh), 86°F (30°C) maximum wet bulb temperature, non-condensing
	Storage	10% to 95% relative humidity (Rh), 101.66°F (38.7°C) maximum wet bulb temperature, non-condensing
Altitude	**Operating**	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	0 to 30,000 feet (0 to 9,144 meters) – Maximum allowable altitude change rate is 1200 ft/min (365.76 m/min).

System Details

Shock		Listed are the levels of shock the product can withstand with NO damage being incurred. The values represent peak input acceleration during a 2 to 3 ms half-sine shock pulse, 11 ms trapezoidal shock pulse.
	Non-Operating	35G's (Half-sine Shock) 35G'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	Random vibration at 5Hz@0.00025G^2/Hz, 10Hz@0.01G^2/Hz, 100Hz@0.01G^2/Hz, 300Hz@0.00001G^2/Hz 5Hz to 300Hz, (0.25G's nominal).
	Non-Operating	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).
	IDLE (Fixed disk drive spinning)	LWAd = 4.3 Bels, Desktop Average LpAm = 32dBA
	FIXED DISK (Random write)	LWAd = 4.8 Bels, Desktop Average LpAm = 37dBA
	CD-ROM (Sequential Reads)	LWAd = 5.0 Bels, Deskside Average LpAm = 39dBA

Service and Support

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

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	**NICs**	
	Intel Pro 1000 CT PCIe Gigabit NIC	EH352AA
	Wireless LAN	
	HP Wireless 802.11 b/g/n PCIe Card	FH971AA
	Modems	
	LSI PCIe x1 Hi-Speed 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	AH053AA
	HP 1.44-MB USB Diskette Drive – External	DC141B
	HP 22-in-1 Media Card 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 USB Mini Keyboard	AS601AA
	HP USB 2-Button Laser Mouse	GW405AA
	HP PS/2 2-Button Optical Scroll Mouse	EY703AA
	HP USB 2-Button Optical Scroll Mouse	DC172B
Memory	HP 2-GB PC2-6400 (DDR2-800 MHz) DIMM	AH060AA
	HP 1-GB PC2-6400 (DDR2-800 MHz) DIMM	AH058AA
Audio	HP Thin USB Powered Speakers	KK912AA
Graphics	ATI Radeon HD 2400XT 256MB DH PCIe x16 Graphics Card	KD060AA
	ATI Radeon 3470 256MB SH PCIe x16	FH972AA
	ATI Radeon HD 4650 512MB PCIe x16	AR956AA
	HP DisplayPort To DVI-D Adapter	FH973AA
	HP DisplayPort To VGA Adapter	AS615AA
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
	HP Chassis Security Kit	AR639AA
	HP USB Smart Card Keyboard	ED707AA

Miscellaneous Accessories	HP FireWire / IEEE 1394 PCI Card	PA997A
	HP Serial/Parallel PCI Card	KD062AA
	Belkin USB To Serial Adapter	EM449AA

Monitors	All HP Monitors are supported, but the 30-inch LP3065 model requires a dual-link graphics card.	
	Options	
	HP Flat Panel Speaker Bar	EE418AA
	HP CRT Monitor Multimedia Base	PM552AA

Memory

DDR SYNCH DRAM NON-ECC MEMORY

The Intel G31 Express chipset supports non-ECC DDR2 memory up to PC2-6400 (800-MHz). Memory upgrades are accomplished by adding single or dual 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
1-GB, 2-GB, or 4-GB DDR2 SYNCH DRAM

OPTIONAL MEMORY UPGRADES
Supports up to 4 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	Slot 2
1-GB	1-GB	
2-GB (dual-channel symmetric)	1-GB	1-GB
3-GB	2-GB	1-GB
4-GB (dual-channel symmetric)	2-GB	2-GB

Storage
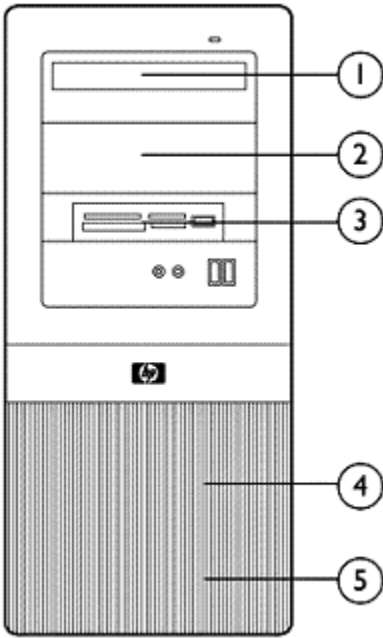
HP Compaq dx2420 Microtower Business

	Maximum Quantity Supported	Position Supported	Controller
Drive Support			
Media Reader	1	3	Internal USB 2.0 port
DVD-ROM Drives	2	1, 2	SATA
SuperMulti LightScribe DVD Writer Drives	2	1, 2	SATA
3.5" Serial ATA Hard Drives	2	4,5	SATA

Technical Specifications - Audio

Integrated Realtek ALC662 Audio		
	Type	Integrated
	HD Audio compatible codec	Yes 5:1 channel
	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 Realtek 8101E-GR 10/100 Fast Ethernet Controller	**Controller**	8101E-GR
	Memory	N/A
	Data rates supported	2.5GHz data rate with X1 link width
	Compliance	IEEE802.3, IEEE 802.3u, IEEE 802.3ab
	Bus architecture	PCIexpress 1.1
	Data transfer mode	Half/Full Duplex Operation
	Hardware certifications	MS NDIS5, IPv4, IPv6, TCP, UDP
	Power requirement	100mbps (heavy traffic) max.　　TBD mW
		10mbps (heavy traffic) max.　　TBD mW
		S3 with Link　　TBD mW
		Link Down @S0　　TBD mW
		Link Down @S3/S5　　TBD mW
	Boot ROM support	EEPROM, 1Kb, 2Kb
	Network transfer rate	10/100Mbps over CAT.5
		10Mbps over CAT.3
	Dimensions	9mm x 9mm
	Management capabilities	ACPI rev 2.0, PM rev 1.1, ASPM v1.0a

Technical Specifications - Graphics

Integrated Graphics Media Accelerator	**3D/2D Controller**	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.
	VGA Controller	Integrated
	Bus Type	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).
	RAMDAC	Integrated, 350 MHz
	Memory	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. **System memory equal or greater than 512 MB** 8 MB pre-allocated + 248 MB DVMT = max frame buffer of 256 MB
	Controller Clock Speed	250 MHz
	Overlay Planes	Single overlay support with 5x3 filtering
	Maximum Color Depth	32 bits/pixel
	Maximum Vertical Refresh Rate	75 Hz at up to 2048 x 1536 analog, 60 Hz at up to 1920 x 1200 for flat panel, 85 Hz at up to 1400 x 1050 for digital CRT/HDTV. Varies with mode and configuration. See table below.
	Multi-display Support	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.
	Graphics/Video API Support	Microsoft DirectX®9, DirectXVA®, VMR9, GDI/GDI+; OpenGL® 1.4.

Resolutions Supported[1]	**Resolution**	**Maximum Refresh Rate** (Hz)		
		Analog Monitor	**Digital Monitor**	
			Flat Panel	**CRT / HDTV**
	640 x 480	75	60	85
	800 x 600	75	60	85
	1024 x 768	75	60	85
	1280 x 1024	75	60	85
	1400 x 1050	75	60	85
	1600 x 1200	75	60	N/A
	1920 x 1080	75	60	N/A
	1920 x 1200	75	60	N/A
	1920 x 1440	75	N/A	N/A
	2048 x 1536	75	N/A	N/A

All HP Monitors are supported, but the 30-inch LP3065 model requires a dual-link graphics card.
1 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.

ATI Radeon HD 2400XT	**Bus type**	PCI Express (x16 lanes)

Technical Specifications - Graphics

(256MB DH) PCIe Graphics Card	**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 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.

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

Resolution	Maximum Refresh Rate (Hz)	
	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	N/A

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

Technical Specifications - Graphics

ATI Radeon HD 4650 512MB 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	

ATI Radeon HD 4650 (512MB) 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

Resolution	Maximum Refresh Rate (Hz)	
	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**

* Max HDMI resolution is 1080p
** Only supported when using a dual-link DVI connection
NOTE: 60-R denotes reduced blanking timings are used on single-link DVI connections and may be used with other digital connections

Board display options	Supports two displays through any combination of two of the three output ports.	
Board configuration	**Specification**	**Description**
	Graphics Chip	RV730Pro
	Core clock	600MHz
	Memory clock	500 MHz
	Frame buffer	512 MB DDR2, 128 bit wide
Maximum power	55 W	
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	
Operating systems support	Windows Vista Home Basic 32*, FreeDOS	

* Certain Windows Vista product features require advanced or additional hardware. 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. For Windows Vista system requirements, visit: http://www.windowsvista.com/systemrequirements.

Linux x86 and x86_64 distributions using XFree86 or X.Org**

** Linux drivers are available from ATI's website and may be available in a Linux distribution. Refer to the Open Source and Linux from HP website: http://www.hp.com/wwsolutions/linux/products/clients/ for support information.

Technical Specifications - Graphics

Option kit contents	• ATI Radeon HD 4650 512MB PCIe x16 Graphics Card • Software CD with graphics drivers • Warranty documentation
Compliance standards	EMC Emissions: a) CISPR22: 1997/EN 55022:1998 - Class B - Limits and methods of measurement of radio disturbance characteristics of Information Technology Equipment EMC Immunity: CISPR 24:1997/EN 55024:1998 - Information Technology Equipment - Immunity Characteristics - Limits and Methods of Measurement.

Technical Specifications - Input Devices

HP USB Value Standard Keyboard	Physical characteristics	Keys	104, 105, 106, 107, 109 layout (depending upon country)
		Dimensions (L x W x H)	18.14 x 1.07 x 6.02 in (46.1 x 2.74 x15.3 cm)
		Weight	1.3 lb(0.6 kg) minimum
	Electrical	Operating voltage	+ 5VDC ± 5%
		Power consumption	50-mA maximum (with three LEDs ON)
		ESD	CE level 4, 12.5-kV air discharge
		EMI – RFI	Conforms to FCC rules for a Class B computing device
		MicrosoftPC 99 – 2001	Functionally compliant
	Mechanical	Languages	40 available
		Keycaps	Slim design
		Switch actuation	60-g nominal peak force with tactile feedback
		Switch life	10 million keystrokes (using Hasco modified tester)
		Switch type	Contamination-resistant switch membrane
		Key-leveling mechanisms	N/A
		Cable length	1.5 m
		Microsoft PC 99 – 2001	Mechanically compliant
		Acoustics	50-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)	30 in (76 cm) on carpet, 5-drop sequence
		Drop (in box)	30 in (76 cm) on rigid surface, 10-drop sequence
	Approvals		ULcUL, FCC, CE, TUV/Bauart, VCCI, BSMI, C-Tick, KCC
	Ergonomic compliance		N/A

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

HP Serial/Parallel PCI Card	Dimensions	9.5 x 2.25 x 7.5 in (24.13 x 5.71 x 19.05)
	Weight	2.2 lbs (1 kg)

Technical Specifications - Hard Drives

Serial ATA Hard Drives 80 GB (7200 rpm)			
	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)	3.0 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 (8.89 cm) Physical size: 4 in (10.2 cm)	
	Interface	Serial ATA (3.0 Gb/s)	
	Synchronous Transfer Rate (Maximum)	3.0 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)	
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	

QuickSpecs

Technical Specifications - Hard Drives

	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)	3.0 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

HP SATA SuperMulti LightScribe DVD Writer Drive	**Height**	5.25-inch, half-height, tray-load	
	Orientation	Either horizontal or vertical	
	Interface type	SATA/ATAPI	
	Disc capacity	8.5 GB DL or 4.7 GB standard	
	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-RAM**	Up to 12X
		DVD+R	Up to 16X
		DVD+RW	Up to 8X
		DVD+R DL	Up to 8X
		DVD-R DL	Up to 8X
		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 12X
		DVD+R/-R/+RW/ -RW/+R DL /-R DL	Up to 8X
		DVD-ROM DL	Up to 8X
		DVD-ROM, DVD+R, DVD-R	Up to 16X
		CD-ROM, CD-R	Up to 48X
		CD-RW	Up to 32X
	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)
	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 - 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:

- IT ECO declaration
- Korea Eco-label

Ultra-Slim Desktop

System Configuration The configuration used for the Energy Consumption and Declared Noise Emissions data for the Ultra-slim Desktop model is based on a typically configured product

Energy Consumption

	115 VAC	230 VAC	100 VAC
Normal Operation	46.563W	45.595W	45.126W
Sleep (Energy Star low power mode)	5.647W	5.647W	5.445W
Off	2.302W	2.301W	2.054W

Heat Dissipation*	115 VAC	230 VAC	100 VAC
Normal Operation	159 BTU/hr	156 BTU/hr	154 BTU/hr
Sleep	19 BTU/hr	19 BTU/hr	19 BTU/hr
Off	8 BTU/hr	8 BTU/hr	7 BTU/hr

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

Declared Noise Emissions (in accordance with ISO 7779 and ISO 9296)

System Fan Off	Sound Power (LWAd, bels)	Sound Pressure (LpAm, decibels)
Idle	3.6	26
Fixed Disk (random writes)	4.0	30

Batteries This battery(s) in this product comply with EU Directive 2006/66/EC

Batteries used in the product do not contain:

- Mercury greater the 5ppm by weight
- Cadmium greater than 10ppm by weight

Battery size: CR2032 (coin cell)
Battery type: Lithium

Additional Information

- This product is in compliance with the Restrictions of Hazardous Substances (RoHS) directive - 2002/95/EC.
- This 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).
- This product is in compliance with the IEEE 1680 (EPEAT) standard at the level, see: www.epeat.net
- Plastics parts weighing over 25 grams used in the product are marked per ISO 11469 and ISO1043.
- This product contains 0% post consumer recycled plastic (by wt.)
- This product is 92.4% recyclable when properly disposed of at end of life.

Technical Specifications - Environmental Data

<u>Packaging Materials</u>

- External:
  - ○ Corrugated Carton 2260 g
- Internal:
  - ○ EPE-Expanded Polyethylene 115 g
  - ○ Polyethylene low density foam 15 g
- Corrugated Carton packaging material is made from 100% recycled content.
- EPE-Expanded Polyethylene packaging material is made from 100% recycled content.
- Polyethylene low density packaging material is made from 100% recycled content.

Ultra-Slim Desktop, Small Form Factor, Convertible Minitower

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 Hewlett-Packard offers end-of-life HP product return and recycling programs in many geographic

Technical Specifications - Environmental Data

Management and Recycling	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