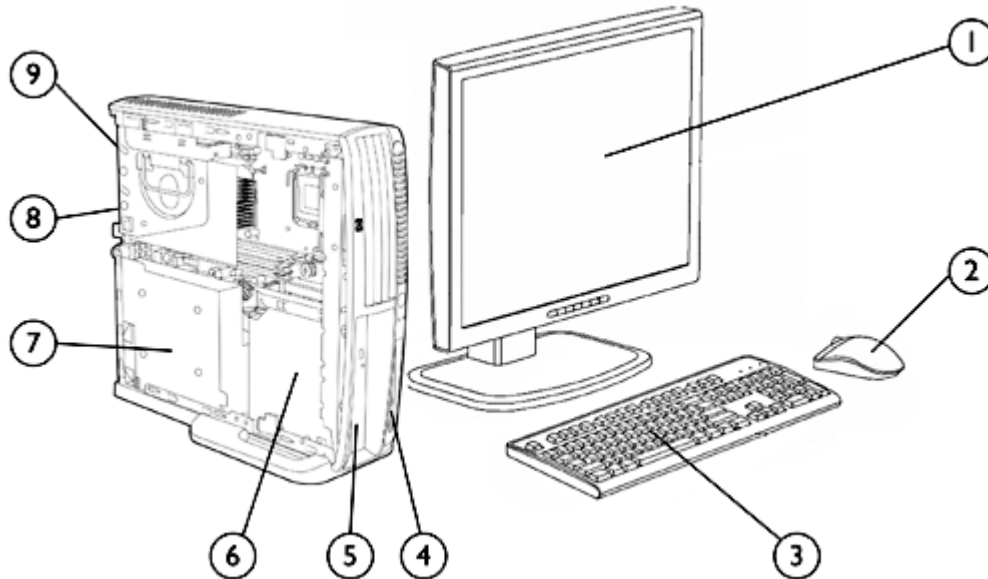


### Overview

HP recommends  
Windows Vista® Business

#### Ultra-slim Desktop



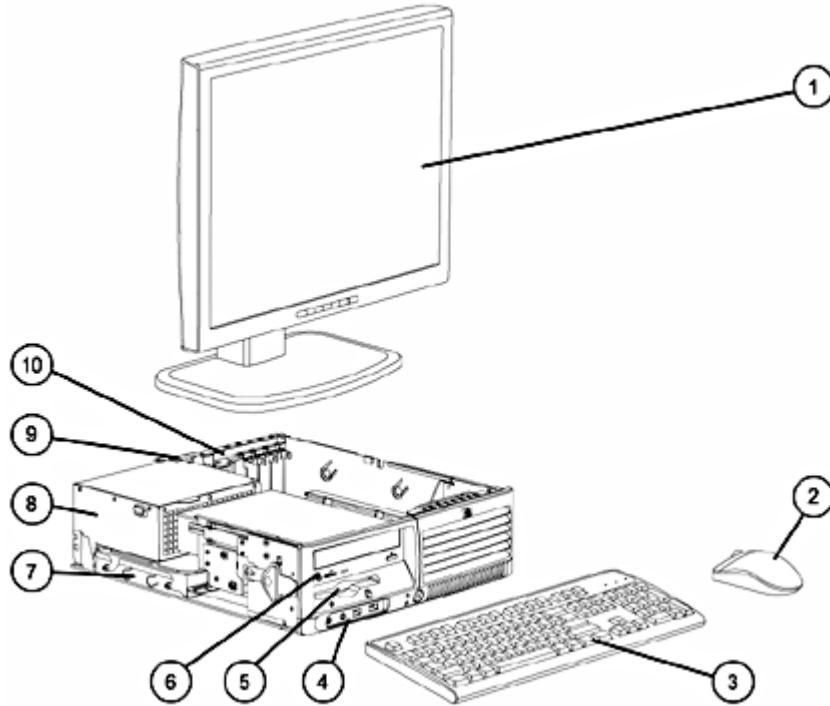
1. Monitor (sold separately)
2. 2-Button Scroll Mouse (PS/2) or Optical Scroll Mouse (PS/2 or USB)
3. HP Standard Keyboard (PS/2 or USB) or HP USB Smartcard Keyboard
4. Front I/O: (2) USB 2.0, headphone and microphone
5. (1) Slimline Drive Bay
6. (1) 3.5" internal bay
7. 200-watt Active Power Factor Correction (PFC) power supply
8. (1) full-height PCI slot (requires optional PCI riser), (1) low profile PCI Express x16 slot (requires optional PCIe x16 riser)\*
9. Rear I/O: (6) USB 2.0, (1) optional serial port (available via adapter), (1) optional parallel port (available via adapter), (1) optional DVI graphics port (available via DVI ADD2 adapter), (2) PS/2, (1) RJ-45, (1) VGA, audio in/out

\* Only one optional PCI riser card (the PCI riser or the PCI Express x16 riser) or one PCI Serial and parallel I/O adapter is allowed.



## Overview

### Small Form Factor

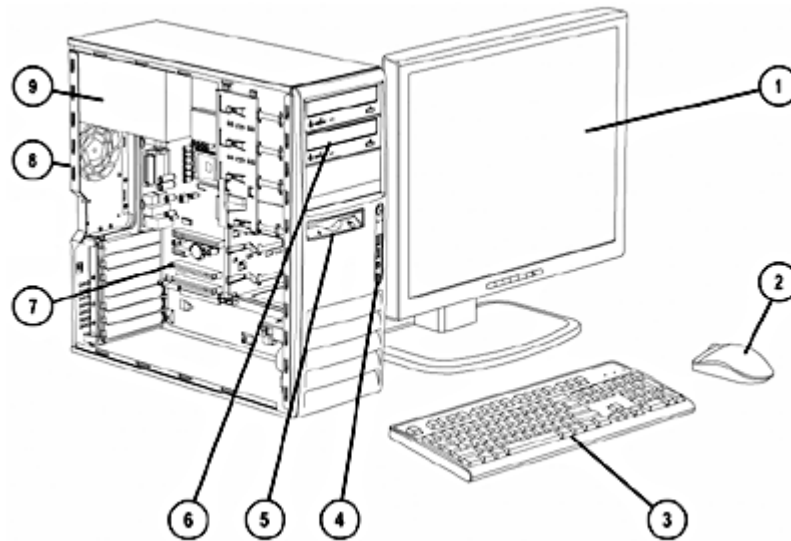


1. Monitor (sold separately)
2. 2-Button Scroll Mouse (PS/2) or Optical Scroll Mouse (PS/2 or USB)
3. HP Standard Keyboard (PS/2 or USB) or HP USB Smartcard Keyboard
4. Front I/O: (2) USB 2.0, headphone and microphone
5. (1) 3.5" external bay for optional HP 16-in-1 Media Card Reader, diskette drive, or other 3.5" device
6. (1) 5.25" external bay for optional optical drive, or other 5.25" device (bay tilts up for device removal and insertion)
7. (1) 3.5" internal bay
8. 240-watt or 240-watt high efficiency 80 PLUS® Active Power Factor Correction (PFC) power supply
9. Rear I/O: (6) USB 2.0, (1) standard serial port, (1) optional serial port, (1) parallel port, (2) PS/2, (1) RJ-45, (1) VGA, (1) optional DVI graphics port (available via DVI ADD2 adapter), audio in/out
10. (2) low profile PCI slots, (1) low profile PCI Express x1 slot, (1) low profile PCI Express x16 slot; (2) full-height PCI slots optional (require PCI riser card)\*

\* With riser card option, PCI Express x1 and x16 slots are inaccessible.

### Overview

#### Convertible Minitower



1. Monitor (sold separately)
2. 2-Button Scroll Mouse (PS/2) or Optical Scroll Mouse (PS/2 or USB)
3. HP Standard Keyboard (PS/2 or USB) or HP USB Smartcard Keyboard
4. Front I/O: (2) USB 2.0, headphone and microphone
5. (1) 3.5" external bay for optional HP 16-in-1 Media Card Reader, diskette drive, or other 3.5" device
6. (3) 5.25" external bays and (2) 3.5" internal bays
7. (2) full-height PCI slots, (1) full-height PCI Express x1 slot, (1) full-height PCI Express x16 slot, (2) additional full-height PCI slots optional
8. Rear I/O: 6 USB 2.0, 1 standard serial port, 1 optional serial port, 1 parallel port, 2 PS/2, 1 RJ-45, 1 VGA, audio in/out, mic in
9. 365-watt or 365-watt high efficiency 80 PLUS Active Power Factor Correction (PFC) power supply

### Overview

#### At A Glance

- Designed for long-term, networked deployment within medium and large organizations in commercial business, finance and public sector industries
- Created using industry leading Design for Environment standards. Upgradeable, recyclable and energy efficient.
- Long purchase lifecycles and image stability for demanding enterprise environments
- Support for new Intel technologies introduced in 2006: Intel® Q965 Express chipset, Intel Core™ 2 Duo Processors, and Intel Graphics Media Accelerator 3000 integrated graphics
- Select models with new Intel vPro technology support the latest in manageability and security technology
- Value-added software on select models
  - HP Total Care Advisor
  - HP ProtectTools Security Software Suite, including embedded security, preinstalled standard
  - HP Backup and Recovery Manager
  - HP Software Agent
  - Altiris Deployment Solution Agent
  - Symantec AntiVirus 10.0 with 60 day Live Update Subscription
  - HP Insight Diagnostics software
  - Microsoft Office 2007
  - PDF Complete
  - Computrace for Desktops
- Value-added software available for free download from the Web (<http://www.hp.com/go/easydeploy>)
  - HP Client Configuration Manager, Basic Edition
  - HP Out-of-Band Management Console (for Intel AMT enabled models)
  - HP Client Manager for Altiris
  - Altiris Out-of-Band Management Solution (for Intel AMT enabled models)
  - HP SoftPak Download Manager
  - HP System Software Manager
  - HP Client Catalog for Microsoft SMS
  - Verdiem Surveyor remote power management agent
- Fully compatible software OS image across all three models (Ultra-slim Desktop, Small Form Factor, and Convertible Minitower)
- HP BIOS for better security, manageability and software image stability
- Selected configurations with global availability easily set up and ordered through HP.com Business to Business portals (<http://h10019.www1.hp.com/business-site/index.html>)
- Tailored HP Factory Express deployment and lifecycle services available (<http://h71028.www7.hp.com/enterprise/cache/97688-0-0-225-121.aspx>)
- Protected by HP Services, including standard warranties up to 5-5-5 (terms and conditions vary by country; certain restrictions and exclusions apply).
- Security
  - Embedded TPM1.2 compliant security module\* (requires HP ProtectTools Embedded Security software), providing compatibility with future security features expected in Microsoft Vista
  - Redundant Array of Independent Disks (RAID) 1 configurations to protect data against hardware failures
  - HP Backup and Recovery Manager to protect data against software corruption or incompatibilities due to patching or upgrades
- Tool-less serviceability features for easier upgrades and repairs
- Choice of professional chassis form factors to accommodate the desired mix between expandability and size

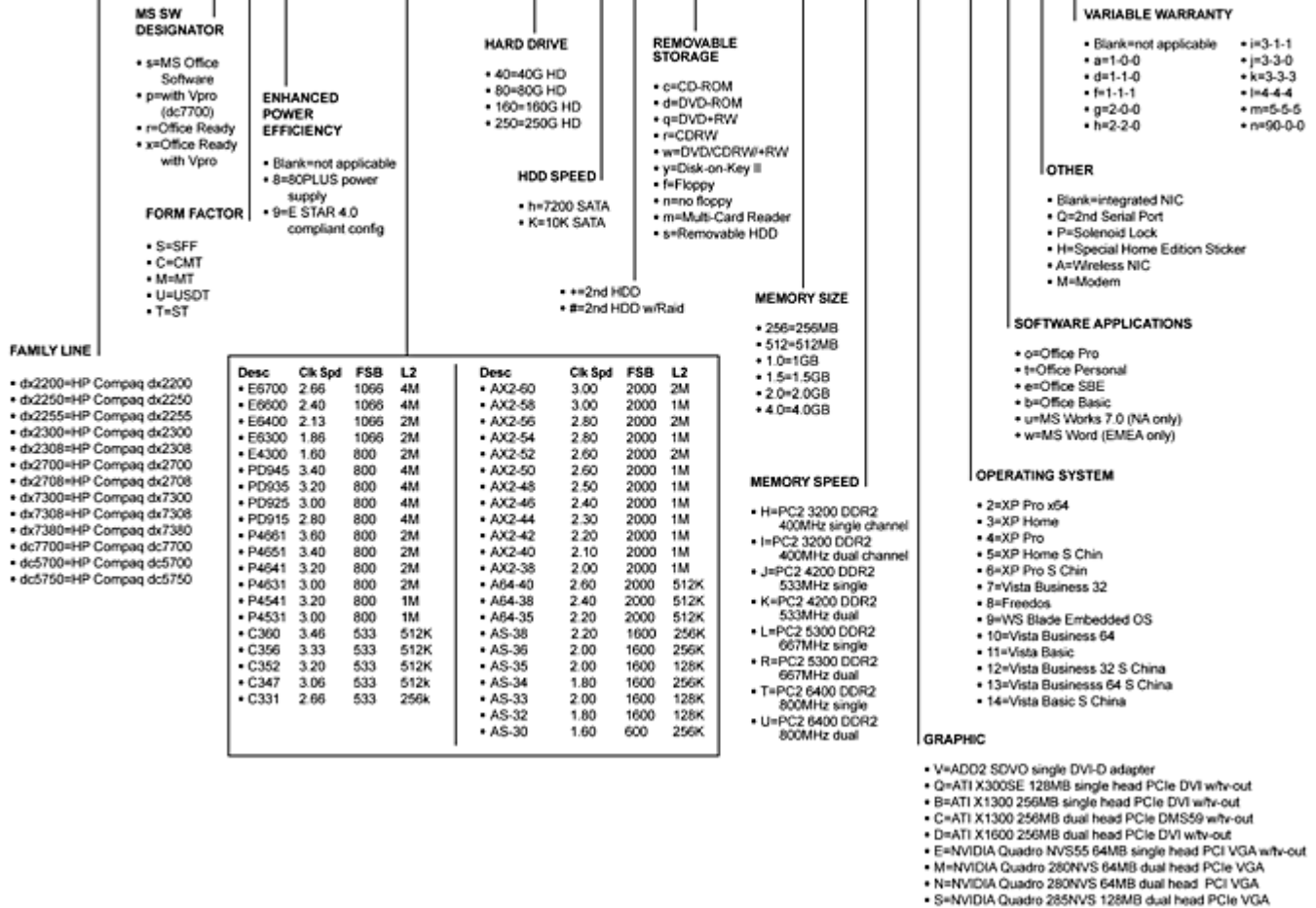


### Configurable Components - Select Models (localized by Regions)

#### Model Key and Example

**NOTE:** This diagram is an example that illustrates how to read the model number. It is not intended to give every available configuration choice specified in the body of this document and may include references to modules that are out of date and no longer available.

# dc7700pC8/E6300/250h+nyr/512H/S11tQk



## Standard Features and Configurable Components

**Operating System –**  
One of the following

**Preinstalled**

Genuine Windows Vista Business 64\*  
Genuine Windows Vista Business 32\*  
Genuine Windows Vista Home Basic 32\*  
Genuine Windows XP Professional SP2  
Genuine Windows XP Home SP2  
FreeDOS†

**Supported**

Genuine Windows 2000

\* 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>.

† The following features are not supported by Linux:

- HP 16-in-1 Media Card Reader
- Intel PRO/1000 PT PCIe Gigabit NIC
- Broadcom NetXtreme Gigabit PCIe NIC
- Wireless A+G PCI Card (full height and low profile)
- HP BT450 USB Bluetooth Wireless Printer and PC Adapter
- Agere 2006 PCI 56K International SoftModem
- DVI-D ADD2 SDVO single head Graphics Adapter (PCIe x16)
- ATI Radeon X1300 (256MB SH) PCIe Card, DVI w/TV
- ATI Radeon X1300 Pro (256MB DH) PCIe Graphics Card
- ATI Radeon X1600XT (256MB DH) full-height PCIe Card, DVI w/TV-out
- NVIDIA Quadro NVS 280 (64MB DH) PCI VGA Card
- NVIDIA Quadro NVS 285 (128MB DH) PCIe x16 VGA Card
- NVIDIA Quadro NVS 290 (256MB DH) PCIe x16 Graphics Card
- HP USB Smartcard Keyboard
- HP FireWire / IEEE 1394 PCI Card
- HP Serial & Parallel IO Adapter
- HP 2nd Serial Port
- Belkin USB to Serial Adapter

**NOTE:** Drivers for Windows Vista are continually being made available for download from <http://www.hp.com>.



### Standard Features and Configurable Components

<b>Value-added Software</b> (on select models; not included with FreeDOS)	HP ProtectTools Security Solutions Altiris Deployment Solution Agent HP Software Agent HP Insight Diagnostics (available via HP Backup and Recovery Manager) Computer Setup Utility HP Backup and Recovery Manager Symantec AntiVirus 10.0 with 60 day Live Update Subscription Sonic/Roxio DigitalMedia Plus 7.2 (select models) or Easy Media Creator 9 (select models)	HP Total Care Advisor Microsoft Office 2007 Basic Microsoft Office 2007 Personal Microsoft Office 2007 Professional Microsoft Office 2007 Small Business Microsoft Works 8.5 Microsoft Internet Explorer with Google Toolbar PDF Complete Computrace for Desktops Verdiem Surveyor agent InterVideo WinDVD 5.0 (select models)	
<b>Value-added Software</b> (available for free download from the Web <a href="http://www.hp.com/go/easydeploy">http://www.hp.com/go/easydeploy</a> )	HP Client Configuration Manager, Basic Edition HP Client Manager for Altiris HP SoftPaq Download Manager HP Client Catalog for Microsoft SMS	HP Out-of-Band Management Console (for Intel AMT enabled models) Altiris Out-of-Band Management Solution (for Intel AMT enabled models) HP Systems Software Manager Verdiem Surveyor agent	
<b>Value-added Services and Features</b>	HP Stable Platform Program Business-to-Business Portals HP Global Series Services	Factory Express Deployment and Lifecycle Services TPM 1.2 Security Tool-less Serviceability	
<b>Service and Support</b>	<p>On-site Warranty and Service<sup>1</sup>: This three-year (3-3-3), limited warranty and service offering delivers three years of parts, labor and on-site repair. Response time is next business-day<sup>2</sup> and includes free telephone support<sup>3</sup> 24 x 7. Global coverage<sup>2</sup> ensures that any product purchased in one country and transferred to another non-restricted country will remain fully covered under the original warranty and service offering. Some countries/regions do not offer one year onsite and labor.</p> <p><sup>1</sup> Terms and conditions may vary by country. Certain restrictions and exclusions apply.</p> <p><sup>2</sup> 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.</p> <p><sup>3</sup> Technical telephone support applies only to HP-configured, HP and HP-qualified, third-party hardware and software. Toll-free calling and 24 x 7 support may not be available in some countries.</p>		
	Ultra-slim Desktop	Small Form Factor	Convertible Minitower



### Standard Features and Configurable Components

<b>Dimensions</b>			
Chassis Dimensions (H x W x D)	2.95 x 12.4 x 13.18 in (7.49 x 31.50 x 33.48 cm)	3.95 x 13.3 x 14.9 in (10.03 x 33.78 x 37.85 cm)	17.65 x 6.6 x 17.8 in (44.83 x 16.76 x 45.21 cm)
System weight*	12.08 lb (5.48 kg)	17.18 lb (7.79 kg)	31.18 lb (14.14 kg)
System volume	7.9 liters	12.8 liters	33.8 liters
Shipping weight*	19.20 lb (8.71 kg)	25.10 lb (11.39 kg)	39.5 lb (17.92 kg)
Maximum supported weight (desktop orientation)	77.1 lb (35 kg)	77.1 lb (35 kg)	77.1 lb (35 kg)
Shipping box dimensions (H x W x D)	12.63 x 18.75 x 20 in (32.08 x 47.63 x 50.8 cm)	12.63 x 18.75 x 20 in (32.08 x 47.63 x 50.8 cm)	23.38 x 13.06 x 22.88 in (59.39 x 33.17 x 58.12 cm)
* Configured with 1 hard drive, 1 optical drive, no diskette drive, and no PCI card.			
<b>Power Supply</b>	200W power supply – Active PFC	240W power supply – Active PFC	365W power supply – Active PFC
<b>80 PLUS® Power Supply</b>	N/A	240W 80 PLUS* power supply – Active PFC	365W 80 PLUS* power supply – Active PFC
* This alternate 80% efficient power supply is a requirement for ENERGY STAR® compliance in conjunction with a select range of processors and modules.			
<b>Ports</b>			
USB 2.0	8 (2 front, 6 rear)	8 (2 front, 6 rear)	8 (2 front, 6 rear)
Serial	1 optional via Serial & parallel I/O adapter	1 standard with 2nd optional	1 standard with 2nd optional
Parallel	1 optional via Serial & parallel I/O adapter	1	1
PS/2	1 keyboard, 1 mouse		
Video	analog for integrated graphics		
DVI output	available via ADD2 card, PCI-E x16 card, or PCI card		
Support for Multi-Monitor	available via ADD2 card, PCI-E x16 card, or PCI card		
Audio	Front – mic and headphone Rear – line in, line out	Front – mic and headphone Rear – line in, line out, mic in	
NIC (RJ-45)	Integrated Intel 82566DM Gigabit Network Connection Ethernet		

<b>Chipset</b>	Intel Q965 Express chipset	<b>USDT</b>	<b>SFF</b>	<b>CMT</b>
		X	X	X



## Standard Features and Configurable Components

		USDT	SFF	CMT
<b>Processor and Speed*</b> One of the following	<b>Intel Celeron Processors:</b>			
	Intel Celeron 430 Processor (1.8-GHz, 512K L2 cache, 800-MHz FSB)	X	X	X
	<b>Intel Pentium D Processors:</b>			
	Intel Pentium D 925 Processor (3.0-GHz, 2x2MB L2 cache, 800-MHz FSB)	X	X	X
	Intel Pentium D 945 Processor (3.4-GHz, 2x2MB L2 cache, 800-MHz FSB)	X	X	X
	<b>Intel Core 2 Duo Processors:</b>			
	Intel Core 2 Duo E4300 Processor (1.80-GHz, 2 MB L2 cache, 800-MHz FSB)	X	X	X
	Intel Core 2 Duo E4400 Processor (2.00-GHz, 2 MB L2 cache, 800-MHz FSB)	X	X	X
	Intel Core 2 Duo E6300 Processor (1.86-GHz, 2 MB L2 cache, 1066-MHz FSB)	X	X	X
	Intel Core 2 Duo E6400 Processor (2.13-GHz, 2 MB L2 cache, 1066-MHz FSB)	X	X	X
Intel Core 2 Duo E6600 Processor (2.40-GHz, 4 MB L2 cache, 1066-MHz FSB)	X	X	X	
Intel Core 2 Duo E6700 Processor (2.66-GHz, 4 MB L2 cache, 1066-MHz FSB)	X	X	X	

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

		USDT	SFF	CMT
<b>Intel vPro Technology*</b>	Uses AMT 2.0 (Active Management Technology) for network alerting and management of systems regardless of power state, as well as operating system-absent environments	X	X	X

\* Units configured with this feature are referred to as HP Compaq dc7700p Business PCs.

### Memory

#### DDR2 SYNCH DRAM NON-ECC MEMORY

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. The Intel Q965 Express chipsets support non-ECC DDR2 PC2-5300 (667-MHz) and PC2-6400 (800-MHz) memory.

**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.

### Ultra-slim Desktop

#### Maximum Memory\*

Supports up to 3 GB of DDR2 SYNCH DRAM. *Slot 1 is black and must always be populated. Not all memory configurations possible are represented below.*



## Standard Features and Configurable Components

DIMM Size	Slot		
	Channel A		Channel B
	1 (black)	2 (white)	3 (white)
512-MB	512-MB		
512-MB (dual-channel symmetric)	256-MB		256-MB
1-GB	1-GB		
1-GB (dual channel symmetric)	512-MB		512-MB
3-GB maximum	1-GB	1-GB	1-GB

\* The Intel Q965 Express chipset includes a built-in Management Engine (ME), which allocates memory for manageability functions. Management Engine memory is shared with system memory. If the PC contains a single DIMM, 8 MB of memory is pre-allocated for it at system startup. If the PC contains two DIMMs, 16 MB of memory is pre-allocated. This memory is not made available to the operating system, just as pre-allocated video memory is not available.

### Small Form Factor and Convertible Minitower

#### Maximum Memory\*

Supports up to 8 GB of DDR2 SYNCH DRAM. Slot 1 is black and must always be populated. 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			
	Channel A		Channel B	
	1 (black)	2 (white)	3 (white)	4 (white)
512-MB	512-MB			
512-MB (dual-channel symmetric)	256-MB		256-MB	
1-GB	1-GB			
1-GB (dual-channel symmetric)	512-MB		512-MB	
1-GB (dual-channel symmetric)	256-MB	256-MB	512-MB	
2-GB (dual-channel symmetric)	1-GB		512-MB	512-MB
2-GB (dual-channel symmetric)	512-MB	512-MB	512-MB	512-MB
4-GB (dual-channel symmetric)	1-GB	1-GB	1-GB	1-GB
8-GB maximum (dual-channel symmetric)	2-GB	2-GB	2-GB	2-GB

\* The Intel Q965 Express chipset includes a built-in Management Engine (ME), which allocates memory for manageability functions. Management Engine memory is shared with system memory. If the PC contains a single DIMM, 8 MB of memory is pre-allocated for it at system startup. If the PC contains two DIMMs, 16 MB of memory is pre-allocated. This memory is not made available to the operating system, just as pre-allocated video memory is not available.



### Standard Features and Configurable Components

#### Memory Configurations –

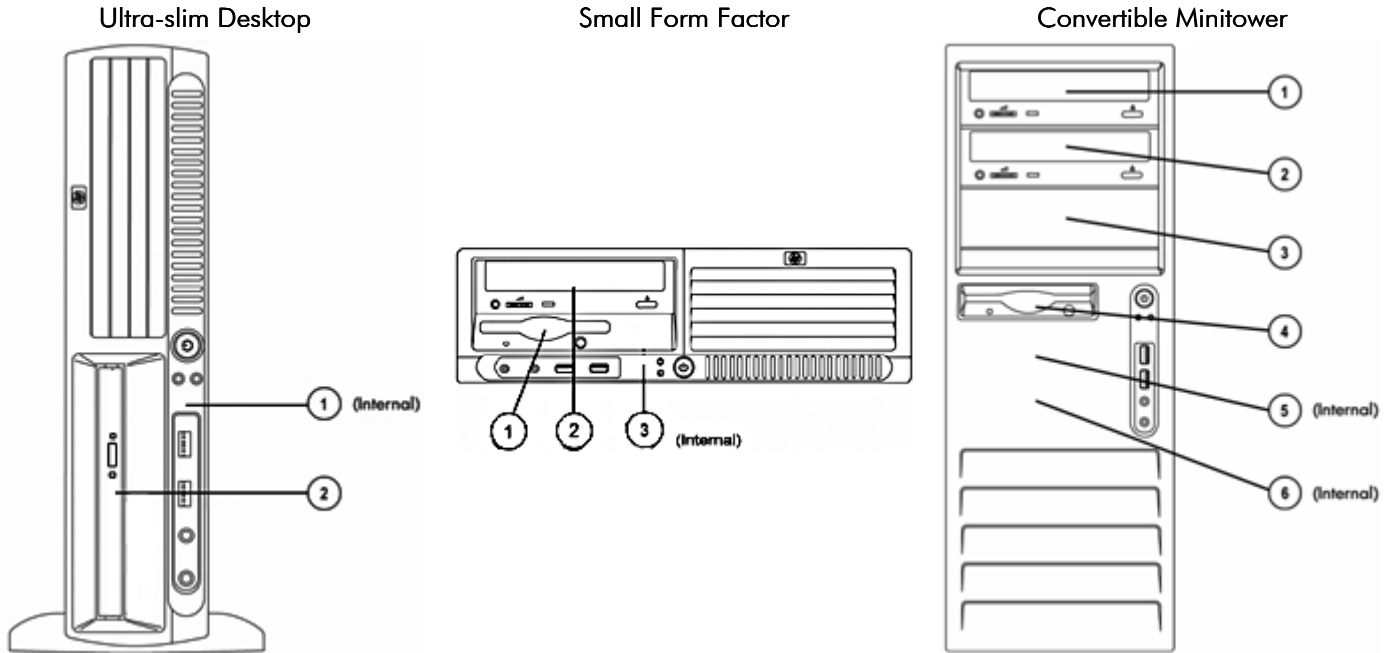
		USDT	SFF	CMT
One of the following	512-MB DDR2 Synch Dram PC2-6400 (800-MHz) Non ECC (1 x 512)	X	X	X
	512-MB DDR2 Synch Dram PC2-6400 (800-MHz) Non ECC (2 x 256)	X	X	X
	1-GB DDR2 Synch Dram PC2-6400 (800-MHz) Non ECC (1 x 1GB)	X	X	X
	1-GB DDR2 Synch Dram PC2-6400 (800-MHz) Non ECC (2 x 512)	X	X	X
	2-GB DDR2 Synch Dram PC2-6400 (800-MHz) Non ECC (2 x 1GB)	X	X	X
	2-GB DDR2 Synch Dram PC2-6400 (800-MHz) Non ECC (4 x 512)		X	X
	3-GB DDR2 Synch Dram PC2-6400 (800-MHz) Non ECC (3 x 1GB)	X	X	X
	4-GB DDR2 Synch Dram PC2-6400 (800-MHz) Non ECC (4 x 1GB)		X	X
	256-MB DDR2 Synch Dram PC2-5300 (667-MHz) Non ECC (1 x 256)	X	X	X
	512-MB DDR2 Synch Dram PC2-5300 (667-MHz) Non ECC (1 x 512)	X	X	X
	512-MB DDR2 Synch Dram PC2-5300 (667-MHz) Non ECC (2 x 256)	X	X	X
	1-GB DDR2 Synch Dram PC2-5300 (667-MHz) Non ECC (1 x 1GB)	X	X	X
	1-GB DDR2 Synch Dram PC2-5300 (667-MHz) Non ECC (2 x 512)	X	X	X
	2-GB DDR2 Synch Dram PC2-5300 (667-MHz) Non ECC (2 x 1GB)	X	X	X
	2-GB DDR2 Synch Dram PC2-5300 (667-MHz) Non ECC (4 x 512)		X	X
	3-GB DDR2 Synch Dram PC2-5300 (667-MHz) Non ECC (3 x 1GB)	X	X	X
	4-GB DDR2 Synch Dram PC2-5300 (667-MHz) Non ECC (4 x 1GB)		X	X

Expandability	USDT	SFF	CMT
PCI slots	Optional, requires PCI riser: 1 full-height (4.2"), length (6.6")	2 low-profile (2.5"), length (6.6") standard; 2 full-height (4.2"), length (6.875") via optional riser card. <b>NOTE: With riser card option, PCIe x1 and PCIe x16 slots are not accessible.</b>	2 full-height (4.2"), length (13.4") standard; (2 additional full-height slots available via optional PCI extender card)
Max power per slot	25W	25W	25W
PCI Express x16 slot	Optional, requires PCIe x16 riser: 1 low-profile (3.987"), length (6.60")	1 low-profile (2.5"), length (6.6")	1 full-height (4.2"), length (10.5")
Max power per slot	25W	25W	75W
PCI Express x1 slot	N/A	1 low profile (2.5"), length (6.6")	1 full-height (4.2"), length (13.4")
Max power per slot	N/A	10W	10W
External Bays	1 Slimline (WxDxH): 128 x 127 x 12.7 mm	2	4
3.5"	N/A	1	1
5.25"	N/A	1 (length 8.189")	3 (2 – length 8.189", 1 – length 5.71")
Internal 3.5" HDD Bays	1	1	2
Hard Drive Controller (PCI) Supported	Serial ATA (support for SATA 1.5-Gb/s and 3.0-Gb/s hard drives)		



## Standard Features and Configurable Components

Hard Drive and Optical SATA Interfaces Supported	1 Serial ATA interface	3 Serial ATA interfaces	4 Serial ATA interfaces
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### Storage – Drive Support

	USDT		SFF			CMT			
	Slimline Drive Bay	3.5" Serial ATA Hard Drive	Diskette Drive or PCI Media Card Reader (optional)	Storage Drive Bay	3.5" Serial ATA Hard Drives	Diskette Drive	PCI Media Card Reader (optional)	Storage Drive Bays for multiple Optical Drives	3.5" Serial ATA Hard Drives
Quantity Supported	1	1	1	1	2	1	1	3	3
Position Supported	②	①	①	②	①, ③	④	④, ①, ②, ③	①, ②, ③	④, ⑤, ⑥
Controller	SATA to IDE Bridge	SATA	Diskette Controller or USB header on PCI card	SATA	SATA	Diskette Controller	USB header on PCI card	SATA	SATA



## Standard Features and Configurable Components

		USDT	SFF	CMT
<b>Hard Drive –</b> One or two of the following	80-GB SATA 3.0-Gb/s Hard Drive (8MB Cache, 7200 rpm)	X	X	X
	160-GB SATA 3.0-Gb/s Hard Drive (8MB Cache, 7200 rpm)	X	X	X
	250-GB SATA 3.0-Gb/s Hard Drive (8MB Cache, 7200 rpm)	X	X	X
	80-GB SATA 3.0-Gb/s Hard Drive (8MB Cache, 10K rpm)		X	X
	160-GB SATA 3.0-Gb/s Hard Drive (8MB Cache, 10K rpm)		X	X
	RAID 80-GB SATA 3.0-Gb/s Hard Drive (7200 rpm)		X	X
	RAID 160-GB SATA 3.0-Gb/s Hard Drive (7200 rpm)		X	X
	RAID 250-GB SATA 3.0-Gb/s Hard Drive (7200 rpm)		X	X
	2nd hard drive, 80-GB SATA 3.0-Gb/s Hard Drive (8MB Cache, 7200 rpm)		X	X
	2nd hard drive, 160-GB SATA 3.0-Gb/s Hard Drive (8MB Cache, 7200 rpm)		X	X
	2nd hard drive, 250-GB SATA 3.0-Gb/s Hard Drive (8MB Cache, 7200 rpm)		X	X
	Removable 3.5" 80GB SATA 3.0 Gb/s (7200 rpm) – occupies 5.25" optical bay		X	X
	Removable 3.5" 160GB SATA 3.0 Gb/s (7200 rpm) – occupies 5.25" optical bay		X	X
Removable 3.5" 250GB SATA 3.0 Gb/s (7200 rpm) – occupies 5.25" optical bay		X	X	
<b>Removable Storage –</b> One or more of the following depending on form factor (see Storage section below)	<b>Diskette Drives</b>			
	1.44-MB Diskette Drive		X	X
	<b>Optical Drives</b>			
	SATA CD-RW/DVD-ROM Combo Drive		X	X
	SATA DVD-ROM Drive		X	X
	SATA DVD+/-RW (DL/DF) LightScribe Drive		X	X
	<b>Slimline Optical Drives</b>			
	PATA CD-ROM Slim Drive	X		
	PATA CD-RW/DVD-ROM Combo Slim Drive	X		
	PATA DVD+/-RW Slim Drive	X		
PATA DVD-ROM Slim Drive	X			
<b>Media Card Reader –</b> One of the following	HP 16-in-1 3.5" Media Card Reader w/ PCI card			X
	HP 16-in-1 5.25" Media Card Reader w/ PCI card			X



### Standard Features and Configurable Components

Security	Integrated 1.2 TPM Embedded Security Chip	X	X	X
	Drive Lock	X	X	X
	HP ProtectTools Embedded Security Software	X	X	X
	Serial, Parallel, USB Enable/Disable (via BIOS)	X	X	X
	Removable Media Write/Boot Control	X	X	X
	Power-On Password (via BIOS)	X	X	X
	Setup Password (via BIOS)	X	X	X
	Solenoid Hood Lock / Sensor		X	X
	Hood Removal Sensor	X		
NIC	Intel 82566DM Gigabit Network Connection (integrated on system board)	X	X	X
	Intel PRO/1000 PT PCIe Gigabit NIC (full height bracket)			X
	Intel PRO/1000 PT PCIe Gigabit NIC (low profile bracket)		X	
	Broadcom NetXtreme Gigabit PCIe NIC (full height bracket)			X
	Broadcom NetXtreme Gigabit PCIe NIC (low profile bracket)	X*	X	
	* Requires optional PCIe riser card.			
Modem	Agere 2006 PCI 56K International SoftModem (full height)	X*	X*	X
	Agere 2006 PCI 56K International SoftModem (low profile)		X	
	* Requires optional PCI riser card.			
Graphics	Integrated Intel Graphics Media Accelerator 3000	X	X	X
	DVI-D ADD2 SDVO single head Graphics Adapter for USDT (PCIe x16)	X		
	DVI-D ADD2 SDVO single head low profile Graphics Adapter (PCIe x16)		X	
	DVI-D ADD2 SDVO single head full-height Graphics Adapter (PCIe x16)			X
	ATI Radeon X1300 (256MB SH) low profile PCIe Card, DVI w/TV	X*	X	
	ATI Radeon X1300 (256MB SH) full-height PCIe Card, DVI w/TV			X
	ATI Radeon X1300 Pro (256MB DH) low profile PCIe Graphics Card	X*	X	
	ATI Radeon X1300 Pro (256MB DH) full-height PCIe Graphics Card			X
	ATI Radeon X1600XT (256MB DH) full-height PCIe Card, DVI w/TV-out			X
	NVIDIA Quadro NVS 280 (64MB DH) PCI VGA Card	X**	X***	X***
NVIDIA Quadro NVS 285 (128MB DH) PCIe x16 VGA Card	X*	X***	X***	
	* USDT requires optional PCIe riser card.			
	** USDT requires optional PCI riser card.			
	*** NVIDIA Quadro 285 and NVS 280 graphics cards can be combined to provide support for four monitors.			



### Standard Features and Configurable Components

Audio	Integrated High Definition audio with Realtek 4-channel ALC262 codec (all ports are stereo)	X	X	X
	Microphone and Headphone front ports	X	X	X
	Microphone rear port*			X
	Line-out and Line-In rear ports*	X	X	X
	Multistreaming capable*	X	X	X
	Internal Speaker	X	X	X

\* Rear audio ports are re-taskable as Line-in, Line-out, or Microphone-in. External speakers must be powered externally. Multistreaming can be enabled in the Realtek control panel to allow independent audio streams to be sent to/from the front and rear jacks. This allows for different audio applications to use separate audio ports on the system. For example, the front jacks could be used with a headset for a communications application while the rear jacks are being used with external speakers and a multimedia application.

Input Devices	<b>Keyboard</b> – One of the following			
	HP PS/2 Standard Keyboard	X	X	X
	HP USB Standard Keyboard	X	X	X
	HP USB Smartcard Keyboard	X	X	X
	<b>Mouse</b> – One of the following			
	HP PS/2 2-Button Scroll Mouse	X	X	X
	HP PS/2 2-Button Optical Scroll Mouse	X	X	X
	HP USB 2-Button Optical Scroll Mouse	X	X	X

Miscellaneous	HP FireWire / IEEE 1394 PCI Card (full height)	X*	X*	X
	HP FireWire / IEEE 1394 PCI Card (low profile)		X	
	PCI Express riser card – adds 1 low profile PCIe x16 slot	X		
	PCI riser card – adds 1 full-height PCI slot	X		
	PCI riser card – adds 2 full-height PCI slots		X	
	<b>NOTE:</b> Low profile slots are unusable with riser card installed.			
	PCI extender card for CMT (adds 2 PCI slots)			X
	PCI Serial and parallel I/O adapter	X**		
	2nd serial port adapter (full height)			X
	2nd serial port adapter (low profile)		X	
	Tower stand	X	X	
Configure dc7700 CMT in desktop orientation			X	

\*Requires optional PCI riser card.

\*\*Occupies same location as PCI riser card, so both cannot be used.



After-Market Options (availability may vary by region)

		USDT	SFF	CMT	After-Market Options Part Number
<b>Communications</b>	<b>Wireless LAN</b>				
	HP BT450 USB Bluetooth Wireless Printer and PC Adapter	X	X	X	Q6398A#ABA
	HP Wireless A+G PCI Card (North America only)	X	X	X	EA118AA
	<b>NICs</b>				
	Broadcom NetXtreme Gigabit Ethernet PCI Express x1 Card	X	X	X	EA833AA
	Intel/PRO 1000 PT PCIe Gigabit NIC Card	X**	X	X	EH352AA
	<b>Modem</b>				
	Agere 2006 PCI 56K International SoftModem	X*	X	X	EK694AA
	<b>Connectivity</b>				
	HP Surge Protector, LAN & Printer Cable	X	X	X	RT174AA
	* USDT requires optional PCI riser card.				
	** USDT requires optional PCIe riser card.				
<b>Office 2007 Media-less License Kits (MLKs)</b>	MS Office Basic Edition 2007 – Media-less License Kit	X	X	X	RZ361A#ABA
	MS Office Small Business Edition 2007 – Media-less License Kit	X	X	X	RZ365A#ABA
	MS Office Professional Edition 2007 – Media-less License Kit	X	X	X	RZ363A#ABA
<b>Graphics</b>	<b>Single head solutions</b>				
	HP ADD2 SDVO PCIe DVI-D Adapter (PCIe x16)	X*	X	X	DY674A
	ADD2 SDVO PCIe VGA Adapter	X*	X	X	KH540AA
	ATI Radeon X1300 (256MB SH) PCIe Graphics Card	X*	X	X	AG392AA
	<b>Multi head solutions</b>				
	ATI Radeon X1300 (256MB DH) PCIe Graphics Card	X*	X	X	AH050AA
	ATI Radeon X1600 XT 256MB Dual Head PCIe x16, full height Graphics Card			X	KA647AA
	NVIDIA Quadro NVS285 (128MB DH) PCIe Graphics Card	X*	X	X	RD069AA
	NVIDIA GeForce 8400 GS 256MB Dual Head PCIe x1, low profile Graphics Card	X	X	X	GJ120AA
	NVIDIA Quadro NVS 280 Dual Head, low profile Graphics Card	X	X	X	DY599A
	HP DMS59 DVI Dual-head Connector Cable**	X**	X	X	DL139A
	* USDT requires optional PCIe riser card (EU054AA).				
	** Requires NVIDIA Quadro NVS285 PCIe Graphics Card				



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

#### Hard Drives

##### Serial ATA Hard Drives

HP 80-GB SATA 3.0-Gb/s Hard Drive	X	X	X	PY276AA
HP 160-GB SATA 3.0-Gb/s Hard Drive	X	X	X	PY277AA
HP 250-GB SATA 3.0-Gb/s Hard Drive	X	X	X	PY278AA

#### Input/Output Devices

##### Keyboards

HP PS/2 Standard Keyboard	X	X	X	DT527A#ABA
HP USB Standard Keyboard	X	X	X	DT528A#ABA
HP USB Smartcard Keyboard	X	X	X	ED707AA#ABA

##### Pointing Devices

HP PS/2 2-Button Scroll Mouse	X	X	X	DD440B
HP PS/2 2-Button Optical Scroll Mouse	X	X	X	EY703AA
HP USB 2-Button Optical Scroll Mouse	X	X	X	DC172B

#### Memory (DIMMs)

##### PC2-5300 (DDR2 667-MHz) DIMMs Non-ECC

HP 2-GB PC2-5300 (DDR2 667-MHz) DIMM	X	X	X	PX977AA
HP 1-GB PC2-5300 (DDR2 667-MHz) DIMM	X	X	X	PX976AA
HP 512-MB PC2-5300 (DDR2 667-MHz) DIMM	X	X	X	PX975AA
HP 256-MB PC2-5300 (DDR2 667-MHz) DIMM	X	X	X	PX974AA

##### PC2-6400 (DDR2 800-MHz) DIMMs

HP 1-GB PC2-6400 (DDR2 800-MHz) DIMM	X	X	X	AH058AA
HP 512-MB PC2-6400 (DDR2 800-MHz) DIMM	X	X	X	AH056AA
HP 256-MB PC2-6400 (DDR2 800-MHz) DIMM	X	X	X	AH054AA

#### Monitors

##### CRTs

HP s7540 17" (16.0" vis) CRT Monitor	PF997AA#ABA
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##### TFTs

HP L1506 15" TFT Flat Panel Monitor – Analog only	PX848AA#ABA
HP L1706 17" TFT Flat Panel Monitor – Analog only	PX849AA#ABA
HP L1740 17" TFT Flat Panel Display – Analog/Digital	PL766AA#ABA
HP L1745 17" TFT Flat Panel Display – Analog/Digital	GE178AA#ABA
HP L1906 19" TFT Flat Panel Display – Analog only	PX850AA#ABA
HP L1940T 19" TFT Flat Panel Display – Analog/Digital	EM869AA#ABA
HP LP1965 19" TFT Flat Panel Display – Analog/Digital	RA373AA#ABA
HP LP2065 20" TFT Flat Panel Display – Analog/Digital	EF227A4#ABA

##### Widescreen TFTs

HP L2045w 20" Widescreen Flat Panel Display – Analog/Digital	RD125AA#ABA
HP LP2465 24" TFT Widescreen Flat Panel Display – Analog/Digital	EF224A4#ABA
HP LP3065 30" TFT Widescreen Flat Panel Display – Analog/Digital	EZ320A4#ABA



After-Market Options (availability may vary by region)

<b>GSA Monitors</b>					3PO Offering
<b>Touchscreen TFT</b>					
HP L5006tm 15" Touch Screen Flat Panel Display					RB146AA#ABA
<b>Options</b>					
HP Flat Panel Speaker Bar					EE418AA

<b>Multimedia</b>	HP USB Powered Speakers	X	X	X	RD628AA
	Flat Panel Speaker Bar	X	X	X	EE418AA

<b>PATA Slim Optical Drives</b>	<b>DVD-ROM Drive</b>				
	HP PATA DVD-ROM Slim Drive	X			AH041AA
	<b>Combo Drive</b>				
	HP PATA CD-RW/DVD-ROM Combo Slim Drive	X			AH042AA
	<b>DVD+/-RW Drive</b>				
	Slim 8X DVD+/-RW (DL/DF) LightScribe PATA Slim Drive	X			AH043AA

<b>SATA Half-Height Optical Drives</b>	<b>DVD-ROM Drive</b>				
	HP SATA DVD-ROM Drive		X	X	AH047AA
	<b>Combo Drive</b>				
	HP SATA CD-RW/DVD-ROM Combo Drive		X	X	AH046AA
	<b>DVD+/-RW Drive</b>				
	HP SATA DVD+/-RW (DL/DF) SuperMulti LightScribe Drive		X	X	GF343AA

<b>Removable Storage</b>	<b>Diskette and Digital Drives</b>				
	HP 1.44-MB External USB Diskette Drive	X	X	X	DC141B
	1.44-MB Internal Floppy Drive			X	AG295AA
	1.44-MB Internal Floppy Drive		X		AG296AA
	<b>Multimedia</b>				
	HP 16-in-1 Media Card Reader with PCI Card		X	X	EM718AA
	<b>Removable Hard Drive</b>				
	HP Removable SATA Hard Drive Enclosure (Frame & Carrier)		X	X	RY102AA
	HP Removable SATA Hard Drive Enclosure (Carrier Only)		X	X	RY103AA



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

<b>Security</b>	Kensington Lock	X	X	X	PC766A
	HP Business PC Security Lock	X	X	X	TBD
	HP (USDT) Wall Mount Security Sleeve*	X			PA719A
	HP (SFF) Wall Mount Security Sleeve**		X		PA717A
	HP USB Smartcard Keyboard	X	X	X	ED707AA#ABA
	Solenoid Lock			X	DE618A
	Solenoid Lock		X		PT839AA
	HP Smart Data Protection Service	X	X	X	BB731UT
* Dimensions (W x H x L): 12.7 x 3.5 x 12.0 inches; Weight: 3.8 lb					
** Dimensions (W x H x L): 13.5 x 4.4 x 14.4 inches; Weight: 5.9 lb					
<b>Software</b>	HP Client Configuration Manager, Premium Edition	X	X	X	T3488AA (use T3489AA for 1000 licenses)
	Altiris Client Management Suite Level 1 Includes: Altiris Deployment Solution Altiris Inventory Solution Altiris Application Metering Solution Altiris Carbon Copy Solution Altiris Software Delivery Solution Altiris Application Management Solution Altiris Patch Management Solution	X	X	X	DR605A (use DR606A for 1000+ licenses)
<b>Brackets/Stand</b>	HP Integrated Work Center Stand	X			DL641B
	Tower Stand		X		PS797A
	5.25" Blank Bezel Kit (Carbonite 50/Bulk Pack)		X	X	DC177B
<b>Miscellaneous Accessories</b>	HP Serial & Parallel IO Adapter	X			PD825A
	HP 2nd Serial Port		X	X	PA716A
	HP (USDT) PCI Riser Board	X			ED247AA
	HP (USDT) PCIe Riser Board	X			EU054AA
	HP (SFF) PCI Riser Board		X		PD824A
	HP PCI Extender			X	DC179B
	HP FireWire / IEEE 1394 PCI Card	X*	X	X	PA997A
	Belkin USB to Serial Adapter	X	X	X	EM449AA
	Cat5e Patch Cable	X	X	X	AH122AA
	Firewire (1394) Cable	X	X	X	AH123AA
	DVI to DVI cable	X	X	X	DC198A
	7-outlet Surge Protector	X	X	X	AG290AA#ABA



## Technical Specifications

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

Power Supply	Ultra-slim Desktop	Small Form Factor	Convertible Minitower
Power Supply	200 watt custom power supply – Active PFC)	240 watt custom power supply – Active PFC	365 watt custom power supply – Active PFC)
Operating Voltage Range	90 – 264 VAC	90 – 264 VAC	90 – 264 VAC
Rated Voltage Range	100 – 240 VAC	100 – 240 VAC	100 – 240 VAC
Rated Line Frequency	50/60 Hz	50/60 Hz	50/60 Hz
Operating Line Frequency Range	47 – 63 Hz	47 – 63 Hz	47 – 63 Hz
Rated Input Current	4A	4A	6A
Rated Input Current 80 PLUS*	N/A	3.5A	5A
System Heat Dissipation	Typical 300 btu/hr (76 kg-cal/hr) Maximum 1050 btu/hr (265 kg-cal/hr)	Typical 307 btu/hr (77 kg-cal/hr) Maximum 1260 btu/hr (318 kg-cal/hr)	Typical 307 btu/hr (77 kg-cal/hr) Maximum 1916 btu/hr (483 kg-cal/hr)
System Heat Dissipation 80 PLUS* Power Supply	N/A	Typical 239 btu/hr (60 kg-cal/hr) Maximum 1024 btu/hr (258 kg-cal/hr)	Typical 239 btu/hr (60 kg-cal/hr) Maximum 1557 btu/hr (392 kg-cal/hr)
Power Supply Fan	70mm variable speed	80mm variable speed	92mm variable speed
ENERGY STAR Compliant 80 PLUS* Power Supply	X	X	X



### Technical Specifications

FEMP Standby Power Compliant (<2W in S5 – Power Off)**	X	X	X
Power Consumption in ES Mode – Suspend to RAM (S3) (Instantly Available PC)	< 3W	< 3W	< 3W

\* This 80% efficient power supply is a requirement for ENERGY STAR compliance in conjunction with a select range of processors and modules.

\*\* Power consumption in the Off/Apparent Off mode is measured and reported with the network interface controller "Wake on LAN" feature disabled in F10 Setup (default is "enabled").

### ROM BIOS Information

Key features of the HP BIOS in the dc7700 include:

- Deployment and manageability – HP BIOS provides several technologies that help integrate the HP Business desktop computer into the enterprise, such as PXE, remote configuration, remote control, and F10 Setup support for 12 languages. Select models offer Intel vPro technology including AMT (Active Management Technology).
- Stability – HP BIOS supports the HP stable product roadmap by releasing only critical BIOS changes to the factory and advanced change notification.
- Security – HP BIOS Configuration for ProtectTools offers a robust and flexible set of security features to help the system administrator secure their systems from removal of sensitive data, and help prevent access by unauthorized users.
- Thermal and power management – The HP BIOS provides and enables thermal and power management technologies to assist in operating the HP Business Desktop computer in any enterprise environment.
- Serviceability – HP BIOS provides diagnostic and detailed service information.
- Upgrades and recovery – HP BIOS provides numerous ways to upgrade HP Business Desktop computers, including BIOS updates from within DOS (Flashlite), BIOS updates from within Windows (HPQFlash, SSM), HP Client Manager, and fail-safe recovery. In addition, the HP Business Desktop BIOS Utilities tool enables replicated BIOS setup throughout the Enterprise; it is available from within the BIOS software and from the support website.

### Additional HP BIOS Features

- Power-On password – Helps prevent an unauthorized user from powering on the system. After a TPM Basic User password is established in windows, the user or admin can require TPM hardware based authentication during the power-on process.
- Administrator password – Also known as the setup password, this helps prevent unauthorized changes to the system configuration. If the administrator password is not known, the BIOS version cannot be changed and changes cannot be made to BIOS settings using F10 setup or under the OS.
- Advanced Configuration and Power Interface (ACPI) – Represents a significant innovation in power and configuration management, allowing operating systems and applications to manage power based on activity and usage. HP Compaq dc7700 models use ACPI to provide power conservation features under Windows XP.



## Technical Specifications

Other Features	Description
ACPI-Ready Hardware	Advanced Configuration and Power Management Interface (ACPI). <ul style="list-style-type: none"> <li>• Allows the system to wake from a low power mode.</li> <li>• Controls system power consumption, making it possible to place individual cards and peripherals in a low-power or powered-off state without affecting other elements of the system.</li> </ul>
SMBIOS Ver. 2.5	System Management BIOS, for system management information
Wired for Management Support	Intel-driven, industry-wide initiative to make Intel architecture-based PCs, servers and mobile computers more inherently manageable right out of the box and over the network
Dual-State Power Button	Power button acts as both an on/off button and suspend-to-sleep button

Serviceability Features of System		
Dual Color Power LED on Front of Computer (Indicates Normal Operations and Fault Conditions)		
Diagnostic LED Explanation Table	Number of 1-second red LED blinks followed by 2-second pause, then repeats: 2-processor thermal protection activated 3-processor not installed 4-power supply failure 5-memory error 6-video error 7-PCA failure (ROM detected failure prior to video) 8-invalid ROM, bootblock recover mode	
<ul style="list-style-type: none"> <li>• System/Emergency ROM</li> </ul>	<ul style="list-style-type: none"> <li>• Flash ROM</li> </ul>	<ul style="list-style-type: none"> <li>• CMOS Battery Holder for easy Replacement</li> </ul>
<ul style="list-style-type: none"> <li>• Flash Recovery with Video Configuration Record SW</li> </ul>	<ul style="list-style-type: none"> <li>• 5 Aux Power LED on System PCA</li> </ul>	<ul style="list-style-type: none"> <li>• Processor ZIF Socket for easy Upgrade</li> </ul>
<ul style="list-style-type: none"> <li>• Over-Temp Warning on Screen (Requires IM Agents)</li> </ul>	<ul style="list-style-type: none"> <li>• Clear Password Jumper</li> </ul>	<ul style="list-style-type: none"> <li>• DIMM Connectors for easy Upgrade</li> </ul>
<ul style="list-style-type: none"> <li>• HP Backup and Recovery Manager</li> </ul>	<ul style="list-style-type: none"> <li>• Clear CMOS Button</li> </ul>	<ul style="list-style-type: none"> <li>• NIC LEDs (integrated) (Green &amp; Amber)</li> </ul>



### Technical Specifications

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

**NOTE:** Thumb screw release mechanism is used with the Ultra-slim Desktop chassis cover.

Feature	Description
AMT 2.0 support (Active Management Technology)	Select models offer new Intel vPro Technology utilizing AMT 2.0 for network alerting and management of systems regardless of power state, as well as operating system-absent environments.
ASF 2.0 support (Alert Standard Format)	Industry-standard specification for network alerting in operating system-absent environments
Tower	Product can be oriented as a tower (in addition to desktop orientation)
Drive Lock*	Implementation of the industry standard ATA Security feature set. When enabled, it prevents software access to user data on the drive until one or two user-defined passwords are provided.
Drive Self Tests (DPS)*	<ul style="list-style-type: none"> <li>Drive Protection System</li> <li>A diagnostic hard drive self test. It scans critical physical components and every sector of the hard drive for physical faults and then reports any faults to the user.</li> <li>Running independently of the operating system, it can be accessed through a Windows-based diagnostics utility or through the computer's setup procedure. It produces an evaluation on whether the hard drive is the source of the problem and needs to be replaced.</li> <li>The system expands on the Self-Monitoring, Analysis, and Reporting Technology (SMART), a continuously running systems diagnostic that alerts the user to certain types of failures.</li> </ul>
DPS Access through F10 Setup during Boot	
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
SMART I – Drive Failure Prediction	<ul style="list-style-type: none"> <li>Predicts failures before they occur. Tracks fault prediction and failure indication parameters such as re-allocated sector count, spin retry count, calibration retry count</li> </ul>
SMART II – Off-Line Data Collection	
SMART III – Off-Line Read Scanning with Defect Reallocation	<ul style="list-style-type: none"> <li>By avoiding actual hard drive failures, SMART hard drives act as "insurance" against unplanned user downtime and potential data loss from hard drive failure</li> </ul>

\* This feature is inoperable when a RAID (Redundant Array of Independent Disks) configuration is enabled.



## Technical Specifications - Audio

High Definition Audio	Type	Integrated
	High Definition Stereo Codec	Yes – Realtek ALC262, 4-channel
Audio Jacks	Microphone-In (64-K ohm Input Impedance); front and rear stereo analog microphone ports available except for USDT and SFF, which has front stereo microphone only	
	Line-In (64-K ohm Input Impedance)	
	Line-Out * (200 ohms Output Impedance, expects at least a 10-K ohm load)	
	Headphone-Out (1 Ohm Output Impedance, expects at least a 32 ohm load)	
	<i>* Internal Speaker Amplifier is for Internal Speaker only. External Speakers need to be powered externally. Rear audio ports are re-taskable as Line-in, Line-out, or Microphone-in.</i>	
Multistreaming Capable	Multistreaming can be enabled in the Realtek control panel to allow independent audio streams to be sent to/from the front and rear jacks.	
Sampling	8 kHz – 192 kHz	
Wavetable Syntheses (software)	Yes – Uses OS soft wavetable	
Analog Audio	Yes	
Number of Channels on Line-Out (mono/stereo)	Stereo (Left & Right channels)	
Internal Audio Speaker Power Rating	1.5 W	
Internal Speaker	Yes	
External Speaker Jack (Line-Out)	Yes	



### Technical Specifications - Communications

Integrated Intel 82566DM Gigabit Network Connection	<b>Connector</b>	RJ-45
	<b>Controller</b>	Intel Nineveh Gigabit platform LAN Connect Networking Controller
	<b>Memory</b>	Integrated 96KbB on chip buffer memory
	<b>Data rates supported</b>	10/100/1000 Mbps
	<b>Compliance</b>	IEEE 802.1P, 802.1Q, 802.2, 802.3, 802.3 ab and 802.3u compliant,
	<b>Bus architecture</b>	GLCI, LCI interface. Intel specific MAC to PHY interface
	<b>Data transfer mode</b>	At gigabit GLCI (802.3 serdes) is for Data, LCI (parallel bus)for MDIO, at 10/100 LCI for both data and MDIO, GLCI is idle.
	<b>Hardware certifications</b>	FCC, B, CE, TUV- cTUVus Mark Canada and United States, TUV- GS Mark for European Union
	<b>Power requirement</b>	Require 3.3Vaux, 1.8V and 1.0V or just 3.3V with integrated regulators Power consumption 1.16 Watts for 82566, whole LOM 2.53 Watts
	<b>ACBS</b>	Intel Auto Connect Battery Saving feature
	<b>Boot ROM support</b>	Yes
	<b>Network transfer mode</b>	Full-duplex Half-duplex (not available for the 1000BASE-T transceiver)
	<b>Network transfer rate</b>	10BASE-T (half-duplex) 10 Mbps 10BASE-T (full-duplex) 20 Mbps 100BASE-TX (half-duplex) 100 Mbps 100BASE-TX (full-duplex) 200 Mbps 1000BASE-T (full-duplex) 2000 Mbps
	<b>Environmental</b>	<b>Operating temperature</b> 32° to 131°F (0° to 55° C) To 70° C for external regulator <b>Operating humidity</b> 85% at 131° F (55° C)
	<b>Management capabilities</b>	WOL, auto MDI crossover, PXE, Multi-port teaming, RSS, Advanced cable diagnostic.
	<b>Alerting</b>	ASF 2.0 support, AMT 2.0 support on dc7700p models with Intel vPro Technology



### Technical Specifications - Communications

Intel PRO/1000 PT PCIe Gigabit NIC	Connector	RJ-45	
	Controller	Intel 82572EI 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 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	6.4 x 2.6 x 0.8 in (16.3 x 6.6 x 1.9 cm)		
Management capabilities	ASF, WOL, PXE, DMI, WFM 2.0.		

Agere 2006 PCI 56K International SoftModem	Data Transmission	Technology speeds: 56,000 Kbps maximum downstream data, controllerless
		<b>NOTE:</b> 56 Kbps technology refers to download speeds only and requires compatible modems at server sites. Other conditions may limit modem speed. FCC limitations allow a maximum of 53 Kbps during download transmissions.
	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.42bis, 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	ACPI; PPMI 1.1 and wake support with PME and Vaux; meets PCI 2.3 requirements and PC 2001 requirements
	Upgradeability	Driver upgradeable for future enhancements
	Video	ITU-T V.80 video ready interface



### Technical Specifications - Communications

<b>Other</b>	TIA/EIA 602 standard AT command set Integrated DTE interface with speeds of up to 115.2 Kbps, parallel 16550a UART-compatible interface Optional ring wakeup signal
<b>Operating Temperature</b>	32° to 158° F (0° to 70° C)
<b>Operating Humidity</b>	20% to 90%, non-condensing
<b>Power</b>	Requires a 3.3-V auxiliary power rail on PCI bus Uses only one PCI load (i.e., one grant/request pair), one shared IRQ, one electrical load
<b>Chipset</b>	Agere Systems SV92PL – Integrated PCI interface with 5-V tolerant buffers and CardBus support
<b>Dimensions (L X H)</b>	Complies with PCI low profile specifications-6.7 x 2.3 in (17.0 x 5.8 cm) and supports high- and low-profile brackets
<b>Connection</b>	Single RJ-11 connector
<b>Other Features</b>	Digital line protection, call progress monitoring via on-board piezo device, support for high profile and low profile brackets, PnP ID support
<b>Safety</b>	UL recognized to UL 1950, 3rd edition (U.S. and Canada); IEC 950 (TUV, NEMKO, DEMKO, SEMKO); CE Mark, EC 950 (TUV, NEMKO, DEMKO, SEMKO, CE mark)
<b>EMC</b>	FCC Part 15, IC ES003, EN 55022, 3rd edition, EN 55024, annex A, EN 61000-4-6, EN 61000-4-8
<b>Telecom</b>	FCC Part 68, IC-CS-03 (Canada); Worldwide PTT approvals Not available in Korea or the Republic of South Africa.
<b>Health</b>	Bare PCB material compliant to 94V-0 or better (marked as such)
<b>Other</b>	PC 2001 compliant, PCI version 2.3, WHQL approved; ACPI compliant



### Technical Specifications - Graphics

<p><b>Integrated Graphics</b> <b>Media Accelerator 3000</b></p>	<p><b>3D/2D Controller</b></p>	<p>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.</p>
	<p><b>VGA Controller</b></p>	<p>Integrated</p>
	<p><b>Bus Type</b></p>	<p>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).</p>
	<p><b>RAMDAC</b></p>	<p>Integrated, 400 MHz</p>
	<p><b>Memory</b></p>	<p>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.</p>
		<p><b>System memory equal or greater than 512 MB</b> 8 MB pre-allocated + 248 MB DVMT = max frame buffer of 256 MB</p>
	<p><b>Controller Clock Speed</b></p>	<p>400 MHz</p>
	<p><b>Overlay Planes</b></p>	<p>Single overlay support with 5x3 filtering</p>
	<p><b>Maximum Color Depth</b></p>	<p>32 bits/pixel</p>
	<p><b>Maximum Vertical Refresh Rate</b></p>	<p>85 Hz at up to 1920x1440, 85 Hz at 2048x1536. Varies with mode and configuration. See table below.</p>
	<p><b>Multi-display Support</b></p>	<p>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.</p>
	<p><b>Graphics/Video API Support</b></p>	<p>Microsoft DirectX®9, DirectXA®, VMR9, GDI/GDI+; OpenGL® 1.4.</p>

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

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

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



## Technical Specifications - Graphics

<b>DVI ADD2 Graphics</b>	<b>Models</b>	DY674A Intel DVI ADD2 adapter			
	<b>Form Factor</b>	Low-profile card			
	<b>DVI-D Connector</b>	Compliant with DDWG (Digital Display Working Group) and VESA specifications for a single-link digital DVI (DVI-D) connector.			
	<b>Dual Head Support</b>	Yes, when used with the integrated VGA connector			
	<b>Display Devices Supported</b>	HP L1530 HP L1740 HP L1755 HP L1940 HP L1955 HP L2035 HP L2335			
	<b>NOTE:</b> The DVI ADD2 card offers optimal performance with any display that meets applicable VESA standards.				
	<b>Color Depth</b>	All modes support 8-bpp, 16-bpp, and 24-bpp color depths			
	<b>Host Interface Connector</b>	Mechanically compliant with PCI-E standard Complies with the Intel ADD2 and Intel Serial Digital Video Output (SDVO) specifications			
	<b>Dot Clock</b>	165 MHz maximum			
	<b>Display Modes</b>	Supports display modes that require up to 165-MHz bandwidth on the link, as shown in the following table.			
<b>Resolution</b>		<b>60-Hz LCD</b>	<b>60-Hz</b>	<b>75-Hz</b>	<b>85-Hz</b>
Blanking		5% reduced	GTF	GTF	GTF
640 x 480	VGA	Yes	Yes	Yes	Yes
800 x 600	SVGA	Yes	Yes	Yes	Yes
1024 x 768	XGA	Yes	Yes	Yes	Yes
1280 x 1024	SXGA	Yes	Yes	No	No
1600 x 1200	UXGA	Yes	Yes	No	No

<b>ATI Radeon X1300 (256MB SH) PCIe Graphics Card</b>	<b>Bus Type</b>	PCI Express (x16 lanes)
	<b>Maximum Vertical Refresh Rate</b>	85 Hz
	<b>Display Support</b>	Integrated 400 MHz RAMDAC
	<b>Display Max Resolution</b>	2048 x 1536
	<b>Board Display Options</b>	DVI-I + TV DVI-I supports analog CRT or flat panel or digital flat panel (using DVI-A, DVI-D or DVI-I connector) DVI-I supports analog CRT or flat panel (with VGA connector and DVI-I to VGA dongle) TV connector is a 4-pin mini-DIN S-video connector



## Technical Specifications - Graphics

Board Configuration	Specification	Description
128 MB Frame Buffer	Graphics Chip	RV515
	Core clock	450 MHz
	Memory clock	250 MHz
	Frame buffer	256 MB DDR2
Languages supported	24 languages: English, Arabic, Chinese Simplified, Chinese Traditional, Czechoslovakian, Danish, Dutch, Finnish, French, German, Greek, Hebrew, Hungarian, Italian, Japanese, Korean, Norwegian, Polish, Portuguese, Russian, Spanish, Swedish, Thai, Turkish	
Core Power	25 W (Max board power)	
Option kit contents	<ul style="list-style-type: none"><li>● ATI RADEON X1300 PCIe graphics card with full height bracket attached</li><li>● Low profile bracket</li><li>● DVI-to-VGA Adapter</li><li>● Software CD with graphics drivers</li><li>● Warranty documentation</li></ul>	
Compliance standards	<b>EMC Emissions:</b> <ul style="list-style-type: none"><li>a) FCC Part 15, Subpart B – Unintentional Radiators, Class B Computing Devices for Home &amp; Office Use</li><li>b) CISPR22: 1997/EN 55022:1998 – Class B – Limits and methods of measurement of radio disturbance characteristics of Information Technology Equipment</li><li>c) Canadian Standard ICES-003 is equivalent to CISPR22</li><li>d) Taiwanese Standard BSMI</li><li>e) Japanese VCCI</li><li>f) Australian C-Tick</li></ul> <b>EMC Immunity:</b> <p>CISPR 24:1997/EN 55024:1998 – Information Technology Equipment - Immunity Characteristics – Limits and Methods of Measurement.</p> <b>Safety:</b> <p>UL 60950 (USA) &amp; EN 60950 (EU): Safety of Information Technology Equipment, Including Electrical Business Equipment. All boards meet UL PCB flammability requirements.</p>	



## Technical Specifications - Graphics

ATI RADEON X1600XT (256 MB DH) FH 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	2 DVI-I ports (one port supports dual link DVI). DVI-I supports an analog CRT or flat panel with a VGA connector via the provided DVI-I to VGA adapter 4-pin mini-DIN S-video connector for TV output	
	Board Configuration	<b>Specification</b>	<b>Description</b>
		Graphics chip	RV530
		Core clock	590 MHz
		Memory clock	690 MHz
		Frame buffer	256 MB GDDR3, 128 bit wide
Core Power	56 W (Max board power)		

NVIDIA Quadro NVS 280 64MB PCI Dual Head	Form Factor	Low profile (both ATX and low profile brackets included)	
	Graphic Controller	Integrated Quadro 280 2-D graphics processor unit (GPU)	
	Bus type	PCI	
	RAMDAC	Dual 350 MHz integrated	
	Memory	64 MB DDR with frame buffer and Texture storage	
	Connector	Single High-density DMS-59 Connector	
	Dimensions	Low-profile, 2.586 x 6.6 in (6.57 x 16.76 cm)	
	Controller clock speed	250 MHz	
	Color depth	32-bits/pixel max	
	Overlay planes	One 16-bit Video overlay plane	
	Maximum vertical refresh rate	85 Hz	
	Multi-monitor support	Dual analog or digital monitors	
	Dual DVI Support	Yes (with kit DL139A)	
	High-definition Video Processor (HDVP)	Full-screen, full-frame video playback of HDTV and DVD content DVD-ready motion compensation for MPEG-2 Independent hardware color controls for video overlay Hardware color-space conversion (YUV 4:2:2 and 4:2:0) IDCT motion compensation	
	Available graphics drivers	Microsoft Windows 2000 and Microsoft Windows XP (Provides full native Dual View mode, Span or Big Desktop mode, and Clone mode)	

**NOTE:** HP qualified drivers may be preloaded or available from the HP support Web site:  
[http://welcome.hp.com/country/us/eng/software\\_drivers.html](http://welcome.hp.com/country/us/eng/software_drivers.html).



## Technical Specifications - Graphics

### Analog Resolution

640 x 480

800 x 600

1024 x 768

1600 x 1200

1600 x 1200

1600 x 1200

1920 x 1200

1920 x 1200

1920 x 1440

2048 x 1536

### Digital Resolution

640 x 480

800 x 600

1024 x 768

1152 x 864

1280 x 1024

1600 x 1200

### Maximum Refresh Rate

240 Hz

240 Hz

200 Hz

170 Hz

150 Hz

100 Hz

85 Hz

85 Hz

75 Hz

60 Hz

### Maximum Refresh Rate

75 Hz

75 Hz

75 Hz

60 Hz

60 Hz

60 Hz (primary only)

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## Technical Specifications - Hard Drives

7200 rpm Serial ATA Hard Drives	250-GB	<b>Capacity</b>	250,059,350,016 bytes			
		<b>Height</b>	1 in (2.54 cm)			
		<b>Width</b>	Media diameter: 3.5 in (8.89 cm) Physical size: 4 in (10.2 cm)			
		<b>Interface</b>	Serial ATA (3.0 Gb/s)			
		<b>Synchronous Transfer Rate (Maximum)</b>	Up to 3 Gb/s			
		<b>Buffer</b>	8 MB			
		<b>Seek Time</b> (typical reads, includes controller overhead, including settling)	<b>Single Track</b>	1.0 ms		
			<b>Average</b>	8.5 ms		
			<b>Full-Stroke</b>	18 ms		
		<b>Rotational Speed</b>	7,200 rpm			
		<b>Logical Blocks</b>	488,397,168			
		<b>Operating Temperature</b>	41° to 131° F (5° to 55° C)			
			160-GB	<b>Capacity</b>	163,928,604,672 bytes	
				<b>Height</b>	1 in (2.54 cm)	
<b>Width</b>	Media diameter: 3.5 in (8.89 cm) Physical size: 4 in (10.2 cm)					
<b>Interface</b>	Serial ATA (3.0 Gb/s)					
<b>Synchronous Transfer Rate (Maximum)</b>	Up to 3 Gb/s					
<b>Buffer</b>	8 MB					
<b>Seek Time</b> (typical reads, includes controller overhead, including settling)	<b>Single Track</b>			0.9 ms		
	<b>Average</b>			9.3 ms		
	<b>Full-Stroke</b>			18 ms		
<b>Rotational Speed</b>	7,200 rpm					
<b>Logical Blocks</b>	320,173,056					
<b>Operating Temperature</b>	41° to 131° F (5° to 55° C)					



## Technical Specifications - Hard Drives

<b>80-GB</b>	<b>Capacity</b>	80,026,361,856 bytes		
	<b>Height</b>	1 in (2.54 cm)		
	<b>Width</b>	Media diameter: 3.5 in (8.89 cm) Physical size: 4 in (10.2 cm)		
	<b>Interface</b>	Serial ATA (3.0 Gb/s)		
	<b>Synchronous Transfer Rate (Maximum)</b>	Up to 3 Gb/s		
	<b>Buffer</b>	8 MB		
	<b>Seek Time</b> (typical reads, includes controller overhead, including settling)	<b>Single Track</b>	2.0 ms	
		<b>Average</b>	9.3 ms	
		<b>Full-Stroke</b>	21 ms	
	<b>Rotational Speed</b>	7,200 rpm		
	<b>Logical Blocks</b>	156,301,488		
	<b>Operating Temperature</b>	41° to 131° F (5° to 55° C)		

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### 10,000 RPM Serial ATA 160-GB Hard Drives

	<b>Capacity</b>	160,041,885,696 bytes		
	<b>Height</b>	1 in (2.54 cm)		
	<b>Width</b>	Media diameter: 3.0 in (7.62 cm) Physical size: 4 in (10.2 cm)		
	<b>Interface</b>	Serial ATA (1.5 Gb/s), Native Command Queuing enabled		
	<b>Synchronous Transfer Rate (Maximum)</b>	Up to 1.5 Gb/s		
	<b>Cache</b>	16 Mbytes		
	<b>Seek Time</b> (typical reads, includes controller overhead, including settling)	<b>Single Track</b>	0.3 ms	
		<b>Average</b>	4.6 ms	
		<b>Full-Stroke</b>	10.2 ms	
	<b>Rotational Speed</b>	10,000 RPM		
	<b>Logical Blocks</b>	312,581,808		
	<b>Operating Temperature</b>	41° to 131° F (5° to 55° C)		



## Technical Specifications - Hard Drives

80-GB	<b>Capacity</b>	80,026,361,856 bytes	
	<b>Height</b>	1 in (2.54 cm)	
	<b>Width</b>	Media diameter: 3.0 in (7.62 cm) Physical size: 4 in (10.2 cm)	
	<b>Interface</b>	Serial ATA (1.5 Gb/s), Native Command Queuing enabled	
	<b>Synchronous Transfer Rate (Maximum)</b>	Up to 1.5 Gb/s	
	<b>Cache</b>	16 Mbytes	
	<b>Seek Time</b> (typical reads, includes controller overhead, including settling)	<b>Single Track</b>	0.3 ms
		<b>Average</b>	4.6 ms
		<b>Full-Stroke</b>	10.2 ms
	<b>Rotational Speed</b>	10,000 RPM	
	<b>Logical Blocks</b>	156,301,488	
	<b>Operating Temperature</b>	41° to 131° F (5° to 55° C)	



### Technical Specifications - Input/Output Devices

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



### Technical Specifications - Input/Output Devices

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

HP USB Smartcard Keyboard	Physical characteristics	Keys	104, 105, 106, 107, 109 layout (depending upon country)
		Form factor	USB basic Smart Card keyboard
		Colors	Carbonite/Silver



### Technical Specifications - Input/Output Devices

Electrical	Dimensions (H x W x D)	18.2 x 6.3 x 1.3 in (46.3 x 16.1 x 3.3 cm)
	Weight	2 lb (0.9 kg) minimum
	Operating voltage	+ 5VDC $\pm$ 5%
	Power consumption	100-mA maximum (with four LEDs ON)
	System interface	USB Type A plug connector
	ESD	CE level 4, 15-kV air discharge
	EMI – RFI	Conforms to FCC rules for a Class B computing device
Mechanical	Microsoft PC 99 – 2001	Functionally compliant
	Languages	30+ 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 membrane
	Key-leveling mechanisms	For all double-wide and greater-length keys
Environmental	Cable length	6 ft (1.8 m)
	Microsoft PC 99 - 2001	Mechanically compliant
	Acoustics	43-dBA maximum sound pressure level
	Operating temperature	50° to 122° F (10° to 50° C)
	Non-operating temperature	-22° to 140° F (-30° to 60° C)
	Operating humidity	10% to 90% (non-condensing at ambient)
	Non-operating humidity	20% to 80% (non-condensing at ambient)
	Operating shock	40 g, six surfaces
	Non-operating shock	80 g, six surfaces
	Operating vibration	2-g peak acceleration
	Non-operating vibration	4-g peak acceleration
	Drop (out of box)	26 in (66 cm) on carpet, six-drop sequence
	Drop (in box)	42 in (107 cm) on concrete, 16-drop sequence
SMARTCARD function	Support	All ISO 7816 smart cards
	Interface	Reads from and writes to all ISO7816-1, 2, 3, 4 memory and microprocessor smart cards (T=0, T=1)
	Chipset	SCM STCII
	Standard APIs supported	PC/SC, EMV2000, SET
	Power	USB Port Short circuit detection (protects smart card and reader) Power supply compliant with ISO7816 and EMV (5V, 60 mA) Supports 3-V and 5-V cards



### Technical Specifications - Input/Output Devices

<b>Power consumption</b>	250-mA maximum draw (50 mA for the keyboard with three LEDs ON and 200-mA maximum startup current using a high-current, 60-mA smart card)	
<b>Communication</b>	<b>From card</b>	Programmable from 9,600 baud to 115,200 baud
	<b>From computer</b>	Up to 38,400 baud
<b>Landing mechanism</b>	<b>Contact device</b>	Friction contact
	<b>Card insertions rating</b>	Up to 100,000 insertion cycles
<b>Interface modes</b>	USB communications through USB port SCM protocol Automatic card insertion/removal detection	
<b>Reader performance interface</b>	USB connection	
<b>Electro-magnetic standards</b>	<b>Europe</b>	89/336/CEE guideline
	<b>USA</b>	USAFCC part 15

HP PS/2 Scroll Mouse	<b>Dimensions</b>	3.8 x 6.3 x 11.6 cm (1.5 x 2.5 x 4.6 in)		
	<b>Weight</b>	4.44 oz (126 g)		
	<b>Environmental</b>	<b>Operating temperature</b>	50° to 122° F (10° to 50° C)	
		<b>Non-operating temperature</b>	22° to 140° F (-30° to 60° C)	
		<b>Operating humidity</b>	10% to 90% (non condensing at ambient)	
		<b>Non-operating humidity</b>	20% to 80% (non condensing at ambient)	
		<b>Operating shock</b>	40 g, 6 surfaces	
		<b>Non-operating shock</b>	80 g, 6 surfaces	
		<b>Operating vibration</b>	2 g peak acceleration	
		<b>Non-operating vibration</b>	4 g peak acceleration	
		<b>Drop (out of box)</b>	26 in (66 cm) on carpet, 6-drop sequence	
		<b>Drop (out of box)</b>	1 m on asphalt tile over concrete, 6-drop sequence	
	<b>Electrical</b>	<b>Operating voltage</b>	5 VDC ± 10%	
		<b>Power consumption</b>	15 mA	
		<b>System consumption</b>	PS/2 mini-din connector	
		<b>ESD</b>	CE level 4, 15 kV air discharge	
		<b>EMI-RFI</b>	Conforms to FCC rules for a Class B computing device	
		<b>Microsoft PC99 – 2001</b>	Functionally compliant	
	<b>Mechanical</b>	<b>Resolution</b>	400 ± 20% DPI	



Technical Specifications - Input/Output Devices

		<b>Tracking speed</b>	10 in/s (25.4 cm/s) maximum
		<b>Acceleration</b>	100 in/s/s (2.54 m/s/s)
		<b>Switch actuation</b>	65 g nominal peak force
		<b>Switch life</b>	1,000,000 operations (using Hasco modified tester)
		<b>Switch type</b>	Low force micro-switches
		<b>Tracking mechanism life</b>	155 mi (250 km) at average speed of 10 in/s
		<b>Cable length</b>	6 ft (1.8 m)
		<b>Microsoft PC99 – 2001</b>	Mechanically compliant
	<b>Scroll wheel</b>	<b>Width</b>	8 mm
		<b>Diameter</b>	0.99 in (25.2 mm)
		<b>Maximum rotation speed</b>	30 mm/s
		<b>Switch type</b>	Light force micro-switch
		<b>Switch life</b>	1 million operations
		<b>Mechanical life</b>	Minimum 200,000 revolutions
	<b>Regulatory approvals</b>	<b>Compliant</b>	UL, CSA, FCC, CE Mark, TUV, TUV GS, VCCI, BSMI, C-Tick, MIC

HP PS/2 Optical Scroll Mouse

	<b>Dimensions (H x L x W)</b>	3.95 x 6.21 x 11.7 cm (1.56 x 2.44 x 4.61 in)
	<b>Weight</b>	4.44 oz (126 g)
	<b>Environmental</b>	<b>Operating temperature</b> -32° to 104°F (0° to 40° C)
		<b>Non-operating temperature</b> -4° to 140°F (-20° to 60° C)
		<b>Operating humidity</b> 10% to 90% (non condensing at ambient)
		<b>Non-operating humidity</b> 10% to 90% non condensing
		<b>Operating shock</b> 40 g, 6 surfaces
		<b>Non-operating shock</b> 80 g, 6 surfaces
		<b>Operating vibration</b> 2 g peak acceleration
		<b>Non-operating vibration</b> 4 g peak acceleration
		<b>Drop (out of box)</b> 80 cm height onto asphalt tile over concrete or equivalent, 5-drop in 5 direction except the cable face
	<b>Electrical</b>	<b>Operating voltage</b> 5 VDC ± 10%
		<b>Power consumption</b> 100mA
		<b>System consumption</b> PS/2 mini-din connector
		<b>ESD</b> CE level 4, 15 kV air discharge
		<b>EMI-RFI</b> Conforms to FCC rules for a Class B computing device
	<b>Mechanical</b>	<b>Microsoft PC99 – 2001</b> Functionally compliant
		<b>Resolution</b> 400 ± 20% DPI
		<b>Tracking speed</b> 10 in/s (25.4 cm/s) maximum



### Technical Specifications - Input/Output Devices

	<b>Acceleration</b>	100 in/s/s (2.54 m/s/s)
	<b>Switch actuation</b>	61 g nominal peak force
	<b>Switch life</b>	3,000,000 operations (using Hasco modified tester)
	<b>Switch type</b>	Low force micro-switches
	<b>Tracking mechanism life</b>	155 mi (250 km) at average speed of 10 in/s
	<b>Cable length</b>	6 ft (1.8 m)
	<b>Microsoft PC99 – 2001</b>	Mechanically compliant
<b>Scroll wheel</b>	<b>Width</b>	8 mm
	<b>Diameter</b>	1.01 in (25.6 mm)
	<b>Maximum rotation speed</b>	48 rats/sec
	<b>Switch type</b>	Light force micro-switch
	<b>Switch life</b>	1 million operations
	<b>Mechanical life</b>	Minimum 200,000 revolutions
<b>Regulatory approvals</b>	<b>Compliant</b>	UL, CSA, FCC, CE Mark, TUV, TUV GS, VCCI, BSMI, C-Tick, MIC

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<b>HP USB Optical Scroll Mouse</b>	<b>Dimensions (H x L x W)</b>	1.5 x 4.5 x 2.5 in (3.8 x 11.6 x 6.3 cm)
	<b>Weight</b>	0.27 lb (0.12 kg)
	<b>Cable length</b>	72.8 in (185 cm)
	<b>System requirements</b>	Microsoft Windows 95, 98, 2000, Me, and XP Available USB port



## Technical Specifications - Optical Storage

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

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SATA DVD-ROM Drive	<b>Height</b>	5.25-inch, half-height, tray-load
	<b>Orientation</b>	Either horizontal or vertical
	<b>Interface type</b>	SATA/ATAPI



## Technical Specifications - Optical Storage

<b>Disc capacity</b>	Single layer: Up to 4.7 GB (6 times capacity of CD-ROM) Double layer: Up to 8.5 GB (12 times capacity of CD-ROM)		
<b>Dimensions (W x H x D)</b>	5.9 x 1.7 x 8.0 in (15.0 x 4.4 x 20.3 cm)		
<b>Weight (max)</b>	2.6 lb (1.2 kg)		
<b>Read speeds</b>	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	
<b>Removable Storage – Media Compatibility – DVD-ROM</b>	<b>Media</b>	<b>Read</b>	<b>Write</b>
	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	
<b>Access times</b> (typical reads, including setting)	<b>Random</b>	DVD: < 140 ms (typical), CD: < 125 ms (typical)	
	<b>Full Stroke</b>	DVD: < 250 ms (seek), CD: < 210 ms (seek)	
	<b>Cache Buffer</b>	2 MB (minimum)	
	<b>Data Transfer Modes</b>	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)	
<b>Power</b>	<b>Source</b>	SATA DC power receptacle	
	<b>DC Power Requirement</b>	5 VDC ± 5%-100 mV ripple p-p 12 VDC ± 5%-200 mV ripple p-p	
	<b>DC Current</b>	5 VDC – < 1000 mA typical, < 1600 mA maximum 12 VDC –< 600 mA typical, < 1400 mA maximum	
<b>Environmental</b> (all conditions non-condensing)	<b>Temperature</b>	41° to 122° F (5° to 50° C)	
	<b>Relative Humidity</b>	10% to 90%	
	<b>Maximum Wet Bulb Temperature</b>	86° F (30° C)	



## Technical Specifications - Optical Storage

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

PATA DVD+/-RW LightScribe Slim Drive	<b>Height</b>	5.25-inch, half-height, tray-load		
	<b>Orientation</b>	Either horizontal or vertical		
	<b>Interface type</b>	ATAPI/EIDE		
	<b>Disc recording capacity</b>	Up to 8.5 GB DL or 4.7 GB standard		
	<b>Dimensions (W x H x D)</b>	5.0 x 0.5 x 5.0 in (128 x 13.6 x 129 mm)		
	<b>Weight (max)</b>	0.42 lb (190 g)		
	<b>Write speeds</b>	<b>DVD+R</b>	Up to 8X	
		<b>DVD+RW</b>	Up to 8X	
		<b>DVD+R DL</b>	Up to 4X	
		<b>DVD-R</b>	Up to 8X	
<b>DVD-RW</b>		Up to 6X		



## Technical Specifications - Optical Storage

Read speeds	CD-R	Up to 24X
	CD-RW	Up to 16X
	DVD+RW, DVD-RW, DVD-ROM, DVD+R, DVD-R	Up to 8X
	DVD-R DL	Up to 4X
	CD-ROM, CD-R	Up to 24X
Access time (typical reads, including settling)	CD-RW	Up to 24X
	Random	DVD: < 140 ms (typical), CD: < 125 ms (typical)
	Full Stroke	DVD: < 250 ms (seek), CD: < 210 ms (seek)
	Stop Time	< 4 seconds
	Cache Buffer	2 MB (minimum)
Power	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)
	Source	Four-pin, DC power receptacle
	DC Power Requirement	5 VDC $\pm$ 5%-100 mV ripple p-p 12 VDC $\pm$ 5%-200 mV ripple p-p
	DC Current	5 VDC (< 1000 mA typical, 1600 mA maximum) 12 VDC (< 600 mA typical, 1400 mA maximum)
	Total Drive Power (standby mode)	< 2.5 Watt
Audio output	Line-Out	0.7 VRMS
	Signal-to-Noise Ratio	74 dB
	Channel Separation	65 dB
Environmental conditions (operating – 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

PATA CD-RW/DVD-ROM Combo Slim Drive	<b>Height</b>	12.7mm height slim CD-RW
	<b>Orientation</b>	Either horizontal or vertical
	<b>Interface type</b>	PATA/ATAPI
	<b>Disc capacity</b>	Single layer: Up to 4.7 GB (6 times capacity of CD-ROM)
	<b>Dimensions (W x H x D)</b>	5.0 x 0.5 x 5.0 in (128 x 13.6 x 129 mm)
	<b>Weight (max)</b>	0.42 lb (190 g)
	<b>Write speeds</b>	<b>CD-R</b> Up to 24X <b>CD-RW</b> Up to 24X
	<b>Read speeds</b>	<b>DVD+R/-R/+RW/ -RW/+R DL /-R DL</b> Up to 4X <b>DVD-ROM</b> Up to 8X <b>CD-ROM, CD-R</b> Up to 24X <b>CD-RW</b> Up to 24X
	<b>Access time</b> (typical reads, including settling)	<b>Random DVD</b> DVD: < 140 ms (typical), CD: < 125 ms (typical) <b>Random CD</b> DVD: < 250 ms (typical), CD: < 210 ms (typical)
		<b>Cache Buffer</b> 2 MB (minimum)
		<b>Data Transfer Modes</b> ATA PIO mode 4); ATA Multi-word DMA mode 2; ATA UltraDMA mode 0; ATA UltraDMA mode 1, mode 2; ATA UltraDMA Mode 3 (default)
	<b>Power</b>	<b>Source</b> Four-pin, DC power receptacle <b>DC Power Requirement</b> 5 VDC $\pm$ 5%-100 mV ripple p-p <b>DC Current</b> 5 VDC (< 1000 mA typical, < 1600 mA maximum)
		<b>Total Drive Power</b> (< 2.5 Watt (standby mode)
	<b>Audio output level</b>	0.7 Vrms (typical)
	<b>Environmental</b> (all conditions non-condensing)	<b>Temperature</b> 41° to 122° F (5° to 50° C) <b>Relative Humidity</b> 5% to 85% <b>Maximum Wet Bulb Temperature</b> (operating) 86° F (30° C)



## Technical Specifications - Optical Storage

PATA DVD-ROM Slim Drive	<b>Height</b>	12.7mm
	<b>Orientation</b>	Either horizontal or vertical
	<b>Interface type</b>	PATA/ATAPI
	<b>Dimensions (W x H x D)</b>	5.0 x 0.5 x 5.0 in (128 x 13.6 x 129 mm)
	<b>Weight (max)</b>	0.42 lb (190 g)
	<b>Read speeds</b>	<b>DVD+R/-R/+RW/-RW/+R DL /-R DL</b> Up to 4X
		<b>DVD-ROM</b> Up to 8X
		<b>CD-ROM, CD-R</b> Up to 24X
		<b>CD-RW</b> Up to 24X
	<b>Access time</b> (typical reads, including settling)	<b>Random DVD</b> DVD: < 140 ms (typical), CD: < 125 ms (typical)
		<b>Random CD</b> DVD: < 250 ms (seek), CD: < 210 ms (seek)
		<b>Data Transfer Modes</b> ATA PIO mode 4 (16.7 MB/s); ATA Multi-word DMA mode 2 (16.7 MB/s)
	<b>Power</b>	<b>Source</b> Four-pin, DC power receptacle
		<b>DC Power Requirement</b> 5 VDC $\pm$ 5%-100 mV ripple p-p
		<b>DC Current</b> 5 VDC - <1000 mA typical, < 1600 mA maximum
		<b>Total Drive Power</b> (standby mode) < 2.5 Watt
	<b>Audio output</b>	<b>Line-Out</b> 0.7 VRMS
		<b>Signal-to-Noise Ratio</b> 74 dB
		<b>Channel Separation</b> 65 dB
	<b>Environmental</b> (all conditions non-condensing)	<b>Temperature</b> 41° to 122° F (5° to 50° C)
		<b>Relative Humidity</b> 5% to 85%
		<b>Maximum Wet Bulb Temperature</b> (operating) 86° F (30° C)



## Technical Specifications - Removable Storage

HP 16-in-1 Media Card Reader	USB Interface	USB 2.0 High-speed device
	Advance protocol support	Supports hardware ECC (Error Correction Code) function <ul style="list-style-type: none"><li>• Supports hardware CRC (Cyclic Redundancy Check) function</li><li>• Supports MS 4-bit parallel transfer mode</li><li>• Supports MS-PRO 4-bit parallel transfer mode</li><li>• Supports SD 4-bit parallel transfer mode</li><li>• Supports high-speed 50-MHz SD 4-bit card (version 1.1)</li><li>• Support high-speed 52-MHz MMC 8-bit card</li></ul>
	Supported media type with card adapter	<ul style="list-style-type: none"><li>• MicroSD (T-Flash)</li><li>• Memory Stick Micro</li></ul>
	Mechanical	
	Environmental	<b>Operational</b> <b>Environmental Extremes</b> Test Parameters/Conditions – Power applied, unit operating on system $\pm 5\%$ nominal supply voltage. 10°C 10% R.H. = 24 hours 10°C 90% R.H. = 24 hours 20°C 90% R.H. = 24 hours 30°C 90% R.H. = 24 hours 40°C 90% R.H. = 24 hours 50°C 90% R.H. = 24 hours 50°C 10% R.H. = 24 hours
		<b>Storage Environmental Extremes</b> Test Parameters/Conditions 60°C @ 80% R.H. for 96 hours -30°C @ 20% R.H. for 48 hours No power applied Delta °C < 1.0°C/min Delta % R.H. < 1.5% R.H./min
	Approvals	USB-IF, WHQL, Compliant with USB Mass Storage Class Bulk only Transport Specification Rev. 1.0, Compliant Intel Front Panel I/O Connectivity Design Guide V. 1.2 FCC, CE, BSMI, C-Tick, VCCI, MIC, cUL, TUV-T



### Technical Specifications - Environmental Data

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

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

\* Select configurations available for ENERGY STAR compliance.

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

### 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	105.3 W	103.0 W	106.8 W
Sleep (ENERGY STAR low power mode)	2.74 W	3.00 W	2.76 W
Off	1.58 W	1.85 W	1.57 W
Heat Dissipation*	115 VAC	230 VAC	100 VAC
Normal Operation	359.3 BTU/hr	351.4 BTU/hr	364.4 BTU/hr
Sleep	9.3 BTU/hr	10.2 BTU/hr	9.4 BTU/hr
Off	5.4 BTU/hr	6.3 BTU/hr	5.4 BTU/hr

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

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



## Technical Specifications - Environmental Data

### Declared Noise

#### Emissions

(in accordance with ISO 7779 and ISO 9296)

	Sound Power (LWAd, bels)	Sound Pressure (LpAm, decibels)
System Fan Off		
Idle	3.9	29
Fixed Disk (random writes)	3.9	30
Optical Drive (sequential reads)	4.9	40

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

- Intel LGA775 processor socket
- 8 USB ports
- 1 empty PCI full-height slot (w/ optional PCI riser card), or 1 empty PCIe low-profile x16 slot (w/optional PCIe riser card)
- 1 internal drive slot
- 1 Slimline optical drive slot
- 3 memory slots
- 1 Serial/Parallel adapter (optional)

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

### Batteries

This product complies with ISO standards:

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

Batteries used in the product do not contain:

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

Battery size: CR2032 (coin cell)

Battery type: Lithium

### Additional Information

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



## Technical Specifications - Environmental Data

- This product contains 0% recycled materials (by wt.)
- This product is 92% recyclable when properly disposed of at end of life.

<b>Packaging Materials</b>	Corrugated Paper	1100 g
	EPE Foam	200 g
	LDPE Bag	23 g

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

## Small Form Factor

### System Configuration

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

### Energy Consumption

	115 VAC	230 VAC	100 VAC
Normal Operation	99.0 W	94.0 W	99.5 W
Sleep (ENERGY STAR low power mode)	2.64 W	2.87 W	2.62 W
Off	1.68 W	1.87 W	1.67 W
Heat Dissipation*	115 VAC	230 VAC	100 VAC
Normal Operation	337.8 BTU/hr	320.7 BTU/hr	339.5 BTU/hr
Sleep	9.0 BTU/hr	9.8 BTU/hr	8.9 BTU/hr
Off	5.7 BTU/hr	6.4 BTU/hr	5.7 BTU/hr

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

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

### Declared Noise Emissions

(in accordance with ISO 7779 and ISO 9296)

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

\* 4.6 with 10,000 rpm hard drive

\*\* 37 with 10,000 rpm hard drive



### Technical Specifications - Environmental Data

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

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

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

### Batteries

This product complies with ISO standards:

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

Batteries used in the product do not contain:

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

Battery size: CR2032 (coin cell)

Battery type: Lithium

### Additional Information

- This product is in compliance with the Restrictions of Hazardous Substances (RoHS) directive – 2002/95/EC.
- This product is in compliance with California Proposition 65 (State of California; Safe Drinking Water and Toxic Enforcement Act of 1986).
- This HP product is designed to comply with the Waste Electrical and Electronic Equipment (WEEE) Directive – 2002/96/EC.
- This product is in compliance with the IEEE 1680 (EPEAT) standard at the Silver level (see <http://www.epeat.net>)
- Plastics parts weighing over 25 grams used in the product are marked per ISO 11469 and ISO1043.
- This product contains 0% recycled materials (by wt.)
- This product is 91% recyclable when properly disposed of at end of life.

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

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



## Technical Specifications - Environmental Data

### Convertible Minitower

<b>System Configuration</b>	<b>Processor</b>	Intel Pentium D 945 Processor (3.4-GHz, 2x2MB L2 cache, 800-MHz FSB)
	<b>Memory</b>	1-GB DDR2 Synch Dram PC2-5300 (667-MHz)
	<b>Hard Drive</b>	80-GB SATA 3.0-Gb/s (7200 rpm)
	<b>Optical Drive</b>	SATA DVD-ROM Drive
	<b>Communications</b>	Integrated Intel 82566DM Gigabit Network Connection, Agere 2006 PCI 56K International SoftModem

### Energy Consumption

	115 VAC	230 VAC	100 VAC
Normal Operation	92.2 W	87.2 W	91.7 W
Sleep (ENERGY STAR low power mode)	2.38 W	2.88 W	2.34 W
Off	1.01 W	1.45 W	0.98 W

	115 VAC	230 VAC	100 VAC
<b>Heat Dissipation*</b>			
Normal Operation	337.8 BTU/hr	320.7 BTU/hr	339.5 BTU/hr
Sleep	9.0 BTU/hr	9.8 BTU/hr	8.9 BTU/hr
Off	5.7 BTU/hr	6.4 BTU/hr	5.7 BTU/hr

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

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

### Declared Noise

#### Emissions

(in accordance with  
ISO 7779 and ISO 9296)

	Sound Power (LWAd, bels)	Sound Pressure (LpAm, decibels)
System Fan Off		
Idle	4.0	23
Fixed Disk (random writes)	4.1*	24**
Optical Drive (sequential reads)	4.9	32

\* 5.3 with 10,000 rpm hard drive

\*\* 37 with 10,000 rpm hard drive



### Technical Specifications - Environmental Data

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

- Intel LGA775 processor socket
- 8 USB ports
- 4 empty full-height PCI slots (2 standard, 2 optional)
- 1 empty full-height PCIe x1 slot
- 1 empty full-height PCIe x16 slot
- 2 internal 3.5-inch drive bays
- 3 external 5.25-inch SATA drive bays
- 1 external 3.5-inch drive bay
- 4 memory slots
- 1 second Serial port (optional)

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

### Batteries

This product complies with ISO standards:

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

Batteries used in the product do not contain:

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

Battery size: CR2032 (coin cell)

Battery type: Lithium

### Additional Information

- This product is in compliance with the Restrictions of Hazardous Substances (RoHS) directive – 2002/95/EC.
- This product is in compliance with California Proposition 65 (State of California; Safe Drinking Water and Toxic Enforcement Act of 1986).
- This HP product is designed to comply with the Waste Electrical and Electronic Equipment (WEEE) Directive – 2002/96/EC.
- This product is in compliance with the IEEE 1680 (EPEAT) standard at the Silver level (see <http://www.epeat.net>)
- Plastics parts weighing over 25 grams used in the product are marked per ISO 11469 and ISO1043.
- This product contains 0% recycled materials (by wt.)
- This product is 97% recyclable when properly disposed of at end of life.

<b>Packaging Materials</b>	Corrugated Paper	1642 g
	EPE Foam	399 g
	LDPE Bag	63 g

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



### Technical Specifications - Environmental Data

#### 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. From July 1, 2006, RoHS substances will be virtually eliminated (virtually = to levels below legal limits) for all HP electronic products subject to the RoHS Directive, except where it is widely recognized that there is no technically feasible alternative (as indicated by an exemption under the EU RoHS Directive).

##### Material Usage

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

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

##### Packaging

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

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

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

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



### Technical Specifications - Environmental Data

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:

[link to new HP white paper now in progress]

Global Citizenship Report

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

Eco-label certifications

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

ISO 14001 certificates:

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

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