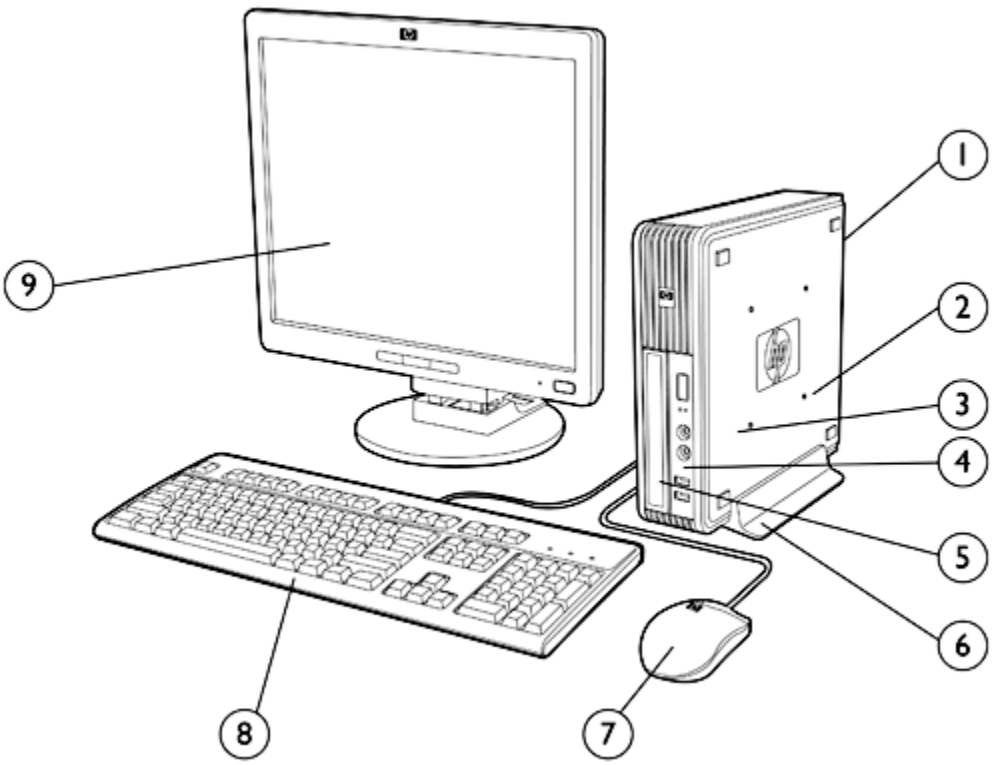
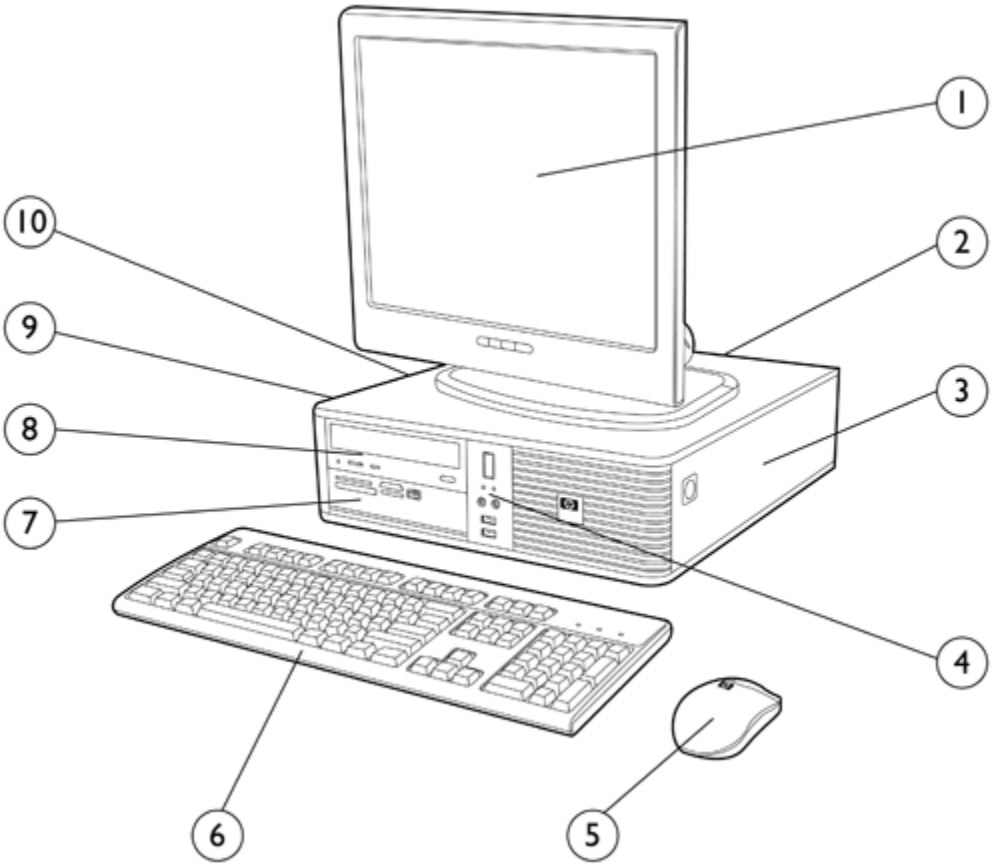
HP recommends
Windows Vista® Business

Ultra-slim Desktop



1. Rear I/O: (6) USB 2.0, (1) DVI-D graphics port, (2) PS/2, (1) RJ-45, (1) VGA, (1) audio in, (1) audio out
2. 135-watt External 80% efficient Active PFC power supply
3. (1) 2.5" internal bay for 2.5" Internal Hard Drive
4. Front I/O: (2) USB 2.0, headphone and microphone
5. (1) Slimline Drive Bay
6. Tower Stand (sold separately)
7. 2-Button Optical Scroll Mouse (PS/2 or USB)
8. HP Standard Keyboard (PS/2 or USB) or HP USB Smartcard Keyboard
9. Monitor (sold separately)

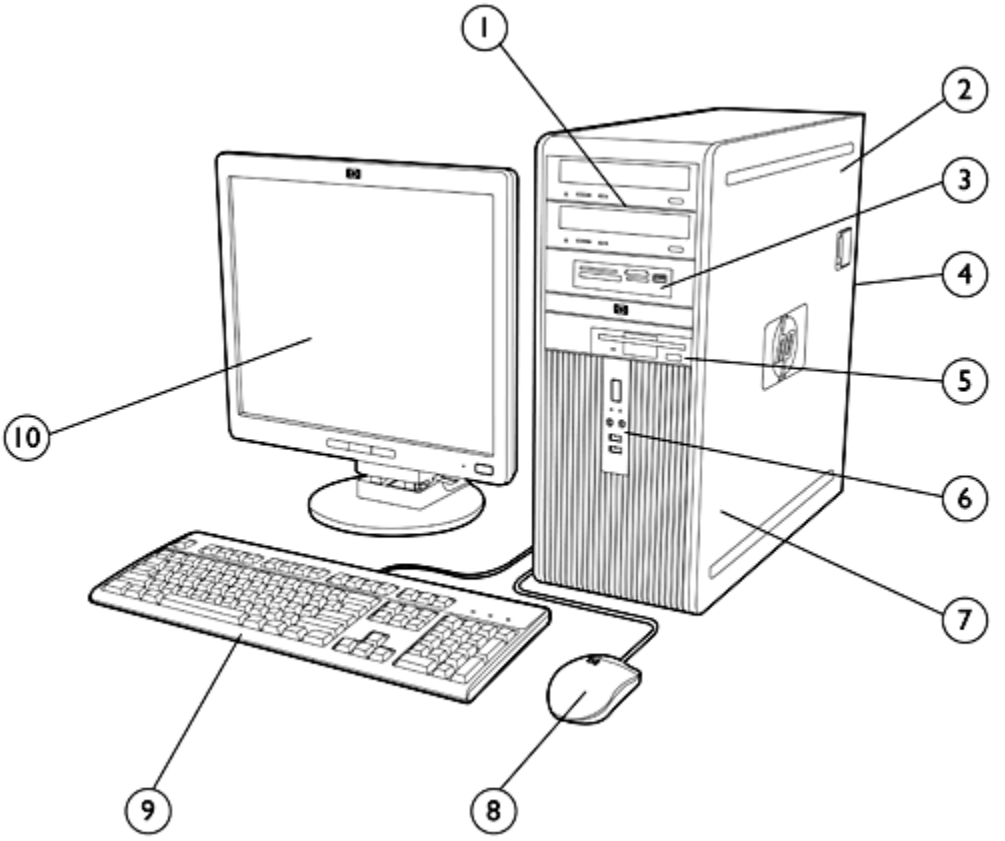
Small Form Factor



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

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

Convertible Minitower



1. (3) 5.25" external bays and (2) 3.5" internal bays
2. 365-watt or 365-watt high efficiency 80 PLUS Active Power Factor Correction (PFC) power supply
3. Media Card Reader or other 5.25" device
4. 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) audio in, (1) audio out
5. Diskette drive or Media Card Reader
6. Front I/O: (2) USB 2.0, headphone and microphone
7. (3) full-height PCI slots, (2) full-height PCI Express x1 slots, (1) full-height PCI Express x16 (ADD2/SDVO) slot
8. 2-Button Optical Scroll Mouse (PS/2 or USB)
9. HP Standard Keyboard (PS/2 or USB) or HP USB Smartcard Keyboard
10. Monitor (sold separately)

Overview

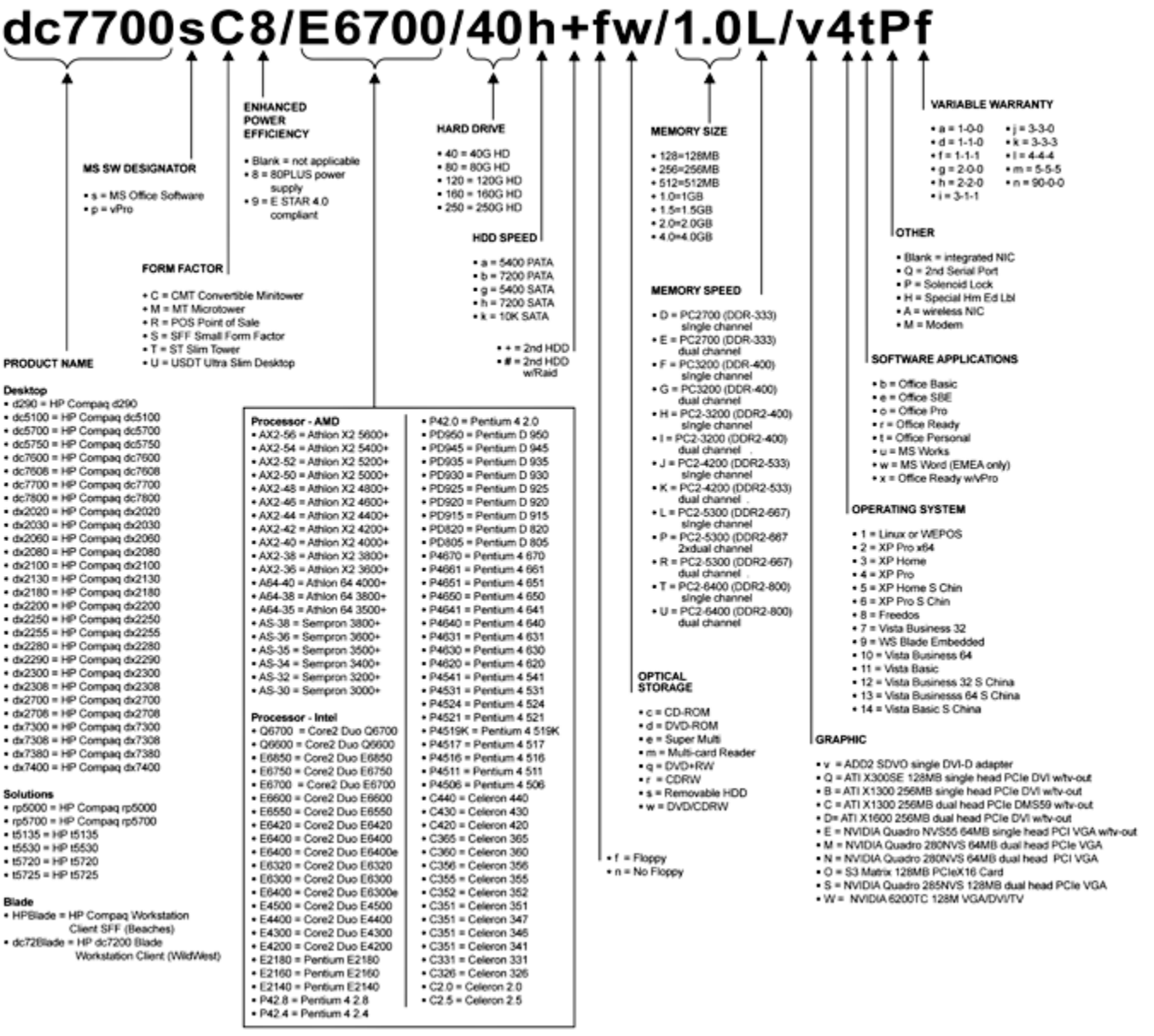
At A Glance

- Designed for long-term, networked deployment within medium and large organizations in commercial business, finance and public sector organizations
- Created using industry leading Design for Environment standards. Upgradeable, recyclable and energy efficient.
- Optional 80% efficient power supplies
- Long purchase lifecycles and image stability for demanding enterprise environments
- Support for new Intel technologies introduced in 2007: Intel® Q35 Express chipset, Intel Core™ 2 Duo Processors, Intel Core 2 Quad Processors and Intel Graphics Media Accelerator 3100 integrated graphics
- Select models with Intel vPro technology (iAMT 3.0) 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
- 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 SoftPaq 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
  - HP ProtectTools Security Software Suite, including embedded security, preinstalled standard
  - Embedded TPM1.2 compliant security module* (uses HP ProtectTools Embedded Security software)
  - 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
  - Computrace agent in HP BIOS
- Tool-less serviceability features for easier upgrades and repairs
- Choice of professional chassis form factors to accommodate the desired mix between expandability and size

* TPM module and cryptographic software disabled where use is restricted by law; for example, Russia.

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.



Operating System – One of the following	**Preinstalled**	Genuine Windows Vista Business 32* Genuine Windows Vista Business 64* Genuine Windows Vista Home Basic 32* Genuine Windows XP Professional SP2 FreeDOS
	Supported	Windows XP Home 32, Vista Enterprise 32, Vista Enterprise 64
	Limited Support	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.

Value-added Software (on select models; not included with FreeDOS)	HP ProtectTools Security Solutions	HP Total Care Advisor
	Altiris Deployment Solution Agent	Microsoft Office 2007 Basic
	HP Software Agent	Microsoft Office 2007 Personal
	HP Insight Diagnostics (available via HP Backup and Recovery Manager)	Microsoft Office 2007 Professional
	Computer Setup Utility	Microsoft Office 2007 Small Business
	HP Backup and Recovery Manager	Microsoft Works 8.5
	Symantec AntiVirus 10.0 with 60 day Live Update Subscription	Microsoft Internet Explorer with Google Toolbar
	Sonic/Roxio DigitalMedia Plus 7.2 (select models) or Easy Media Creator 9 (select models)	PDF Complete Computrace for Desktops* Verdiem Surveyor agent InterVideo WinDVD 5.0 (select models)

* Computrace agent is in HP BIOS. For tracking and tracing services, available in select countries, separate software and purchase of a subscription is required.

Value-added Services and Features	HP Stable Platform Program	Factory Express Deployment and Lifecycle Services
	Business-to-Business Portals	TPM 1.2 Security*
	HP Global Series Services	Intel vPro technology

* TPM module disabled where use is restricted by law; for example, Russia.

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 SoftPaq Download Manager	HP Systems Software Manager
	HP Client Catalog for Microsoft SMS	Verdiem Surveyor agent

Standard Features and Configurable Components

Service and Support

On-site Warranty and Service[1]: 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[2] and includes free telephone support[3] 24 x 7. Global coverage[2] ensures that any product purchased in one country and transferred to another non-restricted country will remain fully covered under the original warranty and service offering. Some countries/regions do not offer one year onsite and labor.

[1] Terms and conditions may vary by country. Certain restrictions and exclusions apply.

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

[3] Technical telephone support applies only to HP-configured, HP and HP-qualified, third-party hardware and software. Toll-free calling and 24 x 7 support may not be available in some countries.

	Ultra-slim Desktop	Small Form Factor	Convertible Minitower
Dimensions			
Chassis Dimensions (H x W x D)	2.60 x 9.90 x 10 in (66.0 x 251.5 x 254 mm)	3.95 x 13.3 x 14.9 in (100.3 x 337.8 x 378.5)	17.63 x 7.0 x 17.8 in (447.8 x 177.8 x 452.12 mm)
Optional Tower Stand Dimensions (H x W x D)	1.26 x 4.82 x 6.69 in (32.0 x122.3 x 170.0 mm)	1.05 x 6.95 x 7.83 in (26.75 x 176.46 x 198.87 mm)	N/A
System weight*	7.0 lb (3.18 kg)	18.75 lb (8.50 kg)	26.2 lb (11.89 kg)
System volume	4.21 liters	13 liters	36 liters
Shipping weight*	14.34 lb (6.52 kg)	26.10 lb (11.86 kg)	34.60 lb (15.72 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)	8.60 x 15.68 x 19.68 in (218.4 x 398.3 x 499.9 mm)	9.00 x 19.68 x 23.38 in (228.6 x 499.9 x 593.85 mm)	24.25 x 12.33 x 22.13 in (616.0 x 313.2 x 562.1 mm)
* Configured with 1 hard drive, 1 optical drive, no diskette drive, and no PCI card.			
Standard Power Supply	N/A	240W power supply – Active PFC	365W power supply – Active PFC
80% Efficient Power Supply	135W External 85% efficient* power supply – Active PFC	240W 80 PLUS* power supply – Active PFC	365W 80 PLUS* power supply – Active PFC
	External power supply dimensions: 6.7 x 2.6 x 1.5 in Total length of external power supply and power cord: 12 feet 8 inches		
* This alternate 80% efficient power supply is a requirement for ENERGY STAR® compliance in conjunction with a select range of processors and modules. ** Ultra-slim Desktop power supply is > 85% efficient at nominal load with 115V AC input.			
Ports			
USB 2.0	8 (2 front, 6 rear)	8 (2 front, 6 rear)	8 (2 front, 6 rear)
Serial	N/A	1 standard with 2nd optional	1 standard with 2nd optional
Parallel	N/A	1	1
PS/2	1 keyboard, 1 mouse		
Video	analog for integrated graphics		
DVI output	1	available via ADD2 card or optional graphics cards	
Support for Multi-Monitor	Yes	available via ADD2 card or optional graphics cards	
Audio	Front – mic and headphone Rear – input (supports microphone or line input), line out		
NIC (RJ-45)	Integrated Intel 82566DM Gigabit Network Connection Ethernet		

		USDT	SFF	CMT
Chipset	Intel Q35 Express chipset	X	X	X

		USDT	SFF	CMT
Processor and Speed* One of the following	**Intel Celeron Processors:**			
	Intel Celeron 420 Processor (1.6-GHz, 512K L2 cache, 800-MHz FSB)	X	X	X
	Intel Celeron 430 Processor (1.8-GHz, 512K L2 cache, 800-MHz FSB)	X	X	X
	Intel Celeron 440 Processor (2.0-GHz, 512K L2 cache, 800-MHz FSB)	X	X	X
	Intel Pentium dual-core Processors:			
	Intel Pentium E2160 Processor (1.8-GHz, 1-MB L2 cache, 800-MHz FSB)	X	X	X
	Intel Pentium E2180 Processor (2.0-GHz, 1-MB L2 cache, 800-MHz FSB)	X	X	X
	Intel Core 2 Duo Processors:			
	Intel Core 2 Duo E4400 Processor (2.0-GHz, 2 MB L2 cache, 800-MHz FSB)	X	X	X
	Intel Core 2 Duo E4500 Processor (2.20-GHz, 2 MB L2 cache, 800-MHz FSB)	X	X	X
	Intel Core 2 Duo E6550 Processor (2.33-GHz, 4 MB L2 cache, 1333-MHz FSB)**	X	X	X
	Intel Core 2 Duo E6750 Processor (2.66-GHz, 4 MB L2 cache, 1333-MHz FSB)**	X	X	X
	Intel Core 2 Duo E6850 Processor (3.0-GHz, 4 MB L2 cache, 1333-MHz FSB)**	X	X	X
	Intel Core 2 Quad Processors:			
	Intel Core 2 Quad Q6600 Processor (2.40-GHz, 8 MB L2 cache, 1066-MHz FSB)		X	X
	Intel Core 2 Quad Q6700 Processor (2.66-GHz, 8 MB L2 cache, 1066-MHz FSB)		X	X

* Intel processor numbers are not a measure of performance. Processor numbers differentiate features within each processor family, not across different processor families.
** These processors are compliant with Intel vPro Processor Technology and Intel Trusted Execution Technology (TXT)

		USDT	SFF	CMT
Intel vPro Processor Technology*	Uses AMT 3.0 (Active Management Technology) for network alerting and management of systems regardless of power state or health of operating system. AMT is offered with all processor configurations sold with the dc7800. vPro enabled PCs are supported with select processors noted in the chart above and support AMT 3.0 as well as Intel Trusted Execution Technology (TXT) and Intel Virtualization Technology.	X	X	X

* vPro Processor Technology based PCs are referred to as HP Compaq dc7800p Business PCs.

Standard Features and Configurable Components

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 Q35 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 4 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.

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

***** The Intel Q35 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 SO-DIMM, 16 MB of memory is pre-allocated for it at system startup. If the PC contains two SO-DIMMs, 32 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.

Standard Features and Configurable Components

DIMM Size	Slot			
	Channel A		Channel B	
	1 (black)	**2** (white)	**3** (white)	**4** (white)
512-MB	512-MB			
1-GB	1-GB			
1-GB (dual-channel symmetric)	512-MB		512-MB	
2-GB (dual-channel symmetric)	1-GB		1-GB	
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 Q35 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, 16 MB of memory is pre-allocated for it at system startup. If the PC contains two DIMMs, 32 MB of memory is pre-allocated. This memory is no made available to the operating system, just as pre-allocated video memory is not available.

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
	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 (1 x 2GB)	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
	4-GB DDR2 Synch Dram PC2-6400 (800-MHz) Non ECC (4 x 1GB)		X	X
	4-GB DDR2 Synch Dram PC2-6400 (800-MHz) Non ECC (2 x 2GB)	X	X	X
	8-GB DDR2 Synch Dram PC2-6400 (800-MHz) Non ECC (4 x 2GB)		X	X
	512-MB DDR2 Synch Dram PC2-5300 (667-MHz) Non ECC (1 x 512)	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 (1 x 2GB)	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
	4-GB DDR2 Synch Dram PC2-5300 (667-MHz) Non ECC (4 x 1GB)		X	X
	4-GB DDR2 Synch Dram PC2-5300 (667-MHz) Non ECC (2 x 2GB)	X	X	X
	8-GB DDR2 Synch Dram PC2-5300 (667-Mhz) Non ECC (4 x 2GB)		X	X

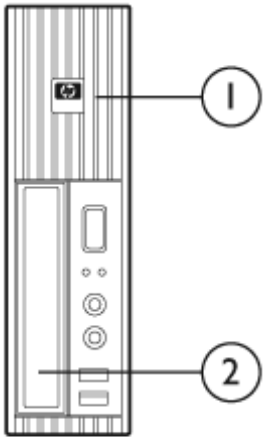
* Ultra-slim Desktop uses SODIMM modules. Small Form Factor and Convertible Minitower use DIMM modules.

Expandability	**USDT**	**SFF**	**CMT**

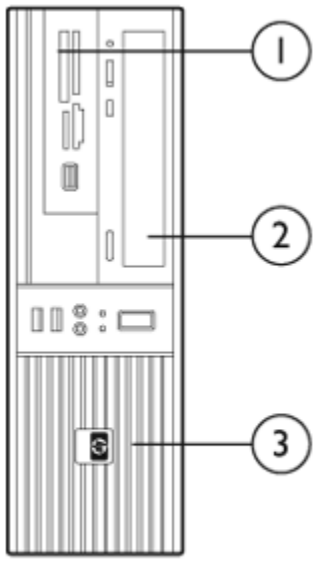
Standard Features and Configurable Components

PCI slots	N/A	1 low-profile (2.5"), length (6.6") standard; 2 full-height (4.2"), length (6.875") via optional riser card. **NOTE:** With riser card option, PCIe x1 and PCIe x16 slots are not accessible.	3 full-height (4.2"), length (13.4") standard
Max power per slot	N/A	25W	25W
PCI Express x16 slot (Also functions as SDVO/ADD2 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	25W	75W
PCI Express x1 slot	N/A	2 low profile (2.5"), length (6.6")	2 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 2.5" HDD Bays	1	0	0
Internal 3.5" HDD Bays	0	1	2
Hard Drive Controller (PCI) Supported	Serial ATA (support for SATA 1.5-Gb/s and 3.0-Gb/s hard drives)		
Hard Drive and Optical SATA Interfaces Supported	1 Serial ATA interface; 1 SATA to PATA converter	3 Serial ATA interfaces	4 Serial ATA interfaces

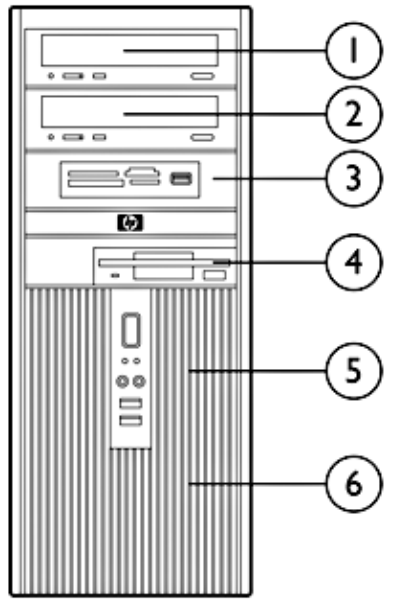
Ultra-slim Desktop



Small Form Factor



Convertible Minitower



Storage – Drive Support

Standard Features and Configurable Components

	USDT		SFF			CMT			
	Slimline Drive Bay	2.5" Serial ATA Hard Drive	Diskette Drive or Media Card Reader (optional)	Storage Drive Bay	3.5" Serial ATA Hard Drives	Diskette Drive	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	2	3
Position Supported	②	①	①	③	①, ②	④	①, ②, ③, ④	①, ②	④, ⑤, ⑥
Controller	SATA to IDE Bridge	SATA	Diskette Controller or USB header on PCA	SATA	SATA	Diskette Controller	USB header on PCA	SATA	SATA

		USDT	SFF	CMT
Hard Drives	80-GB SATA 1.5-Gb/s Hard Drive (8MB Cache, 7200 RPM, NCQ, Smart III)	X		
	80-GB SATA 1.5-Gb/s Hard Drive (8MB Cache, 5400 RPM, NCQ, Smart III)	X		
	160-GB SATA 1.5-Gb/s Hard Drive (8MB Cache, 7200 RPM, NCQ, Smart III)	X		
	80-GB SATA 3.0-Gb/s Hard Drive (8MB Cache, 7200 RPM, NCQ, Smart IV)		X	X
	160-GB SATA 3.0-Gb/s Hard Drive (8MB Cache, 7200 RPM, NCQ, Smart IV)		X	X
	250-GB SATA 3.0-Gb/s Hard Drive (8MB Cache, 7200 RPM, NCQ, Smart IV)		X	X
	500-GB SATA 3.0-Gb/s Hard Drive (16MB Cache, 7200 RPM, NCQ, Smart IV)		X	X
	80-GB SATA 3.0-Gb/s Hard Drive (16MB Cache, 10,000 RPM, NCQ, Smart III)		X	X
	160-GB SATA 3.0-Gb/s Hard Drive (16MB Cache, 10,000 RPM, NCQ, Smart III)		X	X
	3.5" Removable 80-GB SATA 3.0 Gb/s Hard Drive (8MB Cache, 7200 RPM, NCQ, Smart IV)		X	X
	3.5" Removable 160-GB SATA 3.0 Gb/s Hard Drive (8MB Cache, 7200 RPM, NCQ, Smart IV)		X	X
	3.5" Removable 250-GB SATA 3.0 Gb/s Hard Drive (8MB Cache, 7200 RPM, NCQ, Smart IV)		X	X
	RAID 80-GB SATA 3.0-Gb/s Hard Drive (8MB Cache, 7200 RPM, NCQ, Smart IV)		X	X
	RAID 160-GB SATA 3.0-Gb/s Hard Drive (8MB Cache, 7200 RPM, NCQ, Smart IV)		X	X
	RAID 250-GB SATA 3.0-Gb/s Hard Drive (8MB Cache, 7200 RPM, NCQ, Smart IV)		X	X
	2nd hard drive, 80-GB SATA 3.0-Gb/s Hard Drive (8MB Cache, 7200 RPM, NCQ, Smart IV)		X	X
	2nd hard drive, 160-GB SATA 3.0-Gb/s Hard Drive (8MB Cache, 7200 RPM, NCQ, Smart IV)		X	X
	2nd hard drive, 250-GB SATA 3.0-Gb/s Hard Drive (8MB Cache, 7200 RPM, NCQ, Smart IV)		X	X

	2nd hard drive, 500-GB SATA 3.0-Gb/s Hard Drive (16MB Cache, 7200 RPM, NCQ, Smart IV)		X	X
	2nd hard drive, 80-GB SATA 3.0-Gb/s Hard Drive (16MB Cache, 10,000 RPM, NCQ, Smart III)			X
	2nd hard drive, 160-GB SATA 3.0-Gb/s Hard Drive (16MB Cache, 10,000 RPM, NCQ, Smart III)			X
	NOTE: NCQ functionality requires a BIOS setting for RAID mode/ACHI support. This setting is the factory default for RAID configurations and requires user set-up in all non-RAID or single drive configurations.			
Removable Storage – One or more of the following depending on form factor (see Storage – Drive Support section above)	**Diskette Drives**	**USDT**	**SFF**	**CMT**
	1.44-MB Diskette Drive		X	X
	Optical Drives			
	SATA DVD-ROM Drive[1]		X	X
	SATA CD-RW/DVD-ROM Combo Drive[1,2]		X	X
	SATA SuperMulti LightScribe DVD Writer Drive[1,2,3]		X	X
	Slimline Optical Drives			
	PATA DVD-ROM Slim Drive[1]	X		
	PATA CD-RW/DVD-ROM Combo Slim Drive[1,2]	X		
	PATA Slim SuperMulti LightScribe DVD Writer[1,2,3]	X		
	[1] For playing DVDs, InterVideo WinDVD 5 [2] For writing CDs, choice of Sonic/Roxio DigitalMedia Plus 7.2 (Windows XP only) or Easy Media Creator 9 (Windows Vista and Windows XP) [3] For writing CDs and DVDs, video editing and authoring DVDs, choice of Sonic/Roxio DigitalMedia Plus 7.2 (Windows XP only) or Easy Media Creator 9 (Windows Vista and Windows XP)			
Media Card Reader – One of the following	HP 16-in-1 3.5" Media Card Reader		X	X
	HP 16-in-1 5.25" Media Card Reader		X	X
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		
	* TPM module disabled where use is restricted by law; for example, Russia.			
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	

Standard Features and Configurable Components

Wireless	Wireless A+G PCI Card (full height bracket)		X*	X
	Wireless A+G PCI Card (low profile bracket)		X	
	Mini PCIe wireless	X		
	* Requires optional PCI riser card.			
Modem	Agere 2006 PCI 56K International SoftModem (full height)			X
	Agere 2006 PCI 56K International SoftModem (low profile)		X	
Graphics	Integrated Intel Graphics Media Accelerator 3100	X	X	X
	Integrated DVI-D	X		
	HP ADD2 SDVO PCIe DVI-D adapter		X	X
	ATI Radeon X1600XT 256MB dual head graphics adapter (PCIe x16)			X
	NVIDIA GF 8400 GS 256MB single head graphics adapter (PCIe x16)*		X	X
	NVIDIA GF 8400 GS 256MB dual head graphics adapter (PCIe x1)**		X	X
	NVIDIA Quadro NVS 290 256MB dual head PCIe x16 Graphics Card		X	X
	* 1GB of system memory required. Graphics cards use part of the total system memory to enhance graphics performance. ** 2 NVIDIA GF 8400 GS 256MB dual head (PCIe x1) graphics cards can be combined to provide support for multiple combinations of monitors.			
Audio	Integrated High Definition audio with ADI1884 codec (all ports are stereo)	X	X	X
	Microphone and Headphone front ports	X	X	X
	Line-out and Line-In rear ports*	X	X	X
	Multistreaming capable*	X	X	X
	Internal Speaker	X	X	X
	* Rear audio input ports are re-taskable as Line-in or Microphone-in. External speakers must be powered externally. Multistreaming can be enabled in the ADI 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	**Keyboard** – 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
	Mouse – One of the following			
	HP PS/2 2-Button Optical Scroll Mouse	X	X	X
	HP USB 2-Button Optical Scroll Mouse	X	X	X

Standard Features and Configurable Components

Miscellaneous	HP FireWire / IEEE 1394 PCI Card (full height)		X*	X
	HP FireWire / IEEE 1394 PCI Card (low profile)		X	
	PCI riser card – adds 2 full-height PCI slots **NOTE:** Low profile slots are unusable with riser card installed.		X	
	2nd serial port adapter (full height)			X
	2nd serial port adapter (low profile)		X	
	Tower stand	X	X	
	Configure dc7800 CMT in desktop orientation			X
	Rear Port Control Cover	X		
	1-GB Flash Module for ReadyBoost	X	X	X
	*Requires optional PCI riser card.			

After-Market Options (availability may vary by region)

		USDT	SFF	CMT	After-Market Options Part Number
Communications	**Wireless**				
	HP Wireless A+G PCI Card (North America only)		X	X	EA118AA
	HP Wireless A+G PCI Card (WW except North America)		X	X	PZ928AA
	HP BT450 USB Bluetooth Wireless Printer and PC Adapter	X	X	X	Q6398A
	NICs				
	Broadcom NetXtreme Gigabit Ethernet PCIe NIC Card		X	X	EA833AA
	Intel/PRO 1000 PT PCIe Gigabit NIC Card		X	X	EH352AA
	Modem				
	Agere 2006 PCI 56K International SoftModem		X	X	EK694AA
Graphics	**Single head solutions**				
	HP ADD2 SDVO DVI-D Adapter		X	X	DY674A
	NVIDIA GeForce 8400 GS 256MB SH PCIe x16 Graphics Card*		X	X	GJ119AA
	Multi head solutions				
	NVIDIA GeForce 8400 GS 256MB DH PCIe x1 Graphics Card		X	X	GJ120AA
	NVIDIA Quadro NVS 290 256MB DH PCIe x16 Graphics Card		X	X	KG748AA
	HP DMS59 DVI Dual-head Connector Cable		X	X	DL139A
	* 1GB of system memory required. Graphics cards use part of the total system memory to enhance graphics performance.				
Hard Drives	**Serial ATA Hard Drives**				
	HP 80-GB SATA (NCQ/Smart IV) 3.0-Gb/s Hard Drive		X	X	PY276AA
	HP 160-GB SATA (NCQ/Smart IV) 3.0-Gb/s Hard Drive		X	X	PY277AA
	HP 250-GB SATA (NCQ/Smart IV) 3.0-Gb/s Hard Drive		X	X	PY278AA
	HP 500-GB SATA (NCQ/Smart IV) 3.0-Gb/s Hard Drive		X	X	PV943A
	HP Removable SATA Hard Drive Enclosure (Frame & Carrier)		X	X	RY102AA
	HP Removable SATA Hard Drive Enclosure (Carrier Only)		X	X	RY103AA
Input/Output Devices	**Keyboards**				
	HP PS/2 Standard Keyboard	X	X	X	DT527A
	HP USB Standard Keyboard	X	X	X	DT528A
	HP USB Gray Keyboard	X	X	X	DT529A
	Pointing Devices				
	HP PS/2 2-Button Optical Scroll Mouse	X	X	X	EY703AA
	HP USB 2-Button Optical Scroll Mouse	X	X	X	DC172B

After-Market Options (availability may vary by region)

Memory (DIMMs)	**PC2-5300 (DDR2, 667 MHz) DIMMs Non-ECC**				
	HP 2-GB PC2-5300 (DDR2-667) DIMM		X	X	PX977AA
	HP 1-GB PC2-5300 (DDR2-667) DIMM		X	X	PX976AA
	HP 512-MB PC2-5300 (DDR2-667) DIMM		X	X	PX975AA
	PC2-5300 (DDR2, 667 MHz) SODIMMs Non-ECC				
	HP 2-GB PC2-5300 (DDR2-667) SODIMM	X			GM252AA
	HP 1-GB PC2-5300 (DDR2-667) SODIMM	X			GK995AA
	HP 512-MB PC2-5300 (DDR2-667) SODIMM	X			GK994AA
	PC2-6400 (DDR2, 800 MHz) DIMMs Non-ECC				
	HP 1-GB PC2-6400 (DDR2 800 MHz) DIMM		X	X	AH058AA
	HP 512-MB PC2-6400 (DDR2 800 MHz) DIMM		X	X	AH056AA
	PC2-6400 (DDR2, 800 MHz) SODIMMs Non-ECC				
	HP 1-GB PC2-6400 (DDR2 800 MHz) SODIMM	X			GM254AA
	HP 512-MB PC2-6400 (DDR2 800 MHz) SODIMM	X			GM253AA
Monitors	**TFTs**				
	HP L1506 15 TFT Flat Panel Monitor – Analog only	X	X	X	PX848AA#ABA
	HP L1706 17 TFT Flat Panel Monitor – Analog only	X	X	X	PX849AA#ABA
	HP L1740 17 LCD Flat Panel Display – Analog/Digital	X	X	X	PL766AA#ABA
	HP L1745 17 TFT Flat Panel Display – Analog/Digital	X	X	X	GE178AA#ABA
	HP L1906 19 TFT Flat Panel Display – Analog only	X	X	X	PX850AA#ABA
	HP L1940T 19 TFT Flat Panel Display – Analog/Digital	X	X	X	EM869AA#ABA
	HP LP1965 19 TFT Flat Panel Display – Analog/Digital	X	X	X	RA373AA#ABA
	HP L2045w TFT Flat Panel Display – Analog/Digital	X	X	X	RD125AA#ABA
	HP L2065 20 TFT Flat Panel Display – Analog/Digital	X	X	X	EF227A4#ABA
	HP LP2465 24 TFT Widescreen Flat Panel Display – Analog/Digital	X	X	X	EF224A4#ABA
	HP LP3045 30 TFT Flat Planel Display – Digital	X	X	X	EZ320A8#ABA
	HP w19 Wide LCD Display – Analog/Digital	X	X	X	EM885AA#ABA
	CRTs				
	HP s7540 17 (16.0 vis) CRT Monitor	X	X	X	PF997AA#ABA
Multimedia	HP USB Powered Speakers	X	X	X	RD628AA
PATA Slim Optical Drives	**DVD-ROM Drive**				
	HP PATA DVD-ROM Slim Drive	X			AH041AA
	Combo Drive				
	HP PATA CD-RW/DVD-ROM Combo Slim Drive	X			AH042AA
	DVD Writer				
	HP PATA Slim SuperMulti LightScribe DVD Writer Drive	X			AH043AA

After-Market Options (availability may vary by region)

SATA Half-Height Optical Drives	**DVD-ROM Drive**				
	HP SATA DVD-ROM Drive		X	X	AH047AA
	Combo Drive				
	HP SATA CD-RW/DVD-ROM Combo Drive		X	X	AH046AA
	DVD Writer				
	HP SATA SuperMulti LightScribe DVD Writer Drive		X	X	GF343AA
Removable Storage	**Diskette and Digital Drives**				
	HP 1.44-MB External USB Diskette Drive	X	X	X	DC141B
	HP 1.44-MB Internal Diskette Drive		X	X	AH053AA
	Multimedia				
	HP 16-in-1 Media Card Reader with PCI Card		X	X	EM718AA
Security	Kensington Lock	X	X	X	PC766A
	HP Business PC Security Lock	X	X	X	PV606AA
	HP USB Biometric Fingerprint Reader	X	X	X	EM717AA
	HP (dc7800 SFF) Solenoid Lock/Hood Sensor		X		GJ116AA
	HP (CMT) Solenoid Lock/Hood Sensor			X	DE618A
	HP (dc7800 USDT) Rear Port Controller Cover	X			GJ121AA
	HP USB Smartcard Keyboard	X	X	X	ED707AA
Software	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)
Brackets/Stands	HP Compaq dc7800 Series Integrated Work Center Stand	X			GN783AA
	HP (dc7800 USDT) Tower Stand	X			GJ117AA
	HP 2007 SFF Tower Stand		X		GJ118AA
Miscellaneous Accessories	HP 2nd Serial Port		X	X	PA716A
	HP (50 Pk) 5.25" Blank Bezel Kit		X	X	DC177B
	HP (dc7800 SFF) PCI Riser Card		X		GJ115AA
	HP FireWire / IEEE 1394 PCI Card		X	X	PA997A

Unit Environment and Operating Conditions	Ultra-slim Desktop	Small Form Factor	Convertible Minitower
General Unit Operating Guidelines • Keep the computer away from excessive moisture, direct moisture and the extremes of heat and cold, to ensure that unit is operated within the specified operating range. • Leave a 10.2 cm (4 in) clearance on all vented sides of the computer to permit the required airflow. • Never restrict airflow into the computer by blocking any vents or air intakes. • Do not stack computers on top of each other or place computers so near each other that they are subject to each other's re-circulated or preheated air. • Occasionally clean the air vents on the front, back, and any other vented side of the computer. Lint, dust and other foreign matter can block the vents and limit the airflow. • If the computer is to be operated within a separate enclosure, intake and exhaust ventilation must be provided on the enclosure, and the same operating guidelines listed above will still apply.			
Temperature Range	Operating: 50° to 95° F (10° to 35° C)* Non-operating: -22° to 140° F(-30° to 60° C)		
Relative Humidity	Operating: 10% to 90% (non-condensing at ambient) Non-operating: 5% to 95% (non-condensing at ambient)		
Maximum Altitude (unpressurized)	Operating: 10,000 ft (3048 m) Non-operating: 30,000 ft (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	135 watt External 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	N/A	4A	6A
Rated Input Current with 80% Efficient* Power Supply	1.5A	3.5A	5A
Current Leakage (NFPA 99)	< 275 µA	< 275 µA	< 450 µA
System Heat Dissipation	N/A	Typical 198 btu/hr (50 kg-cal/hr) Maximum 1260 btu/hr (318 kg-cal/hr	Typical 222 btu/hr (56 kg-cal/hr) Maximum 1916 btu/hr (483 kg-cal/hr)
System Heat Dissipation with 80% Efficient* Power Supply	Typical 133 btu/hr (33.5 kg-cal/hr) Maximum 549 btu/hr (132 kg-cal/hr)	Typical 150 btu/hr (38 kg-cal/hr) Maximum 1024 btu/hr (258 kg-cal/hr)	Typical 171 btu/hr (43 kg-cal/hr) Maximum 1557 btu/hr (392 kg-cal/hr)
Power Supply Fan	N/A	80mm variable speed	92mm variable speed
ENERGY STAR Compliant with 80% Efficient* 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)	< 2.7W	< 2.7W	< 2.7W
Environmental and Mechanical Engineering Support Center (EMESC) – Intranet Web Site only	http://env-webserver.ccm.cpqcorp.net/EMESC/default.htm		

* 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 dc7800 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 3.0 (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.
- Computrace agent – For tracking and tracing services, available in select countries, separate software and purchase of a subscription is required.
- Thermal and power management – The HP BIOS provides and enables thermal and power management technologies so component temperatures are managed for high reliability and to assist in operating the HP Business Desktop computer in any enterprise environment.
- Acoustic performance – Industry leading acoustic emissions across the range of operating conditions.
- 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 (Flashbin), 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 dc7800 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). • Allows the system to wake from a low power mode. • 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.
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	
• System/Emergency ROM	• Flash ROM	• CMOS Battery Holder for easy Replacement
• Flash Recovery with Video Configuration Record SW	• 5 Aux Power LED on System PCA	• Processor ZIF Socket for easy Upgrade
• Over-Temp Warning on Screen (Requires IM Agents)	• Clear Password Jumper	• DIMM Connectors for easy Upgrade
• HP Backup and Recovery Manager	• Clear CMOS Button	• NIC LEDs (integrated) (Green & Amber)

Serviceability Features of Chassis		
• Dual Color Power and HD LED – To Indicate Normal Operations and Fault Conditions	• Color coordinated cables and connectors	• Tool-less Hood Removal
• Front power switch	• System memory can be upgraded without removing the system board or any internal components	• Tool-less Hard Drive, CD & Diskette Removal
• Green Pull Tabs, and Quick Release Latches for easy Identification		
NOTE: Thumb screw release mechanism is used with the Ultra-slim Desktop chassis cover.		

Additional Features	Description
AMT 3.0 support (Active Management Technology)	Select models offer new Intel vPro Technology utilizing AMT 3.0 for network alerting and management of systems regardless of power state, as well as operating system-absent environments. Supports existing AMT 2.1 features plus: • Remote Configuration (RCFG) – Uses root certificate hashes for simpler deployment (existing PSK method remains supported) • 802.1x – compatibility with Cisco NAC • WS-Management – Web Services for Management interface

	Network Heuristics – built-in basic capabilities to filter inbound and outbound network traffic. Backwards compatible with earlier management consoles
DASH 1.0 support (Desktop and mobile Architecture for System Hardware)	A standards initiative for representing out-of-band management capability for computer systems. It is a secure, web-services based successor to ASF.
ASF 2.0 support (Alert Standard Format)	Industry-standard specification for network alerting in operating system-absent environments
TXT (Trusted Execution Technology) and VT-d (Virtualized devices)	• TXT allows for secure management (via TPM) and measured launch of VMM, as well as teardown of secrets in unexpected reset case. TXT support provided in select Intel processors. • VT-d is a chipset technology that virtualizes directed I/O Together, TXT and VT-d may be used to support verified launch of a known trusted VMM that also may protect VMs from accessing each other's memory.
Virtual Appliance support	Tested support for Virtual Appliance (VA) 2.6 ISV applications. Hardware ready for future VA 3.0 ISV applications (with VT-d and TXT support)
Computrace	Computrace agent support standard
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)*	• Drive Protection System • 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. • 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. • 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.
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 • Predicts failures before they occur. Tracks fault prediction and failure indication parameters such as re-allocated sector count, spin retry count, calibration retry count • By avoiding actual hard drive failures, SMART hard drives act as "insurance" against unplanned user downtime and potential data loss from hard drive failure • IOEDC: I/O Error Detection Circuitry • Detects errors in Read/Write buffers on HDD cache RAM • Interface in F10 setup for dc7800 CMT and SFF platforms provides confirmation of SMART IV support.
SMART I – Drive Failure Prediction	
SMART II – Off-Line Data Collection	
SMART III – Off-Line Read Scanning with Defect Reallocation	
SMART IV – End-to-End CRC for hard drives	
* This feature is inoperable when a RAID (Redundant Array of Independent Disks) configuration is enabled.	

High Definition Audio	**Type**	Integrated
	High Definition Stereo Codec	Yes – ADI 4-channel ADI 1884 codec
	Audio Jacks	Front microphone-In (150-K ohm Input Impedance) Rear Line-In/Microphone input (150-K ohm Input Impedance, function is configurable by audio driver) Rear Line-Out * (190 ohms Output Impedance, expects at least a 10-K ohm load) Front Headphone-Out (0.5 Ohm Output Impedance, expects at least a 32 ohm load)
	* Internal Speaker Amplifier is for Internal Speaker only. External Speakers need to be powered externally. Rear Line in audio port is re-taskable as Line-in or Microphone-in.	
	Multistreaming Capable	Multistreaming can be enabled in the ADI 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

Integrated Intel 82566DM Gigabit Network Connection	**Connector**	RJ-45	
	Controller	Intel Nineveh Gigabit platform LAN Connect Networking Controller	
	Memory	Integrated 96KbB on chip buffer memory	
	Data rates supported	10/100/1000 Mbps	
	Compliance	IEEE 802.1P, 802.1Q, 802.2, 802.3, 802.3 ab and 802.3u compliant,	
	Bus architecture	GLCI, LCI interface. Intel specific MAC to PHY interface	
	Data transfer mode	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.	
	Hardware certifications	FCC, B, CE, TUV- cTUVus Mark Canada and United States, TUV- GS Mark for European Union	
	Power requirement	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	
	ACBS	Intel Auto Connect Battery Saving feature	
	Boot ROM support	Yes	
	Network transfer mode	Full-duplex	
		Half-duplex (not available for the 1000BASE-T transceiver)	
	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	
	Environmental	**Operating temperature**	32° to 131°F (0° to 55° C) To 70° C for external regulator
		Operating humidity	85% at 131° F (55° C)
	Management capabilities	WOL, auto MDI crossover, PXE, Muti-port teaming, RSS, Advanced cable diagnostic.	
	Alerting	ASF 2.0 support, AMT 3.0 support	

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.

Broadcom NetXtreme Gigabit Ethernet PCIe NIC Card	**Connector**	RJ-45	
	Controller	Broadcom 5751 PCI-Express LAN Controller	
	Memory	Integrated 96Kb frame buffer memory	
	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	
	Data path width	Single channel, PCI-E	
	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	3.1 watts @ +3.3V AUX supply with 5V tolerance	
	Boot ROM support	Yes	
	Network transfer mode	Full-duplex	
		Half-duplex (not available for the 1000BASE-T transceiver)	
	Network transfer rate	10BASE-T (half-duplex) 10 Mbps	
		10BASE-T (full-duplex) 20 Mbps	
		100BASE-TX (half-duplex) 100 Mbps	
		100BASE-TX (full-duplex) 200 Mbps	
		1000BASE-T (full-duplex) 2000 Mbps (actual rate limited by PCI Bus)	
	Environmental	**Operating temperature**	32° to 131°F (0° to 55° C)
		Operating humidity	85% at 131° F (55° C)
	Dimensions	4.4 x 2.2 x 0.08 in (11.2 x 5.5 x 2 cm)	
	Management capabilities	ACPI, WOL and DMI 2.0, PXE 2.0, WfM 2.0, Broadcom mgmt utility	
	Alerting	ASF 2.0	

HP Wireless A+G PCI	**Dimensions**	4.99 x 2.54 x 0.71 in (126.8 x 64.4 x 18.0 mm)
	Weight	0.268 lb (65 g)
	Controller system interface	Atheros AR5414X chipset PCI Spec 2.2
	Network standard	IEEE 802.11a/b/g
	Frequency band	5.1500 to 5.8500 GHz
		2.4000 to 2.4835 GHz
		2.4465 to 2.4835 GHz (Europe, Middle East, Asia and Asia Pacific - excluding Japan)
		2.4000 to 2.4697 GHz (Japan)
	Operating temperature	32° to 140° F (0° to 60° C), operating
	Storage temperature	-4° to 176° F (-20° to 80° C), non-operating
	Humidity	10% to 85% non-condensing
	Operating voltage	5V ± 5%
	Power consumption	Tx/Rx peak 560/250mA @ 3.3V (max.)

Output power (approximately)	15 dBM ±2dB	
Receive sensitivity	-90dBm at 11 Mbps (typical)	
Data transfer rate	Standard rates of 1, 2, 5.5, 11, 6, 9, 12, 18, 24, 48, 54 and Super AG Mode108-Mbps	
Spreading	DSSS (Direct Sequence Spread Spectrum)	
Security	64(40h) bit, 128(104h) bit, WPA, IEEE802.1X, AES-OCB, AES-CCM, Microsoft PEAP,TKIP, WEP.	
Antenna	External 5dBi antenna	
Throughput	108 Mbps (only with Belkin 54G or above router that supports 108 Mbps speed)	200 ft (60.96 m) – Indoor
	54 Mbps	200 ft (60.96 m) – Indoor
	11 Mbps	200 ft (60.96 m) – Indoor
Certifications	Wi-Fi certified	
Certifications for use by country	North America: United States, Canada	
	Europe: Austria, Belgium, Cyprus, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Liechtenstein, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom Australia	
	New Zealand	

Agere 2006 PCI 56K International SoftModem

Data Transmission	Technology speeds: 56,000 Kbps maximum downstream data, controllerless

NOTE: 56 Kbps technology refers to download speeds only and requires compatible modems at server sites. Other conditions may limit modem speed. FCC limitations allow a maximum of 53 Kbps during download transmissions.

Data Speeds	(Upload only) 33,600/31,200/28,800/26,400/21,600/19,200/16,800/14,400/12,000/ 9,600/7,200/4,800/2,400/1,200/300
Data Standards	ITU-T V.90, ITU-T, ITU-T V.34, V.44, V.42, V.42bis21, V.32bis, Bell 212A, and Bell 103
Fax Speeds	14,400/12,000/9,600/7,200/4,800/2,400/1,200/300 b/s
Fax Mode Capabilities	ITU-T T.31 class 1 FAX, V. 17, V.29, V.27ter, and V.21 Channel 2
Error Correction and Data Compression	V.44, 42bis, V.42 and MNP2-5
Power Management	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
Other	TIA/EIA 602 standard AT command set
	Integrated DTE interface with speeds of up to 115.2 Kbps, parallel 16550a UART-compatible interface
	Optional ring wakeup signal
Operating Temperature	32° to 158° F (0° to 70° C)
Operating Humidity	20% to 90%, non-condensing
Power	Requires a 3.3-V auxiliary power rail on PCI bus
	Uses only one PCI load (i.e., one grant/request pair), one shared IRQ, one electrical load

Technical Specifications - Communications

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

Integrated Graphics Media Accelerator 3100	**3D/2D Controller**	Microsoft DirectX® 9 based with support for Pixel Shader 2.0, 4:1 anisotropic filtering, Gaussian texture filtering, shadow maps, volumetric textures, double-sided stencil buffers, and 4 pixel pipes.
	VGA Controller	Integrated
	Bus Type	PCI Express™ x16 (If an external graphics card is installed in a PCI or PCIe x1 slot, the internal graphics can be enabled or disabled using the system's BIOS setup utility. If a graphics card other than an SDVO/ADD2 card is installed in the PCI Express™ x16 slot, the internal graphics cannot be enabled).
	RAMDAC	Integrated, 350 MHz (2048x1536@75 Hz)
	Memory	Graphics memory is shared with system memory. Graphics memory usage varies depending on the amount of system memory installed and system load. 8 MB is pre-allocated for graphics use at system boot time Additional memory is allocated for graphics as needed using Intel's Dynamic Video Memory Technology (DVMT), to provide an optimal balance between graphics and system memory use. **System memory equal or greater than 512 MB** 8 MB pre-allocated + 248 MB DVMT = max frame buffer of 256 MB
	Overlay Planes	Single overlay support with 5x3 filtering
	Maximum Color Depth	32 bits/pixel
	Maximum Vertical Refresh Rate	85 Hz at up to 1920x1440, 75 Hz at 2048x1536. Varies with mode and configuration. See table below.
	Multi-display Support	Support for one CRT via the motherboard's VGA connector on SFF and CMT. USDT includes support for an additional DVI-D display. Support for an additional display on SFF/CMT can be accomplished with the addition of SDVO/ADD2 option installed in PCIe x16 slot.
	Graphics/Video API Support	Microsoft DirectX®9, DirectXVA®, VMR9, GDI/GDI+; OpenGL® 1.4.

Resolutions Supported[1]

	Maximum Refresh Rate (Hz)	
Resolution	**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	N/A
2048 x 1536	75	N/A

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

Technical Specifications - Graphics

DVI ADD2 Graphics

Models	HP ADD2 SDVO DVI-D Out Adapter
Form Factor	Low-profile card
DVI-D Connector	Digital connection only
Dual Head Support	Yes, when used with the integrated VGA connector
Display Devices Supported	HP L1740 HP L1940T HP L2045W HP LP1965

NOTE: These graphics adapters offer optimal performance with any display that meets applicable VESA standards.

Color Depth	All modes support 8-bpp, 16-bpp, and 24-bpp color depths
Host Interface Connector	Mechanically compliant with PCI-E standard Complies with the Intel ADD2 and Intel Serial Digital Video Output (SDVO) specifications
Dot Clock	165 MHz maximum
Display Modes	Supports display modes that require up to 165-MHz bandwidth on the link, as shown in the following table.

Resolution		60-Hz LCD	60-Hz	75-Hz	85-Hz
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

NVIDIA GeForce 8400 GS (256 MB SH) PCIe x16 Graphics Controller

Bus type	PCI Express (x16 lanes)
Maximum vertical refresh rate	85 Hz
Display support	Integrated 400 MHz RAMDAC
Display max resolution	2048 x 1536 (analog), 2560 x 1600 (digital)
Input/Output connectors	DVI-I (DVI port supports dual-link and HDCP) TV-out (4 pin S-video)
Board display options	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

Board configuration	**Specification**	**Description**
	Graphics Chip	NVIDIA GeForce 8400 GS
	Core clock	460 MHz
	Memory clock	200 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)

NVIDIA GeForce 8400 GS (256 MB SH) PCIe x16 Graphics Controller display resolutions and refresh rates

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

Analog Resolution	Maximum Refresh Rate
640 x 480	85 Hz
800 x 600	85 Hz
1024 x 768	85 Hz
1280 x 1024	85 Hz
1600 x 1200	85 Hz
1920 x 1080	85 Hz
1920 x 1200	85 Hz
1920 x 1440	85 Hz
2048 x 1536	85 Hz
Digital Resolution	**Maximum Refresh Rate**
640 x 480	60 Hz
800 x 600	60 Hz
1024 x 768	60 Hz
1280 x 1024	60 Hz
1600 x 1200	60 Hz
1920 x 1200*	60 Hz
1920 x 1440**	60 Hz
2560 x 1600**	60 Hz

* Reduced blanking timings used when connected to a single-link DVI monitor
** Requires a dual-link DVI capable monitor

NVIDIA GeForce 8400 GS (256 MB DH) PCIe x1 Graphics Controller	**Bus type**	PCIe x1	
	Maximum vertical refresh rate	85 Hz	
	Display support	Integrated 400 MHz RAMDAC	
	Display max resolution	2048 x 1536 (analog), 2560 x 1600 (digital)	
	Input/Output connectors	DMS59 (DMS-59 port supports Dual VGA or Dual DVII connections) TV-out (4 pin S-video)	
	Board display options	DMS59 + TV DMS59 supports either 2 VGA displays with the included cable or 2 DVII displays with optional HP DMS59 DVI Dual-head Connector Cable kit #DL139A TV connector is a 4-pin mini-DIN S-video connector	
	Board configuration	**Specification**	**Description**
		Graphics Chip	NVIDIA GeForce 8400 GS
		Core clock	460 MHz
		Memory clock	200 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)	

Technical Specifications - Graphics

NVIDIA GeForce 8400 GS (256 MB DH) PCIe x1 Graphics Controller display resolutions and refresh rates

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

Analog Resolution	Maximum Refresh Rate
640 x 480	85 Hz
800 x 600	85 Hz
1024 x 768	85 Hz
1280 x 1024	85 Hz
1600 x 1200	85 Hz
1920 x 1080	85 Hz
1920 x 1200	85 Hz
1920 x 1440	85 Hz
2048 x 1536	85 Hz
Digital Resolution	**Maximum Refresh Rate**
640 x 480	85 Hz
800 x 600	85 Hz
1024 x 768	85 Hz
1280 x 1024	85 Hz
1600 x 1200	85 Hz
1920 x 1200*	85 Hz

* Reduced blanking timings used when connected to a single-link DVI monitor

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	**Specification**	**Description**
		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)	

Technical Specifications - Graphics

NVIDIA Quadro NVS 290 256MB PCIe Dual Head	**Form Factor**	Low Profile
	Bus Type	PCIe x16
	Memory	256 MB 400MHz DDR2 SDRAM unified frame buffer, Z-buffer and Texture storage
	Connector	DMS-59, includes DMS-59 to Dual DVI-I cable. DMS-59 to Dual VGA cable available as an option.
	Display resolution support	Dual integrated analog display controllers supporting up to two analog displays at 2048x1536 @ 85Hz on both displays or dual digital displays at 1920x1200 (single-link). NVIEW advanced multi-display desktop and application management seamlessly integrated into Microsoft Windows
	RAMDAC	Integrated dual 400MHz
	Color planes	32-bit color buffer
	Overlay planes	Hardware supported
	nView architecture	Advanced multi-display desktop & application management seamlessly integrated into Microsoft Windows.
	Multi-Monitor support	Dual monitor support
	DVI support	DMS-59 (to dual DVI-SL)
	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 5-tap horizontal by 3-tap vertical filtering 8:1 up/down scaling
	Supported graphics APIs	OGL 2.1 & DX10 Support; Shader Model 4.0

7200 RPM Serial ATA Hard Drives	**500-GB**	**Capacity**	500,107,862,016 bytes	
		Height	1 in (2.54 cm)	
		Width	Media diameter: 3.5 in (8.89 cm) Physical size: 4 in (10.2 cm)	
		Interface	Serial ATA (3.0 Gb/s)	
		Synchronous Transfer Rate (Maximum)	Up to 3 Gb/s	
		Buffer	16 MB	
		Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	2.0 ms
			Average	11 ms
			Full-Stroke	21 ms
		Rotational Speed	7,200 RPM	
		Logical Blocks	976,773,168	
		Operating Temperature	41° to 131° F (5° to 55° C)	
	250-GB	**Capacity**	250,059,350,016 bytes	
		Height	1 in (2.54 cm)	
		Width	Media diameter: 3.5 in (8.89 cm) Physical size: 4 in (10.2 cm)	
		Interface	Serial ATA (3.0 Gb/s)	
		Synchronous Transfer Rate (Maximum)	Up to 3 Gb/s	
		Buffer	8 MB	
		Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	1.0 ms
			Average	8.5 ms
			Full-Stroke	18 ms
		Rotational Speed	7,200 RPM	
		Logical Blocks	488,397,168	
		Operating Temperature	41° to 131° F (5° to 55° C)	
	160-GB	**Capacity**	160,041,885,696 bytes	
		Height	1 in (2.54 cm)	
		Width	Media diameter: 3.5 in (8.89 cm) Physical size: 4 in (10.2 cm)	
		Interface	Serial ATA (3.0 Gb/s)	
		Synchronous Transfer Rate (Maximum)	Up to 3 Gb/s	
		Buffer	8 MB	
		Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	0.9 ms
			Average	9.3 ms
			Full-Stroke	18 ms
		Rotational Speed	7,200 RPM	
		Logical Blocks	312,581,808	
		Operating Temperature	41° to 131° F (5° to 55° C)	
	80-GB	**Capacity**	80,026,361,856 bytes	
		Height	1 in (2.54 cm)	
		Width	Media diameter: 3.5 in (8.89 cm) Physical size: 4 in (10.2 cm)	

	Interface	Serial ATA (3.0 Gb/s)	
	Synchronous Transfer Rate (Maximum)	Up to 3 Gb/s	
	Buffer	8 MB	
	Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	2.0 ms
		Average	9.3 ms
		Full-Stroke	21 ms
	Rotational Speed	7,200 RPM	
	Logical Blocks	156,301,488	
	Operating Temperature	41° to 131° F (5° to 55° C)	
10,000 RPM Serial ATA Hard Drives	**160-GB**		
	Capacity	160,041,885,696 bytes	
	Height	1 in (2.54 cm)	
	Width	Media diameter: 3.0 in (7.62 cm) Physical size: 4 in (10.2 cm)	
	Interface	Serial ATA (1.5 Gb/s), Native Command Queuing enabled	
	Synchronous Transfer Rate (Maximum)	Up to 1.5 Gb/s	
	Cache	16 Mbytes	
	Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	0.3 ms
		Average	4.6 ms
		Full-Stroke	10.2 ms
	Rotational Speed	10,000 RPM	
	Logical Blocks	312,581,808	
	Operating Temperature	41° to 131° F (5° to 55° C)	
	80-GB		
	Capacity	80,026,361,856 bytes	
	Height	1 in (2.54 cm)	
	Width	Media diameter: 3.0 in (7.62 cm) Physical size: 4 in (10.2 cm)	
	Interface	Serial ATA (1.5 Gb/s), Native Command Queuing enabled	
	Synchronous Transfer Rate (Maximum)	Up to 1.5 Gb/s	
	Cache	16 Mbytes	
	Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	0.3 ms
		Average	4.6 ms
		Full-Stroke	10.2 ms
	Rotational Speed	10,000 RPM	
	Logical Blocks	156,301,488	
	Operating Temperature	41° to 131° F (5° to 55° C)	

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

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
		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
	Electrical	**Operating voltage**	+ 5VDC ± 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	
	Microsoft PC 99 – 2001	Functionally compliant	
Mechanical	**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	
	Cable length	6 ft (1.8 m)	
	Microsoft PC 99 - 2001	Mechanically compliant	
	Acoustics	43-dBA maximum sound pressure level	
Environmental	**Operating temperature**	50° to 122° F (10° to 50° C)	
	Non-operating temperature	-22° to 140° F (-30° to 60° C)	
	Operating humidity	10% to 90% (non-condensing at ambient)	
	Non-operating humidity	20% to 80% (non-condensing at ambient)	
	Operating shock	40 g, six surfaces	
	Non-operating shock	80 g, six surfaces	
	Operating vibration	2-g peak acceleration	
	Non-operating vibration	4-g peak acceleration	
	Drop (out of box)	26 in (66 cm) on carpet, six-drop sequence	
	Drop (in box)	42 in (107 cm) on concrete, 16-drop sequence	
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	
	Power consumption	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)	
	Communication	**From card**	Programmable from 9,600 baud to 115,200 baud
		From computer	Up to 38,400 baud
	Landing mechanism	**Contact device**	Friction contact
		Card insertions rating	Up to 100,000 insertion cycles

	Interface modes	USB communications through USB port SCM protocol Automatic card insertion/removal detection	
	Reader performance interface	USB connection	
	Electro-magnetic standards	**Europe**	89/336/CEE guideline
		USA	USAFCC part 15

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

HP PS/2 Optical Scroll Mouse	**Dimensions** (H x L x W)		3.95 x 6.21 x 11.7 cm (1.56 x 2.44 x 4.61 in)
	Weight		4.44 oz (126 g)
	Environmental	**Operating temperature**	-32° to 104°F (0° to 40° C)
		Non-operating temperature	-4° to 140°F (-20° to 60° C)
		Operating humidity	10% to 90% (non condensing at ambient)
		Non-operating humidity	10% to 90% non condensing
		Operating shock	40 g, 6 surfaces
		Non-operating shock	80 g, 6 surfaces
		Operating vibration	2 g peak acceleration
		Non-operating vibration	4 g peak acceleration
		Drop (out of box)	80 cm height onto asphalt tile over concrete or equivalent, 5-drop in 5 direction except the cable face
	Electrical	**Operating voltage**	5 VDC ± 10%
		Power consumption	100mA
		System consumption	PS/2 mini-din connector
		ESD	CE level 4, 15 kV air discharge
		EMI-RFI	Conforms to FCC rules for a Class B computing device
		Microsoft PC99 – 2001	Functionally compliant
	Mechanical	**Resolution**	400 ± 20% DPI
		Tracking speed	10 in/s (25.4 cm/s) maximum
		Acceleration	100 in/s/s (2.54 m/s/s)
		Switch actuation	61 g nominal peak force
		Switch life	3,000,000 operations (using Hasco modified tester)
		Switch type	Low force micro-switches
		Tracking mechanism life	155 mi (250 km) at average speed of 10 in/s
		Cable length	6 ft (1.8 m)
		Microsoft PC99 – 2001	Mechanically compliant
	Scroll wheel	**Width**	8 mm
		Diameter	1.01 in (25.6 mm)
		Maximum rotation speed	48 rats/sec
		Switch type	Light force micro-switch
		Switch life	1 million operations
		Mechanical life	Minimum 200,000 revolutions
	Regulatory approvals	**Compliant**	UL, CSA, FCC, CE Mark, TUV, TUV GS, VCCI, BSMI, C-Tick, MIC

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

HP SATA SuperMulti LightScribe DVD Writer Drive	**Height**	5.25-inch, half-height, tray-load	
	Orientation	Either horizontal or vertical	
	Interface type	SATA/ATAPI	
	Disc capacity	8.5 GB DL or 4.7 GB standard	
	Dimensions (W x H x D)	5.9 x 1.7 x 8.0 in (15.0 x 4.4 x 20.3 cm)	
	Weight (max)	2.6 lb (1.2 kg)	
	Write speeds	**DVD-RAM**	Up to 12X
		DVD+R	Up to 16X
		DVD+RW	Up to 8X
		DVD+R DL	Up to 8X
		DVD-R DL	Up to 8X
		DVD-R	Up to 16X
		DVD-RW	Up to 6X
		CD-R	Up to 48X
		CD-RW	Up to 32X
	Read speeds	**DVD-RAM**	Up to 12X
		DVD+RW, DVD-RW, DVD+R DL, DVD-R DL	Up to 8X
		DVD-ROM DL	Up to 8X
		DVD-ROM, DVD+R, DVD-R	Up to 16X
		CD-ROM, CD-R	Up to 48X
		CD-RW	Up to 32X
	Access time (typical reads, including settling)	**Random**	DVD: < 140 ms (typical), CD: < 125 ms (typical)
		Full Stroke	DVD: < 250 ms (seek), CD: < 210 ms (seek)
	Power	**Source**	SATA DC power receptacle
		DC Power Requirement	5 VDC ± 5%-100 mV ripple p-p
			12 VDC ± 5%-200 mV ripple p-p
		DC Current	5 VDC (< 1000 mA typical, 1600 mA maximum)
			12 VDC (< 600 mA typical, 1400 mA maximum)
	Environmental 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

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

Technical Specifications - Optical Storage

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

PATA Slim SuperMulti LightScribe DVD Writer Drive	**Height**	5.25-inch, half-height, tray-load	
	Orientation	Either horizontal or vertical	
	Interface type	ATAPI/EIDE	
	Disc recording capacity	Up to 8.5 GB DL or 4.7 GB standard	
	Dimensions (W x H x D)	5.0 x 0.5 x 5.0 in (128 x 13.6 x 129 mm)	
	Weight (max)	0.42 lb (190 g)	
	Write speeds	**DVD-RAM**	Up to 5X
		DVD-R DL	Up to 4X
		DVD+R	Up to 8X
		DVD+RW	Up to 4X
		DVD+R DL	Up to 4X
		DVD-R	Up to 8X
		DVD-RW	Up to 6X
		CD-R	Up to 24X
		CD-RW	Up to 16X
	Read speeds	**DVD-RAM**	Up to 5X
		DVD-RW, DVD+RW	Up to 8X

		DVD-R DL, DVD+R DL	Up to 6X
		DVD+R, DVD-R	Up to 8X
		DVD-ROM DL, DVD-ROM	Up to 8X
		CD-ROM, CD-R	Up to 24X
		CD-RW	Up to 24X
	Access time (typical reads, including settling)	**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)
		Data Transfer Modes	ATA PIO mode 4 (16.7 MB/s); ATA Multi-word DMA mode 2 (16.7 MB/s); ATA UltraDMA Mode 3 (44.4 MB/s - default)
	Power	**Source**	Four-pin, DC power receptacle
		DC Power Requirement	5 VDC ± 5%-100 mV ripple p-p
			12 VDC ± 5%-200 mV ripple p-p
		DC Current	5 VDC (< 1000 mA typical, 1600 mA maximum)
			12 VDC (< 600 mA typical, 1400 mA maximum)
		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)

PATA CD-RW/DVD-ROM Combo Slim Drive	**Height**	12.7mm height slim CD-RW	
	Orientation	Either horizontal or vertical	
	Interface type	PATA/ATAPI	
	Disc capacity	Single layer: Up to 4.7 GB (6 times capacity of CD-ROM)	
	Dimensions (W x H x D)	5.0 x 0.5 x 5.0 in (128 x 13.6 x 129 mm)	
	Weight (max)	0.42 lb (190 g)	
	Write speeds	**CD-R**	Up to 24X
		CD-RW	Up to 24X
	Read speeds	**DVD+R/-R/+RW/-RW/+R DL /-R DL**	Up to 4X
		DVD-ROM	Up to 8X
		CD-ROM, CD-R	Up to 24X
		CD-RW	Up to 24X
	Access time (typical reads, including settling)	**Random DVD**	DVD: < 140 ms (typical), CD: < 125 ms (typical)
		Random CD	DVD: < 250 ms (typical), CD: < 210 ms (typical)

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

HP 16-in-1 Media Card Reader	**USB Interface**	USB 2.0 High-speed device	
	Dimensions	5.7 x 5.86 x 1.68 in (145 x 148.9 x 42.7 mm)	
	Weight	4 lbs (1.81 kg)	
	Advance protocol support	Supports hardware ECC (Error Correction Code) function • Supports hardware CRC (Cyclic Redundancy Check) function • Supports MS 4-bit parallel transfer mode • Supports MS-PRO 4-bit parallel transfer mode • Supports SD 4-bit parallel transfer mode • Supports high-speed 50-MHz SD 4-bit card (version 1.1) • Support high-speed 52-MHz MMC 8-bit card	
	Supported media type with card adapter	• MicroSD (T-Flash) • Memory Stick Micro	
	Mechanical		
	Environmental	**Operational Environmental Extremes**	Test Parameters/Conditions – Power applied, unit operating on system ±5% nominal supply voltage. 10°C 10% R.H. ≥ 24 hours 10°C 90% R.H. ≥ 24 hours 20°C 90% R.H. ≥ 24 hours 30°C 90% R.H. ≥ 24 hours 40°C 90% R.H. ≥ 24 hours 50°C 90% R.H. ≥ 24 hours 50°C 10% R.H. ≥ 24 hours
		Storage Environmental Extremes	Test Parameters/Conditions 60°C @ 80% R.H. for 96 hours -30°C @ 20% R.H. for 48 hours No power applied Delta °C < 1.0°C/min Delta % R.H. < 1.5% R.H./min
	Approvals	USB-IF, WHQL, Compliant with USB Mass Storage Class Bulk only Transport Specification Rev. 1.0, Compliant Intel Front Panel I/O Connectivity Design Guide V. 1.2 FCC, CE, BSMI, C-Tick, VCCI, MIC, cUL, TUV-T	

Eco-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
- ECO declaration
- EPEAT Silver Rated
- Korea Eco-label
- 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 with External 85% Efficient Power Adapter

System Configuration The configuration used for the Energy Consumption and Declared Noise Emissions data for the Ultra-slim Desktop model is based on a model with an Intel Core 2 Duo E6850 Processor, 1-GB memory, and 80-GB HD.

Energy Consumption	**AC Input Voltage at 115 VAC +/- 5 VAC, 60 Hz +/- 3 Hz**	**AC Input Voltage at 230 VAC +/- 5 VAC, 50 Hz +/- 3 Hz**	**AC Input Voltage at 100 VAC +/- 5 VAC, 50 Hz +/- 3 Hz**
Normal Operation On-Idle (ENERGY STAR Idle [S0])	38.7 W	39.8 W	36.8 W
ENERGY STAR “Sleep” (S3) (Wake On LAN (WOL) Enabled)	2.85 W	3.12 W	2.8 W
ENERGY STAR “Sleep” (S3) (Wake On LAN (WOL) Disabled)	2.83 W	3.13 W	2.85 W
ENERGY STAR “Standby” (Off) (S5) (Wake On LAN (WOL) Enabled)	2.4 W	1.85 W	1.55 W
ENERGY STAR “Standby” (Off) (S5) (Wake On LAN (WOL) Disabled)	0.98 W	1.15 W	0.94 W

Heat Dissipation*	**AC Input Voltage at 115 VAC +/- 5 VAC, 60 Hz +/- 3 Hz**	**AC Input Voltage at 230 VAC +/- 5 VAC, 50 Hz +/- 3 Hz**	**AC Input Voltage at 100 VAC +/- 5 VAC, 50 Hz +/- 3 Hz**
Normal Operation On-Idle (ENERGY STAR Idle (S0))	132.044 BTU/hr	135.797 BTU/hr	125.561 BTU/hr
ENERGY STAR “Sleep” (S3) (Wake On LAN (WOL) Enabled)	9.724 BTU/hr	10.645 BTU/hr	9.553 BTU/hr
ENERGY STAR “Sleep” (S3) (Wake On LAN (WOL) Disabled)	9.655 BTU/hr	10.679 BTU/hr	9.724 BTU/hr
ENERGY STAR “Standby” (Off) (S5) (Wake On LAN (WOL) Enabled)	8.188 BTU/hr	6.312 BTU/hr	5.288 BTU/hr

ENERGY STAR "Standby" (Off) (S5) (Wake On LAN (WOL) Disabled)	3.343 BTU/hr	3.923 BTU/hr	3.207 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	3.9	29
Fixed Disk (random writes)	3.9	29

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 internal drive slot
- 1 Slimline optical drive slot
- 2 memory slots

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 (see http://www.epeat.net)
- Plastics parts weighing over 25 grams used in the product are marked per ISO 11469 and ISO1043.
- This product contains 0% recycled materials (by wt.)
- This product is 90% recyclable when properly disposed of at end of life.

Packaging Materials		
	Corrugated Paper	1116 g
	EPE Foam	145 g
	LDPE Bag	36 g

- The EPE foam packaging material is made from 30 to 40% industrial recycled content.
- The corrugated paper packaging materials contain at least 25% post consumer recycled content.

Small Form Factor with 80% Efficient Power Supply

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 model with an Intel Core 2 Duo E6850 Processor, 1 GB memory and 160-GB HD.

Energy Consumption	**AC Input Voltage at 115 VAC +/- 5 VAC, 60 Hz +/- 3 Hz**	**AC Input Voltage at 230 VAC +/- 5 VAC, 50 Hz +/- 3 Hz**	**AC Input Voltage at 100 VAC +/- 5 VAC, 50 Hz +/- 3 Hz**
Normal Operation On-Idle (ENERGY STAR Idle (S0))	63.1 W	62 W	63.4 W
ENERGY STAR “Sleep” (S3) (Wake On LAN (WOL) Enabled)	2.36 W	2.55 W	2.34 W
ENERGY STAR “Sleep” (S3) (Wake On LAN (WOL) Disabled)	2.32 W	2.57 W	2.31 W
ENERGY STAR “Standby” (Off) (S5) (Wake On LAN (WOL) Enabled)	1.58 W	1.75 W	1.56 W
ENERGY STAR “Standby” (Off) (S5) (Wake On LAN (WOL) Disabled)	0.87 W	1.05 W	0.87 W
Heat Dissipation*	**AC Input Voltage at 115 VAC +/- 5 VAC, 60 Hz +/- 3 Hz**	**AC Input Voltage at 230 VAC +/- 5 VAC, 50 Hz +/- 3 Hz**	**AC Input Voltage at 100 VAC +/- 5 VAC, 50 Hz +/- 3 Hz**
Normal Operation On-Idle (ENERGY STAR Idle (S0))	215.297 BTU/hr	211.544 BTU/hr	216.32 BTU/hr
ENERGY STAR “Sleep” (S3) (Wake On LAN (WOL) Enabled)	8.052 BTU/hr	8.7 BTU/hr	7.984 BTU/hr
ENERGY STAR “Sleep” (S3) (Wake On LAN (WOL) Disabled)	7.915 BTU/hr	8.768 BTU/hr	7.881 BTU/hr
ENERGY STAR “Standby” (Off) (S5) (Wake On LAN (WOL) Enabled)	5.39 BTU/hr	5.971 BTU/hr	5.322 BTU/hr
ENERGY STAR “Standby” (Off) (S5) (Wake On LAN (WOL) Disabled)	2.968 BTU/hr	3.582 BTU/hr	2.968 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)
Idle	3.8	29
Fixed Disk (random writes)	4.0	30

*Not for systems containing 10,000 RPM hard drives.

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 slot
- 2 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.

Packaging Materials		
	Corrugated Paper	1736 g
	EPE Foam	293 g
	LDPE Bag	36 g

- The EPE foam packaging material is made from 30 to 40% industrial recycled content.
- The corrugated paper packaging materials contains at least 25% post consumer recycled content.

Convertible Minitower with 80% Efficient Power Supply

System Configuration The configuration used for the Energy Consumption and Declared Noise Emissions data for the CMT Desktop model is based on a model with an Intel Core 2 Duo E6850 Processor, 1 GB memory and 160-GB HD.

Energy Consumption	**AC Input Voltage at 115 VAC +/- 5 VAC, 60 Hz +/- 3 Hz**	**AC Input Voltage at 230 VAC +/- 5 VAC, 50 Hz +/- 3 Hz**	**AC Input Voltage at 100 VAC +/- 5 VAC, 50 Hz +/- 3 Hz**
Normal Operation On-Idle (ENERGY STAR Idle (S0))	62.762 W	61.212 W	62.27 W
ENERGY STAR “Sleep” (S3) (Wake On LAN (WOL) Enabled)	3.08 W	3.444 W	3.07 W
ENERGY STAR “Sleep” (S3) (Wake On LAN (WOL) Disabled)	3.09 W	3.42 W	3.05 W
ENERGY STAR “Standby” (Off) (S5) (Wake On LAN (WOL) Enabled)	1.53 W	1.79 W	1.46 W
ENERGY STAR “Standby” (Off) (S5) (Wake On LAN (WOL) Disabled)	0.79 W	1.08 W	0.77 W
Heat Dissipation*	**AC Input Voltage at 115 VAC +/- 5 VAC, 60 Hz +/- 3 Hz**	**AC Input Voltage at 230 VAC +/- 5 VAC, 50 Hz +/- 3 Hz**	**AC Input Voltage at 100 VAC +/- 5 VAC, 50 Hz +/- 3 Hz**
Normal Operation On-Idle (ENERGY STAR Idle (S0))	214.143 BTU/hr	208.855 BTU/hr	212.465 BTU/hr
ENERGY STAR “Sleep” (S3) (Wake On LAN (WOL) Enabled)	10.508 BTU/hr	11.75 BTU/hr	10.474 BTU/hr
ENERGY STAR “Sleep” (S3) (Wake On LAN (WOL) Disabled)	10.543 BTU/hr	11.669 BTU/hr	10.406 BTU/hr
ENERGY STAR “Standby” (Off) (S5) (Wake On LAN (WOL) Enabled)	5.22 BTU/hr	6.107 BTU/hr	4.981 BTU/hr
ENERGY STAR “Standby” (Off) (S5) (Wake On LAN (WOL) Disabled)	2.695 BTU/hr	3.684 BTU/hr	2.627 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	3.8	22
Fixed Disk (random writes)	3.8	22

*Not for systems containing 10,000 RPM hard drives.

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
- 3 empty full-height PCI slots
- 2 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 >91% recyclable when properly disposed of at end of life.

Packaging Materials

Corrugated Paper	1687 g
EPE Foam	308 g
LDPE Bag	63 g

- The EPE foam packaging material is made from 30 to 40% industrial recycled content.
- The corrugated paper packaging materials contains at least 25% post consumer recycled content.

Ultra-slim Desktop, Small Form Factor, Convertible Minitower

RoHS Compliance

Hewlett-Packard is committed to compliance with all applicable environmental laws and regulations, including the European Union Restriction of Hazardous Substances (RoHS) Directive. HP's goal is to exceed compliance obligations by meeting the requirements of the RoHS Directive on a worldwide basis. 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):

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

Packaging

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

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

End-of-life Management and Recycling

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

The EU WEEE directive (2002/95/EC) requires manufacturers to provide treatment information for each product type for use by treatment facilities. This information (product disassembly instructions) is posted on the Hewlett Packard web site at: http://www.hp.com/go/recyclers. These

	instructions may be used by recyclers and other WEEE treatment facilities as well as HP OEM customers who integrate and re-sell HP equipment.
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