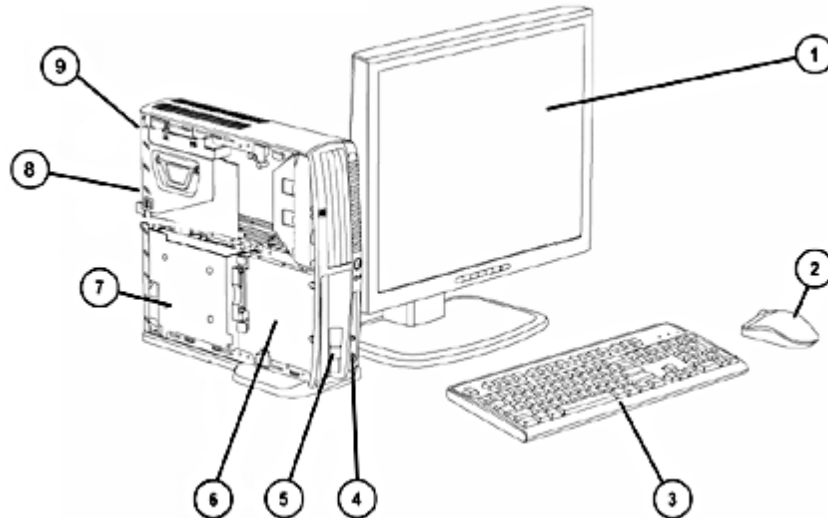


## Overview

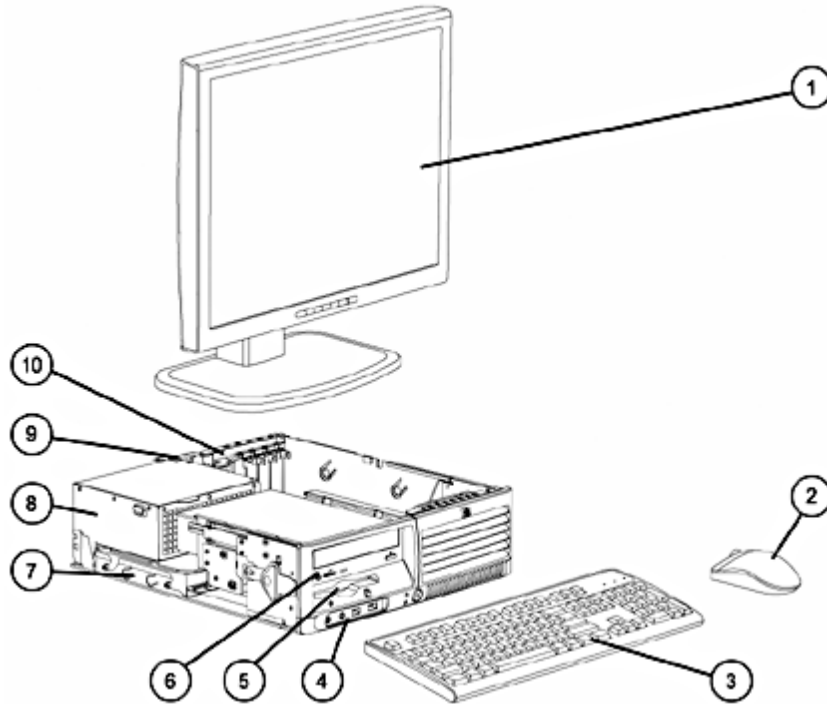
### Ultra-slim Desktop



1. Monitor (sold separately)
2. 2-Button Scroll Mouse (PS/2 or USB)
3. 2004 Standard Keyboard (PS/2 or USB)
4. Front I/O: 2 USB 2.0, headphone and microphone
5. 1 MultiBay Drive Bay
6. 1 3.5" internal bay
7. 200-watt power supply
8. 1 full-height PCI slot (optional)
9. Rear I/O: 6 USB 2.0, 1 optional serial port (available via PCI card), 1 optional parallel port (available via PCI card), 1 optional DVI graphics port (available via DIV ADD2 adapter), 2 PS/2, 1 RJ-45, 1 VGA, audio in/out

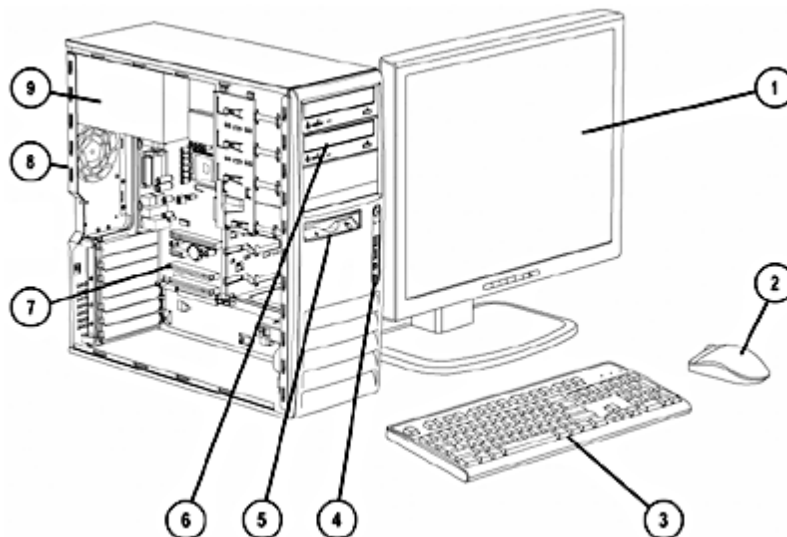
### Small Form Factor

## Overview



1. Monitor (sold separately)
  2. 2-Button Scroll Mouse (PS/2 or USB)
  3. 2004 Standard Keyboard (PS/2 or USB)
  4. Front I/O: 2 USB 2.0, headphone and microphone
  5. 1 3.5" external bay for optional diskette drive or other 3.5" device
  6. 1 5.25" external bay for optional optical drive, or other 5.25" device (bay tilts up for device removal and insertion)
  7. 1 3.5" internal bay
  8. 240-watt power supply
  9. Rear I/O: 6 USB 2.0, 1 standard serial port, 1 optional serial port, 1 parallel port, 2 PS/2, 1 RJ-45, 1 VGA, audio in/out
  10. 2 low profile PCI slots, 1 low profile PCI Express x1 slot, 1 low profile PCI Express x16 slot standard; 2 full-height PCI slots optional
- NOTE:** With riser card option, express x1 and x16 slots are not supported.

### Convertible Minitower



### Overview

1. Monitor (sold separately)
2. 2-Button Scroll Mouse (PS/2 or USB)
3. 2004 Standard Keyboard (PS/2 or USB)
4. Front I/O: 2 USB 2.0, headphone and microphone
5. 1 3.5" external bay for optional diskette drive or other 3.5" device
6. 3 5.25" external bays and 2 3.5" internal bays
7. 2 full-height PCI slots, 1 full-height PCI Express x1 slot, 1 full-height PCI Express x16 slot, 2 additional full-height PCI slots optional
8. Rear I/O: 6 USB 2.0, 1 standard serial port, 1 optional serial port, 1 parallel port, 2 PS/2, 1 RJ-45, 1 VGA, audio in/out, mic in
9. 365-watt power supply

### At A Glance

- Choice of operating systems: Microsoft Windows XP Professional, Microsoft Windows XP Home, or FreeDOS
- Intel® Pentium® 4 processors, Intel Pentium D processors, Intel Celeron D processors
- Intel 945G Express chipset with Integrated Intel Graphics Media Accelerator 950
- DDR2 Synch Dram PC2-4200 (533-MHz) and PC2-5300 (667-MHz) Memory
- Integrated Broadcom NetXtreme Gigabit Ethernet
- Support for up to 1-GHz processor front side bus
- Intel Hyper-Thread Technology on selected processors\*<sup>1</sup>
- Support for high speed 3.0-Gb/s Serial ATA Hard Drives
- Support for PCI Express
- Embedded TPM 1.2 compliant security module (requires separate software purchase)
- RoHS compliant configurations
- Optimized thermal solutions for each system
- Three tool-less chassis, with outstanding serviceability
- High Definition integrated audio with internal speaker
- Manageability tools included
- Energy Star compliance with energy-saving features
- Protected by HP Services, including a 3-3-3 standard warranty. Terms and conditions vary by country. Certain restrictions and exclusions apply.

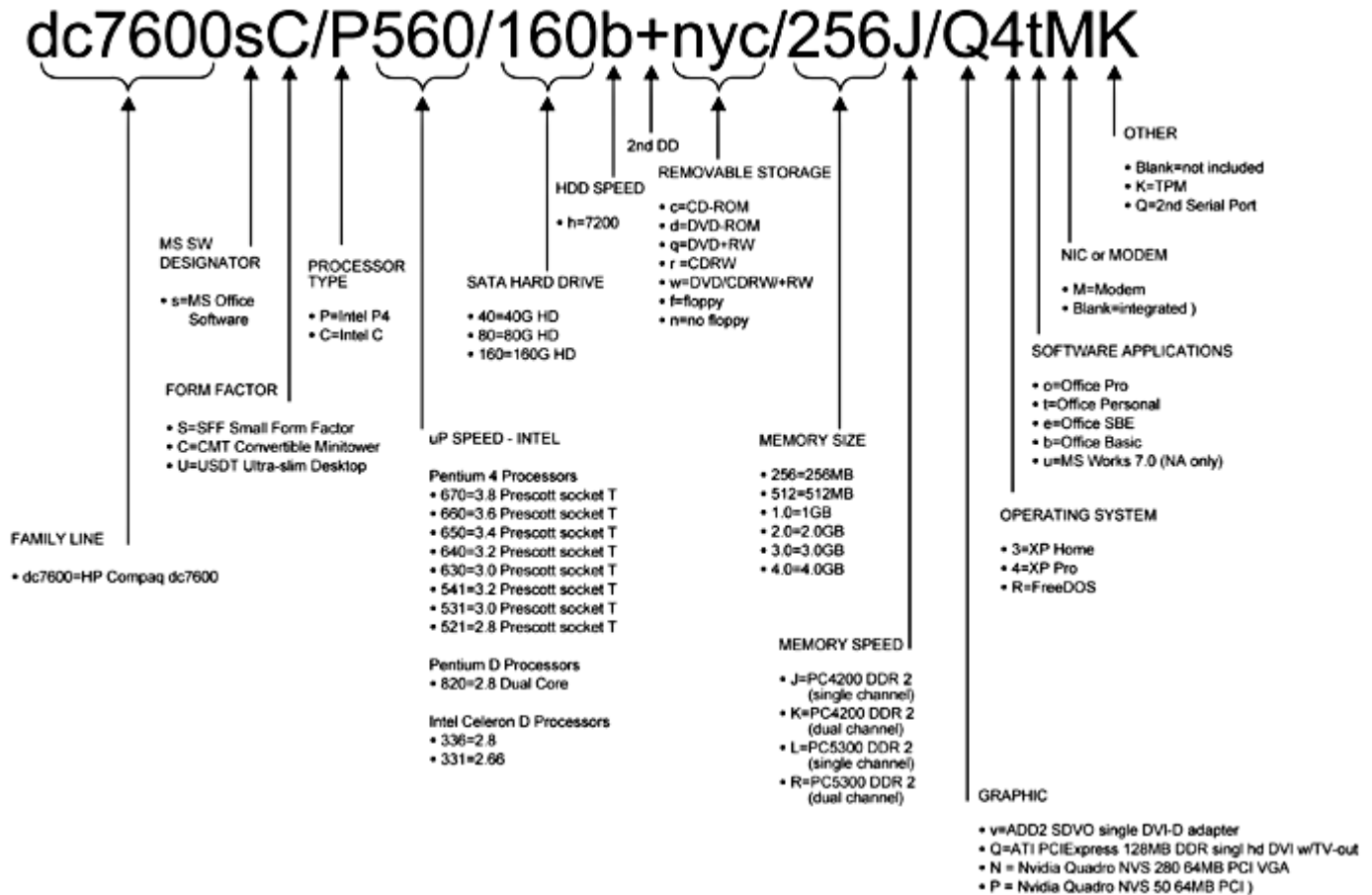
<sup>1</sup> The Hyper-Threading feature is a technology designed to improve performance of multi-threaded software products; please contact your software provider to determine software compatibility. Not all customers or software applications will benefit from the use of hyperthreading. Visit <http://www.intel.com/info/hyperthreading/> for more information.

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

### Model Key and Example

**NOTE:** This diagram is an example that illustrates how to read the model number.

It is not intended to give every available configuration choice specified in the body of this document.



### Configurable Components

		Ultra-slim Desktop	Small Form Factor	Convertible Minitower	
<b>Processor and Speed</b> One of the following	Intel Celeron D 331 Processor (2.66-GHz, 256K L2 cache, 533-MHz FSB)	X	X	X	
	Intel Celeron D 336 Processor (2.80-GHz, 256K L2 cache, 533-MHz FSB)	X	X	X	
	<b>Intel Pentium 4 Processors with HT Technology:</b>				
	Intel Pentium 4 521 Processor (2.8-GHz, 1 MB L2 cache, 800 MHz FSB)	X	X	X	
	Intel Pentium 4 531 Processor (3.0-GHz, 1 MB L2 cache, 800 MHz FSB)	X	X	X	
	Intel Pentium 4 541 Processor (3.2-GHz, 1 MB L2 cache, 800 MHz FSB)	X	X	X	
	Intel Pentium 4 630 Processor (3.0-GHz, 2 MB L2 cache, 800 MHz FSB)	X	X	X	
	Intel Pentium 4 640 Processor (3.2-GHz, 2 MB L2 cache, 800 MHz FSB)	X	X	X	
	Intel Pentium 4 650 Processor (3.4-GHz, 2 MB L2 cache, 800 MHz FSB)	X	X	X	
	Intel Pentium 4 660 Processor (3.6-GHz, 2 MB L2 cache, 800 MHz FSB)			X	
	Intel Pentium 4 670 Processor (3.8-GHz, 2 MB L2 cache, 800 MHz FSB)			X	
	Intel Pentium D 820 Dual Core Processor (2.8-GHz x 2, 2 MB L2 cache, 800 MHz FSB)		X	X	
	<b>Operating System -</b> One of the following	Microsoft Windows XP Professional SP2	X	X	X
Microsoft Windows XP Home SP2		X	X	X	
FreeDOS		X	X	X	
<b>NOTE:</b> Microsoft Windows NT 4.0 and Microsoft Windows 2000 are not available on these systems. Some drivers for Windows 2000 are available for download from <a href="http://hp.com">hp.com</a> .					
<b>Hard Drive</b> One or two of the following	40-GB SATA 1.5-Gb/s Hard Drive (7200 rpm)	X	X	X	
	80-GB SATA 3.0-Gb/s Hard Drive (7200 rpm)	X	X	X	
	160-GB SATA 3.0-Gb/s Hard Drive (7200 rpm)	X	X	X	
	2nd hard drive, 80-GB SATA 3.0-Gb/s Hard Drive (7200 rpm)		X	X	
	2nd hard drive, 160-GB SATA 3.0-Gb/s Hard Drive (7200 rpm)		X	X	

## Configurable Components

<b>Memory -</b> One of the following	256-MB DDR2 Synch Dram PC2-4200 (533-MHz) Non ECC (1 x 256)	X	X	X
	512-MB DDR2 Synch Dram PC2-4200 (533-MHz) Non ECC (1 x 512)	X	X	X
	512-MB DDR2 Synch Dram PC2-4200 (533-MHz) Non ECC (2 x 256)	X	X	X
	1-GB DDR2 Synch Dram PC2-4200 (533-MHz) Non ECC (1 x 1GB)	X	X	X
	1-GB DDR2 Synch Dram PC2-4200 (533-MHz) Non ECC (2 x 512)	X	X	X
	2-GB DDR2 Synch Dram PC2-4200 (533-MHz) Non ECC (4 x 512)		X	X
	3-GB DDR2 Synch Dram PC2-4200 (533-MHz) Non ECC (3 x 1GB)	X		
	4-GB DDR2 Synch Dram PC2-4200 (533-MHz) Non ECC (4 x 1GB)		X	X
	256-MB DDR2 Synch Dram PC2-5300 (667-MHz) Non ECC (1 x 256)	X	X	X
	512-MB DDR2 Synch Dram PC2-5300 (667-MHz) Non ECC (1 x 512)	X	X	X
	512-MB DDR2 Synch Dram PC2-5300 (667-MHz) Non ECC (2 x 256)	X	X	X
	1-GB DDR2 Synch Dram PC2-5300 (667-MHz) Non ECC (2 x 512)	X	X	X
	2-GB DDR2 Synch Dram PC2-5300 (667-MHz) Non ECC (4 x 512)		X	X

**NOTE:** For best performance, memory speeds and sizes should not be mixed. See memory section for more information.

<b>Storage -</b> One or more of the following depending on form factor (see Storage section below)	<b>Diskette Drives</b>			
	1.44-MB Diskette Drive		X	X
	<b>Optical Drives</b>			
	48X CD-ROM Drive		X	X
	48X/32X/48X CD-RW Drive		X	X
	48X/32X Combo CD-RW/DVD-ROM Drive		X	X
	16X/48X DVD-ROM Drive		X	X
	16X DVD+/-RW Drive (LightScribe/Double Layer/Dual Format)		X	X
	<b>MultiBay</b>			
	MultiBay 24X CD-ROM Drive	X		
	MultiBay 24X/24X/24X/8X DVD-CDRW Combo Drive	X		
	MultiBay 8X/24X DVD-ROM Drive	X		
	Multibay 1.44-MB diskette drive	X		

### Configurable Components

<b>Keyboard -</b> One of the following	HP PS/2 2004 Standard Keyboard	X	X	X
	HP USB 2004 BG1650 Blue Angel Keyboard	X	X	X
	HP USB 2004 Standard Keyboard	X	X	X
	HP Smartcard Adapter	X	X	X
<b>Mouse -</b> One of the following	PS/2 2-Button Scroll Mouse	X	X	X
	USB 2-Button Optical Scroll Mouse	X	X	X
	USB 2-Button Scroll Mouse	X	X	X
<b>Modem</b>	Agere 56K PCI SoftModem (full height)	X	X	X
	Agere 56K PCI SoftModem (low profile)		X	
<b>NIC</b>	Broadcom NetXtreme Gigabit Ethernet integrated on system board	X	X	X
	Intel Pro 1000 MT Gigabit NIC (full height)	X	X	X
	Intel Pro 1000 MT Gigabit NIC (low profile)		X	
<b>Miscellaneous</b>	Adaptec FireConnect 2100 Firewire IEEE 1394 PCI Card (full height)	X	X	X
	Adaptec FireConnect 2100 Firewire IEEE 1394 PCI Card (low profile)		X	
	PCI riser card - adds 1 full-height PCI slot	X		
	PCI riser card - adds 2 full-height PCI slots		X	
	<b>NOTE: Low profile slots are unusable with riser card installed.</b>			
	PCI extender card for CMT (adds 2 PCI)			X
	Serial & parallel I/O adapter	X		
	2nd serial port adapter (full height)			X
	2nd serial port adapter (low profile)		X	
Tower stand	X	X		
Blue Angel Compliant Bezel - Europe Only	X	X	X	
<b>Graphics</b>	Integrated Intel Graphics Media Accelerator 950	X	X	X
	DVI ADD2 SDVO single head Graphics Adapter for USDT	X		
	DVI ADD2 SDVO single head Graphics Adapter (low profile)		X	
	DVI ADD2 SDVO single head Graphics Adapter (full height)		X	X
	ATI RADEON X300 SE PCI Express 128-MB DDR single head DVI with TV out		X	X
	NVIDIA Quadro NVS 280 64MB PCI dual head VGA		X	X
	NVIDIA Quadro NVS 50 64MB PCI DVI with TV-Out	X	X	X

### Configurable Components

<b>Security</b>	Solenoid Lock		X	X
	Hood Sensor	X	X	X
	1.2 TPM Embedded Security Chip integrated with Broadcom (NIC)	X	X	X
	HP Desktop Security lock kit (lock and cable)	X	X	X
	Security cable with Kensington lock	X	X	X
	Rear port control cover		X	X
<hr/>				
<b>Software</b>	Norton AntiVirus 2005	X	X	X
	Microsoft Office 2003 Basic	X	X	X
	Microsoft Office 2003 Personal	X	X	X
	Microsoft Office 2003 Professional	X	X	X
	Microsoft Office 2003 Small Business	X	X	X
	Microsoft Works 7.0	X	X	X
	PDF Complete	X	X	X
	QuickBooks Simple Start	X	X	X



### Standard Features

	Ultra-slim Desktop	Small Form Factor	Convertible Minitower
Operating System (choice)			
Microsoft Windows XP Professional SP2	X		
Microsoft Windows XP Home SP2	X		
FreeDOS	X		
Processor	Intel Pentium 4 processors, Intel Celeron D processors	Intel Pentium 4 processors, Intel Pentium D processors, Intel Celeron D processors	
CPU Bus Speed Supported	533 MHz, 800 MHz, or 1 GHz depending on processor <b>NOTE: Processors with a 1-GHz FSB are not currently offered on these models.</b>		
Standard L2 Cache	2 MB, 1 MB or 256 K depending on processor		
Chipset	Intel 945G Express	Intel 945G Express	Intel 945G Express
Memory Expansion Slots	3 DIMMs	4 DIMMs	4 DIMMs
Memory Type Supported	Non-ECC DDR2 Synch DRAM (ECC not supported by Chipset)		
Memory Speed Supported	DDR2 Synch DRAM PC2-4200 (533-MHz) non-ECC memory DDR2 Synch DRAM PC2-5300 (667-MHz) non-ECC memory		
Maximum Memory <b>NOTE: Above 3-GB, all memory may not be available due to system resource requirements.</b>	3-GB	4-GB	4-GB
Network controller	Integrated Broadcom NetXtreme Gigabit Ethernet for HP		
Graphics	Integrated Intel Graphics Media Accelerator 950		
Audio	Integrated High Definition audio with Realtek 2 channel ALC260 codec Microphone and Headphone front ports Aux Input connection on system board Line-out and Line-In rear ports on SFF/USDT* Line-out, Line-in and Microphone rear ports on CMT* (All ports are stereo) Internal Speaker <b>NOTE: *Rear audio ports are re-taskable as Line-in, Line-out, or Microphone-in, with optional driver, available only through download from HP support website. External speakers must be powered externally.</b>		
<b>Expandability</b>			
PCI slots	Optional: 1 full-height (4.2"), length (6.6")	2 low-profile (2.5"), length (6.6") standard; 2 full-height (4.2"), length (6.875") via optional riser card. <b>NOTE: With riser card option, express x1 and x16 slots are not supported.</b>	2 full-height (4.2"), length (13.4") standard; (2 additional full-height slots available via optional extender card)
PCI Express x16 slot	--	1 low-profile (2.5"), length (6.6")	1 full-height (4.2"), length (10.5")
PCI Express x1 slot	--	1 low profile (2.5"), length (6.6")	1 full-height (4.2"), length (13.4")
AGP slot	none	none	none
External Bays	1 MultiBay I (12 mm)	2 bays (1 - 5.25", length (8.189"), and 1 - 3.5" (supports 2nd HDD))	4 bays (2 - 5.25", length (8.189"), 1 - 5.25" length (5.71") and 1 - 3.5")
Internal Bays	1 - 3.5" hard drive bay	1 - 3.5" hard drive bay	2 - 3.5" hard drive bays

### Standard Features

MultiBay	standard	none	none
IDE	1 IDE for multibay	2 IDE connectors for opticals	2 IDE connectors for opticals
Hard Drive Interfaces Supported	1 Serial ATA interface	2 Serial ATA interfaces	2 Serial ATA interfaces
Hard Drive Controller (PCI) Supported	Serial ATA (support for SATA 1.5-Gb/s and 3.0-Gb/s hard drives)		
<b>Security</b>			
1.2 TPM (Trusted Platform Module) Embedded Security Chip	Integrated 1.2 TPM chip (ProtectTools software optional)	Integrated 1.2 TPM chip (ProtectTools software optional)	Integrated 1.2 TPM chip (ProtectTools software optional)
<b>Ports</b>			
USB 2.0	8 (2 front, 6 rear)	8 (2 front, 6 rear)	8 (2 front, 6 rear)
Serial	1 optional via Serial & parallel I/O adapter	1 standard with 2nd optional	1 standard with 2nd optional
Parallel	1 optional via Serial & parallel I/O adapter	1	1
PS/2	1 keyboard, 1 mouse	1 keyboard, 1 mouse	1 keyboard, 1 mouse
Video	analog for integrated graphics	analog for integrated graphics	analog for integrated graphics
DVI output	available via ADD2 card or PCI card	available via ADD2 card, PCI-E x16 card, or PCI card	available via ADD2 card, PCI-E x16 card, and PCI card
Support for Multi-Monitor	available via ADD2 card or PCI card	available via ADD2 card, PCI-E x16 card, or PCI card	available via ADD2 card, PCI-E x16 card, and PCI card
Audio	Front - mic and headphone Rear - line in, line out	Front - mic and headphone Rear - line in, line out	Front - mic and headphone Rear - line in, line out, mic in
NIC	Integrated Broadcom NetXtreme Gigabit Ethernet for HP	Integrated Broadcom NetXtreme Gigabit Ethernet for HP	Integrated Broadcom NetXtreme Gigabit Ethernet for HP
<b>Dimensions</b>			
Chassis Dimensions (H x W x D)	2.95 x 12.4 x 13.18 in	3.95 x 13.3 x 14.9 in	17.65 x 6.6 x 17.8 in
Chassis Dimensions (H x W x D)	7.49 x 31.50 x 33.48 cm	10.03 x 33.78 x 37.85 cm	44.83 x 16.76 x 45.21 cm
System weight	13.2 lb (5.99 kg)	19.5 lb (8.85 kg)	32.5 lb (14.74 kg)
System volume	7.9 liters	12.8 liters	33.8 liters
Shipping weight	19 lb (8.62 kg)	30 lb (13.61 kg)	43 lb (19.50 kg)
Shipping box dimensions (H x W x D)	12.63 x 18.75 x 20 in (32.08 x 47.63 x 50.8 cm)	12.63 x 18.75 x 20 in (32.08 x 47.63 x 50.8 cm)	23.38 x 13.06 x 22.88 in (59.39 x 33.17 x 58.12 cm)
<b>Power Supply</b>	200W power supply – Active PFC	240W power supply – Active PFC	365W power supply - Active PFC
<b>Preinstalled Software</b> (not included with FreeDOS)			
Computer Setup Utility		X	
Microsoft Internet Explorer		X	
Altiris Local Recovery		X	
Acrobat Reader		X	
Roxio Cineplayer (with writable optical drive)		X	
HP Client Management Solutions (visit <a href="http://www.hp.com/go/easydeploy">http://www.hp.com/go/easydeploy</a> )		X	

After-Market Options (availability may vary by region)

		Ultra-slim Desktop	Small Form Factor	Convertible Minitower	Part Number
<b>Communications</b>	<b>Wireless LAN</b>				
	HP USB Bluetooth transceiver (BT1.2)	X	X	X	DN650B
	<b>NICs</b>				
	Broadcom NetXtreme Gigabit Ethernet PCI Express x1 Adapter		X	X	EA833AA
	Intel Pro/1000 MT Gigabit Ethernet PCI Adapter (full height only)			X	DC193A
	<b>Modem</b>				
	Agere 56K PCI Modem		X	X	DC132D
<b>Graphics</b>	<b>Single head solutions</b>				
	DVI ADD2 Graphics Adapter (full height)		X	X	DY674A
	ATI RADEON X300 SE PCI Express 128-MB DDR DVI with TV out		X	X	DY596A
	NVIDIA Quadro NVS 50 64-MB Graphics Card (PCI version)	X	X	X	PU615A
	<b>Multi head solutions</b>				
	NVIDIA Quadro NVS 280 64-MB PCI dual head (DMS59 connector with dual VGA Y-cable)		X	X	DY599A
	NVIDIA Quadro NVS 280 64MB PCIE dual head (DMS59 connector with dual VGA Y-cable)		X	X	DY650A
Dual DVI Y-cable for DY599A or DY650A		X	X	DL139A	
<b>Hard Drives</b>	<b>Serial ATA Hard Drives</b>				
	40-GB SATA 1.5 Gb/s Hard Drive	X	X	X	PB371A
	80-GB SATA 3.0-Gb/s Hard Drive	X	X	X	PY276AA
	160-GB SATA 3.0-Gb/s Hard Drive	X	X	X	PY277AA

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

Input/Output Devices	Keyboards				
	HP PS/2 2004 Standard Keyboard	X	X	X	DT527A
	HP USB 2004 Standard Keyboard	X	X	X	DT528A
	HP USB 2004 Standard Keyboard BG1650 compliant	X	X	X	DT529A
	HP Wireless Easy Access Keyboard with Wireless/Optical Mouse	X	X	X	DC170B
	HP USB Easy Access Smartcard Keyboard	X	X	X	DC169B
	HP Smartcard Adapter	X	X	X	DT531A
	<b>Pointing Devices</b>				
	HP PS/2 2-Button Scroll Mouse (Carbonite)	X	X	X	DD440B
	HP USB 2-Button Scroll Mouse (Carbonite)	X	X	X	DD441B
	HP USB 2-Button Optical Scroll Mouse (Carbonite/Silver)	X	X	X	DC172B
<b>Memory (DIMMs)</b>	<b>PC2-5300 (DDR2, 667 MHz) DIMMs Non-ECC</b>				
	1 GB PC2-5300 (DDR2-667) DIMM	X	X		PX976AA
	512 MB PC2-5300 (DDR2-667) DIMM	X	X	X	PX975AA
	256 MB PC2-5300 (DDR2-667) DIMM	X	X	X	PX974AA
	<b>PC2-4200 (DDR2, 533 MHz) DIMMs Non-ECC</b>				
	1 GB PC2-4200 (DDR2-533) DIMM	X	X	X	PV557AA
	512 MB PC2-4200 (DDR2-533) DIMM	X	X	X	PV560AA
	256 MB PC2-4200 (DDR2-533) DIMM	X	X	X	PV558AA
<b>Monitors</b>	<b>TFTs</b>				
	HP L1502 Flat Panel Monitor (15" analog only)	X	X	X	P9617D#XXX
	HP L1530 Flat Panel Monitor (15" analog/digital & multimedia)	X	X	X	P9624A#XXX
	HP L1702 Flat Panel Monitor (17" analog only)	X	X	X	P9621D#XXX
	HP L1730 Flat Panel Monitor (17" analog/digital & multimedia)	X	X	X	P9625A#XXX
	HP L1925 Flat Panel Monitor (19" analog/digital)	X	X	X	P9626A#XXX
	HP L2035 Flat Panel Monitor (20")	X	X	X	P9614A#XXX
	HP L2335 Flat Panel Monitor (23" widescreen)	X	X	X	P9615A#XXX
	<b>CRTs</b>				
	HP v7550 CRT Monitor (17" flat-face)	X	X	X	P9013A#XXX
	HP s9500 CRT Monitor (19")	X	X	X	P9010A#XXX
	HP p1230 CRT Monitor (22" natural flat)	X	X	X	P9613A#XXX

After-Market Options (availability may vary by region)

Multimedia	JBL Platinum Series Speakers - Carbonite	X	X	X	DE893D
	HP Desktop Access Center	X	X	X	DK985A
Optical Drives	<b>DVD-ROM Drive</b>				
	16X/48X DVD-ROM Drive		X	X	PR596A
	<b>CD-ROM Drive</b>				
	48X Max CD-ROM Drive		X	X	DC143B
	<b>CD-RW Drive</b>				
	48X/32X/48X CD-RW Drive		X	X	DL975B
	<b>Combo Drive</b>				
48X/32X Combo CD-RW/DVD-ROM Drive		X	X	DL976B	
	<b>DVD+/-RW Drive</b>				
	16X DVD+/-RW LightScribe Drive (Double Layer/Dual Format)		X	X	PR595A
Removable Storage	<b>Drive Key Options</b>				
	256-MB HP Drive Key II (USB 2.0)	X	X	X	PH657A
	<b>Diskette and Digital Drives</b>				
	1.44-MB USB Diskette Drive - External (Carbonite)	X	X	X	DC141B
	1.44-MB Internal Diskette Drive		X	X	DS710G
	<b>Zip Drives and Media</b>				
	Zip 250 Drive (Carbonite)		X	X	DC140B
	Zip 750 Drive (Carbonite)		X	X	DC518B
MultiBay Drive Storage	Multibay 60GB hard drive	X			DC894A
	Multibay 80GB hard drive	X			DC920A
	Multibay 1.44-MB Diskette Drive	X			DE612B
	MultiBay 24X CD-ROM Drive	X			DC513B
	MultiBay 24X/24X/24X/8X Combo DVD-ROM/CD-RW Drive	X			DL974B
	MultiBay 8X DVD-ROM Drive	X			DC515B
Security	HP Smartcard Adapter	X	X	X	DT531A
	HP USB Easy Access Smartcard Keyboard	X	X	X	DC169B
	Kensington lock	X	X	X	PC766A
	HP Business PC Security Lock	X	X	X	PV606AA
	Wall mount/security sleeve (USDT)	X			PA719A
	Wall mount/security sleeve (SFF)		X		PA717A

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

<b>Brackets/Stand</b>	HP Compaq 7000 Series Ultra-slim Desktop Integrated Work Center Stand (no display)	X			DL641B
<b>Miscellaneous Accessories</b>	Serial and parallel I/O adapter (USDT)	X			PD825A
	2nd serial port adapter		X		PA716A
	PCI riser card (SFF)		X		PD824A
	PCI extender card (CMT)			X	DC179B
	Adaptec FireConnect 2100 Firewire (1394) PCI Card	X	X	X	PA997A

## Memory

### 945G Express chipset

#### DDR2 SYNCH DRAM NON-ECC MEMORY

It is not necessary to add memory in pairs. 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 945G Express chipsets support non-ECC DDR2 PC2-4200 (533-MHz) and PC2-5300 (667-MHz) memory.

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

#### MAXIMUM MEMORY (ULTRA-SLIM DESKTOP)

Supports up to 3-GB of DDR2 SYNCH DRAM. *Not all memory configurations possible are represented below.*

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

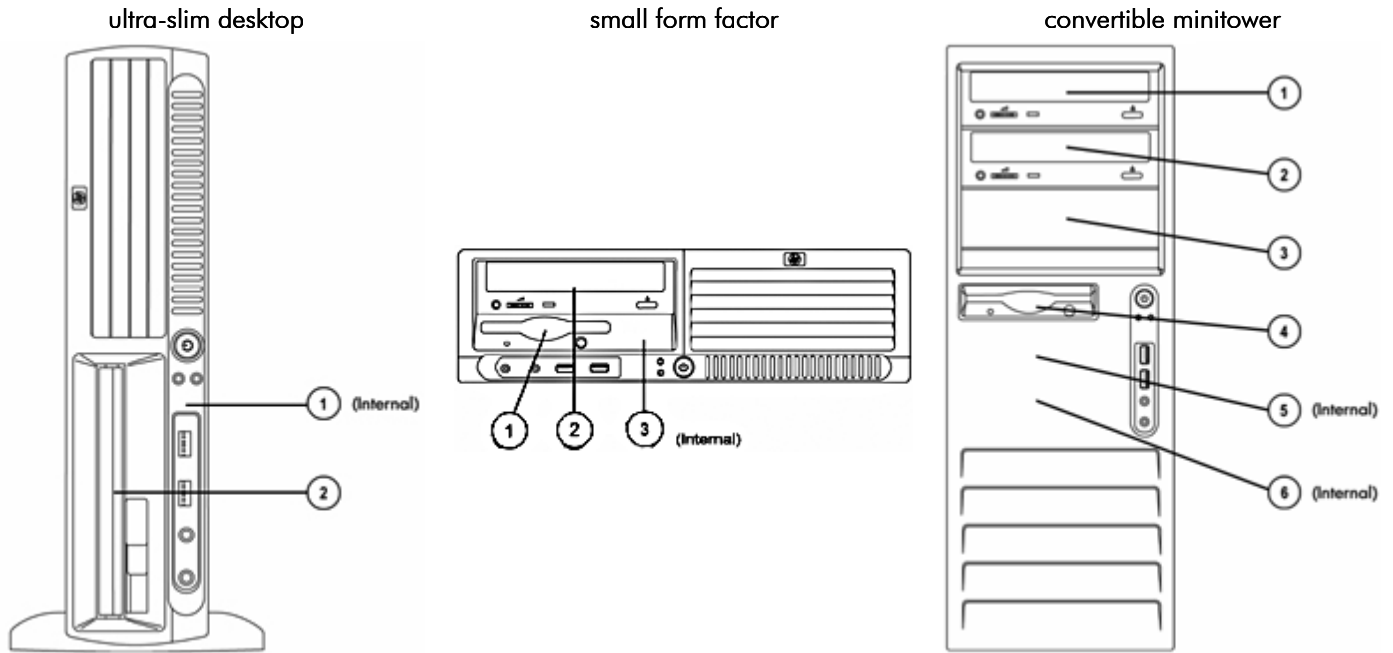
#### MAXIMUM MEMORY (SMALL FORM FACTOR AND CONVERTIBLE MINITOWER)

Supports up to 4-GB of DDR2 SYNCH DRAM. *Not all memory configurations possible are represented below.*

**NOTE:** Above 3-GB, all memory may not be available due to system resource requirements.

DIMM Size	Slot			
	Channel A		Channel B	
	1	2	3	4
256-MB	256-MB			
512-MB	512-MB			
512-MB (dual-channel)	256-MB		256-MB	
1-GB	1-GB			
1-GB (dual-channel)	512-MB		512-MB	
2-GB (dual-channel)	512-MB	512-MB	512-MB	512-MB
4-GB maximum (dual-channel)	1-GB	1-GB	1-GB	1-GB

## Storage



### Ultra-slim Desktop

MultiBay Drive Bay  
3.5" Serial ATA Hard Drive

#### Quantity Supported

1  
1

#### Position Supported

2  
1

#### Controller

IDE  
SATA

### Small Form Factor

Diskette Drives (optional)  
Storage Drive Bay  
3.5" Serial ATA Hard Drives

1  
1  
2

1  
2  
1, 3

Diskette  
IDE  
SATA

### Convertible Minitower

Diskette Drive  
Storage Drive Bay  
3.5" Serial ATA Hard Drives

1  
2  
2

4  
1, 2, 3  
4, 5, 6

Diskette  
IDE  
SATA



### Technical Specifications

Base Unit Contents	Ultra-Slim Desktop	Small Form Factor	Convertible Minitower
Coprocessor	Integrated		
L2 Cache Architecture/Speed	Full core clock speed		
Cache Upgradeable	Not upgradeable – Integrated into Processor		
System board with Intel 945G Express Chipset with Integrated graphics	945G Express chipset	945G Express chipset	945G Express chipset
Cables	Serial ATA Cable		
Quick Setup Poster	X		
Product Documentation on CD	X		
Operating System CD	X		
Restore CD	X		
Power Cord	X		
Keyboard	X (PS/2)		
Mouse	X (PS/2)		
Memory Parity	Not Needed for non-ECC		
ECC Memory	Not Supported by chipset		
Serial Presence Detect Support	Supported		
Hard Drive Interfaces Supported	1 Serial ATA interface	2 Serial ATA interfaces	2 Serial ATA interfaces
Hard Drive Controller Supported	Serial ATA (support for SATA 1.5-Gb/s and 3.0-Gb/s hard drives)		

System Board	Ultra-Slim Desktop	Small Form Factor	Convertible Minitower
Architecture	P4/PCI/PCI Express		
Chipset	Intel 945G Express Chipset	Intel 945G Express Chipset	Intel 945G Express Chipset
I/O Controller	LPC47B397		
System Board Form Factor	custom BTX-like	custom BTX-like	micro ATX
Processor Socket - 775 Pin ZIF	X		
DIMM Connectors (2.5V)	3	4	4
Intel Graphics Media Accelerator 950 integrated	X		
PCI Connector	Optional: 1 full height	2 low profile standard (2 Full height available with optional riser card)	2 full height (2 full height additional with optional extender card)
PCI Express x16	--	1 low-profile (2.5"), length (6.6")	1 full-height (4.2"), length (10.5")
PCI Express x1	--	1 low profile (2.5"), length (6.6")	1 full-height (4.2"), length (13.4")
Audio (High Definition)	X		
Analog CD IN Support (Audio)	Available through MultiBay	--	--
AUX IN (Audio)	X		
Clear CMOS Button	X		
CPU Fan Header	X		
Chassis Fan Header	X		
Chassis Speaker Header	X		
CMOS Battery Holder – Lithium	X		
Hood Lock Header	--	Optional	Optional
Hood Sensor Header	--	Optional	Optional
Multibay Header	X	--	--



## Technical Specifications

Integrated Broadcom NetXtreme Gigabit Ethernet for HP, includes 1.2 TPM Embedded Security chip			X	
Wake-On-Lan®			X	
ASF 2.0 (Alert Standard Format)			X	
Power Supply Header			X	
Power Switch, Power LED & Hard Drive LED Header			X	
Password Clear Header			X	
Riser Connector	X		X	--
PCI extender that connects to System Board	--		--	X

Chassis	Ultra-Slim Desktop	Small Form Factor	Convertible Minitower
Color	Carbonite/Silver		
System Board Form Factors Supported	custom	custom	micro ATX
Power Supply Fan (Variable Speed)		X	
Processor Fan-Heatsink (Variable Speed)		X	
Chassis Fan		X	
Internal Speaker		X	
Security Locks Supported	Kensington Cable Lock Provision (Lock not included) Hood Cover Security Loop (Lock not included) HP Desktop Security Lock (Lock not included)		
Security Loop hole diameter	0.236 inches		

Unit Environment and Operating Conditions	Ultra-Slim Desktop	Small Form Factor	Convertible Minitower
General Unit Operating Guidelines			
	<ul style="list-style-type: none"> <li>Keep the computer away from excessive moisture, direct moisture and the extremes of heat and cold, to ensure that unit is operated within the specified operating range.</li> <li>Leave a 10.2 cm (4 in) clearance on all vented sides of the computer to permit the required airflow.</li> <li>Never restrict airflow into the computer by blocking any vents or air intakes.</li> <li>Do not stack computers on top of each other or place computers so near each other that they are subject to each other's recirculated or preheated air.</li> <li>Occasionally clean the air vents on the front, back, and any other vented side of the computer. Lint, dust and other foreign matter can block the vents and limit the airflow.</li> <li>If the computer is to be operated within a separate enclosure, intake and exhaust ventilation must be provided on the enclosure, and the same operating guidelines listed above will still apply.</li> </ul>		
Temperature Range	Operating Temperature: 50° to 95° F (10° to 35° C) Non-operating Temperature: 22° to 140° F (30° to 60° C)		
Relative Humidity	Operating Humidity 10% to 90% (non condensing at ambient) Non-operating Humidity 5% to 95% (non condensing at ambient)		
Maximum Altitude (unpressurized)	Operating: 10,000 ft (3048 m) Non-operating: 30,000 ft (9144 m)		

### Technical Specifications

**NOTE:** 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.

Interfaces	Ultra-Slim Desktop	Small Form Factor	Convertible Minitower
Serial Port	1 optional	1 standard, 2nd via option	1 standard, 2nd via option
Parallel Port	1 optional	1	1
PS/2	1 Keyboard and 1 Mouse		
USB (2.0)	8 ports (6 rear/2 front)		
RJ-45 10/100/1000 Network	X		
Keyboard	X (PS/2)		
Mouse	X (PS/2)		
Multibay	1 standard	none	none
Video (VGA)	X		
Audio	X		

Power Supply	Ultra-Slim Desktop	Small Form Factor	Convertible Minitower
Power Supply	200 watt custom power supply – Active PFC)	240 watt custom power supply – Active PFC	365 watt custom power supply – Active PFC)
Operating Voltage Range	90 – 264 VAC	90 – 264 VAC	90 – 264 VAC
Rated Voltage Range	100 – 240 VAC	100 – 240 VAC	100 – 240 VAC
Rated Line Frequency	50/60 Hz	50/60 Hz	50/60 Hz
Operating Line Frequency Range	47 – 63 Hz	47 – 63 Hz	47 – 63 Hz
Rated Input Current	4A	5A	6A
Heat Dissipation	Typical 340 btu/hr (86 kg-cal/hr) Maximum 1050 btu/hr (265 kg-cal/hr)	Typical 340 btu/hr (86 kg-cal/hr) Maximum 1260 btu/hr (318 kg-cal/hr)	Typical 375 btu/hr (95 kg-cal/hr) Maximum 1916 btu/hr (483 kg-cal/hr)
Power Supply Fan	70mm variable speed	80mm variable speed	92mm variable speed
Energy Star Compliant	X	X	X
Blue Angel Compliant (<5w in S5 – Power Off)	X	X	X
FEMP Standby Power Compliant (<2W in S5 – Power Off)	X	X	X
Power Consumption in ES Mode – Suspend to RAM (S3) (Instantly Available PC)	< 3W	< 3W	< 3W
Environmental and Mechanical Engineering Support Center (EMESC) – Intranet Web Site only	<a href="http://env-webserver.ccm.cpqcorp.net/EMESC/default.htm">http://env-webserver.ccm.cpqcorp.net/EMESC/default.htm</a>		

ROM Features	Description	Ultra-slim Desktop	Small Form Factor	Convertible Minitower
Instantly Available PC (Suspend to RAM - S3)	Allows for very low power consumption with quick resume time	X	X	X
ROM Based F10 Setup	Review and customize BIOS settings	X	X	X
Remote System Installation via F12 (PXE) (Remote Boot from Server)	Allows a new or existing system to boot over the network and download software, including the operating system	X	X	X

### Technical Specifications

System/Emergency ROM Flash Recovery with Video	Recovers corrupted system BIOS	X	X	X
BIOS Smart Card Support	BIOS preboot smart card authentication (passwords) via USB CCID compliant smart card readers	X	X	X
Auto Setup when New Hardware Installed	System automatically detects addition of new hardware	X	X	X
Serial, Parallel, USB, Network, Enable/Disable Port Control	Enable or disables serial, parallel, USB, and network ports	X	X	X
Removable Media Write/Boot Control	Prevents ability to boot from removable media on supported devices (and can disable writes to media)	X	X	X
Legacy Diskette Write	Prevents ability to write to removable media on supported devices	X	X	X
Network Service Boot	Allows for secured keyboard-less operation	X	X	X
Power-On Password	Prevents an unauthorized person from booting up the computer (enhanced to 32 characters case sensitive)	X	X	X
Setup Password	Prevents an unauthorized person from changing the system configuration (enhanced to 32 characters case sensitive)	X	X	X
Replicated Setup	Saves BIOS settings to diskette or USB disk-on-key in human readable file. Repset.exe utility can then replicate these settings on machines being deployed without entering ROM-based F10 setup	X	X	X
Remote ROM Flash	Provides secure, fail-safe ROM image management from a central network console	X	X	X
Remote Wakeup	<ul style="list-style-type: none"> <li>System administrators can power on, restart, and power off a client computer from a remote location.</li> <li>Enables cost-effective power consumption when the administrator needs to distribute software, perform security management, or update the ROM</li> </ul>	X	X	X
ACPI (Advanced Configuration and Power Management Interface)	<ul style="list-style-type: none"> <li>Allows the system to wake from a low power mode</li> <li>Controls system power consumption, making it possible to place individual cards and peripherals in a low-power or powered-off state without affecting other elements of the system</li> </ul>	X	X	X
Keyboard-less Operation	The system can be operated without a keyboard	X	X	X
SMBIOS Ver. 2.4	System Management BIOS, previously known as DMI BIOS, for system management information	X	X	X
No Fault Found (NFF) reduction for memory	F10 setup option allows DIMM identification and failure analysis	X	X	X
HP Client Management Interface	Uses industry standards including Microsoft Windows Management Interface, WBEM, SMBIOS, and ACPI, to allow system management tools (e.g. HP Systems Insight Manager, Microsoft SMS) to request in-depth client inventory, receive health status information, and manage system BIOS settings by communicating directly with the client computer.	X	X	X
Wake on USB insertion	Allows system to wake from low power state on USB device insertion	X	X	X
Trusted BIOS (TCG Metrics)	BIOS performs pre-boot measurements that are stored in TPM to provide chain of trust from power-on to OS handoff <b>NOTE:</b> Available after product introduction with TPM 1.2 version of HP ProtectTools.	X	X	X

### Technical Specifications

Setup browse mode	Allows option to be set where F10 settings are not visible when setup password is set	X	X	X
Default Setup	Allows user to save custom F10 Setup settings as defaults. If CMOS settings are lost, such as during battery replacement, the user can restore the custom settings by selecting Apply Defaults and Exit. If desired, factory defaults can be restored through the same menu item.	X	X	X
BIOS Power-On	Allows user to select the day(s) of the week and the time of day the system will automatically power on. Works only from Off state (S5), not from sleep states S3 or S4.	X	X	X
Windows-based BIOS upgrade	Supported	X	X	X
System Management Interrupt (SMI) security	Prevents system management mode from being disabled (e.g. to bypass password security)	X	X	X
Data Execution Prevention (DEP)	F10 setup option, enabled by default with supported processors, to help prevent malicious code and viruses from executing in the operating system	X	X	X

Software	Description	Ultra-slim Desktop	Small Form Factor	Convertible Minitower
<b>Preinstalled Software</b>		X	X	X
Microsoft Windows XP Professional SP2		X	X	X
Microsoft Windows XP Home SP2		X	X	X
Computer Setup Utility		X	X	X
Diagnostics for Windows		X	X	X
Microsoft Internet Explorer		X	X	X

Initial Configuration and Deployment	Description	Ultra-slim Desktop	Small Form Factor	Convertible Minitower
HP Client Management Solutions	<p>HP Client Management Solutions help simplify management of PCs and significantly reduce total ownership costs. These solutions share a common design and are highly integrated due to the extensive work between HP and its partner Altiris. HP Client Manager is included free with all HP business PCs. It enables central tracking, monitoring, and management of the hardware aspects of HP client systems:</p> <ul style="list-style-type: none"> <li>• Get valuable hardware information such as CPU, memory, video, and security settings</li> <li>• Monitor system health to fix problems before they occur</li> <li>• Install drivers and BIOS updates without visiting each PC</li> <li>• Remotely configure BIOS and security settings</li> </ul> <p>Automate processes to quickly resolve hardware problems Additional Altiris solutions (fee-based) are available to address PC management challenges through the entire IT lifecycle including:</p>	X	X	X

## Technical Specifications

	<ul style="list-style-type: none"> <li>• Inventory assessment</li> <li>• Software license compliance</li> <li>• Personality migration</li> <li>• Software image deployment</li> <li>• Software distribution</li> <li>• Asset management</li> <li>• Client backup and recovery</li> <li>• Problem resolution</li> </ul> <p>Visit <a href="http://www.hp.com/go/easydeploy">http://www.hp.com/go/easydeploy</a> for more information, to download HP Client Manager, and to evaluate the Altiris solutions.</p>			
System Software Manager (free)	A free utility that detects and updates BIOS, device drivers, and management agent versions on your networked PCs	X	X	X
Replicated Setup	Saves BIOS settings to diskette or USB disk-on-key in human readable file. Repset.exe utility can then replicate these settings on machines being deployed without entering ROM-based F10 setup	X	X	X
Support Software CD	--	X	X	X
Software Restore CD	Restores computer to its original factory shipping image	X	X	X
Asset Tag	<ul style="list-style-type: none"> <li>• Repository for storing company-specific property asset numbers for easy tracking</li> <li>• Initially set equal to the system serial number</li> <li>• Stored in a protected section of non-volatile memory that can be accessed and modified with the F10 Setup program</li> </ul>	X	X	X
DIMM Serial Presence Detect	Detects whether or not memory DIMMs are present and their type	X	X	X
Hard drive serial number, model, and manufacturer	Hard drive manufacturer, model, and serial number is stored in the hard drive firmware and reported in ROM-based F10 setup	X	X	X
Monitor serial number, model & manufacturer	--	X	X	X
System serial number, model, & manufacturer	System serial number, model, & manufacturer stored in a non-volatile memory and can be retrieved with management SW or viewed in ROM-based F10 setup	X	X	X
ROM revision levels	<ul style="list-style-type: none"> <li>• Identifies system ROM revision levels and reports in ROM-based F10 setup</li> <li>• Version is stored in an industry standard memory location (SMBIOS) so that management SW applications can use and report this information</li> </ul>	X	X	X
System board revision level	<ul style="list-style-type: none"> <li>• Allows management SW to read the revision level of the system board</li> <li>• Revision level is digitally encoded into the hardware and cannot be modified</li> </ul>	X	X	X
Memory Change Alert	Alerts management console if memory is removed or changed	X	X	X
Ownership Tag	A user-defined string stored in non-volatile memory that is displayed in the BIOS splash screen	X	X	X

## Technical Specifications

Security Features	Description	Ultra-slim Desktop	Small Form Factor	Convertible Minitower
Mechanical Hood Security Provision	Security Loop	X	X	X
Kensington Lock Support	Kensington lock slot on the chassis	X	X	X
Cable Lock Provision	Physically secure computer hardware from theft	X	X	X
Serial, Parallel, USB Enable/Disable	Enable or disable serial, parallel or USB ports and hide them from the operating system	X	X	X
Removable Media Write/Boot Control	Prevents the computer from being booted from removable media on supported devices (and can disable writes to media)	X	X	X
Power-On Password	Prevents an unauthorized person from booting up the computer	X	X	X
Setup Password	Prevents an unauthorized person from changing the system configuration	X	X	X
1.2 TPM Embedded Security chip	Supported by Broadcom BCM5752 NIC (Embedded Security Manager for ProtectTools application software is optional)	X	X	X
Hood Removal Sense	Detects if system hood has been removed	X	X	X
Optional Solenoid Hood Lock	Electronic hood lock controlled through F10 Setup		X	X
HP Desktop Security Lock kit support	Protects PC from theft or tampering and includes master key	X	X	X

Fault Notification and Recovery	Description	Ultra-slim Desktop	Small Form Factor	Convertible Minitower
SMART Hard Drives, Fault & Prefailure Notification	<ul style="list-style-type: none"> <li>Allows hard drives to monitor their own health and to raise flags if imminent failures were predicted</li> <li>Predicts failures before they occur. Tracks fault prediction and failure indication parameters such as re-allocated sector count, spin retry count, calibration retry count</li> <li>By avoiding actual hard drive failures, SMART hard drives act as "insurance" against unplanned user downtime and potential data loss from hard drive failure</li> </ul>	X	X	X
Memory Change Notification (Requires HP Client Manager)	Alerts management console if memory is removed or changed	X	X	X
Thermal Notification (Requires HP Client Manager)	Monitors the temperature state within the chassis. Three modes: <ul style="list-style-type: none"> <li>NORMAL – normal temperature ranges</li> <li>ALERTED – excessive temperatures are detected. Raises a flag so action can be taken to avoid shutdown or provide for a smoother system shutdown</li> <li>SHUTDOWN – excessive temperatures are encountered. Automatically shuts down the computer without warning before hardware component damage occurs</li> </ul>	X	X	X

## Technical Specifications

Altiris Local Recovery	Provides data and system file protection for HP business PCs to enable fast recovery of information that is accidentally deleted or if the system becomes corrupted. Designed for disconnected or seldom-connected users, Local Recovery protects your HP computer's data and system state by taking scheduled snapshots, which are then stored in a protected area on the local hard disk. System backup and disaster recovery is now simple and fast for all users, regardless of connectivity.	X	X	X
Surge Tolerant Full Ranging Power Supply	Withstands power surges up to 2000V	X	X	X
Ultra ATA Integrity Monitoring (CRC Checking)	Provides data transfer verification and proactive notification of hard drive data transmission problems with recommendations for enhancing system performance. It detects all the following errors types: <ul style="list-style-type: none"> <li>• single bit errors</li> <li>• double bit errors</li> <li>• an odd number of errors</li> <li>• error bursts up to 32-bits long</li> </ul>	X	X	X

System Software Updating	Description	Ultra-slim Desktop	Small Form Factor	Convertible Minitower
Subscriber's Choice	Free web-based subscription service that provides customized support information, products tips, and feature articles based on subscriber profile <ul style="list-style-type: none"> <li>• E-mail Driver and Support Alerts/Notifications (available WW) <ul style="list-style-type: none"> <li>○ Proactive email information on drivers, software patches, product change notifications, and customer advisories on HP product lines</li> <li>○ The Product Change Notification service provides information on hardware and software changes that will be implemented in manufacturing up to 60-days in advance</li> </ul> </li> <li>• E-newsletters (available NA) <ul style="list-style-type: none"> <li>○ HP Technology at Work</li> <li>○ SMB Promotional Newsletter</li> </ul> </li> </ul>	X	X	X
Remote ROM Flash	Provides secure, fail-safe ROM image management from a central network console	X	X	X
Remote Wakeup/ Remote Shutdown	<ul style="list-style-type: none"> <li>• System administrators can power on, restart, and power off a client computer from a remote location.</li> <li>• Enables cost-effective power consumption when the administrator needs to distribute software, perform security management, or update the ROM.</li> </ul>	X	X	X
ROM Based Setup (F10) and Start-up Diagnostics	--	X	X	X
Support Software CD & WWW	--	X	X	X



## Technical Specifications

Other Features	Description	Ultra-slim Desktop	Small Form Factor	Convertible Minitower
ACPI-Ready Hardware	Advanced Configuration and Power Management Interface (ACPI). <ul style="list-style-type: none"> <li>Allows the system to wake from a low power mode.</li> <li>Controls system power consumption, making it possible to place individual cards and peripherals in a low-power or powered-off state without affecting other elements of the system.</li> </ul>	X	X	X
SMBIOS Ver. 2.4	System Management BIOS, previously known as DMI BIOS, for system management information	X	X	X
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	X	X	X
Dual-State Power Button	Power button acts as both an on/off button and suspend-to-sleep button	X	X	X

Serviceability Features of System	Description	Ultra-slim Desktop	Small Form Factor	Convertible Minitower
Dual Color Power LED on Front of Computer (Indicates Normal Operations and Fault Conditions)	--	X	X	X
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	X	X	X
System/Emergency ROM	Recovers corrupted system BIOS.	X	X	X
Flash Recovery with Video Configuration Record SW	--	X	X	X
Over-Temp Warning on Screen (Requires IM Agents)	--	X	X	X
OS CD (Restore OS CD)	Restores computer to its original factory shipping image	X	X	X
Restore CD	Restores the computer to its original factory shipping image	X	X	X
Flash ROM	--	X	X	X
5 Aux Power LED on System PCA	--	X	X	X
Clear Password Jumper	--	X	X	X
Clear CMOS Button	--	X	X	X
CMOS Battery Holder for easy Replacement	--	X	X	X

### Technical Specifications

Processor ZIP Socket for easy Upgrade	--	X	X	X
DIMM Connectors for easy Upgrade	--	X	X	X
NIC LEDs (integrated) (Green & Amber)	Used to determine NIC status	X	X	X

Serviceability Features of Chassis	Description	Ultra-slim Desktop	Small Form Factor	Convertible Minitower
Dual Color Power and HD LED - To Indicate Normal Operations and Fault Conditions	--	X	X	X
ASF 2.0 support (Alert Standard Format)	Industry-standard specification for network alerting in operating system-absent environments	X	X	X
Front power switch	--	X	X	X
Green Pull Tabs, and Quick Release Latches for easy Identification	--	X	X	X
Color coordinated cables and connectors		X	X	X
System memory can be upgraded without removing the system board or any internal components	Eases memory upgrading	X	X	X
Tool-less Hood Removal	Eases entry to the chassis without use of special tools	X (thumb screw)	X	X
Tool-less Hard Drive, CD & Diskette Removal	--	X	X	X
Tool-less System Board Removal	No special tools required for system board removal or maintenance	X	X	X
Towerable	Product can be oriented as a tower (in addition to desktop orientation)	X	X	X
Drive Self Tests (DPS)	<ul style="list-style-type: none"> <li>• Drive Protection System</li> <li>• A diagnostic hard drive self test. It scans critical physical components and every sector of the hard drive for physical faults and then reports any faults to the user.</li> <li>• Running independently of the operating system, it can be accessed through a Windows-based diagnostics utility or through the computer's setup procedure. It produces an evaluation on whether the hard drive is the source of the problem and needs to be replaced.</li> <li>• The system expands on the Self-Monitoring, Analysis, and Reporting Technology (SMART), a continuously running systems diagnostic that alerts the user to certain types of failures</li> </ul>	X	X	X
DPS Access through F10 Setup during Boot		X	X	X
DPS Access through Diagnostics for Windows		X	X	X

## Technical Specifications

SMART Technology (Self-Monitoring, Analysis and Reporting Technology)	<p>Allows hard drives to monitor their own health and to raise flags if imminent failures were predicted</p> <ul style="list-style-type: none"> <li>Predicts failures before they occur. Tracks fault prediction and failure indication parameters such as re-allocated sector count, spin retry count, calibration retry count</li> <li>By avoiding actual hard drive failures, SMART hard drives act as "insurance" against unplanned user downtime and potential data loss from hard drive failure</li> </ul>	X	X	X
SMART I - Drive Failure Prediction		X	X	X
SMART II - Off-Line Data Collection		X	X	X
SMART III - Off-Line Read Scanning with Defect Reallocation		X	X	X

<b>Service and Support</b>	<p>On-site Warranty and Service <a href="#">Note 1</a>: 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 <a href="#">Note 2</a> and includes free telephone support <a href="#">Note 3</a> 24 x 7. Global coverage <a href="#">Note 2</a> ensures that any product purchased in one country and transferred to another non-restricted country will remain fully covered under the original warranty and service offering. Some countries/regions do not offer one year onsite and labor.</p>
	<p><a href="#">NOTE 1</a>: Terms and conditions may vary by country. Certain restrictions and exclusions apply.</p>
	<p><a href="#">NOTE 2</a>: On-site service may be provided pursuant to a service contract between HP and an authorized HP third-party provider, and is not available in certain countries. Global service response times are based on commercially reasonable best effort and may vary by country.</p>
	<p><a href="#">NOTE 3</a>: Technical telephone support applies only to HP-configured, HP and HP-qualified, third-party hardware and software. Toll-free calling and 24 x 7 support may not be available in some countries.</p>

## Technical Specifications - Audio

High Definition Audio	Type	Integrated
	High Definition Stereo Codec	Yes – Realtek ACL260
	Audio Jacks	Microphone-In (64-K ohm Input Impedance); front and rear stereo analog microphone ports available except for USDT, which has front stereo microphone only Line-In (64-K ohm Input Impedance) Line-Out * (200 ohms Output Impedance, expects at least a 10-K ohm load) Headphone-Out (1 Ohm Output Impedance, expects at least a 32 ohm load)
	<b>NOTE:</b> *Internal Speaker Amplifier is for Internal Speaker only. External Speakers need to be powered externally.	
	Sampling	8 kHz - 192 kHz
	Wavetable Syntheses (software)	Yes - Uses OS soft wavetable
	Analog Audio	Yes
	Number of Channels on Line-Out (mono/stereo)	Stereo (Left & Right channels)
	Internal Audio Speaker Power Rating	1.5 W
	Internal Speaker	Yes
	External Speaker Jack (Line-Out)	Yes

### Technical Specifications - Communications

Integrated Broadcom NetXtreme Gigabit Ethernet	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 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	<b>Operating temperature</b>	32° to 131°F (0° to 55° C)
		<b>Operating humidity</b>	85% at 131° F (55° C)
	Operating system driver support	Microsoft Windows NT 4.0, Microsoft Windows 98, Microsoft 2000, Microsoft XP	
	Management capabilities	ACPI, WOL and DMI 2.0, PXE 2.0, WfM 2.0, Broadcom mgmt utility	
Alerting	N/A		

Intel Pro 1000 MT Gigabit NIC	Connector	RJ-45	
	Controller	Intel 82540EM Gigabit Controller	
	Memory	Integrated 96Kb frame buffer memory	
	Data rates supported	10/100/1000 Mbps	
	Compliance	IEEE 802.1A, 802.1P, 802.1Q, 802.2, 802.3, 802.3AB and 802.3u compliant, 802.3x flow control	
	Bus architecture	PCI 2.2	
	Data path width	32-bit, 33/66 MHz bus interface	
	Data transfer mode	Bus-master DMA	
	Hardware certifications	FCC, B, CE, TUV- cTUVus Mark Canada and United States, TUV- GS Mark for European Union	
	Power requirement	1.48 watts @ +3.3V AUX supply with 5V tolerance	
	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,	1000 Mbps	

### Technical Specifications - Communications

<b>Environmental</b>	<b>Operating temperature</b>	32° to 131° F (0° to 55° C)
	<b>Operating humidity</b>	85% at 131° F (55° C)
<b>Dimensions</b>		6.4 x 4.8 x 0.8 in (16.3 x 12.1 x 1.9 cm)
<b>Operating system driver support</b>		Microsoft Windows NT 4.0, Microsoft Windows 98, Microsoft 2000, Microsoft XP
<b>Management capabilities</b>		ACPI, WOL and DMI 2.0, PXE 2.0, WfM 2.0, Intel PROset II utility

#### Agere 56K PCI SoftModem

<b>Data Transmission</b>	Technology speeds: 56,000 Kbps maximum downstream data, controllerless <b>NOTE:</b> 56 Kbps technology refers to download speeds only and requires compatible modems at server sites. Other conditions may limit modem speed. FCC limitations allow a maximum of 53 Kbps during download transmissions.
<b>Data Speeds</b>	(Upload only) 33,600/31,200/28,800/26,400/21,600/19,200/16,800/14,400/12,000/9,600/7,200/4,800/2,400/1,200/300
<b>Data Standards</b>	ITU-T V.90, ITU-T, ITU-T V.34, V.44, V.42, V.42bis21, V.32bis, Bell 212A, and Bell 103
<b>Fax Speeds</b>	14,400/12,000/9,600/7,200/4,800/2,400/1,200/300 b/s
<b>Fax Mode Capabilities</b>	ITU-T T.31 class 1 FAX, V. 17, V.29, V.27ter, and V.21 Channel 2
<b>Error Correction and Data Compression</b>	V.44, 42bis, V.42 and MNP2-5
<b>Power Management</b>	ACPI; PPM1 1.1 and wake support with PME and Vaux; meets PCI 2.3 requirements and PC 2001 requirements
<b>Upgradeability</b>	Driver upgradeable for future enhancements
<b>Video</b>	ITU-T V.80 video ready interface
<b>Other</b>	TIA/EIA 602 standard AT command set Integrated DTE interface with speeds of up to 115.2 Kbps, parallel 16550a UART-compatible interface Optional ring wakeup signal
<b>Operating Temperature</b>	32° to 158° F (0° to 70° C)
<b>Operating Humidity</b>	20% to 90%, non-condensing
<b>Operating System Support</b>	Microsoft® Windows® 2000 and Microsoft Windows XP
<b>OS Driver Support</b>	Microsoft Windows 2000 and Microsoft Windows XP
<b>Power</b>	Requires a 3.3-V auxiliary power rail on PCI bus Uses only one PCI load (i.e., one grant/request pair), one shared IRQ, one electrical load
<b>Chipset</b>	Agere Systems SV92PL – Integrated PCI interface with 5-V tolerant buffers and CardBus support
<b>Dimensions (L X H)</b>	Complies with PCI low profile specifications-6.7 x 2.3 in (17.0 x 5.8 cm) and supports high- and low-profile brackets
<b>Connection</b>	Single RJ-11 connector
<b>Other Features</b>	Digital line protection, call progress monitoring via on-board piezo device, support for high profile and low profile brackets, PnP ID support

## Technical Specifications - Communications

<b>Safety</b>	UL recognized to UL 1950, 3rd edition (U.S. and Canada); IEC 950 (TUV, NEMKO, DEMKO, SEMKO); CE Mark, EC 950 (TUV, NEMKO, DEMKO, SEMKO, CE mark)
<b>EMC</b>	FCC Part 15, IC ES003, EN 55022, 3rd edition, EN 55024, annex A, EN 61000-4-6, EN 61000-4-8
<b>Telecom</b>	FCC Part 68, IC-CS-03 (Canada); Worldwide PTT approvals Not available in Korea or the Republic of South Africa.
<b>Health</b>	Bare PCB material compliant to 94V-0 or better (marked as such)
<b>Other</b>	PC 2001 compliant, PCI version 2.3, WHQL approved; ACPI compliant

## Technical Specifications - Graphics

<p><b>Integrated Graphics Media Accelerator 950</b></p>	<p><b>3D/2D Controller</b></p>	<p>Microsoft DirectX® 9 based with support for Pixel Shader 2.0, 4:1 anisotropic filtering, Gaussian texture filtering, shadow maps, volumetric textures, double-sided stencil buffers, and 4 pixel pipes.</p>
	<p><b>VGA Controller</b></p>	<p>Integrated</p>
	<p><b>Bus Type</b></p>	<p>PCI Express™ x16 (Internal graphics is automatically disabled if an external PCIE or PCI graphics card is installed. If the external graphics card is installed in a PCI slot, the internal graphics can be re-enabled using the system's BIOS setup utility. If the external graphics card is installed in the PCI Express™ slot, the internal graphics cannot be enabled).</p>
	<p><b>RAMDAC</b></p>	<p>Integrated, 400 MHz</p>
	<p><b>Memory</b></p>	<p>Graphics memory is shared with system memory. Graphics memory usage can vary from 8-128 MB 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 using Intel's Dynamic Video Memory Technology (DVMT) to balance the optimum amount of memory between graphics and other system use.            Memory &lt; 256 MB: 8 MB pre-allocated (for DOS) + 24 MB DVMT : max frame buffer of 32 MB            256 MB &lt;= Memory: 8 MB pre-allocated + 120 MB DVMT : max frame buffer of 128 MB</p>
	<p><b>Controller Clock Speed</b></p>	<p>400 MHz</p>
	<p><b>Overlay Planes</b></p>	<p>Single overlay support with 5x3 filtering</p>
	<p><b>Maximum Color Depth</b></p>	<p>32 bits/pixel</p>
	<p><b>Maximum Vertical Refresh Rate</b></p>	<p>85 Hz at up to 1920x1440, 85Hz at 2048x1536. Varies with mode and configuration. See table below.</p>
	<p><b>Multi-display Support</b></p>	<p>Support for one CRT via the motherboard's VGA connector. Support for an additional DVI-D display via the optional DVI ADD2 card. Dual independent displays and dual synchronous (Twin or Clone mode) displays are supported.</p>
	<p><b>Operating Systems</b></p>	<p>Microsoft Windows XP and Windows 2000</p>
	<p><b>Graphics/Video API Support</b></p>	<p>Microsoft DirectX®9, DirectXA®, VMR9, GDI/GDI+; OpenGL® 1.4.</p>

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

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

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



## Technical Specifications - Graphics

<b>DVI ADD2 Graphics</b>	<b>Models</b>	DY674A Intel DVI ADD2 adapter for Convertible Minitower and Small Form Factor				
	<b>Form Factor</b>	Low-profile card (normal layout for Convertible Minitower; reverse layout for Small Form Factor)				
	<b>DVI-D Connector</b>	Compliant with DDWG (Digital Display Working Group) and VESA specifications for a single-link digital DVI (DVI-D) connector.				
	<b>Dual Head Support</b>	Yes, when used with the integrated VGA connector				
	<b>Display Devices Supported</b>	HP L1530 HP L1740 HP L1755 HP L1940 HP L1955 HP L2035 HP L2335				
		<b>NOTE:</b> The DVI ADD2 card offers optimal performance with any display that meets applicable VESA standards.				
	<b>Color Depth</b>	All modes support 8-bpp, 16-bpp, and 24-bpp color depths (up to 16.7 million colors)				
	<b>Host Interface Connector</b>	Mechanically compliant with PCI-E standard Complies with the Intel ADD2 and Intel Serial Digital Video Output (SDVO) specifications				
	<b>Dot Clock</b>	165 MHz maximum				
	<b>Display Modes</b>	Supports display modes that require up to 165-MHz bandwidth on the link, as shown in the following table.				
	<b>Resolution</b>		<b>60-Hz LCD</b>	<b>60-Hz</b>	<b>75-Hz</b>	<b>85-Hz</b>
	Blanking		5% reduced	GTF	GTF	GTF
	640 x 480	VGA	Yes	Yes	Yes	Yes
	800 x 600	SVGA	Yes	Yes	Yes	Yes
	1024 x 768	XGA	Yes	Yes	Yes	Yes
	1280 x 1024	SXGA	Yes	Yes	No	No
	1600 x 1200	UXGA	Yes	Yes	No	No

## Technical Specifications - Graphics

ATI RADEON X300 SE PCI Express Graphics	Models	ATI RADEON X300 SE PCI Express 128-MB DDR single head DVI with TV out	
	Bus Type	PCI Express (x16 lanes)	
	Maximum Vertical Refresh Rate	85 Hz	
	Display Support	Integrated 400MHz RAMDAC	
	Display Max Resolution	2048 x 1536	
	Board Display Options	<b>128 MB Card Display Option</b> DVI-I + TV DVI-I supports analog CRT or flat panel or digital flat panel (using DVI-A, DVI-D or DVI-I connector) DVI-I supports analog CRT or flat panel (with VGA connector and DVI-I to VGA dongle) TV Connector is a 7-pin mini-DIN (also allowing 4-pin S-Video without adaptor)	
	<b>Board Configuration</b> 128 MB Frame Buffer	<b>Specification</b>	<b>Description</b>
		Graphics Chip	RADEON X300 SE PCI Express
		Core clock	200 MHz
		Memory clock	200 MHz
		Frame buffer	128 MB DDR
		Memory I/O	64 bit
		Memory Configuration	4 pcs 16M x 16 DDR
	Memory Type	DDR1	
	Maximum Memory	128MB	
	Operating Systems Support	Windows 2000, Windows XP	
	Core Power	10 W (Max ASIC power) 18 W (Max Board power)	
	Option Kit Contents	ATI RADEON X300 SE PCI Express graphics card with full height bracket attached Low profile bracket Software CD with graphics drivers Warranty documentation	

## Technical Specifications - Graphics

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

**Available graphics drivers** Microsoft Windows 2000 and Microsoft Windows XP (Provides full native Dual View mode, Span or Big Desktop mode, and Clone mode)

**NOTE:** HP qualified drivers may be preloaded or available from the HP support Web site:

[http://welcome.hp.com/country/us/eng/software\\_drivers.html](http://welcome.hp.com/country/us/eng/software_drivers.html).

Analog Resolution	Maximum Colors Supported	Maximum Refresh Rate
640 x 480	16.7 M	240 Hz
800 x 600	16.7 M	240 Hz
1024 x 768	16.7 M	200 Hz
1600 x 1200	16.7 M	170 Hz
1600 x 1200	16.7 M	150 Hz
1600 x 1200	16.7 M	100 Hz
1920 x 1200	16.7 M	85 Hz
1920 x 1200	16.7 M	85 Hz
1920 x 1440	16.7 M	75 Hz
2048 x 1536	16.7 M	60 Hz
Digital Resolution	Maximum Colors Supported	Maximum Refresh Rate
640 x 480	16.7 M	75 Hz
800 x 600	16.7 M	75 Hz
1024 x 768	16.7 M	75 Hz
1152 x 864	16.7 M	60 Hz
1280 x 1024	16.7 M	60 Hz
1600 x 1200	16.7 M	60 Hz (primary only)

## Technical Specifications - Graphics

<b>NVIDIA Quadro NVS 50 64MB PCI DVI with TV- Out</b>	<b>Form Factor</b>	Low profile, both ATX and low profile brackets included
	<b>Graphic Controller</b>	Integrated Quadro 50 Graphics Processor Unit (GPU)
	<b>Bus type</b>	PCI 2.1, 32-bit, 5V
	<b>Memory</b>	64 MB DDR
	<b>Connectors</b>	Single DVI-I connector Single S-Video connector
	<b>Dimensions</b>	Low profile, 2.586 x 6.6 in (6.57 x 16.76 cm)
	<b>Controller clock speed</b>	250 MHz
	<b>Memory speed</b>	200 MHz
	<b>Color depth</b>	32-bits/pixel max
	<b>Overlay planes</b>	One 16 bit video overlay plane
	<b>Maximum vertical refresh rate</b>	85 Hz
	<b>Maximum pixel clock</b>	Analog output: 350 MHz Digital output: 162 MHz
	<b>Single DVI Support</b>	Yes
	<b>TV out support</b>	Yes (S-Video 4 pin mini-Din)
	<b>High-definition Video Processor (HDVP)</b>	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 colorspace conversion (YUV 4:2:2 and 4:2:0) IDCT motion compensation Up to 5-tap horizontal by 3-tap vertical filtering
<b>Available graphics drivers</b>	Microsoft Windows 2000 and Microsoft Windows XP HP qualified drivers may be preloaded or available from the HP support Web site: <a href="http://welcome.hp.com/country/us/eng/software_drivers.html">http://welcome.hp.com/country/us/eng/software_drivers.html</a>	

Analog Resolution	Maximum Colors Supported	Maximum Refresh Rate
640 x 480	32 M	85 Hz
800 x 600	32 M	85 Hz
1024 x 768	32 M	85 Hz
1280 x 1024	32 M	85 Hz
1600 x 1024	32 M	85 Hz
1600 x 1200	32 M	85 Hz
1920 x 1080	32 M	85 Hz
1920 x 1200	32 M	85 Hz
1920 x 1440	32 M	75 Hz
2048 x 1536	16.7 M	75 Hz
Digital Resolution	Maximum Colors Supported	Maximum Refresh Rate
640 x 480	32 M	60 Hz
800 x 600	32 M	60 Hz
1024 x 768	32 M	60 Hz
1280 x 1024	32 M	60 Hz
1600 x 1200	32 M	60 Hz
TV Output Resolution	Maximum Colors Supported	Maximum Refresh Rate
640 x 480	32 M	60 Hz
800 x 600	32 M	60 Hz
1024 x 768	32 M	60 Hz

## Technical Specifications - Hard Drives

7200 rpm Serial ATA Hard Drives	160-GB	<b>Capacity</b>	163,928,604,672 bytes			
		<b>Height</b>	1 in (2.54 cm)			
		<b>Width</b>	Media diameter: 3.5 in (8.89 cm) Physical size: 4 in (10.2 cm)			
		<b>Interface</b>	Serial ATA (3.0 Gb/s)			
		<b>Synchronous Transfer Rate (Maximum)</b>	Up to 3 Gb/s			
		<b>Buffer</b>	8 MB			
		<b>Seek Time</b> (typical reads, includes controller overhead, including settling)	<b>Single Track</b>	0.9 ms		
			<b>Average</b>	9.3 ms		
			<b>Full-Stroke</b>	21 ms		
		<b>Rotational Speed</b>	7,200 rpm			
		<b>Logical Blocks</b>	320,173,056			
		<b>Operating Temperature</b>	41° to 131° F (5° to 55° C)			
			80-GB	<b>Capacity</b>	80,026,361,856 bytes	
				<b>Height</b>	1 in (2.54 cm)	
<b>Width</b>	Media diameter: 3.5 in (8.89 cm) Physical size: 4 in (10.2 cm)					
<b>Interface</b>	Serial ATA (3.0 Gb/s)					
<b>Synchronous Transfer Rate (Maximum)</b>	Up to 3 Gb/s					
<b>Buffer</b>	8 MB					
<b>Seek Time</b> (typical reads, includes controller overhead, including settling)	<b>Single Track</b>			2.0 ms		
	<b>Average</b>			9.3 ms		
	<b>Full-Stroke</b>			18 ms		
<b>Rotational Speed</b>	7,200 rpm					
<b>Logical Blocks</b>	156,301,488					
<b>Operating Temperature</b>	41° to 131° F (5° to 55° C)					

## Technical Specifications - Hard Drives

40-GB	<b>Capacity</b>	40,020,000,000 bytes	
	<b>Height</b>	1 inch (2.54 mm)	
	<b>Width</b>	Media diameter: 3.5 in (8.89 cm) Physical size: 4 in (10.2 cm)	
	<b>Interface</b>	Serial ATA	
	<b>Synchronous Transfer Rate (Maximum)</b>	Up to 1.5 Gb/s	
	<b>Buffer</b>	2 MB	
	<b>Seek Time</b> (typical reads, includes controller overhead, including settling)	<b>Single Track</b>	1.0 ms
		<b>Average</b>	8.5 ms
		<b>Full-Stroke</b>	18.0 ms
	<b>Rotational Speed</b>	7,200 rpm	
	<b>Logical Blocks</b>	78,165,360	
	<b>Operating Temperature</b>	41° to 131° F (5° to 55° C)	

### Technical Specifications - Input/Output Devices

<b>USB 2004 Standard Keyboard</b>	<b>Physical characteristics</b>	<b>Keys</b>	104, 105, 106, 107, 109 layout (depending upon country)
		<b>Dimensions (L x W x H)</b>	18.0 x 6.4 x 0.98 in (45.8 x 16.3 x 2.5 cm)
		<b>Weight</b>	2 lb (0.9 kg) minimum
	<b>Electrical</b>	<b>Operating voltage</b>	+ 5VDC $\pm$ 5%
		<b>Power consumption</b>	50-mA maximum (with three LEDs ON)
		<b>System interface</b>	USB Type A plug connector
		<b>ESD</b>	CE level 4, 15-kV air discharge
		<b>EMI - RFI</b>	Conforms to FCC rules for a Class B computing device
	<b>Mechanical</b>	<b>Microsoft® PC 99 - 2001</b>	Functionally compliant
		<b>Languages</b>	38 available
		<b>Keycaps</b>	Low-profile design
		<b>Switch actuation</b>	55-g nominal peak force with tactile feedback
		<b>Switch life</b>	20 million keystrokes (using Hasco modified tester)
		<b>Switch type</b>	Contamination-resistant switch membrane
		<b>Key-leveling mechanisms</b>	For all double-wide and greater-length keys
		<b>Cable length</b>	6 ft (1.8 m)
		<b>Microsoft PC 99 - 2001</b>	Mechanically compliant
	<b>Environmental</b>	<b>Acoustics</b>	43-dBA maximum sound pressure level
		<b>Operating temperature</b>	50° to 122° F (10° to 50° C)
		<b>Non-operating temperature</b>	-22° to 140° F (-30° to 60° C)
		<b>Operating humidity</b>	10% to 90% (non-condensing at ambient)
		<b>Non-operating humidity</b>	20% to 80% (non-condensing at ambient)
		<b>Operating shock</b>	40 g, six surfaces
		<b>Non-operating shock</b>	80 g, six surfaces
		<b>Operating vibration</b>	2-g peak acceleration
		<b>Non-operating vibration</b>	4-g peak acceleration
		<b>Drop (out of box)</b>	26 in (66 cm) on carpet, six-drop sequence
		<b>Drop (in box)</b>	42 in (107 cm) on concrete, 16-drop sequence
	<b>Operating system support</b>	Windows 2000 and Windows XP	
	<b>Approvals</b>	UL, CSA, FCC, CE Mark, TUV, TUV GS, VCCI, BSMI, C-Tick, MIC	
	<b>Ergonomic compliance</b>	ANSI HFS 100, ISO 9241-4, and TUVGS	
	<b>Kit contents</b>	Keyboard, installation guide, warranty card, safety and comfort guide	

### Technical Specifications - Input/Output Devices

PS/2 2004 Standard Keyboard	Physical characteristics	Keys	104, 105, 106, 107, 109 layout (depending upon country)
		Dimensions (L x W x H)	18.0 x 6.4 x 0.98 in (45.8 x 16.3 x 2.5 cm)
		Weight	2 lb (0.9 kg) minimum
	Electrical	Operating voltage	+ 5VDC $\pm$ 5%
		Power consumption	50-mA maximum (with three LEDs ON)
		System interface	PS/2 6-pin mini din connector
		ESD	CE level 4, 15-kV air discharge
		EMI - RFI	Conforms to FCC rules for a Class B computing device
	Mechanical	Microsoft PC 99 - 2001	Functionally compliant
		Languages	38 available
		Keycaps	Low-profile design
		Switch actuation	55-g nominal peak force with tactile feedback
		Switch life	20 million keystrokes (using Hasco modified tester)
		Switch type	Contamination-resistant switch membrane
		Key-leveling mechanisms	For all double-wide and greater-length keys
		Cable length	6 ft (1.8 m)
		Microsoft PC 99 - 2001	Mechanically compliant
	Environmental	Acoustics	43-dBA maximum sound pressure level
		Operating temperature	50° to 122° F (10° to 50° C)
		Non-operating temperature	-22° to 140° F (-30° to 60° C)
		Operating humidity	10% to 90% (non-condensing at ambient)
		Non-operating humidity	20% to 80% (non-condensing at ambient)
		Operating shock	40 g, six surfaces
		Non-operating shock	80 g, six surfaces
		Operating vibration	2-g peak acceleration
		Non-operating vibration	4-g peak acceleration
		Drop (out of box)	26 in (66 cm) on carpet, six-drop sequence
		Drop (in box)	42 in (107 cm) on concrete, 16-drop sequence
	Operating system support	Microsoft Windows 2000 and Windows XP	
	Approvals	UL, CSA, FCC, CE Mark, TUV, TUV GS, VCCI, BSMI, C-Tick, MIC	
	Ergonomic compliance	ANSI HFS 100, ISO 9241-4, and TUVGS	
	Kit contents	Keyboard, keyboard software media, installation guide, warranty card, safety and comfort guide	

HP USB Easy Access Smartcard Keyboard	Physical characteristics	Keys	104, 105, 106, 107, 109 layout (depending upon country) plus eight programmable keys for Internet, shortcuts, or multimedia
		Form factor	USB basic smartcard keyboard
		Colors	Carbonite/Silver
		Dimensions (L x W x H)	18.2 x 6.3 x 1.3 in (46.3 x 16.1 x 3.3 cm)



### Technical Specifications - Input/Output Devices

Electrical	Weight	2 lb (0.9 kg) minimum	
	Operating voltage	+ 5VDC $\pm$ 5%	
	Power consumption	100-mA maximum (with four LEDs ON)	
	System interface	USB Type A plug connector	
	ESD	CE level 4, 15-kV air discharge	
	EMI - RFI	Conforms to FCC rules for a Class B computing device	
Mechanical	Microsoft PC 99 - 2001	Functionally compliant	
	Languages	30+ available	
	Keycaps	Low-profile design	
	Switch actuation	55-g nominal peak force with tactile feedback	
	Switch life	20 million keystrokes (using Hasco modified tester)	
	Switch type	Contamination-resistant 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	
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	O2Micro	
	Standard APIs supported	PC/SC, EMV, 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)

### Technical Specifications - Input/Output Devices

	<b>Communication</b>	<b>From card</b>	Programmable from 9,600 baud to 115,200 baud
		<b>From computer</b>	Up to 38,400 baud
	<b>Landing mechanism</b>	<b>Contact device</b>	Friction contact
		<b>Card insertions rating</b>	Up to 100,000 insertion cycles
	<b>Interface modes</b>	USB communications through USB port O2Micro protocol Automatic card insertion/removal detection	
	<b>Reader performance interface</b>	USB connection	
	<b>Electro-magnetic standards</b>	<b>Europe</b>	89/336/CEE guideline
		<b>USA</b>	USAFCC part 15
<b>Operating system support</b>	Microsoft Windows 2000 and Windows XP		
<b>Approvals</b>	CE-Mark, UL, CSA, FCC, CE Mark, TUV, TUV GS, VCCI, BSMI, C-Tick, MIC		
<b>Ergonomic compliance</b>	ANSI HFS 100, ISO 9241-4, and TUVGS		

<b>USB 2004 Standard BG1650 (gray)</b>	<b>Physical characteristics</b>	<b>Keys</b>	104, 105, 106, 107, 109 layout (depending upon country)
		<b>Dimensions (L x W x H)</b>	18.0 x 6.4 x 0.98 in (45.8 x 16.3 x 2.5 cm)
		<b>Weight</b>	2 lb (0.9 kg) minimum
	<b>Electrical</b>	<b>Operating voltage</b>	+ 5VDC $\pm$ 5%
		<b>Power consumption</b>	50-mA maximum (with three LEDs ON)
		<b>System interface</b>	USB Type A plug connector
		<b>ESD</b>	CE level 4, 15-kV air discharge
		<b>EMI - RFI</b>	Conforms to FCC rules for a Class B computing device
	<b>Mechanical</b>	<b>Microsoft PC 99 - 2001</b>	Functionally compliant
		<b>Languages</b>	38 available
		<b>Keycaps</b>	Low-profile design
		<b>Switch actuation</b>	55-g nominal peak force with tactile feedback
		<b>Switch life</b>	20 million keystrokes (using Hasco modified tester)
<b>Switch type</b>		Contamination-resistant switch membrane	
<b>Key-leveling mechanisms</b>		For all double-wide and greater-length keys	
<b>Cable length</b>		6 ft (1.8 m)	
<b>Microsoft PC 99 - 2001</b>	Mechanically compliant		
<b>Acoustics</b>	43-dBA maximum sound pressure level		

### Technical Specifications - Input/Output Devices

<b>Environmental</b>	<b>Operating temperature</b>	50° to 122° F (10° to 50° C)
	<b>Non-operating temperature</b>	-22° to 140° F (-30° to 60° C)
	<b>Operating humidity</b>	10% to 90% (non-condensing at ambient)
	<b>Non-operating humidity</b>	20% to 80% (non-condensing at ambient)
	<b>Operating shock</b>	40 g, six surfaces
	<b>Non-operating shock</b>	80 g, six surfaces
	<b>Operating vibration</b>	2-g peak acceleration
	<b>Non-operating vibration</b>	4-g peak acceleration
	<b>Drop (out of box)</b>	26 in (66 cm) on carpet, six-drop sequence
	<b>Drop (in box)</b>	42 in (107 cm) on concrete, 16-drop sequence
<b>Operating system support</b>	Windows 2000 and Windows XP	
<b>Approvals</b>	UL, CSA, FCC, CE Mark, TUV, TUV GS, VCCI, BSMI, C-Tick, MIC, BG Prufzert Mark	
<b>Ergonomic compliance</b>	ANSI HFS 100, ISO 9241-4, and TUVGS	
<b>Kit contents</b>	Keyboard, installation guide, warranty card, safety and comfort guide	

<b>HP Smartcard Adapter</b>	<b>Physical characteristics</b>	<b>Dimensions (L x W x H)</b>	6.73 x 4.1 x 1.13 in (171 x 104 x 28.9 mm)	
	<b>Electrical</b>	<b>Operating voltage</b>	4.75 ~ 5.25 VDC	
		<b>Input current</b>	100 mA Max. with LED's on	
		<b>System interface</b>	RJ11 umbilical cable to the keyboard (Also functions a stand-alone USB device, independent of the modular keyboard)	
		<b>ESD</b>	CE level 4, 15-kV air discharge	
		<b>EMI - RFI</b>	Conforms to FCC rules for a Class B computing device	
		<b>Microsoft PC 99 - 2001</b>	Functionally compliant	
	<b>Smart Card Interface</b>	<b>Smart Card Interface</b>	<ul style="list-style-type: none"> <li>• T=0, T=1 support</li> <li>• Memory card upon request</li> <li>• Communication speed: up to 115,200 bps (DI)</li> <li>• Frequency up to 12MHz (FI)</li> <li>• Reads from and writes to all ISO7816 1,2,3,4 memory and microprocessor Class A and AB smart cards</li> <li>• Synchronous and Asynchronous mode</li> <li>• Frequency adjustable clock to speed up transaction</li> <li>• Adjustable transaction speed with Smart Card, up to 1,000 Kb/s for fast Crypto data exchange</li> <li>• Secure PIN Entry</li> </ul>	
			<b>Smart Card Connector</b>	<ul style="list-style-type: none"> <li>• 8 contacts (ISO position)</li> <li>• Certified for 100,000 insertions</li> <li>• Sliding contact</li> </ul>

## Technical Specifications - Input/Output Devices

	API	<ul style="list-style-type: none"> <li>• PC/SC</li> <li>• CT-API (thru wrapper on top of PC/SC)</li> <li>• OCF upon request</li> </ul>
Mechanical	Cable length	2 meters (6.5 feet)
	Microsoft PC 99 - 2001	Mechanically compliant
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
Smart card device support	SCM Approval	<b>Schlumberger</b> CyberFlex Access 32k e-gate CyberFlex Access 64k v1 CryptoFlex 32k CryptoFlex 32k e-gate PayFlex-S PayFlex 1K PayFlex 2K PayFlex 4K PayFlex 8K <b>U.S. Government CAC</b> AXALTO <b>Oberthur CAC</b> Galactic 2.1 CosmopolIC V4 CosmopolIC v4.1 American Express Amex Blue <b>Java</b> Gem Espresso CyberFlex Palmera

## Technical Specifications - Input/Output Devices

	<b>Generic Data Cards</b>	SLE4406 SLE4418 SLE4428 SLE4432 SLE4436 SLE4442 SLE5536 AT24CO1ASC AT24C02SC AT24C04SC AT24CO8SC AT24C16SC AT24C32SC AT24C64SC AT24C128SC AT24C256SC AT24C512SC AT88SC153 AT88SC1608 IS23SC4418 IS23SC4428 PrimeFlex Store 8K PrimeFlex Store 2K X24026 ST 14CO2
	<b>GemPlus Approval</b>	GemExpresso GKK32k GemClub Memo GemClub Micro Gemsafe
<b>Approvals</b>	UL, CSA, FCC, CE Mark, TUV, TUV GS, VCCI, BSMI, C-Tick, MIC, BG Prufzert Mark, EMV, USB-IF	
<b>Ergonomic compliance</b>	ANSI HFS 100, ISO 9241-4, and TUVGS	

---

<b>HP PS/2 Scroll Mouse</b>	<b>Dimensions</b>	3.8 x 6.3 x 11.6 cm (1.5 x 2.5 x 4.6 in)		
	<b>Weight</b>	4.44 oz (126 g)		
	<b>Environmental</b>	<b>Operating temperature</b>	50° to 122° F (10° to 50° C)	
		<b>Non-operating temperature</b>	22° to 140° F (-30° to 60° C)	
		<b>Operating humidity</b>	10% to 90% (non condensing at ambient)	
		<b>Non-operating humidity</b>	20% to 80% (non condensing at ambient)	
		<b>Operating shock</b>	40 g, 6 surfaces	
		<b>Non-operating shock</b>	80 g, 6 surfaces	
		<b>Operating vibration</b>	2 g peak acceleration	
		<b>Non-operating vibration</b>	4 g peak acceleration	
		<b>Drop (out of box)</b>	26 in (66 cm) on carpet, 6-drop sequence	
		<b>Drop (out of box)</b>	1 m on asphalt tile over concrete, 6-drop sequence	

### Technical Specifications - Input/Output Devices

Electrical	Operating voltage	5 VDC $\pm$ 10%
	Power consumption	15 mA
	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 $\pm$ 20% DPI
	Tracking speed	10 in/s (25.4 cm/s) maximum
	Acceleration	100 in/s/s (2.54 m/s/s)
	Switch actuation	65 g nominal peak force
	Switch life	1,000,000 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	.99 in (25.2 mm)
	Maximum rotation speed	30 mm/s
	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
Compatibility	Operating system support	Microsoft® Windows® Me, Windows 2000 and Windows XP

---

HP USB Scroll Mouse	Environmental	Operating temperature	50° to 122° F (10° to 50° C)
		Non-operating temperature	-22° to 140° F (-30° to 60° C)
		Operating humidity	10% to 90% (non condensing at ambient)
		Non-operating humidity	20% to 80% (non condensing at ambient)
		Operating shock	40 g, 6 surfaces
		Non-operating shock	80 g, 6 surfaces
		Operating vibration	2 g peak acceleration
		Non-operating vibration	4 g peak acceleration
		Drop (out of box)	26 in (66 cm) on carpet, 6-drop sequence
		Drop (out of box)	1 m on asphalt tile over concrete, 6-drop sequence

## Technical Specifications - Input/Output Devices

Electrical	Operating voltage	5 VDC $\pm$ 10%
	Power consumption	15 mA
	System consumption	USB Type-A plug connector
	ESD	CE level 4, 15 kV air discharge
	EMI-RFI	Conforms to FCC rules for a Class B computing device
Mechanical	Microsoft® PC99 - 2001	Functionally compliant
	Resolution	400 $\pm$ 20% DPI
	Tracking speed	10 in/s (25.4 cm/s) maximum
	Acceleration	100 in/s/s (2.54 m/s/s)
	Switch actuation	65 g nominal peak force
	Switch life	1,000,000 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
Maximum rotation speed		30 mm/s
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
Compatibility	Operating system support	Microsoft® Windows® 9X, Me, Windows 2000 and Windows XP

---

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, and XP Available USB port

---

## Technical Specifications - Input/Output Devices

HP USB Bluetooth Mouse	Wireless/Optical Mouse	<b>Dimensions</b> (H x L x W)	50° to 122° F (10° to 50° C)
		<b>Weight</b> (Without Two AA Rechargeable Batteries)	0.21 lb (96.2 g)
	<b>System requirements</b>	Microsoft® Windows® 2000 or Windows XP Available USB port for the receiver	
	<b>Approvals</b>	<b>Product Safety</b>	UL; CSA (or alternate Canadian approval); VDE/TUV (Europe only)
		<b>Ergonomics</b>	ANSI; ISO (Europe only); GS Mark (Germany only)
		<b>EMC</b>	FCC, CE, BSMI, CTICK, MIC
		<b>CE Mark</b>	EN 55022:1998; EN 55024
		<b>Design Guidelines for PCs</b>	PC 99 - connector overmold colors; PC 2001 – full functionality
		<b>Telecom</b>	All local telecom requirements and approvals for intended markets
		<b>USA</b>	FCC Part 15 Equipment Certificate; CFR 47, Part 15; other local requirements



## Technical Specifications - Optical Storage

<b>16X DVD+/-RW LightScribe Drive (Double Layer / Dual Format)</b>	<b>Height</b>	5.25-inch, half-height, tray-load
	<b>Orientation</b>	Either horizontal or vertical
	<b>Interface type</b>	ATAPI/EIDE
	<b>Disc recording capacity</b>	8.5 GB DL or 4.7 GB standard
	<b>Dimensions (W x H x D)</b>	5.9 x 1.7 x 8.0 in (15.0 x 4.4 x 20.3 cm)
	<b>Weight (max)</b>	2.6 lb (1.2 kg)
	<b>Write speed</b>	DVD+R Up to 16X DVD+RW Up to 4X DVD+R DL Up to 2.4X DVD-R Up to 8X DVD-RW Up to 4X CD-R Up to 40X CD-RW Up to 24X
	<b>Read speed</b>	DVD+R/-R/+RW/ -RW/+R DL Up to 8X DVD-ROM Up to 16X CD-ROM, CD-R Up to 40X CD-RW Up to 32X
	<b>Access time (typical reads, including settling)</b>	<b>Random</b> DVD: < 130 ms (typical), CD: < 120 ms (typical) <b>Full Stroke</b> DVD: < 240 ms (seek), CD: < 200 ms (seek) <b>Startup Time</b> Single-session: < 15 seconds (typical), Multi-session: < 30 seconds (typical) <b>Stop Time</b> < 4 seconds <b>Cache Buffer</b> 2 MB (minimum) <b>Data Transfer Modes</b> ATA PIO mode 4 (16.7 MB/s); ATA Multi-word DMA mode 2 (16.7 MB/s); ATA UltraDMA Mode 3 (44.4 MB/s -default)
	<b>Power</b>	<b>Source</b> Four-pin, DC power receptacle <b>DC Power Requirement</b> 5 VDC $\pm$ 5%-100 mV ripple p-p 12 VDC $\pm$ 5%-200 mV ripple p-p <b>DC Current</b> 5 VDC (< 1000 mA typical, 1600 mA maximum) 12 VDC (< 600 mA typical, 1400 mA maximum) <b>Total Drive Power (standby mode)</b> < 2.5 Watt
	<b>Audio output</b>	<b>Line-Out</b> 0.7 VRMS <b>Signal-to-Noise Ratio</b> 74 dB <b>Channel Separation</b> 65 dB
	<b>Environmental conditions (operating - non- condensing)</b>	<b>Temperature</b> 41° to 122° F (5° to 50° C) <b>Relative humidity</b> 10% to 90% <b>Maximum wet bulb temperature</b> 86° F (30° C)

### Technical Specifications - Optical Storage

<b>System configuration</b>	Intel PentiumIII Processor or later with 128 MB of memory (required); 256 MB recommended 2-D or 3-D graphics cards on primary disk drive for operating system and application software; second disk drive for audio and video data
<b>Operating systems support</b>	Microsoft Windows 2000, Windows XP Professional, Windows XP Home
<b>Regulatory approvals</b>	MPC-3 compliant, multi-read requirements, ATA Spec X3T9.2, ATAPI Spec T13.1 153D, ANSI C63.4-1992, UL 1950, ACA AS/NZS 3548, CB Bulletin No. 96A, CSA C22.2 No. 950-1995, CFR 47 C.I.S.P.R. Pub 22 Class B, DHHS/FDA, EMKO-TSE 07/94, TUV EN60950, EN60825-1, MIC, BSMI-CNS 13438, CE, Microsoft PC2001 certification, Microsoft Logo for Windows XP and 2000.
<b>Option kit contents</b>	16X DVD+/-RW LightScribe drive, LightScribe software, InterVideo WinDVD, InterVideo WinDVD Creator, Roxio Easy Media Creator 7, Dantz Retrospect Express Backup Software, installation guide, and DVD+R media.

<b>16X/48X DVD-ROM Drive Height</b>	5.25-in, half-height	
<b>Interface Type</b>	ATAPI	
<b>Dimensions— External, Excluding Bezel (W x H)</b>	5.88 x 1.71 in (149.5 x 43.5 mm)	
<b>Disc Diameter</b>	12 cm, 8 cm	
<b>Disc Thickness</b>	1.2 mm	
<b>Track Pitch</b>	1.6 $\mu$ m (CD), 0.74 $\mu$ m (DVD)	
<b>Disc Center Hole Diameter</b>	15 mm	
<b>Disc Formats</b>	DVD-ROM (single and dual layer); DVD-video; DVD-R version 1.0 and 2.0; DVD-RW version 1.0 and 1.1; DVD-R multi-border; DVD+RW; DVD+R, DVD+R DL ; CD-ROM Mode 1 and 2; CD-DA; CD-ROM XA Mode 2, Form 1 and 2; CD-extra; CD-text; CD-I Mode 2, Form 1 and 2; CD-I ready; video CD, CD-bridge; PhotoCD (single and multi-session); CD-R; CD-RW	
<b>Disc Capacity</b>	<b>DVD-ROM</b>	4.7 GB (DVD-5), 8.54 GB (DVD-9), 9.4 GB (DVD-10), 3.95 GB (DVD-R version 1.0), 4.7 GB (DVD-R version 2.0), 4.7 GB (DVD-RW version 1.0 and 1.1), 4.7 GB (DVD+RW), 4.7 GB (DVD+R), 8.5 GB (DVD+R DL)
	<b>CD-ROM</b>	540 MB (Mode 1, 12 cm), 640 MB (Mode 2, 12 cm), 700 MB (80 minimum CD-R and CD-RW), 180 MB (8 cm)
<b>Block Size (bytes)</b>	DVD-ROM - 2048; CD-ROM Mode 0 - 2352; CD-ROM Mode 1 - 2352, 2340, 2336, 2048; CD-ROM Mode 2 - 2352, 2340, 2336, 2048	
<b>Access Times</b> (typical reads, including settling)	<b>DVD-ROM Single Layer</b>	120 ms (typical)
	<b>CD-ROM Mode 1</b>	90 ms (typical)
	<b>Full Stroke DVD</b>	240 ms (seek) (typical)
	<b>Full Stroke CD</b>	160 ms (seek) (typical)
<b>Maximum Data Transfer Rates</b>	<b>CD-ROM Read</b>	7200 KB/s (up to 48X)
	<b>DVD-ROM Read</b>	21,600 KB/s (16X) Max
<b>Data Transfer Modes</b>	PIO Mode 4 (16.6 MB/s); Multi-word DMA mode 2 (16.6 MB/s); UltraDMA Mode 3 (44.4 MB/s)	

## Technical Specifications - Optical Storage

<b>Power</b>	<b>Source</b>	Four-pin, DC power receptacle
	<b>DC Power Requirement</b>	5 VDC $\pm$ 5% – 100 mV ripple p-p 12 VDC $\pm$ 5% – 200 mV ripple p-p
	<b>DC Current</b>	5 VDC – <800 mA typical, < 1000 mA maximum 12 VDC – < 870 mA typical
<b>Audio Output Level</b>	0.7 Vrms (typical)	
<b>Configuration Jumper Block</b>	Master, slave, and cable select modes	
<b>Data Interface Connector</b>	40-pin, shrouded and keyed, flat ribbon	
<b>Environmental</b> (all conditions non-condensing)	<b>Temperature</b> (operating)	41° to 122° F (5° to 50° C)
	<b>Relative Humidity</b> (operating)	10% to 85%
	<b>Maximum Wet Bulb Temperature</b> (operating)	86° F (30° C)
<b>Certifications, Approvals</b>	MMC II support, multi-read certification, Microsoft WHQL certification, ACA AS/NZS 3548 class B, CNS 13438, C.I.S.P.R. Pub 22, TUV or VDE EN60950, EN 55022, EN55024, SEMKO, NEMKO, DEMKO, FIMKO, EN 60825-1, UL 60950, and CSA C22.2 60950-2000.	
<b>Operating systems supported</b>	Microsoft Windows 2000, Windows XP	

### 48X/32X Combo CD-RW/DVD-ROM Drive

<b>Orientation</b>	Either horizontal or vertical
<b>Disc Loading Mechanism</b>	Half-height, tray load
<b>Interface Type</b>	ATAPI
<b>Dimensions—external</b> (W x H x D)	5.77 x 1.71 x 7.36 in (14.66 x 4.34 x 18.69 cm) (external, excluding bezel)
<b>Disc Diameter</b>	12 cm, 8 cm
<b>Disc Thickness</b>	0.05 in (1.2 mm)
<b>Track Pitch</b>	1.6 $\mu$ m (CD), 0.74 $\mu$ m (DVD)
<b>Disc Center Hole Diameter</b>	0.6 in (15 mm)
<b>Reference Scanning Velocity</b>	1.2 m/s (CD); 3.49 m/s (DVD SL); 3.84 m/s (DVD DL)

### Technical Specifications - Optical Storage

<b>Read Only Disc Parameters</b>	<b>Formats and Modes Supported</b>	CD-ROM-Mode 1; CD-ROM XA-Mode 2; CD-Bridge; CD digital audio; CD Extra; Photo CD (single and multi-session); video CD; DVD (single- and double-layer); DVD-R; DVD-RW; DVD-RW Multi-Border; DVD+R; DVD+R Multi-Session, and DVD+RW
	<b>Capacity</b>	180 MB (8 cm); 540 MB (12 cm); 650 MB (12 cm); 700 MB (12 cm); 4.7 GB (DVD-5); 8.54 GB (DVD-9); 9.4 GB (DVD-10)
	<b>Block Size</b>	Mode 1-2,048 and 2,352 bytes; mode 2, form 1-2,048; 2,328; 2,336; 2,340 and 2,352 bytes; mode 2, form 2-2,328; 2,336; 2,340 and 2,352 bytes; CD-DA-2,352 bytes; DVD-2,048 bytes
<b>Writeable Disc Parameters</b>	<b>Disc Type</b>	CD-R and CD-RW
	<b>Write Methods</b>	Disc at Once, Track at Once, Session at Once, Variable Packet, Fixed Packet
	<b>Formats and Modes Supported</b>	CD-ROM; CD-ROM XA; CD digital audio, video CD; CD-Bridge
	<b>Capacity</b>	180 MB (8 cm); 540 MB (12 cm); 650 MB (12 cm); 700 MB (12 cm)
	<b>Block Size</b>	CD-DA-2,352 bytes; mode 0- 2,336 and 2,352 bytes; mode 1-2,048 and 2,352 bytes; mode 2- 2,336 and 2,352; mode 2, form 1-2,048 and 2,352 bytes; mode 2, form 2-2,324 and 2,352 bytes
<b>Access Times (typical)</b>	<b>Random DVD</b>	< 140 ms (typical)
	<b>Random CD</b>	< 125 ms (typical)
	<b>Full Stroke DVD</b>	< 250 ms (seek)
	<b>Full Stroke CD</b>	< 210 ms
<b>Data Transfer Rates</b>	<b>CD-R write</b>	7200 KB/s (48X) Max
	<b>CD-RW write</b>	4800 KB/s (32X) Max
	<b>CD-ROM, CD-R, CD-RW read</b>	7200 KB/s (32X) Max
	<b>DVD ROM read</b>	21,632 KB/s (16X) Max
<b>Data Transfer Modes</b>	ATA PIO mode 4); ATA Multi-word DMA mode 2; ATA UltraDMA mode 0; ATA UltraDMA mode 1, mode 2; ATA UltraDMA Mode 3 (default)	
<b>Cache Buffer</b>	2 MB (minimum)	
<b>Start-up Time (single)</b>	< 7 seconds typical	
<b>Start-up Time (multi-session)</b>	< 30 seconds typical	
<b>Stop Time</b>	< 4 seconds	

### Technical Specifications - Optical Storage

<b>Power</b>	<b>Source</b>	Four-pin, DC power receptacle
	<b>DC power requirement</b>	5 VDC $\pm$ 5%—100 mV ripple p-p 12 VDC $\pm$ 5%—200 mV ripple p-p
	<b>DC current</b>	5 VCD < 1A (typical) < 1600 mA (maximum)
		12 VCD < 600 mA (typical) < 1.4A (maximum)
		Total Drive Power (Standby mode) < 2.5 watt
<b>Audio Output Level</b>	0.7 Vrms	
<b>Configuration Jumper Block</b>	Cable select (default), master and slave modes	
<b>Data Interface Connector</b>	40-pin, shrouded and keyed, flat ribbon	
<b>Environmental</b> (all conditions, non-condensing)	<b>Temperature (operating)</b>	41° to 122° F (5° to 50° C)
	<b>Relative Humidity (operating)</b>	10% to 90%
	<b>Maximum Wet Bulb Temperature (operating)</b>	86° F (30° C)
<b>Certifications, Requirements</b>	MPC-3 compliant, multi-read requirements, ACA AS/NZS 3548, ANSI C63.4-1992, ATAPI Spec SFF-8020, ATA Spec X3T9.2, CB Bulletin No. 92A, CSA C22.2 No. 950-1995, C.I.S.P.R. Pub 22, EMKO-TSE 207/94, TUV or VDE EN60 950, EN60825-1, Microsoft ®PC2001 certification, Microsoft Logo for Windows XP, 2000	
<b>Operating Systems Supported</b>	Microsoft Windows 2000, Windows XP Professional, Windows XP Home	

<b>48X/32X/48X CD-RW Drive</b>	<b>Orientation</b>	Either horizontal or vertical	
	<b>Disc loading mechanism</b>	Half-height, tray load	
	<b>Interface type</b>	ATAPI IDE	
	<b>Dimensions-external</b> (W x H x D)	7.99 x 5.88 x 1.71 in (20.3 x 14.93 x 4.34 cm)	
	<b>Weight</b>	2.6 lb (1.2 kg)	
	<b>Disc diameter</b>	12 cm, 8 cm	
	<b>Disc thickness</b>	1.2 mm	
	<b>Track pitch</b>	1.6 $\mu$ m	
	<b>Disc center hole diameter</b>	15 mm	
	<b>Reference scanning velocity</b>	1.2 m/s	
	<b>Recording/playing time</b>	80 minutes with CD-R media	
	<b>Read only disc parameters</b>	<b>Formats and modes supported</b>	CD-ROM-Mode 1; CD-ROM XA-Mode 2 (forms 1 and 2); CD digital audio; CD Extra; CD-I-Mode 2 (forms 1 and 2) and CD-I-Ready; Photo CD (single and multi-session); video CD
		<b>Capacity</b>	185 MB (Mode 2, 8cm); 540 MB (Mode 1, 12 cm); 650 MB (Mode 2, 12 cm); 700 MB (Mode 2, 12 cm)

### Technical Specifications - Optical Storage

	<b>Block size</b>	Mode 1-2,048 and 2,352 bytes; mode 2, form 1-2,048; 2,328; 2,336; 2,340 and 2,352 bytes; mode 2, form 2-2,328; 2,336; 2,340 and 2,352 bytes; CD-DA-2,352 and 2,368 bytes	
<b>Writeable disc parameters</b>	<b>Disc type</b>	CD-R and CD-RW	
	<b>Write methods</b>	Disc at Once, Track at Once, Session at Once, Variable Packet, Fixed Packet	
	<b>Format and modes supported</b>	CD-ROM (mode 1); CD-ROM XA (mode 2, forms 1 and 2); CD digital audio, CD-I (mode 2, forms 1 and 2); video CD	
	<b>Capacity</b>	185 MB (Mode 2, 8cm); 540 MB (Mode 1, 12 cm); 650 MB (Mode 2, 12 cm); 700 MB (Mode 2, 12 cm)	
	<b>Block size</b>	Mode 1-2,048 bytes; mode 2, form 1-2,048 and 2,352 bytes; mode 2, form 2-2,352 bytes; CD-DA ---2,352 bytes	
<b>Access times (typical)</b>	<b>Random</b>	< 120 ms	
	<b>Full stroke</b>	< 200 ms	
<b>Data transfer rates</b>	<b>CD-RW write</b>	4800 KB/s (up to 32X)	
	<b>CD-ROM, CD-R read</b>	7200 KB/s (up to 48X)	
	<b>CD-RW read</b>	7200 KB/s (up to 32X)	
	<b>CD-R write</b>	7200 KB/s (up to 48X)	
<b>Data transfer modes</b>	ATA PIO mode 4 (16.7MB/s); ATA multi-word DMA mode 2 (16.7 MB/s); ATA UltraDMA mode 0 (16.7 MB/s) ;ATA UltraDMA mode 1 (24 MB/s) ; ATA UltraDMA mode 2 (33 MB/s) - default.		
<b>Cache buffer</b>	2 MB (minimum)		
<b>Start-up time (single)</b>	< 7 seconds typical		
<b>Start-up time (multi-session)</b>	< 30 seconds typical		
<b>Stop time</b>	< 4 seconds		
<b>Power</b>	<b>Source</b>	Four-pin, DC power receptacle	
	<b>DC power requirement</b>	5 VDC 5%-100 mV ripple p-p	
		12 VDC 5%-200 mV ripple p-p	
	<b>DC current</b>	5 VCD	< 1A (typical)
			< 1600 mA (maximum)
		12 VCD	< 600 mA (typical)
		< 1.4A (maximum)	
	<b>Total Drive Power (Standby mode)</b>	< 2.5 watt	
<b>Audio output level</b>	0.7 Vrms		
<b>Configuration jumper block</b>	Master, slave and cable select modes		
<b>Data interface connector</b>	50-pin IDE interface		

### Technical Specifications - Optical Storage

<b>Environmental</b> (all conditions, non-condensing)	<b>Temperature</b> (operating) 41° to 122° F (5° to 50° C) <b>Relative Humidity</b> (operating) 10% to 90% <b>Maximum Wet Bulb Temperature</b> (operating) 84° F (29° C)
<b>Certifications, requirements</b>	ACA AS/NZS 3548, ANSI C63.4-1992, CB Test Certificate for IEC 950, CE Mark, CFR 47 part 15, CNS 13438, CSA C22.2 No. 60950, DHHS/FDA - 1040, EN60825, EN55022:1998, EN55024, EN60 950:2000, ICES-003 class B, IEC 61000 4-2 - 4-11, Nordic EN60 950, TUV or VDE EN60 950, UL 60950, C.I.S.P.R. Publication 22 Class B, BSMI, Microsoft P2001, Microsoft Logo for Windows98, 2000 and XP
<b>Operating systems supported</b>	Microsoft Windows 2000, Windows XP
<b>Option kit contents</b>	CD-RW drive, CD-R media, High-Speed CD-RW media, Roxio Digital Media Plus, Dantz Retrospect Express Backup for CD-RW and installation guide.

<b>48X Max CD-ROM Drive</b>	<b>Interface</b>	ATAPI
	<b>Data Transfer Rate</b>	Variable (Audio CD) - 1,800 to 3,600 KB/s (24X) Max Variable (CD-ROM, CD-R)-2,400 to 7,200 KB/s (48X) Max
	<b>Access Time</b> (ms)	Random: <125 ms Full-stroke seek: <210 ms
	<b>Data Buffer</b>	2MB
	<b>Disk Formats Read</b>	CD-ROM Mode 1, CD-ROM XA (Mode 2, Form 1 and 2), CD Digital Audio, CD-EXTRA, CD-I (Mode 2, Form 1 and 2) and CD-I Ready, CD-Text, CD-Bridge, Photo CD (Single and Multi Session), Video CD, CD-R and CD-RW Multi-Session
	<b>Disk Formats Written</b>	None
	<b>Disk Capacity</b> (CD)	180MB, 540MB, 650 MB, and 700MB
	<b>Block Size</b>	Mode 1-2,048, 2,352 bytes Mode 2-1, 2,048, 2,328, 2,336, 2,340, 2,353 bytes Mode 2-2, 2,328, 2,336, 2,340, 2,352 bytes CD-DA-2,352, 2,368 bytes
	<b>Diameter</b>	12 cm; 8 cm
	<b>Thickness</b>	1.2 mm
	<b>Track Pitch</b>	1.6 μm
	<b>Audio Output Level</b>	Line-out-0.7 V @ 47 Kohm
	<b>Startup Time</b>	<7 seconds (typical); < 30 seconds with multi-session
	<b>Operating Conditions</b>	<b>Temperature</b> 41° to 122° F (5° to 50° C) <b>Relative Humidity</b> 10% to 90%
	<b>Dimensions</b> (H x W x D, maximum)	1.7 x 5.9 x 8.0 in (4.3 x 15.0 x 20.3 cm)
	<b>Weight</b>	2.6 lb (1200 g)
	<b>Operating Systems Supported</b>	Microsoft Windows 2000, Windows XP Professional, Windows XP Home
	<b>Kit Contents</b>	CD-ROM drive, installation guide, warranty card

## *Technical Specifications - Optical Storage*

© Copyright 2005 Hewlett-Packard Development Company, L.P.  
The information contained herein is subject to change without notice.

Intel and Pentium are U.S. registered trademarks of Intel Corporation. Microsoft and Windows are U.S. registered trademarks of Microsoft Corporation. The only warranties for HP products and services are set forth in the express warranty statements accompanying such products and services. Nothing herein should be construed as constituting an additional warranty. HP shall not be liable for technical or editorial errors or omissions contained herein.