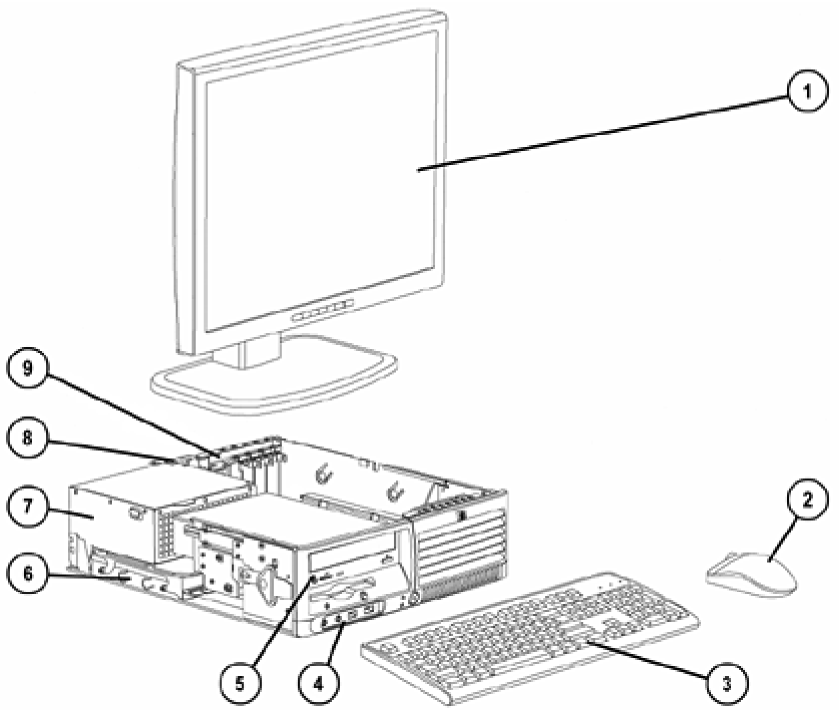
Overview

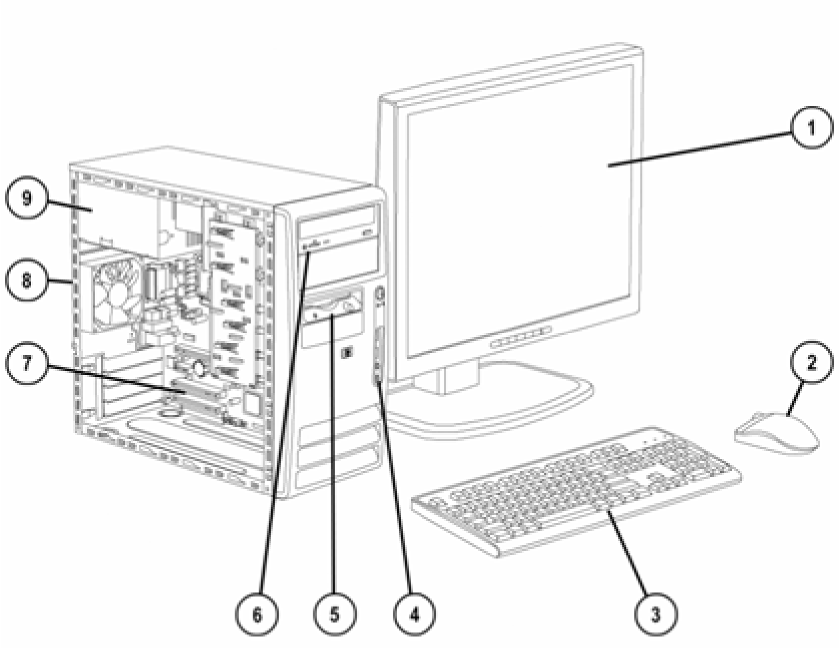
HP recommends
Windows Vista™ Business

Small Form Factor



1. Monitor (sold separately)
2. 2-Button Scroll Mouse (PS/2)
3. Standard Keyboard (PS/2)
4. Front I/O: 2 USB 2.0, headphone and microphone
5. 1 5.25" bay and 1 3.25" external bay for optional diskette drive, 16-in-1 Media Card Reader, or other device
6. 1 3.5" internal bay
7. 240-watt power supply
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
9. 2 low profile PCI slots, 1 low profile PCI Express x1 slot

Microtower



1. Monitor (sold separately)
2. 2-Button Scroll Mouse
3. Standard Keyboard
4. Front I/O: 2 USB 2.0, headphone and microphone
5. 2 – 3.5" external bays for optional diskette drive, 16-in-1 Media Card Reader, or other 3.5" device
6. 2 – 5.25" external bays, and 2 internal 3.5" bays
7. 2 full-height PCI slots, 1 full height PCI Express x1 slot
8. 6 USB 2.0, 1 standard serial port, 1 parallel port, 2 PS/2, 1 RJ-45, 1 VGA, audio in/out
9. 300-watt power supply

At A Glance

- Intel® Pentium® 4 Processor with HT Technology[1] and Celeron[1]™ D processors
- Operating Systems:
  - Genuine Windows XP Professional
  - Genuine Windows XP Home
  - SuSE Linux Personal 9.2 OEM (delivered on CDs with system, not pre-installed) - WW except Asia
  - Turbolinux 10D (delivered on CDs with system, not pre-installed)- China only
  - FreeDOS
- Intel 915GV Express chipset with Integrated Intel Graphics Media Accelerator 900
- DDR2 Synch DRAM PC2-3200 (DDR2-400) Memory
- Integrated Broadcom BCM5751 NetXtreme Gigabit Ethernet
- Dual Channel Memory with 4 available color coded DIMM slots
- Pre-loaded manageability tools
- Serial ATA Hard Drives
- SoundMax Digital AC97 Integrated Audio with internal speaker
- Color coded cables for ease of use
- Basic serviceability with tool-less covers and drives
- In compliance with the Restrictions of Hazardous Substances (RoHS) directive – 2002/95/EC
- In compliance with the IEEE 1680 (EPEAT) standard at the SILVER level, see http://www.epeat.net
- 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.

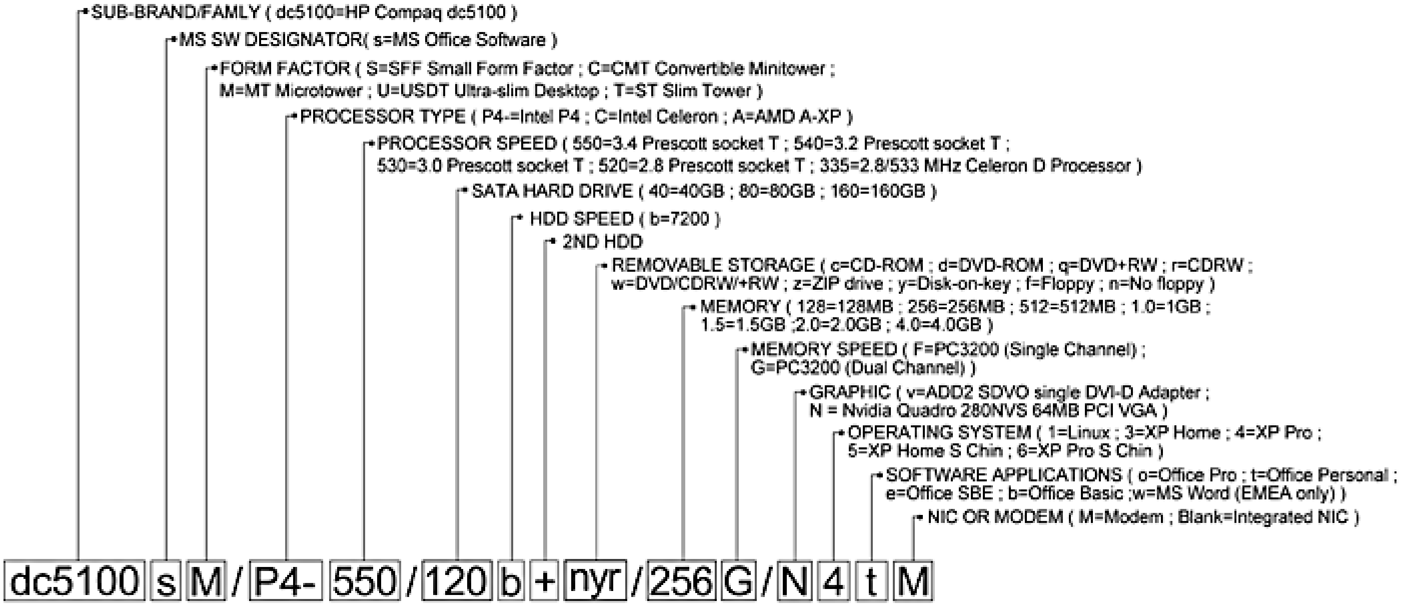
Overview

[1] The Hyper-Threading feature is a new 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 Hyper-Threading technology. Visit http://www.intel.com/info/hyperthreading/ for more information.

Standard Features - Select Models (localized by Regions)

Model Key and Example

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


SUB-BRAND/FAMLY (dc5100=HP Compaq dc5100)
MS SW DESIGNATOR(s=MS Office Software)
FORM FACTOR (S=SFF Small Form Factor ; C=CMT Convertible Minitower ; M=MT Microtower ; U=USDT Ultra-slim Desktop ; T=ST Slim Tower)
PROCESSOR TYPE (P4-=Intel P4 ; C=Intel Celeron ; A=AMD A-XP)
PROCESSOR SPEED (550=3.4 Prescott socket T ; 540=3.2 Prescott socket T ; 530=3.0 Prescott socket T ; 520=2.8 Prescott socket T ; 335=2.8/533 MHz Celeron D Processor)
SATA HARD DRIVE (40=40GB ; 80=80GB ; 160=160GB)
HDD SPEED (b=7200)
2ND HDD
REMOVABLE STORAGE (c=CD-ROM ; d=DVD-ROM ; q=DVD+RW ; r=CDRW ; w=DVD/CDRW/+RW ; z=ZIP drive ; y=Disk-on-key ; f=Floppy ; n=No floppy)
MEMORY (128=128MB ; 256=256MB ; 512=512MB ; 1.0=1GB ; 1.5=1.5GB ;2.0=2.0GB ; 4.0=4.0GB)
MEMORY SPEED (F=PC3200 (Single Channel) ; G=PC3200 (Dual Channel))
GRAPHIC (v=ADD2 SDVO single DVI-D Adapter ; N = Nvidia Quadro 280NVS 64MB PCI VGA)
OPERATING SYSTEM (1=Linux ; 3=XP Home ; 4=XP Pro ; 5=XP Home S Chin ; 6=XP Pro S Chin)
SOFTWARE APPLICATIONS (o=Office Pro ; t=Office Personal ; e=Office SBE ; b=Office Basic ;w=MS Word (EMEA only))
NIC OR MODEM (M=Modem ; Blank=Integrated NIC)
dc5100 s M / P4- 550 / 120 b + nyr / 256 G / N 4 t M

Standard Features - Custom Components

		SFF	MT
Processor and Speed* – One of the following	**Intel Celeron D Processors**		
	Intel Celeron D 331 Processor (2.66-GHz, 256K L2 cache, 533-MHz FSB)	X	X
	Intel Celeron D 336 Processor (2.80-GHz, 256K L2 cache, 533-MHz FSB)	X	X
	Intel Celeron D 341 Processor (2.93-GHz, 256K L2 cache, 533-MHz FSB)	X	X
	Intel Celeron D 346 Processor (3.06-GHz, 256K L2 cache, 533-MHz FSB)	X	X
	Intel Celeron D 351 Processor (3.20-GHz, 256K L2 cache, 533-MHz FSB)	X	X
	Intel Pentium 4 Processors		
	Intel Pentium 4 515 Processor (2.93-GHz, 1-MB L2 cache, 533-MHz FSB)	X	X
	Intel Pentium 4 519K Processor (3.06-GHz, 1-MB L2 cache, 533-MHz FSB)		
	Intel Pentium 4 Processors with Hyper-Thread Technology		
	Intel Pentium 4 517 Processor (2.93-GHz, 1-MB L2 cache, 533-MHz FSB)	X	X
	Intel Pentium 4 521 Processor (2.8-GHz, 1-MB L2 cache, 800-MHz FSB)	X	X
	Intel Pentium 4 524 Processor (3.06-GHz, 1-MB L2 cache, 533-MHz FSB)	X	X
	Intel Pentium 4 531 Processor (3.0-GHz, 1-MB L2 cache, 800-MHz FSB)	X	X
	Intel Pentium 4 541 Processor (3.2-GHz, 1-MB L2 cache, 800-MHz FSB)	X	X
	Intel Pentium 4 620 Processor (2.8-GHz, 2-MB L2 cache, 800-MHz FSB)	X	X
	Intel Pentium 4 630 Processor (3.0-GHz, 2-MB L2 cache, 800-MHz FSB)	X	X
	Intel Pentium 4 631 Processor (3.0-GHz, 2-MB L2 cache, 800-MHz FSB)	X	X
	Intel Pentium 4 640 Processor (3.2-GHz, 2-MB L2 cache, 800-MHz FSB)	X	X
	Intel Pentium 4 641 Processor (3.2-GHz, 2-MB L2 cache, 800-MHz FSB)	X	X
	Intel Pentium 4 650 Processor (3.4-GHz, 2-MB L2 cache, 800-MHz FSB)	X	X
	Intel Pentium 4 651 Processor (3.4-GHz, 2-MB L2 cache, 800-MHz FSB)	X	X
	Intel Pentium 4 661 Processor (3.6-GHz, 2-MB L2 cache, 800-MHz FSB)	X	X

***NOTE**: Intel processor numbers are not a measure of performance. Processor numbers differentiate features within each processor family, not across different processor families. Not all processors are available in all regions or on all models.

Operating System – One of the following	Genuine Windows XP Professional with service SP2	X	X
	Genuine Windows XP Home with service SP2	X	X
	SuSE Linux Personal 9.2 OEM (delivered on CDs with system, not pre-installed) – WW except Asia	X	X
	Turbolinux 10D (delivered on CDs with system, not pre-installed) – China only	X	X
	FreeDOS	X	X
Limited Software Driver Support	Windows 2000 with service pack 4	–	–
Hard Disk Drive – One of the following	**Serial ATA SMART III Hard Drives**		
	40-GB Serial ATA 1.5-Gb/s Hard Drive (7200 rpm)	X	X
	80-GB Serial ATA 1.5-Gb/s Hard Drive (7200 rpm)	X	X
	160-GB Serial ATA 1.5-Gb/s Hard Drive (7200 rpm)	X	X
	250-GB Serial ATA 1.5-Gb/s Hard Drive (7200 rpm)	X	X
	2nd hard drive, 40-GB Serial ATA 1.5-Gb/s Hard Drive (7200 rpm)	X	X
	2nd hard drive, 80-GB Serial ATA 1.5-Gb/s Hard Drive (7200 rpm)	X	X
	2nd hard drive, 160-GB Serial ATA 1.5-Gb/s Hard Drive (7200 rpm)	X	X
	2nd hard drive, 250-GB Serial ATA 1.5-Gb/s Hard Drive (7200 rpm)	X	X
Memory – One of the following, available in both PC2-3200 (400 MHz) and PC2-4200 (533 MHz)	256-MB DDR2 Synch DRAM Non ECC (1 x 256)	X	X
	512-MB DDR2 Synch DRAM Non ECC (1 x 512)	X	X
	512-MB DDR2 Synch DRAM Non ECC (2 x 256)	X	X
	1-GB DDR2 Synch DRAM Non ECC (1x 1GB)	X	X
	1-GB DDR2 Synch DRAM Non ECC (2 x 512)	X	X
	1-GB DDR2 Synch DRAM Non ECC (4 x 256)	X	X
	2-GB DDR2 Synch DRAM Non ECC (4 x 512)	X	X
	2-GB DDR2 Synch DRAM Non ECC (2x 1GB)	X	X
	4-GB DDR2 Synch DRAM Non ECC (4x 1GB)	X	X

Standard Features - Custom Components

Storage	**Diskette and Zip Dives**		
	Optional 1.44-MB Floppy Diskette Drive	X	X
	Zip 250 for 3.5" drive bay	X	X
	Zip 250 for 5.25" drive bay		X
	Media Reader		
	HP 16-in-1 Media Reader (PCI card supplies internal USB connection)	X	X
	Optical Drives		
	48X CD-ROM Drive	X	X
	52X CD-ROM Drive (APJ Only)	X	X
	16X/40X DVD-ROM	X	X
	48X/32X/48X CD-RW Drive	X	X
	48X/32X Combo CD-RW/DVD-ROM Drive	X	X
	16X DVD+/-RW Drive (LightScribe/Double Layer/Dual Format)*	X	X
	* The Lightscribe feature is available on Windows only.		
Keyboard – One of the following	HP PS/2 Standard Keyboard	X	X
	HP USB Standard Keyboard	X	X
	HP USB Smartcard Keyboard	X	X
	HP USB BG1650 Keyboard	X	X
Mouse – One of the following	PS/2 2-Button Scroll Mouse	X	X
	HP PS/2 2-Button Optical Scroll Mouse	X	X
	USB 2-Button Optical Mouse	X	X
	USB 2-Button Scroll Mouse	X	X
Modem	2006 Agere PCI 56K International SoftModem (full height)*	–	X
	2006 Agere PCI 56K International SoftModem (low profile)*	X	–
	*Windows only		
Audio	Integrated ADI 1981B AC97 Audio with Internal Speaker	X	X
NIC	Integrated Broadcom BCM5751 NetXtreme Gigabit Ethernet	X	X
	Intel PRO/1000 GT Gigabit PCI Adapter (full height bracket)*	–	X
	Intel PRO/1000 GT Gigabit PCI Adapter (low profile bracket)*	X	–
	*Windows only		

Standard Features - Custom Components

Accessories	Second Serial Port Adapter full height	–	X
	Second Serial Port Adapter low profile	X	X
	HP FireWire / IEEE 1394 PCI Card full height*	–	X
	HP FireWire / IEEE 1394 PCI Card low profile*	X	–
	Tower Stand	X	–
	*Windows only		
Graphics – One of the following	NVIDIA Quadro NVS 55 64MB PCI low profile DVI w/TV-Out	X	X
	NVIDIA Quadro NVS 280 64MB PCI full height dual head (DMS59 with VGA Y-Cable)*	–	X
	NVIDIA Quadro NVS 280 64MB PCI low profile dual head (DMS59 with VGA Y-Cable)*	X	–

NOTE: Two NVS 280 graphics cards can be installed to provide support for four monitors.

Preloaded Software	Altiris Local Recovery back up software preloaded	X	X
Provided on CD (not preinstalled)	SuSE Linux Personal 9.2 OEM – WW except Asia		–
	Turbolinux 10D – China only	X	X
Preinstalled Software	Norton AntiVirus 2005 with 60 day Live Update Subscription	X	X
	Microsoft Office 2003 Professional	X	X
	Microsoft Office 2003 Small Business Edition	X	X
	Microsoft Office 2003 Personal	X	X
	Microsoft Office 2003 Basic	X	X
	Microsoft Works 7.0 (only available in North America and in English)	X	X
	Google Toolbar	X	X
	Intervideo WinDVD	X	X
	PDF Complete (only available in North America and in English)	X	X
	For information about Intelligent Manageability visit: http://www.hp.com/go/EasyDeploy.	X	X
	NOTE: Office XP Small Business and Office Professional not available in all countries.		
	NOTE: Norton AntiVirus includes FREE 60 day live update subscription.		
Drop-in-box Software (shipped when DVD player is selected)	Intervideo WinDVD Creator	X	X
	Roxio Easy CD & DVD Creator	X	X
	Dantz Retrospect Backup Express (used with DVD)	X	X
Web deliverable Software	HP Client Management Solutions (visit http://www.hp.com/go/easydeploy)	X	X
	HP Insight Diagnostics	X	X

Standard Features

	Small Form Factor	Microtower
Processor	Intel Pentium 4 and Intel Celeron processors	
Operating System (choice)		
Genuine Windows XP Professional SP2	X	X
Genuine Windows XP Home SP2	X	X
CPU Bus Speed Supported	800-MHz or 533-MHz FSB, depending on processor	
Standard L2 Cache	256 or 1024 KB	
Chipset	Intel 915GV	
Memory Expansion Slots	4 DIMMs	
Memory Type Supported	Non-ECC DDR2 Synch DRAM (ECC not supported by Chipset)	
Memory Speed Supported	DDR2 Synch DRAM PC2-3200 (400 MHz) and PC2-4200 (533 MHz) non-ECC	
Maximum Memory	4-GB **NOTE:** With the 915GV chipset, some addressable memory gets reserved for the system components and for devices that are added to the system. This will reduce the total addressable memory available for applications to less than 4 GB, depending on the number and type of devices that are added.	
Network controller	Integrated Broadcom BCM5751 NetXtreme Gigabit Ethernet	
Graphics	Intel Graphics Media Accelerator 900	
Audio	Integrated ADI 1981B Digital Audio with SPDif 6-channel pass-through, Stereo Microphone, Active Noise Cancellation and Yamaha XG Lite Softsynth support	
Expandability		
PCI slots	2 low-profile	2 full length, full height
PCI Express x1	1 low profile (2.5"), length (6.6")	1 full-height (4.2"), length (13.4")
AGP slot	none	
Bays	Total Bays = 3	Total Bays = 6
External Bays	(1) full-length 5.25" (1) full-length 3.5"	(2) full-length 5.25" (2) full-length 3.5"
Internal Bays	(1) internal hard drive bay (2nd HDD bay via external 3.5" bay)	(2) 3.5 inch hard drive bays
Wireless Support	PCI card or external USB (optional)	
IDE	1 IDE connector for opticals	
Serial-ATA	2 serial-ATA connectors for SATA hard drives	
Ports		
USB 2.0	8 (2 front, 6 rear)	
Serial	1 standard, 1 optional	
Parallel	1	
PS/2	1 keyboard, 1 mouse	
Video	VGA connector	
DVI output	PCI graphics card	
Support for Multi-Monitor	PCI graphics card	
Audio	Front – mic and headphone	
	Rear – line in, line out, mic input	
NIC	Integrated Broadcom BCM5751 NetXtreme Gigabit Ethernet	
Dimensions		
Chassis Dimensions (H x W x D) cm	33.78 x 10.03 x 37.85	36.6 x 17.5 x 42

Standard Features

Chassis Dimensions (H x W x D) Inches	3.95 x 13.3 x 14.9	14.4 x 6.88 x 16.55
System Weight	20.0 lb (9.07 kg)	24.0 lb (10.89 kg)
System Volume	782.7 sq. in (12.8 liters)	1640 sq. in (27.0 liters)
Shipping Weight	30 lb (13.61 kg)	34 lb (15.42 kg)
Weight Supported	75 lb (34.02 kg)	NA
Shipping Box Size	20.00 x 18.75 x 12.63 in (50.8 x 47.63 x 32.08 cm)	22.25 x 19.63 x 15.13 in (56.52 x 49.86 x 38.43 cm)
Power Supply	240-watt active PFC	300-watt passive PFC (user selectable 115V / 230V)
Hard Drive Interfaces Supported	2 Serial ATA interfaces	2 Serial ATA interfaces
Hard Drive Controller (PCI) Supported	Serial ATA	Serial ATA
Optical/Removable Storage Interface Supported	1 Ultra ATA/100 interface (supporting 2 devices)	1 Ultra ATA/100 interface (supporting 2 devices)
Optical/Removable Controller (PCI) Supported	Ultra ATA/100	Ultra ATA/100
Preinstalled Software		
Computer Setup Utility	X	X
Microsoft Internet Explorer	X	X
Downloadable from Web		
Diagnostics for Windows	X	X
NOTE: Exact products and specifications shown may vary by geographic region and are subject to change.		

After-Market Options

		SFF	MT	Part Number
Communications	**Wireless**			
	HP BT450 USB Bluetooth Wireless Printer and PC Card*	X	X	IPQ6398A
	HP Wireless A+G PCI (North America only)*	X	X	EA118AA
	HP Wireless A+G PCI (WW except North America)*	X	X	PZ928AA
	NICs			
	Broadcom NetXtreme Gigabit Ethernet PCIe NIC	X	X	EA833AA
	Intel Pro/1000 GT Gigabit PCI NIC (full height only)*	–	X	AG393AA
	Intel Pro/1000 PT Gigabit PCIe NIC*	X	X	EH352AA
	Modem			
	2006 Agere PCI 56K International Modem*	X	X	EK694AA
	*Windows only			
Graphics	NVIDIA Quadro 280 NVS 64MB PCI dual head (DMS59 with VGA Y-Cable)	X	X	DY599A
	NVIDIA Quadro 50 NVS 64MB PCI DVI w/TV Out	X	X	PU615A
	NVIDIA Quadro 55 NVS 64MB PCI DVI w/TV Out	X	X	EK561AA
Hard Drives	**Serial ATA Hard Drives**			
	80-GB Serial ATA 3.0Gb/s SMART III Hard Drives (7200 rpm)	X	X	PY276AA
	160-GB Serial ATA 3.0Gb/s SMART III Hard Drives (7200 rpm)	X	X	PY277AA
Input/Output Devices	**Keyboards**			
	HP PS/2 Standard Keyboard	X	X	DT527A
	HP USB Standard Keyboard	X	X	DT528A
	HP USB BG1650 Keyboard	X	X	DT529A
	HP USB Smartcard Keyboard	X	X	ED707AA
	Pointing Devices			
	HP PS/2 2-Button Scroll Mouse (Carbonite)	X	X	DD440B
	HP PS/2 2-Button Optical Scroll Mouse	X	X	EY703AA
	HP USB 2-Button Scroll Mouse (Carbonite)	X	X	DD441B
	HP USB 2-Button Optical Scroll Mouse (Carbonite/Silver)	X	X	DC172B

After-Market Options

Memory (DIMMs)	**Non-ECC**			
	256-MB DDR2 Synch DRAM PC2-3200 (DDR400)	X	X	PR661A
	512-MB DDR2 Synch DRAM PC2-3200 (DDR400)	X	X	PR662A
	1-GB DDR2 Synch DRAM PC2-3200 (DDR400)	X	X	PR663A
	256-MB DDR2 Synch DRAM PC2-4200 (DDR533)	X	X	PV558AA
	512-MB DDR2 Synch DRAM PC2-4200 (DDR533)	X	X	PV560AA
	1-GB DDR2 Synch DRAM PC2-4200 (DDR533)	X	X	PV557AA
Monitors	**CRTs**			
	HP s7540 17" (16.0" vis) CRT Monitor			PF997AA#XXX
	HP v7650 17" (16.0" vis) Flat-face CRT Monitor			PF996AA#XXX
	TFTs			
	HP L1506 15" TFT Flat Panel Monitor – Analog only			PX848AA#XXX
	HP L1706 17" TFT Flat Panel Monitor – Analog only			PX849AA#XXX
	HP L1740 17" TFT Flat Panel Display – Analog/Digital			PL766AA#XXX
	HP L1755 17" TFT Flat Panel Display – Analog/Digital			PL777AA#XXX
	HP L1906 19" TFT Flat Panel Display – Analog only			PX850AA#XXX
	HP L1940T 19" TFT Flat Panel Display – Analog/Digital			EM869AA#XXX
	HP L1955 19" TFT Flat Panel Display – Analog/Digital			PD974AA#XXX
	HP L2065 20" TFT Flat Panel Display – Analog/Digital			EF227A4#XXX
	HP LP2465 24" TFT Widescreen Flat Panel Display – Analog/Digital			EF224A4#XXX
	GSA Monitors			
	HP L717g 17" GSA Flat Panel Monitor			EE191AA#XXX
	HP L919g 19" GSA Flat Panel Monitor			EE192AA#XXX
	Options			
	HP Flat Panel Speaker Bar			EE418AA
	HP CRT Monitor Multimedia Base			PM552AA
Multimedia	HP Satellite Speakers	X	X	ZD929AA
	HP 16-in-1 Media Card Reader with PCI Card	X	X	EM718AA

After-Market Options

Optical Drives	**DVD-ROM Drive**			
	16X/48X DVD-ROM	X	X	PR596A
	CD-ROM Drive			
	48X Max CD-ROM Drive	X	X	DC143B
	CD-RW Drive			
	48X/32X/48X CD-RW Drive	X	X	DL975B
	Combo Drive			
	48X/32X Combo DVD-ROM/CD-RW Drive	X	X	DL976B
	DVD+/-RW Drive			
	16X DVD+/-RW Drive (LightScribe/Double Layer/Dual Format)*	X	X	PR595A
	* The Lightscribe feature is available on Windows only.			
Removable Storage	**Drive Key Options**			
	256-MB HP Drive Key II (USB 2.0)	X	X	PH657A
	512-MB HP Drive Key II (USB 2.0)	X	X	ED516AA
	1-GB HP Drive Key II (USB 2.0)	X	X	AG382AA
	Diskette and Digital Drives			
	1.44-MB USB Diskette Drive – External (Carbonite)	X	X	DC141B
	1.44-MB Internal Diskette Drive	X	X	DS710B
	Zip Drives and Media			
	Zip 250 Drive (Carbonite)	X	X	DC140B
	Zip 750 Drive (Carbonite)	X	X	DC518B
Security	Security cable with Kensington lock	X	X	DC368A
	HP Business PC Security Lock Kit	X	X	EV265AA
Software	HP Client Foundation Suite Includes: HP Client Manager HP Systems Insight Manager Connector Altiris Local Recovery Pro Altiris Migration Suite	X	X	EF117AA (use EF118AA for 1000+ licenses)
	HP Client Premium Suite Includes: HP Client Manager HP Systems Insight Manager Connector Altiris Local Recovery Pro Altiris Migration Suite Altiris Connector Solution Altiris Client Management Suite Level 1 HP OpenView Connector	X	X	EF119AA (use EF120AA for 1000+ licenses

After-Market Options

Miscellaneous Accessories	HP FireWire / IEEE 1394 PCI Card*	X	X	PA997A
	2nd Serial Port	X	X	PA716A
	*Windows only			
Brackets/Stands	Tower Stand (Carbonite)	X		PS797A

NOTE: Exact options and specifications shown may vary by geographic region and are subject to change.

915GV 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 915GV Express chipset supports non-ECC DDR2 PC2-3200 (400-MHz), and non-ECC DDR2 PC2-4200 (533-MHz) memory.

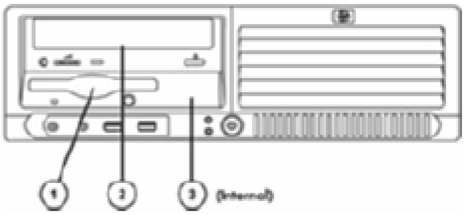
For best performance, add in pairs, add in same channel, and do not mix speeds. For dual-channel performance, the total amount of memory in each channel should be equal. If speeds are mixed, speed will default to the slowest DIMM.

MAXIMUM MEMORY (SMALL FORM FACTOR AND CONVERTIBLE MINITOWER)
Supports up to 4-GB of DDR2 SYNCH DRAM.
NOTE: Above 3-GB, all memory may not be available due to system resource requirements. Not all memory configurations possible are represented below.

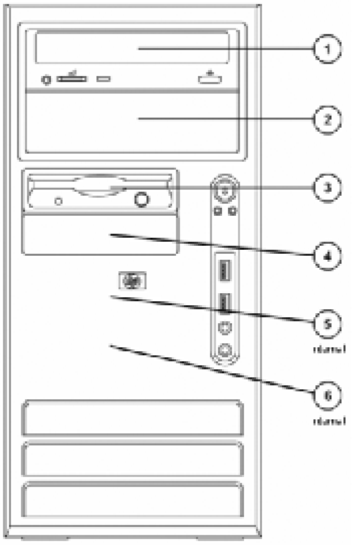
DIMM Size	**Slot**			
	Channel A		**Channel B**	
	1	**2**	**3**	**4**
128-MB	128-MB			
256-MB (dual-channel)	128-MB		128-MB	
512-MB	512-MB			
512-MB (dual-channel)	256-MB		256-MB	
1-GB	1-GB			
1-GB (dual-channel)	512-MB		512-MB	
2-GB (dual channel)	1-GB		1-GB	
2-GB (dual channel)	512-MB	512-MB	512-MB	512-MB
4-GB maximum (dual-channel)	1-GB	1-GB	1-GB	1-GB

Storage

Small Form Factor



Microtower



	Quantity Supported	Position Supported	Controller
Small Form Factor			
Diskette Drives (optional)	1	1	Diskette
Media Reader	1	1	PCI card supplies internal USB 2.0 port
Storage Drive Bay	1	1,2	IDE
3.5" Serial ATA Hard Drives	2	1,3	SATA
Microtower			
Diskette Drive (optional)	1	3	Diskette
Media Reader	1	3	PCI card supplies internal USB 2.0 port
5.25" Storage Drive Bays	2	1, 2	IDE
3.5" Serial ATA Hard Drives	3	4, 5, 6	IDE

Base Unit Contents	Small Form Factor	Microtower
Coprocessor	Integrated	
L2 Cache Architecture / Speed	Full core clock speed	
Cache Upgradeable	Not upgradeable - Integrated into Processor	
System board with Intel 915GV chipset with Intel integrated Graphics Media Accelerator 900	X	
Cables	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	2 Serial ATA interfaces	
Hard Drive Controller (PCI) Supported	Serial ATA	
Optical/Removable Storage Interface Supported	1 Ultra ATA/100 interface (supporting 2 devices)	
Optical/Removable Controller (PCI) Supported	Ultra ATA/100	

Software	Description	Small Form Factor	Microtower
Preinstalled Software			
Windows XP Professional SP2		X	X
Windows XP Home SP2		X	X
Computer Setup Utility		X	X
Diagnostics for Windows		X	X
Microsoft Internet Explorer		X	X
Norton AntiVirus 2005 with 60 day Live Update Subscription		X	X
Microsoft Office XP Professional		X	X
Microsoft Office XP Small Business Edition		X	X
Microsoft Office XP Personal		X	X
Microsoft Office XP Basic		X	X
PDF Complete (available in English only)		X	X
Pre-loaded Software			

Altiris Deployment Solution Agent	Downloadable from http://www.altiris.com/	X	X
HP Client Manager Software	Downloadable from http://www.hp.com/go/easydeploy	X	X
Local Diskette Boot		X	X
Network Boot		X	X
Disk-on-Key Boot		X	X

System Board	**Small Form Factor**	**Microtower**
Architecture	P4 / PCI / PCI Express x 1	
Chipset	Intel 915GV Chipset	
I/O Controller	LPC47B397	
System Board Form Factor	Custom	UATX
Processor Socket – 775 Pin ZIF	X	
DIMM Connectors (2.5V)	4	
Intel Graphics Media Accelerator 900 integrated	X	
PCI Connector	2 low profile	2 full height, full length
PCI Express x1	1	
Flash ROM	X	
Audio (AC97 Integrated Audio)	X	
CD ROM IN (Audio)	X	
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	
Integrated Broadcom BCM5751 NetXtreme Gigabit	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	

Technical Specifications

Chassis	**Small Form Factor**	**Microtower**
Color	Carbonite/Silver	
System Board Form Factors Supported	Custom	Standard µATX
Cooling Solutions Supported	X	
Power Supply Fan (Variable Speed)	X	
Processor Fan-Heatsink (Variable Speed)	X	
Chassis Fan (Variable Speed)	X	
Internal Speaker	X	
Security Locks Supported	Kensington Cable Lock Provision (Lock not included) Hood Cover Security Loop (Lock not included)	
Security Loop Hole Diameter	0.236 in (0.60 cm)	

Unit Environment and Operating Conditions	**Small Form Factor**	**Microtower**
General Unit Operating Guidelines • Keep the computer away from excessive moisture, direct moisture and the extremes of heat and cold, to ensure that unit is operated within the specified operating range. • Leave a 10.2 cm (4 in) clearance on all vented sides of the computer to permit the required airflow. • Never restrict airflow into the computer by blocking any vents or air intakes. • Do not stack computers on top of each other or place computers so near each other that they are subject to each other's re-circulated or preheated air. • Occasionally clean the air vents on the front, back, and any other vented side of the computer. Lint, dust and other foreign matter can block the vents and limit the airflow. • If the computer is to be operated within a separate enclosure, intake and exhaust ventilation must be provided on the enclosure, and the same operating guidelines listed above will still apply.		
Temperature Range	Operating: 50° to 95° F (10° to 35° C)* Non-operating: -22° to 140° F(-30° to 60° C)	
Relative Humidity	Operating: 10% to 90% (non-condensing at ambient) Non-operating: 5% to 95% (non-condensing at ambient)	
Maximum Altitude (unpressurized)	Operating: 10,000 ft (3048 m) Non-operating: 30,000 ft (9144 m)	
***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.		

Technical Specifications

Power Supply	**Small Form Factor**	**Microtower**
Power Supply	240 Watt Power Supply – active PFC	300 Watt Power Supply – passive PFC (115v / 230v line switch)
Maximum Rated Power	240 Watt	300 Watt
Full Ranging Input (No Line Select Switch)	–	–
Active Power Factor Correction (APFC) (Input Current is nearly ½ a non-APFC PS)	X	–
Passive Power Factor Correction (PFC)	–	X
Operating Voltage Range	90 – 264 VAC	90 – 132 / 180 – 264 VAC
Rated Voltage Range	100 – 240 VAC	100 – 127 / 200 – 240 VAC
Rated Line Frequency	50/60 Hz	50/60 Hz
Operating Line Frequency Range	47 – 63 Hz	47 – 63 Hz
Rated Input Current	5A / 2.5A	6A / 3A
Heat Dissipation	Typical 341 btu/hr (86 kg-cal/hr) Maximum 1170 btu/hr (295 kg-cal/hr)	Typical 341 btu/hr (86 kg-cal/hr) Maximum 1575 btu/hr (397 kg-cal/hr)
Power Supply Fan	80mm variable speed	80mm variable speed
Energy Star Compliant	X	X
Blue Angel Compliant (<5w in S5-Power Off)	X	X
FEMP Standby Power Compliant (<2W in S5 - Power Off) Note: User must disable the "S5 Wake on LAN" in the F10 setup (default is enabled).**	X	X
Power Consumption in ES Mode - Suspend to RAM (S3) (Instantly Available PC)	2.5W to 3W	2.5W to 3W
Processor/Cache Memory Power -Down (S3)	< 3W	< 3W
Environmental and Mechanical Engineering Support Center	http://env-webserver.ccm.cpqcorp.net/EMESC/default.htm	
****NOTE:** Power consumption in the Off/Apparent Off mode is measured and reported with the network interface controller "Wake on LAN" feature disabled in F10 Setup (default is "enabled").		

Technical Specifications

ROM Features	**Description**	**Small Form Factor**	**Microtower**
Instantly Available PC (Suspend to RAM – S3)	Allows for very low power consumption with quick resume time	X	X
ROM Based F10 Setup	Review and customize BIOS settings	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
System/Emergency ROM Flash Recovery with Video	Recovers corrupted system BIOS	X	X
BIOS Smart Card Support	BIOS preboot smart card authentication (passwords) via USB CCID compliant smart card readers	X	X
Auto Setup when New Hardware Installed	System automatically detects addition of new hardware	X	X
Serial, Parallel, USB, Audio, Network, Enable/Disable Port Control	Enable or disables serial, parallel, USB, audio, and network ports	X	X
Removable Media Write/Boot Control	Prevents ability to boot from removable media on supported devices (and can disable writes to media on supporting devices)	X	X
Network Server Mode	Allows for secured keyboard-less operation	X	X
Power-On Password	Prevents an unauthorized person from booting up the computer	X	X
Setup Password	Prevents an unauthorized person from changing the system configuration	X	X
Replicated Setup	Saves BIOS settings to diskette or USB disk-on-key in human readable file. SSM and Repset.exe utility can then replicate these settings on machines being deployed without entering ROM-based F10 setup	X	X
Remote ROM Flash	Provides secure, fail-safe ROM image management from a central network console	X	X
Remote Wakeup	• System administrators can power on, restart, and power off a client computer from a remote location. • Enables cost-effective power consumption when the administrator needs to distribute software, perform security management, or update the ROM.	X	X
ACPI (Advanced Configuration and Power Management Interface)	• Allows the system to wake from a low power mode • Controls system power consumption, making it possible to place individual cards and peripherals in a low-power or powered-off state without affecting other elements of the system	X	X
Keyboard-less Operation	The system can be operated without a keyboard	X	X
SMBIOS	System Management BIOS, previously known as DMI BIOS, for system management information	X	X

Initial Configuration and Deployment	**Description**	**Small Form Factor**	**Microtower**

HP Client Management Solutions	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 Software is included free with all HP business PCs. It enables central tracking, monitoring, and management of the hardware aspects of HP client systems: • Get valuable hardware information such as CPU, memory, video, and security settings • Monitor system health to fix problems before they occur • Install drivers and BIOS updates without visiting each PC • Remotely configure BIOS and security settings • 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: • Inventory assessment • Software license compliance • Personality migration • Software image deployment • Software distribution • Asset management • Client backup and recovery • Problem resolution Visit http://www.hp.com/go/easydeploy for more information, to download HP Client Manager Software, and to evaluate the Altiris solutions.	X	X
System Software Manager (free)	A free utility that detects and updates BIOS, device drivers, and management agent versions on your networked PCs	X	X
Replicated Setup	Saves BIOS settings to diskette or USB disk-on-key in human readable file. Repset.exe utility and System Software Manager (SSM) can then replicate these settings on machines being deployed without entering ROM-based F10 setup	X	X
HP Systems Insight Manager	Easy to use management application for the enterprise. For more information see www.hp.com/go/hpsim	X	X
Support Software CD	—	X	X
Software Restore CD	Restores computer to its original factory shipping image	X	X
Asset Tag	• Repository for storing company-specific property asset numbers for easy tracking • Initially set equal to the system serial number • Stored in a protected section of non-volatile memory that can be accessed and modified with the F10 Setup program	X	X
DIMM Serial Presence Detect	Detects whether or not memory DIMMs are present and their type	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
Monitor serial number, model & manufacturer	—	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
ROM revision levels	• Identifies system ROM revision levels and reports in ROM-based F10 setup • Version is stored in an industry standard memory location (SMBIOS) so that management SW applications can use and report this information	X	X
System board revision level	• Allows management SW to read the revision level of the system board • Revision level is digitally encoded into the hardware and cannot be modified	X	X
Memory Change Alert	Alerts management console if memory is removed or changed	X	X
Ownership Tag	A user-defined string stored in non-volatile memory that is displayed in the BIOS splash screen	X	X

Security Features	**Description**	**Small Form Factor**	**Microtower**
Mechanical Hood Security Provision	Security Loop	X	X
Kensington Lock Support	Kensington lock slot on the chassis	X	X
Cable Lock Provision	Physically secure computer hardware from theft	X	X
Serial, Parallel, USB Enable/Disable	Enable or disable serial, parallel or USB ports and hide them from the operating system	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
Power-On Password	Prevents an unauthorized person from booting up the computer	X	X
Setup Password	Prevents an unauthorized person from changing the system configuration	X	X

Fault Notification and Recovery	**Description**	**Small Form Factor**	**Microtower**
SMART Hard Drives, Fault & Pre-failure Notification (Self-monitoring, analysis, and reporting technology)	• Allows hard drives to monitor their own health and to raise flags if imminent failures were predicted • Predicts failures before they occur. Tracks fault prediction and failure indication parameters such as re-allocated sector count, spin retry count, calibration retry count • By avoiding actual hard drive failures, SMART hard drives act as "insurance" against unplanned user downtime and potential data loss from hard drive failure	X	X
Memory Change Notification (Requires HP Client Manager Software)	Alerts management console if memory is removed or changed	X	X

Technical Specifications

Thermal Notification (Requires HP Client Manager Software)	Monitors the temperature state within the chassis. Three modes: • NORMAL – normal temperature ranges • ALERTED – excessive temperatures are detected. Raises a flag so action can be taken to avoid shutdown or provide for a smoother system shutdown • SHUTDOWN – excessive temperatures are encountered. Automatically shuts down the computer without warning before hardware component damage occurs	X	X
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
Surge Tolerant Full Ranging Power Supply	Withstands power surges up to 2000V	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: • single bit errors • double bit errors • an odd number of errors ○ error bursts up to 32-bits long	X	X

System Software Updating	**Description**	**Small Form Factor**	**Microtower**
Remote ROM Flash	Provides secure, fail-safe ROM image management from a central network console	X	X
Remote Wakeup/ Remote Shutdown	• System administrators can power on, restart, and power off a client computer from a remote location. • Enables cost-effective power consumption when the administrator needs to distribute software, perform security management, or update the ROM.	X	X
Support Software CD & WWW	—	X	X

Technical Specifications

Other Features	**Description**	**Small Form Factor**	**Microtower**
ACPI-Ready Hardware	Advanced Configuration and Power Management Interface (ACPI). • Allows the system to wake from a low power mode. • Controls system power consumption, making it possible to place individual cards and peripherals in a low-power or powered-off state without affecting other elements of the system.	X	X
SMBIOS	System Management BIOS, previously known as DMI BIOS, for system management information	X	X
Microsoft Windows Hardware Quality Lab (WHQL)	Microsoft Windows Hardware Quality Lab (WHQL) certified ensures that the system meets Microsoft's standard for hardware compatibility with Windows XP.	X	X
Dual-State Power Button	Power button acts as either an on/off button and suspend-to-sleep button	X	X

Serviceability Features of System	**Description**	**Small Form Factor**	**Microtower**
Dual Color Power LED on Front of Computer (Indicates Normal Operations and Fault Conditions)	—	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 9-system powers on but is unable to boot 10-bad option card	X	X
System/Emergency ROM Flash Recovery with Video	Recovers corrupted system BIOS.	X	X
Diagnostic for Windows Software	—	X	X
Configuration Record SW	—	X	X
Over-Temp Remote Warning (Requires HP Client Manager Software)	—	X	X
HP OS CD (Restore OS CD)	Restores computer to its original factory shipping image	X	X
HP Restore CD	Restores the computer to its original factory shipping image	X	X
Flash ROM	–	X	X
5V Aux Power LED on System PCA	–	X	X

Dual Function 5V Aux Power LED (ON) / PS_ON LED (OFF) on System PCA	–	X	–
Diagnostic Power Switch LED on board	–	X	–
Clear Password Jumper	–	X	X
Clear CMOS Button	–	X	X
CMOS Battery Holder for easy Replacement	–	X	X
Processor ZIP Socket for easy Upgrade	–	X	X
DIMM Connectors for easy Upgrade	–	X	X
NIC LEDs (integrated) (Green & Amber)	Used to determine NIC status	X	X

Serviceability Features of Chassis	**Description**	**Small Form Factor**	**Microtower**
Dual Color Power and HD LED - To Indicate Normal Operations and Fault Conditions	–	X	X
ASF 2.0 support (Alert Standard Format)	Industry-standard specification for network alerting in operating system-absent environments	X	X
Front power switch	–	X	X
Green Pull Tabs, and Quick Release Latches for easy Identification	–	X	X
Color coordinated cables and connectors		X	X
System memory can be upgraded without removing the system board or any internal components	Eases memory upgrading	X	X
Tool-less Hood Removal	Eases entry to the chassis without use of special tools	X (2 side buttons - Hood and bezel one piece)	X (1 thumb screw)
Tool-less Hard Drive, CD & Diskette Removal	–	X	X
Tool-less System Board Removal	No special tools required for system board removal or maintenance	X	–
Universal Tower Stand	Optional	X (Optional)	–

Drive Self Tests (DPS)	• Drive Protection System • A diagnostic hard drive self test. It scans critical physical components and every sector of the hard drive for physical faults and then reports any faults to the user. • Running independently of the operating system, it can be accessed through a Windows-based diagnostics utility or through the computer's setup procedure. It produces an evaluation on whether the hard drive is the source of the problem and needs to be replaced. • The system expands on the Self-Monitoring, Analysis, and Reporting Technology (SMART), a continuously running systems diagnostic that alerts the user to certain types of failures	X	X
DPS Access through F10 Setup during Boot		X	X
DPS Access through Diagnostics for Windows		X	X
SMART Technology (Self-Monitoring, Analysis and Reporting Technology)	Allows hard drives to monitor their own health and to raise flags if imminent failures were predicted • Helps predict failures before they occur. Tracks fault prediction and failure indication parameters such as re-allocated sector count, spin retry count, calibration retry count • By helping to avoid actual hard drive failures, SMART hard drives may provide additional protection against unplanned user downtime and potential data loss from hard drive failure	X	X
SMART I – Drive Failure Prediction		X	X
SMART II – Off-Line Data Collection		X	X
SMART III – Off-Line Read Scanning with Defect Reallocation		X	X

RoHS Compliance	Hewlett-Packard is committed to compliance with all applicable environmental laws and regulations, including the European Union Restriction of Hazardous Substances (RoHS) Directive. HP's goal is to exceed compliance obligations by meeting the requirements of the RoHS Directive on a worldwide basis. From July 1, 2006, RoHS substances will be virtually eliminated (virtually = to levels below legal limits) for all HP electronic products subject to the RoHS Directive, except where it is widely recognized that there is no technically feasible alternative (as indicated by an exemption under the EU RoHS Directive). Prior to this date, customers interested in purchasing RoHS compliant product should contact their local HP sales or distribution office to determine specific configuration status.

Service and Support	On-site Warranty and Service[Note 1]: This three-year (3-1-1), limited warranty and service offering delivers three years of parts and one year of both labor and on-site repair. Response time is next business-day[Note 2] and includes free telephone support[Note 3] 24 x 7. Global coverage[Note 2] ensures that any product purchased in one country and transferred to another non-restricted country will remain fully covered under the original warranty and service offering. Some countries/regions do not offer one year onsite and labor.
	NOTE 1: Terms and conditions may vary by country. Certain restrictions and exclusions apply.
	NOTE 2: On-site service may be provided pursuant to a service contract between HP and an authorized HP third-party provider, and is not available in certain countries. Global service response times are based on commercially reasonable best effort and may vary by country.
	NOTE 3: Technical telephone support applies only to HP-configured, HP and HP-qualified, third-party hardware and software. Toll-free calling and 24 x 7 support may not be available in some countries.

Technical Specifications - Audio

AC97 Integrated ADI 1981B Audio	**Type**	Integrated
	AC '97 Stereo Codec	Yes
	FM Synthesis Support	Yes – Yamaha XG Lite
	OPL3 FM Synthesis Support	Yes
	Sound Blaster Compatibility	Yes
	Audio Jacks	Microphone-In (20-K ohm Input Impedance); rear stereo and front analog microphone ports available except for USDT which has front stereo microphone only Line-In (12-K ohm Input Impedance) Line-Out * (less than 800 ohms Output Impedance, expects at least a 10-K ohm load) Headphone-Out (2.5 Ohms Output Impedance, expects at least a 32 ohm load)
	NOTE: *Internal Speaker Amplifier is for Internal Speaker only. External Speakers need to be powered externally.	
	Sampling	7 kHz – 48 kHz
	Wavetable Syntheses (software)	Yes – GM and FM Midi Support, Direct Music and Down Loadable Soundset (4 Meg DLS Level 1 and 2 Support)
	3D Positional Sound	No
	Digital Audio	Yes
	Analog Audio	Yes
	Number of Channels on Line-Out (mono/stereo)	Stereo (Left & Right channels)
	Internal Audio Speaker Power Rating	3W
	Internal Speaker	Yes
	Hardware Equalizer for Internal Speaker	Fixed 7 Band ParametricEQ
	External Speaker Jack (Line-Out)	Yes

Technical Specifications - Communications

Integrated Broadcom BCM5751 NetXtreme Gigabit Ethernet	**Connector**	RJ-45	
	Controller	Broadcom 5751 PCI-Express LAN Controller	
	Memory	Integrated 72KByte frame buffer memory	
	Network data rates supported	10Mbps-Half Duplex, 10Mbps-Full Duplex/100Mbps-Half Duplex, 100Mbps Full Duplex /1000Mbps	
	Compliance	IEEE 802.1A, 802.1P, 802.1P, 802.1Q, 802.2, 802.3, 802.3AB and 802.3u compliant, 802.3x flow control	
	Bus architecture	PCI-Express 1.0a	
	Data path width	x1	
	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	1.45 watts maximum	
	Boot ROM support	Yes	
	LEDs	2; #1 on for link and flashes off for activity; #2 green for 1000Mbps, yellow for 100Mbps, off for 10Mbps	
	Auto MDI-X	Automatic MDI crossover is supported (eliminates need for crossover cables)	
	Statistics	SNMP MIB II, Ethernet-like MIB, and Ethernet MIB (802.3z Clause 30)	
	Teaming	Supported (additional NICs required)	
	Package	196-pin BGA	
	Environmental	**Operating temperature**	32° to 131°F (0° to 55° C)
		Operating humidity	85% at 131° F (55° C)
	Dimensions	0.59 x 0.59 in (15 x 15 mm)	
	Management capabilities	ACPI, WoL and DMI 2.0, PXE 2.0, WfM 2.0, Broadcom mgmt utility	
	Alerting	ASF 1.1	

Intel PRO/1000 GT Gigabit PCI NIC	**Connector**	RJ-45
	Controller	Intel 82541PI Gigabit Controller
	Memory	Integrated 64KB configurable transmit receive 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 2.3
	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	(800mA) 4watts @ +5VDC
	Boot ROM support	Yes

Technical Specifications - Communications

Network transfer rate	10BASE-T (half-duplex) 10 Mbps 10BASE-T (full-duplex) 20 Mbps 100BASE-TX (half-duplex) 100 Mbps 100BASE-TX (full-duplex) 200 Mbps 1000BASE-T (full-duplex) 2000 Mbps (actual rate limited by PCI Bus)	
Environmental	**Operating temperature**	32° to 131°F (0° to 55° C)
	Operating humidity	85% at 131° F (55° C)
Dimensions	6.4 x 4.8 x 0.8 in (16.3 x 12.1 x 1.9 cm)	
Management capabilities	ACPIWOL and DMI 2.0, S5 WOL, WMI, PXE 2.0, RPL	

Hi-Speed 56K PCI SoftModem	**Data Transmission**	Hi-Speed: 56,000 Kbps maximum downstream data, controllerless **NOTE:** 56 Kbps technology refers to download speeds only and requires compatible modems at server sites. Other conditions may limit modem speed. FCC limitations allow a maximum of 53 Kbps during download transmissions.
	Data Speeds	(Upload only) 33,600/31,200/28,800/26,400/21,600/19,200/16,800/14,400/12,000/9,600/7,200/4,800/2,400/1,200/300
	Data Standards	ITU V.90, ITU-T, V.34bis, V.22bis, V.22bis, V.21, V.23, Bell 212A, and Bell 103
	Fax Speeds	14,400 / 12,000 / 9,600 / 7,200 / 4,800 / 2,400 / 1,200 / 300 b/s
	Fax Mode Capabilities	Group3 FAX, V. 17, V.29, V.27ter, and V.21 Channel 2, Class 1
	Error Correction and Data Compression	V.44 (software upgradeable), 4.2bis, V.42 and MNP2-5
	Power Management	APM and ACPI states D0, D1, D2, and D3; meets PCI 2.2 requirements and PC'99 requirements
	Upgradeability	Software driver upgradeable for v.92 and future enhancements
	Video	ITU-T V.80 video ready interface
	Other	TIA/EIA 602 standard AT command set Integrated DTE interface with speeds of up to 115.2 Kbps, parallel 16550a UART-compatible interface Optional ring wakeup signal
	Operating Temperature	32° to 158° F (0° to 70° C)
	Operating Humidity	20% to 90%, non-condensing
	Power	Requires a 3.3-V auxiliary power rail on PCI bus Uses only one PCI load (i.e., one grant/request pair), one shared IRQ, one electrical load
	Chipset	Agere Systems 1648C (Mars 3.2) - Integrated PCI interface with 5-V tolerant buffers and CardBus support
	Dimensions (L x H)	Complies with PCI low profile specifications - 6.7 x 2.3 in (17.0 x 5.8 cm) and supports high-and low-profile brackets
	Connection	Dual, parallel RJ-11 support with auxiliary Tip/Ring connector

Technical Specifications - Communications

Other Features	Digital line protection, call progress monitoring via on-board piezo device, transformer-based DAA design, support for high profile and low profile brackets, PnP ID supports via external EEPROM
EMC	FCC Part 15, IC ES003, EN 55022, 3rd edition, EN 55024, annex A, EN 61000-4-6, EN 61000-4-8
Telecom	FCC Part 68, IC-CS-03 (Canada); Worldwide PTT approvals Not available in India, Russia, Slovakia, Slovenia, Belarus, Brunei, Croatia, Ecuador, Latvia, Lithuania, Morocco, Peru, Phillipines, Sri Lanka, Ukraine, Malaysia (use DC132B or DC132C instead)
Health	Bare PCB material compliant to 94V-0 or better (marked as such), Microsoft Windows Me health compliant
Other	PC'99 compliant, PCI version 2.2, WHQL approved; support for ACPI revision 1.1

Technical Specifications - Graphics

Integrated Graphics Media Accelerator 900	**3D/2D Controller**	Microsoft DirectX® 9 based with support for Pixel Shader 2.0, 4:1 anisotropic filtering, Gaussian texture filtering, shadow maps, volumetric textures, double-sided stencil buffers, and 4 pixel pipes.
	VGA Controller	Integrated
	Bus Type	With the GV chipset, the integrated graphics is always enabled. Plugging in the PCI card does not disable it and does not require the integrated graphics to be re-enabled.
	RAMDAC	Integrated, 400 MHz.
	Memory	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 < 256 MB: 8 MB pre-allocated (for DOS) + 24 MB DVMT : max frame buffer of 32 MB 256 MB <= Memory < 512 MB: 8 MB pre-allocated + 56 MB DVMT: max frame buffer of 64 MB 512 MB <= Memory: 8 MB pre-allocated + 120 MB DVMT : max frame buffer of 128 MB
	Controller Clock Speed	270 MHz
	Overlay Planes	Single Overlay support with 5x3 filtering
	Max Color Depth	32-bits/pixel
	Maximum Vertical Refresh Rate	100 Hz at up to 1920x1440, 75Hz at 2048x1536. Varies with mode and configuration. See table below.
	Multi-display Support	Support for one CRT via the motherboard's VGA connector. Support for an additional DVI-D or VGA display via the optional dual head NVS280 PCI card.
	Graphics API Support	Microsoft DirectX 9, DirectXVA®, VMR9, GDI/GDI+; OpenGL® 1.4.

Resolutions Supported[1]

Resolution	**Maximum Refresh Rate** (Hz)	
	Analog Monitor	**Digital Monitor**
640 x 480	120	60
800 x 600	120	60
1024 x 768	120	60
1152 x 864	120	60
1280 x768	120	60
1280 x 960	120	60
1280 x 1024	120	60
1600 x 900	100	60
1600 x 1200	100	60
1920 x 1080	100	-
1920 x 1200	100	-
1920 x 1440	100	-
2048 x 1536	75	-

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

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

NVIDIA Quadro NVS 280 Graphics Card	**Form factor**	ATX
	Graphic Controller	Integrated Quadro NVS 280 graphics processor unit (GPU)
	Bus Type	Workstations: AGP 8X or PCI Desktops: PCI
	RAMDAC	Dual 350 MHz
	Memory	64 MB DDR with frame buffer and texture storage
	Connector	Single DMS-59 high-density flex connector
	Dimensions	Low-profile, 2.586 x 6.6 in (6.57 x 16.76 cm)
	Controller clock speed	275 MHz
	Color planes	One 16-bit video overlay plane
	Overlay planes	1 16-bit Video overlay plane
	Maximum vertical refresh rate	120 Hz
	Maximum pixel clock	350 MHz
	Multi-monitor support	Dual analog or digital monitors
	Single DVI Support	Yes
	Dual DVI Support	Yes
	High definition Video Processor	Full screen, full frame video playback of HDTV and DVD content DVD-ready motion compensation for MPEG-2 Independent hardware color controls for video overlay Hardware color-space conversion (YUV 4:2:2 and 4:2:0) IDCT motion compensation 5-tap horizontal by 3-tap vertical filtering 8:1 up/down scaling

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

Technical Specifications - Graphics

NVIDIA Quadro NVS 55 64MB PCI DVI with TV-Out	**Form Factor**	Low profile, both ATX and low profile brackets included
	Graphic Controller	Integrated Quadro NVS 55 Graphics Processor Unit (GPU)
	Bus type	PCI 2.1, 32-bit, 5V
	Memory	64 MB DDR
	Connectors	Single DVI-I connector Single S-Video connector
	Dimensions	Low profile, 2.586 x 6.6 in (6.57 x 16.76 cm)
	Controller clock speed	250 MHz
	Memory speed	200 MHz
	Color depth	32-bits/pixel max
	Overlay planes	One 16 bit video overlay plane
	Maximum vertical refresh rate	85 Hz
	Maximum pixel clock	Analog output: 350 MHz Digital output: 162 MHz
	Single DVI Support	Yes
	TV out support	Yes (S-Video 4 pin mini-Din)
	High-definition Video Processor (HDVP)	Full screen, full frame video playback of HDTV and DVD content DVD-ready motion compensation for MPEG-2 Independent hardware color controls for video overlay Hardware colorspace conversion (YUV 4:2:2 and 4:2:0) IDCT motion compensation Up to 5-tap horizontal by 3-tap vertical filtering
	Agency Approvals	ACA C-tick, BSMI, CE Mark, FCC, ICES/C.I.S.P.R, MIC, UL, VCCI

Technical Specifications - Hard Drives

7200 rpm SMART III Serial ATA Hard Drives	**40-GB**	**Capacity**	40,020,000,000 bytes	
		Height	1 inch (2.54 cm)	
		Width	Media diameter: 3.5 in (8.89 cm)	
			Physical size: 4 in (10.2 cm)	
		Interface	Serial ATA	
		Synchronous Transfer Rate (Maximum)	150 MB/s	
		Buffer	2 MB	
		Seek Time (typical reads, including settling)	**Single Track**	1.0 ms
			Average	8.5 ms
			Full-Stroke	18.0 ms
		Rotational Speed	7200 rpm	
		Logical Blocks	78,165,360	
		Operating Temperature	41° to 131° F (5° to 55° C)	
	80-GB	**Capacity**	80,026,361,856 bytes	
		Height	1 inch (2.54 cm)	
		Width	Media diameter: 3.5 in (8.89 cm)	
			Physical size: 4 in (10.2 cm)	
		Interface	Serial ATA (3.0 Gb/s)	
		Synchronous Transfer Rate (Maximum)	Up to 3 Gb/s	
		Buffer	8 MB	
		Seek Time (typical reads, including settling)	**Single Track**	2.0 ms
			Average	9.3 ms
			Full-Stroke	21 ms
		Rotational Speed	7200 rpm	
		Logical Blocks	156,301,488	
		Operating Temperature	41° to 131° F (5° to 55° C)	

Technical Specifications - Hard Drives

160-GB	**Capacity**	163,928,604,672 bytes	
	Height	1 inch (2.54 cm)	
	Width	Media diameter: 3.5 in (8.89 cm) Physical size: 4 in (10.2 cm)	
	Interface	Serial ATA (3.0 Gb/s)	
	Synchronous Transfer Rate (Maximum)	Up to 3 Gb/s	
	Buffer	8 MB	
	Seek Time (typical reads, including settling)	**Single Track**	0.9 ms
		Average	9.3 ms
		Full-Stroke	18 ms
	Rotational Speed	7200 rpm	
	Logical Blocks	320,173,056	
	Operating Temperature	41° to 131° F (5° to 55° C)	

Technical Specifications - Input/Output Devices

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

Technical Specifications - Input/Output Devices

2-Button Scroll Mouse (PS/2 or USB)	**Scroll Wheel**	8 mm	
	Maximum Rotation Speed	30 mm/s	
	Switch Type	Light force micro-switch	
	Switch Life	1 million operations	
	Mechanical Life	Minimum 200,000 revolutions	
	Environmental	**Operating Temperature**	50° to 122° F (10° to 50° C)
		Non-operating Temperature	-22° to 140° F (-30° to 60° C)
		Operating Humidity	10% to 90% (non-condensing at ambient)
		Non-operating Humidity	20% to 80% (non-condensing at ambient)
		Operating Shock	40 g, 6 surfaces
		Non-operating Shock	80 g, 6 surfaces
		Operating Vibration	2 g peak acceleration
		Non-operating Vibration	4 g peak acceleration
	Electrical	**Operating Voltage**	+ 5VDC ± 10%
		Power Consumption	15mA
		System Consumption	PS/2 mini-din connector
		ESD	CE level 4, 15 kV air discharge
		EMI-RFI	Conforms to FCC rules for a Class B computing device
		PC98	Functionally compliant
	Mechanical	**Resolution**	400 ± 20% DPI
		Tracking Speed	10 in/s maximum
		Acceleration	100 in/s
		Switch Actuation	65 g nominal peak force
		Switch Life	1,000,000 operations (using Hasco modified tester)
		Cable Length	6 ft (1.8 m)
		PC98-99	Mechanically compliant
	Regulatory Approvals	UL, CSA, FCC, CE Mark, TUV, TUV GS, VCCI, BCIQ, C-Tick	

Technical Specifications - Input/Output Devices

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

Technical Specifications - Optical Storage

48X Max CD-ROM Drive	**Interface**	ATAPI IDE
	Data Buffer	16.6 Mbps
	Data Transfer Rate	Sustained—1200 Kbps minimum (audio) Variable (CD)—3,000 to 7,200 Kbps
	Disk Rotation Technology	CAV (Constant Angular Velocity)
	Access Time (ms)	Random: <100 ms Full-stroke seek: <150 ms
	Average Access Time	< 80 ms
	Cache Buffer (standard/maximum)	128 KB
	Disk Formats Read	Multi-session Photo CD, multi-read CD-ROM, CD text, audio CD, CD-I, CD-RW, CD-R, CD-Extra, CD-ROM XA
	Disk Formats Written	None
	Disk Capacity (CD)	650 MB
	Block Size	Mode 1–2,048, 2,352 bytes Mode 2–1, 2,088, 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
	Diameter	12 cm; 8 cm
	Thickness	1.2 mm
	Track Pitch	1.6 µm
	Audio Output Level	Line-out—0.7 V @ 47 Kohm Headphone—0.6 V @ 32 ohm
	Startup Time	<7 seconds (typical); < 30 seconds with multi-session
	Operating Conditions	**Temperature** 41° to 120° F (5° to 50° C) **Relative Humidity** 10% to 80%
	Dimensions (H x W x D, maximum)	1.7 x 5.9 x 8.0 in (4.3 x 15.0 x 20.3 cm)
	Weight	2.6 lb (1200 g)
	MPEG Playback Graphics Solution Support	None

48X/32X/48X CD-RW Drive	**Orientation**	Either horizontal or vertical
	Disc Loading Mechanism	Half-height, tray load
	Interface Type	ATAPI IDE
	Dimensions—external (W x H x D)	7.99 x 5.88 x 1.71 in (203 x 149.5 x 43.5 mm)
	Weight	2.6 lb (1.2 kg)
	Disc Diameter	12 cm, 8 cm
	Disc Thickness	1.2 mm
	Track Pitch	1.6 µm

Technical Specifications - Optical Storage

Disc Center Hole Diameter	15 mm	
Reference Scanning Velocity	1.2 m/s	
Recording/Playing Time	80 minutes with CD-R media	
Read Only Disc Parameters	**Formats and Modes Supported**	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
	Capacity	185 MB (Mode 2, 8 cm); 540 MB (Mode 1, 12 cm); 650 MB (Mode 2, 12 cm); 700 MB (Mode 2, 12 cm)
	Block Size	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
Writeable Disc Parameters	**Disc Type**	CD-R and CD-RW
	Write Methods	Disc at Once, Track at Once, Session at Once, Variable Packet, Fixed Packet
	Format and Modes Supported	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
	Capacity	185 MB (Mode 2, 8cm); 540 MB (Mode 1, 12 cm); 650 MB (Mode 2, 12 cm); 700 MB (Mode 2, 12 cm)
	Block Size	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
Access Times (typical)	**Random**	< 120 ms
	Full Stroke	< 200 ms
Maximum Data Transfer Rates	**CD-RW Write**	4800 KB/s (32X) Max
	CD-ROM, CD-R read	7200 KB/s (48X) Max
	CD-RW read	7200 KB/s (32X) Max
	CD-R write	7200 KB/s (48X) Max
Data Transfer Modes	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.	
Cache Buffer	2 MB (minimum)	
Start-up Time (single)	< 7 seconds typical	
Start-up Time (multi-session)	< 30 seconds typical	
Stop Time	< 4 seconds	

Technical Specifications - Optical Storage

	Power	**Source**	Four-pin, DC power receptacle	
		DC power requirement	5 VDC ± 5%—100 mV ripple p-p 12 VDC ± 5%—200 mV ripple p-p	
		DC current	5 VCD	< 1A (typical) < 1600 mA (maximum)
			12 VCD	< 600 mA (typical) < 1.4A (maximum)
			Total Drive Power (Standby mode)	< 2.5 watt
	Audio Output Level	0.7 Vrms		
	Configuration Jumper Block	Master, slave and cable select modes		
	Data Interface Connector	50-pin IDE interface		
	Environmental (all conditions, non-condensing)	**Temperature** (operating)	41° to 122° F (5° to 50° C)	
		Relative Humidity (operating)	10% to 90%	
		Maximum Wet Bulb Temperature (operating)	84° F (29° C)	

16X/48X DVD-ROM Drive	**Height**	5.25-in, half-height	
	Interface Type	ATAPI	
	Dimensions – External, Excluding Bezel (W x H)	5.88 x 1.71 in (149.5 x 43.5 mm)	
	Disc Diameter	12 cm, 8 cm	
	Disc Thickness	1.2 mm	
	Track Pitch	1.6 µm (CD), 0.74 µm (DVD)	
	Disc Center Hole Diameter	15 mm	
	Disc Formats	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	
	Disc Capacity	**DVD-ROM**	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), 4.7G (DVD+R), 8.5 GB (DVD+R DL)
		CD-ROM	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)
	Block Size (bytes)	DVD-ROM – 2048; CD-ROM Mode 0 – 2352; CD-ROM Mode 1 – 2352, 2340, 2336, 2048; CD-ROM Mode 2 – 2352, 2340, 2336, 2048	

Technical Specifications - Optical Storage

Access Times (typical reads, including settling)	**DVD-ROM Single Layer**	120 ms (typical)
	CD-ROM Mode 1	90 ms (typical)
	Full Stroke DVD	240 ms (seek) (typical)
	Full Stroke CD	160 ms (seek) (typical)
Maximum Data Transfer Rates	**CD-ROM Read**	7200 KB/s (up to 48X)
	DVD-ROM Read	21,600 KB/s (16X) Max
Data Transfer Modes	PIO Mode 4 (16.6 MB/s); Multi-word DMA mode 2 (16.6 MB/s); UltraDMA Mode 3 (44.4 MB/s)	
Power	**Source**	Four-pin, DC power receptacle
	DC Power Requirement	5 VDC ± 5% – 100 mV ripple p-p
		12 VDC ± 5% – 200 mV ripple p-p
	DC Current	5 VDC – <800 mA typical, < 1000 mA maximum
		12 VDC – < 870 mA typical
Audio Output Level	0.7 Vrms (typical)	
Configuration Jumper Block	Master, slave, and cable select modes	
Data Interface Connector	40-pin, shrouded and keyed, flat ribbon	
Environmental (all conditions non-condensing)	**Temperature** (operating)	41° to 122° F (5° to 50° C)
	Relative Humidity (operating)	10% to 85%
	Maximum Wet Bulb Temperature (operating)	86° F (30° C)
Certifications, Approvals	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.	

48X/32X/48X/16X Combo CD-RW/DVD-ROM	5.25-inch, half-height, tray-load	
	Color	Carbonite
	Orientation	Either horizontal or vertical
	Interface Type	ATAPI
	Dimensions (W x H x D)	5.77 x 1.71 x 7.36 in (146.5 x 43.5 x 187 mm) (external, excluding bezel)
	Disc Diameter	12 cm, 8 cm
	Disc Thickness	0.05 in (1.2 mm)
	Track Pitch	1.6 µm (CD), 0.74 µm (DVD)
	Disc Center Hole Diameter	0.6 in (15 mm)
	Reference Scanning Velocity	1.2 m/s (CD); 3.49 m/s (DVD SL); 3.84 m/s (DVD DL)

Technical Specifications - Optical Storage

Read Only Disc Parameters	**Formats and Modes Supported**	CD-ROM–Mode 1; CD-ROM XA–Mode 2 (forms 1 and 2); CD-Bridge; 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; DVD (single- and double-layer); DVD-R; DVD-RW; DVD-RW Multi-Border; DVD+R; DVD+R Multi-Session, and DVD+RW
	Capacity	180 MB (mode 2, 8 cm); 540 MB (mode 1, 12 cm); 650 MB (mode 2, 12 cm); 700 MB (Mode 2, 12 cm); 4.7 GB (DVD-5); 8.54 GB (DVD-9); 9.4 GB (DVD-10)
	Block Size	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
Writeable Disc Parameters	**Disc Type**	CD-R and CD-RW
	Write Methods	Disc at Once, Track at Once, Session at Once, Variable Packet, Fixed Packet
	Format and Modes Supported	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; CD-Bridge; Video CD
	Capacity	180 MB (mode 2, 8 cm); 540 MB (mode 1, 12 cm); 650 MB (mode 2, 12 cm); 700 MB (mode 2, 12 cm)
	Block Size	CD-DA–2,352 bytes; mode 0 – 2,336 and 2,352 bytes; mode 1– 2,048 and 2,352 bytes; mode 2?,336 and 2,352; mode 2, form 1?,048 and 2,352 bytes; mode 2, form 2?,324 and 2,352 bytes
Access Times (typical reads, including settling)	**Random DVD**	< 140 ms (typical)
	Random CD	< 125 ms, (typical)
	Full Stroke DVD	< 250 ms (seek)
	Full Stroke CD	< 210 ms (seek)
Maximum Data Transfer Rates	**CD-R write**	7200 KB/s (48X) Max
	CD-RW write	1500 KB/s (10X) Max
	CD-ROM, CD-R, CD-RW read	7200 KB/s (48X) Max
	DVD ROM read	21,632 KB/s (16X) Max

	Data Transfer Modes	ATA PIO mode 4 (16.7 MB/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), mode 2 (33 MB/s); ATA UltraDMA Mode 3 44 Mbytes/s (default)	
		Cache Buffer	2 MB (minimum)
		Startup Time (single)	< 7 seconds (typical)
		Startup Time (multi-session)	< 30 seconds (typical)
		Stop Time	< 4 seconds
	Power	**Source**	Four-pin, DC power receptacle
		DC Power Requirement	5 VDC ± 5%-100 mV ripple p-p 12 VDC ± 5%-200 mV ripple p-p
		DC Current	5 VDC (< 1000 mA typical, < 1600 mA maximum) 12 VDC (< 600 mA typical, < 1400 mA maximum)
		Total Drive Power (standby mode)	< 2.5 Watt
	Audio Output Level	0.7 Vrms (typical)	
	Configuration Jumper Block	Master, slave, and cable select modes	
	Data Interface Connector	40-pin, shrouded and keyed, flat ribbon	
	Environmental (all conditions, non-condensing)	**Temperature** (operating)	41° to 122° F (5° to 50° C)
		Relative humidity (operating)	10% to 90%
		Maximum wet bulb temperature (operating)	86° F (30° C)
	Certifications, Requirements	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, and NT4	
16X DVD+/-RW LightScribe Drive*	**Height**	5.25-inch, half-height, tray-load	
	Orientation	Either horizontal or vertical	
	Interface type	ATAPI/EIDE	
	Disc recording capacity	8.5 GB DL or 4.7 GB standard	
	Dimensions (W x H x D)	5.9 x 1.7 x 8.0 in (15.0 x 4.4 x 20.3 cm)	
	Weight (max)	2.6 lb (1.2 kg)	

Technical Specifications - Optical Storage

Write speed	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
Read speed	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
Access time (typical reads, including settling)	**Random**	DVD: < 130 ms (typical), CD: < 120 ms (typical)
	Full Stroke	DVD: < 240 ms (seek), CD: < 200 ms (seek)
	Startup Time	Single-session: < 15 seconds (typical), Multi-session: < 30 seconds (typical)
	Stop Time	< 4 seconds
	Cache Buffer	2 MB (minimum)
	Data Transfer Modes	ATA PIO mode 4 (16.7 MB/s); ATA Multi-word DMA mode 2 (16.7 MB/s); ATA UltraDMA Mode 3 (44.4 MB/s -default)
Power	**Source**	Four-pin, DC power receptacle
	DC Power Requirement	5 VDC ± 5%-100 mV ripple p-p
		12 VDC ± 5%-200 mV ripple p-p
	DC Current	5 VDC (< 1000 mA typical, 1600 mA maximum)
		12 VDC (< 600 mA typical, 1400 mA maximum)
	Total Drive Power (standby mode)	< 2.5 Watt
Audio output	**Line-Out**	0.7 VRMS
	Signal-to-Noise Ratio	74 dB
	Channel Separation	65 dB
Environmental conditions (operating – non-condensing)	**Temperature**	41° to 122° F (5° to 50° C)
	Relative humidity	10% to 90%
	Maximum wet bulb temperature	86° F (30° C)
System configuration	Intel Pentium III 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	

Technical Specifications - Optical Storage

Regulatory approvals	MPC-3 compliant, multi-read requirements, ATA Spec X3T9.2, ATAPI Spec T13.1153D, 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.

* The Lightscribe feature is available on Windows only.

Technical Specifications - Removable Storage

HP Drive Key II	**Dimensions** (HxWxD)	0.32 x 0.63 x 2.67 in (0.8 x 1.6 x 6.8 cm)	
	Storage Capacity	256 MB	
	Weight	0.05 lb (0.02 kg)	
	Transfer Rates	Read	Capable of 6.0 MB/s sustained read speed in USB 2.0 system
		Write	Capable of 6.0 MB/s sustained write speed in USB 2.0 system
	Operating Temperature	41° to 122° F (5° to 50° C)	
	Non-operating Temperature	-22° to 140° F (-30° to 60° C)	
	Option Kit Contents	HP Drive Key II, documentation	

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

Technical Specifications - Removable Storage

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