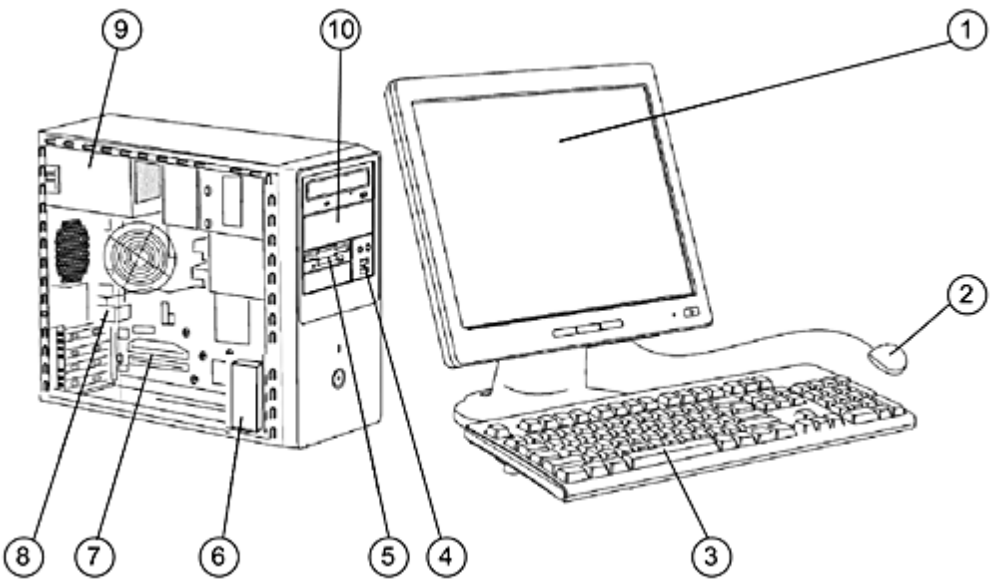
HP recommends
Windows Vista® Business

Microtower



1. Monitor (sold separately)
2. 2-Button Scroll Mouse
3. HP Standard Keyboard
4. Front I/O – 2 USB 2.0 ports & MIC, Headset
5. 2 internal 3.5" drive bays
6. 2 external 3.5" drive bays for optional diskette drive
7. 2 PCI 2.2 slots, 1 PCI-Ex1 slot ,1 PCI Ex16 slot
8. 6 USB 2.0 ports, 1 serial port, 1 parallel port, 2 PS/2, 1 RJ-45, 1 VGA, 1 audio in, 1 audio out, 1 MIC
9. 300-watt max power supply
10. 2 external 5.25" drive bays for optional optical drives

At A Glance

- Intel® Core 2 Duo, Pentium Dual Core, Pentium D, Celeron D, Celeron Conroe-L processors
- Choice of operating systems:
  Genuine Microsoft Windows Vista Basic,
  Genuine Microsoft Windows Vista Business,
  Genuine Microsoft Windows XP Home
  Genuine Microsoft Windows XP Professional,
  FreeDOS
- Red Hat Linux
- Intel 945G Express chipset
- Intel Graphics Media Accelerator 950
- Single or dual channel DDRII SDRAM system memory
- PCI Express I/O bus
- Integrated SATA II controller
- Integrated Ultra ATA/100 controller
- Integrated Realtek 10/100/1000 Network Connection
- Integrated Realtek High Definition Audio
- Choice of hard drives and optical drives
- Optional Internal Speaker

Overview

- UL and FCC certified
- Protected by HP Services. Terms and conditions vary by country. Certain restrictions & exclusions apply.

Processors	Intel Celeron D Processors
	Intel Celeron D 326 Processor (2.53-GHz, 256-KB L2 cache, 533-MHz FSB)
	Intel Celeron D 331 Processor (2.66-GHz, 256-KB L2 cache, 533-MHz FSB)
	Intel Celeron D 336 Processor (2.80-GHz, 256-KB L2 cache, 533-MHz FSB)
	Intel Celeron D 346 Processor (3.06-GHz, 256-KB L2 cache, 533-MHz FSB)
	Intel Celeron D 347 Processor (3.06-GHz, 512-KB L2 cache, 533-MHz FSB)
	Intel Celeron D 351 Processor (3.20-GHz, 256-KB L2 cache, 533-MHz FSB)
	Intel Celeron D 352 Processor (3.20-GHz, 512-KB L2 cache, 533-MHz FSB)
	Intel Celeron D 355 Processor (3.33-GHz, 256-KB L2 cache, 533-MHz FSB)
	Intel Celeron D 356 Processor (3.33-GHz, 512-KB L2 cache, 533-MHz FSB)
	Intel Celeron D 365 Processor (3.6-GHz, 512KB L2 cache, 533-MHz FSB)
	Intel Pentium D Processors
	Intel Pentium D 915 Processor (2.8-GHz, 2x2MB L2 cache, 800-MHz FSB)
	Intel Pentium D 925 Processor (3.0-GHz, 2x2MB L2 cache, 800-MHz FSB)
	Intel Pentium D 935 Processor (3.2-GHz, 2x2MB L2 cache, 800-MHz FSB)
	Intel Pentium D 945 Processor (3.4-GHz,2 x 2MB L2 cache, 800-MHz FSB)
	Intel Pentium D 950 Processor (3.40-GHz, 2x2MB L2 cache, 800-MHz FSB)
	Intel Pentium D 960 Processor (3.60-GHz, 2x2MB L2 cache, 800-MHz FSB)
	Intel Pentium 4 Processors
	Intel Pentium 4 531 Processor (3.0-GHz, 1MB L2 cache, 800-MHz FSB)
	Intel Pentium 4 541 Processor (3.2-GHz, 1MB L2 cache, 800-MHz FSB)
	Intel Pentium 4 631 Processor (3.0-GHz, 2MB L2 cache, 800-MHz FSB)
	Intel Pentium 4 641 Processor (3.2-GHz, 2MB L2 cache, 800-MHz FSB)
	Intel Pentium 4 651 Processor (3.4-GHz, 2MB L2 cache, 800-MHz FSB)
	Intel Pentium 4 661 Processor (3.6-GHz, 2MB L2 cache, 800-MHz FSB)
	Intel Core 2 Duo Processor*
	Intel Core 2 Duo E6300 Processor (1.86GHz, 2MB L2 Cache, 1066MHz
	Intel Core 2 Duo E6400 Processor (2.13GHz, 2MB L2 Cache, 1066MHz)
	Intel Core 2 Duo E6600 Processor (2.40GHz, 4MB L2 Cache, 1066MHz)
	Intel Core 2 Duo E6700 Processor (2.66GHz, 4MB L2 Cache, 1066MHz)
	Intel Core 2 Duo E4300 Processor (1.80GHz, 2MB L2 Cache, 800MHz)
	Intel Core 2 Duo E6320 Processor (1.86GHz, 4MB L2 Cache, 1066MHz)
	Intel core 2 Duo E6420 Processor (2.13GHz,4MB L2 Cache,1066MHz)
	Intel Core 2 Duo E4400 Processor (2.0GHz, 2MB L2 Cache, 800MHz)
	Intel Core 2 Duo E4500 Processor (2.2GHz, 2MB L2 Cache, 800MHz)
	Intel Pentium Dual Core Processors
	Intel Pentium E2180 Processor (2.0GHz, 1MB L2 Cache, 800MHz)
	Intel Pentium E2160 Processor (1.8GHz, 1MB L2 Cache, 800MHz)
	Intel Pentium E2140 Processor(1.6GHz, 1MB L2 Cache, 800MHz)
	Intel Celeron Processors
	Intel Celeron 440 (2.0GHz, 512KB L2 Cache, 800MHz)
	Intel Celeron 430 (1.8GHz, 512KB L2 Cache, 800MHz)

Intel Celeron 420 (1.6GHz, 512KB L2 Cache, 800MHz)

* Core 2 Duo Processors supported only on rev 2.0.

Operating Systems and Application Software	Genuine Microsoft Windows XP Genuine Microsoft Windows Vista Business 32 Bit Free DOS Symantec Antivirus (availability varies by region) HP Insight Diagnostics (on documentation CD) Desktop Management Tool (availability varies by region) Tool for Health management, Asset Management and Remote Management Smart Mon – SMART Disk Monitoring Tool (availability varies by region). Log Tool for Email Alert, Audio able Sound Alert, Flexibility to configure Auto Launch Programs (e.g. Starting a backup program), Alert Pop-Up Window, View Event files
Hard Drives	80-GB Serial ATA 3.0-Gb/s Hard Drive (7200 rpm) 160-GB Serial ATA 3.0-Gb/s Hard Drive (7200 rpm) 250-GB Serial ATA 3.0-Gb/s Hard Drive (7200 rpm) NOTE: The Serial ATA interfaces in the HP Compaq dx2280 Microtower support data transfer rates up to 3.0 Gb/s.
System Memory – Single Channel Configurations	256 MB DDRII Sync DRAM PC4200 (533-MHz) Non-ECC (1 x 256-MB) 256-MB DDRII Synch DRAM PC 5300 (667-MHz) Non-ECC (1 x 256-MB) 512-MB DDRII Synch DRAM PC4200 (533-MHz) Non-ECC (1 x 512-MB) 512-MB DDRII Synch DRAM PC5300 (667-MHz) Non-ECC (1 x 512-MB) 1-GB DDRII Synch DRAM PC4200 (533-MHz) Non-ECC (1 x 1-GB) 1-GB DDRII Synch DRAM PC5300 (667-MHz) Non-ECC (1 x 1-GB)
System Memory – Dual Channel Configurations	512-MB DDRII Synch DRAM PC5300 (667-MHz) Non-ECC (2 x 256-MB) 512-MB DDRII Synch DRAM PC4200 (533-MHz) Non-ECC (2 x 256-MB) 1-GB DDRII Synch DRAM PC4200 (533-MHz) Non-ECC (2 x 512-MB) 1-GB DDRII Synch DRAM PC 5300 (667-MHz) Non-ECC (2 x 512-MB) 2-GB DDR Synch DRAM PC4200 (533-MHz) Non-ECC (2 x 1-GB) 2-GB DDR Synch DRAM PC5300 (667-MHz) Non-ECC (2 x 1-GB) 2-GB DDR Synch DRAM PC4200 (533-MHz) Non-ECC (4 x 512MB) 2-GB DDR Synch DRAM PC5300 (667-MHz) Non-ECC (4 x 512MB) 4-GB DDR Synch DRAM PC4200 (667-MHz) Non-ECC (4 x 1 GB) 4-GB DDR Synch DRAM PC5300 (667-MHz) Non-ECC (4 x 1 GB) NOTE1: For best performance, memory speeds and sizes should not be mixed. See memory section for more information. NOTE2: Four (4) DIMM slots (4 GB maximum memory support) -As per Intel specification , in 4GB configuration user available memory will be approx 3.2GB and remaining memory is allocated to system resources.

Available Technology and Features

Storage Support One or more of the following (see Storage section below)	**Diskette Drive** 1.44-MB Diskette Drive **Optical Drives** 52X CD-ROM drive (available in APJ only) 48X/32X/48X CD-RW drive 16X/48X DVD-ROM drive 48X/32X Combo CD-RW/DVD-ROM Drive 16X DVD+/-RW * For Vista OS only DVD/COMBO/DVDRW will be supported. ** PATA ODD not supported on PCB version 2.0 and above.
Keyboard – One of the following	HP PS/2 Standard Keyboard HP USB Standard Keyboard
Mouse – One of the following	PS/2 2-Button Scroll Mouse USB 2-Button Optical Scroll Mouse PS2 – Optical Mouse
Audio	8-channel High definition audio (Realtek ALC 883)
Communication	Integrated Realtek 10/100/1000 Network Connection (RTL8110SX) Agere 56K PCI Modem
Graphics	On board Intel Graphics Media Accelerator 950

System Details

Base Unit

- Micro ATX Microtower chassis, including power supply and front bezel
- Six drive bays and three expansion slots
- Microsoft operating system CD
- System board with Intel 945G Express chipset, integrated Realtek 10/100/1000 Network Connection, integrated graphics and audio, 2 PCI slots, 1 PCIEx16, 1 PCI Express x1 slot, 4 DDR II DIMM memory slots
- (2) Serial ATA data cable
- System fan
- Product documentation on CD
- HP system restore CD
- Power cord
- Chassis intrusion alert

Slots	**PCI**	Two (2) PCI 2.2 slots on PCA One (1) PCI Express x1 slot on PCA One (1) PCI Express x16 slot on PCA
	Memory Expansion	Four (4) DIMM slots (4 GB maximum memory support) * As per Intel specification, in 4GB configuration user available memory will be approx 3.2GB, and remaining memory is allocated to system resources.
Bays	**Internal**	Two (2) 3.50" internal
	External	Two (2) 5.25" external Two (2) 3.50" external
USB Support		High-speed USB 2.0 controller Two (2) front ports; Six (6) rear ports
Interfaces (Legacy)		One (1) parallel port One (1) serial port One (1) PS/2 keyboard port One (1) PS/2 mouse port One (1) analog VGA video port One (1) line in; one (1) line out; one (1) mic in One (1) RJ-45 network port Front Audio One (1) Speaker One (1) MIC
Weight & Dimensions	**Chassis Dimensions** (H x W x D)	14.37 x 7.08 x 15.75 in (36.5 x 18.0 x 40.0 cm)
	Packaged Dimensions (L x W x H)	23.2 x 19.6 x 10.9 in (58.9 x 49.9 x 27.8 cm)
	System Weight	~ 26.45 lb (12.0 kg) (depending on configuration)
	Shipping Weight	~ 28.66 lb (13.0 kg) (depending on configuration)

System Details

Intel Pentium Processor	Coprocessor	Integrated
	CPU Socket Type/Number	Socket T LGA775 socket
	CPU Package	LGA775
	Front Side Bus Speed	533/800/1066MHz
	Cache Memory	1-MB L2 /2 MB /4 MB Advanced Transfer – depending on CPU
Intel Celeron D Processor	Coprocessor	Integrated
	CPU Socket Type/Number	Socket T LGA775 socket
	CPU Package	LGA 775
	Front Side Bus Speed	533-MHz
	Cache Memory	256-KB /512-KB L2 Advanced Transfer Cache
Chassis	Front Panel	• Power button • Power On LED • HDD Activity LED
	Cooling Solutions Supported	• Power Supply Fan • Active heat sink fan (variable speed) • System fan
	Slots Supported	Four (4) PCI & PCIe expansion slots
	Front I/O	Two (2) USB 2.0 ports Two (2) Front Audio ports (1 Headphone, 1 MIC)
	Rear I/O	Standard Micro ATX I/O connectors, including six (6) USB 2.0 ports
	Drive Bays	• Two (2) 5-1/4" external • Two (2) 3-1/2" external • Two (2) 3-1/2" internal
	Power Supply	• 300-watt ATX Power Supply – non-PFC

Unit Environment and Operating Conditions

General Unit Operating Guidelines

- Keep the computer away from excessive moisture, direct moisture and the extremes of heat and cold, to ensure that unit is operated within the specified operating range.
- Leave a 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 Temperature: 41° to 113° F (5° to 45 ° C) Non-operating Temperature: -22° to 140° F (-30° to 60° C)
Relative Humidity	Operating Humidity: 10% to 95% (non-condensing at ambient) Non-operating Humidity: 5% to 95% (non-condensing at ambient)

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.

Motherboard	Socket LGA775 industry standard Micro ATX form factor	
	Processor	• Socket T; LGA775 • Support single Intel Core 2 Duo, Pentium Dual Core, Pentium D , Celeron D ,Celeron Conroe-L Processors
	Chipset	• Intel 945G Express • Intel ICH7
	Super I/O	• ITE IT8712/8718 (ITE IT8718 supports only in rev2.0 and above)
	Front Side Bus Frequency	• 533/800/1066-MHz (1066-MHz supports Rev2.0 and above)
	Memory	• PC4200/5300 DDRII SDRAM • 4 x DIMM slots • Support for single or dual-channel configurations
	Clock Generator	• Cypress CY28411
	Integrated Graphics	• Intel Graphics Media Accelerator (GMA) 950
	Audio	• Realtek ALC883 – 8 channel High definition audio
	LAN	• Integrated Realtek 10/100/1000 (RTL8110SX) network controller
	IDE	• Support all PIO modes • 1 x IDE ports support up to 2 devices • Support Ultra ATA 33/66/100
	SATA	• Four Serial ATA interfaces support data transfer rates up to 3.0 Gb/s
	Expansion Slots	• 2 x PCI 2.2 slots • 1 x PCI Express x1 slot • 1 x PCI Express x 16 slot
	BIOS	• 4Mbit flash EEPROM
	Manageability	• WfM 2.0, SMBus, DMI 2.0, WOL, PXE
	Industrial Standard	• PCI 2.3 compliant • USB 2.0
	Rear Side I/O Ports	• 1 x PS/2 keyboard port • 1 x PS/2 mouse port • 6x USB 2.0 ports • 1 x RJ-45 10/100/1000 port • 1 x serial port • 1 x parallel port • 1 x DB 15 pin analog VGA port • 3 x audio ports
	On Board I/O Interfaces	• 1 x ATX power connector • 1 x +12V power connector • 1 x Floppy connector • 1 x Front panel connector, Switch, LED (ON/Flash/OFF) • 2 x Fan headers for CPU, chassis, with voltage/fan speed control • 1 x ATAPI headers-CD IN • 1 x header to support 2 USB 2.0 ports at front side
	Board Size	• Micro-ATX

System Details

	Additional Features	• Support S3, S4 and S5 • ACPI status • Hardware monitor capability • CPU fan speed control • Wake on LAN
Network Interface	Integrated Realtek RTL8110SX Network Connection	
	Hardware Highlights	• Realtek RTL8110SX Platform LAN Connect device • 10/100/1000 mbps • IEEE 802.3 10BASE-T compliant physical layer interface • IEEE 802.3u Auto-Negotiation and 100BASE-TX support • 10BASE-T auto-polarity correction • 1:1 transmit transformer ratio support • Low power (300 mW) typical in active transmit mode • Reduced power(less than 50 mW) in "unplugged mode" • Automatic detection of "unplugged mode"
	Features	• ACPI support • Magic Packet filtering for Wake on LAN support • Automatic detection of "unplugged mode" • Low power (less than 300 mW in active transmit mode) • Platform LAN connect interface support • Low power 3.3 V device
Power Supply		• ATX Power Supply - non-PFC • 220 to 230VAC input voltage range • 50-60 Hz rated line frequency • 300 watt maximum power • Power supply fan • Over Voltage Protection • Over Current Protection • Short Circuit Protection • FCC, UL approved
Power Conservation 'Energy Saver'		• ACPI 2.0 support • Screen blanking • Hard drive 'Idle' mode • System Idle mode • Processor/Cache memory power-down (S3)

System Details

System Environmental Specs

- Values are subject to change without notification and are for reference only.
- Performance of system, options, and ancillary equipment will vary depending on the system configuration.
- Levels presented do not account for non-HP/Compaq installed hardware.

Ambient Air Temperature	Operating	50° to 113°F (10° to 45°C) at sea level with an altitude de-rating of 1.0°C per every 1000 ft (300 m) above sea level to a maximum of 8000 ft (2500 m), no direct sustained sunlight. Maximum rate of change is 77°F/Hr (25°C/Hr). The upper limit may be limited by the type and number of options installed.
	Storage	-22° to 140°F (-30° to 60°C) – Maximum rate of change: 410°F/Hr (210°C/Hr).
Humidity	Operating	10% to 90% relative humidity (Rh), 86°F (30°C) maximum wet bulb temperature, non-condensing
	Storage	5% to 95% relative humidity (Rh), 101.66°F (38.7°C) maximum wet bulb temperature, non-condensing
Altitude	Operating	0 to 8,000 feet (0 to 2438.4 meters) – This value may be limited by the type and number of options installed. Maximum allowable altitude change rate is 1,000 ft/min (304.8 m/min).
	Non-Operating	0 to 30,000 feet (0 to 9,144 meters) – Maximum allowable altitude change rate is 1200 ft/min (365.76 m/min).
Shock	Listed are the levels of shock the product can withstand with NO damage being incurred. The values represent peak input acceleration during a 2~3 ms half-sine shock pulse, 11 ms trapezoidal shock pulse.	
	Non-Operating	40G's (Half-sine Shock) 40G's (Trapezoidal Shock)
Vibration	Listed are the levels of vibration the product can withstand with NO damage being incurred. The values represent a flat random vibration input acceleration profile across the given frequency range.	
	Operating	Random vibration at 5Hz@0.00025G^2/Hz, 10Hz@0.01 G^2/Hz, 100Hz@0.01G^2/Hz, 300Hz@0.00001G^2/Hz 5Hz to 300Hz, (0.25 G's nominal).
	Non-Operating	Random vibration at 0.008G^2/Hz, 10Hz to 500Hz, (2 Grms nominal).
Acoustic Noise	Listed are the declared A-WEIGHTED SOUND POWER LEVELS (LWAd) and declared average desktop seated operator position A-WEIGHTED SOUND PRESSURE LEVELS (LpAm) when the product is operating in a 73.4°F (23°C) ambient environment.	
	IDLE (Fixed disk drive spinning)	Desktop Average LpAm = 35 dBA
	Operating (Random write)	Desktop Average LpAm = 42 dBA

System Details

Service and Support

On-site Warranty[1]: One-year (1-1-1) limited warranty delivers one year of on-site, next business day or second business-day[2] service for parts and labor and includes free telephone support[3] 24 x 7. Additional configurable warranty options (sold separately) include: three years parts and one year labor (3/1/1), or 3 years next business day, three years parts and three years labor (3/3/3).

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 Compaq and third-party HP-qualified hardware and software. Toll-free calling and 24 x 7 support may not be available in some countries.

After-Market Options

Communication	**Modems**	
	Agere PCI Hi-Speed 56K International SoftModem	EK694AA
	RJ11 Modem adapter Kit (country/network) specific	DC131C
Hard Disk Drives	250-GB SATA 3.0-Gb/s Hard Drive	PY278AA
	160-GB SATA 3.0-Gb/s Hard Drive	PY277AA
	80-GB SATA 3.0-Gb/s Hard Drive	PY276AA
Removable Storage Devices	**Diskette Drive**	
	1.44-MB Internal Diskette Drive for dx2280	EY084AA
	1.44-MB USB Diskette Drive – External	DC141B
	USB Drive Key	
	512-MB HP Drive Key II (USB 2.0)	ED516AA
	1-GB HP Drive Key II (USB 2.0)	AG382AA
Input Devices	**Keyboards**	
	HP PS/2 Standard Keyboard	DT527A
	HP USB Standard Keyboard	DT528A
	HP USB Smart Card Keyboard	ED707AA
	Mice	
	HP PS/2 2-Button Scroll Mouse	DD440B
	HP USB 2-Button Optical Scroll Mouse	DC172B
	HP PS/2 2-Button Optical Scroll Mouse	EY703AA
Memory	1-GB PC4200 (DDRII-533) DIMM	PB557AA
	512-MB PC4200 (DDRII-533) DIMM	PB560AA
	256-MB PC4200 (DDRII-533) DIMM	PB558AA
	1-GB PC5300 (DDRII-533) DIMM	PX976AA
	512-MB PC5300 (DDRII-533) DIMM	PX975AA
	256-MB PC5300 (DDRII-533) DIMM	PX974AA
Optical Drives (Only PATA)	52X Max CD-ROM Drive (available in Asia Pacific and Japan only)	AG041AA
	48X/32X/48X CD-RW Drive	DL975B
	48X/32X Combo Drive CD-RW / DVD-ROM Drive	DL976B
	16X/48X DVD-ROM Drive	PR596A
	16X DVD+/-RW	PR595A

After-Market Options

Optical Drives (Only SATA)	HP 52X SATA CD-ROM (APJ)	AH045AA
	HP 48X/32X SATA Combo Drive (CDRW/DVD)	AH046AA
	HP 16X/48X SATA DVD-ROM Drive	AH047AA
	HP 16X SATA DVD+/-RW Drive (Dual Format, Double Layer, Light Scribe)	AH048AA
Miscellaneous Accessories	Adaptec FireConnect 2100 FireWire (1394) PCI Card	PA997A
	USB to Serial Adapter	EM449AA
Monitors	HP L1506 Flat Panel Monitor (15" analog only)	PX848AA
	HP L1506S Flat Panel Monitor (15" analog only)	GL831AA
	HP L1706 Flat Panel Monitor (17" analog only)	PX849AA
	HP L1906 Flat Panel Monitor (19" analog only)	PX850AA
	HP L1740 Flat Panel Monitor (17" analog only)	PL766AA
	HP L1755 Flat Panel Monitor (17" analog only)	PL777AA
	HP L1940T Flat Panel Monitor (19" analog only)	EM869AA
	HP L1955 Flat Panel Monitor (19" analog only)	PD974AA
	HP L2065 Flat Panel Monitor 20" analog only)	EF227A4
	HP S5502 15" CRT	PQ560AA
	HP S7540 17" CRT	PF997AA
	HP v7650 FLAT FACE CRT	PF996AA

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.

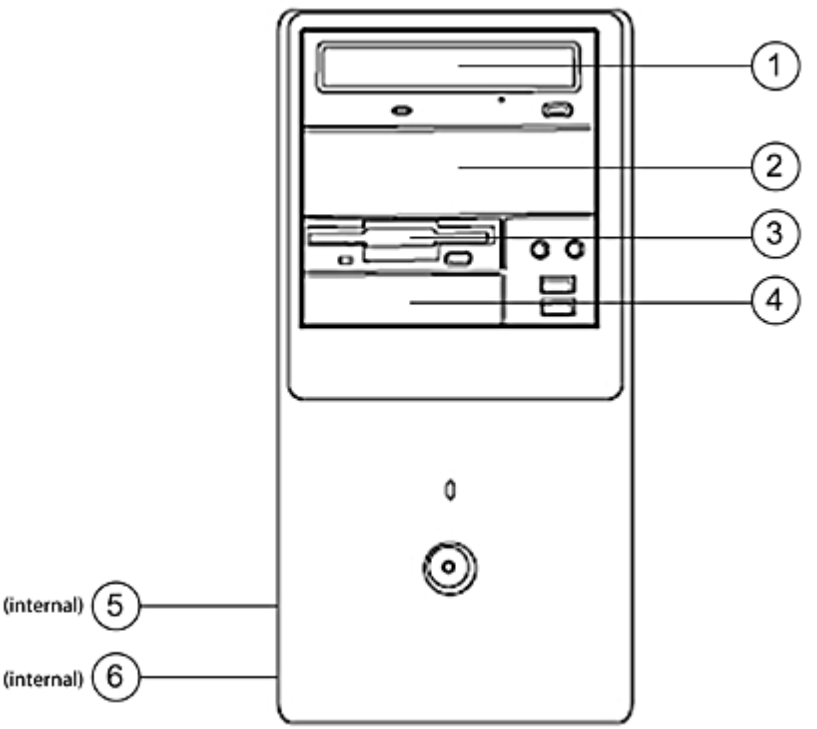
MAXIMUM MEMORY (MICROTOWER)

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

NOTE: In 4-GB configuration, 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



HP Compaq dx2280 Microtower Business PC

	Maximum Quantity Supported	Position Supported	Controller
Drive Support			
Diskette Drives	1	3, 4	ICH7
CD-ROM Drives	2	1, 2	ICH7
DVD-ROM Drives	2	1, 2	ICH7
CD-RW/Combo Drives	2	1, 2	ICH7
DVD+/-RW Drives	2	1, 2	ICH7
3.5" Serial ATA Hard Drives	2	5, 6	ICH7

Technical Specifications - Audio

Integrated Realtek ALC883 Audio	Type	Integrated
	High Definition Stereo Codec	Yes
	Sampling	Supports 44.1KHz to 96 KHz Support 16/20/24-bit PCM format, 3D audio
	Audio Jacks	Mic-In
		Line-In
		Line-Out
	Power Support	Digital: 3.3V
		Analog: 3.0 to 5.0V
	Other	Meets performance requirements for audio on PC99/2001 systems High quality differential CD input

Agere 56K PCI Modem	Data Transmission	56,000 Kbps maximum downstream data NOTE: 56 Kbps technology refers to download speeds only and requires compatible modems at server sites. Other conditions may limit modem speed. FCC limitations allow a maximum of 53 Kbps during download transmissions.
	Data Speeds	(Upload only) 33,600/31,200/28,800/26,400/21,600/19,200/16,800/14,400/12,000/9,600/7,200/4,800/2,400/1,200/300
	Data Standards	ITU-T V.90, ITU-T, ITU-T V.34, V.44, V.42, V.42bis21, V.32bis, Bell 212A, and Bell 103
	Fax Speeds	14,400/12,000/9,600/7,200/4,800/2,400/300 b/s
	Fax Mode Capabilities	ITU-T T.31 class 1 FAX, V. 17, V.29, V.27ter, and V.21 Channel 2
	Error Correction and Data Compression	V.44, 42bis, V.42 and MNP2-5
	Power Management	ACPI; PPMI 1.1 and wake support with PME and Vaux; meets PCI 2.3 requirements and PC 2001 requirements
	Upgradeability	Driver upgradeable for future enhancements
	Video	ITU-T V.80 video ready interface
	Other	TIA/EIA 602 standard AT command set Integrated DTE interface with speeds of up to 115.2 Kbps, parallel 16550a UART-compatible interface Optional ring wakeup signal
	Operating Temperature	32° to 158° F (0° to 70° C)
	Operating Humidity	20% to 90%, non-condensing
	Power	Requires a 3.3-V auxiliary power rail on PCI bus Uses only one PCI load (i.e., one grant/request pair), one shared IRQ, one electrical load
	Chipset	Agere Systems SV92PL – Integrated PCI interface with 5-V tolerant buffers and CardBus support
	Dimensions (L X H)	Complies with PCI low profile specifications-6.7 x 2.3 in (17.0 x 5.8 cm) and supports high- and low-profile brackets
	Connection	Single RJ-11 connector
	Other Features	Digital line protection, call progress monitoring via on-board piezo device, support for high profile and low profile brackets, PnP ID support
	Safety	UL recognized to UL 1950, 3rd edition (U.S. and Canada); IEC 950 (TUV, NEMKO, DEMKO, SEMKO); CE Mark, EC 950 (TUV, NEMKO, DEMKO, SEMKO, CE mark
	EMC	FCC Part 15, IC ES003, EN 55022, 3rd edition, EN 55024, annex A, EN 61000-4-6, EN 61000-4-8
	Telecom	FCC Part 68, IC-CS-03 (Canada); Worldwide PTT approvals Not available in Korea or the Republic of South Africa.
	Health	Bare PCB material compliant to 94V-0 or better (marked as such)
	Other	PC 2001 compliant, PCI version 2.3, WHQL approved; ACPI compliant

	Kit Contents	DC132D : Agere Systems PCI International Softmodem with full-height bracket attached, additional low-profile bracket, RJ11 modem cable, driver and documentation CD. NOTE: RJ11 modem adapter is not included. DC131C #xxx: RJ11 modem adapter kit for use with DC132D #ACP: Austria, #ABW: Belgium (Dutch/Flemish), #AKN: Bosnia, Herzegovna, Croatia, Slovenia, Yugoslavia (Slovenian), #AKB: Czech Republic (Czech) & Slovakia, #ABF: France, #ABD: Germany, #AB7: Greece, #AKC: Hungary, #ABT: Israel, #ABZ: Italy, #ABH: Netherlands, #UUW: Nordic Region, #ACB: Russia, #ACQ: South Africa, #ACD: Switzerland, #AB8: Turkey, #ABU: UK, #ABG: Australia, New Zealand, #ACJ: India.
Realtek RTL8110SX Integrated Gigabit Ethernet Controller	Connector	RJ-45
	Controller	Realtek RTL8110SX PCI LAN Controller
	Data rates supported	10/100/1000 Mbps
	Compliance	IEEE 802.3, 802.1Q, 802.3ab and 802.3u compliant, 802.3x flow control
	Bus architecture	PCI 2.2
	WOL Support	Yes
	Data transfer mode	Bus-master DMA
	Power requirement	+3.3 Volt signaling, 5V PCI I/O tolerant
	Boot ROM support	Yes
	Network transfer mode	Full-duplex Half-duplex
	Other features	WOL & PXE support Auto Negotiation Cross over Detection and auto correction ACPI support Transmit/receipt FIFO – 8K /64K support
	Operating system driver support	Microsoft Windows XP, Windows Vista

Integrated Graphics Media Accelerator 950	3D/2D Controller	Microsoft DirectX® 9 based with support for Pixel Shader 2.0, 4:1 anisotropic filtering, Gaussian texture filtering, shadow maps, volumetric textures, double-sided stencil buffers, and 4 pixel pipes.
	VGA Controller	Integrated
	Bus Type	PCI Express™ x16 (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).
	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: 8 MB pre-allocated + 120 MB DVMT : max frame buffer of 128 MB
	Controller Clock Speed	400 MHz
	Overlay Planes	Single overlay support with 5x3 filtering
	Maximum Color Depth	32 bits/pixel
	Maximum Vertical Refresh Rate	85 Hz at up to 1920x1440, 85Hz 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 display via the optional DVI ADD2 card. Dual independent displays and dual synchronous (Twin or Clone mode) displays are supported.
	Graphics/Video API Support	Microsoft DirectX®9, DirectXVA®, VMR9, GDI/GDI+; OpenGL® 1.4.

Resolutions Supported[1]

Resolution	Maximum Refresh Rate (Hz)	
	Analog Monitor	Digital Monitor
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

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

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

Technical Specifications - Graphics

NVIDIA Quadro NVS 285 128-MB PCIe Dual Head

Form Factor	Low profile, both ATX and low profile brackets included
Graphics Controller	Integrated Quadro 285 2D graphics processor unit (GPU)
Bus Type	PCI-Express
Memory	128 MB DDR (64 MB local frame buffer plus 64 MB of system memory via TurboCache)
Connector	DMS-59 to dual-DVI Y-cable or dual-VGA Y-cable
Dimensions	Low-profile, 2.586 x 6.6 in (6.57 x 16.76 cm)
Multi-monitor Support	Dual analog or digital monitors
RAMDAC	Dual 350 MHz (integrated)
Maximum Pixel Clock	350 MHz
Overlay Planes	One 16-bit Video overlay plane
High-definition Video Processor (HDVP)	Full screen, full frame video playback of HDTV and DVD content DVD-ready motion compensation for MPEG-2 Independent hardware color controls for video overlay Hardware color-space conversion (YUV 4:2:2 and 4:2:0) IDCT motion compensation 5-tap horizontal by 3-tap vertical filtering 8:1 up/down scaling
Available Graphics Drivers	Microsoft Windows 2000 and Microsoft Windows XP (Provides full native Dual View mode, Span or Big Desktop mode, and Clone mode) HP qualified drivers may be preloaded or available from the HP support Web site: http://www.hp.com/country/us/en/support.html?pageDisplay=drivers

Analog Resolution	Maximum Refresh Rate
640 x 480	240 Hz
800 x 600	240 Hz
1024 x 768	240 Hz
1152 x 864	170 Hz
1280 x 1024	150 Hz
1600 x 1200	100 Hz
1920 x 1080	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
1900 x 1200	60 Hz

HP PS/2 or USB Standard Keyboard	Physical characteristics	Keys	104, 105, 106, 107, 109 layout (depending upon country)
		Dimensions (L x W x H)	18.0 x 6.4 x 0.98 in (45.8 x 16.3 x 2.5 cm)
		Weight	2 lb (0.9 kg) minimum
	Electrical	Operating voltage	+ 5VDC ± 5%
		Power consumption	50-mA maximum (with three LEDs ON)
		ESD	CE level 4, 15-kV air discharge
		EMI - RFI	Conforms to FCC rules for a Class B computing device
		MicrosoftPC 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

HP 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	85 g nominal peak force
		Switch Life	1,000,000 operations (using Hasco modified tester)
		Cable Length	2 m
		PC98-99	Mechanically compliant
	Regulatory Approvals	UL, CSA, FCC, CE Mark, TUV, TUV GS, VCCI, BCIQ, C-Tick	

Serial ATA Hard Drives (7200 rpm)	80 GB*	Capacity	80,026,361,856 bytes	
		Height	1 in (2.6 cm)	
		Width	Media diameter: 3.5 in (8.9.x cm) Physical size: 4 in (10.2 cm)	
		Interface	Serial ATA	
		Synchronous Transfer Rate (Maximum)	3.0 Gb/s	
		Buffer	8 MB	
		Seek Time (typical reads, includes controller overhead, including settling)	Single Track	1.0 ms
			Average	8.5 ms
			Full-Stroke	18.0 ms
		Rotational Speed	7,200 rpm	
		Logical Blocks	156,301,488	
		Operating Temperature	32° to 140° F (0° to 60° C)	
	160 GB*	Capacity	160,041,885,696 bytes	
		Height	1 in (2.6 cm)	
		Width	Media diameter: 3.5 in (8.9.x cm) Physical size: 4 in (10.2 cm)	
		Interface	Serial ATA	
		Synchronous Transfer Rate (Maximum)	3.0 Gb/s	
		Buffer	8 MB	
		Seek Time (typical reads, includes controller overhead, including settling)	Single Track	1.0 ms
			Average	8.5 ms
			Full-Stroke	18 ms
		Rotational Speed	7,200 rpm	
		Logical Blocks	312,581,808	
		Operating Temperature	32° to 140° F (0° to 60° C)	

Technical Specifications - Hard Drives

250 GB*	Capacity	250,059,350,016 bytes	
	Height	1 in (2.6 cm)	
	Width	Media diameter: 3.5 in (8.9 cm) Physical size: 4 in (10.2 cm)	
	Interface	Serial ATA	
	Synchronous Transfer Rate (Maximum)	3.0 Gb/s	
	Buffer	8 MB	
	Seek Time (typical reads, includes controller overhead, including settling)	Single Track	0.8 ms
		Average	<9.0 ms
		Full-Stroke	<17 ms
	Rotational Speed	7,200 rpm	
	Logical Blocks	488,397,168	
	Operating Temperature	41° to 131°F (5° to 55°C)	

Technical Specifications - Optical Storage

52X CD-ROM Drive	Interface	ATAPI
	Data Transfer Rate	CDR read – 16X ~ 52X (2400 ~ 7800 KB/s) CDRW read – 12X ~ 24X (1800 ~ 3600 KB/s) Digital audio –12X ~ 24X (1800 ~ 3600 KB/s)
	Access Time (ms)	Random: <125 ms Full-stroke seek: <210 ms
	Data Buffer	2 MB
	Interface Type	E-IDE / ATPI
	Disk Capacity (CD)	180 MB, 540 MB, 650 MB, and 700 MB
	Start up Time (Single)	<7 seconds
	Start up Time (Multi Session)	< 30 seconds
	Stop up Time	< 4 seconds
	MTBF	150000 POH @ 25% Duty cycle
	Disk Diameter	12 cm, 8 cm
	Disk Thickness	1.2 mm
	CD Media supported	CDROM, CD DA, CDR, CDRW
	Block Size	CD -DA (2352 and 2368) Mode 1 (2048 and 2352) , Mode 2 form1 (2048,2328,2336,2340,2352) ,Mode 2 form 2 (2328,2336,2340,2352)
	Operating Conditions	Temperature 41° to 122° F (5° to 50° C)
		Relative Humidity 10% to 90%
	Dimensions (H x W x D, maximum)	1.6 x 5.7 x 7.3 in (4.1 x 14.6 x 18.5 cm)
	Operating Systems Supported	Microsoft Windows XP and Windows Vista

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 (20.3 x 14.93 x 4.34 cm)
	Weight	2.6 lb (1.2 kg)
	Disc diameter	12 cm, 8 cm
	Disc thickness	1.2 mm
	Track pitch	1.6 μm
	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, 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 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
Data transfer rates	CD-RW write	4800 KB/s (up to 32X)
	CD-ROM, CD-R read	7200 KB/s (up to 48X)
	CD-RW read	7200 KB/s (up to 32X)
	CD-R write	7200 KB/s (up to 48X)
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)	
Certifications, requirements	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 Windows XP & Vista		
Operating systems supported	Microsoft Windows XP		

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

Technical Specifications - Optical Storage

	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	
	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.	
	Operating systems supported	Microsoft Windows XP & Vista	
48X Combo CD-RW/DVD-ROM	Height	5.25-inch, half-height, tray-load	
	Orientation	Either horizontal or vertical	
	Interface Type	ATAPI/EIDE	
	Dimensions (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)	
	Disc diameter	12 cm, 8 cm	
	Disc thickness	0.05 in (1.2 mm)	

Technical Specifications - Optical Storage

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)	
Read only disc parameters	Formats and modes supported	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
	Capacity	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)
	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; CD-ROM XA; CD digital audio, video CD; CD-Bridge
	Capacity	180 MB (8 cm); 540 MB (12 cm); 650 MB (12 cm); 700 MB (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 2-2,336 and 2,352; mode 2, form 1-2,048 and 2,352 bytes; mode 2, form 2-2,324 and 2,352 bytes
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)
Data Transfer Rates	CD-R write	7200 KB/s (up to 48X)
	CD-RW write	4800 KB/s (up to 32X)
	CD-ROM, CD-R, CD-RW read	7200 KB/s (up to 48X)
	DVD ROM read	21,632 KB/s (16X) Max
Data Transfer Modes	ATA PIO mode 4); ATA Multi-word DMA mode 2; ATA UltraDMA mode 0; ATA UltraDMA mode 1, mode 2; ATA UltraDMA Mode 3 (default)	
	Cache buffer	2 MB (minimum)
	Startup time (single)	< 7 seconds (typical)
	Startup 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 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	Cable select (default), master and slave modes	
	Data Interface Connector	40-pin, shrouded and keyed, flat ribbon	
	Operating Conditions (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, Vista	
	Operating systems supported	Microsoft Windows XP Professional, Windows XP Home	
16X DVD+/-RW LightScribe Drive (Double Layer/Dual Format)	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)	
	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

Technical Specifications - Optical Storage

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)
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 Vista.	

1.44-MB Diskette Drive	Size	3.5 in (8.89 cm)	
	LED Indicators (front panel)	Green	
	Read/Write Capacity per Diskette (high/low)	1.44 MB/720 KB	
	Drive Height	One-third	
	Drive Rotation	300 rpm	
	Transfer Rate (high/low)	500/250 KB/s	
	Bytes/Sector	512	
	Sectors/Track (high/low)	18/9	
	Tracks/Side (high/low)	80/80	
	Access Times	Track-to-Track (high/low)	3/6 ms
		Average (high/low)	94/173 ms
		Settling Time	15 ms
		Latency Average	100 ms
	Cylinders (high/low)	80/80	
	Read/Write Heads	Two	

Environmental Data

Longevity and Upgrading

This product is designed to be upgraded, possibly extending its useful life by several years. Spare parts are available throughout the warranty period and for up to 15 months after the end of production. Upgradeability features contained in the product include:

- 8 USB ports
- 2 external 5.25" drive bays
- 2 external 3.5" drive bays
- 2 internal 3.5" drive bays
- 2 empty standard PCI slots
- 1 empty standard PCI-EX1 slot
- 4 memory slots
- 1 Serial port
- 1 Parallel port

Material Usage

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

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

Packaging	HP follows these guidelines to decrease the environmental impact of product packaging: • Eliminate the use of heavy metals such as lead, chromium, mercury and cadmium in packaging materials. • Eliminate the use of ozone-depleting substances (ODS) in packaging materials. • Design packaging materials for ease of disassembly. • Maximize the use of post-consumer recycled content materials in packaging materials. • Use readily recyclable packaging materials such as paper and corrugated materials. • Reduce size and weight of packages to improve transportation fuel efficiency. • Plastic packaging materials are marked according to ISO 11469 and DIN 6120 standards.
End-of-life Management and Recycling	Hewlett-Packard offers end-of-life HP product return and recycling programs in many geographic areas. To recycle your product, please go to: http://www.hp.com/recycle or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner.
Hewlett-Packard Corporate Environmental Information	For more information about HP's commitment to the environment: [link to new HP white paper now in progress] Global Citizenship Report http://www.hp.com/hpinfo/globalcitizenship/gcreport/index.html Eco-label certifications http://www.hp.com/hpinfo/globalcitizenship/environment/productdesign/ecolabels.html ISO 14001 certificates: http://www.hp.com/hpinfo/globalcitizenship/environment/operations/envmanagement.html