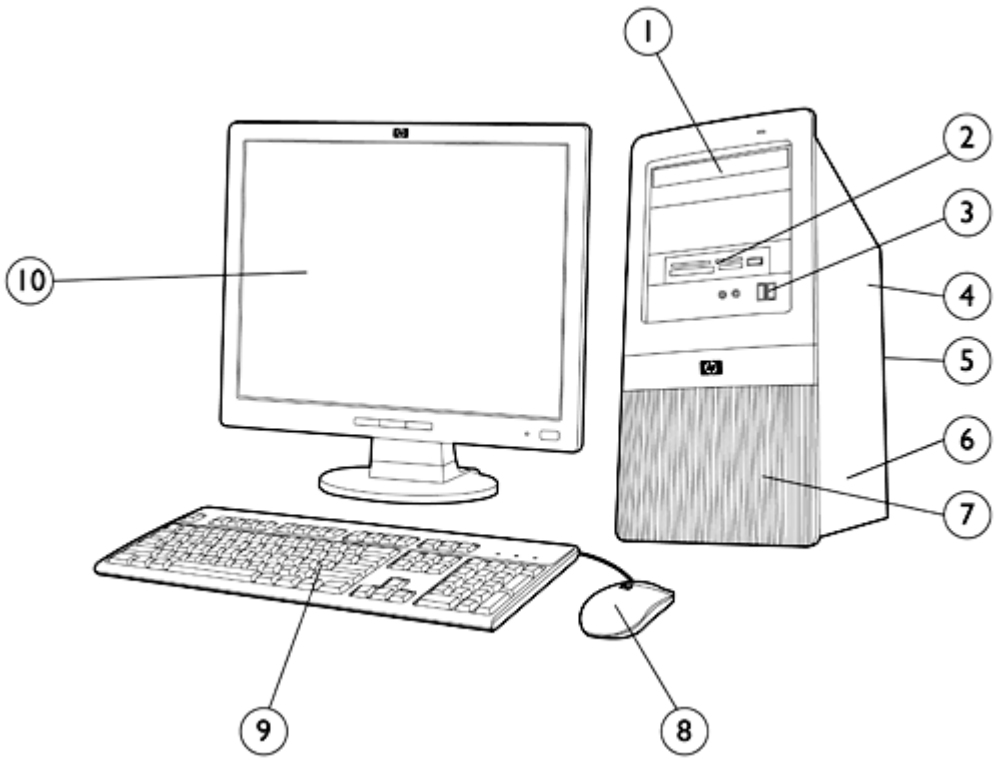
Overview

HP recommends
Windows Vista® Business

Microtower



1. (2) external 5.25” drive bays for optional optical drives
2. (1) external 3.5” drive bay for optional media reader or diskette drive
3. (2) USB 2.0 ports, audio ports
4. 300-watt max power supply
5. (4) USB 2.0 ports, (2) PS/2, (1) RJ-45, (1) VGA, (1) audio in – (1) audio out – (1) MIC
6. (1) full-height PCI 2.3 slot, (2) PCIe x1 slots, (1) PCIe x16 slot
7. (2) internal 3.5” drive bays
8. PS/2 Scroll Mouse
9. HP Standard Keyboard
10. Monitor (sold separately)

Overview

At A Glance

- Intel® Core™ 2 processors, Intel Pentium® processors, or Intel Celeron® processors
- Choice of operating systems:
  - Genuine Windows Vista Business 32
  - Genuine Windows Vista Home Premium
  - Genuine Windows Vista Home Basic 32
  - Genuine Windows Vista Business with Genuine Windows XP Professional custom pre-installed
  - Genuine Windows Vista Ultimate 32 (English Only)
  - FreeDOS
- Intel G33 Express Chipset
- Intel I/O Controller Hub 9 (ICH9R)*
- Intel Graphics Media Accelerator 3100
- PCI and PCI Express I/O buses
- Serial ATA controller
- USB 2.0 support
- Realtek 8111C-GR Gigabit Ethernet controller
- Choice of hard drives and optical drives
- DDR2 SDRAM system memory
- Protected by HP Services. Terms and conditions vary by country. Certain restrictions and exclusions apply.

* RAID mode not supported
NOTE: Feature availability may vary by region/country.

Standard Features and Configurable Components

Processor and Speed
One of the following

Intel Celeron Processors

Intel Celeron 420 Processor (1.60-GHz, 512-KB L2 cache, 800-MHz FSB)

Intel Celeron 430 Processor (1.80-GHz, 512-KB L2 cache, 800-MHz FSB)

Intel Celeron 450 Processor (2.2-GHz, 512K L2 cache, 800-MHz FSB)

Intel Celeron Dual-Core Processors

Intel Celeron Dual Core E1200 Processor (1.60-GHz, 512-KB L2 cache, 800-MHz FSB)

Intel Celeron Dual Core E1400 Processor (2.0-GHz, 512-KB L2 cache, 800-MHz FSB)

Intel Celeron Dual Core E1500 Processor (2.2-GHz, 512K L2 cache, 800-MHz FSB)

Intel Pentium Dual-Core Processors

Intel Pentium Dual Core E2160 Processor (1.80-GHz, 1-MB L2 cache, 800-MHz FSB)

Intel Pentium Dual Core E2180 Processor (2.0-GHz, 1-MB L2 cache, 800-MHz FSB)

Intel Pentium Dual Core E2200 Processor (2.20-GHz, 1-MB L2 cache, 800-MHz FSB)

Intel Pentium Dual Core E5200 processor (2.50 GHz, 2 MB L2 cache, 800 MHz FSB)

Intel Pentium Dual Core E5300 Processor (2.6-GHz, 2MB L2 cache, 800-MHz FSB)

Intel Core 2 Duo Processors

Intel Core 2 Duo E4600 Processor (2.40-GHz, 2-MB L2 cache, 800-MHz FSB)

Intel Core 2 Duo E4700 Processor (2.60-GHz, 2-MB L2 cache, 800-MHz FSB)

Intel Core 2 Duo E6850 Processor (3.00-GHz, 4-MB L2 cache, 1333-MHz FSB)

Intel Core 2 Duo E7200 Processor (2.53-GHz, 3-MB L2 cache, 1066-MHz FSB)

Intel Core 2 Duo E7300 Processor (2.66-GHz, 3-MB L2 cache, 1066-MHz FSB)

Intel Core 2 Duo E7400 Processor (2.80-GHz, 3 MB L2 cache, 1066-Mhz FSB)

Intel Core 2 Duo E8200 Processor (2.66-GHz, 6-MB L2 cache, 1333-MHz FSB)

Intel Core 2 Duo E8400 Processor (3.00-GHz, 6-MB L2 cache, 1333-MHz FSB)

Intel Core 2 Duo E8500 Processor (3.16-GHz, 6-MB L2 cache, 1333-MHz FSB)

Intel Core 2 Duo E8600 processor (3.33 GHz, 6 MB L2 cache, 1333 MHz FSB)

Intel Core 2 Quad Processors

Intel Core 2 Quad Q8200 processor (2.33-GHz, 4 MB L2 cache, 1333-MHz FSB)

Intel Core 2 Quad Q8300 Processor (2.50-GHz, 4 MB L2 cache, 1333-MHz FSB)

Intel Core 2 Quad Q9400 processor (2.66-GHz, 6 MB L2 cache, 1333-MHz FSB)

Intel Core 2 Quad Q9650 processor (3.00-GHz, 12 MB L2 cache, 1333-MHz FSB)

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

Standard Features and Configurable Components

Operating Systems and Application Software	Genuine Windows Vista Ultimate 32 (English Only) * Genuine Windows Vista Business 32* Genuine Windows Vista Home Basic 32* Genuine Windows Vista Business with Genuine Windows XP Professional custom pre-installed*† Free DOS * Certain Windows Vista product features require advanced or additional hardware. See: http://www.microsoft.com/windowsvista/getready/hardwarereqs.mspx and http://www.microsoft.com/windowsvista/getready/capable.mspx for details. Windows Vista Upgrade Advisor can help you determine which features of Windows Vista will run on your computer. To download the tool, visit: http://www.windowsvista.com/upgradeadvisor † This Windows Vista Business licensed product will ship to you with Genuine Windows XP Professional custom installed on the hard drive. Customers buying these downgraded systems are expected to purchase at least 25 licenses annually. Microsoft Office 2007 Basic optional Microsoft Office 2007 Small Business optional Microsoft Office 2007 Professional optional HP Power Manager 2.0 Roxio Easy Media Creator 9.x** Intervideo WinDVD Player 5.x** McAfee Total Protection Service Sun Java Runtime Environment Firefox-HP Virtual Browser ** Supporting software available with certain optical drive configurations
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) 320-GB Serial ATA 3.0-Gb/s Hard Drive (7200 rpm) 500-GB Serial ATA 3.0-Gb/s Hard Drive (7200 rpm)

Standard Features and Configurable Components

System Memory	512-MB DDR2 Synch DRAM PC2-6400 (800-MHz) Non-ECC (1 x 512MB) 1-GB DDR2 Synch DRAM PC2-6400 (800-MHz) Non-ECC (1 x 1GB) 2-GB DDR2 Synch DRAM PC2-6400 (800-MHz) Non-ECC (2 x 1GB) 2-GB DDR2 Synch DRAM PC2-6400 (800-MHz) Non-ECC (1 x 2GB) 3-GB DDR2 Synch DRAM PC2-6400 (800-MHz) Non-ECC (3 x 1GB) 4-GB DDR2 Synch DRAM PC2-6400 (800-MHz) Non-ECC (4 x 1GB) 4-GB DDR2 Synch DRAM PC2-6400 (800-MHz) Non-ECC (2 x 2GB) 8-GB DDR2 Synch DRAM PC2-6400 (800-MHz) Non-ECC (4 x 2GB) **NOTE:** For systems configured with more than 3 GB of memory and a 32-bit operating system, all memory may not be available due to system resource requirements. Addressing memory above 4 GB requires a 64-bit operating system.
Storage – One or more of the following (see Storage section below)	**Diskette Drive** 1.44-MB Diskette Drive **Media Reader** HP 16-in-1 Media Reader and additional USB 2.0 port HP 22-in-1 Media Card Reader HP 22-in-1 Media Card Reader with 1394 port **Optical Drives (Serial ATA)** SATA DVD-ROM Drive SATA CD-RW/DVD-ROM Combo Drive SATA SuperMulti LightScribe DVD Writer Drive HP USB Smartcard Keyboard
Input Devices	**Keyboard** – One of the following HP PS/2 Standard Keyboard HP USB Standard Keyboard HP USB Smartcard Keyboard **Mouse** – One of the following PS/2 2-Button Optical Scroll Mouse USB 2-Button Optical Scroll Mouse USB 2-Button Laser Mouse
Audio	Realtek ALC888S High Definition audio codec 3D audio compliant and HD Audio compatible Internal PC speaker

Standard Features and Configurable Components

Communication	Integrated Realtek 8111C-GR GbE Ethernet Controller Intel Gigabit CT Desktop NIC Intel PRO/1000 PT Gigabit PCIe Controller (full height) – optional Agere 56K PCI Modem – optional LSI PCIe x1 Hi-Speed 56K International SoftModem – optional HP Wireless A+G PCI Card (full height) – optional HP Wireless 802.11 b/g/n PCIe Card
Graphics	Intel Graphics Media Accelerator 3100 – integrated NVIDIA GeForce 8400 GS (256MB) Single Head PCIe x16 – optional* HP ADD2 SDVO PCIe x16 DVI-D Adapter – optional ATI Radeon HD 2400XT (256MB DH) PCIe x16 – optional ATI Radeon 3470 256MB Single Head graphics adapter (PCIe x16) ATI Radeon HD 3650 (512MB DH) PCIe x16 – optional HP DisplayPort To DVI-D Adapter * 1GB of system memory required. Graphics cards use part of the total system memory to enhance graphics performance.
Miscellaneous	HP FireWire / IEEE 1394 PCI Card (full height) HP Serial/Parallel PCI Card (full height)

System Details

Base Unit

- Micro ATX microtower chassis, including power supply and front bezel
- Five (5) drive bays and four expansion slots
- Microsoft operating system CD – optional
- Active type heatsink
- 92 x 92 x 25 mm chassis fan
- System board with Intel G33 Express chipset, Intel I/O Controller Hub 9R (ICH9R), Realtek RTL8111C-GR GbE Ethernet controller, Intel GMA 3100 graphics, and Realtek audio, (1) full-height PCI 2.3 slot, (2) PCI Express x1 slots, (1) PCI Express x16 slot, (4) DDR2 DIMM memory slots, (4) Serial ATA data connectors
- Product documentation on CD
- HP system restore CD – optional
- Power cord

Slots

PCI	One (1) full-height PCI 2.3 slot on PCA Two (2) full-height PCI Express x1 slots on PCA One (1) full-height PCI Express x16 slot on PCA (for graphic cards)
Memory Expansion	Four (4) DDR2 SDRAM DIMM slots (8 GB maximum memory support)

NOTE: For systems configured with more than 3 GB of memory and a 32-bit operating system, all memory may not be available due to system resource requirements. Addressing memory above 4 GB requires a 64-bit operating system.

Bays

Internal	Two (2) 3.5”
External	Two (2) 5.25” One (1) 3.5”

USB Support

EHCI high-speed USB 2.0 controller

Two (2) front ports; Four (4) rear ports, Two (2) internal ports on motherboard

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Interfaces (Legacy)

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) RJ45 network port

System Details

Weight & Dimensions	**Chassis Dimensions** (H x W x D)	15.16 x 7.28 x 16.38 in. with bezel (385 x 185 x 416 mm) 14.88 x 6.50 x 16.10 in. without bezel (378 x 165 x 409 mm)
	Packaged Dimensions (L x W x H)	19.13 x 21.875 x 10.13 in 490 x 556 x 257 mm
	System Weight	22.4 lb (10.2 kg)
	Shipping Weight	30.8 lb (14.0 kg)
Technology and Features	**Memory Type**	PC2-6400 DDR2 SDRAM (800MHz) non-ECC Up to 8-GB maximum system memory supported
	NOTE: For systems configured with more than 3 GB of memory and a 32-bit operating system, all memory may not be available due to system resource requirements. Addressing memory above 4 GB requires a 64-bit operating system.	
	Hard Drive Interfaces Supported	Serial ATA
Chassis	**Front Panel**	Power button (located above chassis) Power On LED HDD Activity LED
	Cooling Solutions Supported	Power Supply Fan (variable speed) Active heatsink (variable speed) Chassis fan
	Slots Supported	Four (4) full-height expansion slots
	Front I/O	Two (2) USB 2.0 ports
	Rear I/O	Standard Micro ATX I/O connectors, including four (4) USB 2.0 ports
	Drive Bays	Two (2) 5-1/4” external One (1) 3-1/2” external Two (2) 3-1/2” internal
	Internal Speaker	Standard
	Security	Padlock loop Support for chassis padlocks and cable lock devices Kensington Lock Support Optional USB Port Disable at factory (user configurable via BIOS)
	Power Supply	300-watt ATX Power Supply – PFC/non-PFC with a 115v/230v line switch (varies by country/region)

System Details

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 4 in (10.2 cm) 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 (9000 m)

NOTE: Operating temperature is de-rated 1.0 deg C per 1000 ft (300 m) to 10,000 ft (3000 m) 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.

System Board	**Processor**	Socket T; LGA775 industry standard Micro ATX form factor Support single Intel Core 2 Duo or Quad, Celeron 4xx or Dual Core
	PWM	ON NCP5387 – 3 phase
	Chipset	Intel G33 Express Intel I/O Controller Hub 9 (ICH9)
	Super I/O	ASUS F8000
	Front Side Bus Frequency	800/1066/1333 MHz
	Memory	DDR2 SDRAM 4 x DIMM slots
	Clock Generator	IDT CV1908PAG
	Integrated Graphics	Intel Graphics Media Accelerator (GMA) 3100
	Audio	Realtek ALC888S HD Audio compatible codec with two channel audio 3D audio
	LOM	Realtek RTL8111C-GR GbE Ethernet controller
	Storage	Four Serial ATA interfaces
	Expansion Slots	1 x PCI 2.3 slot 2 x PCI Express x1 slots 1 x PCI Express x16 slot
	BIOS	SPI EEPROM
	Industrial Standard	PCI 2.3 compliant USB 2.0

System Details

	Rear Side I/O Ports	1 x PS/2 keyboard port 1 x PS/2 mouse port 4 x USB 2.0 ports 1 x RJ-45 10/100/1000 port 1 x D-sub 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 header to support 2 USB 2.0 ports at front side 1 x header to support 2 front (Headphone/Mic) audio ports 1 x header to support USB media reader
	Board Size	Micro-ATX, PCB Size: 9.6 x 9.0 in (24.38 x 22.86 cm) 4-layer PCB with green colour
	Additional Features	• Bootable without keyboard, mouse or monitor • Keyboard/mouse/USB wake up • Support S1, S3, S4 and S5 • ACPI status • Hardware monitor capability • CPU fan speed control

Network Interface	**Integrated Realtek 8111C-GR GbE Ethernet Controller**	**Hardware Highlights**	PCIe x1 interface
		Features	10-Mbps, 100-Mbps and 1000-Mbps operation Crossover detection and auto-correction Wake-on-Lan and remote Wake-up (Wake-on-LAN supported from S1, S3, S4 only. Not supported from S5)
	Intel PRO/1000 PT Gigabit PCIe Adapter	**Hardware Highlights**	PCI Express interface
		Features	10-Mbps, 100-Mbps and 1000-Mbps operation (Wake-on-LAN supported from S1, S3, S4 only. Not supported from S5).

Wireless	Wireless A+G PCI Card (full height bracket) – optional

System Details

Power Supply

- ATX Power Supply – Passive PFC/non-PFC with a 115v/230v line switch
- Passive Power Factor Correction (PFC) – with line switch set to 230V – No PFC in 115V line switch position
- 90 to 140VAC, or 180 to 264VAC operating voltage range
- 100 to 127VAC, or 200 to 240VAC rated voltage range
- 50-60 Hz rated line frequency
- 47-63 Hz operating line frequency range
- 300 watt maximum rated power
- 80-mm power supply fan – variable speed for optimum acoustics

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Power Conservation 'Energy Saver'

- APM 1.2 support
- Screen blanking
- Hard drive 'Idle' mode
- System Idle mode
- ~2 watt power consumption in ES mode – suspend to RAM (S3) (instantly available PC)
- Processor/Cache memory power-down (S3)

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 95°F (10° to 35°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	10% to 95% relative humidity (Rh), 101.66°F (38.7°C) maximum wet bulb temperature, non-condensing
Altitude	**Operating**	0 to 10,000 feet (0 to 3048 metres) – 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 metres) – 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 to 3 ms half-sine shock pulse, 11 ms trapezoidal shock pulse.	
	Non-Operating	35G's (Half-sine Shock) 35G's (Trapezoidal Shock)

System Details

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@0.01G^2/Hz, 100Hz@0.01G^2/Hz, 300Hz@0.00001G^2/Hz 5Hz to 300Hz, (0.25G'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. Noise emissions were measured in accordance with ISO 7779 (ECMA 74) and declared in accordance with ISO 9296 (ECMA 109).	
	IDLE (Fixed disk drive spinning)	LWAd = 4.3 Bels, Desktop Average LpAm = 32 dBA
	FIXED DISK (Random write)	LWAd = 4.8 Bels, Desktop Average LpAm = 37dBA
	CD-ROM (Sequential Reads)	LWAd = 5.0 Bels, Deskside Average LpAm = 39dBA

Service and Support

On-site Warrant[Note 1]: One-year (1-1-1) limited warranty delivers one year of on-site, next business-day[Note 2] service for parts and labor 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. One-year onsite and labor are not available in all countries.

NOTE 1: Terms and conditions may vary by country. Certain restrictions and exclusions apply. Other warranty variations may be offered in your region

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

Office 2007 Media-less License Kits (MLK's)	MS Office Basic Edition 2007 – Media-less License Kit	RZ361A#ABA
	MS Office Small Business Edition 2007 – Media-less License Kit	RZ365A#ABA
	MS Office Professional Edition 2007 – Media-less License Kit	RZ363A#ABA
Communications	**NICs**	
	Intel PRO/1000 PT Gigabit PCIe Controller (full height)	EH352AA
	Wireless LAN	
	HP Wireless 802.11 b/g/n PCIe Card	FH971AA
	Modems	
	LSI PCIe x1 Hi-Speed 56K International SoftModem	FH970AA
	Connectivity	
	HP Surge Protector, LAN & Printer Cable	RT174AA
Hard Disk Drives	HP 500-GB SATA 3.0-Gb/s SMART IV Hard Drive	KW347AA
	HP 320-GB SATA (NCQ/Smart IV) 3.0-Gb/s Hard Drive	FH963AA
	HP 250-GB SATA (NCQ/Smart IV) 3.0-Gb/s Hard Drive	PY278AA
	HP 160-GB SATA (NCQ/Smart IV) 3.0-Gb/s Hard Drive	PY277AA
	HP 80-GB SATA (NCQ/Smart IV) 3.0-Gb/s Hard Drive	PY276AA
Removable Storage Devices	**Diskette Drive**	
	1.44-MB Internal Diskette Drive	AH053AA
	HP 1.44-MB USB Diskette Drive – External	DC141B
	HP 22-in-1 Media Card Reader with 1394 port	KN518AA
Input Devices	**Wirelss Keyboard and Mouse**	
	2.4 GHz Wireless Keyboard and Mouse	NB896AA
	Keyboards	
	HP USB PS2 Washable Keyboard	VF097AA#ABA (launching July 27th)
	USB Mini Keyboard	AS601AA#ABA
	HP PS/2 Standard Keyboard	DT527A
	HP USB Standard Keyboard	DT528A
	HP USB Smartcard Keyboard	ED707AA
	Mice	
	HP Business Mouse Pad	AT485AA
	HP USB 2-Button Laser Mouse	GW405AA
	HP PS/2 2-Button Optical Scroll Mouse	EY703AA

After-Market Options

	HP USB 2-Button Optical Scroll Mouse	DC172B
Memory	Promo - 2GB (2 x 1GB) PC2-6400 DDR2-800	NQ604AT
	Promo - 4GB (2 x 2GB) PC2-6400 DDR2-800	NQ605AT
	HP 2-GB PC2-6400 (DDR2-800 MHz) DIMM	AH060AA
	HP 1-GB PC2-6400 (DDR2-800 MHz) DIMM	AH058AA
Audio	Thin USB Powered Speakers	KK912AA
	Wired Premium Headset (VoIP and Overture Conf)	AQ704AA
Graphics	ATI HD 2400 XT 256MB Dual Head PCIe x16, low profile Graphics Card	KD060AA
	ATI Radeon 3470 256MB SH PCIe x16	FH972AA
	ATI Radeon HD 3650, 512MB Dual Head PCIe x16, full height Graphics Card	KS505AA
	ATI HD 4550 PCIe x16 (256GB/DDR3) Dual Head Graphics Card	AT042AA
	* 1GB of system memory required. Graphics cards use part of the total system memory to enhance graphics performance.	
Optical Drives	HP SATA DVD-ROM Drive	AH047AA
	HP SATA SuperMulti LightScribe DVD Writer Drive	GF343AA
Security	Kensington Security Lock	PC766A
	HP Business PC Security Lock Kit	PV606AA
	Credential Manager for HP ProtectTools (2.5)	FU634AA
Miscellaneous Accessories	HP USB Graphics Adapter	NL571AA
	DisplayPort TO VGA Adapter	AS615AA
	DisplayPort TO DVI-D Dual Link Adapter (WKS offering)	NR078AA (launching July 09)
	HP DisplayPort To DVI-D Adapter	FH973AA
	DMS-59 to Dual VGA Cable Kit	GS567AA
	HP DMS59 DVI Dual-head Connector Cable (supports DY599A/RD069AA/AH050AA)	DL139A
	HP ADD2 SDVO DVI-D Adapter	DY674A
	HP FireWire / IEEE 1394 PCI Card	PA997A
	Belken USB to Serial Adapter	EM449AA
	Serial & Parallel PCI Card	KD062AA
	5.25" Blank Bezel Kit (Carbonite 50/Bulk Pack)	DC177B
	DVI to DVI Cable	DC198A
	Local Area Network (LAN) cable	AH122AA

After-Market Options

	Firewire (1394) Cable	AH123AA
	7-outlet Surge Protector	AG290AA#ABA
	HP 1TB Media Vault Pro MV5140	GX667AA#ABA
	HP 1.5TB Media Vault Pro MV5150	GX668AA#ABA
Monitors	**CRTs**	3PO Offering
	Value Series Monitors	
	HP LV156w 15-inch Widescreen LCD Monitor	NJ711AA#ABA
	Business LCD Monitors	
	HP L1506 15-inch LCD Monitor	PX848AA#ABA
	HP w17e 17-inch LCD Monitor	GV537AA#ABA
	HP L1710 17-inch LCD Monitor	GS917AA#ABA
	HP L1910 19-inch LCD Monitor	GS918AA#ABA
	HP L1910i 19-inch LCD Monitor with Integrated Work Stand	GS581AA#ABA
	HP L1908w 19-inch Widescreen LCD Monitor	GP536AA#ABA
	HP L1908wm 19-inch Widescreen LCD Monitor with multimedia	KA214AA#ABA
	HP L1908wi 19-inch Widescreen LCD Monitor with Integrated Work Stand	GP537AA#ABA
	HP L2208w 22-inch Widescreen LCD Monitor	GX007AA#ABA
	Advantage Series Monitors	
	HP L1745 17-inch LCD Monitor	GE178AA#ABA
	HP L1750 17-inch LCD Monitor	GF904AA#ABA
	HP L1750 17-inch LCD Monitor - TAA Compliant	GF904A2#ABA
	HP L1950g 19-inch LCD Monitor	KR145AA#ABA
	HP L1950g TAA 19-inch LCD Monitor - TAA Compliant	KR145A2#ABA
	HP L1945w 19-inch Widescreen LCD Monitor	KD286AA#ABA
	HP L2045w 20-inch Widescreen LCD Monitor	RD125AA#ABA
	HP L2245wg 22-inch Widescreen LCD Monitor	FL472AA#ABA
	HP L2445w 24-inch Widescreen LCD Monitor	KT931AA#ABA
	Performance Series Monitors	
	HP LP1965 19-inch LCD Monitor	RA373AA#ABA
	HP LP2065 20-inch LCD Monitor	EF227A4#ABA
	HP LP2275 22-inch Widescreen LCD Monitor	KE289A4#ABA
	HP LP2275 22-inch Widescreen LCD Monitor Bulk Pack (6 baseless units)	KD289A6#ABA
	HP LP2475w 24-inch Widescreen LCD Monitor	KD911A4#ABA
	HP LP2480zx 24-inch DreamColor Widescreen LCD Monitor	GV546A4#ABA
	HP LP3065 30-inch Widescreen LCD Monitor	EZ320A4#ABA
	Digital Signage	
	HP LD4200 42-inch LCD Monitor	NH322AA#ABA
	Touchscreen Monitor	
	HP L5006tm 15-inch Touch Screen LCD Monitor	RB146AA#ABA

After-Market Options

Options	
HP USB 2.0MP Business WebCam	NX252AA
HP Flat Panel Speaker Bar	EE418AA
HP Quick Release Kit	EM870AA
HP Integrated Work Stand (stand alone)	GN783AA
HP DreamColor Advanced Profiling Solution (aka Puck)	KZ300AA
HP LCD Hood Kit	KZ301AA
3M 17-in Privacy Screen Filter	KM218AA
3M 19-in Privacy Screen Filter	KZ310AA
Digital Signage Speaker	NK352AA
Digital Signage Stand	NK353AA

Memory

DDR SYNCH DRAM NON-ECC MEMORY

The Intel G33 Express chipset supports non-ECC DDR2 memory up to PC2-6400 (800-MHz). 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.

CAUTION: You must shut down the computer **and disconnect the power cord** before adding or removing memory modules. Regardless of the power-on state, voltage is always supplied to the memory modules as long as the computer is plugged in to an active AC outlet. Adding or removing memory modules while voltage is present may cause irreparable damage to the memory modules or system board.

HP recommends dual-channel symmetric configurations for maximum performance.

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

STANDARD MEMORY

512-MB, 1-GB, 2-GB, or 4-GB DDR2 SYNCH DRAM

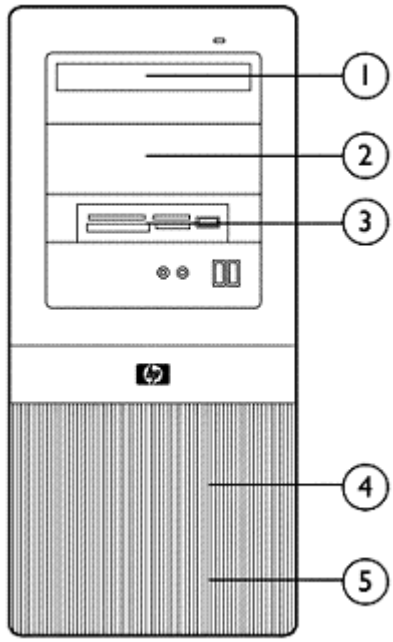
OPTIONAL MEMORY UPGRADES

Supports up to 8 GB of DDR2 SYNCH DRAM. Not all memory configurations possible are represented below.

NOTE: For systems configured with more than 3 GB of memory and a 32-bit operating system, all memory may not be available due to system resource requirements. Addressing memory above 4 GB requires a 64-bit operating system.

	Channel A		Channel B	
DIMM Size	**Slot 1**	**Slot 2**	**Slot 3**	**Slot 4**
512-MB	512-MB			
1-GB	1-GB			
2-GB (dual-channel symmetric)	1-GB		1-GB	
4-GB (dual-channel symmetric)	1-GB	1-GB	1-GB	1-GB
4-GB (dual-channel symmetric)	2-GB		2-GB	
8-GB (dual-channel symmetric)	2-GB	2-GB	2-GB	2-GB

Storage



HP Compaq dx2400 Microtower Business PC

	Maximum Quantity Supported	Position Supported	Controller
Drive Support			
Diskette Drives	1	3	SIO
Media Reader	1	3	Internal USB 2.0 port
DVD-ROM Drives	2	1, 2	SATA
CD-RW/Combo Drives	2	1, 2	SATA
SuperMulti LightScribe DVD Writer Drives	2	1, 2	SATA
3.5” Serial ATA Hard Drives	2	4,5	SATA

Technical Specifications - Audio

Integrated Realtek ALC888S Audio	**Type**	Integrated
	HD Audio compatible codec	Yes
	Sampling	Supports 48/96 KHz
	Audio Jacks	Mic-In
		Line-In
		Line-Out / Headphone Out
	Power Support	Digital: 3.3V
		Analog: 5V
	Other	Meets performance requirements for audio on PC99/2001 systems High-performance DACs with 97dB SNR(A-Weighting) ADCs with 90dB NR(A-Weighting)

Technical Specifications - Communications

Integrated Realtek 8111C-GR GbE Ethernet Controller	**Controller**	8111C-CG
	Memory	N/A
	Data rates supported	2.5GHz data rate with X1 link width
	Compliance	IEEE802.3, IEEE 802.3u, IEEE 802.3ab
	Bus architecture	PCIexpress 1.1
	Data transfer mode	Hal/Full Duplex Operation
	Hardware certifications	MS NDIS5, NDIS6, IPv4, IPv6, TCP, UDP
	Power requirement	1000mbps (heavy traffic) max. 588.5mW 100mbps (heavy traffic) max. 322.3mW 10mbps (heavy traffic) max. 278.3mW S3 with Link 195.8mW Link Down @S0 78.1mW Link Down @S3/S5 51.7mW
	Boot ROM support	EEPROM, 1Kb, 2Kb
	Network transfer rate	10/100/1000Mbps over CAT.5 100/1000Mbps over CAT.3 10Mbps over CAT.3
	Dimensions	9mm x 9mm
	Management capabilities	ACPI rev 2.0, PM rev 1.1, ASPM v1.0a

Intel PRO/1000 PT Gigabit PCIe Controller	**Connector**	RJ-45	
	Controller	Intel 82572EI Gigabit Ethernet Controller	
	Memory	Integrated Dual 48K configurable transmit receive FIFO Buffers	
	Data rates supported	10/100/1000 Mbps	
	Compliance	IEEE 802.1P, 802,1Q, 802.2, 802.3, 802.3AB and 802.3u compliant, 802.3x flow control	
	Bus architecture	PCI Express 1.0a	
	Data transfer mode	Bus-master DMA	
	Hardware certifications	FCC, B, CE, TUV- cTUVus Mark Canada and United States, TUV- GS Mark for European Union	
	Power requirement	Aux 3.3V, 3.0 Watts in 1000base-T and 2.0 Watts in 100Base-T	
	Boot ROM support	Yes	
	Network transfer rate	10BASE-T (half-duplex) 10 Mbps 10BASE-T (full-duplex) 20 Mbps 100BASE-TX (half-duplex) 100 Mbps 100BASE-TX (full-duplex) 200 Mbps 1000BASE-T (full-duplex) 2000 Mbps (actual rate limited by PCI Bus)	
	Environmental	**Operating temperature**	32° to 131°F (0° to 55° C)
		Operating humidity	85% at 131° F (55° C)
	Dimensions	6.4 x 2.6 x 0.8 in (16.3 x 6.6 x 1.9 cm)	

Technical Specifications - Communications

	Management capabilities	ASF 2.0, WOL, PXE, DMI, WFM 2.0. ((Wake-on-LAN supported from S1, S3, S4 only. Not supported from S5).
HP Wireless A+G PCI	**Dimensions**	4.99 x 2.54 x 0.71 in (126.8 x 64.4 x 18.0 mm)
	Weight	0.268 lb (65 g)
	Controller system interface	Atheros AR5414X chipset PCI Spec 2.2
	Network standard	IEEE 802.11a/b/g
	Frequency band	5.1500 to 5.8500 GHz 2.4000 to 2.4835 GHz 2.4465 to 2.4835 GHz (Europe, Middle East, Asia and Asia Pacific – excluding Japan) 2.4000 to 2.4697 GHz (Japan)
	Operating Temperature	32° to 140° F (0° to 60° C), operating
	Storage temperature	-4° to 176° F (-20° to 80° C), non-operating
	Humidity	10% to 85% non-condensing
	Operating voltage	5V ± 5%
	Power consumption	Tx/Rx peak 560/250mA @ 3.3V (max.)
	Output power (approximately)	15 dBM ±2dB
	Receive sensitivity	-90dBm at 11 Mbps (typical)
	Data transfer rate	Standard rates of 1, 2, 5.5, 11, 6, 9, 12, 18, 24, 48, 54 and Super AG Mode108-Mbps
	Spreading	DSSS (Direct Sequence Spread Spectrum)
	Security	64(40h) bit, 128(104h) bit, WPA, IEEE802.1X, AES-OCB, AES-CCM, Microsoft PEAP,TKIP, WEP
	Antenna	External 5dBi antenna
	Throughput	**108 Mbps** (only with Belkin 54G or above router that supports 108 Mbps speed) – 200 ft (60.96 m) – Indoor **54 Mbps** – 200 ft (60.96 m) – Indoor **11 Mbps** – 200 ft (60.96 m) – Indoor
	Certifications	Wi-Fi certified
	Certifications for use by country	North America: United States, Canada Europe: Austria, Belgium, Cyprus, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Liechtenstein, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom Australia, New Zealand
HP Wireless 802.11b/g/n PCIe	**Dimensions (L x H)**	3.3 x 4.7 inches (8.5 x 12 cm)
	Weight	0.08 pounds (40 g)

Technical Specifications - Communications

Controller	Ralink RT2790		
System interface	PCIExpress x1		
Network standard	802.11 b/g/n		
Frequency band	2.400 - 2.497 GHz		
Operating temperature	14° to 149°F, operating (-10° to 65°C, operating)		
Storage temperature	-40° to 176°F, non-operating (-40° to 80°C, non-operating)		
Humidity	10-90% operating 5-95% non-operating		
Operating voltage	3.3V +/- 9% 12V +/- 8%		
Power consumption	Platform/WLAN Mode	Power Consumption	
	Maximum Power Consumption	10 Watts	
	Transmit Only	4 Watts maximum averaged power over 1 second	
	Transmit Packet or Active Scanning	1000 mA peak current for 100 microseconds or longer	
	Receive Only Mode or Idle without IEEE PSP mode enabled	3 Watts maximum averaged over 1 second	
	Idle, with IEEE PSP mode enabled	1.0 Watts maximum averaged over 1 second	
	Transmit Disabled (turned off in software)	50 mW maximum, averaged over 1 second	
	Platform in S3 or S4 (power removed from Low Profile PCI Express Card)	5 mW maximum, averaged over 1 second	
Output power (approximately)	**802.11b modes**	**802.11g modes**	**EWC modes**
	+19 dBm +/- 1.0 dB maximum	+17 dBm +/- 1.0 dB maximum	+17 dBm +/- 1.0 dB maximum (total power in all transmit chains)
Receive sensitivity	**Mode**	**Data rate**	**Sensitivity**
	802.11b	1 Mbps	-94 dBm
	802.11b	11 Mbps	-85 dBm
	802.11g	6 Mbps	-91 dBm
	802.11g	18 Mbps	-85 dBm
	802.11g	48 Mbps	-75 dBm
	802.11g	54 Mbps	-72 dBm
	EWC (2.4 GHz)	6.5 Mbps	-87 dBm
	EWC (2.4 GHz)	54 Mbps	-82 dBm
	EWC (2.4 GHz)	81 Mbps	-78 dBm
	EWC (2.4 GHz)	162 Mbps	-74 dBm
	EWC (2.4 GHz)	270 Mbps	-68 dBm
	EWC (2.4 GHz)	300 Mbps	-64 dBm

Technical Specifications - Communications

Data transfer rate	**Data Rate (MCS)**	**Minimum Throughput**
	1 Mbps (802.11 b)	700 kbps
	2 Mbps (802.11 b)	1.4 Mbps
	5.5 Mbps (802.11 b)	3.5 Mbps
	11 Mbps (802.11 b)	5.9 Mbps
	12 Mbps (802.11 g)	6 Mbps
	18 Mbps (802.11 g)	9 Mbps
	24 Mbps (802.11 g)	12 Mbps
	36 Mbps (802.11 g)	18 Mbps
	48 Mbps (802.11 g)	21 Mbps
	54 Mbps (802.11 g)	22.5 Mbps
	6.5 Mbps (20 MHz EWC)	4.5 Mbps
	13 Mbps (20 MHz EWC)	9 Mbps
	19.5 Mbps (20 MHz EWC)	13.5 Mbps
	26 Mbps (20 MHz EWC)	18 Mbps
	39 Mbps (20 MHz EWC)	27 Mbps
	52 Mbps (20 MHz EWC)	36 Mbps
	58.5 Mbps (20 MHz EWC)	40 Mbps
	65 Mbps (20 MHz EWC)	45 Mbps
	78 Mbps (20 MHz EWC)	54 Mbps
	104 Mbps (20 MHz EWC)	72 Mbps
	117 Mbps (20 MHz EWC)	81 Mbps
	130 Mbps (20 MHz EWC)	91 Mbps
	13.5 Mbps (40 MHz EWC)	8 Mbps
	27 Mbps (40 MHz EWC)	16 Mbps
	40.5 Mbps (40 MHz EWC)	24 Mbps
	54 Mbps (40 MHz EWC)	32 Mbps
	81 Mbps (40 MHz EWC)	48 Mbps
	108 Mbps (40 MHz EWC)	64 Mbps
	121.5 Mbps (40 MHz EWC)	72 Mbps
	135 Mbps (40 MHz EWC)	81 Mbps
Security	• IEEE and WiFi compliant 64 / 128 bit WEP encryption • AES: CCM • 802.1x authentication • WPA: 802.1x. WPA-PSK and TKIP • WPA2 certification • IEEE 802.11i • Cisco Certified Extensions, all versions through V5	
Antenna	HP part number 497792-001	
Certifications	Wi-Fi certified	
Certifications for use by country	United States, Canada, Peru, Taiwan	

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

Technical Specifications - Communications

LSI PCIe x1 56K International SoftModem	**Data Transmission**	Technology speeds: 56,000 Kbps maximum downstream data, controllerless **NOTE:** 56 Kbps technology refers to download speeds only and requires compatible modems at server sites. Other conditions may limit modem speed. FCC limitations allow a maximum of 53 Kbps during download transmissions.
	Data Speeds	(Upload only) 33,600/31,200/28,800/26,400/21,600/19,200/ 16,800/14,400/12,000/9,600/7,200/4,800/2,400/1,200/300
	Data Standards	ITU-T V.90, ITU-T, ITU-T V.34, V.44, V.42, V.42bis21, V.32bis, Bell 212A, and Bell 103
	Fax Speeds	14,400/12,000/9,600/7,200/4,800/2,400/1,200/300 b/s
	Fax Mode Capabilities	ITU-T T.31 class 1 FAX, V. 17, V.29, V.27ter, and V.21 Channel 2
	Error Correction and Data Compression	V.44, 42bis, V.42 and MNP2-5
	Power Management	PCI Bus Power Management Interface Specification (PCI-PM) Revision 1.2, Appendix A. D0, D3hot, and D3cold. Wake on Ring state when in D3cold. If the power management event (PME) feature is enabled in D3cold, a modem can wake the system via WAKE# (WAKEN) or beacon. Meets PCI Express 1.1 standard.
	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 express bus Uses only one PCI express load (i.e., one grant/request pair), one shared IRQ, one electrical load
	Chipset	LSI SV92EX – Integrated PCI interface with 3.3-V tolerant buffers and CardBus support
	Dimensions (L X H)	Complies with PCI express 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.
	Other	The SV92EX device is packaged in a 32-pin micro leadless chip carrier (MLCC). The SV92EX is fully compliant with the PCI Express revision 1.1 specification. WHQL approved; ASPM compliant.

Technical Specifications - Graphics

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

Resolutions Supported

Resolution	**Maximum Refresh Rate** (Hz)	
	Analog Connection	**Digital Connection**
640x480	85	N/A
800x600	85	N/A
1024x768	85	N/A
1280x720	85	N/A
1280x1024	85	N/A
1440x900	75	N/A
1600x1200	85	N/A
1680x1050	75	N/A
1920x1080	85	N/A
1920x1200	85	N/A
1920x1440	85	N/A
2048x1536	75	N/A
2560x1600	N/A	N/A

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

NVIDIA GeForce 8400 GS (256 MB SH) PCIe x16 Graphics Controller	**Bus type**	PCI Express (x16 lanes)
	Maximum vertical refresh rate	85 Hz
	Display support	Integrated 400 MHz RAMDAC
	Display max resolution	2048 x 1536 (analog), 2560 x 1600 (digital)
	Input/Output connectors	DVI-I (DVI port supports dual-link and HDCP) TV-out (4 pin S-video)
	Board display options	DVI-I + TV DVI-I supports analog CRT or flat panel or digital flat panel (using DVI-A, DVI-D or DVI-I connector) DVI-I supports analog CRT or flat panel (with VGA connector and DVI-I to VGA dongle) TV connector is a 4-pin mini-DIN S-video connector
	Board configuration	**Specification** / **Description**
		Graphics Chip / NVIDIA GeForce 8400 GS
		Core clock / 460 MHz
		Memory clock / 200 MHz
		Frame buffer / 256 MB DDR2
	Languages supported	24 languages: English, Arabic, Chinese Simplified, Chinese Traditional, Czechoslovakian, Danish, Dutch, Finnish, French, German, Greek, Hebrew, Hungarian, Italian, Japanese, Korean, Norwegian, Polish, Portuguese, Russian, Spanish, Swedish, Thai, Turkish
	Core power	25 W (Max board power)

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

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

Resolution	**Maximum Refresh Rate** (Hz)	
	Analog Connection	**Digital Connection**
640x480	85	60
800x600	85	60
1024x768	85	60
1280x720	85	60
1280x1024	85	60
1440x900	75	60
1600x1200	85	60
1680x1050	75	60
1920x1080	85	60-R
1920x1200	85	60-R
1920x1440	85	N/A
2048x1536	75	N/A
2560x1600	N/A	60*

* Only supported when using a dual-link DVI or DP connection

NOTE: 60-R denotes reduced blanking timings are used on single-link DVI connections and may be used with other digital connections

HP ADD2 SDVO PCIe x16 DVI-D Adapter

Models	HP ADD2 SDVO DVI-D Out Adapter
Form Factor	Low-profile card
DVI-D Connector	Digital connection only
Dual Head Support	Yes, when used with the integrated VGA connector
Display Devices Supported	HP L1750 HP L1950 HP L2045W HP LP1965

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

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

Resolution		**60-Hz LCD**	**60-Hz**	**75-Hz**	**85-Hz**
Blanking		5% reduced	GTF	GTF	GTF
640 x 480	VGA	Yes	Yes	Yes	Yes
800 x 600	SVGA	Yes	Yes	Yes	Yes
1024 x 768	XGA	Yes	Yes	Yes	Yes
1280 x 1024	SXGA	Yes	Yes	No	No
1600 x 1200	UXGA	Yes	Yes	No	No

ATI Radeon HD 2400XT (256MB DH) PCIe Graphics Card

Bus type	PCI Express (x16 lanes)
Maximum vertical refresh rate	85 Hz
Display support	Integrated 400 MHz RAMDAC
Display max resolution	2560 x 1600 digital, 2048 x 1536 analog
Board display options	Supports two displays via included DMS-59 to dual VGA cable or 2 DVI monitors via optional DMS-59 to dual DVI cable kit part number: DL139A. 4-pin mini-DIN S-video connector for TV output

Board configuration	**Specification**	**Description**
	Graphics Chip	RV610
	Core clock	650 MHz
	Memory clock	500 MHz
	Frame buffer	256 MB DDR2, 128 bit wide

Technical Specifications - Graphics

Languages supported	24 languages: English, Arabic, Chinese Simplified, Chinese Traditional, Czechoslovakian, Danish, Dutch, Finnish, French, German, Greek, Hebrew, Hungarian, Italian, Japanese, Korean, Norwegian, Polish, Portuguese, Russian, Spanish, Swedish, Thai, Turkish
Core power	21 W
Compliance standards	EMC Emissions: a) FCC Part 15, Subpart B – Unintentional Radiators, Class B Computing Devices for Home & Office Use b) CISPR22: 1997/EN 55022:1998 – Class B – Limits and methods of measurement of radio disturbance characteristics of Information Technology Equipment c) Canadian Standard ICES-003 is equivalent to CISPR22 d) Taiwanese Standard BSMI e) Japanese VCCI f) Australian C-Tick g) Korean (MIC) EMC Immunity: CISPR 24:1997/EN 55024:1998 – Information Technology Equipment – Immunity Characteristics – Limits and Methods of Measurement.

ATI Radeon HD 2400XT (256MB DH) PCIe Graphics Card display resolutions and refresh rates

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

Resolution	**Maximum Refresh Rate** (Hz)	
	Analog Connection	**Digital Connection**
640x480	85	60
800x600	85	60
1024x768	85	60
1280x720	85	60
1280x1024	85	60
1440x900	75	60
1600x1200	85	60
1680x1050	75	60
1920x1080	85	60-R
1920x1200	85	60-R
1920x1440	85	N/A
2048x1536	75	N/A
2560x1600	N/A	N/A

NOTE: 60-R denotes reduced blanking timings are used on single-link DVI connections and may be used with other digital connections

ATI Radeon HD 3470 (256MB SH) PCIe x16 Graphics Card	**Bus type**	PCI Express (x16 lanes)
	Maximum vertical refresh rate	85 Hz
	Display support	Integrated 400 MHz RAMDAC
	Display max resolution	2560x1600 digital, 2048 x 1536 analog

Technical Specifications - Graphics

Board display options
Supports two displays via the DisplayPort and DVI connectors

Board configuration

Specification	Description
Graphics Chip	RV620
Core clock	750 MHz
Memory clock	500 MHz
Frame buffer	256 MB DDR2, 64 bit wide

Languages supported
24 languages: English, Arabic, Chinese Simplified, Chinese Traditional, Czechoslovakian, Danish, Dutch, Finnish, French, German, Greek, Hebrew, Hungarian, Italian, Japanese, Korean, Norwegian, Polish, Portuguese, Russian, Spanish, Swedish, Thai, Turkish

Operating systems support
Windows Vista Business 64*, Windows Vista Business 32*, Windows Vista Home Basic 32*, Windows XP Professional or Windows XP Home 32*.

* Certain Windows Vista product features require advanced or additional hardware. Windows Vista Upgrade Advisor can help you determine which features of Windows Vista will run on your computer. To download the tool, visit: http://www.windowsvista.com/upgradeadvisor. For Windows Vista system requirements, visit: http://www.windowsvista.com/systemrequirements.

Linux x86 and x86_64 distributions using XFree86 or X.Org**.

** Linux drivers are available from ATI's website and may be available in a Linux distribution. Refer to the Open Source and Linux from HP website: http://www.hp.com/wwsolutions/linux/products/clients/ for support information.

Core power
22 W (max)

Dimensions (H x D)
2.71 in x 6.60 in (68.90 mm x 167.65 mm)

Weight
0.30 lb (134.3 g)

Option kit contents

- ATI Radeon HD 3470 (256MB SH) PCIe x16 Graphics Card with full height bracket attached
- DVI to VGA adapter
- Software CD with graphics drivers
- Low profile bracket to convert the card for using in a low profile chassis
- Warranty documentation

Compliance standards
EMC Emissions:
a) FCC Part 15, Subpart B - Unintentional Radiators, Class B Computing Devices for Home & Office Use
b) CISPR22: 1997/EN 55022:1998 - Class B - Limits and methods of measurement of radio disturbance characteristics of Information Technology Equipment
c) Canadian Standard ICES-003 is equivalent to CISPR22
d) Taiwanese Standard BSMI
e) Japanese VCCI
f) Australian C-Tick
g) Korean (MIC)
EMC Immunity:
CISPR 24:1997/EN 55024:1998 - Information Technology Equipment -

Immunity Characteristics - Limits and Methods of Measurement.

ATI Radeon HD 3470 (256MB SH) PCIe x16 Graphics Card display resolutions and refresh rates

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

Resolution	Maximum Refresh Rate (Hz)	
	Analog Connection	Digital Connection
640x480	85	60
800x600	85	60
1024x768	85	60
1280x720	85	60
1280x1024	85	60
1440x900	75	60
1600x1200	85	60
1680x1050	75	60
1920x1080	85	60-R
1920x1200	85	60-R
1920x1440	85	N/A
2048x1536	75	N/A
2560x1600	N/A	60*

* Only supported when using a dual-link DVI or DP connection
NOTE: 60-R denotes reduced blanking timings are used on single-link DVI connections and may be used with other digital connections

ATI Radeon HD 3650 (512MB DH) PCIe x16 Graphics Card

Bus type	PCI Express (x16 lanes)	
Maximum vertical refresh rate	85 Hz	
Display support	Integrated 400 MHz RAMDAC	
Display max resolution	2560 x 1600 digital, 1920 x 1440 analog	
Board display options	Supports two displays via included two DisplayPort and one Dual Link DVII connectors.	
Board configuration	**Specification**	**Description**
	Graphics Chip	RV635
	Core clock	600 MHz
	Memory clock	500 MHz
	Frame buffer	512 MB DDR2, 128 bit wide
Languages supported	24 languages: English, Arabic, Chinese Simplified, Chinese Traditional, Czechoslovakian, Danish, Dutch, Finnish, French, German, Greek, Hebrew, Hungarian, Italian, Japanese, Korean, Norwegian, Polish, Portuguese, Russian, Spanish, Swedish, Thai, Turkish	
Core power	56 W	
Compliance standards	EMC Emissions: a) FCC Part 15, Subpart B - Unintentional Radiators, Class B Computing Devices for Home & Office Use b) CISPR22: 1997/EN 55022:1998 - Class B - Limits and methods of	

measurement of radio disturbance characteristics of Information Technology Equipment
c) Canadian Standard ICES-003 is equivalent to CISPR22
d) Taiwanese Standard BSMI
e) Japanese VCCI
f) Australian C-Tick
g) Korean (MIC)
EMC Immunity:
CISPR 24:1997/EN 55024:1998 - Information Technology Equipment - Immunity Characteristics - Limits and Methods of Measurement.

ATI Radeon HD 3650 (512MB DH) PCIe x16 Graphics Card display resolutions and refresh rates

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

Resolution	**Maximum Refresh Rate** (Hz)	
	Analog Connection	**Digital Connection**
640x480	85	60
800x600	85	60
1024x768	85	60
1280x720	85	60
1280x1024	85	60
1440x900	75	60
1600x1200	85	60
1680x1050	75	60
1920x1080	85	60-R
1920x1200	85	60-R
1920x1440	85	N/A
2048x1536	75	N/A
2560x1600	N/A	60*

* Only supported when using a dual-link DVI or DP connection
NOTE: 60-R denotes reduced blanking timings are used on single-link DVI connections and may be used with other digital connections

Technical Specifications - Input Devices

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 Devices

HP USB 2-Button Laser Mouse	**Scroll Wheel**	24	
	Maximum Rotation Speed	48 rats/sec	
	Switch Type	wheel	
	Switch Life	Button – 3,000,000 Wheel – 1,000,000 times Tilt switch – 500,000 times	
	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	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
	Electrical	**Operating Voltage**	+ 5VDC ± 5%
		Power Consumption	
		MTBF	> 150,000 hrs
		ESD	IEC-61000-4-2 criteria B, Contact discharge: +/- 4kV, Air discharge: +/- 8kV
		EMI-RFI	FCC Class B
		PC98	PC 99 Compliant
	Mechanical	**Resolution**	800dpi
		Tracking Speed	25 cm/sec
		Acceleration	0.5mm
		Switch Actuation	0.6N (60gf)
		Switch Life	Button – 3,000,000 Wheel – 1,000,000 times Tilt switch – 500,000 times
		Cable Length	1850mm
		PC98-99	PC99 compliant
	Regulatory Approvals	UL60950-1, UL 94, UL 746 (A-E), UL 796 TUV/GS: EN 60950-1, EN 60825-1 FCC Class B, UL 1950, cUL, TUV GS, CE, C-tick, VCCI, BSMI, RRL	

Technical Specifications - Input 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 - Input Devices

HP USB Optical Scroll Mouse	**Dimensions** (H x L x W)	1.5 x 4.5 x 2.5 in (3.8 x 11.6 x 6.3 cm)
	Weight	0.27 lb (0.12 kg)
	Cable length	72.8 in (185 cm)

Technical Specifications - Hard Drives

Serial ATA Hard Drives (7200 rpm)	**80 GB**	**Capacity**	80,026,361,856 bytes	
		Height	1 in (2.54 cm)	
		Width	Media diameter: 3.5 in (8.9 cm) Physical size: 4 in (10.2 cm)	
		Interface	Serial ATA (3.0 Gb/s)	
		Synchronous Transfer Rate (Maximum)	3.0 Gb/s	
		Buffer	8 MB	
		Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	2.0 ms
			Average	11 ms
			Full-Stroke	21 ms
		Rotational Speed	7,200 rpm	
		Logical Blocks	156,301,488	
		Operating Temperature	32° to 140° F (0° to 60° C)	
	160 GB	**Capacity**	160,041,885,696 bytes	
		Height	1 in (2.54 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)	3.0 Gb/s	
		Buffer	8 MB	
		Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	2.0 ms
			Average	11 ms
			Full-Stroke	21 ms
		Rotational Speed	7,200 rpm	
		Logical Blocks	312,581,808	
		Operating Temperature	32° to 140° F (0° to 60° C)	
	250 GB	**Capacity**	250,059,350,016 bytes	
		Height	1 in (2.54 cm)	
		Width	Media diameter: 3.5 in (8.89 cm) Physical size: 4 in (10.2 cm)	
		Interface	Serial ATA (3.0 Gb/s)	
		Synchronous Transfer Rate (Maximum)	3.0 Gb/s	
		Buffer	8 MB	

Technical Specifications - Hard Drives

	Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	2.0 ms
		Average	11 ms
		Full-Stroke	21 ms
	Rotational Speed	7,200 rpm	
	Logical Blocks	488,397,168	
	Operating Temperature	41° to 131° F (5° to 55° C)	
320 GB	**Capacity**	320,072,933,376 bytes	
	Height	1 in (2.54 cm)	
	Width	Media diameter: 3.5 in (8.9 cm) Physical size: 4 in (10.2 cm)	
	Interface	Serial ATA (3.0 Gb/s)	
	Synchronous Transfer Rate (Maximum)	Up to 3 Gb/s	
	Buffer	8 MB	
	Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	2.0 ms
		Average	11 ms
		Full-Stroke	21 ms
	Rotational Speed	7,200 rpm	
	Logical Blocks	625,142,448	
	Operating Temperature	41° to 131° F (5° to 55° C)	
500 GB	**Capacity**	500,107,862,016 bytes	
	Height	1 in (2.54 cm)	
	Width	Media diameter: 3.5 in (8.89 cm) Physical size: 4 in (10.2 cm)	
	Interface	Serial ATA (3.0 Gb/s)	
	Synchronous Transfer Rate (Maximum)	3.0 Gb/s	
	Buffer	8 MB	
	Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	2.0 ms
		Average	11 ms
		Full-Stroke	21 ms
	Rotational Speed	7,200 rpm	
	Logical Blocks	976,773,168	
	Operating Temperature	41° to 131° F (5° to 55° C)	

Technical Specifications - Optical Storage

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

Technical Specifications - Optical Storage

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

Technical Specifications - Optical Storage

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

Technical Specifications - Removable Storage

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	

HP 16-in-1 Media Card Reader	**USB interface**	USB 2.0 High-speed device via PCI card or pass -through via internal USB port of system board
	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 MultiMediaCard 8-bit card (version 4.x)
	Supported media types	• Supports CompactFlash Card Type I (CF I), CompactFlash Card Type II (CF II),MicroDrive (MD) • Supports 3.3V SmartMedia Card (SM), SmartMedia ROM (SM ROM), Picture Card • Supports Secure Digital Card (SD), Secure Digital ROM Card (SD ROM), miniSD, MultiMediaCard, Secure MultiMediaCard (Secure MultiMediaCard), ROM Type MultiMediaCard (MultiMediaCard ROM), Reduced Size MultiMediaCard (RS MultiMediaCard), MultiMediaCard 4.0 (MultiMediaCard Plus), Reduced Size MultiMediaCard 4.0 (MultiMediaCard Mobile) • Support Memory Stick (MS), Memory Stick ROM (MS ROM), MagicGate Memory Stick (MG), Memory Stick Select, Memory Stick Duo (MS Duo), Memory Stick PRO (MS-PRO), Memory Stick PRO Duo (MS PRO Duo)
	Mechanical	**Length** (3.5”) 124.7 cm **Width** (3.5”) 101.6 cm **Height** (3.5”) 25.4 cm

Technical Specifications - Removable Storage

		Length (5.25")	171.6 cm
		Width (5.25")	148.9 cm
		Height (5.25")	42.7 cm
	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
HP 22-in-1 Media Card Reader (with 1394 port)	**USB Interface**		USB 2.0 High-speed interface **NOTE:** Requires the USB cable to be connected to the internal USB 2.0 port or a USB 2.0 PCI card.
	1394 Interface		Two IEEE-1394a external ports; 1 IEEE-1394a internal port (connects to the pass through cable on the media card reader)
	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 MS PRO-HG Duo 4-bit parallel transfer mode • Supports SD 4-bit parallel transfer mode • Supports high-speed 50Mhz SD 4-bit card (version 2.0) • Supports high-speed 52Mhz MultiMediaCard 8-bit card (version 4.2) • Supports CF v4.0 with PIO mode 6 and Ultra DMA mode
	Supported media type		• CompactFlash Type I • CompactFlash Type II • Microdrive • MultiMediaCard • Reduced Size MultiMediaCard (RS MultiMediaCard) • MultiMediaCard 4.2 (MultiMediaCard Plus, including MultiMediaCard Plus HC) • Reduced Size MultiMediaCard 4.2 (MultiMediaCard Mobile, including MultiMediaCard Mobile HC) • Secure Digital Card (SD) • Secure Digital High Capacity (SDHC)

		• miniSD • miniSD High Capacity • Micro SD (T-Flash) • Micro SD HC • Memory Stick • Memory Stick Select • Memory Stick Duo (MS Duo) • Memory Stick PRO (MS PRO) • Memory Stick PRO Duo (MS PRO Duo) • Memory Stick PRO-HG Duo • MagicGate Memory Stick (MG) • MagicGate Memory Stick Duo • Picture Card
Supported media type with card adapter		• Memory Stick Micro (M2) • MultiMediaCard Micro
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 140°F (60°C) @ 80% R.H. for 96 hours -22°F (-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. 1.3 FCC, CE, BSMI, C-Tick, VCCI, MIC, cUL, TUV-T

Technical Specifications - Environmental Data

Eco-Label Certifications & declarations	This product has received or is in the process of being certified to the following approvals and may be labeled with one or more of these marks:
Hewlett-Packard Corporate Environmental Information	For more information about HP's commitment to the environment: 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