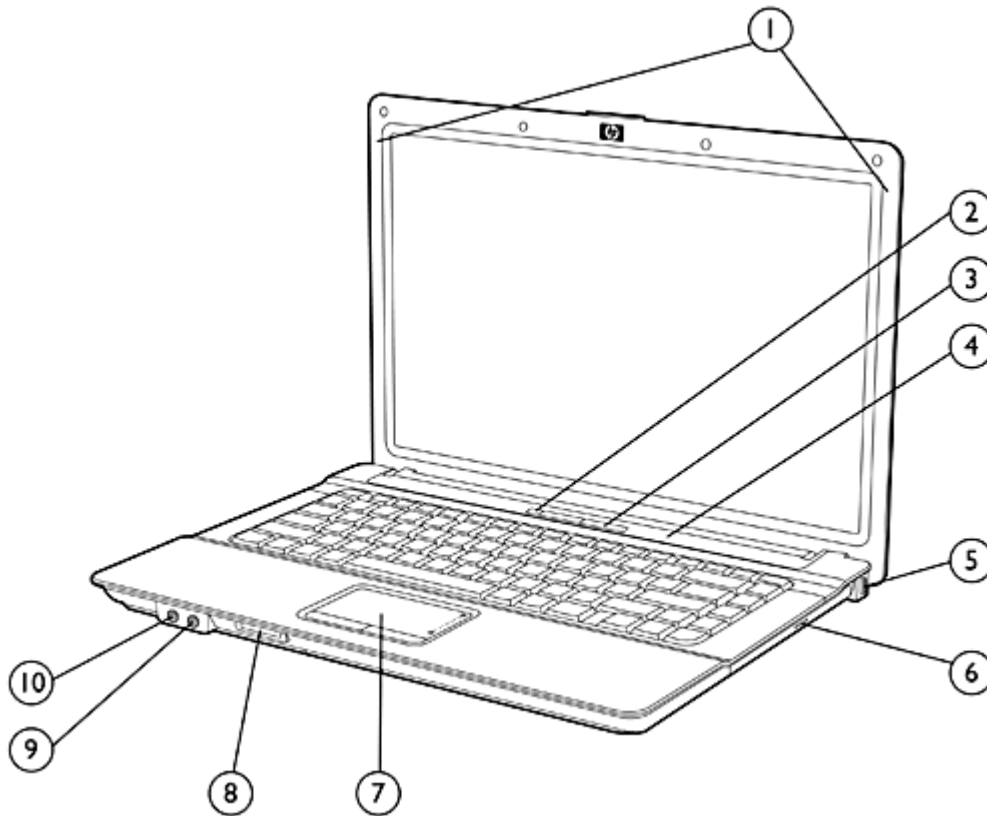


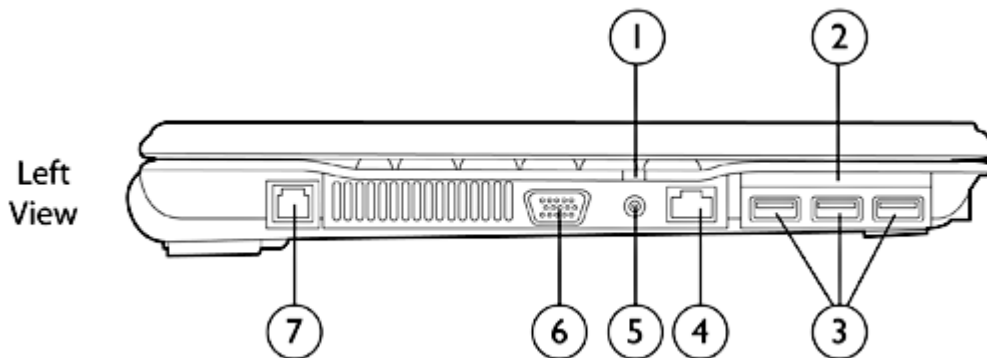
## Overview

HP recommends Windows Vista® Business



- |                                     |                               |
|-------------------------------------|-------------------------------|
| 1. Dual-band wireless LAN antennas* | 6. Optical drive              |
| 2. Wireless On/Off button with LED* | 7. Touchpad with scroll zone  |
| 3. Power button with LED            | 8. Secure Digital (SD) slot   |
| 4. Speaker                          | 9. Stereo microphone in       |
| 5. Kensington Lock slot             | 10. Stereo headphone/line out |

\* Select models only



## Overview

1. Battery charging LED
2. ExpressCard/54 slot
3. Three USB 2.0 ports
4. RJ-45/Ethernet port
5. Power connector
6. VGA/external monitor connector
7. RJ-11/modem port

## At A Glance

- Genuine Windows Vista Business 32 Genuine Windows Vista Home Premium 32  
Genuine Windows Vista Home Basic 32  
Genuine Windows Vista Business with Genuine Windows XP Professional custom preinstalled  
FreeDOS  
Red Flag Linux
- Intel® Core™2 Duo processor or Intel Celeron® processor
- Sleek industrial design starting at 5.5 lb/2.49 kg and 1.27 inch/32.3 mm thin at front
- Widescreen 15.4-inch diagonal display
- Mobile Intel GME965 Express Chipset or Mobile Intel GLE960 Express Chipset
- Supports up to 4 GB of 667 MHz DDR2 SDRAM
- 120/160/250 GB 5400 rpm SATA hard drive with HP Drive Guard
- Intel Graphics Media Accelerator X3100, with up to 384 MB shared system memory
- Integrated 802.11 a/b/g/draft-n, a/b/g, or b/g wireless LAN module\*
- Bluetooth® 2.0\*
- Intel 82562GT 10/100 Network Connection
- Touchpad with scroll zone

\* Select models only

### Standard Features

#### Processors

Intel Core 2 Duo Processor T5670 (1.80 GHz, 2 MB L2 cache, 800 MHz FSB)\*  
Intel Core 2 Duo Processor T5470 (1.60 GHz, 2 MB L2 cache, 800 MHz FSB)\*  
Intel Core 2 Duo Processor T5270 (1.4 GHz, 2 MB L2 cache, 800 MHz FSB)\*  
Intel Celeron Dual Core Processor T1400 (1.73 GHz, 512 KB L2 cache, 533 MHz FSB)\*  
Intel Celeron M Processor 550 (2.0 GHz, 1 MB L2 cache, 533 MHz FSB)\*  
Intel Celeron M Processor 530 (1.73 GHz, 1 MB L2 cache, 533 MHz FSB)\*

\* Intel's numbering is not a measurement of higher performance.

**NOTE:** Processor speed denotes maximum performance mode; processors will run at lower speeds in battery optimization mode.

#### Operating System

##### Preinstalled

Genuine Windows Vista Business 32\*  
Genuine Windows Vista Business with downgrade to Windows XP Professional custom installed\*†  
Genuine Windows Vista Home Premium 32\*  
Genuine Windows Vista Home Basic 32\*  
FreeDOS

##### Supported

Genuine Windows XP Professional

##### Certified

SUSE Linux Enterprise Desktop 10

\* 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.

#### Chipset

Mobile Intel GME965 or GLE960 Express Chipset

#### Graphics

Mobile Intel Graphics Media Accelerator X3100, up to 384-MB shared system memory  
Microsoft DirectX 9 capable

#### Display

##### Internal

15.4-inch diagonal WXGA BrightView (1280 x 800 resolution)

##### External

Up to 32-bit per pixel color depth  
VGA port supports resolutions up to 2048 x 1536 at 75 Hz, and lower resolutions at up to 100 Hz

**NOTE:** Resolutions are dependent upon monitor capability, and resolution and color depth settings.

## Standard Features

<b>Memory</b>	<b>Standard</b>	512 MB, 1024 MB, 2048 MB, or 4096 MB* 667 MHz DDR2 SDRAM total memory; two SODIMM slots supporting dual channel memory
	<b>Dual-channel</b>	Maximized dual-channel performance requires SODIMMs of the same size and speed in both memory slots.
		* with Mobile Intel GME965 chipset only
		<b>NOTE:</b> Due to the non-industry standard nature of some third-party memory modules, we recommend HP branded memory to ensure compatibility. If you mix memory speeds, the system will perform at the lower memory speed.

<b>Communications</b>	Intel Fast Ethernet Integrated Controller (10/100 NIC) 56K V.92 modem*
	* Designed for downloads from 56K modem compliant sources. Maximum achievable download transmission rates currently do not reach 56 KB/s, and will vary with line conditions. Modem availability is subject to country regulatory approval.

<b>Wireless Devices</b>	Support for a broad range of secure, integrated wireless LAN options featuring support for the latest industry standards. Integrated Bluetooth is also available (factory configurable only) and can be combined with any of the supported wireless LAN options.
<b>All 802.11 integrated wireless LAN options</b>	<p>Wi-Fi CERTIFIED</p> <p>Cisco Compatible Extensions support (Version 4.0) with Microsoft Windows XP</p> <p>Wired Equivalent Privacy (WEP) support up to 128-bit keys</p> <p>Wi-Fi Protected Access (WPA) and WPA2 support</p> <p>802.1x authentication support, including EAP-TLS, EAP-TTLS, PEAP-GTC, PEAP-MSCHAPv2, and LEAP</p> <p>Advanced Encryption Standard (AES) support</p> <p>Dual antennas integrated in the display enclosure</p>
<b>Intel Wireless WiFi Link 4965AGN*</b>	Integrated support for 802.11 a, b, g, and draft-n Up to 243 mbps data rate
<b>Intel Wireless WiFi Link 4965AG*</b>	Integrated support for 802.11 a, b and g Up to 54 mbps data rate
<b>Intel PRO/Wireless 3945ABG Network Connection*</b>	Integrated support for 802.11 a, b and g Up to 54 mbps data rate
<b>Intel PRO/Wireless 3945BG Network Connection*</b>	Integrated support for 802.11 b and g Up to 54 mbps data rate
<b>Broadcom 4311AGN 802.11a/b/g/draft n WiFi Adapter</b>	Integrated support for 802.11 a, b and g Up to 54 mbps data rate
<b>Broadcom 4311BG 802.11b/g WiFi Adapter</b>	Integrated support for 802.11 b and g Up to 54 mbps data rate
<b>HP Integrated Module with Bluetooth Wireless Technology</b>	Bluetooth Specification v2.0 compliant Works with a wide range of Bluetooth devices
	* Requires Intel Core 2 Duo processor

### Standard Features

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**Keyboard** The 101/102-key compatible keyboard features an industry standard, full-pitch key layout with desktop keyboard features, such as the isolated inverted-T cursor control keys, editing keys, both left and right control and alt keys, and 12 function keys. International key layouts are available. Other features include an integrated numeric keypad, hotkeys for instant access to power conservation, brightness, and other features, 19 mm x 19 mm key pitch (center-to-center spacing), 2.5 mm stroke, comfort-dished keycaps, and bright key legends for improved visibility in low light conditions.

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**Pointing device** Touchpad with scroll zone, two pick buttons

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**Expansion Card Slots** **ExpressCard/54 slot** Supports ExpressCard/54 and ExpressCard/34

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**Storage**

<b>Hard drives</b>	120/160/250 GB 5400 rpm SMART SATA
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**NOTE:** These hard drives are customer removable and will withstand multiple insertion/removal cycles. Up to 10 GB is reserved for the system recovery software.

<b>HP DriveGuard</b>	The hard drive is mounted directly to the notebook frame, reducing the transmission of shock to the hard drive.
<b>Fixed optical drives</b>	DVD/CD-RW Combo Drive DVD+/-RW SuperMulti DL LightScribe Drive

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**Interfaces**

<b>ExpressCard/54 slot</b>	Supports ExpressCard/54 and ExpressCard/34
<b>External Monitor</b>	One – VGA
<b>External Microphone</b>	One
<b>Headphone/Line out</b>	One
<b>Power Connector</b>	One
<b>RJ-11 (Modem)</b>	One
<b>RJ-45 (NIC)</b>	One
<b>USB 2.0</b>	Three
<b>LED Status Indicators</b>	Five

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**Audio** High Definition Audio support  
Integrated mono speaker  
Stereo headphone/line out  
Stereo microphone in

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### Standard Features

Software	<b>Preinstalled Software with Windows Vista</b>	Adobe Acrobat Reader HP Recovery Manager HP Help and Support Center Roxio Creator Basic 10.1 Synaptics Touchpad Driver McAfee Total Protection* Intervideo WinDVD 8SE- DVD Player
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\* 60 day trial period for McAfee Total Protection for Small Business software. Internet access required to receive updates. First update included. Subscription required for updates thereafter.

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<b>HP Recovery Manager</b>	Each unit is shipped with HP Recovery Manager. HP Recovery Manager enables fast recovery of the factory preinstalled image if the system becomes corrupted or if important system files are accidentally deleted. Up to 10 GB of the hard drive is reserved for the system recovery software.
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<b>SMBIOS Version 2.4</b>	System Management BIOS, previously known as DMI BIOS, is used to store system management information.
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<b>Security</b>	<b>Standard Features</b>	Configuration Control Hardware Memory Change Alert Ownership Tag Setup Password Power-On Password DriveLock Kensington Lock Slot
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For more information on HP security solutions refer to: <http://www.hp.com/go/security>.

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<b>Power Supply</b>	External 65-watt AC adapter, 6-foot (1.8-meter) power cord included. Total length including External AC adapter is 12 feet (3.66 meter). HP Fast Charge* * Fast Charge recharges your battery up to 90% within 90 minutes when the system is off.
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<b>Battery</b>	6-cell (47 WHr) high capacity Lithium-Ion
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<b>Battery Life</b>	Up to 4 hours and 30 minutes
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<b>Power Conservation</b>	Hibernation Standby ACPI compliance
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## Standard Features

### Service and Support

HP Services offers limited 1-year warranty options depending on country; 1-year limited warranty on primary battery. On-site service and warranty upgrades are also available. HP Care Pack Services extend service contracts beyond the standard warranties. To choose the right level of service for your HP product, use the HP Care Pack Services Lookup Tool at: <http://www.hp.com/go/lookuptool>. Additional HP Care Pack Services information by product is available at: <http://www.hp.com/hps/carepack>.

**NOTE:** Certain restrictions and exclusions apply. Consult the HP Customer Support Center for details. <http://h20000.www2.hp.com/bizsupport/TechSupport/ProductRoot.jsp>

### Options

<b>Memory</b>	512 MB 667 MHz DDR2 SDRAM SODIMM*	EM993AA
	1 GB 667 MHz DDR2 SDRAM SODIMM*	EM994AA
	2 GB 667 MHz DDR2 SDRAM SODIMM*	EM995AA
	1 GB 800 MHz DDR2 SDRAM SODIMM*	KT292AA
	2 GB 800 MHz DDR2 SDRAM SODIMM*	KT293AA

\* Models with Mobile Intel GLE960 Express Chipset use this memory at a maximum memory speed of 533 MHz. Models with Mobile Intel GME965 Express Chipset use 800 MHz memory modules at a maximum memory speed of 667 MHz.

<b>Other Storage</b>	HP USB Diskette Drive	DC361B
	HP External MultiBay II	PA509A#xxx
	HP MultiBay II DVD-ROM Drive	PA849A
	HP MultiBay II DVD+/-RW SuperMulti DL Drive	PA851A

<b>Power</b>	65W Smart AC Adapter	ED494AA#xxx
	65W Air/Auto/AC Smart Combo Adapter	ED993AA#xxx
	90W Air/Auto/AC Smart Combo Adapter	AJ652AA#xxx
	Primary 6-cell battery	GJ655AA

<b>Carrying Cases</b>	HP Basic Carrying Case	AJ078AA
	HP Value Nylon Case	RR314AA
	HP Universal Nylon Case	RR315AA
	HP Executive Leather Case	RR316AA
	HP Deluxe Nylon Backpack	RR317AA
	HP Deluxe Roller Case	GD405AA

<b>Security</b>	ExpressCard Smart Card Reader with Java Card	AJ451AA
	HP Protectools Java Card – 10 units	EL348AA
	HP/Kensington Cable Lock	PC766A

<b>Input/Output Devices</b>	USB Keyboard & Mouse Bundle	RC465AA#xxx
	HP USB/PS2 Optical Scroll Mouse	DC369A
	HP USB Optical Travel Mouse	RH304AA

### Technical Specifications

<b>System Unit</b>	<b>Dimensions (HxWxD)</b>	1.27 (at front) x 14.1 x 10.5 in 32.3 (at front) x 358.0 x 266.8 mm
	<b>Weight</b>	Starting at 5.5 lb (2.49 kg)
	<b>NOTE:</b> Height varies depending upon where on the notebook the measurement is made. Weight varies by configuration and components. Weight includes 6-cell battery, 80-GB hard drive, 512-MB memory, and optical drive. Weight varies by configuration and components.	
<b>Stand-Alone Power Requirements</b>	Normal Operating Voltage	18.5 V
	Average Operating Power	12.5 W
	Max Operating Power	< 65 W
<b>Temperature</b>	Operating	32° to 95° F (0° to 35° C) (not writing optical) 41° to 95° F (5° to 35° C) (writing optical)
	Non-operating	-4° to 140° F (-20° to 60° C)
<b>Relative Humidity</b>	Operating	10% to 90%, non-condensing
	Non-operating	5% to 95%, 101.6° F (38.7° C) maximum wet bulb temperature
<b>Shock</b>	Operating	125 G, 2 ms, half-sine
	Non-operating	200 G, 2 ms, half-sine
<b>Random Vibration</b>	Operating	0.75 grms
	Non-operating	1.50 grms
<b>Altitude (unpressurized)</b>	Operating	-50 to 10,000 ft (-15.24 to 3,048 m)
	Non-operating	-50 to 40,000 ft (-15.24 to 12,192 m)
<b>Industry Standard Certifications</b>	UL	Yes
	CSA	Yes
	FCC Compliance	Yes
	ENERGY STAR®	Yes
	EPEAT	Silver
	ICES	Yes
	Australia / NZ A-Tick Compliance	Yes
	CCC	Yes
	Japan VCCI Compliance	Yes
	MIC	Yes
	BSMI	Yes
	CE Marking Compliance	Yes
	BNCL or BELLIS	Yes
	CIT	Yes
	GOST	Yes
	Saudi Arabian Compliance (ICCP)	Yes
	SABS	Yes
	UKRSERTCOMPUTER	Yes

### Technical Specifications

<b>65W AC Adapter</b>	<b>Dimensions</b>	4.17 x 1.85 x 1.1 in (10.6 x 4.7 x 2.8 cm)		
	<b>Weight</b>	0.62 lb (280 g)		
	<b>Input</b>	100 to 240 VAC		
		Input Efficiency	83% min at 115 VAC	
	<b>Output</b>	Input frequency range	47 to 63 Hz	
		Input AC current	1.7 A at 90 VAC, 0.85 A at 180 VAC	
		Output power 65W	65W	
		DC output	18.5V	
		Hold-up time	5 msec at 115 VAC input	
		Output current limit	<5A, Over voltage protection- 29V max automatic shutdown	
		<b>Connector</b>	3 pin/grounded, mates with interchangeable cords	
	<b>Environmental Design</b>	Operating temperature	32° to 104° F (0° to 40° C)	
		Non-operating (storage) temperature	-4° to 149° F (-20° to 65° C)	
		Altitude	0 to 10,000 ft (0 to 3,048 m)	
Humidity		20% to 80%		
Storage Humidity		10% to 90%		
<b>EMI and Safety Certifications</b>	CE Mark – full compliance with LVD and EMC directives; Worldwide safety standards – IEC950, EN60950, UL1950, Class2, SELV; Agency approvals – C-UL-US, NORDICS, DENAN, EN55022 Class B, FCC Class B, CISPR22 Class B, CCIB, NOM-1 NYCE; MTBF – over 200,000 hours at 25°C ambient condition.			

<b>6-Cell (47 WHr) Lithium-Ion battery</b>	<b>Dimensions (H x W x L)</b>	0.8 x 2.1 x 8.0 in (2.0 x 5.3 x 20.3 cm)			
	<b>Weight</b>	0.690 lb (0.313 kg)			
	<b>Cells/Type</b>	6-cell Lithium-Ion			
	<b>Energy</b>	Watt-hour Capacity	47 WHr		
		<b>Temperature</b>	Operating (Charging)	32° to 113° F (0° to 45° C)	
			Operating (Discharging)	14° to 140° F (-10° to 60° C)	
	<b>Battery Re-Charge Time</b>	Non-operating	-4° to 140° F (-20° to 60° C)		
		System in OFF mode or Standby	2.5 hours		
			System ON	3 to 5 hours (depending on system power consumption)	
		HP Fast Charge	Charges the battery up to 90% within 90 minutes when system is OFF		

### Technical Specifications

15.4-inch Color TFT WXGA BrightView Display	Active Area (W x H)	13.0 x 8.1 in (33.1 x 20.7 cm)		
	Diagonal Size	15.4 in (39.1 cm)		
	Surface Treatment	BrightView		
	Contrast Ratio	300:1 (typical)		
	Refresh Rate	60 Hz		
	Brightness	200 nit (typical)		
	Pixel Resolution	Pitch	0.259 mm	
		Format	1280 x 800	
		Configuration	RGB stripe	
	Backlight	CCFL		
PPI	98			
Viewing Angle	$\pm 30^\circ$ Horizontal, $\pm 10^\circ$ Vertical (minimum)			
	30/30/20/10 (Left/Right/Down/Up) (minimum) or 45/45/35/25 (Left/Right/Down/Up) (typical)			

### Hard Drives

250 GB 5400 rpm SATA	Drive Weight	0.22 lb (101 g)		
	Capacity	250 GB		
	Height	0.37 in (9.5 mm)		
	Width	2.75 in (70 mm)		
	Interface	ATA-7 / SATA 1.0a		
	Transfer Rate	Synchronous (maximum)	100 MB/s (Drive Capability)	
	Seek Time (typical reads, including settling)	Single Track	3 ms	
		Average	13 ms	
		Maximum	24 ms	
	Rotational Speed	5400 rpm		
	Logical Blocks	488,397,168		
	Operating Temperature	41° to 131° F (5° to 55° C)		
Features	ATA Security			

### Technical Specifications

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160 GB 5400 rpm SATA	Drive Weight	0.22 lb (101 g)	
	Capacity	160 GB	
	Height	0.37 in (9.5 mm)	
	Width	2.75 in (70 mm)	
	Interface	ATA-7 / SATA 1.0a	
	Transfer Rate	Synchronous (maximum)	100 MB/s (Drive Capability)
	Seek Time (typical reads, including settling)	Single Track	3 ms
		Average	13 ms
		Maximum	24 ms
	Rotational Speed	5400 rpm	
	Logical Blocks	312,581,808	
	Operating Temperature	41° to 131° F (5° to 55° C)	
	Features	ATA Security	

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120 GB 5400 rpm SATA	Drive Weight	0.22 lb (101 g)	
	Capacity	120 GB	
	Height	0.37 in (9.5 mm)	
	Width	2.75 in (70 mm)	
	Interface	ATA-7 / SATA 1.0a	
	Transfer Rate	Synchronous (maximum)	100 MB/s (Drive Capability)
	Seek Time (typical reads, including settling)	Single Track	3 ms
		Average	13 ms
		Maximum	24 ms
	Rotational Speed	5400 rpm	
	Logical Blocks	234,441,648	
	Operating Temperature	41° to 131° F (5° to 55° C)	
	Features	ATA Security	

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### Removable Storage Drives – Fixed Bay

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## Technical Specifications

DVD/CD-RW Combo Drive	<b>Access Times</b>	Random	<110 ms CD <130 ms DVD
	<b>Max Data Transfer Rate</b>	24X CD-ROM	3,600 KB/s
		8X DVD	10,800 KB/s
		24X CD-R	3,600 KB/s
		24X CD-RW	3,600 KB/s
	<b>Transfer Mode</b>	Multiword DMA Mode 2	
	<b>Interface</b>	EIDE	
	<b>Supported Media (read)</b>	CD-DA, CD+(E)G, CD-MIDI, CD-TEXT, CD-ROM, CD-ROM XA, MIXED MODE CD, CD-I, CD-I Bridge (Photo-CD, Video CD), Multisession CD (Photo-CD, CD-EXTRA, Portfolio, CD-R, CD-RW), CD-R, CD-RW, DVD-ROM (DVD-5, DVD-9, DVD-10, DVD-18), DVD-R, DVD-RW, DVD+R, DVD+RW	
	<b>Supported Media (write)</b>	CD-R, CD-RW	
	<b>Max Media Capacity (read)</b>	8.5 GB	
	<b>Max Media Capacity (write)</b>	700 MB	
<b>Transport</b>	Tray loading		

DVD+/-RW SuperMulti DL LightScribe Drive	<b>Access Times</b>	Random	<175 ms CD <230 ms DVD
	<b>Max Data Transfer Rate</b>	24X CD-ROM	3,600 KB/s
		8X DVD	10,800 KB/s
		24X CD-R	3,600 KB/s
		16X CD-RW	2,400 KB/s
		8X DVD+R	10,800 KB/s
		4X DVD+RW	5,400 KB/s
		8X DVD-R	10,800 KB/s
		4X DVD-RW	5,400 KB/s
		2.4X DVD+R(9)	2,700 KB/s
	5X DVD-RAM	6,750 KB/s	
<b>Transfer Mode</b>	Multiword DMA Mode		
<b>Interface</b>	EIDE		
<b>Supported Media (read)</b>	CD-DA, CD+(E)G, CD-MIDI, CD-TEXT, CD-ROM, CD-ROM XA, MIXED MODE CD, CD-I, CD-I Bridge (Photo-CD, Video CD), Multisession CD (Photo-CD, CD-EXTRA, Portfolio, CD-R, CD-RW), CD-R, CD-RW, DVD-ROM (DVD-5, DVD-9, DVD-10, DVD-18), DVD-R, DVD-RW, DVD+R, DVD+RW, DVD-RAM		
<b>Supported Media (write)</b>	CD-R, CD-RW, DVD+R, DVD+RW, DVD-R, DVD-RW, DVD-RAM, LightScribe		
<b>Max Media Capacity (read)</b>	8.5 GB		

## Technical Specifications

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Max Media Capacity (write)	8.5 GB
Transport	Tray Loading

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## Audio

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Hardware	Implementation	ADI1981HD High Definition CODEC
	Full Duplex	Yes
	Sound Blaster Pro compatible	Yes
	Microphone Jack	Stereo
	Headphone/Line Out Jack	Stereo

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Audio Output Quality	Frequency Response	20 Hz – 20 kHz
	Signal to Noise Ratio	>85 dB
	Total Harmonic Distortion	0.01%
	Noise Floor	-110 dB
	Play/Record Sampling Rate(s)	8 kHz – 48 kHz
	DAC	16, 20, or 24-bit
	ADC	16, or 20-bit

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Internal Speaker	Power Rating	2.0 Watts
	Impedance	4 Ohms

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## Communications

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## Technical Specifications

Intel 82562GT 10/100 Network Connection	Ethernet Features	10 Mbit/s operation (10BASE-T; IEEE 802.3i; IEEE 802.3 clauses 13-14) 100 Mbit/s operation (100BASE-TX; IEEE 802.3u; IEEE 802.3 clauses 21-30) Auto-Negotiation (Automatic Speed and Duplex Selection) Full Duplex and Half Duplex operation at 10 and 100 Mbit/s IEEE 802.3x Flow Control (IEEE 802.3 clauses 31-32; configurable)
		<b>NOTE:</b> Auto MDI/MDI-X is not supported.
	Power Management	ACPI compliant -- multiple power modes
	Performance Features	TCP / IP / UDP Checksum Offload
	Manageability	Boot-from-LAN using PXE 2.1 <b>NOTE:</b> Wake-on-LAN and Boot-from-LAN using RPL are not supported.
	NIC Device Driver Name	Intel 82562 Network Internet Connection
	Drivers Available	Windows Vista

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V.92 56K Data/Fax Modem	Form Factor	MDC 1.5 Daughtercard
	Power Management Support	APM Revision 1.2, ACPI
	Approvals/Certifications	UL, CSA, NEMKO, CCIB, Industry Canada, FCC Part 68, CTR21, FCC Part 15 Class B, Canadian ICES-003 Class B, C.I.S.P.R.22, Australian ACA, CE Mark, Other Countries
	Data Mode Capabilities	V.92 data V.8bis V.80 V44, V.42bis, MNP5 (Compression) V.42 (LAPM, MNP2-4) (Error Correction) <b>Optional symbol rates:</b> 2800, 3429 Asymmetric Symbol rates <b>Synchronous primary channel data signaling rates:</b> 3600, 31200 Automatic rate re-negotiation V.34 V.32bis V.32 V.23 V.22bis V.22 V.21 Bell 212A Bell 103J
	Fax Mode Capabilities	TIA/EIA-578-B (Class 1) T.30, T.4 (Group 3) V.17 V.29 V.27ter V.21 Channel 2
	Command Set	V.250 (Partial)



### Technical Specifications

Form Factor	PCI-Express MiniCard	
Weight	0.013 lb (6 g)	
Dimensions	0.19 x 1.2 x 2.0 in (4.75 x 29.85 x 50.8 mm)	
Operating Voltage	3.3V +/- 9%, 1.5V +/- 5%	
Temperature	Operating	32° to 176° F (0° to 80° C)
	Non-operating	-40° to 176° F (-40° to 80° C)
Humidity	Operating	10% to 90% (non-condensing)
	Non-operating	5% to 95% (non-condensing)
Altitude	Operating	0 to 10,000 ft (3,048 m)
	Non-operating	0 to 50,000 ft (15,240 m)
Configuration Utility <sup>5</sup>	Microsoft Windows 2000 or XP Choice of Configuration Utility:	
	<ul style="list-style-type: none"> <li>• Microsoft Windows XP Wireless Network Connection Manager</li> <li>• Intel PROSet for Microsoft Windows 2000 or XP (required for Cisco Compatible Extensions support)</li> </ul>	

#### Microsoft Windows Vista

- Microsoft Windows Vista Wireless Network Connection Manager

#### LED Activity

LED Off – Radio OFF; Solid LED On – Radio ON

1. Check latest software/driver release for updates on supported security features.
2. Maximum output power may vary by country according to local regulations.
3. In Power Save Polling mode.
4. Receiver sensitivity is measured at a packet error rate of 8% for 802.11b (CKK modulation) and a packet error rate of 10% for 802.11a/g (OFDM modulation).
5. WLAN supplier's client utility is required for Cisco Compatible Extensions support with Microsoft Windows 2000 or XP. WLAN may also be compatible with certain third-party software suppliers.

#### Intel PRO/Wireless 3945ABG Network Connection

Wireless LAN Standards	IEEE 802.11a IEEE 802.11b IEEE 802.11g
Interoperability	Wi-Fi certified Cisco Compatible Extensions Program compliant with Microsoft Windows 2000 and XP (details at: <a href="http://www.hp.com/go/notebooks/WLAN">http://www.hp.com/go/notebooks/WLAN</a> )
Frequency Band	2.4 GHz
Data Rates	802.11b: 1, 2, 5.5, 11 Mbps 802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps
Modulation	Direct Sequence Spread Spectrum DBPSK, DQPSK, CCK, OFDM
Security <sup>1</sup>	Supports 64- and 128-bit WEP, WPA, WPA2, hardware-accelerated AES, 802.1x authentication types EAP-TLS, EAP-TTLS, PEAP-GTC, PEAP-MSCHAPv2, LEAP, EAP-FAST, EAP-SIM.

Support for Cisco Security Features (proven compatibility with Cisco Aironet infrastructure products through the Cisco Compatible Extensions Program Version 4).



## Technical Specifications

3. In Power Save Polling mode.
4. Receiver sensitivity is measured at a packet error rate of 8% for 802.11b (CKK modulation) and a packet error rate of 10% for 802.11a/g (OFDM modulation).
5. WLAN supplier's client utility is required for Cisco Compatible Extensions support with Microsoft Windows 2000 or XP. WLAN may also be compatible with certain third-party software supplicants.

<b>Intel Wireless WiFi Link 4965ABGN</b>	<b>Wireless LAN Standards</b>	IEEE 802.11a IEEE 802.11b IEEE 802.11g IEEE 802.11n (draft 1.02)
	<b>Interoperability</b>	Wi-Fi certified (802.11abg only) Cisco Compatible Extensions Program compliant (802.11abg only) with Microsoft Windows 2000 and XP (details at: <a href="http://www.hp.com/go/notebooks/WLAN">http://www.hp.com/go/notebooks/WLAN</a> ) Tested with wireless access points from several major manufacturers (details at: <a href="http://www.hp.com/go/notebooks/WLAN/draft-n">http://www.hp.com/go/notebooks/WLAN/draft-n</a> )
	<b>Frequency Band</b>	2.4 GHz and 5 GHz
	<b>Data Rates</b>	802.11b: 1, 2, 5.5, 11 Mbps 802.11a/g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps 802.11n (draft): 66 possible data rates, ranging from 6 Mbps to 300 Mbps, depending on the combination of Bandwidth, Modulation Coding Scheme, and Guard Interval used, as defined in IEEE 802.11n (draft) specification
	<b>Modulation</b>	Direct Sequence Spread Spectrum DBPSK, DQPSK, CCK, OFDM, BPSK, QPSK, 16-QAM, 64-QAM
	<b>Security<sup>1</sup></b>	Supports 64- and 128-bit WEP, WPA, WPA2, hardware-accelerated AES (support for key sizes of 128, 192, and 256 bits), 802.1x authentication types EAP-TLS, EAP-TTLS, PEAP-GTC, PEAP-MSCHAPv2, LEAP, EAP-FAST.  Support for Cisco Security Features (proven compatibility with Cisco Aironet infrastructure products through the Cisco Compatible Extensions Program Version 4) with Microsoft Windows 2000 and XP only.
	<b>Sub-channels</b>	Multinational support with frequency bands and channels compliant to local regulations.
	<b>Media Access Protocol</b>	CSMA/CA (Collision Avoidance) with ACK
	<b>Network Architecture Models</b>	Ad-hoc (Peer to Peer) Infrastructure (Access Point Required)
	<b>Roaming</b>	IEEE 802.11 compliant roaming between access points
	<b>Output Power (for CCK)<sup>2</sup></b>	15 dBm
	<b>Output Power (for OFDM; power varies by data rate)<sup>2</sup></b>	15 dBm
	<b>Power Consumption</b>	Transmit: 2.3 Watts (average, with two spatial streams) Receive: 1.9 Watts (average with three receive chains) Idle mode <sup>3</sup> : 30 mW (average) Radio off: 20 mW (max)
	<b>Power Management</b>	ACPI compliant power management 802.11 compliant power saving mode

### Technical Specifications

<b>Receiver Sensitivity<sup>4</sup></b>	300 Mbps: -68 dBm, 54 Mbps: -74 dBm, 6 Mbps: -90 dBm	
<b>Antenna Connections</b>	3 U.FL type connectors, 50 ohm nominal impedance	
<b>Range</b>	802.11 a – Typical (@6 Mbps)	600 feet – Outdoor Open Area 150 feet – Indoor, Office environment
	802.11 b – Typical (@1 Mbps)	1200 feet – Outdoor Open Area 300 feet – Indoor, Office environment
	802.11 g – Typical (@1 Mbps)	1200 feet – Outdoor Open Area 300 feet – Indoor, Office environment
<b>Form Factor</b>	PCI-Express MiniCard	
<b>Weight</b>	0.013 lb (6 g)	
<b>Dimensions</b>	0.19 x 1.2 x 2.0 in (4.75 x 29.85 x 50.8 mm)	
<b>Operating Voltage</b>	3.3V +/- 9%, 1.5V +/- 5%	
<b>Temperature</b>	Operating	32° to 176° F (0° to 80° C)
	Non-operating	-40° to 176° F (-40° to 80° C)
<b>Humidity</b>	Operating	10% to 90% (non-condensing)
	Non-operating	5% to 90% (non-condensing)
<b>Altitude</b>	Operating	0 to 10,000 ft (3,048 m)
	Non-operating	0 to 50,000 ft (15,240 m)
<b>Configuration Utility<sup>5</sup></b>	Microsoft Windows 2000 or XP Choice of Configuration Utility:	
	<ul style="list-style-type: none"> <li>• Microsoft Windows XP Wireless Network Connection Manager</li> <li>• Intel PROSet for Microsoft Windows 2000 or XP (required for Cisco Compatible Extensions support)</li> </ul>	
	Microsoft Windows Vista	
	<ul style="list-style-type: none"> <li>• Microsoft Windows Vista Wireless Network Connection Manager</li> </ul>	
<b>LED Activity</b>	LED Off – Radio OFF; Solid LED On – Radio ON	
	<ol style="list-style-type: none"> <li>1. Check latest software/driver release for updates on supported security features.</li> <li>2. Maximum output power may vary by country according to local regulations.</li> <li>3. In Power Save Polling mode and on battery power.</li> <li>4. Receiver sensitivity is measured at a packet error rate of 8% for 802.11 b (CKK modulation) and a packet error rate of 10% for 802.11 a/g (OFDM modulation).</li> <li>5. WLAN supplier's client utility is required for Cisco Compatible Extensions support with Microsoft Windows 2000 or XP. WLAN may also be compatible with certain third-party software supplicants.</li> </ol>	

Broadcom 4311AG  
802.11a/b/g WiFi  
Adapter

<b>Wireless LAN Standards</b>	IEEE 802.11a IEEE 802.11b IEEE 802.11g
<b>Interoperability</b>	Wi-Fi certified (802.11abg only) Cisco Compatible Extensions Program compliant (802.11abg only) with Microsoft Windows Vista and XP (details at: <a href="http://www.hp.com/go/notebooks/WLAN">http://www.hp.com/go/notebooks/WLAN</a> ) Tested with wireless access points from several major manufacturers (details at: <a href="http://www.hp.com/go/notebooks/WLAN/draft-n">http://www.hp.com/go/notebooks/WLAN/draft-n</a> )

### Technical Specifications

<b>Frequency Band</b>	2.4 GHz and 5 GHz	
<b>Data Rates</b>	802.11b: 1, 2, 5.5, 11 Mbps 802.11a/g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps	
<b>Modulation</b>	Direct Sequence Spread Spectrum DBPSK, DQPSK, CCK, OFDM	
<b>Security<sup>1</sup></b>	Supports 64- and 128-bit WEP, WPA, WPA2, hardware-accelerated AES, 802.1x authentication types EAP-TLS, EAP-TTLS, PEAP-GTC, PEAP-MSCHAPv2, LEAP, EAP-FAST.  Support for Cisco Security Features (proven compatibility with Cisco Aironet infrastructure products through the Cisco Compatible Extensions Program Version 4) with Microsoft Windows Vista and XP only.	
<b>Sub-channels</b>	Multinational support with frequency bands and channels compliant to local regulations.	
<b>Media Access Protocol</b>	CSMA/CA (Collision Avoidance) with ACK	
<b>Network Architecture Models</b>	Ad-hoc (Peer to Peer) Infrastructure (Access Point Required)	
<b>Roaming</b>	IEEE 802.11 compliant roaming between access points	
<b>Output Power (for CCK)<sup>2</sup></b>	17.5 dBm	
<b>Output Power (for OFDM; power varies by data rate)<sup>2</sup></b>	15 dBm	
<b>Power Consumption</b>	Idle associated: 350 mW Idle unassociated: 350 mW Transmit: 2.0 W (max) Receive: 1.5 W (max)	
<b>Power Management</b>	ACPI compliant power management 802.11 compliant power saving mode	
<b>Receiver Sensitivity<sup>4</sup></b>	54 Mbps: -72 dBm, 11 Mbps: -85 dBm , 1 Mbps: -95 dBm	
<b>Antenna type</b>	High efficiency dual band antenna with spatial diversity, mounted in the display enclosure	
<b>Range</b>	802.11 a – Typical (@6 Mbps)	600 feet – Outdoor Open Area 150 feet – Indoor, Office environment
	802.11 b – Typical (@1 Mbps)	1200 feet – Outdoor Open Area 300 feet – Indoor, Office environment
	802.11 g – Typical (@1 Mbps)	1200 feet – Outdoor Open Area 300 feet – Indoor, Office environment
<b>Form Factor</b>	PCI-Express MiniCard	
<b>Weight</b>	0.026 lb (12 g)	
<b>Dimensions</b>	0.19 x 1.2 x 2.0 in (4.75 x 29.85 x 50.8 mm)	
<b>Operating Voltage</b>	3.3v +/- 10%	
<b>Temperature</b>	Operating	32° to 176° F (0° to 80° C)
	Non-operating	-40° to 176° F (-40° to 80° C)
<b>Humidity</b>	Operating	10% to 90% (non-condensing)
	Non-operating	5% to 95% (non-condensing)

### Technical Specifications

<b>Altitude</b>	Operating	0 to 10,000 ft (3,048 m)
	Non-operating	0 to 50,000 ft (15,240 m)
<b>Configuration Utility<sup>5</sup></b>	Microsoft Windows XP	Choice of Configuration Utility:
		<ul style="list-style-type: none"> <li>• Microsoft Windows XP Wireless Network Connection Manager</li> <li>• Broadcom Wireless Configuration Utility (required for Cisco Compatible Extensions support)</li> </ul>
	Microsoft Windows Vista	<ul style="list-style-type: none"> <li>• Microsoft Windows Vista Wireless Network Connection Manager</li> <li>• Broadcom IHV extensions for Windows Vista available to support Cisco Compatible Extensions.</li> </ul>
<b>LED Activity</b>	LED Off – Radio OFF; Solid LED On – Radio ON	
	<ol style="list-style-type: none"> <li>1. Check latest software/driver release for updates on supported security features.</li> <li>2. Maximum output power may vary by country according to local regulations.</li> <li>3. In Power Save Polling mode.</li> <li>4. Receiver sensitivity is measured at a packet error rate of 8% for 802.11b (CCK modulation) and a packet error rate of 10% for 802.11a/g (OFDM modulation).</li> <li>5. WLAN supplier's client utility is required for Cisco Compatible Extensions support with Microsoft Windows XP. WLAN may also be compatible with certain third-party software supplicants. WLAN supplier IHV extensions required for Cisco Compatible Extensions support for Microsoft Windows Vista.</li> </ol>	

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<b>HP Integrated Module with Bluetooth Wireless Technology</b>	<b>Bluetooth Specification</b>	2.0 Compliant
	<b>Dimensions</b>	1.02 x 0.55 x 0.22 in (26 x 14 x 5.7 mm)
	<b>Frequency Band</b>	2402 to 2480 MHz
	<b>Number of Available Channels</b>	79 (1 MHz) available channels
	<b>Data Rates and Throughput</b>	3 Mbps data rate; throughput up to 2.17 Mbps Synchronous Connection Oriented links up to 3, 64 kbps, voice channels Asynchronous Connection Less links 2178.1 kbps/177.1 kbps asymmetric or 1306.9 kbps symmetric
	<b>Transmit Power</b>	-6 dBm to 4 dBm (Bluetooth Class II)
	<b>Receiver Sensitivity</b>	Better than -80 dBm at 0.1 % raw bit error rate
	<b>Power Consumption</b>	Peak (Tx) 264 mW Peak (Rx) 231 mW Sleep <1 mW
	<b>Antenna</b>	Internally integrated within module
	<b>Range</b>	Up 33 ft (10 m)
	<b>Electrical Interface</b>	USB 2.0 compliant Microsoft Windows Plug and Play compliant
	<b>OS Support</b>	Microsoft Windows XP Professional and Home Microsoft Windows 2000

### Technical Specifications

<b>Bluetooth Software Supported</b>	Broadcom Bluetooth for Windows Microsoft Windows XP Bluetooth Software
<b>Link Topology</b>	Point to Point, Multipoint Pico Nets up to 7 slaves
<b>Security</b>	Full support of Bluetooth Security Provisions
<b>Power Management</b>	Microsoft Windows ACPI, and USB Bus Support Self configurable to optimize power conservation in all operating modes, including Standby, Hold, Park, and Sniff
<b>Certifications</b>	All necessary regulatory approvals for supported countries, including: FCC (47 CFR) Part 15C, Section 15.247 & 15.249 ETS 300 328, ETS 300 826 Low Voltage Directive IEC950 UL, CSA, and CE Mark
<b>Temperature</b>	Operating                    -4° to 158° F (-20° to 70° C) Non-operating            -40° to 176° F (-40° to 80° C)
<b>Humidity</b>	Operating                    10% to 90% Non-operating            5% to 95%
<b>Altitude</b>	Operating                    15,000 ft (4,572 m) Non-operating            40,000 ft (12,192 m)
<b>Bluetooth Profiles Supported</b>	(with Bluetooth for Windows 4.0 software) Serial Port Profile (SPP)* Dial-Up Networking (DUN)* Generic Object Exchange Profile (GOEP) Object Push Profile (OPP)* File Transfer Profile (FTP) Synchronization Profile (SYNC) Hard Copy Cable Replacement (HCRP)* Personal Area Networking Profile (PAN)* Human Interface Device Profile (HID)* FAX Profile (FAX) Basic Imaging Profile (BIP) Headset Profile (HSP) Hands Free Profile (HFP) Advanced Audio Distribution Profile (A2DP)

\* indicates the profile is also supported by Microsoft Windows XP SP2

## Technical Specifications

### Eco Data

#### Eco-Label Certifications

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:

- US Energy Star
- IT ECO declaration
- EPEAT – SILVER

#### System Configuration

The configuration used for the Energy Consumption and Declared Noise Emissions data for the Convertible Mini tower Desktop model is based on a “Typically Configured Notebook”

Energy Consumption	115 VAC	230 VAC	100 VAC
Normal Operation	10.7W	11.26W	10.8W
Sleep (Energy Star low power mode)	1.14W	1.22W	1.15W
Off	0.74W	0.8W	0.75W
Heat Dissipation*	115 VAC	230 VAC	100 VAC
Normal Operation	37 BTU/hr	39 BTU/hr	37 BTU/hr
Sleep	4 BTU/hr	4 BTU/hr	4 BTU/hr
Off	3 BTU/hr	3 BTU/hr	3 BTU/hr

\* Heat dissipation is calculated based on the measured watts, assuming the service level is attained for one hour.

This product is in compliance with US executive order 13221, WOL (wake on LAN) disabled.

#### Declared Noise Emissions (in accordance with ISO 7779 and ISO 9296)

#### Sound Power (LWAd, bels)

#### Sound Pressure (LpAm, decibels)

System Fan Off

Idle 3.4 26.8

Fixed Disk (random writes) 3.4 26.7

**NOTE:** System fan is usually off except when charging the battery

#### Batteries

This product complies with ISO standards:

- EU Directive 91/ 157/ EEC
- EU Directive 93/ 86/ EEC
- EU Directive 98/ 101/ EEC

Batteries used in the product do not contain:

- Mercury greater the 5ppm by weight
- Cadmium greater than 10ppm by weight
- Lead greater than 4000 ppm by weight.

The battery type and chemistry used in the product is:

CR2032 (coin cell), Lilon  
High capacity Lithium-Ion battery

#### Additional information:

This product is in compliance with the Restrictions of Hazardous Substances (RoHS) directive – 2002/95/EC.

## Technical Specifications

This HP product is designed to comply with the Waste Electrical and Electronic Equipment (WEEE) Directive – 2002/96/EC.

This product is in compliance with California Proposition 65 (State of California; Safe Drinking Water and Toxic Enforcement Act of 1986).

This product is in compliance with the IEEE 1680 (EPEAT) standard at the Silver level, see [www.epeat.net](http://www.epeat.net)

Keyboard complies with ISO standard: ISO 9995, EN 29241-4, and ISO/IEC 15412

Input devices of this product comply with ISO 9241, part 9.

Plastics parts weighing over 25 grams used in the product are marked per ISO 11469 and ISO1043.

This product contains 0% recycled materials (by wt.)

This product is greater than 96.7% recycle-able when properly disposed of at end of life.

### Packaging Materials

- External:
  - CANON bags – several layers – 15 g
  - Corrugated carton & Cardboard & misc. – 685 g
- Internal:
  - EPE-Expanded Polyethylene – 80 g
- The CANON bags – several layers packaging material is made from 100% recycled content.
- The Corrugated carton & Cardboard & misc. packaging materials contain 100% recycled content.
- The EPE-Expanded Polyethylene packaging material is made from 100% recycled content.

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.

### Technical Specifications

#### Material Usage

- Plastic packaging materials are marked according to ISO 11469 and DIN 6120 standards.

This product does not contain any of the following substances in excess of regulatory limits (for reference of these limits please refer to the HP General Specification of the Environment

([http://www.hp.com/hpinfo/globalcitizenship/environment/supplychain/gen\\_specifications.html](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)

#### 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/go/reuse-recycle> or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner.

The EU WEEE directive (2002/95/EC) requires manufacturers to provide treatment information for each product type for use by treatment facilities. This information (product disassembly instructions) is posted on the Hewlett Packard web site at: <http://www.hp.com/go/recyclers>. These instructions may be used by recyclers and other WEEE treatment facilities as well as HP OEM customers who integrate and re-sell HP equipment.

#### Hewlett-Packard Corporate Environmental Information

For more information about HP's commitment to the environment:

Global Citizenship Report  
<http://www.hp.com/hpinfo/globalcitizenship/gcreport/index.html>  
Environment website  
<http://www.hp.com/environment>  
Eco-label certifications

## Technical Specifications

<http://www.hp.com/hpinfo/globalcitizenship/environment/productdesign/ecolabels.html>

ISO 14001 certificates:

<http://www.hp.com/hpinfo/globalcitizenship/environment/operations/envmanagement.html>

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