Overview

**HP recommends Windows Vista®
Business**
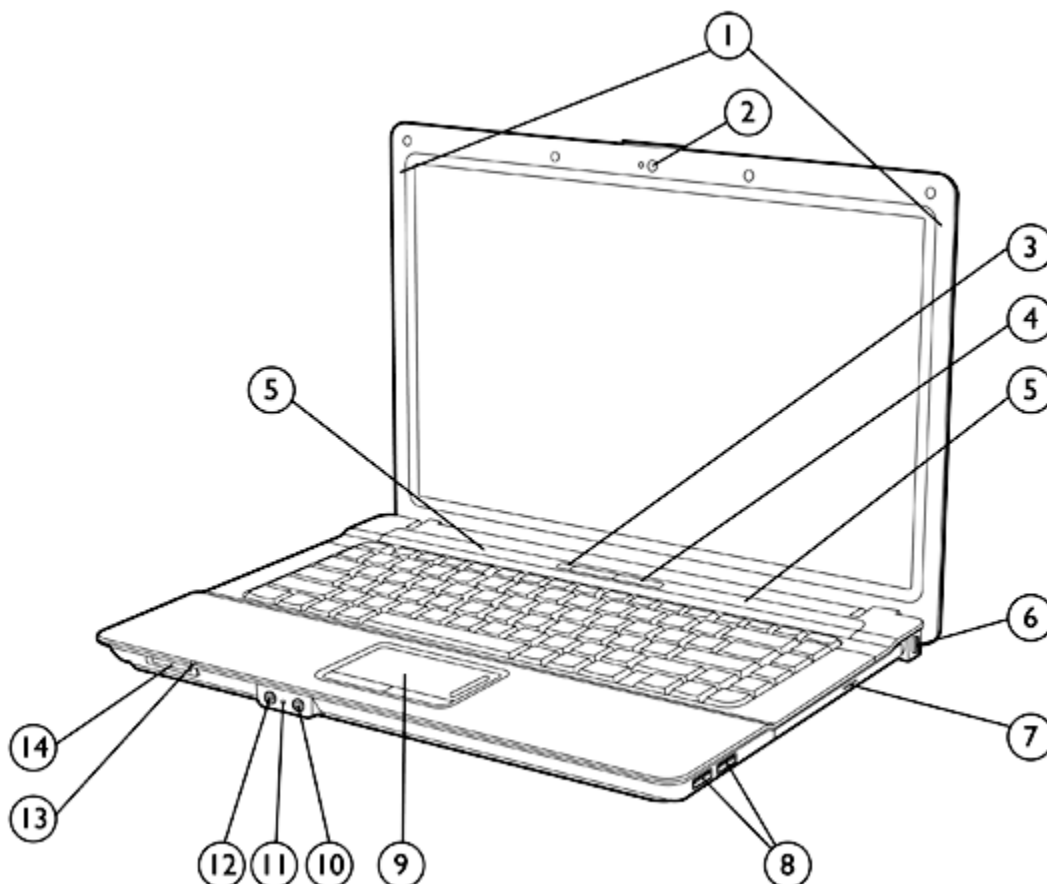
1. WLAN antennas
2. Optional VGA webcam
3. Wireless on/off button with LED indicator
4. Power button with LED indicator
5. Stereo speakers
6. Kensington Lock slot
7. Optical drive

8. (2) USB 2.0 ports
9. Touchpad with scroll zone
10. Stereo microphone in
11. Integrated microphone
12. Stereo headphone/line out
13. Hard drive activity LED indicator
14. Media Card slot

Left View
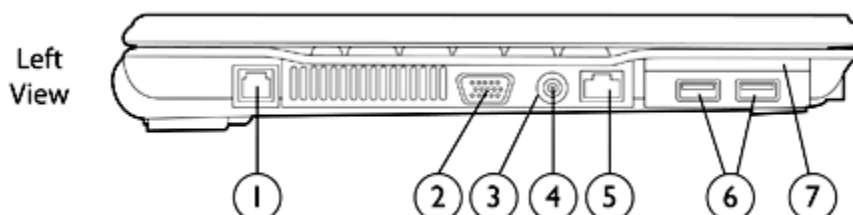
1. RJ-11/modem port
2. VGA connector (external monitor/projector)
3. Battery Charging LED indicator
4. Power Connector

5. RJ-45/Ethernet port
6. (2) USB 2.0 ports
7. ExpressCard/54 slot

Overview
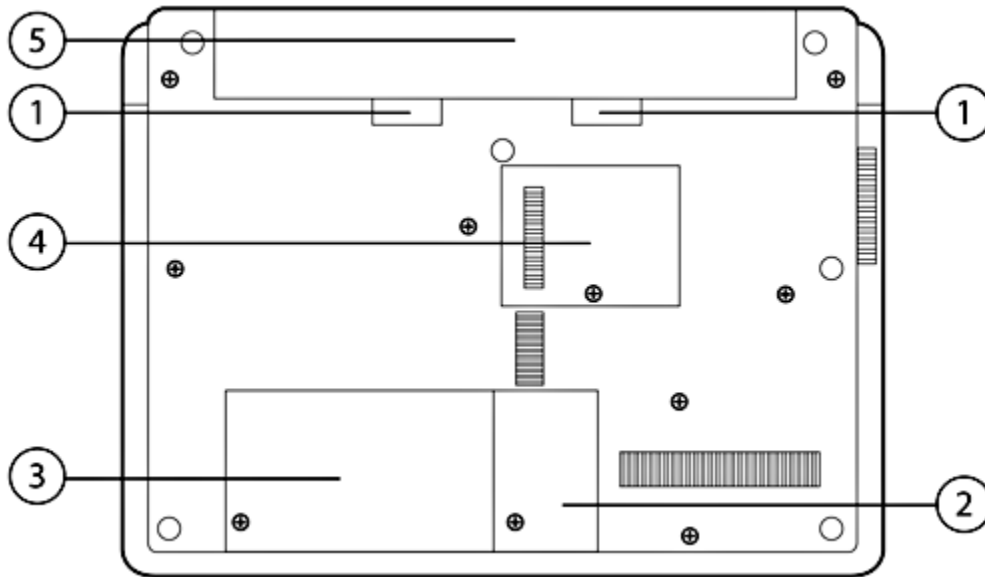
Bottom View

1. Battery release latches
2. WLAN module compartment (select models)
3. Hard drive bay
4. Memory module compartment
5. Battery bay

At A Glance

- Genuine Windows Vista Business 32, Genuine Windows Vista Business 32 downgrade to Genuine Windows XP Professional, Genuine Windows Vista Business 32 with Genuine Windows XP Professional custom preinstalled, Red Flag Linux (PRC only), or FreeDOS
- Thin, lightweight design starting at 5.5 lb/2.49 kg and 1.27 in/32.3 mm thin at front
- Widescreen 15.4-inch diagonal display with BrightView
- Flexible wireless connectivity options:
  - Integrated 802.11 a/b/g/n draft 2.0, a/b/g, or b/g wireless LAN module
  - Bluetooth® 2.0
- Intel® Core™2 Duo processor
- Integrated optical drive
- Integrated Media Card Reader
- Enhanced security features including HP ProtectTool Security Manager and HP SpareKey
- Optional integrated VGA webcam
- Up to 250 GB 5400 rpm or 120 GB 7200 rpm (Discrete only) user-removable hard drive with HP 3D DriveGuard protection
- Up to 8 GB of 667 MHz or 800 MHz DDR2 SDRAM supported, dual channel memory support
- ATI Mobility Radeon HD 3430 graphics with 256 MB video memory (512 MB HyperMemory) Discrete graphics, or Integrated graphics Mobile Intel GMA X4500 HD graphics
- Marvell Ethernet (10/100 NIC) or Marvell Ethernet (10/100/1000 NIC) with PM45 chipset
- Touchpad with scroll zone

Standard Features

Processors	Intel Core 2 Duo Processor T9400 (2.53 GHz, 6 MB L2 cache, 1066 MHz FSB)*
	Intel Core 2 Duo Processor P8600 (2.40 GHz, 3 MB L2 cache, 1066 MHz FSB)*
	Intel Core 2 Duo Processor P8400 (2.26 GHz, 3 MB L2 cache, 1066 MHz FSB)*
	Intel Core 2 Duo Processor T5870 (2.00 GHz, 2 MB L2 cache, 800 MHz FSB)*
	Intel Core 2 Duo Processor T5670 (1.80 GHz, 2 MB L2 cache, 800 MHz FSB)*

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

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

Operating System

Preinstalled
Genuine Windows Vista Business 32*
Genuine Windows Vista Home Basic 32*
Genuine Windows Vista Home Premium 32* (limited availability)
Genuine Windows Vista Business 32 downgrade to Genuine Windows XP Professional*†
Genuine Windows Vista Business 32 with Genuine Windows XP Professional custom preinstalled*
Red Flag Linux (PRC only)
FreeDOS

Supported
Genuine Windows Vista Business 64*
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.

† Windows Vista Business disk also included for future upgrade if desired. To qualify for this downgrade an end user must be a business (including governmental or educational institutions) and is expected to order annually at least 25 customer systems with the same custom image.

Chipset
Mobile Intel PM45 Express Chipset with ICHM9, 1066 MHz front side bus (models with discrete graphics)
  or
Mobile Intel GM45 Express Chipset with ICHM9, 1066 MHz front side bus (models with integrated graphics)

Graphics
Models with discrete graphics:
  ATI Mobility Radeon HD 3430 graphics with 256 MB dedicated video memory
  (512 MB HyperMemory*)
Models with integrated graphics and Mobile Intel GM45 Express chipset:
  Mobile Intel Graphics Media Accelerator X4500 HD graphics

Microsoft DirectX 10.1 (discrete),10 (integrated) capable

*Indicates dedicated video memory and shared system memory.

QuickSpecs

Standard Features

Display	**Internal**	15.4-inch diagonal WXGA anti-glare (1280 x 800 resolution) 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.

Memory	**Standard**	667 MHz or 800 MHz DDR2 SDRAM; two slots supporting dual channel memory 1024 MB or 2048 MB
	Maximum	Upgradeable to 8192 MB with 4096 MB SODIMMs in slots 1 and 2
	Dual-channel	Maximized dual-channel performance requires SODIMMs of the same size and speed in both memory slots.

NOTE: 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. Full availability of 4 GB or more of memory requires Windows Vista Business 64-bit or Linux. With Windows 32-bit operating systems, the amount of usable memory is dependent upon your configuration, so that above 3 GB all memory may not be available due to system resource requirements.

Communications	Marvell Ethernet (10/100 NIC) with GM45 chipset
	Marvell Ethernet (10/100/1000 NIC)* with PM45 chipset
	56K V.92 modem**

* The term "10/100/1000" or "Gigabit" Ethernet indicates compliance with IEEE standard 802.3ab for Gigabit Ethernet, and does not connote actual operating speed of 1 Gb/s. For high-speed transmission, connection to a Gigabit Ethernet server and network infrastructure is required.

** 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.

Wireless Devices		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.
	All 802.11 integrated wireless LAN options	Wi-Fi certified* Cisco Compatible Extensions support Wired Equivalent Privacy (WEP) support up to 128-bit keys Wi-Fi Protected Access (WPA) and WPA2 support 802.1x authentication support, including EAP-TLS, EAP-TTLS, PEAP-GTC, PEAP-MSCHAPv2, and LEAP Advanced Encryption Standard (AES) support Dual antennas integrated in the display enclosure
	Intel WiFi Link 5100	Integrated support for 802.11a, b, g, and n draft 2.0* Up to 450 mbps data rate
	Intel WiFi Link 5100	Integrated support for 802.11 a, b and g Up to 54 mbps data rate
	Broadcom 4321AGN 802.11a/b/g/draft-n Wi-Fi Adapter	Integrated support for 802.11a, b, g, and n draft 2.0* Up to 300 mbps data rate
	Broadcom 4311AG 802.11a/b/g WiFi Adapter	Integrated support for 802.11 a, b and g Up to 54 mbps data rate

Standard Features

	Broadcom 4312G 802.11b/g WiFi Adapter	Integrated support for 802.11 b and g Up to 54 mbps data rate
	HP Integrated Module with Bluetooth Wireless Technology	Bluetooth Specification v2.0 compliant Works with a wide range of Bluetooth devices

* The specifications for 802.11n draft 2.0 are draft specifications and are not final. If the final specifications differ from the draft specifications, it may affect the ability of the notebook to communicate with other 802.11n WLAN devices. In countries where n draft 2.0 is not allowed, this capability is not enabled.

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. U.S. and International key layouts are available. Other features include an integrated numeric keypad, hotkeys for instant access to power conservation, brightness, and other features, 19 x 19 mm key pitch (center-to-center spacing), 2.5 mm stroke, and comfort-dished keycaps.

Pointing device

Touchpad with scroll zone, two pick buttons

Expansion card slots

	ExpressCard/54 slot	Supports ExpressCard/54 (54 mm x 75 mm x 5 mm) and ExpressCard/34 (34 mm x 75 mm x 5 mm) card sizes
	Media Card Reader	Supports SD (Secure Digital), MMC (MultiMedia Card), Memory Stick, Memory Stick Pro, Memory Stick Duo*, xD-Picture card

* Memory Stick Duo Adapters are required and sold separately. Inserting a Memory Stick Duo Card directly into your notebook could damage the memory card and/or notebook.

Storage

	Internal Storage Device	120/160/250 GB 5400 rpm SMART SATA Hard Drive 120 GB 7200 rpm SMART SATA Hard Drive (discrete graphics only)

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.

	HP 3D DriveGuard	The hard drive is mounted directly to the notebook frame, reducing the transmission of shock to the hard drive. Uses three-axis digital motion detection with intelligent sensitivity to help protect the hard drive during normal use from shock and vibration. The digital accelerometer temporarily halts all data transfer and parks the hard drive when abrupt motion is detected.
	Fixed optical drive	Blu-ray ROM DVD+/-RW SuperMulti DL Drive (discrete graphics only) DVD+/-RW SuperMulti DL LightScribe Drive DVD/CD-RW Combo Drive DVD-ROM Drive

Standard Features

Interfaces	ExpressCard/54 slot	One (Supports ExpressCard/54 and ExpressCard/34)
	External monitor	One (VGA)
	Stereo microphone in	One
	Stereo headphone/line out	One
	Power connector	One
	RJ-11/modem	One
	RJ-45/Ethernet	One
	USB 2.0	Four
	LED status indicators	Seven

Audio/Visual	High Definition Audio support
	Integrated stereo speakers
	Integrated microphone
	Stereo headphone/line out
	Stereo microphone in
	Optional VGA webcam

Software	**Preinstalled software with Windows Vista or Windows XP**	HP Recovery Manager
		HP Help and Support Center
		HP Universal Print Driver
		HP ProtectTools Security Manager:
		BIOS Configuration for HP ProtectTools
		Credential Manager for HP ProtectTools
		Device Access Manager for HP ProtectTools
		Drive Encryption for HP ProtectTools
		Embedded Security for HP ProtectTools
		HP Quick Launch Buttons
		HP Wireless Assistant
		Microsoft Office Ready with 60-day Office Professional 2007 Trial Edition (select models)
		PDF Complete SE
		Intervideo WinDVD – DVD Player
		Roxio Creator Business (for optional DVD+/-RW and DVD/CDRW drives)
		McAfee Total Protection*
		Synaptics Touchpad Driver
		Microsoft Windows Live Messenger (select models)
		HP Webcam Software (with optional VGA webcam)
	Additional software available from the web	HP SoftPaq Download Manager
		HP Client Manager Software
		HP Client Management Solutions

* 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.

HP Recovery Manager	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.

Standard Features

HP ProtectTools Security Manager	HP ProtectTools Security Manager is the security platform for business notebooks and desktops. The HP ProtectTools Security Manager is an extensible client security console that delivers enhanced security capabilities through add-on software modules. Modules currently available are:

- BIOS Configuration for HP ProtectTools
- Credential Manager for HP ProtectTools
- Drive Encryption for HP ProtectTools
- File Sanitizer for HP ProtectTools
- Set-up Wizard for HP ProtectTools

Security	**Standard Features**	HP ProtectTools Security Manager
		Enhanced Pre-Boot Security
		HP SpareKey
		One-Step Logon
		Configuration Control Hardware
		Memory Change Alert
		Ownership Tag
		Setup Password
		Power-On Password
		HP Disk Sanitizer
		HP 3D DriveGuard
		Kensington Lock Slot
		Support for Computrace / LoJack for Laptops (must be purchased separately)

For more information on HP security solutions refer to: http://www.hp.com/go/security.

Power Supply	External 65-watt Smart AC adapter
	External 90-watt Smart AC adapter (discrete graphics only)
	6-foot (1.8 meter) power cord included; total length including external AC adapter is 12 feet (3.66 meter)
	HP Fast Charge*

*HP Fast Charge recharges your battery up to 90% within 90 minutes when the system is off.

Battery	**Primary battery**	6-cell (47 WHr) Li-Ion battery
		8-cell (63 WHr) Li-Ion battery

Battery Life		**8-cell (63 WHr)**	**6-cell (47 WHr)**
	Primary battery	Up to TBD hours and TBD minutes	Up to TBD hours and TBD minutes

NOTE: The listed battery life measurements were taken on models running Microsoft Windows Vista Business. Battery life will vary depending on the product configuration, product model, applications loaded on the product, power management settings of the product, and the product features used by the customer. As with all batteries, the maximum capacity of this battery will decrease with time and usage.

System Standby Time	Up to TBD week

Standard Features

Power Conservation	Supports enhanced Intel SpeedStep technology with Intel Core 2 Duo (allows Battery Optimized Mode, Maximum Performance Mode, or Automatic mode)
	Intel Display Power Saving technology (models with integrated graphics) ATI PowerPlay technology (models with discrete graphics)
	Hibernation
	Standby
	ACPI compliance

Service and Support	HP Services offers limited 3- year, 1-year and 90-day warranty options depending on country; 1-year limited warranty on primary battery. Warranty upgrades are also available. HP Care Pack Services extend service contracts beyond the standard warranties. For more details visit: http://www.hp.com/go/lookuptool.
	NOTE: Certain restrictions and exclusions apply. Consult the HP Customer Support Center for details. http://h20000.www2.hp.com/bizsupport/TechSupport/ProductRoot.jsp.

Options

Memory	HP 1 GB (DDR2 800 MHz) SODIMM	KT292AA
	HP 2 GB (DDR2 800 MHz) SODIMM	KT293AA
	HP 4 GB (DDR2 800 MHz) SODIMM	KT293AA
Storage	HP Notebooks USB Diskette Drive	DC361B
	HP Primary SATA 250 GB 5400 rpm Hard Drive	AK072AA
Power	HP 65W Smart AC Adapter	ED494AA#xxx
	HP 90W Smart Auto Adapter	ED493AA
	65W Air/Auto/AC Smart Combo Adapter	ED993AA#xxx
	HP 6800s/6700s Series 8-cell Primary Battery	KU532AA
Carrying Cases	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
Security	HP/Kensington MicroSaver Security Lock	PC766A
Input/Output Devices	HP USB Keyboard & Mouse Bundle	RC465AA#xxx
	HP USB/PS2 Optical 2-Button Scroll Mouse	DC369A
	HP USB Optical Travel Mouse	RH304AA

Memory

667 MHz or 800 MHz DDR2 SDRAM
Two DIMM slots supporting dual channel memory
DIMM sizes supported: 1024 MB and 2048 MB

Standard Memory

- 1024 MB (1024 MB x 1)
- 2048 MB (2048 MB x 1 or 1024 MB x 2)
- 3072 MB (2048 MB x 1024 MB)
- 4096 MB (2048 MB x 2)

Optional Memory Upgrades

Support for up to 8192 MB of memory with the installation of optional DDR2 SDRAM memory kits. Both memory slots are user accessible. Please refer to the Hardware and Software Guide for installation procedures. Maximized dual-channel performance requires SODIMMs of the same size and speed in both memory slots.

Up to	Slot 1	Slot 2
1024 MB	1024 MB	Empty
2048 MB	1024 MB	1024 MB
3072 MB	2048 MB	1024 MB
4096 MB	2048 MB	2048 MB
8192 MB	4096 MB	4096 MB

NOTE: This chart does not represent all possible memory configurations. Due to the non-industry standard nature of some third-party memory modules, we strongly recommend using only HP branded memory modules to ensure compatibility. If you mix memory speeds, the system will perform at the lower memory speed. Full availability of 4 GB or more of memory requires Windows Vista Business 64-bit or Linux. With Windows 32-bit operating systems, the amount of usable memory is dependent upon your configuration, so that above 3 GB all memory may not be available due to system resource requirements.

Memory Upgrades

HP 1 GB (DDR2 667 MHz) SODIMM	EM994AA
HP 2 GB (DDR2 667 MHz) SODIMM	EM995AA
HP 1 GB (DDR2 800 MHz) SODIMM	KT292AA
HP 2 GB (DDR2 800 MHz) SODIMM	KT293AA
HP 4 GB (DDR2 800 MHz) SODIMM	KT293AA

Storage

Removable Media Drive Support

	Quantity Supported	Drive Bay
Blu-ray ROM DVD+/-RW SuperMulti DL Drive (discrete graphics only)	One	Fixed optical drive bay
DVD+/-RW SuperMulti DL LightScribe Drive	One	Fixed optical drive bay
DVD/CD-RW Combo Drive	One	Fixed optical drive bay
DVD-ROM Drive	One	Fixed optical drive bay

Internal Storage Device

	Quantity Supported	Drive Bay
Hard Drives		
250 GB 5400 rpm SMART SATA Hard Drive	One	Dedicated hard drive bay
160 GB 5400 rpm SMART SATA Hard Drive	One	Dedicated hard drive bay
120 GB 5400 rpm SMART SATA Hard Drive	One	Dedicated hard drive bay
120 GB 7200 rpm SMART SATA Hard Drive (discrete graphics only)	One	Dedicated hard drive bay

QuickSpecs

Technical Specifications

System Unit	Dimensions (HxWxD)	1.27 in (at front) x 14.1 in x 10.5 in 32.3 mm (at front) x 358 mm x 266.8 mm	
	Weight	Starting at 5.5 lb (2.49 kg)	

NOTE: Height varies depending upon where on the notebook the measurement is made. Weight varies by configuration and components. Weight includes 6-cell battery, hard drive, and optical drive. Weight varies by configuration and components.

Stand-Alone Power Requirements (AC Power)	Nominal Operating Voltage	18.5 V	
	Average Operating Power	TBD W	
	Max Operating Power	< 90 W	
Temperature	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)	
Relative Humidity	Operating	10% to 90%, non-condensing	
	Non-operating	5% to 95%, 101.6° F (38.7° C) maximum wet bulb temperature	
Shock	Operating	125 G, 2 ms, half-sine	
	Non-operating	200 G, 2 ms, half-sine	
Random Vibration	Operating	0.75 grms	
	Non-operating	1.50 grms	
Altitude (unpressurized)	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)	
Industry Standard Certifications	UL	Yes	
	CSA	Yes	
	FCC Compliance	Yes	
	ENERGY STAR®	Yes	
	ICES	Yes	
	Australia / NZ A-Tick Compliance	Yes	
	CCC	Yes	
	Japan VCCI Compliance	Yes	
	MIC	Yes	
	BSMI	Yes	
	CE Marking Compliance	Yes	
	BNCI or BELUS	Yes	
	CIT	Yes	
	GOST	Yes	
	Saudi Arabian Compliance (ICCP)	Yes	
	SABS	Yes	
	UKRSERTCOMPUTER	Yes	

For accessibility information on HP products, please visit: http://www.hp.com/accessibility.

QuickSpecs

Technical Specifications

HP 65W Smart AC Adapter	**Dimensions**	4.17 x 1.85 x 1.1 in (10.6 x 4.7 x 2.8 cm)	
	Weight	0.62 lb (280 g)	
	Input	100 to 240 VAC	
		Input Efficiency	83% min at 115 VAC
		Input frequency range	47 to 63 Hz
		Input AC current	1.7 A at 90 VAC, 0.85 A at 180 VAC
	Output	Output power 65W	65W
		DC output	18.5V
		Hold-up time	5 msec at 115 VAC inputOutput current limit
		Output current limit	<11A, Over voltage protection- 29V max automatic shutdown
	Connector	3 pin/grounded, mates with interchangeable cords	
	Environmental Design	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%
	EMI and Safety Certifications	CE Mark – full compliance with LVD and EMC directives; Worldwide safety standards – IEC60950, EN60950, UL60950, Class1, SELV; Agency approvals – C-UL-US, NORDICS, DENAN, EN55022 Class B, FCC Class B, CISPR22 Class B, CCC, NOM-1 NYCE; MTBF – over 200,000 hours at 25°C ambient condition.	

HP 90W Smart AC Adapter	**Dimensions**	5.00 x 1.97 x 1.1 in (12.7 x 5.0 x 2.9 cm)	
	Weight	0.82 lb (370 g)	
	Input	100 to 240 VAC	
		Input Efficiency	83% min at 115 VAC
		Input frequency range	47 to 63 Hz
		Input AC current	1.5 A at 90 VAC, 0.75 A at 180 VAC PFC Version
			2.4 A at 90 VAC, 1.2 A at 180 VAC NON PFC Version
	Output	Output power 65W	90W
		DC output	19.0V
		Hold-up time	5 msec at 115 VAC input
		Output current limit	<11A, Over voltage protection- 29V max automatic shutdown
	Connector	3 pin/grounded, mates with interchangeable cords	
	Environmental Design	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%

QuickSpecs

Technical Specifications

	EMI and Safety Certifications	CE Mark – full compliance with LVD and EMC directives; Worldwide safety standards – IEC60950, EN60950, UL60950, Class1, SELV; Agency approvals – C-UL-US, NORDICS, DENAN, EN55022 Class B, FCC Class B, CISPR22 Class B, CCC, NOM-1 NYCE; MTBF– over 200,000 hours at 25°C ambient condition.	

8-Cell (63 WHr) Li-Ion battery	**Dimensions** (H x W x L)	0.8 x 1.9 x 10.6 in (2.0 x 4.8 x 27.0 cm)	
	Weight	0.980 lb (0.445 kg)	
	Cells/Type	8-cell Li-Ion	
	Energy	Watt-hour Capacity	63 WHr
	Temperature	Operating (Charging)	32° to 113° F (0° to 45° C)
		Operating (Discharging)	14° to 140° F (–10° to 60° C)
		Non-operating	–4° to 140° F (–20° to 60° C)
	Battery Re-Charge Time	System in OFF mode or Standby	2.5 hours
		System ON	3 to 5 hours (depending on system power consumption)
		HP Fast Charge Technology	Charges the battery up to 90% within 1.5 hours when system is OFF

6-Cell (55 WHr) Li-Ion battery	**Dimensions** (H x W x L)	0.8 x 2.1 x 8.0 in (2.0 x 5.3 x 20.3 cm)	
	Weight	0.719 lb (0.326 kg)	
	Cells/Type	6-cell Li-Ion	
	Energy	Watt-hour Capacity	55 WHr
	Temperature	Operating (Charging)	32° to 113° F (0° to 45° C)
		Operating (Discharging)	14° to 140° F (–10° to 60° C)
		Non-operating	–4° to 140° F (–20° to 60° C)
	Battery Re-Charge Time	System in OFF mode or Standby	2.5 hours
		System ON	3 to 5 hours (depending on system power consumption)
		HP Fast Charge Technology	Charges the battery up to 90% within 90 minutes when system is OFF

QuickSpecs

Technical Specifications

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

Displays

15.4-inch WXGA anti-glare			
	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	Anti-glare	
	Number of Colors	Up to 16M	
	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	±30° Horizontal, ±10° Vertical (minimum) 30/30/20/10 (Left/Right/Down/Up) (minimum) or 45/45/35/25 (Left/Right/Down/Up) (typical)	

QuickSpecs

Technical Specifications

15.4-inch WXGA BrightView	**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	
	Number of Colors	Up to 16M	
	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	±30° Horizontal, ±10° Vertical (minimum) 30/30/20/10 (Left/Right/Down/Up) (minimum) or 45/45/35/25 (Left/Right/Down/Up) (typical)	

Hard Drives

120 GB 7200 rpm SATA Hard Drive	**Drive Weight**	0.25 lb (115 g)	
	Capacity	120 GB	
	Height	0.37 in (9.5 mm)	
	Width	2.75 in (70 mm)	
	Interface	ATA-7 / SATA 2.5	
	Transfer Rate	**Synchronous** (maximum)	100 MB/s (Drive Capability)
	Seek Time (typical reads, including settling)	**Single Track**	1 ms
		Average	10 ms
		Maximum	18 ms
	Rotational Speed	7200 rpm	
	Logical Blocks	234,441,648	
	Operating Temperature	41° to 140° F (5° to 60° C) [case temp]	
	Features	ATA Security	

QuickSpecs

Technical Specifications

250 GB 5400 rpm SATA Hard Drive			
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 2.5		
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 140° F (5° to 60° C) [case temp]		
Features	ATA Security		

160 GB 5400 rpm SATA Hard Drive			
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 2.5		
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 140° F (5° to 60° C) [case temp]		
Features	ATA Security		

120 GB 5400 rpm SATA Hard Drive			
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 2.5		
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 140° F (5° to 60° C) [case temp]		
Features	ATA Security		

QuickSpecs

Technical Specifications

Removable Storage Drives

DVD-ROM Drive	Access Times	Random	<116 ms CD (typical)
			<125 ms DVD (typical)
	Max Data Transfer Rate	24X CD-ROM	Up to 3,600 KB/s
		8X-DVD	Up to 10,800 KB/s
	Transfer Mode	UDMA Mode 5	
	Interface	Gen 1 SATA	
	Supported Media (read)	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	
	Supported Media (write)	None	
	Max Media Capacity (read)	4.7 GB	
	Transport	Tray Loading	

DVD/CD-RW Combo Drive	Access Times	Random	<110 ms CD (typical)
			<130 ms DVD (typical)
	Max Data Transfer Rate	24X CD-ROM	Up to 3,600 KB/s
		8X DVD	Up to 10,800 KB/s
		24X CD-R	Up to 3,600 KB/s
		24X CD-RW	Up to 3,600 KB/s
	Transfer Mode	UDMA Mode 5	
	Interface	Gen 1 SATA	
	Supported Media (read)	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	
	Supported Media (write)	CD-R, CD-RW	
	Max Media Capacity (read)	8.5 GB	
	Max Media Capacity (write)	700 MB	
	Transport	Tray loading	

Technical Specifications

DVD+/-RW SuperMulti DL LightScribe Drive			
	Access Times	Random	<175 ms CD (typical)
			<230 ms DVD (typical)
	Max Data Transfer Rate	24X CD-ROM	Up to 3,600 KB/s
		8X DVD	Up to 10,800 KB/s
		24X CD-R	Up to 3,600 KB/s
		16X CD-RW	Up to 2,400 KB/s
		8X DVD+R	Up to 10,800 KB/s
		4X DVD+RW	Up to 5,400 KB/s
		8X DVD-R	Up to 10,800 KB/s
		4X DVD-RW	Up to 5,400 KB/s
		2.4X DVD+R(9)	Up to 2,700 KB/s
		5X DVD-RAM	Up to 6,750 KB/s
	Transfer Mode	UDMA Mode 5	
	Interface	Gen 1 SATA	
	Supported Media (read)	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	
	Supported Media (write)	CD-R, CD-RW, DVD+R, DVD+RW, DVD-R, DVD-RW, DVD-RAM, LightScribe	
	Max Media Capacity (read)	8.5 GB	
	Max Media Capacity (write)	8.5 GB	
	Transport	Tray Loading	

Blu-ray ROM DVD+/-RW SuperMulti DL Drive			
	Access Times	Random	<190 ms CD-ROM (typical)
			<180 ms DVD-ROM (typical)
			<230 ms BD-ROM (typical)
	Max Data Transfer Rate	16X CD-ROM	Up to 2400 KB/s
		8X DVD-ROM	Up to 10800 KB/s
		16X CD-R	Up to 2400 KB/s
		10X CD-RW	Up to 1500 KB/s
		8X DVD+R	Up to 10800 KB/s
		4X DVD+RW	Up to 5400 KB/s
		8X DVD-R	Up to 10800 KB/s
		4X DVD-RW	Up to 5400 KB/s
		4X DVD+R(9)	Up to 5400 KB/s
		5X DVD-RAM	Up to 6750 KB/s
		2X BD-ROM	Up to 9000 KB/s
	Transfer Mode	UDMA Mode 5	
	Interface	Gen 1 SATA	
	Supported Media (read)	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, BD-ROM, BD-R, BD-RE	

Technical Specifications

Supported Media (write)	CD-R, CD-RW, DVD+R, DVD+R(9), DVD+RW, DVD-R, DVD-R(9), DVD-RW, DVD-RAM, BD-R, BD-RE	
Max Media Capacity (read)	50.0 GB	
Max Media Capacity (write)	50.0 GB	
Transport	Tray Loading	

Audio

Hardware		
	Implementation	ADI 1984AJCPZ High Definition CODEC
	Touch-Sensitive Volume Controls	Volume up, volume down, and mute
	Full Duplex	Yes
	Microphone In	Stereo
	Headphone/Line Out	Stereo
	Integrated Microphone	Yes

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 – 48kHz
	DAC	16, 20 or 24-bit
	ADC	16 or 20-bit

Integrated Stereo Speakers		
	Power Rating	2 Watts
	Impedance	4 Ohms

Communications

Technical Specifications

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)
		Optional symbol rates: 2800, 3429 Asymmetric Symbol rates
		Synchronous primary channel data signaling rates: 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) TIA-602 Identification: +GMI, +GMM, +GMR Port control: +IPR, +ICF, +IFC, +ILRR Modulation: +MS, +MR, +MA Error control: +ES, +ER, +EB, +ESR, +ETBM Data compression: +DS, +DR V.251
Intel WiFi Link 5100	**Wireless LAN Standards**	IEEE 802.11a IEEE 802.11b IEEE 802.11g
	Interoperability	Wi-Fi certified (802.11abg only) Cisco Compatible Extensions Program compliant (802.11abg only) with Microsoft Windows Vista and XP (details at: http://www.hp.com/go/notebooks/WLAN) Tested with wireless access points from several major manufacturers (details at: http://www.hp.com/go/notebooks/WLAN/draft-n)
	Frequency Band	2.4 GHz and 5 GHz
	Data Rates	802.11b: 1, 2, 5.5, 11 Mbps 802.11a/g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps

Technical Specifications

Modulation	Direct Sequence Spread Spectrum DBPSK, DQPSK, CCK, OFDM
Security[1]	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.
Sub-channels	Multinational support with frequency bands and channels compliant to local regulations.
Media Access Protocol	CSMA/CA (Collision Avoidance) with ACK
Network Architecture Models	Ad-hoc (Peer to Peer) Infrastructure (Access Point Required)
Roaming	IEEE 802.11 compliant roaming between access points
Output Power (for CCK)[2]	17.5 dBm
Output Power (for OFDM; power varies by data rate)[2]	15 dBm
Power Consumption	Idle associated: 350 mW Idle unassociated: 350 mW Transmit: 2.0 W (max) Receive: 1.5 W (max)
Power Management	ACPI compliant power management 802.11 compliant power saving mode
Receiver Sensitivity[4]	54 Mbps: -72 dBm, 11 Mbps: -85 dBm , 1 Mbps: -95 dBm
Antenna type	High efficiency dual band antenna with spatial diversity, mounted in the display enclosure
Range	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
Form Factor	PCI-Express MiniCard
Weight	0.026 lb (12 g)
Dimensions	0.19 x 1.2 x 2.0 in (4.75 x 29.85 x 50.8 mm)
Operating Voltage	3.3v +/- 10%
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[5]	Microsoft Windows XP Choice of Configuration Utility: ● Microsoft Windows XP Wireless Network Connection Manager ● Broadcom Wireless Configuration Utility (required for Cisco Compatible Extensions support)

Technical Specifications

Microsoft Windows Vista

- Microsoft Windows Vista Wireless Network Connection Manager
- Broadcom IHV extensions for Windows Vista available to support Cisco Compatible Extensions.

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 (CCK 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 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.

Intel WiFi Link 5100	**Wireless LAN Standards**	IEEE 802.11a IEEE 802.11b IEEE 802.11g IEEE 802.11n (draft 1.02)
	Interoperability	Wi-Fi certified (802.11abg only) Cisco Compatible Extensions Program compliant (802.11abg only) with Microsoft Windows Vista and XP (details at: http://www.hp.com/go/notebooks/WLAN) Tested with wireless access points from several major manufacturers (details at: http://www.hp.com/go/notebooks/WLAN/draft-n)
	Frequency Band	2.4 GHz and 5 GHz
	Data Rates	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 450 Mbps, depending on the combination of Bandwidth, Modulation Coding Scheme, and Guard Interval used, as defined in IEEE 802.11n (draft) specification
	Modulation	Direct Sequence Spread Spectrum DBPSK, DQPSK, CCK, OFDM, BPSK, QPSK, 16-QAM, 64-QAM
	Security[1]	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 Vista and XP only.
	Sub-channels	Multinational support with frequency bands and channels compliant to local regulations.
	Media Access Protocol	CSMA/CA (Collision Avoidance) with ACK
	Network Architecture Models	Ad-hoc (Peer to Peer) Infrastructure (Access Point Required)
	Roaming	IEEE 802.11 compliant roaming between access points
	Output Power (for CCK)[2]	15 dBm

Technical Specifications

Output Power (for OFDM; power varies by data rate)[2]	15 dBm	
Power Consumption	Transmit: 2.3 Watts (average, with one spatial streams) Receive: 1.9 Watts (average with two receive chains) Idle mode[3]: 30 mW (average) Radio off: 20 mW (max)	
Power Management	ACPI compliant power management 802.11 compliant power saving mode	
Receiver Sensitivity[4]	300 Mbps: -68 dBm, 54 Mbps: -74 dBm, 6 Mbps: -90 dBm	
Antenna Connections	3 U.FL type connectors, 50 ohm nominal impedance	
Range	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
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 Non-operating	32° to 176° F (0° to 80° C) –40° to 176° F (–40° to 80° C)
Humidity	Operating Non-operating	10% to 90% (non-condensing) 5% to 90% (non-condensing)
Altitude	Operating Non-operating	0 to 10,000 ft (3,048 m) 0 to 50,000 ft (15,240 m)
Configuration Utility[5]	Microsoft Windows XP Choice of Configuration Utility:	

- Microsoft Windows XP Wireless Network Connection Manager
- Intel PROSet for Microsoft Windows XP (required for Cisco Compatible Extensions support)

Microsoft Windows Vista

- Microsoft Windows Vista Wireless Network Connection Manager.
- Intel IHV extensions for Windows Vista available to support Cisco Compatible Extensions.

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 and on battery power.
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).
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.

Broadcom 4312G 802.11b/g WiFi Adapter	**Wireless LAN Standards**	IEEE 802.11b IEEE 802.11g

Technical Specifications

Interoperability	Wi-Fi certified (802.11abg only) Cisco Compatible Extensions Program compliant (802.11abg only) with Microsoft Windows Vista and XP (details at: http://www.hp.com/go/notebooks/WLAN) Tested with wireless access points from several major manufacturers (details at: http://www.hp.com/go/notebooks/WLAN/draft-n)
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[1]	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.
Sub-channels	Multinational support with frequency bands and channels compliant to local regulations.
Media Access Protocol	CSMA/CA (Collision Avoidance) with ACK
Network Architecture Models	Ad-hoc (Peer to Peer) Infrastructure (Access Point Required)
Roaming	IEEE 802.11 compliant roaming between access points
Output Power (for CCK)[2]	17 dBm
Output Power (for OFDM; power varies by data rate)[2]	15 dBm
Power Consumption	Idle associated: 250 mW Idle unassociated: 150 mW Transmit: 2.0 W (max) Receive: 2.0 W (max)
Power Management	ACPI compliant power management 802.11 compliant power saving mode
Receiver Sensitivity[3]	54 Mbps: -71 dBm, 11 Mbps: -85 dBm , 1 Mbps: -95 dBm
Antenna type	High efficiency dual band antenna with spatial diversity, mounted in the display enclosure

Range	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

Form Factor	PCI-Express MiniCard
Weight	0.026 lb (12 g)
Dimensions	0.19 x 1.2 x 2.0 in (4.75 x 29.85 x 50.8 mm)
Operating Voltage	3.3v +/- 10%
Temperature	Operating 14° to 149° F (–10° to 65° 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)

Technical Specifications

Altitude	Operating	0 to 10,000 ft (3,048 m)
	Non-operating	0 to 50,000 ft (15,240 m)
Configuration Utility[4]	Microsoft Windows XP	

    Choice of Configuration Utility:

- Microsoft Windows XP Wireless Network Connection Manager
- Broadcom Wireless Configuration Utility (required for Cisco Compatible Extensions support)

Microsoft Windows Vista

- Microsoft Windows Vista Wireless Network Connection Manager
- Broadcom IHV extensions for Windows Vista available to support Cisco Compatible Extensions.

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. 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).
4. 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.

Broadcom 4311AG 802.11a/b/g WiFi Adapter	**Wireless LAN Standards**	IEEE 802.11a IEEE 802.11b IEEE 802.11g
	Interoperability	Wi-Fi certified (802.11abg only) Cisco Compatible Extensions Program compliant (802.11abg only) with Microsoft Windows Vista and XP (details at: http://www.hp.com/go/notebooks/WLAN) Tested with wireless access points from several major manufacturers (details at: http://www.hp.com/go/notebooks/WLAN/draft-n)
	Frequency Band	2.4 GHz and 5 GHz
	Data Rates	802.11b: 1, 2, 5.5, 11 Mbps 802.11a/g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps
	Modulation	Direct Sequence Spread Spectrum DBPSK, DQPSK, CCK, OFDM
	Security[1]	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.
	Sub-channels	Multinational support with frequency bands and channels compliant to local regulations.
	Media Access Protocol	CSMA/CA (Collision Avoidance) with ACK
	Network Architecture Models	Ad-hoc (Peer to Peer) Infrastructure (Access Point Required)
	Roaming	IEEE 802.11 compliant roaming between access points
	Output Power (for CCK)[2]	17.5 dBm

Technical Specifications

Output Power (for OFDM; power varies by data rate)[2]	15 dBm	
Power Consumption	Idle associated: 350 mW Idle unassociated: 350 mW Transmit: 2.0 W (max) Receive: 1.5 W (max)	
Power Management	ACPI compliant power management 802.11 compliant power saving mode	
Receiver Sensitivity[4]	54 Mbps: -72 dBm, 11 Mbps: -85 dBm , 1 Mbps: -95 dBm	
Antenna type	High efficiency dual band antenna with spatial diversity, mounted in the display enclosure	
Range	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
Form Factor	PCI-Express MiniCard	
Weight	0.026 lb (12 g)	
Dimensions	0.19 x 1.2 x 2.0 in (4.75 x 29.85 x 50.8 mm)	
Operating Voltage	3.3v +/- 10%	
Temperature	Operating Non-operating	32° to 176° F (0° to 80° C) -40° to 176° F (-40° to 80° C)
Humidity	Operating Non-operating	10% to 90% (non-condensing) 5% to 95% (non-condensing)
Altitude	Operating Non-operating	0 to 10,000 ft (3,048 m) 0 to 50,000 ft (15,240 m)
Configuration Utility[5]	Microsoft Windows XP Choice of Configuration Utility:	

- Microsoft Windows XP Wireless Network Connection Manager
- Broadcom Wireless Configuration Utility (required for Cisco Compatible Extensions support)

Microsoft Windows Vista

- Microsoft Windows Vista Wireless Network Connection Manager
- Broadcom IHV extensions for Windows Vista available to support Cisco Compatible Extensions.

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 (CCK 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 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.

Broadcom 4321AGN 802.11a/b/g/draft-n WiFi	**Wireless LAN Standards**	IEEE 802.11a IEEE 802.11b

QuickSpecs

Technical Specifications

Adapter		IEEE 802.11g
		IEEE 802.11n (draft)
	Interoperability	Wi-Fi certified (802.11abg only)
		Cisco Compatible Extensions Program compliant (802.11abg only) with Microsoft Windows Vista and XP (details at: http://www.hp.com/go/notebooks/WLAN)
		Tested with wireless access points from several major manufacturers (details at: http://www.hp.com/go/notebooks/WLAN/draft-n)
	Frequency Band	2.4 GHz and 5 GHz
	Data Rates	802.11b: 1, 2, 5.5, 11 Mbps
		802.11a/g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps
		802.11n (draft): 6, 6.5, 9, 12, 13, 13.5, 18, 19.5, 24, 26, 27, 36, 39, 40.5, 48, 52, 54, 58.5, 65, 78, 81, 104, 108, 117, 121.5, 130, 135, 162, 216, 243, 270 Mbps
	Frequency Support	20 MHz: 2.4 GHz and 5 GHz bands
		40 MHz: 2.4 GHz and 5 GHz bands
	Modulation	Direct Sequence Spread Spectrum
		DBPSK, DQPSK, CCK, OFDM, BPSK, QPSK, 16-QAM, 64-QAM
	Security[1]	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.
	Sub-channels	Multinational support with frequency bands and channels compliant to local regulations.
	Media Access Protocol	CSMA/CA (Collision Avoidance) with ACK
	Network Architecture Models	Ad-hoc (Peer to Peer)
		Infrastructure (Access Point Required)
	Roaming	IEEE 802.11 compliant roaming between access points
	Output Power (for CCK)[2]	17 dBm
	Output Power (for OFDM; power varies by data rate)[2]	15 dBm
	Power Consumption	Idle associated: 250 mW
		Idle unassociated: 150 mW
		Transmit/Receive 20 MHz channel: 2.6 W (max)
		Transmit/Receive 40 MHz channel: 3.3 W (max)
	Power Management	ACPI compliant power management
		802.11 compliant power saving mode
	Receiver Sensitivity[3]	270 Mbps: -66dBm, 162 Mbps: -72 dBm, 54 Mbps: -72 dBm, 11 Mbps: -85 dBm , 1 Mbps: -94 dBm
	Antenna type	High efficiency dual band antenna with spatial diversity, mounted in the display enclosure
	Range	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

Technical Specifications

Form Factor	PCI-Express MiniCard	
Weight	0.026 lb (12 g)	
Dimensions	0.19 x 1.2 x 2.0 in (4.75 x 29.85 x 50.8 mm)	
Operating Voltage	3.3v +/- 10%	
Temperature	Operating	14° to 149° F (–10° to 65° 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[4]   Microsoft Windows XP
  Choice of Configuration Utility:

- Microsoft Windows XP Wireless Network Connection Manager
- Broadcom Wireless Configuration Utility (required for Cisco Compatible Extensions support)

Microsoft Windows Vista

- Microsoft Windows Vista Wireless Network Connection Manager
- Broadcom IHV extensions for Windows Vista available to support Cisco Compatible Extensions.

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. 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).
4. 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.

HP Integrated Module with Bluetooth Wireless Technology	**Bluetooth Specification** 2.0 Compliant
	Dimensions 1.02 x 0.55 x 0.22 in (26 x 14 x 5.7 mm)
	Frequency Band 2402 to 2480 MHz
	Number of Available Channels 79 (1 MHz) available channels
	Data Rates and Throughput 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
	Transmit Power -6 dBm to 4 dBm (Bluetooth Class II)
	Receiver Sensitivity Better than -80 dBM at 0.1 % raw bit error rate
	Power Consumption Peak (Tx) 264 mW
	Peak (Rx) 231 mW
	Sleep <1 mW
	Antenna Internally integrated within module
	Range Up 33 ft (10 m)
	Electrical Interface USB 2.0 compliant
	Microsoft Windows Plug and Play compliant

Technical Specifications

OS Support	Microsoft Windows XP Professional and Home	
	Microsoft Windows 2000	
Bluetooth Software Supported	Broadcom Bluetooth for Windows	
	Microsoft Windows XP Bluetooth Software	
Link Topology	Point to Point, Multipoint Pico Nets up to 7 slaves	
Security	Full support of Bluetooth Security Provisions	
Power Management	Microsoft Windows ACPI, and USB Bus Support	
	Self configurable to optimize power conservation in all operating modes, including Standby, Hold, Park, and Sniff	
Certifications	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	
Temperature	Operating	–4° to 158° F (–20° to 70° C)
	Non-operating	–40° to 176° F (–40° to 80° C)
Humidity	Operating	10% to 90%
	Non-operating	5% to 95%
Altitude	Operating	15,000 ft (4,572 m)
	Non-operating	40,000 ft (12,192 m)
Bluetooth Profiles Supported	(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

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:
	System Configuration	The configuration used for the Energy Consumption and Declared Noise Emissions data is based on a "Typically Configured Notebook"

Technical Specifications