Overview

Windows®. Life without Walls™. HP recommends Windows.
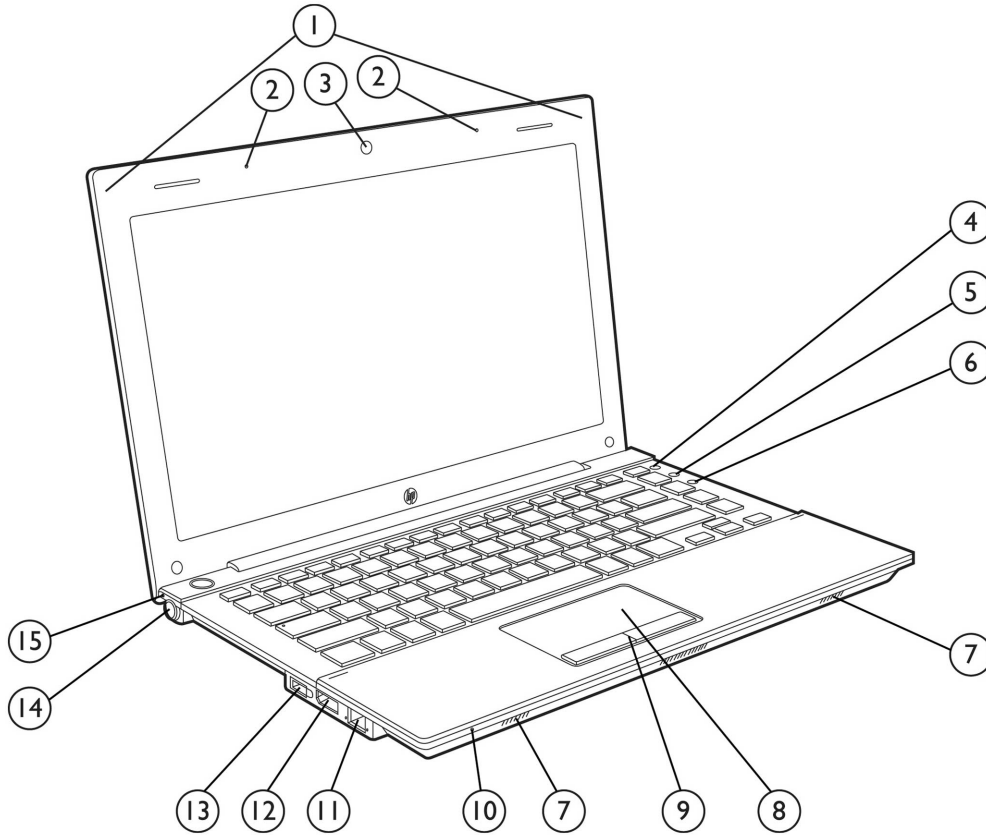

1. WLAN and WWAN antennas (select models)
2. Dual-microphone array
3. Integrated 2 MP webcam
4. Wireless on/off button
5. QuickLook button
6. QuickWeb button
7. Stereo speakers
8. Touchpad with scroll zone
9. Touchpad buttons
10. Hard drive activity / HP 3D DriveGuard LED
11. RJ-45/Ethernet port
12. DisplayPort
13. USB 2.0 Port (powered)
14. Power connector
15. Battery charging LED

Right View
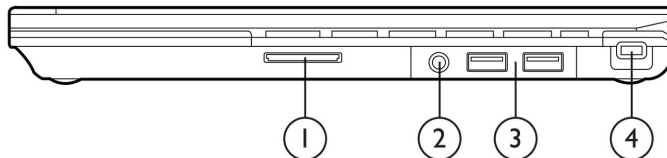
1. Secure Digital (SD)/MMC slot
2. Combo stereo headphone/mic jack
3. (2) USB 2.0 Ports
4. Kensington Lock slot

Overview

Bottom
View
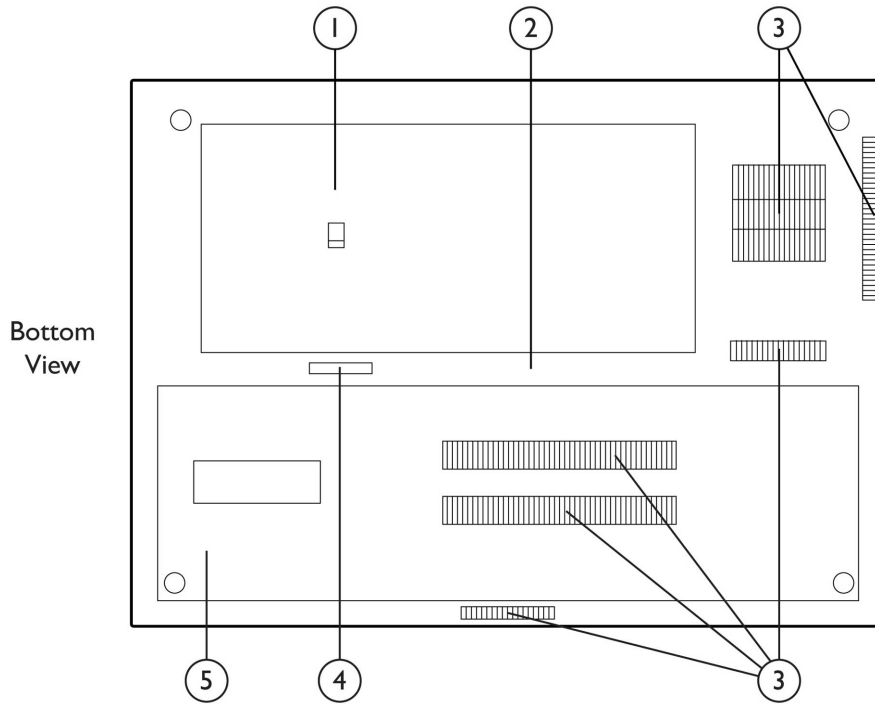
1. Battery bay
2. SIM slot for WWAN (select models) – inside battery bay
3. Vents
4. Battery release latch
5. Wireless/memory/hard drive access door

At A Glance

- Genuine Windows 7 versions offered when Windows 7 is generally available, Genuine Windows Vista versions, Windows XP Professional (available through downgrade rights from Genuine Windows Vista Business or Genuine Windows 7 Professional), Red Flag Linux (PRC only), or FreeDOS
- Sleek design starting at 3.79 lb/1.72 kg and 0.93-inch/23.5 mm thin
- Durable anodized aluminum display enclosure and palm rest; magnesium alloy bottom case
- 13.3-inch diagonal LED-backlit HD 16:9 display, with optional BrightView and HP Privacy Filter support
- BFR/PVC-free configuration available.
- Flexible wireless connectivity options:
    - Integrated HP un2420 EV-DO/HSDPA Mobile Broadband Module provides worldwide Gobi mobile Internet technology with GPS
    - Integrated 802.11 a/b/g/draft-n or b/g wireless LAN module
    - Bluetooth® 2.1
- Choice of Intel® ultra-low voltage Celeron® or standard voltage Core™2 Duo processor
- Choice of 160/250/320-GB 2.5-inch SMART SATA II hard drive protected by HP 3D DriveGuard; or 80/128 GB 2.5-inch Solid State Drive
- Optional HP External USB 2.0 CD/DVD R/RW Drive and HP USB 2.0 Docking Station
- Secure Digital (SD/MMC) slot
- Integrated 2 MP Webcam, DisplayPort, and dual-microphone array
- Enhanced security features including HP ProtectTools, HP SpareKey, and HP Disk Sanitizer
- HP QuickLook 3 for instant access to email, calendar, and contact information; HP QuickWeb for convenient internet access

QuickSpecs

Standard Features

Processors	Intel Core 2 Duo Processor SP9300 (2.26 GHz, 6 MB L2 cache, 1066 MHz FSB)*	
	Intel Celeron Processor SU2300 (1.20 GHz, 1 MB L2 cache, 800 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 7 Professional Edition 32*
		Genuine Windows 7 Home Premium Edition 32*
		Genuine Windows 7 Home Basic Edition 32*
		Genuine Windows Vista Business 32**
		Genuine Windows Vista Home Basic 32**
		Windows XP Professional (available through downgrade rights from Genuine Windows 7 Professional)*†
		Windows XP Professional (available through downgrade rights from Genuine Windows Vista Business)*†
		Red Flag Linux (PRC only)
		FreeDOS
	Supported	Genuine Windows 7 Enterprise 32*
		Genuine Windows Vista Enterprise 32**
	Certified	SuSE Linux Enterprise Desktop 10

* Offered when Windows 7 is generally available. System may require upgraded and/or separately purchased hardware and/or a DVD drive to install the Windows 7 software and take full advantage of Windows 7 functionality.
See http://www.microsoft.com/windows/windows-7/ for details.

** 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 7 Professional or Windows Vista Business disk may be 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 at least 25 customer systems with the same custom image.

Chipset	Mobile Intel GS45 Express Chipset ICH9M-Enhanced

Graphics	Mobile Intel Graphics Media Accelerator 4500MHD
	Microsoft DirectX 10 (Shader 4.0) and OpenGL 2.0 capable

Standard Features

Display	Internal	13.3-inch diagonal LED-backlit HD anti-glare (1366 × 768 resolution) 13.3-inch diagonal LED-backlit HD BrightView (1366 × 768 resolution) HP Privacy Filter support
	External	Up to 32-bit per pixel color depth **DisplayPort** supports resolutions up to 2560 x 1600, 30-bit color depth at 60 Hz with full HD (1920 x 1080) monitors, 24-bit color depth at 120 Hz **NOTE:** Resolutions are dependent upon monitor capability, and resolution and color depth settings.

Memory	Standard	1 GB, 2 GB, or 4 GB DDR3 1066/1333 MHz SDRAM SODIMM* one SODIMM slot
	Maximum	Supports up to 4 GB maximum

* All memory modules operate at the maximum system supported speed of 1066 MHz.
NOTE: Due to the non-industry standard nature of some third-party memory modules, we recommend HP branded memory to ensure compatibility. Availability of 4 GB of memory requires a Windows 64-bit operating system or Linux. With Windows 32-bit operating systems, memory above 3 GB may not all be available due to system resource requirements.

Communications   Integrated Marvell Ethernet (10/100/1000 NIC)*

* 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.

Wireless Devices   Support for a broad range of secure, integrated wireless LAN and wireless WAN options featuring support for the latest industry standards. Mobile Broadband (WWAN) requires a Windows operating system and is available in select countries as a standard, factory configurable feature or as an option to be added later. Integrated Bluetooth is also available (factory configurable only) and can be combined with any of the supported wireless LAN and wireless WAN options.

HP un2420 EV-DO/HSPA Mobile Broadband Module	Integrated mobile broadband module with Gobi global mobile Internet technology that provides connectivity to both CDMA (EVDO) and UMTS (HSPA) networks. It also provides GPS functionality for various mapping applications and security applications. **NOTE:** Separately purchased mobile network operator service is required. Two 850/900/1575/1800/1900/2100 MHz antennas integrated in the top of the display panel support current and future WWAN technologies.
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 Two antennas integrated in the display enclosure
Intel WiFi Link 5100	Integrated support for 802.11 a, b g, and n draft 2.0* Up to 300 mbps data rate

Standard Features

	Broadcom 4322AGN 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 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 v2.1 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 (Intel 802.11a/b/g only).

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. US 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 mm x 19 mm key pitch (center-to-center spacing), 2.0 mm stroke, and comfort-dished keycaps.

HP DuraKeys is a clear coating applied over the notebook keyboard that helps protect the finish and the printed characters on the keys.

Pointing device

Touchpad with scroll zone, two pick buttons

Expansion card slots

	Secure Digital slot	Supports SD (Secure Digital), MMC (MultiMedia Card)

Storage

	Internal Storage Device	160/250/320 GB 7200 rpm 2.5-inch SMART SATA II Hard Drive or 80/128 GB 2.5-inch Solid State Drive

NOTE: 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 (Windows models only)	The hard drive is mounted to the notebook frame, reducing the transmission of shock away from 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.
	Optical drive	Optional HP External USB 2.0 CD/DVD R/RW Drive

Standard Features

Interfaces	External monitor	One - DisplayPort
	Combo stereo headphone/ mic jack	One
	Power connector	One
	RJ-45/Ethernet	One
	USB 2.0	Three (including one powered USB 2.0 port)
	LED status indicators	Seven

Audio/Visual	High definition audio support
	Stereo speakers
	Integrated dual-microphone array
	Combo stereo headphone/mic jack
	2 MP Webcam

- Supports videoconferencing and still image capture
- Large image sensor for excellent color matching and good low light sensitivity
- Up to 30 frames/sec
- Fixed focus lens
- Video capture at VGA, 1.3 Mpixel, and 2 Mpixel resolutions
- 16-bit true color (camera sensors output YCrCb format among others)

Software	Preinstalled software with Windows Vista or Windows XP	HP Recovery Manager (available with Vista only)
		HP Assistant
		HP ProtectTools Security Manager
		HP QuickLaunch Buttons Software
		HP QuickLook 3
		HP QuickWeb
		HP Connection Manager
		HP Wireless Assistant
		HP 3D DriveGuard
		Microsoft Office Professional 2007 60-day Convertible Trial
		McAfee Total Protection*
		PDF Complete SE
		Synaptics Touchpad Driver
		Microsoft Windows Live Messenger (select models)
		HP Webcam Software
	Additional software available from the web	HP SoftPaq Download Manager

* 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.

QuickSpecs

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. The following modules are available on the hard drive (also downloadable from the web) and can be configured in Software Setup:

- BIOS Configuration for HP ProtectTools
- Credential Manager for HP ProtectTools
- Device Access Manager for HP ProtectTools
- Drive Encryption for HP ProtectTools
- File Sanitizer for HP ProtectTools
- Privacy Manager for HP ProtectTools

Security **Standard Features** HP ProtectTools Security Manager
Easy Setup Wizard
One Step Login
Enhanced Pre-Boot Security
HP SpareKey
Disk Sanitizer
Configuration Control Hardware
Memory Change Alert
Ownership Tag
Setup Password
Power-On Password
HP 3D DriveGuard (Windows models only)
Kensington Lock Slot
Support for Computrace / LoJack for Laptops (must be purchased separately)
HP Privacy Filter (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, 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. Fast Charge Technology does not apply to 9 cell primary batteries.

Battery **Primary Battery** 6-cell (62 WHr) high capacity Lithium-Ion
4-cell (41 WHr) high capacity Lithium-Ion

Standard Features

Battery Life

		With Hard Drive		With Solid State Drive	
		SU2300 CPU	SP9300 CPU	SU2300 CPU	SP9300 CPU
	6-cell Primary Battery	Up to TBD hours	Up to TBD hours	Up to TBD hours	Up to TBD hours
	4-cell Primary Battery	Up to 7 hours	Up to 6.5 hours	Up to 8 hours	Up to 7.5 hours

NOTE: The listed battery life measurements were taken on models running Microsoft Windows XP Professional. 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 1 week

Power Conservation   Supports enhanced Intel SpeedStep technology with Intel Core 2 Duo ULV processors (allows Battery Optimized Mode, Maximum Performance Mode, or Automatic mode)

Intel Display Power Saving technology

Hibernation

Standby

ACPI compliance

Service and Support   HP Services includes a one-year standard parts and labor warranty, pick-up or carry-in, and toll-free 7 x 24 hardware technical phone support (depending on model). On-site service and warranty upgrades are also available (depending on model). 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

Memory	HP 1 GB (DDR3 1333 MHz)* SODIMM	AT911AA
	HP 2 GB (DDR3 1333 MHz)* SODIMM	AT912AA
	HP 4 GB (DDR3 1333 MHz)* SODIMM	AT913AA
	* All memory modules operate at the maximum system supported speed of 1066 MHz.	

Storage	HP Notebooks USB Diskette Drive	DC361B
	HP External USB 2.0 CD/DVD R/RW Drive	FS943AA
	HP 250GB Pocket Media Drive	FE477AA
	HP 320GB 7200 rpm Primary SATA HDD	AS282AA

Expansion Solutions	HP USB 2.0 Docking Station	FQ834AA
	HP Essential USB 2.0 Port Replicator	AQ731AA
	HP Basic Adjustable Stand	AL549AA

Graphics	HP DisplayPort to VGA Adapter	AS615AA

Power	HP 65W Smart AC Adapter	ED494AA#xxx
	HP 90W Smart AC/Auto/Air Combo Adapter	AJ652AA#xxx
	HP 90W Smart Auto/Truck Adapter	ED493AA
	HP Smart 65W Travel AC Adapter	AU155AA

Carrying Cases	HP Ultra-portable Carrying Case	AL539AA
	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
	HP Basic Messenger Carrying Case	AP355AA
	HP Basic Backpack	AM863AA
	HP Merlot Slip Case	AU095AA
	HP Professional Series Carrying Case	AT886AA
	HP Professional Series Backpack	AT887AA
	HP Professional Series Messenger	AT888AA
	HP Professional Series Lady's Case	AT889AA
	HP Professional Series Slip Case	AT890AA
	HP Elite Series Lady's Case	AT891AA
	HP Professional Series Quick Case	AT892AA

Options

Security	HP/Kensington MicroSaver Security Lock	PC766A
	HP Privacy Filter	AU649AA

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
	HP Mobile USB 2.0 Speakers	FS944AA
	HP Bluetooth Stereo Headphones	AR085AA
	HP Wireless Optical Mouse	AR084AA
	HP Mobile Audio Speakers	FS944AA
	HP Merlot Special Edition Mouse	AU094AA
	HP Merlot Special Edition Mouse Pad	AU096AA

Wireless	HP un2420 EV-DO/HSDPA Mobile Broadband Module	TBD

QuickSpecs

Memory

Supports 1066/1333 MHz* DDR3 SDRAM
One DIMM slot

Standard Memory   1 GB (1 GB x 1)
                             2 GB (2 GB x 1)
                             4 GB (4 GB x 1)

Optional Memory   Memory slot is user accessible. Please refer to the Hardware and Software Guide for installation
Upgrades   procedures.

NOTE: 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. Availability of 4 GB of memory requires a Windows 64-bit operating system or Linux. With Windows 32-bit operating systems, memory above 3 GB may not all be available due to system resource requirements.

Memory Upgrades   HP 2 GB (DDR3 1333 MHz)* SODIMM   AT912AA
                             HP 4 GB (DDR3 1333 MHz)* SODIMM   AT913AA

* All memory modules operate at the maximum system supported speed of 1066 MHz.

Storage

Internal Storage Device

Hard Drives (2.5-inch SMART SATA II)	Quantity Supported	Drive Bay
160 GB 7200 rpm	One	Dedicated hard drive bay
250 GB 7200 rpm	One	Dedicated hard drive bay
320 GB 7200 rpm	One	Dedicated hard drive bay
Solid State (2.5-inch)		
80 GB Solid State Drive	One	Dedicated hard drive bay
128 GB Solid State Drive	One	Dedicated hard drive bay

Technical Specifications

System Unit	Dimensions (HxWxD)	0.93 in x 12.9 in x 8.7 in 23.5 mm x 328 mm x 221 mm	
	Weight	Starting from 3.79 lb (1.72 kg)	

NOTE: Starting weight includes 4-cell battery, hard drive, 1 GB memory. Weight varies by configuration and components.

	Stand-Alone Power Requirements (AC Power)	Nominal Operating Voltage	18.5 V
		Average Operating Power	< 13 W
		Max Operating Power	< 65 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
		EPEAT	TBD (Gold target)*
		ICES	Yes
		GS	Yes
		Australia / NZ A-Tick Compliance	Yes
		CCC	Yes
		Japan VCCI Compliance	Yes
		MIC	Yes
		BSMI	Yes
		CE Marking Compliance	Yes
		BNCI or BELLIS	Yes
		CIT	Yes
		GOST	Yes
		Saudi Arabian Compliance (ICCP)	Yes
		SABS	Yes
		UKRSERTCOMPUTER	Yes

* EPEAT registered where applicable/supported. See epeat.net for registration status by country. EPEAT status listed above applies to U.S.

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

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
		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.	

4-Cell (41 WHr) Lithium-on battery	Dimensions (H x W x L)	0.4 x 3.8 x 8.6 in (0.9 x 9.7 x 21.9 cm)	
	Weight	0.62 lb (0.283 kg)	
	Cells/Type	4-cell Lithium-Ion	
	Energy	Watt-hour Capacity	41 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 to 5 hours
		System ON	3 to 6.5 hours (depending on system power consumption)

QuickSpecs

Technical Specifications

Displays

13.3-inch LED HD (1366 x 768) anti-glare	Dimensions (W x H)	11.53 x 6.49 in (29.3 x 16.5 cm)	
	Diagonal Size	13.3 in (33.8 cm)	
	Surface Treatment	Anti-glare	
	Contrast Ratio	300:1 (typical)	
	Refresh Rate	60 Hz	
	Brightness	200 nit (typical)	
	Pixel Resolution	Pitch	0.215 mm
		Format	1366 x 768
		Configuration	RGB Stripe
	Backlight	LED	
	PPI	118 ppi	
	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)	

13.3-inch LED HD (1366 x 768) BrightView	Dimensions (W x H)	11.53 x 6.49 in (29.3 x 16.5 cm)	
	Diagonal Size	13.3 in (33.8 cm)	
	Surface Treatment	BrightView (glossy)	
	Contrast Ratio	300:1 (typical)	
	Refresh Rate	60 Hz	
	Brightness	200 nit (typical)	
	Pixel Resolution	Pitch	0.215 mm
		Format	1366 x 768
		Configuration	RGB Stripe
	Backlight	LED	
	PPI	118 ppi	
	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)	

Internal Storage

Technical Specifications

128 GB 2.5-inch SATA Solid State Drive			
	Weight	80.1 Grams	
	Capacity	128 GB	
	Height	0.37 in (9.5 mm)	
	Width	2.75 in (70 mm)	
	Interface	SATA	
	Performance	Maximum Sequential Read	Maximum Sequential Write
		220 MB/s	200 MB/s
	Logical Blocks	250,069,680	
	Operating Temperature	32° to 158°F (0° to 70°C) [case temp]	
	Features	ATA Security; ATA-7 ;SATA 2.6; DIPM	

80 GB 2.5-inch SATA Solid State Drive			
	Weight	0.19 lbs (86 g)	
	Capacity	80 GB	
	Height	0.37 in (9.5 mm)	
	Width	2.75 in (70 mm)	
	Interface	ATA-7 / SATA 2.6	
	Performance	Maximum Sequential Read	Maximum Sequential Write
		250 MB/s	70 MB/s
	Logical Blocks	156,301,488	
	Operating Temperature	32° to 158°F (0° to 70°C) [case temp]	
	Features	ATA Security	

320 GB 7200 rpm SATA Hard Drive			
	Drive Weight	0.25 lbs (115 g)	
	Capacity	320 GB	
	Height	0.37 in (9.5 mm)	
	Width	2.75 in (70 mm)	
	Interface	ATA-8, SATA 2.6, 3.0 Gb/s, NCQ	
	Transfer Rate	Synchronous (maximum)	100 MB/s (Drive Capability)
	Seek Time (typical reads, including settling)	Single Track	1.5 ms
		Average	11 ms
		Maximum	22 ms
	Rotational Speed	7200 rpm	
	Logical Blocks	625,142,448	
	Operating Temperature	32° to 140° F (0° to 60° C) [case temp]	
	Features	ATA Security	

Technical Specifications

250 GB 7200 rpm SATA Hard Drive	Drive Weight	0.25 lbs (115g)	
	Capacity	250 GB	
	Height	0.37 in (9.5 mm)	
	Width	2.75 in (70 mm)	
	Interface	ATA-8, SATA 2.6, 3.0 Gb/s, NCQ	
	Transfer Rate	Synchronous (maximum)	100 MB/s (Drive Capability)
	Seek Time (typical reads, including settling)	Single Track	1.5 ms
		Average	11 ms
		Maximum	22 ms
	Rotational Speed	7200 rpm	
	Logical Blocks	488,397,168	
	Operating Temperature	32° to 140° F (0° to 60° C) [case temp]	
	Features	ATA Security	

160 GB 7200 rpm SATA Hard Drive	Drive Weight	0.25 lb (115 g)	
	Capacity	160 GB	
	Height	0.37 in (9.5 mm)	
	Width	2.75 in (70 mm)	
	Interface	ATA-8, SATA 2.6, 3.0 Gb/s, NCQ	
	Transfer Rate	Synchronous (maximum)	100 MB/s (Drive Capability)
	Seek Time (typical reads, including settling)	Single Track	1.5 ms
		Average	11 ms
		Maximum	22 ms
	Rotational Speed	7200 rpm	
	Logical Blocks	312,581,808	
	Operating Temperature	32° to 140° F (0° to 60° C) [case temp]	
	Features	ATA Security	

Audio

Technical Specifications

Hardware	Implementation	IDT HD Audio
	Full Duplex	Yes
	Integrated Dual-Microphone Array	Yes

Combo stereo headphone/mic jack

Device Used	Operation
Stereo Headphone	Headphone works. Integrated microphone works.
External PC Microphone	External microphone does not work. Integrated microphone works.
Combo headphone / microphone without "Answer" button	Headphone and microphone in headset work as advertised.
Combo headphone / microphone with "Answer" button	Headphone and microphone in headset work initially whenever headset is plugged in; integrated microphone in PC is disabled. If "answer" button is pushed, microphone in headset is disabled, integrated microphone in PC is enabled.

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

Integrated Marvell 10/100/1000 NIC	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) 1000 Mbit/s operation (1000BASE-T; IEEE 802.3z and 802.3ab; IEEE 802.3 clauses 34-42) Auto-Negotiation (Automatic Speed Selection) Full Duplex Operation at all Speeds, Half Duplex operation at 10 and 100 Mbit/s IEEE 802.1p QoS (Quality of Service) Support IEEE 802.3x Flow Control (IEEE 802.3 clauses 31-32; configurable)
	Power Management	ACPI compliant – multiple power modes Situation-sensitive features reduce power consumption
	Performance Features	TCP/IP/UDP Checksum Offload (configurable)
	Manageability	Wake-on-LAN from standby and hibernation (Magic Packet and Microsoft Wake-Up Frame); Wake-on-LAN from off (Magic Packet only) PXE 2.1 Remote Boot Statistics Gathering (SNMP MIB II, Ethernet-like MIB, Ethernet MIB (802.3x, clause 30)) Comprehensive diagnostic and configuration software suite
	Interface	PCI Express x1
	NIC Device Driver Name	Marvell Yukon 88E8072 PCI-E Gigabit Ethernet Controller
HP un2420 EV-DO/HSPA Mobile Broadband Module	Technology/Operating Bands	GSM/GPRS/EDGE: 850MHz(Cell), 900MHz(EGSM), 1800MHz(DCS), 1900MHz (PCS) UMTS/WCDMA with receive diversity: 2100MHz (UTRA FDD Band I), 1900MHz (UTRA FDD Band II), 900MHz (UTRA FDD Band VIII), 850MHz (UTRA FDD Band V) 1xEVDO/1xRTT with receive diversity: 850MHz (Band Class0-Cell), 1900MHz (Band Class1-PCS)
	Wireless Protocol Standards	GSM/GPRS/EDGE: Class B, Multi-slot operation, coding schemes CS1 – CS4 and MSC1 – MSC9. UMTS/WCDMA: Release 99 and Release 6 CDMA: 1xEVDO Release 0 and Release A, IS-95A, IS-95B, IS-2000
	Wireless Parametric Standards	Meets or exceeds TIA/EIA IS-98-D
	Maximum Data Rates	UMTS (HSPA) – 7.2 Mbps (Download), 2.0 Mbps (Upload) CDMA (EVDO Release A) – 3.1 Mbps (Download), 1.8 Mbps (Upload)
	GPS	Standalone GPS enabled
	GPS Bands	L1 – 1575.42 MHz
	Maximum Output Power	GSM/GPRS/EDGE: 32dBm (+/-1) WCDMA: 24dBm (+/-1) CDMA: 24dBm (+/-1)
	Maximum Power Consumption	2500mA (peak); 1000mA (average)
	Power Consumption, Sleep Mode	5 mA

Technical Specifications

	Power Management	USB selective suspend Integrated notebook wireless button
	Antenna Type	Dual high efficiency 5 band antennae with spatial diversity, mounted in the display enclosure
	Form Factor	PCI-Express MiniCard, USB 2.0 interface
	Weight	11.5 g
	Dimensions (Length x Width x Thickness)	2.01 x 1.18 x 0.18 in (51 x 30 x 5 mm)
	Voltage, Operating	3.3v +/- 10%
	Temperature, Operating (from TIA/EIA/IS-98-D)	–22° to 140° F (–30° to 60° C) (full RF performance) –22° to 167° F (–30° to 75° C) (reduced RF performance)
	Temperature, Non-operating, 96 hours (from MIL-STD 202 Method 108)	–40° to 185° F (–40° to 85° C)
	Humidity, Non-operating	85% relative humidity for 48 hours @ 185° F (85° C) (non-condensing)
	Configuration Utilities	HP Connection Manager
	LED Activity	LED Off – Radio Off; Solid LED On – Radio On

Intel WiFi Link 5100	Wireless LAN Standards	IEEE 802.11a IEEE 802.11b IEEE 802.11g IEEE 802.11n (draft 2.0)* * 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.
	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)
	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 300 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

Technical Specifications

	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
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
Form Factor	PCI-Express Half-MiniCard
Weight	0.013 lb (6 g)
Dimensions	0.19 x 1.06 x 1.18 in (4.75 x 26.8 x 30 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 90% (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
- 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

Technical Specifications

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
	Interoperability	Wi-Fi certified Cisco Compatible Extensions Program compliantwith Microsoft Windows Vista and XP (details at: http://www.hp.com/go/notebooks/WLAN)
	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 , nominal
	Output Power (for OFDM; power varies by data rate)[2]	15 dBm , nominal
	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
	Form Factor	PCI-Express Half-MiniCard
	Weight	0.013 lb (6 g)
	Dimensions	0.19 x 1.06 x 1.18 in (4.75 x 26.8 x 30 mm)
	Operating Voltage	3.3v +/- 10%

Technical Specifications

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.

Broadcom 4322AGN 802.11a/b/g/draft-n WiFi Adapter	Wireless LAN Standards	IEEE 802.11a IEEE 802.11b IEEE 802.11g IEEE 802.11n (draft 2.0)* * 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.
	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)
	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, 300 Mbps
	Frequency Support	20 MHz: 2.4 GHz and 5 GHz bands 40 MHz: 2.4 GHz and 5 GHz bands

Technical Specifications

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: 2.0 W (max) Transmit/Receive 40 MHz channel: 2.0 W (max)
Power Management	ACPI compliant power management 802.11 compliant power saving mode
Receiver Sensitivity[3]	270 Mbps: -61dBm, , 54 Mbps: -72 dBm, 11 Mbps: -85 dBm , 1 Mbps: -92 dBm
Antenna type	High efficiency dual band antenna with spatial diversity, mounted in the display enclosure
Form Factor	PCI-Express Half-MiniCard
Weight	0.013 lb (6 g)
Dimensions	0.19 x 1.06 x 1.18 in (4.75 x 26.8 x 30 mm)
Operating Voltage	3.3v +/- 10%

Temperature	Operating Non-operating	14° to 149° F (–10° to 65° 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[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

Technical Specifications

- 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 2.1 Wireless Technology	Bluetooth Specification	2.1 Compliant
	Dimensions	1.18 x 0.26 x 0.13 in (30 x 6.5 x 3.25 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
	Bluetooth Software Supported	Broadcom Bluetooth for Microsoft Windows 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

Technical Specifications

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	Serial Port Profile (SPP)[1]
	Service Discovery Applicaton Profile (SDAP)
	Dial-Up Networking (DUN)[1,2]
	Generic Object Exchange Profile (GOEP)[1,2]
	Object Push Profile (OPP)[1,2]
	File Transfer Profile (FTP)
	Synchronization Profile (SYNC)
	Hard Copy Cable Replacement (HCRP)[1,2]
	Personal Area Networking Profile (PAN)[1,2]
	Human Interface Device Profile (HID)[1,2]
	FAX Profile (FAX)
	Basic Imaging Profile (BIP)[2]
	Headset Profile (HSP)
	Hands Free Profile (HFP)
	Advanced Audio Distribution Profile (A2DP)

[1] indicates the profile is supported by Microsoft Windows XP SP2
[2] indicates the profile is part of Windows Vista