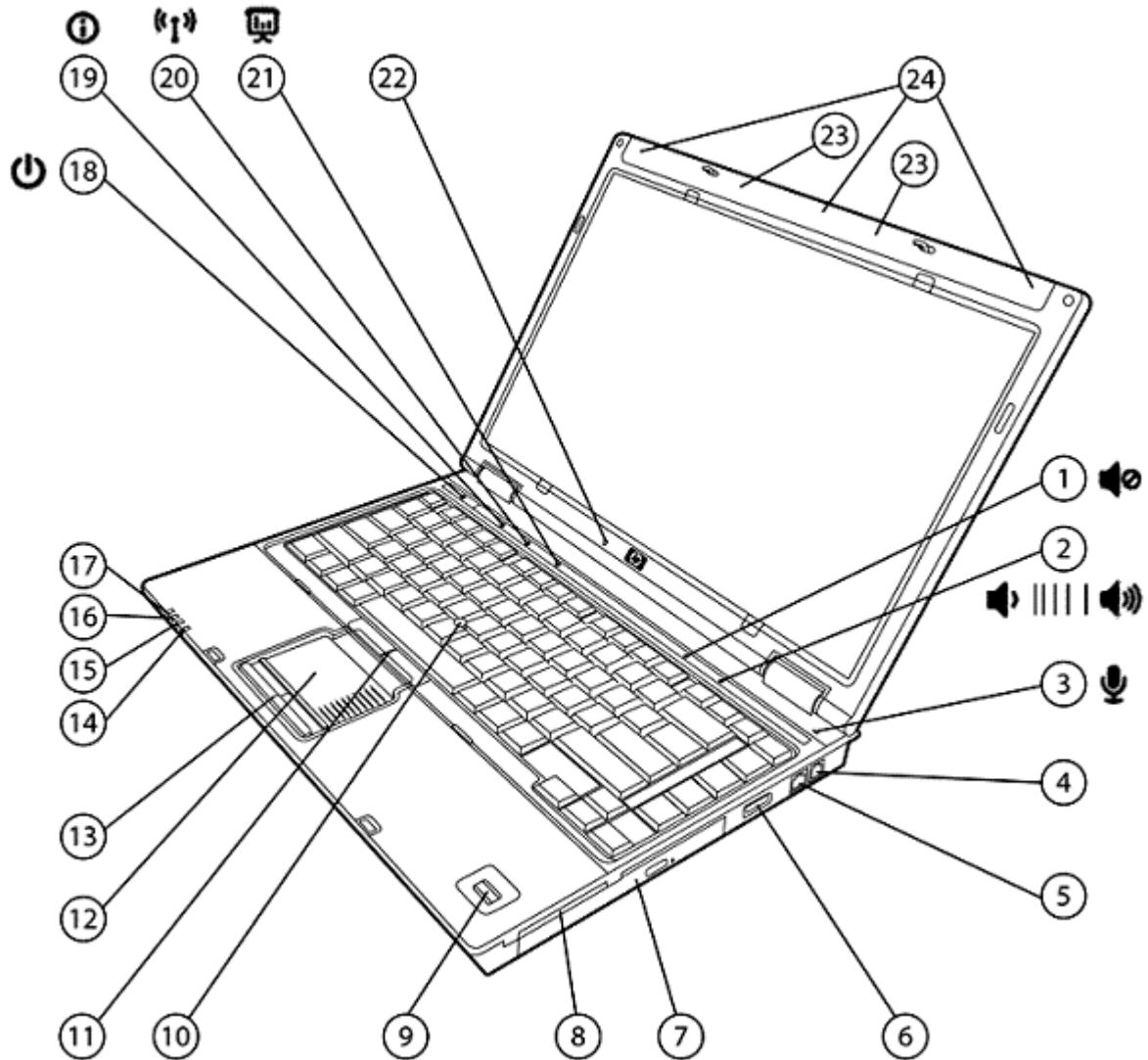


Overview

HP recommends Windows Vista®
Business

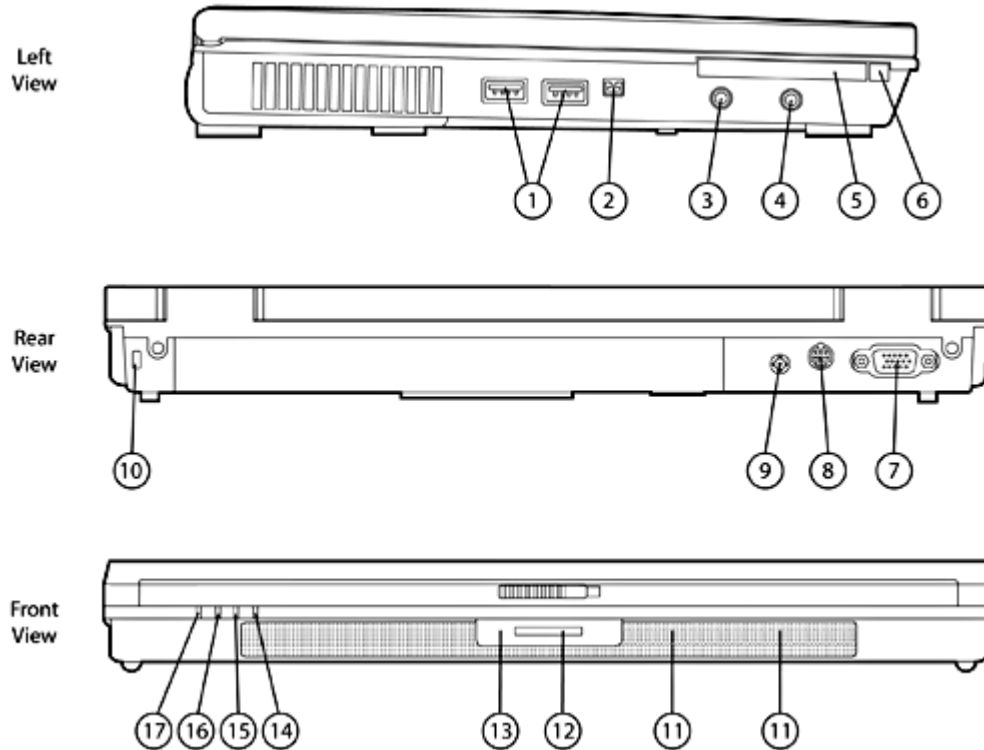


- | | |
|---------------------------------------------------|------------------------------------------------------|
| 1. Volume mute button with LED indicator | 13. Touchpad buttons |
| 2. Volume scroll zone with up/down LED indicators | 14. Hard drive activity / HP 3D DriveGuard LED |
| 3. Integrated microphone | 15. Battery charging LED |
| 4. RJ-11/modem port | 16. Power/standby LED |
| 5. RJ-45/Ethernet port | 17. Wireless on/off LED |
| 6. USB 2.0 port | 18. Power button with LED |
| 7. Optical drive | 19. HP Info / HP QuickLook button with LED indicator |
| 8. Integrated Smart Card Reader | 20. Wireless on/off button with LED indicator |
| 9. HP Fingerprint Sensor | 21. HP Presentation button with LED indicator |
| 10. Pointstick | 22. Ambient Light Sensor |
| 11. Pointstick buttons | 23. Two WWAN antennas |

Overview

12. Touchpad with scroll zone

24. Three WLAN antennas



1. 2 USB 2.0 ports
2. 1394a port
3. Stereo microphone in
4. Stereo headphone/line out
5. Type I/II PC Card slot
6. PC Card eject button
7. VGA/external monitor connector
8. S-Video TV out

9. Power connector
10. Kensington Lock slot
11. Integrated stereo speakers
12. Secure Digital (SD) slot
13. Fast Infrared port
14. Hard drive activity / HP 3D DriveGuard LED
15. Battery charging LED
16. Power/standby LED
17. Wireless on/off LED

Overview

At A Glance

- Genuine Windows Vista Business*, Genuine Windows Vista Home Basic, Genuine Windows XP Professional, or FreeDOS
- ATI Mobility Radeon X2300 graphics with up to 128 MB dedicated memory (256 MB HyperMemory) or Mobile Intel GMA X3100 graphics with up to 384 MB shared system memory
- Flexible wireless connectivity options:
 - Integrated HP ev2210 1xEVDO-A or HP hs2300 HSDPA Broadband Wireless module (select countries only)
 - Integrated 802.11 a/b/g/draft-n, a/b/g, or b/g wireless LAN module
 - Bluetooth®
- Intel® Centrino® Pro processor technology capable, with Intel Core™2 Duo processors
- Designed for common image for corporate environments
- Widescreen 14.1-inch diagonal display with Ambient Light Sensor and optional HP Privacy Filter
- Thin, lightweight design starting at 4.5 lb/2.0 kg and 1.1-inch/29 mm thin at front
- Enhanced security features including integrated Smart Card Reader, Drive Encryption for HP ProtectTools, HP Fingerprint Sensor, TPM 1.2**
- HP QuickLook on Windows Vista models for instant access to email, calendar, and contact information
- Up to 160-GB 7200 rpm user-removable hard drive with HP 3D DriveGuard protection or 64-GB Solid State Drive
- Enhanced reliability with HP DuraKeys and HP DuraFinish
- Touch-sensitive controls for HP Info Center, HP QuickLook, wireless on/off, HP Presentation button, external volume up, volume down, and mute
- MultiBay II drive bay for swapping to a different optical drive, an optional secondary hard drive, or weight-saver
- Up to 4 GB of 667-MHz DDR2 SDRAM, dual channel memory support
- Integrated Intel Gigabit Network Connection (10/100/1000 NIC)
- Enhanced dual pointing devices (touchpad with scroll zone and pointstick)
- Type I/II PC Card slot, Secure Digital (SD) slot

* At initial boot, either 32- or 64-bit can be selected. This is a one time selection and the other version will be deleted.

** TPM module disabled where not permitted by law (for example, Russia and China).

Standard Features

Processors

Intel Core 2 Duo Processor T7800 (2.60-GHz, 800-MHz FSB, 4-MB L2 cache)*
Intel Core 2 Duo Processor T7700 (2.40-GHz, 800-MHz FSB, 4-MB L2 cache)*
Intel Core 2 Duo Processor T7500 (2.20-GHz, 800-MHz FSB, 4-MB L2 cache)*
Intel Core 2 Duo Processor T7300 (2.00-GHz, 800-MHz FSB, 4-MB L2 cache)*
Intel Core 2 Duo Processor T7250 (2.00-GHz, 800-MHz FSB, 2-MB L2 cache)*
Intel Core 2 Duo Processor T7100 (1.80-GHz, 800-MHz FSB, 2-MB L2 cache)*

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

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

Operating System

Preinstalled

Genuine Windows Vista Business†*
Genuine Windows Vista Home Basic*
Genuine Windows XP Professional
FreeDOS

Supported

Genuine Windows Vista Enterprise*
Genuine Windows 2000

Certified

SuSE Linux Enterprise Desktop 10

† At initial boot, either 32- or 64-bit can be selected. This is a one time selection and the other version will be deleted.

* 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>.

Chipset

Mobile Intel PM965 with 800-MHz front side bus (models with discrete graphics)
or
Mobile Intel GM965 with 800-MHz front side bus (models with integrated graphics)

Intel Centrino Pro processor technology capable

Intel Centrino Pro processor technology is a selectable feature that is available on units configured with an Intel Wireless WiFi Link 4965AGN or 4965AG. It provides advances in remote manageability, security, energy efficient performance, and wireless connectivity. Intel Active Management Technology (AMT) offers built-in manageability and proactive security for networked notebook PCs, even when they are powered off* or when the operating system is inoperable. It can help identify threats before they reach the operating system, isolate infected systems, and update PCs regardless of their power state.

*Requires a Windows operating system, network hardware and software, connection with a power source, and a direct (non-VPN) corporate network connection which is either cable or wireless LAN.

NOTE: Some functionality of Intel Centrino Pro, such as Intel AMT and Intel Virtualization technology, requires additional 3rd party software in order to run. Availability of future "virtual appliances" applications for Centrino Pro processor technology is dependant on 3rd party software providers. Compatibility of this generation of Centrino Pro technology-based hardware with future "virtual appliances" and Microsoft Windows Vista operating system is to be determined.

Standard Features

Graphics

Models with discrete graphics:

ATI Mobility Radeon X2300 graphics with 64 or 128 MB dedicated video memory (256 MB HyperMemory*)

Models with integrated graphics:

Mobile Intel GMA X3100 graphics with up to 384 MB shared system memory

Microsoft DirectX9 capable

*Indicates dedicated video memory and shared system memory. Either 64MB or 128MB dedicated video memory, depending on model.

Display

Internal

14.1-inch diagonal WXGA anti-glare (1280 x 800 resolution)
14.1-inch diagonal WXGA+ anti-glare (1440 x 900 resolution)
Ambient Light Sensor
Optional HP Privacy Filter

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
DVI port in optional HP Docking Station (sold separately) supports resolutions up to 1600 x 1200 at both full and reduced blanking, and 1920 x 1200 at reduced blanking
NOTE: Resolutions are dependent upon monitor capability, and resolution and color depth settings.

Memory

Standard

512-MB, 1024-MB, 2048-MB, or 4096-MB 667-MHz DDR2 SDRAM; two SODIMM slots supporting dual channel memory

Maximum

Upgradeable to 4096-MB with 2048-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. Availability of 4 GB of memory requires Windows Vista Business 64-bit or Linux. With Windows 32-bit operating systems, memory above 3 GB may not all be available due to system resource requirements.

Communications

Integrated Intel Gigabit Network Connection (10/100/1000 NIC)*

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 and wireless WAN options featuring support for the latest industry standards. Wireless LAN is factory configurable or available as an option to be added later. Broadband Wireless (WWAN) requires Windows Vista Business or Windows XP Professional and is available in select countries as a standard, factory configurable feature or as an

Standard Features

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 ev2210 1xEVDO-A Broadband Wireless Module	Integrated WWAN module connects to the Verizon Wireless BroadbandAccess and NationalAccess networks (US only) Supports CDMA 1xEVDO-A, 1xRTT connections at 800 and 1900 MHz. NOTE: Separately purchased Verizon Wireless service is required. For details, go to http://www.hp.com/go/broadbandwireless . Upgradeable design and two 850/900/1800/1900/2100-MHz antennas integrated in the top of the display panel support current and future WWAN technologies
HP hs2300 HSDPA Broadband Wireless Module	Integrated WWAN module that provides connection to GSM, GPRS, EDGE, UMTS, and HSDPA mobile networks in many countries. Currently supported networks are the AT&T Broadbandconnect network in the U.S., Vodafone networks in select countries, and roaming on AT&T and Vodafone partner networks in more than 100 countries. NOTE: Separately purchased mobile network operator service is required. Upgradeable design and two 850/900/1800/1900/2100-MHz antennas integrated in the top of the display panel support current and future WWAN technologies.
All 802.11a/b/g integrated wireless LAN options	Wi-Fi certified Cisco Compatible Extensions support (Version 4.0) with Microsoft Windows XP 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 WiFi certified for WPA2, WMM Three antennas integrated in the display enclosure
Intel Wireless WiFi Link 4965AGN	Integrated support for 802.11a, b, g, and draft-n Up to 300-mbps data rate
Intel Wireless WiFi Link 4965AG	Integrated support for 802.11 a, b and g Up to 54-mbps data rate
Intel PRO/Wireless 3945BG Network Connection	Integrated support for 802.11 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 draft-n 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
Broadcom 4311BG 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

Standard Features

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), 2.5-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. HP DuraFinish helps protect the finish on the keyboard deck, graphics, and icons from normal wear and tear.

Touch-sensitive controls

Touch-sensitive controls provide easy access to the following features: HP Info Center, HP QuickLook, wireless on/off, HP Presentation button, external volume up, volume down, and mute

Pointing device

Enhanced dual pointing devices:
Touchpad with scroll zone, two pick buttons
and
Pointstick, two pick buttons

Expansion card slots

1 Type I/II PC Card slot	Supports 32-bit CardBus and 16-bit PC Cards
Integrated Smart Card Reader	Compatible with ISO 7816 compliant Smart Cards PC/SC interface support
Secure Digital slot	Supports SD (Secure Digital), MMC (MultiMedia Card)

Storage

Primary Storage Device	80/120/160-GB 5400 rpm SMART SATA Hard Drive 80/120/160-GB 7200 rpm SMART SATA Hard Drive 64-GB Solid State Drive
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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

The hard drive is mounted directly 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 drives

MultiBay II (9.5-mm)	MultiBay II DVD-ROM Drive MultiBay II DVD/CD-RW Combo Drive MultiBay II DVD+/-RW SuperMulti DL Drive
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Standard Features

Interfaces	PC Card slot	One Type I/II PC Card slot
	Smart Card Reader	One
	External monitor	One – VGA
	1394a	One
	Stereo microphone in	One
	Stereo headphone/line out	One
	Power connector	One
	RJ-11/modem	One
	RJ-45/Ethernet	One
	Fast Infrared Port	One (4-Mb/s support) IrDA 4-MB compliant; IR performance will vary depending on performance of IR peripherals and application used.
	S-video TV out	One (Support for NTSC/PAL)
	USB 2.0	Three
	Docking connector	One
	Secondary battery connector	One
	LED status indicators	Fifteen

Audio	High Definition Audio support w/24-bit DAC Integrated stereo speakers Integrated microphone Touch-sensitive controls for volume up, volume down, and mute Stereo headphone/line out Stereo microphone in
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Software	Preinstalled software with Windows Vista or Windows XP	PDF Complete HP Backup and Recovery Manager HP Help and Support Center HP QuickLook (Windows Vista only) HP OpenView Radia Management Agent 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) Roxio Creator 9 (for optional DVD+/-RW and DVD/CDRW drives) Synaptics Touchpad Driver Symantec Norton Internet Security with complimentary 60-day live update
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Standard Features

Additional software available from the web	<p>Intervideo WinDVD – DVD Player</p> <p>HP Client Manager</p> <p>Java Card Security for HP ProtectTools</p>
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HP Backup and Recovery Manager Each unit is shipped with HP Backup and Recovery Manager. HP Backup and Recovery Manager can provide data and system file protection for HP business PCs to enable fast recovery if the system becomes corrupted or if important information is accidentally deleted. HP Backup and Recovery Manager can perform scheduled or manual backups of the entire drive or individual files and folders. Up to 10 GB of the hard drive is reserved for the system recovery software. HP Backup and Recovery Manager can also create software recovery CDs or DVDs (requires optional hardware).

SMBIOS Version 2.4 System Management BIOS, previously known as DMI BIOS, is used to store system management information.

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
- Device Access Manager for HP ProtectTools
- Drive Encryption for HP ProtectTools
- Embedded Security for HP ProtectTools
- Java Card Security for HP ProtectTools

Security	Standard Features	<p>HP ProtectTools Security Manager</p> <p>HP Fingerprint Sensor</p> <p>Integrated Smart Card Reader</p> <p>Configuration Control Hardware</p> <p>Memory Change Alert</p> <p>Ownership Tag</p> <p>Setup Password</p> <p>Power-On Password</p> <p>TPM 1.2 Embedded Security Chip*</p> <p>TPM Enhanced DriveLock*</p> <p>HP Disk Sanitizer</p> <p>HP 3D DriveGuard</p> <p>Kensington Lock Slot</p> <p>Support for Computrace / LoJack for Laptops (must be purchased separately)</p>
	Optional Features	<p>HP Privacy Filter Narrows viewing area so that screen data is visible only to persons directly in front of the monitor</p>

***NOTE:** TPM module disabled where use is restricted by law; for example, Russia and China. For more information on HP security solutions refer to <http://www.hp.com/go/security>.

Standard Features

Power Supply External 90-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. HP Fast Charge does not apply to 12-cell Ultra-Capacity batteries.

Battery	Primary battery	6-cell (55 WHr) Lithium-Ion battery 4-cell (37 WHr) Lithium-Ion battery (available only on integrated graphics models)
	Optional HP Extended Life Battery	8-cell (52 WHr) high capacity Lithium-Ion battery
	Optional HP Ultra-Capacity Battery	12-cell (95 WHr) high capacity Lithium-Ion battery

Battery Life		6-cell Primary with integrated graphics	6-cell Primary with discrete graphics
	Primary battery	Up to 6 hours	Up to 4 hours and 30 minutes
	Primary battery and optional HP Extended Life Battery	Up to 12 hours	Up to 9 hours
	Primary battery and optional HP Ultra-Capacity Battery	Up to 15 hours and 45 minutes	Up to 12 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 (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

Standard Features

Docking and Stands

HP 3-in-1 NAS Docking Station
HP Advanced Docking Station
HP Docking Station
HP Standard Monitor Stand
HP Adjustable Notebook Stand
HP External MultiBay II

HP's shared docking solutions provide simple and convenient port replication and cable management. Features include Gigabit NIC pass through, modem pass through, legacy parallel and serial ports, S-video TV out, USB 2.0 ports, integrated security mechanism*, integrated MultiBay II and ExpressCard** slots. These docking solutions are compatible across multiple Business Notebook platforms enabling a lower total cost of ownership.

* HP/Kensington Cable Lock required (purchased separately)

** HP 3-in-1 NAS Docking Station and HP Advanced Docking Station only

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. On-site service and warranty upgrades are also available. For HP Care Pack services see <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>.

Select Model(s)

6910p GH715AW#ABA Global (may vary based on local regulatory requirements)	Processor	Intel Core 2 Duo Processor T7300* (2.00-GHz, 800-FSB, 4-MB L2 cache)
	Intel Centrino Pro processor technology	Enabled
	Operating System	Genuine Windows Vista Business**
	System Memory	1024 MB 667-MHz DDR2 (1 DIMM)
	Hard Drive	80-GB 5400 rpm SMART SATA
	Display	14.1-inch WXGA
	Graphics	Mobile Intel GMA X3100
	Audio	ADI High Definition CODEC Stereo headphone/line out and microphone in Integrated microphone
	Communications	Integrated Intel Gigabit Network Connection (10/100/1000 NIC) 56K V.92 modem
	Integrated Wireless	Intel Wireless WiFi Link 4965AG
	Integrated Security	Integrated Smart Card Reader Drive Encryption for HP ProtectTools HP Fingerprint Sensor TPM 1.2***
	Pointing Device	Enhanced dual pointing devices (touchpad with scroll zone and pointstick)
	MultiBay II Drive	DVD/CD-RW Combo MultiBay II Drive
Battery	6-cell (55 WHr) Lithium-Ion	
Power	External 90W adapter	

Standard Features

Warranty 3/3/0

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

** At initial boot, either 32- or 64-bit can be selected. This is a one time selection and the other version will be deleted.

*** TPM module disabled where use is restricted by law; for example, Russia and China.

6910p GH717AW#ABA Global (may vary based on local regulatory requirements)	Processor	Intel Core 2 Duo Processor T7300* (2.00-GHz, 800-FSB, 4-MB L2 cache)
	Intel Centrino Pro processor technology	Enabled
	Operating System	Genuine Windows Vista Business**
	System Memory	1024 MB 667-MHz DDR2 (1 DIMM)
	Hard Drive	80-GB 5400 rpm SMART SATA
	Display	14.1-inch WXGA
	Graphics	ATI Mobility Radeon X2300 with 64 MB of dedicated memory
	Audio	ADI High Definition CODEC Stereo headphone/line out and microphone in Integrated microphone
	Communications	Integrated Intel Gigabit Network Connection (10/100/1000 NIC) 56K V.92 modem
	Integrated Wireless	Intel Wireless WiFi Link 4965AG
	Integrated Security	Integrated Smart Card Reader Drive Encryption for HP ProtectTools HP Fingerprint Sensor TPM 1.2***
	Pointing Device	Enhanced dual pointing devices (touchpad with scroll zone and pointstick)
	MultiBay II Drive	DVD+/-RW SuperMulti DL Drive
	Battery	6-cell (55 WHr) Lithium-Ion
Power	External 90W adapter	
Warranty	3/3/0	

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

** At initial boot, either 32- or 64-bit can be selected. This is a one time selection and the other version will be deleted.

*** TPM module disabled where use is restricted by law; for example, Russia and China.

Standard Features

6910p SKU Part# GH719AW#ABA Global (may vary based on local regulatory requirements)	Processor Intel Centrino Pro processor technology Operating System System Memory Hard Drive Display Graphics Audio Communications Integrated Wireless Integrated Security Pointing Device MultiBay II Drive Battery Power Warranty	Intel Core 2 Duo Processor T7500* (2.20-GHz, 800-FSB, 4-MB L2 cache) Enabled Genuine Windows Vista Business** 1024 MB 667-MHz DDR2 (1 DIMM) 80-GB 7200 rpm SMART SATA 14.1-inch WXGA+ ATI Mobility Radeon X2300 with 128 MB of dedicated memory ADI High Definition CODEC Stereo headphone/line out and microphone in Integrated microphone Integrated Intel Gigabit Network Connection (10/100/1000 NIC) 56K V.92 modem Intel Wireless WiFi Link 4965AG Integrated Smart Card Reader Drive Encryption for HP ProtectTools HP Fingerprint Sensor TPM 1.2*** Enhanced dual pointing devices (touchpad with scroll zone and pointstick) DVD+/-RW SuperMulti DL Drive 6-cell (55 WHr) Lithium-Ion External 90W adapter 3/3/0
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* Intel's numbering system is not a measurement of higher performance.

** At initial boot, either 32- or 64-bit can be selected. This is a one time selection and the other version will be deleted.

*** TPM module disabled where use is restricted by law; for example, Russia and China.

Options

Memory	HP 512-MB (DDR2 667 MHz) SODIMM	EM993AA
	HP 1-GB (DDR2 667 MHz) SODIMM	EM994AA
	HP 2-GB (DDR2 667 MHz) SODIMM	EM995AA
MultiBay II Storage (9.5-mm)	HP MultiBay II DVD-ROM Drive	PA849A
	HP MultiBay II DVD/CD-RW Combo Drive	PA850A
	HP MultiBay II DVD+/-RW SuperMulti DL Drive	PA851A
	HP 80-GB 5400rpm MultiBay II Hard Drive	PH357A
Other Storage	HP 80-GB 5400rpm Primary SATA Hard Drive	ET354AA
	HP 120-GB 5400rpm Primary SATA Hard Drive	RT080AA
	HP Notebooks USB Diskette Drive	DC361B
Communications	Intel Wireless WiFi Link 4965AGN option kit	RT081AA#xxx
	HP ev2210 1xEVDO-A Broadband Wireless Module (Verizon) (available Sept. 2007)	GM763AA#ABA
	HP ev2210 1xEVDO-A Broadband Wireless Module (Sprint) (available Oct. 2007)	GM764AA#ABA
	HP hs2300 HSDPA Broadband Wireless Module (AT&T) (available Sept. 2007)	GG589AA#ABA
	HP hs2300 HSDPA Broadband Wireless Module (Generic) (available Oct. 2007)	GG590AA#xxx
Expansion Solutions	HP Docking Station with Smart Adapter	EN488AA#xxx
	HP Advanced Docking Station with Smart Adapter	EN489AA#xxx
	HP 3-in1 NAS Docking Station with Smart Adapter	EM537AA#xxx
	HP Standard Monitor Stand	PA507A
	HP Adjustable Notebook Stand	PA508A
	HP External MultiBay II	PA509A#xxx
Power	HP 2-Bay Battery Charging Station (North America only)	DT533A#xxx
	HP 2-Bay Battery Charging Station (rest of world)	EW424AA#xxx
	HP 10-Bay Battery Charging Station (North America only)	DT534A#ABA
	HP Battery Adapter Kit	PK402A
	HP 90W Smart AC Adapter	ED495AA#xxx
	HP 90W Smart Auto Adapter	ED493AA
	HP 65W AC/Auto/Air Combo Smart Adapter	ED993AA#xxx
	HP 6-Cell Li-Ion Primary Battery	PB994A
	HP 8-cell Extended Life Battery	PB993A
HP 12-cell Ultra-Capacity Battery	EJ092AA	

Options

Carrying Cases	HP Value Nylon Case	RR314AA
	HP Universal Nylon Case	RR315AA
	HP Executive Leather Case	RR316AA
	HP Deluxe Nylon Backpack	RR317AA
	HP Universal Messenger Bag	GD404AA
	HP Deluxe Roller Case	GD405AA

Security	HP PC Card Smart Card Reader with Java Card	EL347AA
	HP ProtectTools Java Card – 10 units	EL348AA
	HP/Kensington MicroSaver Security Lock	PC766A

Input/Output Devices	HP PS/2 Keyboard & Mouse Bundle	RC464AA#xxx
	HP USB Keyboard & Mouse Bundle	RC465AA#xxx
	HP USB/PS2 Optical 2-Button Scroll Mouse	DC369A
	HP USB Optical Travel Mouse	RH304AA
	HP Bluetooth PC Card Mouse	RJ316AA

Memory

667-MHz DDR2 SDRAM

Two DIMM slots supporting dual channel memory

DIMM sizes supported: 512 MB, 1024 MB, and 2048 MB

Standard Memory

- 512 MB (512 MB x 1)
- 1024 MB (1024 MB x 1 or 512 MB x 2)
- 2048 MB (2048 MB x 1 or 1024 MB x 2)
- 4096 MB (2048 MB x 2)

Optional Memory Upgrades

Support for up to 4096 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
1024 MB	512 MB	512 MB
1536 MB	1024 MB	512 MB
2048 MB	1024 MB	1024 MB
4096 MB	2048 MB	2048 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. Availability of 4 GB of memory requires Windows Vista Business 64-bit 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 512-MB (DDR2 667 MHz) SODIMM

EM993AA

HP 1024-MB (DDR2 667 MHz) SODIMM

EM994AA

HP 2048-MB (DDR2 667 MHz) SODIMM

EM995AA

Storage

Removable Media Drive Support

	Quantity Supported	Drive Bay
MultiBay II DVD-ROM Drive	One	MultiBay II
MultiBay II DVD/CD-RW Combo Drive*	One	MultiBay II
MultiBay II DVD+/-RW SuperMulti DL Drive*	One	MultiBay II

* MultiBay II drives supported in the internal MultiBay II are also supported in the optional HP 3-in-1 NAS Docking Station, HP Advanced Docking Station, or HP External MultiBay II.

Primary Storage Device

	Quantity Supported	Drive Bay
Hard Drives		
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
80-GB 5400 rpm SMART SATA Hard Drive	One	Dedicated hard drive bay
160-GB 7200 rpm SMART SATA Hard Drive	One	Dedicated hard drive bay
120-GB 7200 rpm SMART SATA Hard Drive	One	Dedicated hard drive bay
80-GB 7200 rpm SMART SATA Hard Drive	One	Dedicated hard drive bay
Solid State Drive		
64-GB Solid State Drive	One	Dedicated hard drive bay

Technical Specifications

System Unit	Dimensions (HxWxD)	1.1 in (at front) x 13.0 in x 9.4 in 29 mm (at front) x 330 mm x 239 mm
	Weight	with MultiBay II weight-saver and 4-cell battery 4.5 lb (2.0 kg)
		with MultiBay II weight-saver and 6-cell battery 4.7 lb (2.1 kg)
	with MultiBay II DVD/CDRW Combo Drive or DVD+/-RW SuperMulti DL Drive and 6-cell battery 5.1 lb (2.3 kg)	
<p>NOTE: Height varies depending upon where on the notebook the measurement is made. Starting weight includes integrated graphics, hard drive, 512-MB memory, 802.11 wireless communications module, and Bluetooth. Weight varies by configuration and components.</p>		
Stand-Alone Power Requirements (AC Power)	Nominal Operating Voltage	18.5 V
	Average Operating Power	21.41 W (integrated graphics) 25.55 W (discrete graphics)
Temperature	Max Operating Power	< 90 W
	Operating	32° to 95° F (0° to 35° C) (not writing optical)
		41° to 95° F (5° to 35° C) (writing optical)
Relative Humidity	Non-operating	-4° to 140° F (-20° to 60° C)
	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® 4.0	Yes
	ICES	Yes
	GS	Yes
	Australia / NZ A-Tick Compliance	Yes
	CCC	Yes
	Japan VCCI Compliance	Yes
	MIC	Yes
BSMI	Yes	

Technical Specifications

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>.

HP 90W Smart AC Adapter

Dimensions	5.24 x 2.28 x 1.1 in (13.3 x 5.8 x 2.9 cm)
Weight	0.86 lb (390 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 90W
	DC output 18.5V
	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%
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.

Technical Specifications

Optional HP Ultra-Capacity Battery	Dimensions (H x W x L)	1.3 x 6.0 x 10.6 in (3.33 x 15.25 x 26.88 cm)		
	Weight	1.77 lb (0.803 kg)		
	Cells/Type	12-cell Lithium-Ion		
	Energy	Watt-hour Capacity	95Wh	
	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	Smart Adapter	3 to 4 hours		
	System ON	4 to 5 hours (depending on system power consumption)		
Fuel Gauge	When pressed, LEDs light indicating level of charge remaining on battery			
<hr/>				
Optional HP Extended Life Battery	Dimensions (H x W x L)	1.0 x 3.9 x 8.7 in (2.5 x 10.0 x 22.0 cm)		
	Weight	1.00 lb (0.455 kg)		
	Cells/Type	8-cell Lithium-Ion		
	Energy	Watt-hour Capacity	52Wh	
	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	3 hours		
	System ON	3 to 5 hours (depending on system power consumption)		
	HP Fast Charge	Charges the battery up to 90% within 90 minutes when system is OFF		
Fuel Gauge	When pressed, LEDs light indicating level of charge remaining on battery			
<hr/>				
6-Cell (55Whr) Lithium-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	0.737 lb (0.335 kg)		
	Cells/Type	6-cell Lithium-Ion		
	Energy	Watt-hour Capacity	55Wh	
	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	Charges the battery up to 90% within 90 minutes when system is OFF		

Technical Specifications

4-Cell (37Whr) Lithium-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	0.55 lb (0.249 kg)		
	Cells/Type	4-cell Lithium-Ion		
	Energy	Watt-hour Capacity	37Wh	
	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	Charges the battery up to 90% within 90 minutes when system is OFF	

14.1-inch WXGA anti-glare	Active Area (W x H)	11.9 x 7.5 in (30.3 x 19.0 cm)		
	Diagonal Size	14.1 in (35.7 cm)		
	Surface Treatment	Anti-glare		
	Contrast Ratio	300:1 (typical)		
	Refresh Rate	60 Hz		
	Brightness	200 nit (typical)		
	Pixel Resolution	Pitch	0.237 mm	
		Format	1280x800	
		Configuration	RGB Stripe	
	Backlight	CCFL		
PPI	107			
Viewing Angle	±30° Horizontal, ±10° Vertical (minimum)			

14.1-inch WXGA+ anti-glare	Active Area (W x H)	11.9 x 7.5 in (30.3 x 19.0 cm)		
	Diagonal Size	14.1 in (35.7 cm)		
	Surface Treatment	Anti-glare		
	Contrast Ratio	300:1 (typical)		
	Refresh Rate	60 Hz		
	Brightness	200 nit (typical)		
	Pixel Resolution	Pitch	0.210 mm	
		Format	1440 x 900	
		Configuration	RGB Stripe	
	Backlight	CCFL		
PPI	121			
Viewing Angle	±30° Horizontal, ±10° Vertical (minimum)			

Technical Specifications

Hard Drives

160-GB 7200 rpm SATA	Drive Weight	0.25 lb (113 g)	
	Capacity	160 GB	
	Height	0.37 in (9.5 mm)	
	Width	2.75 in (70 mm)	
	Interface	ATA-7 / SATA 1.0a	
	Transfer Rate	Synchronous (maximum) 100 MB/s (Drive Capability)	
	Seek Time (typical reads, including settling)	Single Track	1 ms
		Average	10 ms
		Maximum	18 ms
	Rotational Speed	7200 rpm	
	Logical Blocks	312,581,808	
Operating Temperature	41° to 140° F (5° to 60° C) [case temp]		
Features	ATA Security		

120-GB 7200 rpm SATA	Drive Weight	0.25 lb (113 g)	
	Capacity	120 GB	
	Height	0.37 in (9.5 mm)	
	Width	2.75 in (70 mm)	
	Interface	ATA-7 / SATA 1.0a	
	Transfer Rate	Synchronous (maximum) 100 MB/s (Drive Capability)	
	Seek Time (typical reads, including settling)	Single Track	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		

Technical Specifications

80-GB 7200 rpm SATA	Drive Weight	0.25 lb (113 g)	
	Capacity	80 GB	
	Height	0.37 in (9.5 mm)	
	Width	2.75 in (70 mm)	
	Interface	ATA-7 / SATA 1.0a	
	Transfer Rate	Synchronous (maximum) 100 MB/s (Drive Capability)	
	Seek Time (typical reads, including settling)	Single Track	1 ms
		Average	10 ms
		Maximum	18 ms
	Rotational Speed	7200 rpm	
	Logical Blocks	156,301,488	
	Operating Temperature	41° to 140° F (5° to 60° C) [case temp]	
	Features	ATA Security	

160-GB 5400 rpm SATA	Drive Weight	0.22 lb (101 g)	
	Capacity	160 GB	
	Height	0.37 in (9.5 mm)	
	Width	2.75 in (70 mm)	
	Interface	ATA-7 / SATA 1.0a	
	Transfer Rate	Synchronous (maximum) 100 MB/s (Drive Capability)	
	Seek Time (typical reads, including settling)	Single Track	3 ms
		Average	13ms
		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	

Technical Specifications

120-GB 5400 rpm SATA	Drive Weight	0.22 lb (101 g)	
	Capacity	120 GB	
	Height	0.37 in (9.5 mm)	
	Width	2.75 in (70 mm)	
	Interface	ATA-7 / SATA 1.0a	
	Transfer Rate	Synchronous (maximum) 100 MB/s (Drive Capability)	
	Seek Time (typical reads, including settling)	Single Track	3 ms
		Average	13ms
		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	

80-GB 5400 rpm SATA	Drive Weight	0.22 lb (101 g)	
	Capacity	80 GB	
	Height	0.37 in (9.5 mm)	
	Width	2.75 in (70 mm)	
	Interface	ATA-7 / SATA 1.0a	
	Transfer Rate	Synchronous (maximum) 100 MB/s (Drive Capability)	
	Seek Time (typical reads, including settling)	Single Track	3 ms
		Average	13 ms
		Maximum	24 ms
	Rotational Speed	5400 rpm	
	Logical Blocks	156,301,488	
	Operating Temperature	41° to 140° F (5° to 60° C) [case temp]	
	Features	ATA Security	

Removable Storage Drives – MultiBay II

Technical Specifications

DVD-ROM Drive	Dimensions	0.37 x 5.51 x 5.04 in (0.95 x 14.0 x 12.8 cm)		
	Weight	0.34 lb (155 g)		
	Access Times	Random	<120 ms CD	
			<200 ms DVD	
	Max Data Transfer Rate	24X-CD-ROM	3,600 KB/s	
		8X-DVD	10,800 KB/s	
	Transfer Mode	Multiword DMA Mode 2		
	Interface	EIDE		
	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)	None		
	Max Media Capacity (read)	8.5 GB		
	Transport	Tray Loading		

DVD/CD-RW Combo Drive	Dimensions	0.37 x 5.51 x 5.04 in (0.95 x 14.0 x 12.8 cm)		
	Weight	0.45 lb (205 g)		
	Access Times	Random	<120 ms CD	
			<155 ms DVD	
	Max Data Transfer Rate	24X CD-ROM	3,600 KB/s	
		8X DVD	10,800 KB/s	
		24X CD-R	3,600 KB/s	
		24X CD-RW	3,600 KB/s	
	Transfer Mode	Multiword DMA Mode 2		
	Interface	EIDE		
	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 Drive	Dimensions	0.37 x 5.51 x 5.04 in (0.95 x 14.0 x 12.8 cm)		
	Weight	0.45 lb (205 g)		
	Access Times	Random	<150 ms CD	
			<125 ms DVD	
	Max Data Transfer Rate	24X CD-ROM	3,600 KB/s	
		8X DVD	10,800 KB/s	
		24X CD-R	3,600 KB/s	
		10X CD-RW	1,500 KB/s	
		4X DVD+R	5,400 KB/s	
		2.4X DVD+RW	3,240 KB/s	
		4X DVD-R	5,400 KB/s	
		2X DVD-RW	2,700 KB/s	
		2X DVD-RAM	2,700 KB/s	
	Transfer Mode	Multiword DMA Mode 2		
	Interface	EIDE		
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			
Max Media Capacity (read)	8.5 GB			
Max Media Capacity (write)	8.5 GB			
Transport	Tray Loading			

80-GB 5400 rpm MultiBay II Hard Drive	MultiBay II Drive Adapter	Dimensions (H x W x D)	0.37 x 5.51 x 5.04 in (0.95 x 14.0 x 12.8 cm)	
		Weight	0.16 lb (72 g)	
	Drive Weight	0.22 lb (101 g)		
	Capacity	80 GB		
	Height	0.37 in (9.5 mm)		
	Width	2.75 in (70 mm)		
	Interface	ATA-6		
	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	156,301,488		
Operating Temperature	41° to 131° F (5° to 55° C)			
Features	ATA Security			

Technical Specifications

HP Fingerprint Sensor	Mobile Voltage Operation	3.0V–3.6V Single Supply
	Operating Temperature	32° – 158°F (0° – 70°C)
	Current Consumption @ 3.3V	Less than 70 mA peak imaging and scrolling Less than 25 mA hardware finger detection Advanced Power Management
	High-Rate Image Capture	Up to 240 image frames /sec
	ESD Resistance	IEC 61000-4-2 Level 4 (±15KV)
	Detection Matrix	192 x 16 Pixels 9.7 mm x 0.81 mm 500 ppi High-Resolution Images

Audio

Hardware	Implementation	ADI1981HD High Definition CODEC
	Touch-Sensitive Volume Controls	Volume up, volume down, and mute
	Full Duplex	Yes
	Sound Blaster Pro compatible	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

Integrated Intel Gigabit Network Connection (10/100/1000 NIC)	Ethernet Features	<p>10 Mbit/s operation (10BASE-T; IEEE 802.3i; IEEE 802.3 clauses 13-14)</p> <p>100 Mbit/s operation (100BASE-TX; IEEE 802.3u; IEEE 802.3 clauses 21-30)</p> <p>1000 Mbit/s operation (1000BASE-T; IEEE 802.3z and 802.3ab; IEEE 802.3 clauses 34-42)</p> <p>Auto-Negotiation (Automatic Speed Selection)</p> <p>Full Duplex Operation at all Speeds, Half Duplex operation at 10 and 100 Mbit/s</p> <p>IEEE 802.1p QoS (Quality of Service) Support</p> <p>IEEE 802.3x Flow Control (IEEE 802.3 clauses 31-32; configurable)</p>
	Power Management	<p>ACPI compliant -- multiple power modes</p> <p>Situation-sensitive features reduce power consumption</p>
	Performance Features	<p>TCP/IP/UDP Checksum Offload (configurable)</p>
	Manageability	<p>Wake-on-LAN from standby and hibernation (Magic Packet and Microsoft Wake-Up Frame); Wake-on-LAN from off (Magic Packet only)</p> <p>PXE 2.1 Remote Boot</p> <p>Statistics Gathering (SNMP MIB II, Ethernet-like MIB, Ethernet MIB (802.3x, clause 30))</p> <p>Comprehensive diagnostic and configuration software suite</p> <p>Intel Advanced Management Technology (iAMT)</p>
	Interface	<p>PCI Express x1</p>
	NIC Device Driver Name	<p>Intel 82566MM Gigabit Network Connection</p>
	Drivers Available	<p>Microsoft Windows Vista</p> <p>Microsoft Windows XP</p>

V.92 56K Data/Fax Modem	Form Factor	<p>MDC 1.5 Daughtercard</p>
	Power Management Support	<p>APM Revision 1.2, ACPI</p>
	Approvals/Certifications	<p>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</p>
	Data Mode Capabilities	<p>V.92 data</p> <p>V.8bis</p> <p>V.80</p> <p>V44, V.42bis, MNP5 (Compression)</p> <p>V.42 (LAPM, MNP2-4) (Error Correction)</p> <p>Optional symbol rates:</p> <p>2800, 3429</p> <p>Asymmetric Symbol rates</p> <p>Synchronous primary channel data signaling rates:</p> <p>3600, 31200</p> <p>Automatic rate re-negotiation</p> <p>V.34</p> <p>V.32bis</p> <p>V.32</p> <p>V.23</p> <p>V.22bis</p>

Technical Specifications

	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

HP ev2210 1xEVDO-A Broadband Wireless Module	Band and Power Class	0 (North American Cellular) – Class III; 1 (North American PCS) – Class II
	Wireless Protocol Standards	CDMA 1x Release A; IS-95A, IS-95B, IS-2000
	Wireless Parametric Standards	Meets or exceeds TIA/EIA IS-98-D
	Interoperability	CDG 22 (TIA/EIA/IS-95-A) CDG 53(TIA/EIA/IS-95-B) C.S0031 (TIA/EIA/IS-2000) CDG 64 (TIA/EIA/IS-2000) C.S0032 (TIA/EIA/IS-866)
	Frequency Band	Dual Band: 800 MHz (Cellular) and 1900 MHz (PCS)
	Data Rates (Packet Mode)	IS-856 rates up to 3.1 Mbps IS-2000 data rates up to 1.8 Mbps
	Maximum Output Power	24dBm (+/-1)
	Power Consumption (maximum)	500mA
	Power Consumption, Sleep Mode	1.7mA – 3.5mA
	Power Management	USB selective suspend CDMA slotted mode sleep and dormant modes
	Antenna Type	High efficiency dual band antennae with spatial diversity, mounted in the display enclosure
	Form Factor	PCI-Express MiniCard
	Weight	0.35 oz (10 g)
	Dimensions (Length x Width x Thickness)	2.01 x 1.18 x 0.18 in (51 x 30 x 4.5 mm)
	Voltage, Operating	3.3v +/- 10%

Technical Specifications

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	Verizon Wireless VZAccess Manager
LED Activity	LED Off – Radio Off; Solid LED On – Radio On

HP hs2300 HSDPA Broadband Wireless Module	Frequency Bands and Power Class	850/1900/2100MHz WCDMA Power class 3 (+24dBm) 850MHz GSM/GPRS/EDGE 900MHz GSM/GPRS/EDGE, 1800MHz GSM/GPRS/EDGE 1900MHz GSM/GPRS/EDGE EDGE E2 power GPRS/EDGE Multislot Class 12 GPRS PCS/DCS power class 1 GSM power class 4
	Wireless Protocol Standards	GPRS/EDGE: 3GPP R99 GERAN P1 WCDMA Release 5 (R5) High-Speed Downlink Packet Access (HSDPA) 3.6Mbps GSM Phase 2+
	Wireless Parametric Standards	Complies with 3GPP specifications
	Additional Standards Compliance	FCC parts 15/22/24, CE, Microsoft WHQL, R&TTE directive 1999/5/EC (health, safety, EMC, spectrum), GCF-CC (Module), European Union Directive 2002/95/EC (restrictions of the use of certain Hazardous Substances (RoHS) in electronic equipment), Infrastructure Interoperability Testing (IOT)
	Data Rates (Packet Mode)	Designed maximum data rate: EDGE 118 kbps UL / 236 kbps DL UMTS 384 kbps UL / 384 kbps DL HSDPA 384 kbps UL / 3.6 Mbps DL
	Chipset and Module	Qualcomm MSM6280 chipset; Sierra Wireless MC8775 module
	Maximum Output Power	32 dBm (+/-2) GSM/EDGE GMSK mode
	Power Consumption (maximum)	800mA
	Power Consumption, Sleep Mode	4 – 8mA
	Power Management	USB Selective Suspend sleep and standby mode
	Antenna Type	High efficiency 5- band antennae, mounted in the display enclosure
	Form Factor	PCI-Express MiniCard
	Weight	0.35 oz (10 g)

Technical Specifications

Dimensions (Length x Width x Thickness)	2.01 x 1.18 x 0.18 in (51 x 30 x 4.5 mm)
Voltage, Operating	3.3v +/- 10%
Temperature, Operating	-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)
LED Activity	LED Off – Radio Off; Solid LED On – Radio On
Configuration Utilities	Varies per country and mobile network operator

Intel PRO/Wireless 3945BG Network Connection	Wireless LAN Standards	IEEE 802.11b IEEE 802.11g
	Interoperability	Wi-Fi certified Cisco Compatible Extensions Program compliant with Microsoft Windows 2000 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
	Security¹	Supports 64- and 128-bit WEP, WPA, WPA2, hardware-accelerated AES, 802.1x authentication types EAP-TLS, EAP-TTLS, PEAP-GTC, PEAP-MSCHAPv2, LEAP, EAP-FAST, EAP-SIM. Support for Cisco Security Features (proven compatibility with Cisco Aironet infrastructure products through the Cisco Compatible Extensions Program Version 4).
	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: 1.8 Watts (max) Receive: 1.4 Watts (max) Idle mode ³ : 150 mW (nominal) Sleep mode: 30 mW (max)

Technical Specifications

Power Management	ACPI compliant power management 802.11 compliant power saving mode
Receiver Sensitivity⁴	54 Mbps: -72 dBm, 11 Mbps: -88 dBm , 1 Mbps: -97 dBm
Antenna Connections	2 U.FL type connectors, 50 ohm nominal impedance
Range	802.11 b – Typical 1200 feet – Outdoor Open Area (@1 Mbps) 300 feet – Indoor, Office environment 802.11 g – Typical 1200 feet – Outdoor Open Area (@1 Mbps) 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 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 Utility⁵	Microsoft Windows 2000 or XP Choice of Configuration Utility: <ul style="list-style-type: none"> • Microsoft Windows XP Wireless Network Connection Manager • Intel PROSet for Microsoft Windows 2000 or XP (required for Cisco Compatible Extensions support) Microsoft Windows Vista <ul style="list-style-type: none"> • Microsoft Windows Vista Wireless Network Connection Manager
LED Activity	LED Off – Radio OFF; Solid LED On – Radio ON <ol style="list-style-type: none"> 1. Check latest software/driver release for updates on supported security features. 2. Maximum output power may vary by country according to local regulations. 3. In Power Save Polling mode. 4. Receiver sensitivity is measured at a packet error rate of 8% for 802.11b (CKK modulation) and a packet error rate of 10% for 802.11a/g (OFDM modulation). 5. WLAN supplier's client utility is required for Cisco Compatible Extensions support with Microsoft Windows 2000 or XP. WLAN may also be compatible with certain third-party software suppliers.

Intel Wireless WiFi Link 4965AG	Wireless LAN Standards	IEEE 802.11a IEEE 802.11b IEEE 802.11g
	Interoperability	Wi-Fi certified Cisco Compatible Extensions Program compliant with Microsoft Windows 2000 and XP (details at 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

Technical Specifications

Modulation	Direct Sequence Spread Spectrum DBPSK, DQPSK, CCK, OFDM
Security¹	Supports 64- and 128-bit WEP, WPA, WPA2, hardware-accelerated AES (support for key sizes of 128, 192, and 256 bits), 802.1x authentication types EAP-TLS, EAP-TTLS, PEAP-GTC, PEAP-MSCHAPv2, LEAP, EAP-FAST. Support for Cisco Security Features (proven compatibility with Cisco Aironet infrastructure products through the Cisco Compatible Extensions Program Version 4) with Microsoft Windows 2000 and XP only.
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: 1.6 Watts (average) Receive: 1.1 Watts (average) Idle mode ³ : 30 mW (average) Radio off: 20 mW (max)
Power Management	ACPI compliant power management 802.11 compliant power saving mode
Receiver Sensitivity⁴	54 Mbps: -74 dBm, 6 Mbps: -90 dBm
Antenna Connections	2 U.FL type connectors, 50 ohm nominal impedance
Range	802.11 a – Typical 600 feet – Outdoor Open Area (@6 Mbps) 150 feet – Indoor, Office environment 802.11 b – Typical 1200 feet – Outdoor Open Area (@1 Mbps) 300 feet – Indoor, Office environment 802.11 g – Typical 1200 feet – Outdoor Open Area (@1 Mbps) 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 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)

Technical Specifications

Configuration Utility⁵	<p>Microsoft Windows 2000 or XP Choice of Configuration Utility:</p> <ul style="list-style-type: none"> • Microsoft Windows XP Wireless Network Connection Manager • Intel PROSet for Microsoft Windows 2000 or XP (required for Cisco Compatible Extensions support) <p>Microsoft Windows Vista</p> <ul style="list-style-type: none"> • Microsoft Windows Vista Wireless Network Connection Manager
LED Activity	<p>LED Off – Radio OFF; Solid LED On – Radio ON</p> <ol style="list-style-type: none"> 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 (CKK modulation) and a packet error rate of 10% for 802.11a/g (OFDM modulation). 5. WLAN supplier's client utility is required for Cisco Compatible Extensions support with Microsoft Windows 2000 or XP. WLAN may also be compatible with certain third-party software supplicants.

Intel Wireless WiFi Link 4965AGN	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 2000 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 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
	Security¹	Supports 64- and 128-bit WEP, WPA, WPA2, hardware-accelerated AES (support for key sizes of 128, 192, and 256 bits), 802.1x authentication types EAP-TLS, EAP-TTLS, PEAP-GTC, PEAP-MSCHAPv2, LEAP, EAP-FAST. Support for Cisco Security Features (proven compatibility with Cisco Aironet infrastructure products through the Cisco Compatible Extensions Program Version 4) with Microsoft Windows 2000 and XP only.
	Sub-channels	Multinational support with frequency bands and channels compliant to local regulations.
	Media Access Protocol	CSMA/CA (Collision Avoidance) with ACK
	Network Architecture	Ad-hoc (Peer to Peer)
	Models	Infrastructure (Access Point Required)

Technical Specifications

Roaming	IEEE 802.11 compliant roaming between access points
Output Power (for CKK) ²	15 dBm
Output Power (for OFDM; power varies by data rate) ²	15 dBm
Power Consumption	Transmit: 2.3 Watts (average, with two spatial streams) Receive: 1.9 Watts (average with three 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 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 2000 or XP Choice of Configuration Utility: <ul style="list-style-type: none">• Microsoft Windows XP Wireless Network Connection Manager• Intel PROSet for Microsoft Windows 2000 or XP (required for Cisco Compatible Extensions support) Microsoft Windows Vista <ul style="list-style-type: none">• Microsoft Windows Vista Wireless Network Connection Manager
LED Activity	LED Off – Radio OFF; Solid LED On – Radio ON

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

Technical Specifications

Broadcom 4311AG 802.11a/b/g WiFi Adapter	Wireless LAN Standards	IEEE 802.11a IEEE 802.11b IEEE 802.11g						
	Interoperability	Wi-Fi certified Cisco Compatible Extensions Program compliant with Microsoft Windows 2000 and XP (details at 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						
	Modulation	Direct Sequence Spread Spectrum DBPSK, DQPSK, CCK, OFDM						
	Security¹	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).						
	Sub-channels	Multinational support with frequency bands and channels compliant to local regulations.						
	Media Access Protocol	CSMA/CA (Collision Avoidance) with ACK						
	Network Architecture	Ad-hoc (Peer to Peer)						
	Models	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; 15 dBm power varies by data rate)²	15 dBm						
	Power Consumption	Transmit: 2.0 W (max) Receive: 1.5 W (max) Idle mode ³ : 390 mW (nominal) Sleep mode: 20 mW (max)						
	Power Management	ACPI compliant power management 802.11 compliant power saving mode						
	Receiver Sensitivity⁴	54 Mbps: -72 dBm, 11 Mbps: -88 dBm , 1 Mbps: -97 dBm						
	Antenna type	High efficiency dual band antenna with spatial diversity, mounted in the display enclosure						
	Range	<table border="0"> <tr> <td>802.11 a – Typical (@6 Mbps)</td> <td>600 feet – Outdoor Open Area 150 feet – Indoor, Office environment</td> </tr> <tr> <td>802.11 b – Typical (@1 Mbps)</td> <td>1200 feet – Outdoor Open Area 300 feet – Indoor, Office environment</td> </tr> <tr> <td>802.11 g – Typical (@1 Mbps)</td> <td>1200 feet – Outdoor Open Area 300 feet – Indoor, Office environment</td> </tr> </table>	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
	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)							

Technical Specifications

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 Utility⁵	Microsoft Windows 2000 or XP Choice of Configuration Utility:	
	<ul style="list-style-type: none"> • Microsoft Windows XP Wireless Network Connection Manager • Broadcom Wireless Configuration Utility (required for Cisco Compatible Extensions support) 	
	Microsoft Windows Vista	
	<ul style="list-style-type: none"> • Microsoft Windows Vista Wireless Network Connection Manager 	
LED Activity	LED Off – Radio OFF; Solid LED On – Radio ON	
	<ol style="list-style-type: none"> 1. Check latest software/driver release for updates on supported security features. 2. Maximum output power may vary by country according to local regulations. 3. In Power Save Polling mode. 4. Receiver sensitivity is measured at a packet error rate of 8% for 802.11b (CKK modulation) and a packet error rate of 10% for 802.11a/g (OFDM modulation). 5. WLAN supplier's client utility is required for Cisco Compatible Extensions support with Microsoft Windows 2000 or XP. WLAN may also be compatible with certain third-party software suppliers. 	
<hr/>		
Broadcom 4311BG 802.11b/g WiFi Adapter	Wireless LAN Standards	IEEE 802.11b IEEE 802.11g
	Interoperability	Wi-Fi certified Cisco Compatible Extensions Program compliant with Microsoft Windows 2000 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
	Security¹	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).
	Sub-channels	Multinational support with frequency bands and channels compliant to local regulations.
	Media Access Protocol	CSMA/CA (Collision Avoidance) with ACK

Technical Specifications

Network Architecture	Ad-hoc (Peer to Peer)	
Models	Infrastructure (Access Point Required)	
Roaming	IEEE 802.11 compliant roaming between access points	
Output Power (for CKK)²	17.5 dBm	
Output Power (for OFDM; 15 dBm power varies by data rate)²		
Power Consumption	Transmit: 2.0 W (max) Receive: 1.5 W (max) Idle mode ³ : 390 mW (nominal) Sleep mode: 20 mW (max)	
Power Management	ACPI compliant power management 802.11 compliant power saving mode	
Receiver Sensitivity⁴	54 Mbps: -72 dBm, 11 Mbps: -88 dBm , 1 Mbps: -97 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	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 Utility⁵	Microsoft Windows 2000 or XP Choice of Configuration Utility: <ul style="list-style-type: none">● Microsoft Windows XP Wireless Network Connection Manager● Broadcom Wireless Configuration Utility (required for Cisco Compatible Extensions support) Microsoft Windows Vista <ul style="list-style-type: none">● Microsoft Windows Vista Wireless Network Connection Manager	
LED Activity	LED Off – Radio OFF; Solid LED On – Radio ON	
	<ol style="list-style-type: none">1. Check latest software/driver release for updates on supported security features.2. Maximum output power may vary by country according to local regulations.3. In Power Save Polling mode.4. Receiver sensitivity is measured at a packet error rate of 8% for 802.11b (CKK modulation) and a packet error rate of 10% for 802.11a/g (OFDM modulation).5. WLAN supplier's client utility is required for Cisco Compatible Extensions support with Microsoft	

Technical Specifications

Windows 2000 or XP. WLAN may also be compatible with certain third-party software supplicants.

Broadcom 4321AGN 802.11a/b/g/draft-n WiFi Adapter	Wireless LAN Standards	IEEE 802.11a IEEE 802.11b 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 2000 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: 5 GHz band only
	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 2000 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: 300 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

Technical Specifications

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	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 Utility⁴	Microsoft Windows 2000 or XP Choice of Configuration Utility:	
	<ul style="list-style-type: none"> ● Microsoft Windows XP Wireless Network Connection Manager ● Broadcom Wireless Configuration Utility (required for Cisco Compatible Extensions support) 	
	Microsoft Windows Vista	
	<ul style="list-style-type: none"> ● Microsoft Windows Vista Wireless Network Connection Manager 	
LED Activity	LED Off – Radio OFF; Solid LED On – Radio ON	
	<ol style="list-style-type: none"> 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 (CKK 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 2000 or XP. WLAN may also be compatible with certain third-party software supplicants. 	

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)

Technical Specifications

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
OS Support	Genuine Windows Vista Genuine Windows XP Genuine 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)

Technical Specifications

Hands Free Profile (HFP)

Advanced Audio Distribution Profile (A2DP)

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

Environmental 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:

- ENERGY STAR 4.0
- US Federal Energy Management Program (FEMP)
- Taiwan Green Mark
- China Energy Conservation Program (CECP)
- ECO declaration
- Korean Eco Label
- EPEAT Silver Rating

System Configuration

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

Energy Consumption

	115 VAC	230 VAC	100 VAC
Normal Operation	13.89 W	13.86 W	13.87 W
Sleep (Energy Star low power mode)	0.8524 W	1.028 W	0.8504 W
Off	1.258 W	1.48 W	1.225 W

Heat Dissipation*

	115 VAC	230 VAC	100 VAC
Normal Operation	47.392 BTU/hr	47.29 BTU/hr	47.324 BTU/hr
Sleep	2.908 BTU/hr	3.507 BTU/hr	2.901 BTU/hr
Off	4.292 BTU/hr	5.049 BTU/hr	4.179 BTU/hr

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

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

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

Sound Power (LWAd, bels)

Sound Pressure (LpAm, decibels)

Idle	3.2	25
Operating mode (HDD)	4.7	40

Batteries

This product complies with ISO standards:

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

Batteries used in the product do not contain:

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

Technical Specifications

Additional information:

The battery type and chemistry used in the product is:

CR2032 (coin cell), Lithium
8 cell rechargeable Lithium-Ion battery

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

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

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

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

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

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

This product is greater than 95% recyclable when properly disposed of at end of life.

Packaging Materials

- External:
 - Corrugated / Paper – 1.0 lb (453 g)
- Internal:
 - EPE Foam – 0.15 lb (70 g)
 - LDPE Bag – 0.01 lb (5 g)
- The corrugated paper packaging materials contains at least 40% recycled content.

HP follows these guidelines to decrease the environmental impact of product packaging:

- Eliminate the use of heavy metals such as lead, chromium, mercury and cadmium in packaging materials.
- Eliminate the use of ozone-depleting substances (ODS) in packaging materials.
- Design packaging materials for ease of disassembly.
- Maximize the use of post-consumer recycled content materials in packaging materials.
- Use readily recyclable packaging materials such as paper and corrugated materials.
- Reduce size and weight of packages to improve transportation fuel efficiency.
- Plastic packaging materials are marked according to ISO 11469 and DIN 6120 standards.

Material Usage

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

Technical Specifications

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

End-of-life Management and Recycling

HP offers our customers several other options for handling their aging computers while also minimizing the impact on the environment—including product trade-in and leasing services—in addition to recycling services.

Please go to: <http://www.hp.com/recycle> or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner.

Hewlett-Packard Corporate Environmental Information

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

Global Citizenship Report

<http://www.hp.com/hpinfo/globalcitizenship/gcreport/index.html>

Environment website

<http://www.hp.com/environment>

Eco-label certifications

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

ISO 14001 certificates:

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

Technical Specifications

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