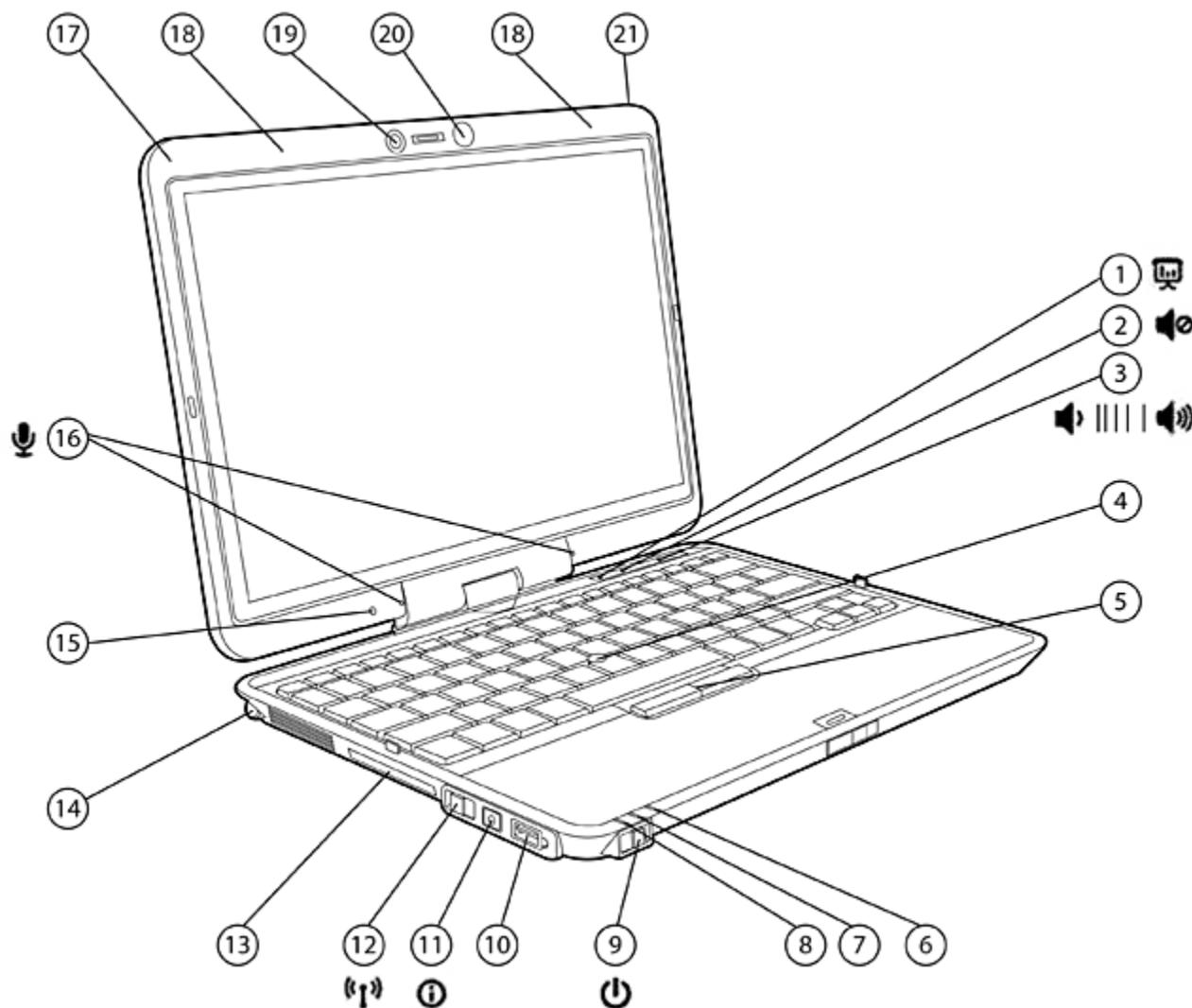


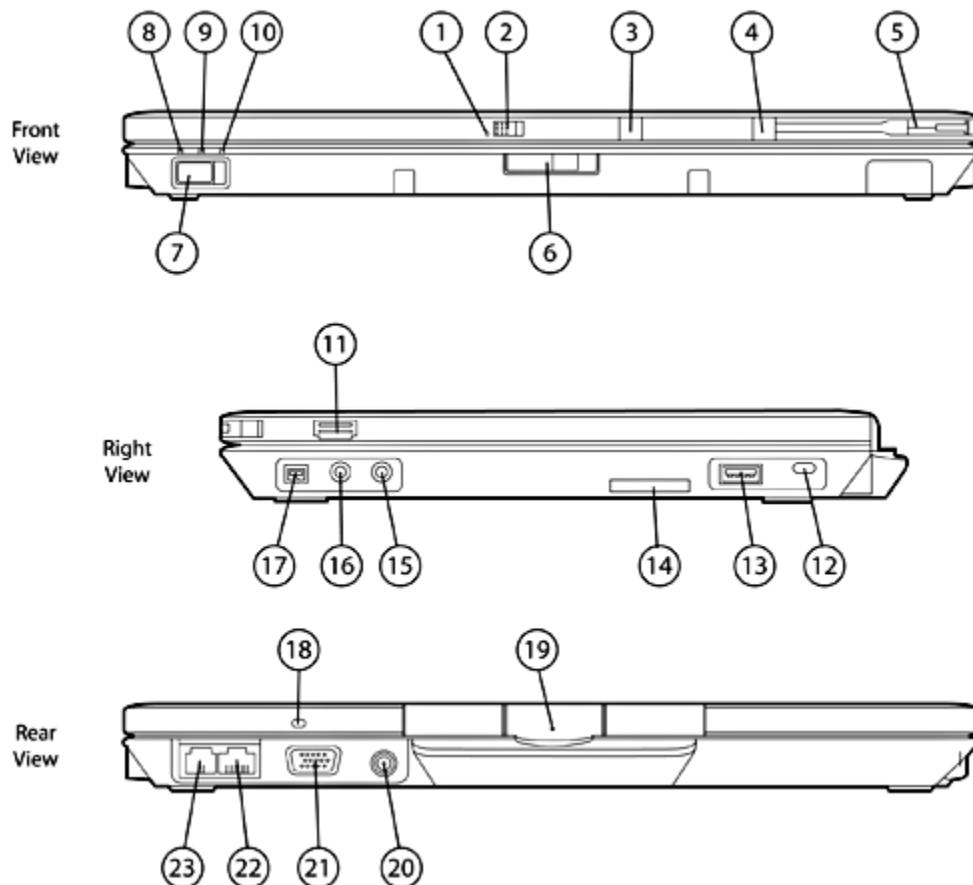
### Overview

HP recommends  
Windows Vista® Business



- |   |  |
|---|--|
| 1. HP Presentation button with LED indicator                  | 11. HP Info / HP QuickLook button            |
| 2. Volume mute button with LED indicator                      | 12. Wireless on/off with LED                 |
| 3. Volume scroll zone with up/down LED indicators             | 13. ExpressCard/54 slot or Smart Card Reader |
| 4. Pointstick   | 14. Pen slot                                 |
| 5. Pointstick buttons   | 15. Ambient light sensor                     |
| 6. Hard drive / optical drive activity / HP 3D DriveGuard LED | 16. Dual-microphone array                    |
| 7. Battery charging LED                                       | 17. Internal WWAN antenna                    |
| 8. Power/standby LED  | 18. Two internal WLAN antennas               |
| 9. Power on/off   | 19. Integrated camera (select models)        |
| 10. USB 2.0 port (powered)                                    | 20. HP Night Light                           |
|   | 21. External WWAN antenna                    |

### Overview



- |  |   |
|--|---|
| <ol style="list-style-type: none"> <li>1. Camera LED (select models)</li> <li>2. Camera mode switch (select models)</li> <li>3. HP Night Light button</li> <li>4. External WWAN antenna button</li> <li>5. External WWAN antenna</li> <li>6. Display release latch</li> <li>7. Power on/off</li> <li>8. Power/standby LED</li> <li>9. Battery charging LED</li> <li>10. Hard drive activity / HP 3D DriveGuard LED</li> <li>11. HP Fingerprint Sensor</li> <li>12. Kensington Lock slot</li> </ol> | <ol style="list-style-type: none"> <li>13. USB 2.0 port</li> <li>14. Secure Digital (SD) slot</li> <li>15. Stereo microphone in</li> <li>16. Stereo headphone/line out</li> <li>17. 1394a port</li> <li>18. Windows security button (ctl-alt-del)</li> <li>19. Convertible Hinge</li> <li>20. Power connector</li> <li>21. VGA/external monitor connector</li> <li>22. RJ-45/Ethernet port</li> <li>23. RJ-11/modem port</li> </ol> |
|--|---|

### Overview

#### At A Glance

- Genuine Windows Vista Business\*, Genuine Windows XP Tablet PC Edition, or FreeDOS
- Convertible tablet design starting at 3.7 lb/1.68 kg and 1.11 inch thin
- 12.1-inch diagonal Illumi-LiteWXGA ultra wide-viewing angle display with Digitizer, Ambient Light Sensor, and optional Outdoor View
- Flexible wireless connectivity options:
  - Integrated HP ev2210 1xEVDO-A or HP hs2300 HSDPA Broadband Wireless module
  - Integrated 802.11 a/b/g/draft-n, a/b/g, or b/g wireless LAN module
  - Bluetooth®
- Optional integrated camera
- HP Night Light
- Intel® Centrino® Pro processor technology capable, with Intel Core™2 Duo ULV processors
- Connectors for HP 2700 Ultra-Slim Expansion Base and HP 2700 Ultra-Slim Battery
- Enhanced security features including HP Fingerprint Sensor, TPM 1.2\*\*, optional Smart Card Reader, and Drive Encryption for HP ProtectTools
- HP QuickLook on Windows Vista models for instant access to email, calendar, and contact information
- ExpressCard/54 slot
- Full magnesium alloy enclosure, chemically-strengthened glass over display, HP DuraKeys and HP DuraFinish
- Up to 100-GB 4200 rpm, user-removable hard drive protected by HP 3D DriveGuard
- Up to 4 GB of 667-MHz DDR2 SDRAM (runs at 533-MHz), dual channel memory support
- Touch-sensitive controls
- Integrated Intel Gigabit Network Connection (10/100/1000 NIC)
- 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 use is restricted by law; for example, Russia and China.

### Standard Features

**Processors** Intel Core 2 Duo ULV Processor U7500 (1.06-GHz, 533-MHz, 2-MB L2 cache)  
Intel Core 2 Duo ULV Processor U7600 (1.20-GHz, 533-MHz, 2-MB L2 cache)

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**Operating System**      **Preinstalled**      Genuine Windows Vista Business<sup>†</sup>\*  
Genuine Windows XP Tablet PC Edition  
FreeDOS

**Supported**      Genuine Windows Vista Enterprise\*

**Certified**      SuSE Linux Enterprise Desktop 10

<sup>†</sup> 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>.

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**Chipset**      Mobile Intel GM965

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**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.

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**Graphics**      Mobile Intel GMA X3100, up to 384 MB of shared system memory  
Microsoft DirectX9 capable

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**Integrated Camera**      2 Megapixel (1600 x 1200 max resolution)  
(select models)      Manual adjust Macro lens  
Full 30 frames/sec video at 800x600 or VGA (640x480) resolution

**NOTE:** Frame rates are dependent on lighting and are slower if lighting is not ideal.

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### Standard Features

<b>Display</b>	<b>Internal</b>	12.1-inch diagonal Illumi-Lite WXGA UWVA anti-glare with Digitizer (1280 × 800 resolution) Ambient light sensor Optional Outdoor View*
	<b>External</b>	Up to 32-bit per pixel color depth <b>VGA</b> port supports resolutions up to 2048 x 1536 at 75 Hz, and lower resolutions at up to 100 Hz <b>NOTE:</b> Resolutions are dependent upon monitor capability, and resolution and color depth settings.

\* A display with optional Outdoor View is a 12.1-inch diagonal WXGA UWVA anti-glare display with Digitizer that provides enhanced viewable improvements:

- 12% increase in front of screen display brightness with no loss of battery life
- Up to 235% increase in contrast, resulting in better viewability, at wide viewing angles
- 25% less specular reflections in bright light
- 91% less diffuse reflections in bright light
- 67% more contrast in bright sunlight

**NOTE:** This data is based on typical measurements by the display manufacturer. Actual measurements may vary from panel to panel.

<b>Memory</b>	<b>Standard</b>	512-MB, 1024-MB, 2048-MB, or 4096-MB 667-MHz* DDR2 SDRAM; two SODIMM slots supporting dual channel memory
	<b>Maximum</b>	Upgradeable to 4096-MB with 2048-MB SODIMM in slots 1 and 2
	<b>Dual-channel</b>	Maximized dual-channel performance requires SODIMMs of the same size and speed in both memory slots.

\* Operates at a maximum of 533-MHz with 667-MHz memory.

**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. Above 3-GB, all memory may not be available due to system resource requirements.

<b>Communications</b>	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.
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<b>Wireless Devices</b>	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 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.
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<b>HP ev2210 1xEVDO-A Broadband Wireless Module</b>	Integrated WWAN module connects to the Sprint Mobile Broadband or Verizon Wireless BroadbandAccess and NationalAccess networks (US only) Supports CDMA 1xEVDO-A, 1xRTT connections at 800 and 1900 MHz. <b>NOTE:</b> Separately purchased Sprint Mobile Broadband or Verizon
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### Standard Features

	<p>Wireless service is required. For details, go to <a href="http://www.hp.com/go/broadbandwireless">http://www.hp.com/go/broadbandwireless</a>.</p> <p>Upgradeable design and two 850/900/1800/1900/2100-MHz antennas (one inside the top of the display panel and one extendable) support current and future WWAN technologies.</p>
<b>HP hs2300 HSDPA Broadband Wireless Module</b>	<p>Integrated WWAN module that provides connection to GSM, GPRS, EDGE, UMTS, and HSDPA mobile networks in many countries. Currently supported networks are the AT&amp;T Broadbandconnect network in the U.S., Vodafone networks in select countries, and roaming on AT&amp;T and Vodafone partner networks in more than 100 countries.</p> <p><b>NOTE:</b> Separately purchased mobile network operator service is required.</p> <p>Upgradeable design and two 850/900/1800/1900/2100-MHz antennas (one inside the top of the display panel and one extendable) support current and future WWAN technologies.</p>
<b>All 802.11a/b/g integrated wireless LAN options</b>	<p>Wi-Fi certified</p> <p>Cisco Compatible Extensions support (Version 4.0) with Microsoft Windows XP</p> <p>Wired Equivalent Privacy (WEP) support up to 128-bit keys</p> <p>Wi-Fi Protected Access (WPA) and WPA2 support</p> <p>802.1x authentication support, including EAP-TLS, EAP-TTLS, PEAP-GTC, PEAP-MSCHAPv2, and LEAP</p> <p>Advanced Encryption Standard (AES) support</p> <p>WiFi certified for WPA2, WMM</p> <p>Three antennas integrated in the display enclosure</p>
<b>Intel Wireless WiFi Link 4965AGN</b>	<p>Integrated support for 802.11a, b, g, and draft-n</p> <p>Up to 300-mbps data rate</p>
<b>Intel Wireless WiFi Link 4965AG</b>	<p>Integrated support for 802.11 a, b and g</p> <p>Up to 54-mbps data rate</p>
<b>Intel PRO/Wireless 3945BG Network Connection</b>	<p>Integrated support for 802.11 b and g</p> <p>Up to 54-mbps data rate</p>
<b>Broadcom 4321AGN 802.11a/b/g/draft-n WiFi Adapter</b>	<p>Integrated support for 802.11a, b, g, and draft-n</p> <p>Up to 300-mbps data rate</p>
<b>Broadcom 4311AG 802.11a/b/g WiFi Adapter</b>	<p>Integrated support for 802.11 a, b and g</p> <p>Up to 54-mbps data rate</p>
<b>Broadcom 4311BG 802.11b/g WiFi Adapter</b>	<p>Integrated support for 802.11 b and g</p> <p>Up to 54-mbps data rate</p>
<b>HP Integrated Module with Bluetooth Wireless Technology</b>	<p>Bluetooth Specification v2.0 compliant</p> <p>Works with a wide range of Bluetooth devices</p>

### Standard Features

<b>Keyboard</b>	<p>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.</p> <p>HP DuraKeys is a clear coating applied over the notebook keyboard that helps protect the finish and the printed characters on the keys.</p> <p>HP DuraFinish helps protect the finish on the keyboard deck, graphics, and icons from normal wear and tear.</p>	
<b>Touch-sensitive controls</b>	<p>Touch-sensitive controls provide easy access to the following features: HP Presentation button, Volume mute button, and Volume scroll zone</p>	
<b>Pointing device</b>	<p>Pointstick, two pick buttons Digital Eraser Pen with tether and clip</p>	
<b>Expansion card slots</b>	<p><b>ExpressCard/54 slot</b> or <b>Optional Integrated Smart Card Reader</b> (replaces ExpressCard slot) <b>Secure Digital slot</b></p>	<p>Supports ExpressCard/54 and ExpressCard/34  Compatible with ISO 7816 compliant Smart Cards PC/SC interface support  Supports SD (Secure Digital), MMC (MultiMedia Card)</p>
<b>Storage</b>	<p><b>Hard drives</b> (1.8" SMART PATA)  <b>HP 3D DriveGuard</b>  <b>External Optical Drives</b>  <b>Second Hard Drive</b></p>	<p>60/80/100-GB 4200 rpm  <b>NOTE:</b> These hard drives are customer removable and will withstand multiple insertion/removal cycles. Up to 10 GB is reserved for the system recovery software.  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.  Via optional HP 2700 Ultra-Slim Expansion Base: 7mm DVD+/-RW SuperMulti Drive  Via optional HP External MultiBay II (9.5-mm): MultiBay II DVD-ROM Drive MultiBay II DVD/CD-RW Combo Drive MultiBay II DVD+/-RW SuperMulti DL Drive  Via optional HP External MultiBay II (9.5-mm): MultiBay II 80-GB 5400 rpm Hard Drive</p>

### Standard Features

<b>Interfaces</b>	<b>ExpressCard/54 slot</b>	Supports ExpressCard/54 and ExpressCard/34
	<b>Smart Card Reader</b>	Optional (replaces ExpressCard/54 slot)
	<b>External monitor</b>	One – VGA
	<b>1394a</b>	One
	<b>Stereo microphone in</b>	One
	<b>Stereo headphone/line out</b>	One
	<b>Power connector</b>	One
	<b>RJ-11/modem</b>	One
	<b>RJ-45/Ethernet</b>	One
	<b>USB 2.0</b>	Two (including one powered USB 2.0 port to support HP External MultiBay II)
	<b>Docking connector</b>	For HP 2700 Ultra-Slim Expansion Base
	<b>Secondary battery connector</b>	For HP 2700 Ultra-Slim Battery
	<b>LED status indicators</b>	Thirteen

<b>Audio</b>	High Definition Audio support w/24-bit DAC Integrated mono speaker Integrated dual-microphone array Touch-sensitive controls for volume up, volume down, and mute Stereo headphone/line out Stereo microphone in
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<b>Software</b>	<b>Preinstalled software with Windows Vista or Windows XP</b>	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) Symantec Norton Internet Security with complimentary 60-day live update Intervideo WinDVD – DVD Player NewSoft Presto! BizCard (for camera configurations)
	<b>Additional software available from the web</b>	HP Client Manager Java Card Security for HP ProtectTools

### Standard Features

#### 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 CD-RW or DVD+/-RW 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

HP ProtectTools Security Manager  
 HP Fingerprint Sensor  
 Configuration Control Hardware  
 Memory Change Alert  
 Ownership Tag  
 Setup Password  
 Power-On Password  
 TPM 1.2 Embedded Security Chip\*  
 TPM Enhanced DriveLock\*  
 HP Disk Sanitizer  
 HP 3D DriveGuard  
 Kensington Lock Slot  
 Windows Security Button (pen-activated Ctrl-Alt-Del)  
 Support for Computrace / LoJack for Laptops (must be purchased separately)

#### Optional Features

**Smart Card Reader**      Compatible with ISO 7816 compliant Smart Cards  
 (replaces ExpressCard/54 slot)      PC/SC interface support

\*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>.

### 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 does not apply to the optional HP 2700 Ultra-Slim Battery.

### Battery

#### Primary Battery

6-cell (44 WHr) high capacity Lithium-Ion with fuel gauge LEDs



### Standard Features

<b>Battery Life</b>	<b>Primary Battery</b>	Up to 5 hours and 30 minutes
	<b>Primary Battery and Optional HP 2700 Ultra-Slim Battery</b>	Up to 11 hours and 45 minutes

**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.

<b>System Standby Time</b>	Up to 1 week
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<b>Power Conservation</b>	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
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<b>Docking (optional)</b>	HP 2700 Ultra-Slim Expansion Base with 7mm DVD+/-RW SuperMulti Drive
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<b>Service and Support</b>	HP Services offers limited 3-year, 1-year and 90-day warranty options depending on country; 1-year limited warranty on primary battery and digital eraser pen. On-site service and warranty upgrades are also available. For HP Care Pack services see <a href="http://www.hp.com/go/lookuptool">http://www.hp.com/go/lookuptool</a> . <b>NOTE:</b> Certain restrictions and exclusions apply. Consult the HP Customer Support Center for details. <a href="http://h20000.www2.hp.com/bizsupport/TechSupport/ProductRoot.jsp">http://h20000.www2.hp.com/bizsupport/TechSupport/ProductRoot.jsp</a> .
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### Select Model(s)

<b>2710p</b> GP590AW#xxx (may vary based on local regulatory requirements)	<b>Processor</b>	Intel Core 2 Duo ULV Processor U7600 (1.20-GHz, 533-MHz, 2-MB L2 cache)
	<b>Intel Centrino Pro processor technology</b>	Enabled
	<b>Operating System</b>	Genuine Windows Vista Business 32/64
	<b>System Memory</b>	1024 MB 667-MHz* DDR2 (1 DIMM)
	<b>Hard Drive</b>	80-GB 4200 rpm 1.8" SMART PATA
	<b>Display</b>	12.1-inch diagonal Illumi-Lite WXGA UWVA anti-glare with Digitizer
	<b>Graphics</b>	Mobile Intel GMA X3100
	<b>Audio</b>	ADI High Definition CODEC Stereo headphone/line out and microphone in Integrated microphone
	<b>Communications</b>	Integrated Intel Gigabit Network Connection (10/100/1000 NIC) 56K V.92 modem
	<b>Integrated Wireless</b>	Intel Wireless WiFi Link 4965AG
	<b>Integrated Security</b>	Drive Encryption for HP ProtectTools HP Fingerprint Sensor TPM 1.2**
	<b>Pointing Device</b>	Pointstick Digital eraser pen
	<b>Battery</b>	6-cell (44 WHr) Lithium-Ion

### Standard Features

**Power** External 65W adapter

**Warranty** 3/3/0

\* System runs at a maximum of 533-MHz.

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

### Options

<b>Memory</b>	HP 512-MB (DDR2 667 MHz) SODIMM	EM993AA
	HP 1-GB (DDR2 667 MHz) SODIMM	EM994AA
	HP 2-GB (DDR2 667 MHz) SODIMM	EM995AA
<b>MultiBay II Storage</b> (9.5-mm) <b>NOTE:</b> Requires HP External MultiBay II	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
<b>Other Storage</b>	HP Notebooks USB Diskette Drive	DC361B
<b>Communications</b>	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
<b>Expansion Solutions</b>	HP 2700 Ultra-Slim Expansion Base with 7mm DVD+/-RW SuperMulti Drive	GD229AA#xxx
	HP External MultiBay II	PA509A#xxx
<b>Power</b>	HP 2700 Ultra-Slim Battery	RX932AA
	HP 65W Smart AC Adapter	ED494AA#xxx
	HP 90W Smart Auto Adapter	ED493AA
	HP 65W AC/Auto/Air Combo Smart Adapter	ED993AA#xxx
	HP 6-Cell Li-Ion Primary Battery	AH547AA
<b>Carrying Cases</b>	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
<b>Security</b>	HP ProtectTools Java Card – 10 units	EL348AA
	HP/Kensington MicroSaver Security Lock	PC766A
	HP Notebook Productivity Bundle	GC832AA
<b>Input/Output Devices</b>	HP Tablet PC Tether/Eraser Pen	PL800A
	HP USB Keyboard & Mouse Bundle	RC465AA#xxx
	HP USB/PS2 Optical 2-Button Scroll Mouse	DC369A
	HP USB Optical Travel Mouse	RH304AA

### Memory

667-MHz\* DDR2 SDRAM

Two DIMM slots supporting dual channel memory

DIMM sizes supported: 512 MB, 1024 MB, 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. Above 3-GB, all memory may not 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

\* System runs at a maximum of 533-MHz.

### Storage

#### Hard Drive Support

Primary Hard Drives (1.8" SMART PATA)	Quantity Supported	Drive Bay
60-GB 4200 rpm	One	Dedicated hard drive bay
80-GB 4200 rpm	One	Dedicated hard drive bay
100-GB 4200 rpm	One	Dedicated hard drive bay

#### Optical Drive Support

External Optical Drives	Quantity Supported	Optional Expansion Unit
7mm DVD+/-RW SuperMulti Drive	One	HP 2700 Ultra-Slim Expansion Base
MultiBay II DVD-ROM Drive	One	HP External MultiBay II
MultiBay II DVD/CD-RW Combo Drive		
MultiBay II DVD+/-RW SuperMulti DL Drive		

### Technical Specifications

<b>System Unit</b>	<b>Dimensions (HxWxD)</b>	1.11 in (at front) x 11.42 in x 8.35 in 28.2 mm (at front) x 290 mm x 212 mm
	<b>Weight</b>	Starting from 3.7 lb (1.68 kg)
	<b>NOTE:</b> Height varies depending upon where on the notebook the measurement is made. Starting weight includes 6-cell battery, hard drive, 512-MB memory, 802.11 wireless communications module. Weight varies by configuration and components.	
<b>Stand-Alone Power Requirements</b> (AC Power)	<b>Nominal Operating Voltage</b>	18.5 V
	<b>Average Operating Power</b>	12.5 W
	<b>Max Operating Power</b>	< 65 W
<b>Temperature</b>	<b>Operating</b>	32° to 95° F (0° to 35° C) (not writing optical) 41° to 95° F (5° to 35° C) (writing optical)
	<b>Non-operating</b>	-4° to 140° F (-20° to 60° C)
<b>Relative Humidity</b>	<b>Operating</b>	10% to 90%, non-condensing
	<b>Non-operating</b>	5% to 95%, 101.6° F (38.7° C) maximum wet bulb temperature
<b>Shock</b>	<b>Operating</b>	125 G, 2 ms, half-sine
	<b>Non-operating</b>	200 G, 2 ms, half-sine
<b>Random Vibration</b>	<b>Operating</b>	0.75 grms
	<b>Non-operating</b>	1.50 grms
<b>Altitude</b> (unpressurized)	<b>Operating</b>	-50 to 10,000 ft (-15.24 to 3,048 m)
	<b>Non-operating</b>	-50 to 40,000 ft (-15.24 to 12,192 m)
<b>Industry Standard Certifications</b>	<b>UL</b>	Yes
	<b>CSA</b>	Yes
	<b>FCC Compliance</b>	Yes
	<b>ENERGY STAR® 4.0</b>	Yes
	<b>ICES</b>	Yes
	<b>GS</b>	Yes
	<b>Australia / NZ A-Tick Compliance</b>	Yes
	<b>CCC</b>	Yes
	<b>Japan VCCI Compliance</b>	Yes
	<b>MIC</b>	Yes
	<b>BSMI</b>	Yes
	<b>CE Marking Compliance</b>	Yes
	<b>BNCI or BELUS</b>	Yes
	<b>CIT</b>	Yes
	<b>GOST</b>	Yes
	<b>Saudi Arabian Compliance (ICCP)</b>	Yes
<b>SABS</b>	Yes	
<b>UKRSERTCOMPUTER</b>	Yes	

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

### Technical Specifications

<b>HP 65W Smart AC Adapter</b>	<b>Dimensions</b>	4.17 x 1.85 x 1.1 in (10.6 x 4.7 x 2.8 cm)		
	<b>Weight</b>	0.62 lb (280 g)		
	<b>Input</b>	100 to 240 VAC		
		Input Efficiency	83% min at 115 VAC	
		Input frequency range	47 to 63 Hz	
		Input AC current	1.7 A at 90 VAC, 0.85 A at 180 VAC	
	<b>Output</b>	Output power 65W	65W	
		DC output	18.5V	
		Hold-up time	5 msec at 115 VAC input	
		Output current limit	<11A, Over voltage protection- 29V max automatic shutdown	
	<b>Connector</b>	3 pin/grounded, mates with interchangeable cords		
	<b>Environmental Design</b>	Operating temperature	32° to 104° F (0° to 40° C)	
		Non-operating (storage) temperature	-4° to 149° F (-20° to 65° C)	
		Altitude	0 to 10,000 ft (0 to 3,048 m)	
		Humidity	20% to 80%	
	Storage Humidity	10% to 90%		
<b>EMI and Safety Certifications</b>	CE Mark – full compliance with LVD and EMC directives; Worldwide safety standards – 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.			

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<b>Optional HP 2700 Ultra-Slim Battery</b>	<b>Dimensions (H x W x L)</b>	0.7 x 7.5 x 10.6 in (1.8 x 19.1 x 26.9 cm)		
	<b>Weight</b>	1.24 lb (0.561 kg)		
	<b>Cells/Type</b>	6-cell Lithium-Ion		
	<b>Energy</b>	Watt-hour Capacity	46Wh	
	<b>Temperature</b>	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)	
	<b>Battery Re-Charge Time</b>	System in OFF mode or Standby	2.5 hours	
		System ON	3 to 5 hours (depending on system power consumption)	
	<b>Fuel Gauge</b>	When pressed, LEDs light indicating level of charge remaining on battery		

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### Technical Specifications

<b>6-Cell (44Whr) Lithium-Ion battery</b>	<b>Dimensions (H x W x L)</b>	0.6 x 2.7 x 8.3 in (1.4 x 6.8 x 21.1 cm)		
	<b>Weight</b>	0.64 lb (0.291 kg)		
	<b>Cells/Type</b>	6-cell Lithium-Ion		
	<b>Energy</b>	Watt-hour Capacity	44Wh	
	<b>Temperature</b>	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)	
	<b>Battery Re-Charge Time</b>	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	
<b>Fuel Gauge</b>	When pressed, LEDs light indicating level of charge remaining on battery			

<b>12.1-inch Illumi-Lite WXGA UWVA, anti-glare with Digitizer</b>	<b>Active Area (W x H)</b>	10.3 x 6.4 in (26.1 x 16.3 cm)		
	<b>Diagonal Size</b>	12.1 in (30.7 cm)		
	<b>Surface Treatment</b>	Anti-glare		
	<b>Contrast Ratio</b>	300:1 (typical)		
	<b>Refresh Rate</b>	60 Hz		
	<b>Brightness</b>	200 nit (typical)		
	<b>Pixel Resolution</b>	<b>Pitch</b>	0.204 mm	
		<b>Format</b>	1280 x 800	
		<b>Configuration</b>	RGB Stripe	
	<b>Backlight</b>	LED		
<b>PPI</b>	125			
<b>Viewing Angle</b>	±80° Horizontal, ±80° Vertical (typical)			

<b>12.1-inch Illumi-Lite WXGA UWVA, anti-glare with Digitizer and Outdoor View</b>	<b>Active Area (W x H)</b>	10.3 x 6.4 in (26.1 x 16.3 cm)		
	<b>Diagonal Size</b>	12.1 in (30.7 cm)		
	<b>Surface Treatment</b>	Anti-glare		
	<b>Contrast Ratio</b>	300:1 (typical)		
	<b>Refresh Rate</b>	60 Hz		
	<b>Brightness</b>	200 nit (typical)		
	<b>Pixel Resolution</b>	<b>Pitch</b>	0.204 mm	
		<b>Format</b>	1280 x 800	
		<b>Configuration</b>	RGB Stripe	
	<b>Backlight</b>	LED		
<b>PPI</b>	125			
<b>Viewing Angle</b>	±80° Horizontal, ±80° Vertical (typical)			

### Hard Drives

### Technical Specifications

<b>100-GB 4200 rpm 1.8" PATA</b>	<b>Drive Weight</b>	0.13 lb (59 g)		
	<b>Capacity</b>	100 GB		
	<b>Height</b>	0.31 in (8 mm)		
	<b>Width</b>	2.12 in (54 mm)		
	<b>Interface</b>	ATA-6		
	<b>Transfer Rate</b>	<b>Synchronous</b> (maximum)	100 MB/s (Drive Capability)	
	<b>Seek Time</b> (typical reads, including settling)	<b>Single Track</b>	3 ms	
		<b>Average</b>	15 ms	
		<b>Maximum</b>	26 ms	
	<b>Rotational Speed</b>	4200 rpm		
	<b>Logical Blocks</b>	195,371,568		
<b>Operating Temperature</b>	41° to 140° F (5° to 60° C) [case temp]			
<b>Features</b>	ATA Security			

<b>80-GB 4200 rpm 1.8" PATA</b>	<b>Drive Weight</b>	0.13 lb (59 g)		
	<b>Capacity</b>	80 GB		
	<b>Height</b>	0.31 in (8 mm)		
	<b>Width</b>	2.12 in (54 mm)		
	<b>Interface</b>	ATA-6		
	<b>Transfer Rate</b>	<b>Synchronous</b> (maximum)	100 MB/s (Drive Capability)	
	<b>Seek Time</b> (typical reads, including settling)	<b>Single Track</b>	3 ms	
		<b>Average</b>	15 ms	
		<b>Maximum</b>	26 ms	
	<b>Rotational Speed</b>	4200 rpm		
	<b>Logical Blocks</b>	156,301,488		
<b>Operating Temperature</b>	41° to 140° F (5° to 60° C) [case temp]			
<b>Features</b>	ATA Security			

<b>60-GB 4200 rpm 1.8" PATA</b>	<b>Drive Weight</b>	0.13 lb (59 g)		
	<b>Capacity</b>	60 GB		
	<b>Height</b>	0.31 in (8 mm)		
	<b>Width</b>	2.12 in (54 mm)		
	<b>Interface</b>	ATA-6		
	<b>Transfer Rate</b>	<b>Synchronous</b> (maximum)	100 MB/s (Drive Capability)	
	<b>Seek Time</b> (typical reads, including settling)	<b>Single Track</b>	3 ms	
		<b>Average</b>	15ms	
		<b>Maximum</b>	26 ms	
	<b>Rotational Speed</b>	4200 rpm		
	<b>Logical Blocks</b>	117,210,240		
<b>Operating Temperature</b>	41° to 140° F (5° to 60° C) [case temp]			
<b>Features</b>	ATA Security			

### Technical Specifications

#### 7mm Optical Drive – Integrated in HP 2700 Ultra-Slim Expansion Base

<b>DVD+/-RW SuperMulti Drive</b>	<b>Dimensions</b>	
	<b>Weight</b>	
	<b>Access Times</b>	Random
	<b>Max Data Transfer Rate</b>	24X CD-ROM
		8X DVD
		24X CD-R
		10X CD-RW
		4X DVD+R
		2.4X DVD+RW
		4X DVD-R
		2X DVD-RW
		2X DVD-RAM
		<b>Transfer Mode</b>
	<b>Interface</b>	
	<b>Supported Media (read)</b>	
	<b>Supported Media (write)</b>	
	<b>Max Media Capacity (read)</b>	
	<b>Max Media Capacity (write)</b>	
	<b>Transport</b>	

#### Optical Drives – MultiBay II

<b>DVD-ROM Drive</b>	<b>Dimensions</b>	0.37 x 5.51 x 5.04 in (0.95 x 14.0 x 12.8 cm)	
	<b>Weight</b>	0.34 lb (155 g)	
	<b>Access Times</b>	Random	<120 ms CD
			<200 ms DVD
	<b>Max Data Transfer Rate</b>	24X-CD-ROM	3,600 KB/s
		8X-DVD	10,800 KB/s
	<b>Transfer Mode</b>	Multiword DMA Mode 2	
	<b>Interface</b>	EIDE	
	<b>Supported Media (read)</b>	CD-DA, CD+(E)G, CD-MIDI, CD-TEXT, CD-ROM, CD-ROM XA, MIXED MODE CD, CD-I, CD-I Bridge (Photo-CD, Video CD), Multisession CD (Photo-CD, CD-EXTRA, Portfolio, CD-R, CD-RW), CD-R, CD-RW, DVD-ROM (DVD-5, DVD-9, DVD-10, DVD-18), DVD-R, DVD-RW, DVD+R, DVD+RW	
	<b>Supported Media (write)</b>	None	
	<b>Max Media Capacity (read)</b>	8.5 GB	
	<b>Transport</b>	Tray Loading	

### Technical Specifications

<b>DVD/CD-RW Combo Drive</b>	<b>Dimensions</b>	0.37 x 5.51 x 5.04 in (0.95 x 14.0 x 12.8 cm)		
	<b>Weight</b>	0.45 lb (205 g)		
	<b>Access Times</b>	Random	<120 ms CD	<155 ms DVD
	<b>Max Data Transfer Rate</b>	24X CD-ROM	3,600 KB/s	
		8X DVD	10,800 KB/s	
		24X CD-R	3,600 KB/s	
		24X CD-RW	3,600 KB/s	
	<b>Transfer Mode</b>	Multiword DMA Mode 2		
	<b>Interface</b>	EIDE		
	<b>Supported Media (read)</b>	CD-DA, CD+(E)G, CD-MIDI, CD-TEXT, CD-ROM, CD-ROM XA, MIXED MODE CD, CD-I, CD-I Bridge (Photo-CD, Video CD), Multisession CD (Photo-CD, CD-EXTRA, Portfolio, CD-R, CD-RW), CD-R, CD-RW, DVD-ROM (DVD-5, DVD-9, DVD-10, DVD-18), DVD-R, DVD-RW, DVD+R, DVD+RW		
	<b>Supported Media (write)</b>	CD-R, CD-RW		
	<b>Max Media Capacity (read)</b>	8.5 GB		
<b>Max Media Capacity (write)</b>	700 MB			
<b>Transport</b>	Tray loading			

<b>DVD+/-RW SuperMulti DL Drive</b>	<b>Dimensions</b>	0.37 x 5.51 x 5.04 in (0.95 x 14.0 x 12.8 cm)		
	<b>Weight</b>	0.45 lb (205 g)		
	<b>Access Times</b>	Random	<150 ms CD	<125 ms DVD
	<b>Max Data Transfer Rate</b>	24X CD-ROM	3,600 KB/s	
		8X DVD	10,800 KB/s	
		24X CD-R	3,600 KB/s	
		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	
<b>Transfer Mode</b>	Multiword DMA Mode 2			
<b>Interface</b>	EIDE			
<b>Supported Media (read)</b>	CD-DA, CD+(E)G, CD-MIDI, CD-TEXT, CD-ROM, CD-ROM XA, MIXED MODE CD, CD-I, CD-I Bridge (Photo-CD, Video CD), Multisession CD (Photo-CD, CD-EXTRA, Portfolio, CD-R, CD-RW), CD-R, CD-RW, DVD-ROM (DVD-5, DVD-9, DVD-10, DVD-18), DVD-R, DVD-RW, DVD+R, DVD+RW, DVD-RAM			
<b>Supported Media (write)</b>	CD-R, CD-RW, DVD+R, DVD+RW, DVD-R, DVD-RW, DVD-RAM			
<b>Max Media Capacity (read)</b>	8.5 GB			
<b>Max Media Capacity (write)</b>	8.5 GB			
<b>Transport</b>	Tray Loading			

### Technical Specifications

<b>80-GB 5400 rpm MultiBay II Hard Drive</b>	<b>MultiBay II Drive Adapter</b>	Dimensions (H x W x D)	0.37 x 5.51 x 5.04 in (0.95 x 14.0 x 12.8 cm)
	<b>Drive Weight</b>	Weight	0.16 lb (72 g)
	<b>Capacity</b>		
	<b>Height</b>		
	<b>Width</b>		
	<b>Interface</b>		
	<b>Transfer Rate</b>		
	<b>Seek Time</b>		
	(typical reads, including settling)		
	<b>Rotational Speed</b>		
	<b>Logical Blocks</b>		
	<b>Operating Temperature</b>		
	<b>Features</b>		

### Security

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

### Audio

<b>Hardware</b>	<b>Implementation</b>	ADI1981HD High Definition CODEC
	<b>Touch-Sensitive Volume Controls</b>	Volume up, volume down, and mute
	<b>Full Duplex</b>	Yes
	<b>Sound Blaster Pro compatible</b>	Yes
	<b>Microphone In</b>	Stereo
	<b>Headphone/Line Out</b>	Stereo

### Technical Specifications

<b>Integrated Mono Speakers</b>	<b>Power Rating</b>	2 Watts
	<b>Impedance</b>	4 Ohms

### Communications

<b>Integrated Intel Gigabit Ethernet Features Network Connection</b> (10/100/1000 NIC)	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)
<b>Power Management</b>	ACPI compliant -- multiple power modes Situation-sensitive features reduce power consumption
<b>Performance Features</b>	TCP/IP/UDP Checksum Offload (configurable)
<b>Manageability</b>	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 Intel Advanced Management Technology (iAMT)
<b>Interface</b>	PCI Express x1
<b>NIC Device Driver Name</b>	Intel 82566MM Gigabit Network Connection
<b>Drivers Available</b>	Microsoft Windows Vista Microsoft Windows XP

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

### Technical Specifications

	V.32
	V.23
	V.22bis
	V.22
	V.21
	Bell 212A
	Bell 103J
<b>Fax Mode Capabilities</b>	TIA/EIA-578-B (Class 1) T.30, T.4 (Group 3) V.17 V.29 V.27ter V.21 Channel 2
<b>Command Set</b>	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

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

### Technical Specifications

<b>Temperature, Operating</b> (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)
<b>Temperature, Non-operating, 96 hours</b> (from MIL-STD 202 Method 108)	-40° to 185° F (-40° to 85° C)
<b>Humidity, Non-operating</b>	85% relative humidity for 48 hours @ 185° F (85° C) (non-condensing)
<b>Configuration Utilities</b>	Sprint Mobile Broadband Software or Verizon Wireless VZAccess Manager
<b>LED Activity</b>	LED Off – Radio Off; Solid LED On – Radio On

<b>HP hs2300 HSDPA Broadband Wireless Module</b>	<b>Frequency Bands and Power Class</b>	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
	<b>Wireless Protocol Standards</b>	GPRS/EDGE: 3GPP R99 GERAN P1 WCDMA Release 5 (R5) High-Speed Downlink Packet Access (HSDPA) 3.6Mbps GSM Phase 2+
	<b>Wireless Parametric Standards</b>	Complies with 3GPP specifications
	<b>Additional Standards Compliance</b>	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)
	<b>Data Rates</b> (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
	<b>Chipset and Module</b>	Qualcomm MSM6280 chipset; Sierra Wireless MC8775 module
	<b>Maximum Output Power</b>	32 dBm (+/-2) GSM/EDGE GMSK mode
	<b>Power Consumption</b> (maximum)	800mA
	<b>Power Consumption, Sleep Mode</b>	4 – 8mA
	<b>Power Management</b>	USB Selective Suspend sleep and standby mode
	<b>Antenna Type</b>	High efficiency 5- band antennae, mounted in the display enclosure
	<b>Form Factor</b>	PCI-Express MiniCard
	<b>Weight</b>	0.35 oz (10 g)
	<b>Dimensions</b> (Length x Width x Thickness)	2.01 x 1.18 x 0.18 in (51 x 30 x 4.5 mm)

### Technical Specifications

<b>Voltage, Operating</b>	3.3v +/- 10%
<b>Temperature, Operating</b>	-22° to 140° F (-30° to 60° C) (full RF performance) -22° to 167° F (-30° to 75° C) (reduced RF performance)
<b>Temperature, Non-operating, 96 hours</b> (from MIL-STD 202 Method 108)	-40° to 185° F (-40° to 85° C)
<b>Humidity, Non-operating</b>	85% relative humidity for 48 hours @ 185° F (85° C) (non-condensing)
<b>LED Activity</b>	LED Off – Radio Off; Solid LED On – Radio On
<b>Configuration Utilities</b>	Varies per country and mobile network operator

<b>Intel PRO/Wireless 3945BG Network Connection</b>	<b>Wireless LAN Standards</b>	IEEE 802.11b IEEE 802.11g
	<b>Interoperability</b>	Wi-Fi certified Cisco Compatible Extensions Program compliant with Microsoft Windows 2000 and XP (details at <a href="http://www.hp.com/go/notebooks/WLAN">http://www.hp.com/go/notebooks/WLAN</a> )
	<b>Frequency Band</b>	2.4 GHz
	<b>Data Rates</b>	802.11b: 1, 2, 5.5, 11 Mbps 802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps
	<b>Modulation</b>	Direct Sequence Spread Spectrum DBPSK, DQPSK, CCK, OFDM
	<b>Security<sup>1</sup></b>	Supports 64- and 128-bit WEP, WPA, WPA2, hardware-accelerated AES, 802.1x authentication types EAP-TLS, EAP-TTLS, PEAP-GTC, PEAP-MSCHAPv2, LEAP, EAP-FAST, EAP-SIM.  Support for Cisco Security Features (proven compatibility with Cisco Aironet infrastructure products through the Cisco Compatible Extensions Program Version 4).
	<b>Sub-channels</b>	Multinational support with frequency bands and channels compliant to local regulations.
	<b>Media Access Protocol</b>	CSMA/CA (Collision Avoidance) with ACK
	<b>Network Architecture Models</b>	Ad-hoc (Peer to Peer) Infrastructure (Access Point Required)
	<b>Roaming</b>	IEEE 802.11 compliant roaming between access points
	<b>Output Power</b> (for CCK) <sup>2</sup>	15 dBm
	<b>Output Power</b> (for OFDM; power varies by data rate) <sup>2</sup>	15 dBm
	<b>Power Consumption</b>	Transmit: 1.8 Watts (max) Receive: 1.4 Watts (max) Idle mode <sup>3</sup> : 150 mW (nominal) Sleep mode: 30 mW (max)
	<b>Power Management</b>	ACPI compliant power management 802.11 compliant power saving mode
<b>Receiver Sensitivity<sup>4</sup></b>	54 Mbps: -72 dBm, 11 Mbps: -88 dBm , 1 Mbps: -97 dBm	
<b>Antenna Connections</b>	2 U.FL type connectors, 50 ohm nominal impedance	
<b>Range</b>	802.11 b – Typical                      1200 feet – Outdoor Open Area (@1 Mbps)                                      300 feet – Indoor, Office environment	

### Technical Specifications

	802.11 g – Typical (@1 Mbps)	1200 feet – Outdoor Open Area 300 feet – Indoor, Office environment
<b>Form Factor</b>	PCI-Express MiniCard	
<b>Weight</b>	0.013 lb (6 g)	
<b>Dimensions</b>	0.19 x 1.2 x 2.0 in (4.75 x 29.85 x 50.8 mm)	
<b>Operating Voltage</b>	3.3V +/- 9%, 1.5V +/- 5%	
<b>Temperature</b>	Operating	32° to 176° F (0° to 80° C)
	Non-operating	–40° to 176° F (–40° to 80° C)
<b>Humidity</b>	Operating	10% to 90% (non-condensing)
	Non-operating	5% to 95% (non-condensing)
<b>Altitude</b>	Operating	0 to 10,000 ft (3,048 m)
	Non-operating	0 to 50,000 ft (15,240 m)
<b>Configuration Utility<sup>5</sup></b>	Microsoft Windows 2000 or XP Choice of Configuration Utility:	
	<ul style="list-style-type: none"> <li>• Microsoft Windows XP Wireless Network Connection Manager</li> <li>• Intel PROSet for Microsoft Windows 2000 or XP (required for Cisco Compatible Extensions support)</li> </ul>	
	Microsoft Windows Vista	
	<ul style="list-style-type: none"> <li>• Microsoft Windows Vista Wireless Network Connection Manager</li> </ul>	
<b>LED Activity</b>	LED Off – Radio OFF; Solid LED On – Radio ON	
	<ol style="list-style-type: none"> <li>1. Check latest software/driver release for updates on supported security features.</li> <li>2. Maximum output power may vary by country according to local regulations.</li> <li>3. In Power Save Polling mode.</li> <li>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).</li> <li>5. WLAN supplier's client utility is required for Cisco Compatible Extensions support with Microsoft Windows 2000 or XP. WLAN may also be compatible with certain third-party software suppliers.</li> </ol>	

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<b>Intel Wireless WiFi Link</b>	IEEE 802.11a
<b>4965AG</b>	IEEE 802.11b
	IEEE 802.11g
<b>Standards</b>	
<b>Interoperability</b>	Wi-Fi certified Cisco Compatible Extensions Program compliant with Microsoft Windows 2000 and XP (details at <a href="http://www.hp.com/go/notebooks/WLAN">http://www.hp.com/go/notebooks/WLAN</a> )
<b>Frequency Band</b>	2.4 GHz and 5 GHz
<b>Data Rates</b>	802.11b: 1, 2, 5.5, 11 Mbps 802.11a/g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps
<b>Modulation</b>	Direct Sequence Spread Spectrum DBPSK, DQPSK, CCK, OFDM
<b>Security<sup>1</sup></b>	Supports 64- and 128-bit WEP, WPA, WPA2, hardware-accelerated AES (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.

### Technical Specifications

<b>Sub-channels</b>	Multinational support with frequency bands and channels compliant to local regulations.	
<b>Media Access Protocol</b>	CSMA/CA (Collision Avoidance) with ACK	
<b>Network Architecture Models</b>	Ad-hoc (Peer to Peer) Infrastructure (Access Point Required)	
<b>Roaming</b>	IEEE 802.11 compliant roaming between access points	
<b>Output Power</b> (for CKK) <sup>2</sup>	15 dBm	
<b>Output Power</b> (for OFDM; power varies by data rate) <sup>2</sup>	15 dBm	
<b>Power Consumption</b>	Transmit: 1.6 Watts (average) Receive: 1.1 Watts (average) Idle mode <sup>3</sup> : 30 mW (average) Radio off: 20 mW (max)	
<b>Power Management</b>	ACPI compliant power management 802.11 compliant power saving mode	
<b>Receiver Sensitivity</b> <sup>4</sup>	54 Mbps: -74 dBm, 6 Mbps: -90 dBm	
<b>Antenna Connections</b>	2 U.FL type connectors, 50 ohm nominal impedance	
<b>Range</b>	802.11 a – Typical (@6 Mbps)	600 feet – Outdoor Open Area 150 feet – Indoor, Office environment
	802.11 b – Typical (@1 Mbps)	1200 feet – Outdoor Open Area 300 feet – Indoor, Office environment
	802.11 g – Typical (@1 Mbps)	1200 feet – Outdoor Open Area 300 feet – Indoor, Office environment
<b>Form Factor</b>	PCI-Express MiniCard	
<b>Weight</b>	0.013 lb (6 g)	
<b>Dimensions</b>	0.19 x 1.2 x 2.0 in (4.75 x 29.85 x 50.8 mm)	
<b>Operating Voltage</b>	3.3V +/- 9%, 1.5V +/- 5%	
<b>Temperature</b>	Operating	32° to 176° F (0° to 80° C)
	Non-operating	-40° to 176° F (-40° to 80° C)
<b>Humidity</b>	Operating	10% to 90% (non-condensing)
	Non-operating	5% to 90% (non-condensing)
<b>Altitude</b>	Operating	0 to 10,000 ft (3,048 m)
	Non-operating	0 to 50,000 ft (15,240 m)

### Technical Specifications

<b>Configuration Utility<sup>5</sup></b>	<p>Microsoft Windows 2000 or XP Choice of Configuration Utility:</p> <ul style="list-style-type: none"> <li>• Microsoft Windows XP Wireless Network Connection Manager</li> <li>• Intel PROSet for Microsoft Windows 2000 or XP (required for Cisco Compatible Extensions support)</li> </ul> <p>Microsoft Windows Vista</p> <ul style="list-style-type: none"> <li>• Microsoft Windows Vista Wireless Network Connection Manager</li> </ul>
<b>LED Activity</b>	<p>LED Off – Radio OFF; Solid LED On – Radio ON</p> <ol style="list-style-type: none"> <li>1. Check latest software/driver release for updates on supported security features.</li> <li>2. Maximum output power may vary by country according to local regulations.</li> <li>3. In Power Save Polling mode and on battery power.</li> <li>4. Receiver sensitivity is measured at a packet error rate of 8% for 802.11b (CKK modulation) and a packet error rate of 10% for 802.11a/g (OFDM modulation).</li> <li>5. WLAN supplier's client utility is required for Cisco Compatible Extensions support with Microsoft Windows 2000 or XP. WLAN may also be compatible with certain third-party software suppliers.</li> </ol>

<b>Intel Wireless WiFi Link</b>	IEEE 802.11a
<b>4965AGN</b>	IEEE 802.11b
	IEEE 802.11g
	IEEE 802.11n (draft 1.02)
<b>Standards</b>	
<b>Interoperability</b>	<p>Wi-Fi certified (802.11abg only) Cisco Compatible Extensions Program compliant (802.11abg only) with Microsoft Windows 2000 and XP (details at <a href="http://www.hp.com/go/notebooks/WLAN">http://www.hp.com/go/notebooks/WLAN</a>) Tested with wireless access points from several major manufacturers (details at <a href="http://www.hp.com/go/notebooks/WLAN/draft-n">http://www.hp.com/go/notebooks/WLAN/draft-n</a>)</p>
<b>Frequency Band</b>	2.4 GHz and 5 GHz
<b>Data Rates</b>	<p>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</p>
<b>Modulation</b>	<p>Direct Sequence Spread Spectrum DBPSK, DQPSK, CCK, OFDM, BPSK, QPSK, 16-QAM, 64-QAM</p>
<b>Security<sup>1</sup></b>	<p>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.</p> <p>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.</p>
<b>Sub-channels</b>	Multinational support with frequency bands and channels compliant to local regulations.
<b>Media Access Protocol</b>	CSMA/CA (Collision Avoidance) with ACK
<b>Network Architecture</b>	Ad-hoc (Peer to Peer)
<b>Models</b>	Infrastructure (Access Point Required)
<b>Roaming</b>	IEEE 802.11 compliant roaming between access points

### Technical Specifications

<b>Output Power</b> (for CKK) <sup>2</sup>	15 dBm
<b>Output Power</b> (for OFDM; power varies by data rate) <sup>2</sup>	15 dBm
<b>Power Consumption</b>	Transmit: 2.3 Watts (average, with two spatial streams) Receive: 1.9 Watts (average with three receive chains) Idle mode <sup>3</sup> : 30 mW (average) Radio off: 20 mW (max)
<b>Power Management</b>	ACPI compliant power management 802.11 compliant power saving mode
<b>Receiver Sensitivity</b> <sup>4</sup>	300 Mbps: -68 dBm, 54 Mbps: -74 dBm, 6 Mbps: -90 dBm
<b>Antenna Connections</b>	3 U.FL type connectors, 50 ohm nominal impedance
<b>Range</b>	802.11 a – Typical            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
<b>Form Factor</b>	PCI-Express MiniCard
<b>Weight</b>	0.013 lb (6 g)
<b>Dimensions</b>	0.19 x 1.2 x 2.0 in (4.75 x 29.85 x 50.8 mm)
<b>Operating Voltage</b>	3.3V +/- 9%, 1.5V +/- 5%
<b>Temperature</b>	Operating                        32° to 176° F (0° to 80° C) Non-operating                 -40° to 176° F (-40° to 80° C)
<b>Humidity</b>	Operating                        10% to 90% (non-condensing) Non-operating                 5% to 90% (non-condensing)
<b>Altitude</b>	Operating                        0 to 10,000 ft (3,048 m) Non-operating                 0 to 50,000 ft (15,240 m)
<b>Configuration Utility</b> <sup>5</sup>	Microsoft Windows 2000 or XP Choice of Configuration Utility: <ul style="list-style-type: none"> <li>● Microsoft Windows XP Wireless Network Connection Manager</li> <li>● Intel PROSet for Microsoft Windows 2000 or XP (required for Cisco Compatible Extensions support)</li> </ul> <p>Microsoft Windows Vista</p> <ul style="list-style-type: none"> <li>● Microsoft Windows Vista Wireless Network Connection Manager</li> </ul>
<b>LED Activity</b>	LED Off – Radio OFF; Solid LED On – Radio ON
	<ol style="list-style-type: none"> <li>1. Check latest software/driver release for updates on supported security features.</li> <li>2. Maximum output power may vary by country according to local regulations.</li> <li>3. In Power Save Polling mode and on battery power.</li> <li>4. Receiver sensitivity is measured at a packet error rate of 8% for 802.11b (CKK modulation) and a packet error rate of 10% for 802.11a/g (OFDM modulation).</li> <li>5. WLAN supplier's client utility is required for Cisco Compatible Extensions support with Microsoft Windows 2000 or XP. WLAN may also be compatible with certain third-party software supplicants.</li> </ol>

**Broadcom 4311AG  
802.11a/b/g WiFi  
Adapter**

**Wireless LAN  
Standards**                        IEEE 802.11a  
    IEEE 802.11b  
    IEEE 802.11g



### Technical Specifications

<b>Interoperability</b>	Wi-Fi certified Cisco Compatible Extensions Program compliant with Microsoft Windows 2000 and XP (details at <a href="http://www.hp.com/go/notebooks/WLAN">http://www.hp.com/go/notebooks/WLAN</a> )	
<b>Frequency Band</b>	2.4 GHz and 5 GHz	
<b>Data Rates</b>	802.11b: 1, 2, 5.5, 11 Mbps 802.11a/g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps	
<b>Modulation</b>	Direct Sequence Spread Spectrum DBPSK, DQPSK, CCK, OFDM	
<b>Security<sup>1</sup></b>	Supports 64- and 128-bit WEP, WPA, WPA2, hardware-accelerated AES, 802.1x authentication types EAP-TLS, EAP-TTLS, PEAP-GTC, PEAP-MSCHAPv2, LEAP, EAP-FAST.  Support for Cisco Security Features (proven compatibility with Cisco Aironet infrastructure products through the Cisco Compatible Extensions Program Version 4).	
<b>Sub-channels</b>	Multinational support with frequency bands and channels compliant to local regulations.	
<b>Media Access Protocol</b>	CSMA/CA (Collision Avoidance) with ACK	
<b>Network Architecture Models</b>	Ad-hoc (Peer to Peer) Infrastructure (Access Point Required)	
<b>Roaming</b>	IEEE 802.11 compliant roaming between access points	
<b>Output Power</b> (for CCK) <sup>2</sup>	17.5 dBm	
<b>Output Power</b> (for OFDM; power varies by data rate) <sup>2</sup>	15 dBm	
<b>Power Consumption</b>	Transmit: 2.0 W (max) Receive: 1.5 W (max) Idle mode <sup>3</sup> : 390 mW (nominal) Sleep mode: 20 mW (max)	
<b>Power Management</b>	ACPI compliant power management 802.11 compliant power saving mode	
<b>Receiver Sensitivity<sup>4</sup></b>	54 Mbps: -72 dBm, 11 Mbps: -88 dBm , 1 Mbps: -97 dBm	
<b>Antenna type</b>	High efficiency dual band antenna with spatial diversity, mounted in the display enclosure	
<b>Range</b>	802.11 a – Typical (@6 Mbps)	600 feet – Outdoor Open Area 150 feet – Indoor, Office environment
	802.11 b – Typical (@1 Mbps)	1200 feet – Outdoor Open Area 300 feet – Indoor, Office environment
	802.11 g – Typical (@1 Mbps)	1200 feet – Outdoor Open Area 300 feet – Indoor, Office environment
<b>Form Factor</b>	PCI-Express MiniCard	
<b>Weight</b>	0.026 lb (12 g)	
<b>Dimensions</b>	0.19 x 1.2 x 2.0 in (4.75 x 29.85 x 50.8 mm)	
<b>Operating Voltage</b>	3.3v +/- 10%	
<b>Temperature</b>	Operating	32° to 176° F (0° to 80° C)
	Non-operating	-40° to 176° F (-40° to 80° C)
<b>Humidity</b>	Operating	10% to 90% (non-condensing)
	Non-operating	5% to 95% (non-condensing)
<b>Altitude</b>	Operating	0 to 10,000 ft (3,048 m)
	Non-operating	0 to 50,000 ft (15,240 m)

### Technical Specifications

<b>Configuration Utility<sup>5</sup></b>	<p>Microsoft Windows 2000 or XP Choice of Configuration Utility:</p> <ul style="list-style-type: none"> <li>• Microsoft Windows XP Wireless Network Connection Manager</li> <li>• Broadcom Wireless Configuration Utility (required for Cisco Compatible Extensions support)</li> </ul> <p>Microsoft Windows Vista</p> <ul style="list-style-type: none"> <li>• Microsoft Windows Vista Wireless Network Connection Manager</li> </ul>
<b>LED Activity</b>	<p>LED Off – Radio OFF; Solid LED On – Radio ON</p> <ol style="list-style-type: none"> <li>1. Check latest software/driver release for updates on supported security features.</li> <li>2. Maximum output power may vary by country according to local regulations.</li> <li>3. In Power Save Polling mode.</li> <li>4. Receiver sensitivity is measured at a packet error rate of 8% for 802.11b (CKK modulation) and a packet error rate of 10% for 802.11a/g (OFDM modulation).</li> <li>5. WLAN supplier's client utility is required for Cisco Compatible Extensions support with Microsoft Windows 2000 or XP. WLAN may also be compatible with certain third-party software suppliers.</li> </ol>

<b>Broadcom 4311BG 802.11b/g WiFi Adapter</b>	<p><b>Wireless LAN Standards</b></p> <p>IEEE 802.11b IEEE 802.11g</p> <p><b>Interoperability</b></p> <p>Wi-Fi certified Cisco Compatible Extensions Program compliant with Microsoft Windows 2000 and XP (details at <a href="http://www.hp.com/go/notebooks/WLAN">http://www.hp.com/go/notebooks/WLAN</a>)</p> <p><b>Frequency Band</b></p> <p>2.4 GHz</p> <p><b>Data Rates</b></p> <p>802.11b: 1, 2, 5.5, 11 Mbps 802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps</p> <p><b>Modulation</b></p> <p>Direct Sequence Spread Spectrum DBPSK, DQPSK, CCK, OFDM</p> <p><b>Security<sup>1</sup></b></p> <p>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.</p> <p>Support for Cisco Security Features (proven compatibility with Cisco Aironet infrastructure products through the Cisco Compatible Extensions Program Version 4).</p> <p><b>Sub-channels</b></p> <p>Multinational support with frequency bands and channels compliant to local regulations.</p> <p><b>Media Access Protocol</b></p> <p>CSMA/CA (Collision Avoidance) with ACK</p> <p><b>Network Architecture Models</b></p> <p>Ad-hoc (Peer to Peer) Infrastructure (Access Point Required)</p> <p><b>Roaming</b></p> <p>IEEE 802.11 compliant roaming between access points</p> <p><b>Output Power</b> (for CKK)<sup>2</sup></p> <p>17.5 dBm</p> <p><b>Output Power</b> (for OFDM; power varies by data rate)<sup>2</sup></p> <p>15 dBm</p> <p><b>Power Consumption</b></p> <p>Transmit: 2.0 W (max) Receive: 1.5 W (max) Idle mode<sup>3</sup>: 390 mW (nominal) Sleep mode: 20 mW (max)</p>
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### Technical Specifications

<b>Power Management</b>	ACPI compliant power management 802.11 compliant power saving mode	
<b>Receiver Sensitivity<sup>4</sup></b>	54 Mbps: -72 dBm, 11 Mbps: -88 dBm , 1 Mbps: -97 dBm	
<b>Antenna type</b>	High efficiency dual band antenna with spatial diversity, mounted in the display enclosure	
<b>Range</b>	802.11 b – Typical (@1 Mbps)	1200 feet – Outdoor Open Area 300 feet – Indoor, Office environment
	802.11 g – Typical (@1 Mbps)	1200 feet – Outdoor Open Area 300 feet – Indoor, Office environment
<b>Form Factor</b>	PCI-Express MiniCard	
<b>Weight</b>	0.026 lb (12 g)	
<b>Dimensions</b>	0.19 x 1.2 x 2.0 in (4.75 x 29.85 x 50.8 mm)	
<b>Operating Voltage</b>	3.3v +/- 10%	
<b>Temperature</b>	Operating	32° to 176° F (0° to 80° C)
	Non-operating	-40° to 176° F (-40° to 80° C)
<b>Humidity</b>	Operating	10% to 90% (non-condensing)
	Non-operating	5% to 95% (non-condensing)
<b>Altitude</b>	Operating	0 to 10,000 ft (3,048 m)
	Non-operating	0 to 50,000 ft (15,240 m)
<b>Configuration Utility<sup>5</sup></b>	Microsoft Windows 2000 or XP Choice of Configuration Utility: <ul style="list-style-type: none"> <li>• Microsoft Windows XP Wireless Network Connection Manager</li> <li>• Broadcom Wireless Configuration Utility (required for Cisco Compatible Extensions support)</li> </ul> <p>Microsoft Windows Vista</p> <ul style="list-style-type: none"> <li>• Microsoft Windows Vista Wireless Network Connection Manager</li> </ul>	
<b>LED Activity</b>	LED Off – Radio OFF; Solid LED On – Radio ON	
	<ol style="list-style-type: none"> <li>1. Check latest software/driver release for updates on supported security features.</li> <li>2. Maximum output power may vary by country according to local regulations.</li> <li>3. In Power Save Polling mode.</li> <li>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).</li> <li>5. WLAN supplier's client utility is required for Cisco Compatible Extensions support with Microsoft Windows 2000 or XP. WLAN may also be compatible with certain third-party software supplicants.</li> </ol>	

<b>Broadcom 4321AGN 802.11a/b/g/draft-n WiFi Standards Adapter</b>	<b>Wireless LAN</b>	IEEE 802.11a IEEE 802.11b IEEE 802.11g IEEE 802.11n (draft)
	<b>Interoperability</b>	Wi-Fi certified (802.11abg only) Cisco Compatible Extensions Program compliant (802.11abg only) with Microsoft Windows 2000 and XP (details at <a href="http://www.hp.com/go/notebooks/WLAN">http://www.hp.com/go/notebooks/WLAN</a> ) Tested with wireless access points from several major manufacturers (details at <a href="http://www.hp.com/go/notebooks/WLAN/draft-n">http://www.hp.com/go/notebooks/WLAN/draft-n</a> )
	<b>Frequency Band</b>	2.4 GHz and 5 GHz

### Technical Specifications

<b>Data Rates</b>	802.11b: 1, 2, 5.5, 11 Mbps 802.11a/g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps 802.11n (draft): 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	
<b>Frequency Support</b>	20 MHz: 2.4 GHz and 5 GHz bands 40 MHz: 5 GHz band only	
<b>Modulation</b>	Direct Sequence Spread Spectrum DBPSK, DQPSK, CCK, OFDM, BPSK, QPSK, 16-QAM, 64-QAM	
<b>Security<sup>1</sup></b>	Supports 64- and 128-bit WEP, WPA, WPA2, hardware-accelerated AES, 802.1x authentication types EAP-TLS, EAP-TTLS, PEAP-GTC, PEAP-MSCHAPv2, LEAP, EAP-FAST.  Support for Cisco Security Features (proven compatibility with Cisco Aironet infrastructure products through the Cisco Compatible Extensions Program Version 4) with Microsoft Windows 2000 and XP only.	
<b>Sub-channels</b>	Multinational support with frequency bands and channels compliant to local regulations.	
<b>Media Access Protocol</b>	CSMA/CA (Collision Avoidance) with ACK	
<b>Network Architecture Models</b>	Ad-hoc (Peer to Peer) Infrastructure (Access Point Required)	
<b>Roaming</b>	IEEE 802.11 compliant roaming between access points	
<b>Output Power</b> (for CCK) <sup>2</sup>	17 dBm	
<b>Output Power</b> (for OFDM; power varies by data rate) <sup>2</sup>	15 dBm	
<b>Power Consumption</b>	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)	
<b>Power Management</b>	ACPI compliant power management 802.11 compliant power saving mode	
<b>Receiver Sensitivity<sup>3</sup></b>	270 Mbps: -66dBm, 162 Mbps: -72 dBm, 54 Mbps: -72 dBm, 11 Mbps: -85 dBm , 1 Mbps: -94 dBm	
<b>Antenna type</b>	High efficiency dual band antenna with spatial diversity, mounted in the display enclosure	
<b>Range</b>	802.11 a – Typical (@6 Mbps)	600 feet – Outdoor Open Area 150 feet – Indoor, Office environment
	802.11 b – Typical (@1 Mbps)	1200 feet – Outdoor Open Area 300 feet – Indoor, Office environment
	802.11 g – Typical (@1 Mbps)	1200 feet – Outdoor Open Area 300 feet – Indoor, Office environment
<b>Form Factor</b>	PCI-Express MiniCard	
<b>Weight</b>	0.026 lb (12 g)	
<b>Dimensions</b>	0.19 x 1.2 x 2.0 in (4.75 x 29.85 x 50.8 mm)	
<b>Operating Voltage</b>	3.3v +/- 10%	
<b>Temperature</b>	Operating	14° to 149° F (–10° to 65° C)
	Non-operating	–40° to 176° F (–40° to 80° C)
<b>Humidity</b>	Operating	10% to 90% (non-condensing)
	Non-operating	5% to 95% (non-condensing)

### Technical Specifications

<b>Altitude</b>	Operating	0 to 10,000 ft (3,048 m)
	Non-operating	0 to 50,000 ft (15,240 m)
<b>Configuration Utility<sup>4</sup></b>	Microsoft Windows 2000 or XP Choice of Configuration Utility:	
	<ul style="list-style-type: none"> <li>• Microsoft Windows XP Wireless Network Connection Manager</li> <li>• Broadcom Wireless Configuration Utility (required for Cisco Compatible Extensions support)</li> </ul>	
	Microsoft Windows Vista	
	<ul style="list-style-type: none"> <li>• Microsoft Windows Vista Wireless Network Connection Manager</li> </ul>	
<b>LED Activity</b>	LED Off – Radio OFF; Solid LED On – Radio ON	
	<ol style="list-style-type: none"> <li>1. Check latest software/driver release for updates on supported security features.</li> <li>2. Maximum output power may vary by country according to local regulations.</li> <li>3. 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).</li> <li>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.</li> </ol>	

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<b>HP Integrated Module with Bluetooth Wireless Technology</b>	<b>Bluetooth Specification</b>	2.0 Compliant
	<b>Dimensions</b>	1.02 x 0.55 x 0.22 in (26 x 14 x 5.7 mm)
	<b>Frequency Band</b>	2402 to 2480 MHz
	<b>Number of Available Channels</b>	79 (1 MHz) available channels
	<b>Data Rates and Throughput</b>	3 Mbps data rate; throughput up to 2.17 Mbps Synchronous Connection Oriented links up to 3, 64 kbps, voice channels Asynchronous Connection Less links 2178.1 kbps/177.1 kbps asymmetric or 1306.9 kbps symmetric
	<b>Transmit Power</b>	-6 dBm to 4 dBm (Bluetooth Class II)
	<b>Receiver Sensitivity</b>	Better than -80 dBm at 0.1 % raw bit error rate
	<b>Power Consumption</b>	Peak (Tx) 264 mW Peak (Rx) 231 mW Sleep <1 mW
	<b>Antenna</b>	Internally integrated within module
	<b>Range</b>	Up 33 ft (10 m)
	<b>Electrical Interface</b>	USB 2.0 compliant Microsoft Windows Plug and Play compliant
	<b>OS Support</b>	Genuine Windows Vista Genuine Windows XP Genuine Windows 2000
	<b>Bluetooth Software Supported</b>	Broadcom Bluetooth for Windows Microsoft Windows XP Bluetooth Software
	<b>Link Topology</b>	Point to Point, Multipoint Pico Nets up to 7 slaves
	<b>Security</b>	Full support of Bluetooth Security Provisions
	<b>Power Management</b>	Microsoft Windows ACPI, and USB Bus Support Self configurable to optimize power conservation in all operating modes, including Standby, Hold, Park, and Sniff

### Technical Specifications

<b>Certifications</b>	All necessary regulatory approvals for supported countries, including: FCC (47 CFR) Part 15C, Section 15.247 & 15.249 ETS 300 328, ETS 300 826 Low Voltage Directive IEC950 UL, CSA, and CE Mark		
<b>Temperature</b>	Operating	-4° to 158° F (-20° to 70° C)	
	Non-operating	-40° to 176° F (-40° to 80° C)	
<b>Humidity</b>	Operating	10% to 90%	
	Non-operating	5% to 95%	
<b>Altitude</b>	Operating	15,000 ft (4,572 m)	
	Non-operating	40,000 ft (12,192 m)	
<b>Bluetooth Profiles Supported</b>	(with Bluetooth for Windows 4.0 software) Serial Port Profile (SPP)* Dial-Up Networking (DUN)* Generic Object Exchange Profile (GOEP) Object Push Profile (OPP)* File Transfer Profile (FTP) Synchronization Profile (SYNC) Hard Copy Cable Replacement (HCRP)* Personal Area Networking Profile (PAN)* Human Interface Device Profile (HID)* FAX Profile (FAX) Basic Imaging Profile (BIP) Headset Profile (HSP) Hands Free Profile (HFP) Advanced Audio Distribution Profile (A2DP)		

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

<b>Environmental Data</b>	<b>Eco-Label Certifications</b>	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:		
		<ul style="list-style-type: none"> <li>● ENERGY STAR 4.0</li> <li>● US Federal Energy Management Program (FEMP)</li> <li>● Taiwan Green Mark</li> <li>● China Energy Conservation Program (CECP)</li> <li>● ECO declaration</li> <li>● Korean Eco Label</li> <li>● EPEAT Silver Rating</li> </ul>		
	<b>System Configuration</b>	The configuration used for the Energy Consumption and Declared Noise Emissions data is based on a "Typically Configured Notebook"		
	<b>Energy Consumption</b>	<b>115 VAC</b>	<b>230 VAC</b>	<b>100 VAC</b>
	Normal Operation	8.5 W	8.6 W	8.53 W
	Sleep (Energy Star low power mode)	0.73 W	0.87 W	0.71 W
	Off	0.64 W	0.77 W	0.63 W
	<b>Heat Dissipation*</b>	<b>115 VAC</b>	<b>230 VAC</b>	<b>100 VAC</b>
	Normal Operation	29.002 BTU/hr	29.343 BTU/hr	29.104 BTU/hr
	Sleep	2.49 BTU/hr	2.968 BTU/hr	2.422 BTU/hr



### Technical Specifications

- 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](http://www.hp.com/hpinfo/globalcitizenship/environment/supplychain/gen_specifications.html)):

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

#### End-of-life Management and Recycling

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



### Technical Specifications

<http://www.hp.com/hpinfo/globalcitizenship/environment/productdesign/ecolabels.html>  
ISO 14001 certificates:  
<http://www.hp.com/hpinfo/globalcitizenship/environment/operations/envmanagement.html>

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