# QuickSpecs

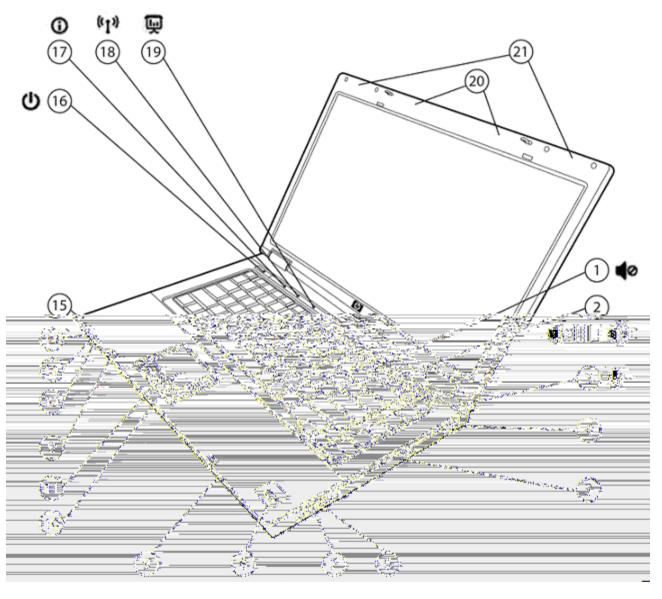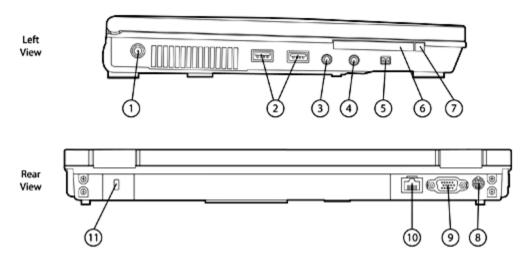*Overview*

**HP recommends Windows Vista® Business**



1. Volume mute button with LED indicator
2. Volume scroll zone with up/down LED indicators
3. Integrated microphone
4. RJ-11/modem port
5. Optical drive
6. Media Card Reader
7. 2 USB 2.0 ports
8. HP Fingerprint Sensor
9. Integrated stereo speakers
10. Touchpad with scroll zone
11. Touchpad buttons

12. Hard drive activity / HP 3D DriveGuard LED
13. Battery charging LED
14. Power/standby LED
15. Wireless on/off LED
16. Power button with LED
17. HP Info / HP QuickLook button with LED indicator
18. Wireless on/off button with LED indicator
19. HP Presentation button with LED indicator
20. WLAN antennas (with WLAN option)
21. WWAN antennas (with WWAN option)

# QuickSpecs

*Overview*

Left View

Rear View

1. Power connector
2. 2 USB 2.0 ports
3. Stereo headphone/line out
4. Stereo microphone in
5. 1394a port
6. Type I/II PC Card slot
7. PC Card eject button
8. S-Video TV out
9. VGA/external monitor connector
10. RJ-45/Ethernet port
11. Kensington Lock slot

## At A Glance

- Genuine Windows Vista Business*, Genuine Windows Vista Home Basic, Genuine Windows XP Professional, or FreeDOS
- Widescreen 15.4-inch diagonal display with wide-viewing angle, BrightView and HP Privacy Filter support
- Flexible wireless connectivity options:
  - Integrated HP ev2200 1xEV-DO, 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®
- Intel® Core™2 Duo processor or Intel Celeron® processor
- Thin, lightweight design starting at 5.7 lb/2.59 kg and 1.4-inch/34.9 mm thin at front
- Security features including 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 250-GB 5400 rpm or 120-GB 7200 rpm user-removable hard drive with HP 3D DriveGuard protection
- Media Card Reader
- Touch-sensitive controls for HP Info Center, HP QuickLook, wireless on/off, HP Presentation button, external volume up, volume down, and mute
- Integrated optical drive, including optional DVD+/-RW SuperMulti DL LightScribe Drive
- Up to 4 GB of 667-MHz DDR2 SDRAM, dual channel memory support
- Mobile Intel Graphics Media Accelerator X3100, with up to 384-MB shared system memory (select models)
- Broadcom NetLink Gigabit Ethernet Controller
- Touchpad with scroll zone

* 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).

# QuickSpecs

*Standard Features*

| | |
|---|---|
| **Processors** | Intel Core 2 Duo Processor T9500 (2.60 GHz, 6 MB L2 cache, 800 MHz FSB)* |
| | Intel Core 2 Duo Processor T9300 (2.50 GHz, 6 MB L2 cache, 800 MHz FSB)* |
| | Intel Core 2 Duo Processor T8300 (2.40 GHz, 3 MB L2 cache, 800 MHz FSB)* |
| | Intel Core 2 Duo Processor T8100 (2.10 GHz, 3 MB L2 cache, 800 MHz FSB)* |
| | Intel Core 2 Duo Processor T7800 (2.60 GHz, 4 MB L2 cache, 800 MHz FSB)* |
| | Intel Core 2 Duo Processor T7700 (2.40 GHz, 4 MB L2 cache, 800 MHz FSB)* |
| | Intel Core 2 Duo Processor T7500 (2.20 GHz, 4 MB L2 cache, 800 MHz FSB)* |
| | Intel Core 2 Duo Processor T7300 (2.00 GHz, 4 MB L2 cache, 800 MHz FSB)* |
| | Intel Core 2 Duo Processor T7250 (2.00 GHz, 2 MB L2 cache, 800 MHz FSB)* |
| | Intel Core 2 Duo Processor T7100 (1.80 GHz, 2 MB L2 cache, 800 MHz FSB)* |
| | Intel Core 2 Duo Processor T5470 (1.60 GHz, 2 MB L2 cache, 800 MHz FSB)* (select countries only) |
| | Intel Celeron Processor 550 (2.00 GHz, 1 MB L2 cache, 533 MHz FSB)* |
| | Intel Celeron Processor 540 (1.86 GHz, 1 MB L2 cache, 533 MHz FSB)* |
| | Intel Celeron Processor 530 (1.73 GHz, 1 MB L2 cache, 533 MHz FSB)* |

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

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

| | | |
|---|---|---|
| **Operating System** | **Preinstalled** | Genuine Windows Vista Business[†]* |
| | | Genuine Windows Vista Home Basic* |
| | | Genuine Windows XP Professional |
| | | FreeDOS |
| | **Supported** | Genuine Windows Vista Enterprise* |
| | **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 GM965 |

# QuickSpecs

## Standard Features

**Graphics**      Mobile Intel Graphics Media Accelerator X3100

| Total System Memory | Reserved Graphics Memory * | Maximum Graphics Memory ** |
|---|---|---|
| **Windows XP** | | |
| 256 MB | 8 MB | 128 MB |
| 512 or 768 MB | 8 MB | 256 MB |
| 1024 MB or more | 8 MB | 384 MB |
| **Windows Vista** | | |
| 512 MB | 32 MB | 64 MB |
| 768 MB | 128 MB | 123 MB |
| 1024 MB | 128 MB | 251 MB |
| 1536 MB or more | 128 MB | 358 MB |

* System memory exclusive to graphics.
** Total available graphics memory (HyperMemory), which includes Reserved Graphics Memory and Shared System Memory.

Microsoft DirectX 9 capable

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**Display**

**Internal**
15.4-inch diagonal WXGA anti-glare (1280 x 800 resolution)
15.4-inch diagonal WXGA BrightView (1280 x 800 resolution)
15.4-inch diagonal WSXGA+ WVA anti-glare (1680 x 1050 resolution)
HP Privacy Filter support

**External**
Up to 32-bit per pixel color depth
**VGA** port supports resolutions up to 2048 x 1536 at 75 Hz, and lower resolutions at up to 100 Hz
**NOTE:** Resolutions are dependent upon monitor capability, and resolution and color depth settings.

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**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 maximum (2048-MB SODIMM in slots 1 and 2)

**Dual-channel**
Maximized dual-channel performance requires SODIMMs of the same size and speed in both memory slots.

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

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**Communications**      Integrated Broadcom NetLink Gigabit Ethernet Controller (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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**Wireless Devices**      Support for a broad range of secure, integrated wireless LAN and wireless WAN options featuring

## Standard Features

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 only. Integrated Bluetooth is also available (factory configurable only) and can be combined with any of the supported wireless LAN and wireless WAN options.

| | |
|---|---|
| **HP ev2200 1xEV-DO Broadband Wireless Module** | Integrated WWAN module connects to the Verizon Wireless BroadbandAccess and NationalAccess networks (U.S. only) Supports CDMA 1xEV-DO, 1xRTT connections at 850 and 1900 MHz. **NOTE:** Separately purchased Verizon Wireless service is required. For details, go to http://www.hp.com/go/broadbandwireless. Two 850/900/1800/1900/2100-MHz antennas integrated in the top of the display panel support current and future WWAN technologies |
| **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 available for the AT&T Broadbandconnect network in the U.S. (supports international roaming). **NOTE:** Separately purchased mobile network operator service is required. 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 Dual 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 3945ABG Network Connection\*** | 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 |

## Standard Features

| | | |
|---|---|---|
| | **Broadcom 4311BG 802.11b/g WiFi Adapter** | Integrated support for 802.11 b and g<br>Up to 54-mbps data rate |
| | **HP Integrated Module with Bluetooth Wireless Technology** | Bluetooth Specification v2.0 compliant<br>Works with a wide range of Bluetooth devices |

\* Requires Intel Core 2 Duo processor

**Keyboard**

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

**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**

Touchpad with scroll zone, two pick buttons

**Expansion card slots**

| | | |
|---|---|---|
| | **1 Type I/II PC Card slot**<br>or | Supports 32-bit CardBus and 16-bit PC Cards |
| | **Optional Integrated Smart Card Reader** (replaces PC Card slot) | Compatible with ISO 7816 compliant Smart Cards<br>PC/SC interface support |
| | **Media Card Reader** | Supports SD (Secure Digital), MMC (MultiMedia Card), Memory Stick, Memory Stick Pro, Memory Stick Duo*, xD-Picture card |

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

**Storage**

| | | |
|---|---|---|
| | **Hard drives** | 80/120/160/250-GB 5400 rpm SMART SATA<br>80/120-GB 7200 rpm SMART SATA |

NOTE: These hard drives are customer removable and will withstand multiple insertion/removal cycles. Up to 10 GB is reserved for the system recovery software.

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

# QuickSpecs

## Standard Features

| | | |
|---|---|---|
| **Interfaces** | **PC Card slot** | One Type I/II PC Card slot or optional Smart Card Reader |
| | **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 |
| | **S-video TV out** | One (Support for NTSC/PAL) |
| | **USB 2.0** | Four |
| | **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 |

| | | |
|---|---|---|
| **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 |
| | | Intervideo WinDVD – DVD Player |
| | **Additional software available from the web** | HP Client Manager |
| | | Java Card Security for HP ProtectTools |

\* Download available from hp.com for Windows Vista; preinstalled with Windows XP.

## 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 hardware). |

| | |
|---|---|
| **SMBIOS Version 2.4** | System Management BIOS, previously known as DMI BIOS, is used to store system managemen 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

| | | |
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| **Security** | **Standard Features** | HP ProtectTools Security Manager<br>HP Fingerprint Sensor<br>Configuration Control Hardware<br>Memory Change Alert<br>Ownership Tag<br>Setup Password<br>Power-On Password<br>TPM 1.2 Embedded Security Chip*<br>TPM Enhanced DriveLock*<br>HP Disk Sanitizer<br>HP 3D DriveGuard<br>Kensington Lock Slot<br>Support for Computrace / LoJack for Laptops (must be purchased separately) |
| | **Optional Features** | **Smart Card Reader** (replaces Type I/II PC Card slot) — Compatible with ISO 7816 compliant Smart Cards / PC/SC interface support |
| | | **HP Privacy Filter** — Narrows viewing area so that screen data is visible only to persons directly in front of the monitor |

***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.

# QuickSpecs

## Standard Features

| | | | |
|---|---|---|---|
| **Power Supply** | External 90-watt Smart AC adapter, 6-foot (1.8-meter) power cord included.<br>Total length including external AC adapter is 12 feet (3.66 meter).<br>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<br>6-cell (47 WHr) Lithium-Ion battery |
| | **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 (55 WHr) Primary** | **6-cell (47 WHr) Primary** |
|---|---|---|---|
| | **Primary battery** | Up to 5 hours and 15 minutes | Up to 4 hours and 15 minutes |
| | **Primary battery and optional HP Extended Life Battery** | Up to 10 hours and 45 minutes | Up to 9 hours and 45 minutes |
| | **Primary battery and optional HP Ultra-Capacity Battery** | Up to 14 hours and 30 minutes | Up to 13 hours and 30 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.

| | |
|---|---|
| **System Standby Time** | Up to 1 week |

| | |
|---|---|
| **Power Conservation** | Supports enhanced Intel SpeedStep technology with Intel Core 2 Duo processors (allows Battery Optimized Mode, Maximum Performance Mode, or Automatic mode)<br>Intel Display Power Saving technology<br>Hibernation<br>Standby<br>ACPI compliance |

| | |
|---|---|
| **Docking and Stands** | HP Advanced Docking Station<br>HP Basic Docking Station<br>HP Standard Monitor Stand<br>HP Adjustable Notebook Stand<br>HP External MultiBay II<br><br>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.<br><br>* HP/Kensington Cable Lock required (purchased separately)<br>** HP 3-in-1 NAS Docking Station and HP Advanced Docking Station only |

## Standard Features

**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.

# QuickSpecs

*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) **NOTE:** Requires HP 3-in-1 NAS Docking Station, HP Advanced Docking Station, or 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 |

| | | |
|---|---|---|
| **Other Storage** | HP 80-GB 5400rpm Primary SATA Hard Drive | ET354AA |
| | HP DVD+/-RW SuperMulti DL LightScribe Drive | ET353AA |
| | HP Notebooks USB Diskette Drive | DC361B |

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|---|---|---|
| **Communications** | Intel Wireless WiFi Link 4965AGN option kit* | RT081AA#xxx |
| | * Requires Intel Core 2 Duo processor | |

| | | |
|---|---|---|
| **Expansion Solutions** | HP Docking Station with Smart Adapter | EN488AA#xx) |
| | HP Advanced Docking Station with Smart Adapter | EN489AA#xx) |
| | HP Standard Monitor Stand | PA507A |
| | HP Adjustable Notebook Stand | PA508A |
| | HP External MultiBay II | PA509A#xx) |

| | | |
|---|---|---|
| **Power** | HP 2-Bay Battery Charging Station (North America only) | DT533A#xxx |
| | HP 2-Bay Battery Charging Station (rest of world) | EW424AA#xx) |
| | HP 10-Bay Battery Charging Station (North America only) | DT534A#ABA |
| | HP Battery Adapter Kit | PK402A |
| | HP 90W Smart AC Adapter | ED495AA#xx) |
| | HP 90W Smart Auto Adapter | ED493AA |
| | HP 65W AC/Auto/Air Combo Smart Adapter | ED993AA#xx) |
| | HP 6-Cell Li-Ion Primary Battery | PB994A |
| | HP 8-cell Extended Life Battery | PB993A |
| | HP 12-cell Ultra-Capacity Battery | EJ092AA |

| | | |
|---|---|---|
| **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 |

# QuickSpecs

## *Options*

| | | |
|---|---|---|
| **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 |

# QuickSpecs

*Memory*

Support for up to 4096 MB of 667-MHz DDR2 SDRAM
Two DIMM slots
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 is available (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. Full availability of 4 GB of memory requires Windows Vista Business 64-bit or Linux. With Windows 32-bit operating systems, the amount of usable memory is dependent upon your configuration, so that above 3 GB all memory may not be available due to system resource requirements.

**Memory Upgrades**

| | |
|---|---|
| HP 512-MB (DDR2 667 MHz) SODIMM | EM993AA |
| HP 1024-MB (DDR2 667 MHz) SODIMM | EM994AA |
| HP 2048-MB (DDR2 667 MHz) SODIMM | EM995AA |

# QuickSpecs

*Storage*

## Removable Media Drive Support

| | Quantity Supported | Drive Bay |
|---|---|---|
| DVD-ROM Drive | One | Fixed optical drive bay |
| DVD/CD-RW Combo Drive | One | Fixed optical drive bay |
| DVD+/-RW SuperMulti DL Drive | One | Fixed optical drive bay |
| DVD+/-RW SuperMulti DL LightScribe Drive | One | Fixed optical drive bay |

## Hard Drive Support

| | Quantity Supported | Drive Bay |
|---|---|---|
| **Primary Hard Drives** | | |
| 250-GB 5400 rpm SMART SATA Hard Drive | One | Dedicated hard drive bay |
| 160-GB 5400 rpm SMART SATA Hard Drive | One | Dedicated hard drive bay |
| 120-GB 5400 rpm SMART SATA Hard Drive | One | Dedicated hard drive bay |
| 80-GB 5400 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 |

# QuickSpecs

*Technical Specifications*

| | | | |
|---|---|---|---|
| **System Unit** | **Dimensions** (HxWxD) | 1.4 in (at front) x 14.1 in x 10.4 in<br>34.9 mm (at front) x 357.0 mm x 265.0 mm | |
| | **Weight** | Starting at 5.7 lb (2.59 kg) | |

**NOTE:** Height varies depending upon where on the notebook the measurement is made. Weight varies by configuration and components. Weight includes 6-cell battery, 80-GB hard drive, and optical drive. Weight varies by configuration and components.

| | | |
|---|---|---|
| **Stand-Alone Power Requirements** (AC Power) | Nominal Operating Voltage | 18.5 V |
| | Average Operating Power | 12.5 W |
| | Max Operating Power | < 90 W |
| **Temperature** | Operating | 32° to 95° F (0° to 35° C) (not writing optical) |
| | | 41° to 95° F (5° to 35° C) (writing optical) |
| | Non-operating | –4° to 140° F (–20° to 60° C) |
| **Relative Humidity** | Operating | 10% to 90%, non-condensing |
| | Non-operating | 5% to 95%, 101.6° F (38.7° C) maximum wet bulb temperature |
| **Shock** | Operating | 125 G, 2 ms, half-sine |
| | Non-operating | 200 G, 2 ms, half-sine |
| **Random Vibration** | Operating | 0.75 grms |
| | Non-operating | 1.50 grms |
| **Altitude** (unpressurized) | Operating | –50 to 10,000 ft (–15.24 to 3,048 m) |
| | Non-operating | –50 to 40,000 ft (–15.24 to 12,192 m) |
| **Industry Standard Certifications** | UL | Yes |
| | CSA | Yes |
| | FCC Compliance | Yes |
| | ENERGY STAR® 4.0 | Yes |
| | ICES | Yes |
| | GS | Yes |
| | Australia / NZ A-Tick Compliance | Yes |
| | CCC | Yes |
| | Japan VCCI Compliance | Yes |
| | MIC | Yes |
| | BSMI | Yes |
| | CE Marking Compliance | Yes |
| | BNCI or BELUS | Yes |
| | CIT | Yes |
| | GOST | Yes |
| | Saudi Arabian Compliance (ICCP) | Yes |
| | SABS | Yes |
| | UKRSERTCOMPUTER | Yes |

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

# QuickSpecs

*Technical Specifications*

| **HP 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. | |

| **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 | |

# QuickSpecs

HP Compaq 6710b Notebook P(

## Technical Specifications

| 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 | |

| 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 |

| 6-Cell (47WHr) 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 | 0.715 lb (0.325 kg) | |
| | Cells/Type | 6-cell Lithium-Ion | |
| | Energy | Watt-hour Capacity | 47Wh |
| | 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 |

# QuickSpecs

## *Technical Specifications*

| 15.4-inch WSXGA+ wide-viewing angle, anti-glare | | | |
|---|---|---|---|
| **Dimensions** (W x H) | 13.0 x 8.1 in (33.1 x 20.7 cm) | | |
| **Diagonal Size** | 15.4 in (39.1 cm) | | |
| **Surface Treatment** | Anti-glare | | |
| **Contrast Ratio** | 300:1 (typical) | | |
| **Refresh Rate** | 60 Hz | | |
| **Brightness** | 200 nit (typical) | | |
| **Pixel Resolution** | **Pitch** | 0.197 mm | |
| | **Format** | 1680 x 1050 | |
| | **Configuration** | RGB stripe | |
| **Backlight** | CCFL | | |
| **PPI** | 129 | | |
| **Viewing Angle** | ±60° Horizontal, ± 50° Vertical (minimum) | | |

| 15.4-inch WXGA anti-glare | | | |
|---|---|---|---|
| **Active Area** (W x H) | 13.0 x 8.1 in (33.1 x 20.7 cm) | | |
| **Diagonal Size** | 15.4 in (39.1 cm) | | |
| **Surface Treatment** | Anti-glare | | |
| **Contrast Ratio** | 300:1 (typical) | | |
| **Refresh Rate** | 60 Hz | | |
| **Brightness** | 200 nit (typical) | | |
| **Pixel Resolution** | **Pitch** | 0.259 mm | |
| | **Format** | 1280 x 800 | |
| | **Configuration** | RGB stripe | |
| **Backlight** | CCFL | | |
| **PPI** | 98 | | |
| **Viewing Angle** | ±30° Horizontal, ±10° Vertical (minimum) | | |

| 15.4-inch WXGA BrightView | | | |
|---|---|---|---|
| **Active Area** (W x H) | 13.0 x 8.1 in (33.1 x 20.7 cm) | | |
| **Diagonal Size** | 15.4 in (39.1 cm) | | |
| **Surface Treatment** | BrightView | | |
| **Contrast Ratio** | 300:1 (typical) | | |
| **Refresh Rate** | 60 Hz | | |
| **Brightness** | 200 nit (typical) | | |
| **Pixel Resolution** | **Pitch** | 0.259 mm | |
| | **Format** | 1280 x 800 | |
| | **Configuration** | RGB stripe | |
| **Backlight** | CCFL | | |
| **PPI** | 98 | | |
| **Viewing Angle** | ±30° Horizontal, ±10° Vertical (minimum) | | |

**Hard Drives**

# QuickSpecs

*Technical Specifications*

| 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 | |

| 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 | |

# QuickSpecs

*Technical Specifications*

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

# QuickSpecs

*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**

# QuickSpecs

*Technical Specifications*

| **DVD-ROM Drive** | **Access Times** | Random | <116 ms CD |
| | | | <125 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) | 4.7 GB | |
| | **Transport** | Tray Loading | |
| **DVD/CD-RW Combo Drive** | **Access Times** | Random | <110 ms CD |
| | | | <130 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 | |

# QuickSpecs

*Technical Specifications*

| DVD+/-RW SuperMulti DL Drive | **Access Times** | Random | <175 ms CD |
| | | | <230 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 |
| | | 16X CD-RW | 2,400 KB/s |
| | | 8X DVD+R | 10,800 KB/s |
| | | 4X DVD+RW | 5,400 KB/s |
| | | 8X DVD-R | 10,800 KB/s |
| | | 4X DVD-RW | 5,400 KB/s |
| | | 2.4X DVD+R(9) | 2,700 KB/s |
| | | 5X DVD-RAM | 6,750 KB/s |
| | **Transfer Mode** | Multiword DMA Mode | |
| | **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 | |

| DVD+/-RW SuperMulti DL LightScribe Drive | **Access Times** | Random | <175 ms CD |
| | | | <230 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 |
| | | 16X CD-RW | 2,400 KB/s |
| | | 8X DVD+R | 10,800 KB/s |
| | | 4X DVD+RW | 5,400 KB/s |
| | | 8X DVD-R | 10,800 KB/s |
| | | 4X DVD-RW | 5,400 KB/s |
| | | 2.4X DVD+R(9) | 2,700 KB/s |
| | | 5X DVD-RAM | 6,750 KB/s |
| | **Transfer Mode** | Multiword DMA Mode | |
| | **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, LightScribe | |

*Technical Specifications*

|  |  |  |
|---|---|---|
| | **Max Media Capacity** (read) | 8.5 GB |
| | **Max Media Capacity** (write) | 8.5 GB |
| | **Transport** | Tray Loading |

| **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 |

*Technical Specifications*

**Communications**

| Integrated Broadcom NetLink Gigabit Ethernet Controller (10/100/1000 NIC) | Ethernet Features | 10 Mbit/s operation (10BASE-T; IEEE 802.3i; IEEE 802.3 clauses 13-14) |
|---|---|---|
| | | 100 Mbit/s operation (100BASE-TX; IEEE 802.3u; IEEE 802.3 clauses 21-30) |
| | | 1000 Mbit/s operation (1000BASE-T; IEEE 802.3z and 802.3ab; IEEE 802.3 clauses 34-42) |
| | | Auto-Negotiation (Automatic Speed Selection) |
| | | Full Duplex Operation at all Speeds, Half Duplex operation at 10 and 100 Mbit/s |
| | | IEEE 802.1p QoS (Quality of Service) Support |
| | | IEEE 802.3x Flow Control (IEEE 802.3 clauses 31-32; configurable) |
| | Power Management | ACPI compliant -- multiple power modes |
| | | Situation-sensitive features reduce power consumption |
| | Performance Features | TCP/IP/UDP Checksum Offload (configurable) |
| | Manageability | Wake-on-LAN from standby and hibernation (Magic Packet and Microsoft Wake-Up Frame); Wake-on-LAN from off (Magic Packet only) |
| | | PXE 2.1 Remote Boot |
| | | Statistics Gathering (SNMP MIB II, Ethernet-like MIB, Ethernet MIB (802.3x, clause 30)) |
| | | Comprehensive diagnostic and configuration software suite |
| | Interface | PCI Express x1 |
| | NIC Device Driver Name | Broadcom NetLink Gigabit Ethernet |
| | Drivers Available | Microsoft Windows Vista |
| | | Microsoft Windows XP |
| V.92 56K Data/Fax Modem | Form Factor | MDC 1.5 Daughtercard |
| | Power Management Support | APM Revision 1.2, ACPI |
| | Approvals/ Certifications | UL, CSA, NEMKO, CCIB, Industry Canada, FCC Part 68, CTR21, FCC Part 15 Class B, Canadian ICES-003 Class B, C.I.S.P.R.22, Australian ACA, CE Mark, Other Countries |
| | Data Mode Capabilities | V.92 data |
| | | V.8bis |
| | | V.80 |
| | | V44, V.42bis, MNP5 (Compression) |
| | | V.42 (LAPM, MNP2-4) (Error Correction) |
| | | **Optional symbol rates:** 2800, 3429 Asymmetric Symbol rates |
| | | **Synchronous primary channel data signaling rates:** 3600, 31200 Automatic rate re-negotiation V.34 V.32bis V.32 V.23 V.22bis |

*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 ev2200 1xEV-DO 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 0/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: 850 MHz (Cellular) and 1900 MHz (PCS) |
|  | **Data Rates** (Packet Mode) | IS-856 rates up to 2.4 Mbps IS-2000 data rates up to 307.2 kbps |
|  | **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% |
|  | **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) |

*Technical Specifications*

| | | |
|---|---|---|
| | **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 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% |
| | **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 |

# QuickSpecs

## Technical Specifications

|  |  |  |
|---|---|---|
|  | **LED Activity** | LED Off – Radio Off;<br>Solid LED On – Radio On |

| | | |
|---|---|---|
| **HP hs2300 HSDPA Broadband Wireless Module** | **Frequency Bands and Power Class** | 850/1900/2100MHz WCDMA<br>Power class 3 (+24dBm)<br>850MHz GSM/GPRS/EDGE<br>900MHz GSM/GPRS/EDGE,<br>1800MHz GSM/GPRS/EDGE<br>1900MHz GSM/GPRS/EDGE<br>EDGE E2 power<br>GPRS/EDGE Multislot Class 12<br>GPRS PCS/DCS power class 1<br>GSM power class 4 |
| | **Wireless Protocol Standards** | GPRS/EDGE: 3GPP R99 GERAN P1<br>WCDMA Release 5 (R5)<br>High-Speed Downlink Packet Access (HSDPA) 3.6Mbps<br>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:<br>EDGE 118 kbps UL / 236 kbps DL<br>UMTS 384 kbps UL / 384 kbps DL<br>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<br>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) |
| | **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)<br>–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) |

# QuickSpecs

*Technical Specifications*

| | | |
|---|---|---|
| **LED Activity** | LED Off – Radio Off;<br>Solid LED On – Radio On | |
| **Configuration Utilities** | Varies per country and mobile network operator | |

| Intel PRO/Wireless 3945ABG Network Connection | | |
|---|---|---|
| **Intel PRO/Wireless 3945ABG Network Connection** | **Wireless LAN Standards** | IEEE 802.11a<br>IEEE 802.11b<br>IEEE 802.11g |
| | **Interoperability** | Wi-Fi certified<br>Cisco Compatible Extensions Program compliant with Microsoft Windows 2000 and XP (details at<br>http://www.hp.com/go/notebooks/WLAN) |
| | **Frequency Band** | 2.4 GHz |
| | **Data Rates** | 802.11b: 1, 2, 5.5, 11 Mbps<br>802.11a/g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps |
| | **Modulation** | Direct Sequence Spread Spectrum<br>DBPSK, DQPSK, CCK, OFDM |
| | **Security[1]** | Supports 64- and 128-bit WEP, WPA, WPA2, hardware-accelerated AES, 802.1x authentication types EAP-TLS, EAP-TTLS, PEAP-GTC, PEAP-MSCHAPv2, LEAP, EAP-FAST, EAP-SIM.<br><br>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)<br>Infrastructure (Access Point Required) |
| | **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: 1.8 Watts (max)<br>Receive: 1.4 Watts (max)<br>Idle mode[3]: 150 mW (nominal)<br>Sleep mode: 30 mW (max) |
| | **Power Management** | ACPI compliant power management<br>802.11 compliant power saving mode |
| | **Receiver Sensitivity[4]** | 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 a – Typical (@6 Mbps) — 600 feet – Outdoor Open Area / 150 feet – Indoor, Office environment<br>802.11 b – Typical (@1 Mbps) — 1200 feet – Outdoor Open Area / 300 feet – Indoor, Office environment<br>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) |

## Technical Specifications

| | | |
|---|---|---|
| **Operating Voltage** | 3.3V +/- 9%, 1.5V +/- 5% | |
| **Temperature** | Operating | 32° to 176° F (0° to 80° C) |
| | Non-operating | –40° to 176° F (–40° to 80° C) |
| **Humidity** | Operating | 10% to 90% (non-condensing) |
| | Non-operating | 5% to 95% (non-condensing) |
| **Altitude** | Operating | 0 to 10,000 ft (3,048 m) |
| | Non-operating | 0 to 50,000 ft (15,240 m) |

**Configuration Utility[5]**  Microsoft Windows 2000 or XP
  Choice of Configuration Utility:

- Microsoft Windows XP Wireless Network Connection Manager
- Intel PROSet for Microsoft Windows 2000 or XP (required for Cisco Compatible Extensions support)

Microsoft Windows Vista

- Microsoft Windows Vista Wireless Network Connection Manager

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

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

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| | | |
|---|---|---|
| **Intel PRO/Wireless 3945BG Network Connection** | **Wireless LAN Standards** | IEEE 802.11b<br>IEEE 802.11g |
| | **Interoperability** | Wi-Fi certified<br>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<br>802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps |
| | **Modulation** | Direct Sequence Spread Spectrum<br>DBPSK, DQPSK, CCK, OFDM |
| | **Security[1]** | Supports 64- and 128-bit WEP, WPA, WPA2, hardware-accelerated AES, 802.1x authentication types EAP-TLS, EAP-TTLS, PEAP-GTC, PEAP-MSCHAPv2, LEAP, EAP-FAST, EAP-SIM.<br><br>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)<br>Infrastructure (Access Point Required) |
| | **Roaming** | IEEE 802.11 compliant roaming between access points |

## Technical Specifications

| | |
|---|---|
| **Output Power** (for CKK)[2] | 15 dBm |
| **Output Power** (for OFDM; power varies by data rate)[2] | 15 dBm |
| **Power Consumption** | Transmit: 1.8 Watts (max)<br>Receive: 1.4 Watts (max)<br>Idle mode[3]: 150 mW (nominal)<br>Sleep mode: 30 mW (max) |
| **Power Management** | ACPI compliant power management<br>802.11 compliant power saving mode |
| **Receiver Sensitivity**[4] | 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 (@1 Mbps) — 1200 feet – Outdoor Open Area / 300 feet – Indoor, Office environment<br>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)<br>Non-operating — −40° to 176° F (−40° to 80° C) |
| **Humidity** | Operating — 10% to 90% (non-condensing)<br>Non-operating — 5% to 95% (non-condensing) |
| **Altitude** | Operating — 0 to 10,000 ft (3,048 m)<br>Non-operating — 0 to 50,000 ft (15,240 m) |
| **Configuration Utility**[5] | Microsoft Windows 2000 or XP<br>  Choice of Configuration Utility: |

- Microsoft Windows XP Wireless Network Connection Manager
- Intel PROSet for Microsoft Windows 2000 or XP (required for Cisco Compatible Extensions support)

Microsoft Windows Vista

- Microsoft Windows Vista Wireless Network Connection Manager

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

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

| | |
|---|---|
| **Intel Wireless WiFi LinkWireless LAN 4965AGN** | **Standards** — IEEE 802.11a<br>IEEE 802.11b<br>IEEE 802.11g<br>IEEE 802.11n (draft 1.02) |

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*Technical Specifications*

| | |
|---|---|
| **Interoperability** | Wi-Fi certified (802.11abg only)<br>Cisco Compatible Extensions Program compliant (802.11abg only) with Microsoft Windows 2000 and XP (details at http://www.hp.com/go/notebooks/WLAN)<br>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<br>802.11a/g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps<br>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<br>DBPSK, DQPSK, CCK, OFDM, BPSK, QPSK, 16-QAM, 64-QAM |
| **Security**[1] | Supports 64- and 128-bit WEP, WPA, WPA2, hardware-accelerated AES (support for key sizes of 128, 192, and 256 bits), 802.1x authentication types EAP-TLS, EAP-TTLS, PEAP-GTC, PEAP-MSCHAPv2, LEAP, EAP-FAST.<br><br>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)<br>Infrastructure (Access Point Required) |
| **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)<br>Receive: 1.9 Watts (average with three receive chains)<br>Idle mode[3]: 30 mW (average)<br>Radio off: 20 mW (max) |
| **Power Management** | ACPI compliant power management<br>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<br>                               150 feet – Indoor, Office environment<br>802.11 b – Typical (@1 Mbps)     1200 feet – Outdoor Open Area<br>                               300 feet – Indoor, Office environment<br>802.11 g – Typical (@1 Mbps)     1200 feet – Outdoor Open Area<br>                               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) |

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## Technical Specifications

| | | |
|---|---|---|
| **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:

- Microsoft Windows XP Wireless Network Connection Manager
- Intel PROSet for Microsoft Windows 2000 or XP (required for Cisco Compatible Extensions support)

Microsoft Windows Vista

- Microsoft Windows Vista Wireless Network Connection Manager

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

1. Check latest software/driver release for updates on supported security features.
2. Maximum output power may vary by country according to local regulations.
3. In Power Save Polling mode 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.

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**Intel Wireless WiFi LinkWireless LAN 4965AG**

| | | |
|---|---|---|
| | **Standards** | IEEE 802.11a<br>IEEE 802.11b<br>IEEE 802.11g |
| | **Interoperability** | Wi-Fi certified<br>Cisco Compatible Extensions Program compliant with Microsoft Windows 2000 and XP (details at<br>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<br>802.11a/g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps |
| | **Modulation** | Direct Sequence Spread Spectrum<br>DBPSK, DQPSK, CCK, OFDM |
| | **Security[1]** | Supports 64- and 128-bit WEP, WPA, WPA2, hardware-accelerated AES (support for key sizes of 128, 192, and 256 bits), 802.1x authentication types EAP-TLS, EAP-TTLS, PEAP-GTC, PEAP-MSCHAPv2, LEAP, EAP-FAST.<br><br>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)<br>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: 1.6 Watts (average)<br>Receive: 1.1 Watts (average)<br>Idle mode[3]: 30 mW (average)<br>Radio off: 20 mW (max) | |
| **Power Management** | ACPI compliant power management<br>802.11 compliant power saving mode | |
| **Receiver Sensitivity[4]** | 54 Mbps: -74 dBm, 6 Mbps: -90 dBm | |
| **Antenna Connections** | 2 U.FL type connectors, 50 ohm nominal impedance | |
| **Range** | 802.11 a – Typical (@6 Mbps) | 600 feet – Outdoor Open Area<br>150 feet – Indoor, Office environment |
| | 802.11 b – Typical (@1 Mbps) | 1200 feet – Outdoor Open Area<br>300 feet – Indoor, Office environment |
| | 802.11 g – Typical (@1 Mbps) | 1200 feet – Outdoor Open Area<br>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<br>Non-operating | 32° to 176° F (0° to 80° C)<br>–40° to 176° F (–40° to 80° C) |
| **Humidity** | Operating<br>Non-operating | 10% to 90% (non-condensing)<br>5% to 90% (non-condensing) |
| **Altitude** | Operating<br>Non-operating | 0 to 10,000 ft (3,048 m)<br>0 to 50,000 ft (15,240 m) |
| **Configuration Utility[5]** | Microsoft Windows 2000 or XP<br>  Choice of Configuration Utility: | |

- Microsoft Windows XP Wireless Network Connection Manager
- Intel PROSet for Microsoft Windows 2000 or XP (required for Cisco Compatible Extensions support)

Microsoft Windows Vista

- Microsoft Windows Vista Wireless Network Connection Manager

| | |
|---|---|
| **LED Activity** | LED Off – Radio OFF; Solid LED On – Radio ON |

1. Check latest software/driver release for updates on supported security features.
2. Maximum output power may vary by country according to local regulations.
3. In Power Save Polling mode 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.

| | | |
|---|---|---|
| **Broadcom 4311AG 802.11a/b/g WiFi** | **Wireless LAN Standards** | IEEE 802.11a<br>IEEE 802.11b |

# QuickSpecs

HP Compaq 6710b Notebook P

*Technical Specifications*

| Adapter | | IEEE 802.11g |
|---|---|---|
| | **Interoperability** | Wi-Fi certified<br>Cisco Compatible Extensions Program compliant with Microsoft Windows 2000 and XP (details at<br>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<br>802.11a/g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps |
| | **Modulation** | Direct Sequence Spread Spectrum<br>DBPSK, DQPSK, CCK, OFDM |
| | **Security[1]** | Supports 64- and 128-bit WEP, WPA, WPA2, hardware-accelerated AES, 802.1x authentication types EAP-TLS, EAP-TTLS, PEAP-GTC, PEAP-MSCHAPv2, LEAP, EAP-FAST.<br><br>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)<br>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; power varies by data rate)[2] | 15 dBm |
| | **Power Consumption** | Transmit: 2.0 W (max)<br>Receive: 1.5 W (max)<br>Idle mode[3]: 390 mW (nominal)<br>Sleep mode: 20 mW (max) |
| | **Power Management** | ACPI compliant power management<br>802.11 compliant power saving mode |
| | **Receiver Sensitivity[4]** | 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 a – Typical (@6 Mbps) — 600 feet – Outdoor Open Area / 150 feet – Indoor, Office environment<br>802.11 b – Typical (@1 Mbps) — 1200 feet – Outdoor Open Area / 300 feet – Indoor, Office environment<br>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)<br>Non-operating — -40° to 176° F (-40° to 80° C) |
| | **Humidity** | Operating — 10% to 90% (non-condensing)<br>Non-operating — 5% to 95% (non-condensing) |

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*Technical Specifications*

| | | | |
|---|---|---|---|
| **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:

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

Microsoft Windows Vista

- Microsoft Windows Vista Wireless Network Connection Manager

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

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

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| **Broadcom 4311BG 802.11b/g WiFi Adapter** | **Wireless LAN Standards** | IEEE 802.11b<br>IEEE 802.11g |
|---|---|---|
| | **Interoperability** | Wi-Fi certified<br>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<br>802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps |
| | **Modulation** | Direct Sequence Spread Spectrum<br>DBPSK, DQPSK, CCK, OFDM |
| | **Security[1]** | Supports 64- and 128-bit WEP, WPA, WPA2, hardware-accelerated AES, 802.1x authentication types EAP-TLS, EAP-TTLS, PEAP-GTC, PEAP-MSCHAPv2, LEAP, EAP-FAST.<br><br>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)<br>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; power varies by data rate)[2] | 15 dBm |

*Technical Specifications*

| | |
|---|---|
| **Power Consumption** | Transmit: 2.0 W (max)<br>Receive: 1.5 W (max)<br>Idle mode[3]: 390 mW (nominal)<br>Sleep mode: 20 mW (max) |
| **Power Management** | ACPI compliant power management<br>802.11 compliant power saving mode |
| **Receiver Sensitivity[4]** | 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<br>300 feet – Indoor, Office environment |
|---|---|---|
| | 802.11 g – Typical (@1 Mbps) | 1200 feet – Outdoor Open Area<br>300 feet – Indoor, Office environment |

| | |
|---|---|
| **Form Factor** | PCI-Express MiniCard |
| **Weight** | 0.026 lb (12 g) |
| **Dimensions** | 0.19 x 1.2 x 2.0 in (4.75 x 29.85 x 50.8 mm) |
| **Operating Voltage** | 3.3v +/- 10% |

| **Temperature** | Operating | 32° to 176° F (0° to 80° C) |
|---|---|---|
| | Non-operating | –40° to 176° F (–40° to 80° C) |
| **Humidity** | Operating | 10% to 90% (non-condensing) |
| | Non-operating | 5% to 95% (non-condensing) |
| **Altitude** | Operating | 0 to 10,000 ft (3,048 m) |
| | Non-operating | 0 to 50,000 ft (15,240 m) |

**Configuration Utility[5]**  Microsoft Windows 2000 or XP
  Choice of Configuration Utility:

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

Microsoft Windows Vista

- Microsoft Windows Vista Wireless Network Connection Manager

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

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

| | | |
|---|---|---|
| **Broadcom 4321AGN 802.11a/b/g/draft-n WiFi Adapter** | **Wireless LAN Standards** | IEEE 802.11a<br>IEEE 802.11b<br>IEEE 802.11g<br>IEEE 802.11n (draft) |

*Technical Specifications*

| | |
|---|---|
| **Interoperability** | Wi-Fi certified (802.11abg only)<br>Cisco Compatible Extensions Program compliant (802.11abg only) with Microsoft Windows 2000 and XP (details at http://www.hp.com/go/notebooks/WLAN)<br>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<br>802.11a/g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps<br>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<br>40 MHz: 5 GHz band only |
| **Modulation** | Direct Sequence Spread Spectrum<br>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.<br><br>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)<br>Infrastructure (Access Point Required) |
| **Roaming** | IEEE 802.11 compliant roaming between access points |
| **Output Power** (for CKK)[2] | 17 dBm |
| **Output Power** (for OFDM; power varies by data rate)[2] | 15 dBm |
| **Power Consumption** | Idle associated: 300 mW<br>Idle unassociated: 150 mW<br>Transmit/Receive 20 MHz channel: 2.6 W (max)<br>Transmit/Receive 40 MHz channel: 3.3 W (max) |
| **Power Management** | ACPI compliant power management<br>802.11 compliant power saving mode |
| **Receiver Sensitivity**[3] | 270 Mbps: -66dBm, 162 Mbps: -72 dBm, 54 Mbps: -72 dBm, 11 Mbps: -85 dBm , 1 Mbps: -94 dBm |
| **Antenna type** | High efficiency dual band antenna with spatial diversity, mounted in the display enclosure |
| **Range** | 802.11 a – Typical (@6 Mbps)    600 feet – Outdoor Open Area / 150 feet – Indoor, Office environment<br>802.11 b – Typical (@1 Mbps)    1200 feet – Outdoor Open Area / 300 feet – Indoor, Office environment<br>802.11 g – Typical (@1 Mbps)    1200 feet – Outdoor Open Area / 300 feet – Indoor, Office environment |
| **Form Factor** | PCI-Express MiniCard |

*Technical Specifications*

| | | |
|---|---|---|
| **Weight** | 0.026 lb (12 g) | |
| **Dimensions** | 0.19 x 1.2 x 2.0 in (4.75 x 29.85 x 50.8 mm) | |
| **Operating Voltage** | 3.3v +/- 10% | |
| **Temperature** | Operating | 14° to 149° F (–10° to 65° C) |
| | Non-operating | –40° to 176° F (–40° to 80° C) |
| **Humidity** | Operating | 10% to 90% (non-condensing) |
| | Non-operating | 5% to 95% (non-condensing) |
| **Altitude** | Operating | 0 to 10,000 ft (3,048 m) |
| | Non-operating | 0 to 50,000 ft (15,240 m) |

**Configuration Utility[4]**  Microsoft Windows 2000 or XP
   Choice of Configuration Utility:

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

Microsoft Windows Vista

- Microsoft Windows Vista Wireless Network Connection Manager

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

1. Check latest software/driver release for updates on supported security features.
2. Maximum output power may vary by country according to local regulations.
3. Receiver sensitivity is measured at a packet error rate of 8% for 802.11b (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.

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

*Technical Specifications*

|  |  |  |
|---|---|---|
|  | 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) |  |
|  | Hands Free Profile (HFP) |  |
|  | Advanced Audio Distribution Profile (A2DP) |  |

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

## Technical Specifications

| 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)
- IT ECO declaration
- Korean Eco Label

**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 | 13.92 W | 13.95 W | 13.65 W |
| Sleep (Energy Star low power mode) | 0.9 W | 1.11 W | 0.87 W |
| Off | 1.19 W | 1.4 W | 1.18 W |

| Heat Dissipation* | 115 VAC | 230 VAC | 100 VAC |
|---|---|---|---|
| Normal Operation | 47.495 BTU/hr | 47.597 BTU/hr | 46.573 BTU/hr |
| Sleep | 3.07 BTU/hr | 3.787 BTU/hr | 2.968 BTU/hr |
| Off | 4.06 BTU/hr | 4.776 BTU/hr | 4.026 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 | 3.1 | 21.4 |
| Operating mode (HDD) | 3.1 | 22.2 |

**Batteries** This product complies with ISO standards:

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

Batteries used in the product do not contain:

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

The battery type and chemistry used in the product is:
CR2032 (coin cell), Lithium
6 cell rechargeable Lithium-Ion battery; optional 8 cell Lithium-Ion battery available

**Additional information:** 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.

*Technical Specifications*

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

- Corrugated / Paper – 2.41 lb (1094 g)
- EPE Foam – 0.112 lb (51 g)
- LDPE Bag – 0.011 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):

- 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)
-

*Technical Specifications*

- 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

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