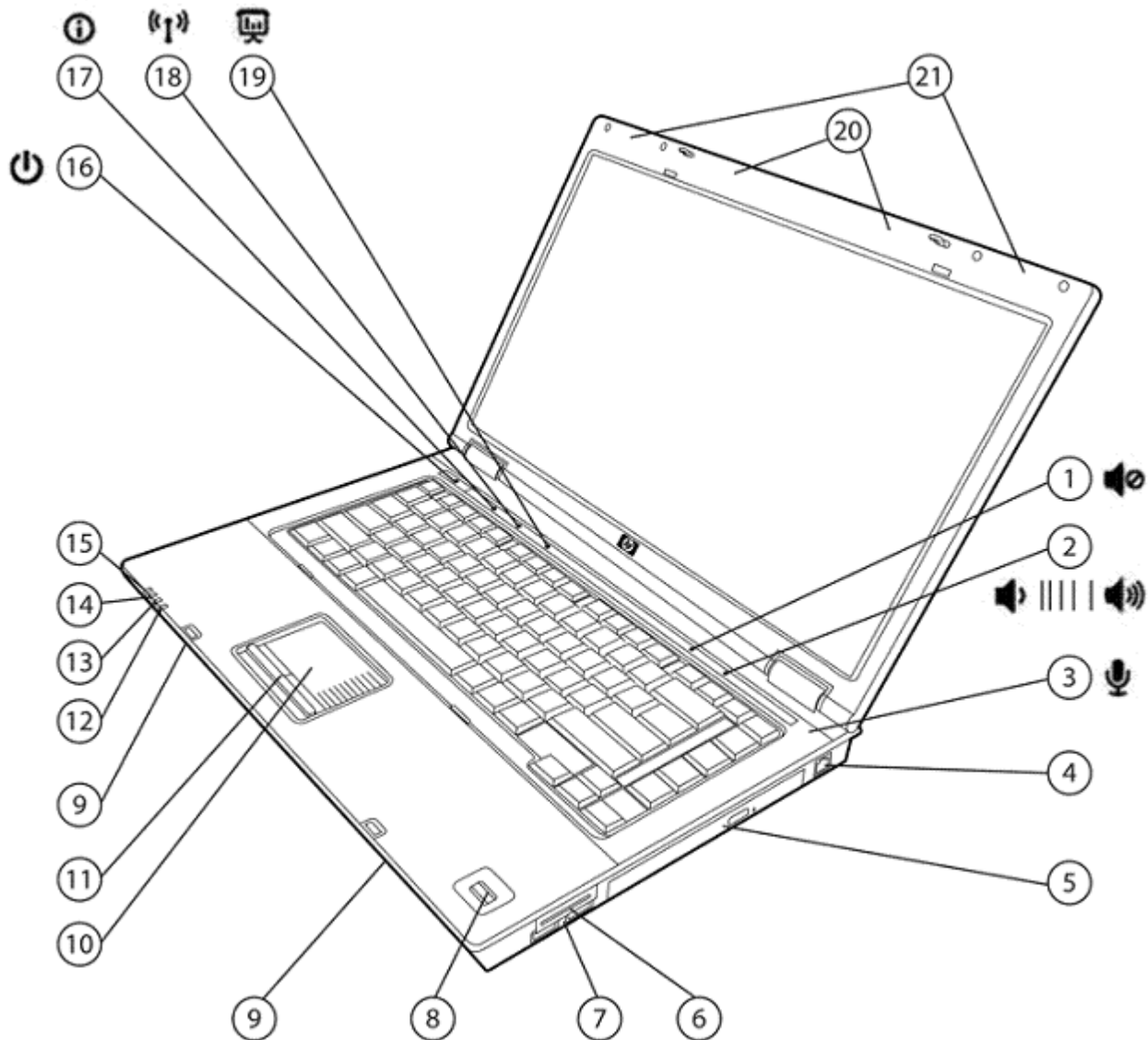


## Overview

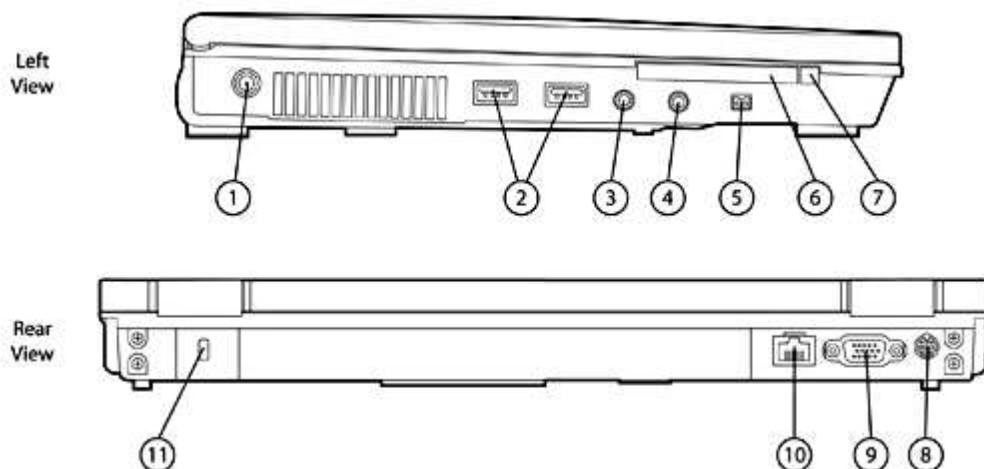
HP recommends Windows Vista™  
Business



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 (from 4 in total)
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, available 3Q 2007)

## Overview



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

## At A Glance

- Genuine Windows Vista Business 32/64, Genuine Windows Vista Home 32, Genuine Windows XP Professional, or FreeDOS
- Widescreen 15.4-inch diagonal display anti glare with optional wide-viewing angle, HP Privacy Filter support
- Flexible wireless connectivity options:
  - Integrated HP ev2200 1xEV-DO or HP hs2300 HSDPA Broadband Wireless module (available June 2007)
  - Integrated 802.11 a/b/g/draft-n, a/b/g, or b/g wireless LAN module
  - Bluetooth®
- Intel® Core™ 2 Duo processors
- Thin, lightweight design starting at 2.59 kg and 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 160-GB 5400 rpm or 80-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
- Broadcom NetLink Gigabit Ethernet Controller
- Touchpad with scroll zone

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

## Standard Features

### Processors

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

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

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

### Operating System

#### Preinstalled

Genuine Windows Vista Business 32/64\*  
 Genuine Windows Vista Home Basic 32\*  
 Genuine Windows XP Professional  
 FreeDOS

#### Supported

Genuine Windows Vista Enterprise\*

#### Certified

SuSE Linux Enterprise Desktop 10

\* Certain Windows Vista product features require advanced or additional hardware. See

<http://www.microsoft.com/windowsvista/getready/hardwarereqs.mspx> and

<http://www.microsoft.com/windowsvista/getready/capable.mspx> for details. Windows Vista Upgrade Advisor can help you determine which features of Windows Vista will run on your computer. To download the tool, visit <http://www.windowsvista.com/upgradeadvisor>.

### Chipset

Mobile Intel GM965

### Graphics

Mobile Intel Graphics Media Accelerator X3100, up to 384-MB shared system memory  
 Microsoft DirectX 9 capable

### Display

#### Internal

15.4-inch diagonal WXGA anti-glare (1280 x 800 resolution)  
 15.4-inch diagonal WSXGA+ WVA anti-glare (1680 x 1050 resolution)

#### External

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

### Memory

#### Standard

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.

### Standard Features

#### 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.

#### Wireless Devices

Support for a broad range of secure, integrated wireless LAN and wireless WAN options featuring support for the latest industry standards. Wireless LAN is factory configurable or available as an option to be added later. Broadband Wireless (WWAN) requires Windows Vista Business or Windows XP Professional and is available in select countries as a standard, factory configurable feature 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 hs2300 HSDPA Broadband Wireless Module (available 3Q 2007)

Integrated WWAN module that provides connection to GSM, GPRS, EDGE, UMTS, and HSDPA mobile networks in many countries. Currently supported networks are the Cingular network in the U.S. and Vodafone networks in Australia, France, Italy, Germany, Netherlands, New Zealand, Spain, and UK, and roaming on Cingular and Vodafone partner networks in more than 100 countries.

**NOTE:** Separately purchased mobile network operator service is required. Two 800/900/1800/1900/2100-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 4311AG 802.11a/b/g WiFi Adapter

Integrated support for 802.11 a, b and g  
Up to 54-mbps data rate

##### Broadcom 4311BG 802.11b/g WiFi Adapter

Integrated support for 802.11 b and g  
Up to 54-mbps data rate

### Standard Features

|                                                                |                                                                                        |
|----------------------------------------------------------------|----------------------------------------------------------------------------------------|
| <b>HP Integrated Module with Bluetooth Wireless Technology</b> | Bluetooth Specification v2.0 compliant<br>Works with a wide range of Bluetooth devices |
| <i>* Requires Intel Core 2 Duo processor</i>                   |                                                                                        |

|                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Keyboard</b> | 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. |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                                 |                                                                                                                                                                                          |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Touch-sensitive controls</b> | 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 |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                        |                                             |
|------------------------|---------------------------------------------|
| <b>Pointing device</b> | Touchpad with scroll zone, two pick buttons |
|------------------------|---------------------------------------------|

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

|                |                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                         |
|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Storage</b> | <b>Hard drives</b>                                                                                                                                                    | 80/120/160-GB 5400 rpm SMART SATA<br>80-GB 7200 rpm SMART SATA                                                                                                                                                                                                                                                                                                                          |
|                | <i>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.</i> |                                                                                                                                                                                                                                                                                                                                                                                         |
|                | <b>HP 3D DriveGuard</b>                                                                                                                                               | 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. |
|                | <b>Fixed optical drives</b>                                                                                                                                           | DVD-ROM Drive<br>DVD/CD-RW Combo Drive<br>DVD+/-RW SuperMulti DL Drive<br>DVD+/-RW SuperMulti DL LightScribe Drive                                                                                                                                                                                                                                                                      |

## 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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <hr/>                                                                                                         |                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Audio                                                                                                         | High Definition Audio support w/24-bit DAC<br>Integrated stereo speakers<br>Integrated microphone<br>Touch-sensitive controls for volume up, volume down, and mute<br>Stereo headphone/line out<br>Stereo microphone in |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <hr/>                                                                                                         |                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Software                                                                                                      | Preinstalled software with Windows Vista or Windows XP                                                                                                                                                                  | PDF Complete<br>HP Backup and Recovery Manager<br>HP Help and Support Center<br>HP QuickLook (Windows Vista only)<br>HP OpenView Radia Management Agent<br>HP Universal Print Driver<br>HP ProtectTools Security Manager:<br>BIOS Configuration for HP ProtectTools<br>Credential Manager for HP ProtectTools<br>Device Access Manager for HP ProtectTools*<br>Drive Encryption for HP ProtectTools<br>Embedded Security for HP ProtectTools<br>HP Quick Launch Buttons<br>HP Wireless Assistant<br>Microsoft Office Ready with 60-day Office Professional 2007 Trial Edition (select models)<br>Roxio Creator 9 (for optional DVD+/-RW and DVD/CDRW drives)<br>Synaptics Touchpad Driver<br>Symantec Norton Internet Security with complimentary 60-day live update<br>Intervideo WinDVD – DVD Player |
|                                                                                                               | Additional software available from the web                                                                                                                                                                              | HP Client Manager<br>Java Card Security for HP ProtectTools                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| * Download available from <a href="http://hp.com">hp.com</a> 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 management information.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| HP ProtectTools Security Manager | <p>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:</p> <ul style="list-style-type: none"><li>• BIOS Configuration for HP ProtectTools</li><li>• Credential Manager for HP ProtectTools</li><li>• Device Access Manager for HP ProtectTools</li><li>• Drive Encryption for HP ProtectTools</li><li>• Embedded Security for HP ProtectTools</li><li>• Java Card Security for HP ProtectTools</li></ul> |

|                                                                                                                                                                                                                                               |                   |                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                      |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|
| 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 | <b>Smart Card Reader</b><br>(replaces Type I/II PC Card slot)                                                                                                                                                                                                                                                                                                                           | Compatible with ISO 7816 compliant Smart Cards<br>PC/SC interface support                            |
|                                                                                                                                                                                                                                               |                   | <b>HP Privacy Filter</b>                                                                                                                                                                                                                                                                                                                                                                | Narrows viewing area so that screen data is visible only to persons directly in front of the monitor |
| <p><b>*NOTE:</b> TPM module disabled where use is restricted by law; for example, Russia and China.<br/>For more information on HP security solutions refer to <a href="http://www.hp.com/go/security">http://www.hp.com/go/security</a>.</p> |                   |                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                      |

Standard Features

|              |                                                                                                                                                   |
|--------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| Power Supply | External 90-watt Smart AC adapter, 1.8-meter power cord included.<br>Total length including external AC adapter is 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                |
|         | 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 | Primary battery                                        | 55 WHr: Up to 5 hours and 15 minutes  |
|              | Primary battery and optional HP Extended Life Battery  | 55 WHr: Up to 10 hours and 45 minutes |
|              | Primary battery and optional HP Ultra-Capacity Battery | 55 WHr: Up to 14 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 |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

### Standard Features

#### Docking and Stands

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

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

\* HP/Kensington Cable Lock required (purchased separately)

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

#### Service and Support

HP Services offers limited 3- year, 1-year and 90-day warranty options depending on country; 1-year limited warranty on primary battery. On-site service and warranty upgrades are also available.

**NOTE:** Certain restrictions and exclusions apply. Consult the HP Customer Support Center for details.  
<http://h20000.www2.hp.com/bizsupport/TechSupport/ProductRoot.jsp>.

### Options

|                                                                                                                                                 |                                                 |             |
|-------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|-------------|
| Memory                                                                                                                                          | HP 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<br>(9.5-mm)<br><b>NOTE:</b> 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 120-GB 5400rpm Primary SATA Hard Drive       | RT080AA     |
|                                                                                                                                                 | HP DVD+/-RW SuperMulti DL LightScribe Drive     | ET353AA     |
|                                                                                                                                                 | HP Notebooks USB Diskette Drive                 | DC361B      |
| Expansion Solutions                                                                                                                             | HP Docking Station with Smart Adapter           | EN488AA#xxx |
|                                                                                                                                                 | HP Advanced Docking Station with Smart Adapter  | EN489AA#xxx |
|                                                                                                                                                 | HP 3-in1 NAS Docking Station with Smart Adapter | EM537AA#xxx |
|                                                                                                                                                 | HP Standard Monitor Stand                       | PA507A      |
|                                                                                                                                                 | HP Adjustable Notebook Stand                    | PA508A      |
|                                                                                                                                                 | HP External MultiBay II Cradle (EMEA)           | PA509A#B13  |
| Power                                                                                                                                           | HP (EMEA) 2-Bay Battery Charging Station        | EW424AA#B13 |
|                                                                                                                                                 | HP Battery Adapter Kit (EMEA)                   | PK403A      |
|                                                                                                                                                 | HP 90W Smart AC Adapter                         | ED495AA#xxx |
|                                                                                                                                                 | HP 65W AC/Auto/Air Combo Smart Adapter          | ED993AA#xxx |
|                                                                                                                                                 | HP 6-Cell Li-Ion Primary Battery                | PB994A      |
|                                                                                                                                                 | HP 8-cell Extended Life Battery                 | PB993A      |
|                                                                                                                                                 | HP 12-cell Ultra-Capacity Battery (EMEA)        | EJ092AA#B13 |
| Carrying Cases                                                                                                                                  | HP Value Nylon Case                             | RR314AA     |
|                                                                                                                                                 | HP Universal Nylon Case                         | RR315AA     |
|                                                                                                                                                 | HP Executive Leather Case                       | RR316AA     |
|                                                                                                                                                 | HP Deluxe Nylon Backpack                        | RR317AA     |
| Security                                                                                                                                        | HP PC Card Smart Card Reader with Java Card     | EL347AA     |
|                                                                                                                                                 | HP ProtectTools Java Card – 10 units            | EL348AA     |
|                                                                                                                                                 | HP/Kensington MicroSaver Security Lock          | PC766A      |

Options

|                      |                                          |            |
|----------------------|------------------------------------------|------------|
| Input/Output Devices | HP PS/2 Keyboard (EMEA)                  | DT527A#xxx |
|                      | HP USB Keyboard (EMEA)                   | DT528A#xxx |
|                      | HP USB/PS2 Optical 2-Button Scroll Mouse | DC369A     |
|                      | HP USB Optical Travel Mouse              | F2100A     |
|                      | HP Bluetooth PC Card Mouse               | RJ316AA    |

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.

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

Storage

## Removable Media Drive Support

|                                             | Quantity Supported | Drive Bay               |
|---------------------------------------------|--------------------|-------------------------|
| 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<br>LightScribe Drive | One                | Fixed optical drive bay |

## Hard Drive Support

|                                          | Quantity Supported | Drive Bay                |
|------------------------------------------|--------------------|--------------------------|
| <b>Primary Hard Drives</b>               |                    |                          |
| 160-GB 5400 rpm SMART SATA<br>Hard Drive | One                | Dedicated hard drive bay |
| 120-GB 5400 rpm SMART SATA<br>Hard Drive | One                | Dedicated hard drive bay |
| 80-GB 5400 rpm SMART SATA<br>Hard Drive  | One                | Dedicated hard drive bay |
| 80-GB 7200 rpm SMART SATA<br>Hard Drive  | One                | Dedicated hard drive bay |

## Technical Specifications

|                                                                                                                                                                                                                                                                    |                                  |                                                                    |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|--------------------------------------------------------------------|
| System Unit                                                                                                                                                                                                                                                        | Dimensions (HxWxD)               | 34.9 mm (at front) x 357.0 mm x 265.0 mm                           |
|                                                                                                                                                                                                                                                                    | Weight                           | Starting at 2.62 kg                                                |
| <p><b>NOTE:</b> 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.</p> |                                  |                                                                    |
| 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                        | 0° to 35° C (not writing optical)<br>5° to 35° C (writing optical) |
|                                                                                                                                                                                                                                                                    | Non-operating                    | –20° to 60° C                                                      |
| Relative Humidity                                                                                                                                                                                                                                                  | Operating                        | 10% to 90%, non-condensing                                         |
|                                                                                                                                                                                                                                                                    | Non-operating                    | 5% to 95%, 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                        | –15.24 to 3,048 m                                                  |
|                                                                                                                                                                                                                                                                    | Non-operating                    | –15.24 to 12,192 m                                                 |
| Industry Standard Certifications                                                                                                                                                                                                                                   | UL                               | Yes                                                                |
|                                                                                                                                                                                                                                                                    | CSA                              | Yes                                                                |
|                                                                                                                                                                                                                                                                    | FCC Compliance                   | Yes                                                                |
|                                                                                                                                                                                                                                                                    | Energy Star Compliant            | 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                                                                |

## Technical Specifications

|                               |                       |                                                                                                                                                                                                                                                                                               |
|-------------------------------|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| HP 90W Smart AC Adapter       | Dimensions            | 13.3 x 5.8 x 2.9 cm                                                                                                                                                                                                                                                                           |
|                               | Weight                | 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 0° to 40° C)                                                                                                                                                                                                                                                            |
|                               |                       | Non-operating (storage) temperature -20° to 65° C                                                                                                                                                                                                                                             |
| EMI and Safety Certifications | Altitude              | 0 to 3,048 m                                                                                                                                                                                                                                                                                  |
|                               | Humidity              | 20% to 80%                                                                                                                                                                                                                                                                                    |
|                               | Storage Humidity      | 10% to 90%                                                                                                                                                                                                                                                                                    |
|                               |                       | 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) | 3.33 x 15.25 x 26.88 cm                                                  |
|                                    | Weight                 | 0.803 kg                                                                 |
|                                    | Cells/Type             | 12-cell Lithium-Ion                                                      |
|                                    | Energy                 | Watt-hour Capacity 95Wh                                                  |
|                                    | Temperature            | Operating (Charging) 0° to 45° C                                         |
|                                    |                        | Operating (Discharging) -10° to 60° C                                    |
|                                    |                        | Non-operating -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 |

## Technical Specifications

|                                   |                                                                          |                               |                                                                    |
|-----------------------------------|--------------------------------------------------------------------------|-------------------------------|--------------------------------------------------------------------|
| Optional HP Extended Life Battery | Dimensions (H x W x L)                                                   | 2.5 x 10.0 x 22.0 cm          |                                                                    |
|                                   | Weight                                                                   | 0.455 kg                      |                                                                    |
|                                   | Cells/Type                                                               | 8-cell Lithium-Ion            |                                                                    |
|                                   | Energy                                                                   | Watt-hour Capacity            | 52Wh                                                               |
|                                   | Temperature                                                              | Operating (Charging)          | 0° to 45° C                                                        |
|                                   |                                                                          | Operating (Discharging)       | –10° to 60° C                                                      |
|                                   |                                                                          | Non-operating                 | –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) | 2.0 x 5.3 x 20.3 cm           |                                                                    |
|                                    | Weight                 | 0.335 kg                      |                                                                    |
|                                    | Cells/Type             | 6-cell Lithium-Ion            |                                                                    |
|                                    | Energy                 | Watt-hour Capacity            | 55Wh                                                               |
|                                    | Temperature            | Operating (Charging)          | 0° to 45° C                                                        |
|                                    |                        | Operating (Discharging)       | -10° to 60° C                                                      |
|                                    |                        | Non-operating                 | -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 |

|                                                 |                    |                                           |             |
|-------------------------------------------------|--------------------|-------------------------------------------|-------------|
| 15.4-inch WSXGA+ wide-viewing angle, anti-glare | Dimensions (W x H) | 33.1 x 20.7 cm                            |             |
|                                                 | Diagonal Size      | 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) |             |

Technical Specifications

|                           |                     |                                          |            |
|---------------------------|---------------------|------------------------------------------|------------|
| 15.4-inch WXGA anti-glare | Active Area (W x H) | 33.1 x 20.7 cm                           |            |
|                           | Diagonal Size       | 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) |            |

Hard Drives

|                     |                                                  |                         |                             |
|---------------------|--------------------------------------------------|-------------------------|-----------------------------|
| 80-GB 7200 rpm SATA | Drive Weight                                     | 113 g                   |                             |
|                     | Capacity                                         | 80 GB                   |                             |
|                     | Height                                           | 9.5 mm                  |                             |
|                     | Width                                            | 70 mm                   |                             |
|                     | Interface                                        | ATA-7 / SATA 1.0a       |                             |
|                     | Transfer Rate                                    | Synchronous (maximum)   | 100 MB/s (Drive Capability) |
|                     | Seek Time<br>(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                            | 5° to 60° C [case temp] |                             |
|                     | Features                                         | ATA Security            |                             |

## Technical Specifications

|                      |                                                  |                                                          |
|----------------------|--------------------------------------------------|----------------------------------------------------------|
| 160-GB 5400 rpm SATA | Drive Weight                                     | 101 g                                                    |
|                      | Capacity                                         | 160 GB                                                   |
|                      | Height                                           | 9.5 mm                                                   |
|                      | Width                                            | 70 mm                                                    |
|                      | Interface                                        | ATA-7 / SATA 1.0a                                        |
|                      | Transfer Rate                                    | <b>Synchronous</b> (maximum) 100 MB/s (Drive Capability) |
|                      | Seek Time<br>(typical reads, including settling) | <b>Single Track</b> 3 ms                                 |
|                      |                                                  | <b>Average</b> 13ms                                      |
|                      |                                                  | <b>Maximum</b> 24 ms                                     |
|                      | Rotational Speed                                 | 5400 rpm                                                 |
|                      | Logical Blocks                                   | 312,581,808                                              |
|                      | Operating Temperature                            | 5° to 60° C [case temp]                                  |
|                      | Features                                         | ATA Security                                             |

|                      |                                                  |                                                          |
|----------------------|--------------------------------------------------|----------------------------------------------------------|
| 120-GB 5400 rpm SATA | Drive Weight                                     | 101 g                                                    |
|                      | Capacity                                         | 120 GB                                                   |
|                      | Height                                           | 9.5 mm                                                   |
|                      | Width                                            | 70 mm                                                    |
|                      | Interface                                        | ATA-7 / SATA 1.0a                                        |
|                      | Transfer Rate                                    | <b>Synchronous</b> (maximum) 100 MB/s (Drive Capability) |
|                      | Seek Time<br>(typical reads, including settling) | <b>Single Track</b> 3 ms                                 |
|                      |                                                  | <b>Average</b> 13ms                                      |
|                      |                                                  | <b>Maximum</b> 24 ms                                     |
|                      | Rotational Speed                                 | 5400 rpm                                                 |
|                      | Logical Blocks                                   | 234,441,648                                              |
|                      | Operating Temperature                            | 5° to 60° C [case temp]                                  |
|                      | Features                                         | ATA Security                                             |

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

## Technical Specifications

### Removable Storage Drives

|               |                           |                                                                                                                                                                                                                                                             |                           |
|---------------|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
| DVD-ROM Drive | Access Times              | Random                                                                                                                                                                                                                                                      | <116 ms CD<br><125 ms DVD |
|               | Max Data Transfer Rate    | 24X CD-ROM<br>8X-DVD                                                                                                                                                                                                                                        | 3,600 KB/s<br>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<br><130 ms DVD                             |
|                       | Max Data Transfer Rate     | 24X CD-ROM<br>8X DVD<br>24X CD-R<br>24X CD-RW                                                                                                                                                                                                               | 3,600 KB/s<br>10,800 KB/s<br>3,600 KB/s<br>3,600 KB/s |
|                       | Transfer Mode              | Multiword DMA Mode 2                                                                                                                                                                                                                                        |                                                       |
|                       | Interface                  | EIDE                                                                                                                                                                                                                                                        |                                                       |
|                       | Supported Media (read)     | CD-DA, CD+(E)G, CD-MIDI, CD-TEXT, CD-ROM, CD-ROM XA, MIXED MODE CD, CD-I, CD-I Bridge (Photo-CD, Video CD), Multisession CD (Photo-CD, CD-EXTRA, Portfolio, CD-R, CD-RW), CD-R, CD-RW, DVD-ROM (DVD-5, DVD-9, DVD-10, DVD-18), DVD-R, DVD-RW, DVD+R, DVD+RW |                                                       |
|                       | Supported Media (write)    | CD-R, CD-RW                                                                                                                                                                                                                                                 |                                                       |
|                       | Max Media Capacity (read)  | 8.5 GB                                                                                                                                                                                                                                                      |                                                       |
|                       | Max Media Capacity (write) | 700 MB                                                                                                                                                                                                                                                      |                                                       |
|                       | Transport                  | Tray loading                                                                                                                                                                                                                                                |                                                       |

## Technical Specifications

|                                 |                            |                                                                                                                                                                                                                                                                      |                           |
|---------------------------------|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
| DVD+/-RW SuperMulti<br>DL Drive | Access Times               | Random                                                                                                                                                                                                                                                               | <175 ms CD<br><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<br>DL LightScribe Drive | Access Times           | Random                                                                                                                                                                                                                                                               | <175 ms CD<br><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 |                           |

## Technical Specifications

|                                   |                                                                 |
|-----------------------------------|-----------------------------------------------------------------|
| <b>Supported Media</b> (write)    | CD-R, CD-RW, DVD+R, DVD+RW, DVD-R, DVD-RW, DVD-RAM, LightScribe |
| <b>Max Media Capacity</b> (read)  | 8.5 GB                                                          |
| <b>Max Media Capacity</b> (write) | 8.5 GB                                                          |
| <b>Transport</b>                  | Tray Loading                                                    |

|                              |                                   |                                                                                                                      |
|------------------------------|-----------------------------------|----------------------------------------------------------------------------------------------------------------------|
| <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<br>Less than 25 mA hardware finger detection<br>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<br>9.7 mm x 0.81 mm<br>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                           |
|                 | <b>Integrated Microphone</b>           | Yes                              |

|                             |                                     |                  |
|-----------------------------|-------------------------------------|------------------|
| <b>Audio Output Quality</b> | <b>Frequency Response</b>           | 20 Hz – 20 kHz   |
|                             | <b>Signal to Noise Ratio</b>        | >85 dB           |
|                             | <b>Total Harmonic Distortion</b>    | 0.01%            |
|                             | <b>Noise Floor</b>                  | -110 dB          |
|                             | <b>Play/Record Sampling Rate(s)</b> | 8 kHz – 48kHz    |
|                             | <b>DAC</b>                          | 16, 20 or 24-bit |
|                             | <b>ADC</b>                          | 16 or 20-bit     |

## Technical Specifications

|                            |              |         |
|----------------------------|--------------|---------|
| Integrated Stereo Speakers | Power Rating | 2 Watts |
|                            | Impedance    | 4 Ohms  |

## 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)<br>100 Mbit/s operation (100BASE-TX; IEEE 802.3u; IEEE 802.3 clauses 21-30)<br>1000 Mbit/s operation (1000BASE-T; IEEE 802.3z and 802.3ab; IEEE 802.3 clauses 34-42)<br>Auto-Negotiation (Automatic Speed Selection)<br>Full Duplex Operation at all Speeds, Half Duplex operation at 10 and 100 Mbit/s<br>IEEE 802.1p QoS (Quality of Service) Support<br>IEEE 802.3x Flow Control (IEEE 802.3 clauses 31-32; configurable) |
|                                                                           | Power Management       | ACPI compliant -- multiple power modes<br>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)<br>PXE 2.1 Remote Boot<br>Statistics Gathering (SNMP MIB II, Ethernet-like MIB, Ethernet MIB (802.3x, clause 30))<br>Comprehensive diagnostic and configuration software suite                                                                                                                                                                                       |
|                                                                           | Interface              | PCI Express x1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|                                                                           | NIC Device Driver Name | Broadcom NetLink Gigabit Ethernet                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|                                                                           | Drivers Available      | Microsoft Windows Vista<br>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 |

Technical Specifications

|                        |                                                   |
|------------------------|---------------------------------------------------|
| Data Mode Capabilities | V.92 data                                         |
|                        | V.8bis                                            |
|                        | V.80                                              |
|                        | V44, V.42bis, MNP5 (Compression)                  |
|                        | V.42 (LAPM, MNP2-4) (Error Correction)            |
|                        | Optional symbol rates:                            |
|                        | 2800, 3429                                        |
|                        | Asymmetric Symbol rates                           |
|                        | Synchronous primary channel data signaling rates: |
|                        | 3600, 31200                                       |
|                        | Automatic rate re-negotiation                     |
|                        | V.34                                              |
|                        | V.32bis                                           |
|                        | V.32                                              |
|                        | V.23                                              |
|                        | V.22bis                                           |
|                        | V.22                                              |
|                        | V.21                                              |
|                        | Bell 212A                                         |
|                        | Bell 103J                                         |
| Fax Mode Capabilities  | TIA/EIA-578-B (Class 1)                           |
|                        | T.30, T.4 (Group 3)                               |
|                        | V.17                                              |
|                        | V.29                                              |
|                        | V.27ter                                           |
|                        | V.21 Channel 2                                    |
| Command Set            | V.250 (Partial)                                   |
|                        | TIA-602                                           |
|                        | Identification: +GMI, +GMM, +GMR                  |
|                        | Port control: +IPR, +ICF, +IFC, +ILRR             |
|                        | Modulation: +MS, +MR, +MA                         |
|                        | Error control: +ES, +ER, +EB, +ESR, +ETBM         |
|                        | Data compression: +DS, +DR                        |
|                        | V.251                                             |

## Technical Specifications

|                                           |                                                                    |                                                                                                                                                                                                                                                                                                 |
|-------------------------------------------|--------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 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                                                             | 10 g                                                                                                                                                                                                                                                                                            |
|                                           | Dimensions (Length x Width x Thickness)                            | 51 x 30 x 4.5 mm                                                                                                                                                                                                                                                                                |
|                                           | Voltage, Operating                                                 | 3.3v +/- 10%                                                                                                                                                                                                                                                                                    |
|                                           | Temperature, Operating                                             | -30° to 60° C (full RF performance)<br>-30° to 75° C (reduced RF performance)                                                                                                                                                                                                                   |
|                                           | Temperature, Non-operating, 96 hours (from MIL-STD 202 Method 108) | -40° to 85° C                                                                                                                                                                                                                                                                                   |
|                                           | Humidity, Non-operating                                            | 85% relative humidity for 48 hours @ 85° C (non-condensing)                                                                                                                                                                                                                                     |
|                                           | LED Activity                                                       | LED Off – Radio Off;<br>Solid LED On – Radio On                                                                                                                                                                                                                                                 |
|                                           | Configuration Utilities                                            | Varies per country and mobile network operator                                                                                                                                                                                                                                                  |

## Technical Specifications

|                                                     |                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                |
|-----------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Intel PRO/Wireless<br>3945ABG Network<br>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 <a href="http://www.hp.com/go/notebooks/WLAN">http://www.hp.com/go/notebooks/WLAN</a> )                                                                                                                                                                                        |
|                                                     | 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 <sup>1</sup>                                           | 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 CCK) <sup>2</sup>                             | 15 dBm                                                                                                                                                                                                                                                                                                                                                                                         |
|                                                     | Output Power (for OFDM; power varies by data rate) <sup>2</sup> | 15 dBm                                                                                                                                                                                                                                                                                                                                                                                         |
|                                                     | Power Consumption                                               | Transmit: 1.8 Watts (max)<br>Receive: 1.4 Watts (max)<br>Idle mode <sup>3</sup> : 150 mW (nominal)<br>Sleep mode: 30 mW (max)                                                                                                                                                                                                                                                                  |
|                                                     | Power Management                                                | ACPI compliant power management<br>802.11 compliant power saving mode                                                                                                                                                                                                                                                                                                                          |
|                                                     | Receiver Sensitivity <sup>4</sup>                               | 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      600 feet – Outdoor Open Area<br>(@6 Mbps)                      150 feet – Indoor, Office environment<br>802.11 b – Typical      1200 feet – Outdoor Open Area<br>(@1 Mbps)                      300 feet – Indoor, Office environment<br>802.11 g – Typical      1200 feet – Outdoor Open Area<br>(@1 Mbps)                      300 feet – Indoor, Office environment |
|                                                     | Form Factor                                                     | PCI-Express MiniCard                                                                                                                                                                                                                                                                                                                                                                           |
|                                                     | Weight                                                          | 6 g                                                                                                                                                                                                                                                                                                                                                                                            |
|                                                     | Dimensions                                                      | 4.75 x 29.85 x 50.8 mm                                                                                                                                                                                                                                                                                                                                                                         |
|                                                     | Operating Voltage                                               | 3.3V +/- 9%, 1.5V +/- 5%                                                                                                                                                                                                                                                                                                                                                                       |

### Technical Specifications

|                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                             |
|------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|
| Temperature                        | Operating                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 0° to 80° C                 |
|                                    | Non-operating                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | –40° to 80° C               |
| Humidity                           | Operating                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 10% to 90% (non-condensing) |
|                                    | Non-operating                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 5% to 95% (non-condensing)  |
| Altitude                           | Operating                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 3,048 m                     |
|                                    | Non-operating                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 15,240 m                    |
| Configuration Utility <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>                                                                                                                                                                                                                                                                                                                                                                                                                            |                             |
|                                    | Microsoft Windows Vista                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                             |
|                                    | <ul style="list-style-type: none"><li>• Microsoft Windows Vista Wireless Network Connection Manager</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                             |
| LED Activity                       | 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> |                             |

#### Intel PRO/Wireless 3945BG Network Connection

|                                           |                                                                                                                                                                                                                                                                                                                                             |
|-------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Wireless LAN Standards</b>             | IEEE 802.11b<br>IEEE 802.11g                                                                                                                                                                                                                                                                                                                |
| <b>Interoperability</b>                   | Wi-Fi certified<br>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<br>802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps                                                                                                                                                                                                                                                                   |
| <b>Modulation</b>                         | Direct Sequence Spread Spectrum<br>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.<br><br>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)<br>Infrastructure (Access Point Required)                                                                                                                                                                                                                                                                             |
| <b>Roaming</b>                            | IEEE 802.11 compliant roaming between access points                                                                                                                                                                                                                                                                                         |
| <b>Output Power (for CCK)<sup>2</sup></b> | 15 dBm                                                                                                                                                                                                                                                                                                                                      |

## Technical Specifications

**Output Power** (for OFDM; 15 dBm  
power varies by data  
rate)<sup>2</sup>

**Power Consumption**

Transmit: 1.8 Watts (max)  
Receive: 1.4 Watts (max)  
Idle mode<sup>3</sup>: 150 mW (nominal)  
Sleep mode: 30 mW (max)

**Power Management**

ACPI compliant power management  
802.11 compliant power saving mode

**Receiver Sensitivity**<sup>4</sup>

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<br>(@1 Mbps) | 1200 feet – Outdoor Open Area<br>300 feet – Indoor, Office environment |
| 802.11 g – Typical<br>(@1 Mbps) | 1200 feet – Outdoor Open Area<br>300 feet – Indoor, Office environment |

**Form Factor**

PCI-Express MiniCard

**Weight**

6 g

**Dimensions**

4.75 x 29.85 x 50.8 mm

**Operating Voltage**

3.3V +/- 9%, 1.5V +/- 5%

**Temperature**

|               |               |
|---------------|---------------|
| Operating     | 0° to 80° C   |
| Non-operating | -40° to 80° C |

**Humidity**

|               |                             |
|---------------|-----------------------------|
| Operating     | 10% to 90% (non-condensing) |
| Non-operating | 5% to 95% (non-condensing)  |

**Altitude**

|               |          |
|---------------|----------|
| Operating     | 3,048 m  |
| Non-operating | 15,240 m |

**Configuration Utility**<sup>5</sup>

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.

Intel Wireless WiFi Link  
4965AGN

**Wireless LAN Standards**

IEEE 802.11a  
IEEE 802.11b  
IEEE 802.11g  
IEEE 802.11n (draft 1.02)

### Technical Specifications

|                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                              |                              |  |                                       |                              |                               |  |                                       |                              |                               |  |                                       |
|-----------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|------------------------------|--|---------------------------------------|------------------------------|-------------------------------|--|---------------------------------------|------------------------------|-------------------------------|--|---------------------------------------|
| <b>Interoperability</b>                                               | <p>Wi-Fi certified (802.11abg only)</p> <p>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>)</p> <p>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</p> <p>802.11a/g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps</p> <p>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</p> <p>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 Models</b>                                    | <p>Ad-hoc (Peer to Peer)</p> <p>Infrastructure (Access Point Required)</p>                                                                                                                                                                                                                                                                                                                                                                                                              |                              |                              |  |                                       |                              |                               |  |                                       |                              |                               |  |                                       |
| <b>Roaming</b>                                                        | IEEE 802.11 compliant roaming between access points                                                                                                                                                                                                                                                                                                                                                                                                                                     |                              |                              |  |                                       |                              |                               |  |                                       |                              |                               |  |                                       |
| <b>Output Power (for CCK)<sup>2</sup></b>                             | 15 dBm                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                              |                              |  |                                       |                              |                               |  |                                       |                              |                               |  |                                       |
| <b>Output Power (for OFDM; power varies by data rate)<sup>2</sup></b> | 15 dBm                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                              |                              |  |                                       |                              |                               |  |                                       |                              |                               |  |                                       |
| <b>Power Consumption</b>                                              | <p>Transmit: 2.3 Watts (average, with two spatial streams)</p> <p>Receive: 1.9 Watts (average with three receive chains)</p> <p>Idle mode<sup>3</sup>: 30 mW (average)</p> <p>Radio off: 20 mW (max)</p>                                                                                                                                                                                                                                                                                |                              |                              |  |                                       |                              |                               |  |                                       |                              |                               |  |                                       |
| <b>Power Management</b>                                               | <p>ACPI compliant power management</p> <p>802.11 compliant power saving mode</p>                                                                                                                                                                                                                                                                                                                                                                                                        |                              |                              |  |                                       |                              |                               |  |                                       |                              |                               |  |                                       |
| <b>Receiver Sensitivity<sup>4</sup></b>                               | 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>                                                          | <table> <tr> <td>802.11 a – Typical (@6 Mbps)</td><td>600 feet – Outdoor Open Area</td></tr> <tr> <td></td><td>150 feet – Indoor, Office environment</td></tr> <tr> <td>802.11 b – Typical (@1 Mbps)</td><td>1200 feet – Outdoor Open Area</td></tr> <tr> <td></td><td>300 feet – Indoor, Office environment</td></tr> <tr> <td>802.11 g – Typical (@1 Mbps)</td><td>1200 feet – Outdoor Open Area</td></tr> <tr> <td></td><td>300 feet – Indoor, Office environment</td></tr> </table> | 802.11 a – Typical (@6 Mbps) | 600 feet – Outdoor Open Area |  | 150 feet – Indoor, Office environment | 802.11 b – Typical (@1 Mbps) | 1200 feet – Outdoor Open Area |  | 300 feet – Indoor, Office environment | 802.11 g – Typical (@1 Mbps) | 1200 feet – Outdoor Open Area |  | 300 feet – Indoor, Office environment |
| 802.11 a – Typical (@6 Mbps)                                          | 600 feet – Outdoor Open Area                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                              |                              |  |                                       |                              |                               |  |                                       |                              |                               |  |                                       |
|                                                                       | 150 feet – Indoor, Office environment                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                              |                              |  |                                       |                              |                               |  |                                       |                              |                               |  |                                       |
| 802.11 b – Typical (@1 Mbps)                                          | 1200 feet – Outdoor Open Area                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                              |                              |  |                                       |                              |                               |  |                                       |                              |                               |  |                                       |
|                                                                       | 300 feet – Indoor, Office environment                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                              |                              |  |                                       |                              |                               |  |                                       |                              |                               |  |                                       |
| 802.11 g – Typical (@1 Mbps)                                          | 1200 feet – Outdoor Open Area                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                              |                              |  |                                       |                              |                               |  |                                       |                              |                               |  |                                       |
|                                                                       | 300 feet – Indoor, Office environment                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                              |                              |  |                                       |                              |                               |  |                                       |                              |                               |  |                                       |
| <b>Form Factor</b>                                                    | PCI-Express MiniCard                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                              |                              |  |                                       |                              |                               |  |                                       |                              |                               |  |                                       |
| <b>Weight</b>                                                         | 6 g                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                              |                              |  |                                       |                              |                               |  |                                       |                              |                               |  |                                       |
| <b>Dimensions</b>                                                     | 4.75 x 29.85 x 50.8 mm                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                              |                              |  |                                       |                              |                               |  |                                       |                              |                               |  |                                       |
| <b>Operating Voltage</b>                                              | 3.3V +/- 9%, 1.5V +/- 5%                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                              |                              |  |                                       |                              |                               |  |                                       |                              |                               |  |                                       |

### Technical Specifications

|                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                             |
|------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|
| Temperature                        | Operating                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0° to 80° C                 |
|                                    | Non-operating                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | –40° to 80° C               |
| Humidity                           | Operating                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 10% to 90% (non-condensing) |
|                                    | Non-operating                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 5% to 90% (non-condensing)  |
| Altitude                           | Operating                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 3,048 m                     |
|                                    | Non-operating                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 15,240 m                    |
| Configuration Utility <sup>5</sup> | Microsoft Windows 2000 or XP<br>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>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                             |
| LED Activity                       | 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> |                             |

|                                    |                        |                                                                                                                                                                                                                                                                                                                                                                                                                              |
|------------------------------------|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Intel Wireless WiFi Link<br>4965AG | 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 <a href="http://www.hp.com/go/notebooks/WLAN">http://www.hp.com/go/notebooks/WLAN</a> )                                                                                                                                                                                                                      |
|                                    | 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 <sup>1</sup>  | 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   | Ad-hoc (Peer to Peer)                                                                                                                                                                                                                                                                                                                                                                                                        |
|                                    | Models                 | Infrastructure (Access Point Required)                                                                                                                                                                                                                                                                                                                                                                                       |
|                                    | Roaming                | 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; 15 dBm power varies by data rate) <sup>2</sup> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Power Consumption</b>                                                      | Transmit: 1.6 Watts (average)<br>Receive: 1.1 Watts (average)<br>Idle mode <sup>3</sup> : 30 mW (average)<br>Radio off: 20 mW (max)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Power Management</b>                                                       | ACPI compliant power management<br>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 600 feet – Outdoor Open Area<br>(@6 Mbps) 150 feet – Indoor, Office environment<br>802.11 b – Typical 1200 feet – Outdoor Open Area<br>(@1 Mbps) 300 feet – Indoor, Office environment<br>802.11 g – Typical 1200 feet – Outdoor Open Area<br>(@1 Mbps) 300 feet – Indoor, Office environment                                                                                                                                                                                                                                                                                                                                                            |
| <b>Form Factor</b>                                                            | PCI-Express MiniCard                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Weight</b>                                                                 | 6 g                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Dimensions</b>                                                             | 4.75 x 29.85 x 50.8 mm                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Operating Voltage</b>                                                      | 3.3V +/- 9%, 1.5V +/- 5%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Temperature</b>                                                            | Operating 0° to 80° C<br>Non-operating -40° to 80° C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Humidity</b>                                                               | Operating 10% to 90% (non-condensing)<br>Non-operating 5% to 90% (non-condensing)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Altitude</b>                                                               | Operating 3,048 m<br>Non-operating 15,240 m                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Configuration Utility</b> <sup>5</sup>                                     | Microsoft Windows 2000 or XP<br>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 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> |

### Technical Specifications

|                                                                 |                                                                                                                                                                                                                                                                                                                                    |
|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Adapter                                                         | IEEE 802.11g                                                                                                                                                                                                                                                                                                                       |
| Interoperability                                                | Wi-Fi certified<br>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> )                                                                                                                            |
| 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 <sup>1</sup>                                           | 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 CCK) <sup>2</sup>                             | 17.5 dBm                                                                                                                                                                                                                                                                                                                           |
| Output Power (for OFDM; power varies by data rate) <sup>2</sup> | 15 dBm                                                                                                                                                                                                                                                                                                                             |
| Power Consumption                                               | Transmit: 2.0 W (max)<br>Receive: 1.5 W (max)<br>Idle mode <sup>3</sup> : 390 mW (nominal)<br>Sleep mode: 20 mW (max)                                                                                                                                                                                                              |
| Power Management                                                | ACPI compliant power management<br>802.11 compliant power saving mode                                                                                                                                                                                                                                                              |
| Receiver Sensitivity <sup>4</sup>                               | 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<br>(@6 Mbps) 600 feet – Outdoor Open Area<br>150 feet – Indoor, Office environment<br>802.11 b – Typical<br>(@1 Mbps) 1200 feet – Outdoor Open Area<br>300 feet – Indoor, Office environment<br>802.11 g – Typical<br>(@1 Mbps) 1200 feet – Outdoor Open Area<br>300 feet – Indoor, Office environment          |
| Form Factor                                                     | PCI-Express MiniCard                                                                                                                                                                                                                                                                                                               |
| Weight                                                          | 12 g                                                                                                                                                                                                                                                                                                                               |
| Dimensions                                                      | 4.75 x 29.85 x 50.8 mm                                                                                                                                                                                                                                                                                                             |
| Operating Voltage                                               | 3.3v +/- 10%                                                                                                                                                                                                                                                                                                                       |
| Temperature                                                     | Operating 0° to 80° C<br>Non-operating -40° to 80° C                                                                                                                                                                                                                                                                               |

### Technical Specifications

|                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                             |
|------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|
| Humidity                           | Operating                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 10% to 90% (non-condensing) |
|                                    | Non-operating                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 5% to 95% (non-condensing)  |
| Altitude                           | Operating                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 3,048 m                     |
|                                    | Non-operating                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 15,240 m                    |
| Configuration Utility <sup>5</sup> | Microsoft Windows 2000 or XP<br>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>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                             |
| LED Activity                       | 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> |                             |

|                                           |                                     |                                                                                                                                                                                                                                                                                                                                    |
|-------------------------------------------|-------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Broadcom 4311BG<br>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 <a href="http://www.hp.com/go/notebooks/WLAN">http://www.hp.com/go/notebooks/WLAN</a> )                                                                                                                            |
|                                           | 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 <sup>1</sup>               | 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 CCK) <sup>2</sup> | 17.5 dBm                                                                                                                                                                                                                                                                                                                           |

## Technical Specifications

**Output Power** (for OFDM; 15 dBm  
power varies by data  
rate)<sup>2</sup>

**Power Consumption** Transmit: 2.0 W (max)  
Receive: 1.5 W (max)  
Idle mode<sup>3</sup>: 390 mW (nominal)  
Sleep mode: 20 mW (max)

**Power Management** ACPI compliant power management  
802.11 compliant power saving mode

**Receiver Sensitivity**<sup>4</sup> 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 1200 feet – Outdoor Open Area  
(@1 Mbps) 300 feet – Indoor, Office environment  
802.11 g – Typical 1200 feet – Outdoor Open Area  
(@1 Mbps) 300 feet – Indoor, Office environment

**Form Factor** PCI-Express MiniCard

**Weight** 12 g

**Dimensions** 4.75 x 29.85 x 50.8 mm

**Operating Voltage** 3.3v +/- 10%

**Temperature** Operating 0° to 80° C  
Non-operating -40° to 80° C

**Humidity** Operating 10% to 90% (non-condensing)  
Non-operating 5% to 95% (non-condensing)

**Altitude** Operating 3,048 m  
Non-operating 15,240 m

**Configuration Utility**<sup>5</sup> 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.

HP Integrated Module  
with Bluetooth Wireless  
Technology

**Bluetooth Specification** 2.0 Compliant  
**Dimensions** 26 x 14 x 5.7 mm  
**Frequency Band** 2402 to 2480 MHz

## Technical Specifications

|                              |                                                                                                                                                                                                                         |
|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Number of Available Channels | 79 (1 MHz) available channels                                                                                                                                                                                           |
| Data Rates and Throughput    | 3 Mbps data rate; throughput up to 2.17 Mbps<br>Synchronous Connection Oriented links up to 3, 64 kbps, voice channels<br>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<br>Peak (Rx) 231 mW<br>Sleep <1 mW                                                                                                                                                                     |
| Antenna                      | Internally integrated within module                                                                                                                                                                                     |
| Range                        | Up 33 ft (10 m)                                                                                                                                                                                                         |
| Electrical Interface         | USB 2.0 compliant<br>Microsoft Windows Plug and Play compliant                                                                                                                                                          |
| OS Support                   | Genuine Windows Vista<br>Genuine Windows XP<br>Genuine Windows 2000                                                                                                                                                     |
| Bluetooth Software Supported | Broadcom Bluetooth for Windows<br>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<br>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:<br>FCC (47 CFR) Part 15C, Section 15.247 & 15.249<br>ETS 300 328, ETS 300 826<br>Low Voltage Directive IEC950<br>UL, CSA, and CE Mark            |
| Temperature                  | Operating -20° to 70° C<br>Non-operating -40° to 80° C                                                                                                                                                                  |
| Humidity                     | Operating 10% to 90%<br>Non-operating 5% to 95%                                                                                                                                                                         |
| Altitude                     | Operating 4,572 m<br>Non-operating 12,192 m                                                                                                                                                                             |

### Technical Specifications

#### 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

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