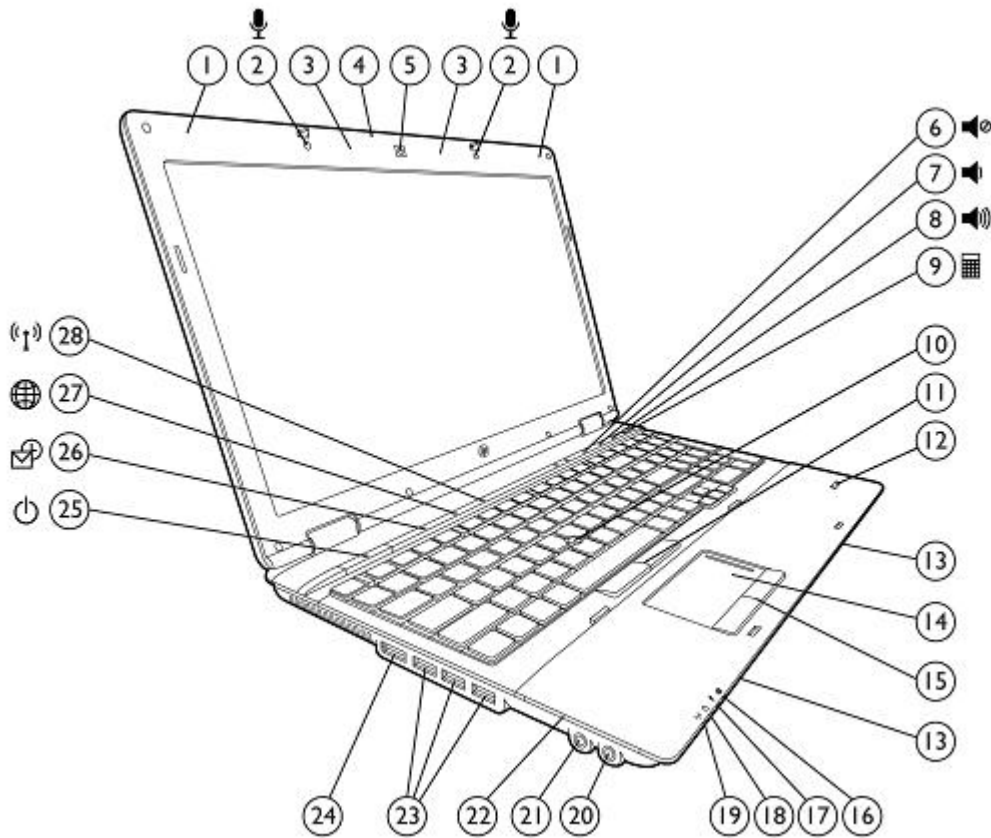


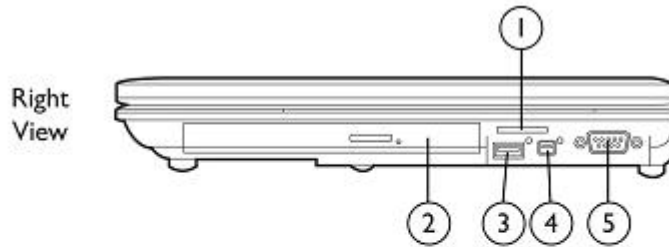
## Overview



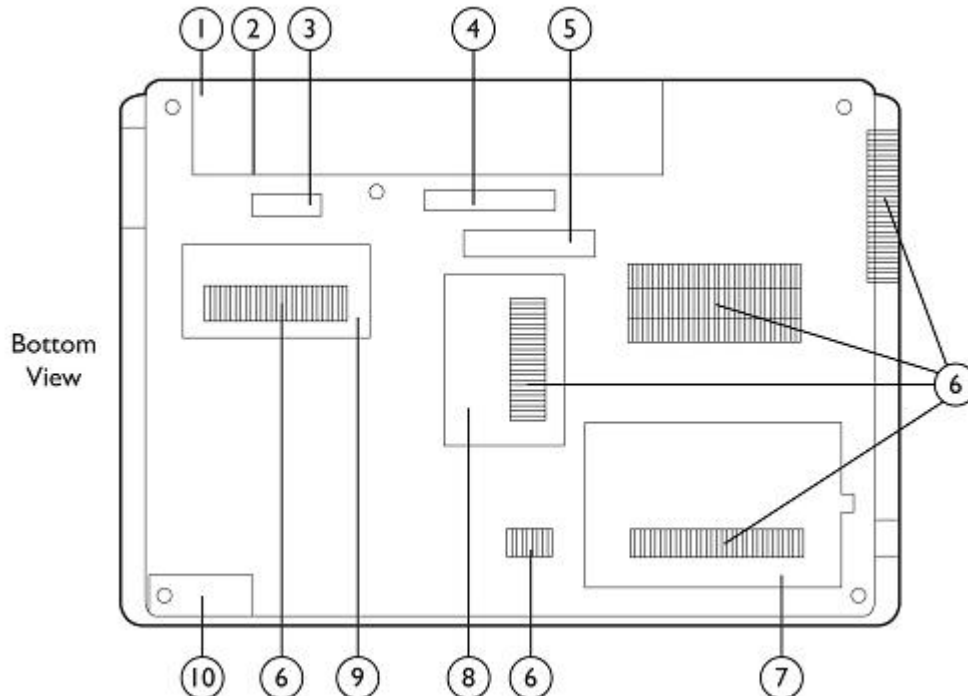
- |  |  |
|--|--|
| 1. WWAN antennas (select models)   | 15. Touchpad pick buttons                                |
| 2. Integrated microphone (dual-microphone array with webcam models only) | 16. Hard drive activity / HP 3D DriveGuard LED indicator |
| 3. WLAN antennas   | 17. Battery charging LED indicator                       |
| 4. Webcam LED indicator  | 18. Power/standby LED indicator                          |
| 5. Optional 2 MP webcam  | 19. Wireless on/off LED indicator                        |
| 6. Volume mute button with LED indicator                                 | 20. Stereo headphone/line out                            |
| 7. Volume down button with LED indicator                                 | 21. Stereo microphone/line in                            |
| 8. Volume up button with LED indicator                                   | 22. ExpressCard/54 slot or optional Smart Card Reader    |
| 9. Calculator button   | 23. (3) USB 2.0 ports                                    |
| 10. Optional pointstick  | 24. DisplayPort  |
| 11. Pointstick pick buttons (with optional pointstick)                   | 25. Power button with LED indicator                      |
| 12. Optional HP Fingerprint Sensor                                       | 26. QuickLook button                                     |
| 13. Stereo speakers  | 27. QuickWeb button                                      |
| 14. Touchpad with scroll zone  | 28. Wireless on/off button with LED indicator            |



## Overview



- |   |                                   |
|---|-----------------------------------|
| 1. Media Card Reader                                | 6. Kensington Lock slot           |
| 2. Upgrade Bay (optical drive or second hard drive) | 7. RJ-11/modem port               |
| 3. (1) USB 2.0 port                                 | 8. RJ-45/Ethernet port            |
| 4. 1394a port                                       | 9. VGA/external monitor connector |
| 5. Serial port                                      | 10. Power connector               |



- |   |                                   |
|---|-----------------------------------|
| 1. Battery bay  | 6. Vents                          |
| 2. SIM slot for WWAN (select models) - inside battery bay | 7. Hard drive bay                 |
| 3. Battery release latch                                  | 8. Memory module compartment      |
| 4. Docking connector                                      | 9. WLAN/WWAN module compartment*  |
| 5. Secondary battery connector                            | 10. Bluetooth module compartment* |

\* User upgradeability is not supported.



## Overview

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### At A Glance

- Genuine Windows 7 versions, Genuine Windows Vista versions, or FreeDOS
- Widescreen 15.6-inch diagonal LED-backlit HD display, or widescreen 15.6-inch diagonal LED-backlit HD+ display with wide viewing angle; optional HP Privacy Filter support
- ATI Mobility Radeon™ HD 4550 discrete graphics or integrated Intel® HD Graphics
- Intel® Core™ i7 or Core i5 processor with Intel Turbo Boost Technology
- Flexible wireless connectivity options:
  - Integrated HP un2420 EV-DO/HSPA Mobile Broadband Module provides worldwide Gobi mobile Internet technology with GPS
  - Integrated Intel Centrino® 802.11 a/b/g/n or b/g/n wireless LAN module; or Broadcom a/b/g/n or b/g wireless LAN module
  - Bluetooth® v2.1
- Thin, lightweight design starting at 5.5 lb/2.51 kg and 1.37 inch/34.8 mm thin at front
- Touchpad with scroll zone; optional pointstick
- Spill-resistant keyboard with full numeric keypad and drain
- Touch-sensitive controls for HP QuickLook 3, HP QuickWeb, wireless on/off, mute, volume down, volume up, calculator
- Accessories include HP Advanced Docking Station, HP Docking Station
- Choice of 9-cell or 6-cell primary battery, plus optional external batteries – HP Ultra-Capacity Battery, HP Extended Life Battery, or HP Long Life Battery
- Optional integrated 2 MP Webcam with dual-microphone array
- Choice of 7200 rpm user-removable hard drive up to 500 GB with HP 3D DriveGuard protection, or 160/128 GB Solid State Drive
- Upgrade Bay for optical drive upgrade or optional second hard drive
- Media Card Reader
- Enhanced security features including HP ProtectTools, Computrace LoJack Pro ready, HP SpareKey, HP Disk Sanitizer, TPM 1.2;\* optional Smart Card Reader, optional HP Fingerprint Sensor, and optional HP Privacy Filter
- HP QuickLook 3 for instant access to e-mail, calendar, and contacts; HP QuickWeb for fast access to the web
- Enhanced reliability with magnesium alloy support structure and HP DuraFinish

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



## Standard Features

### Processors

#### Intel Dual-Core Processors

Intel Core i7-620M Processor (2.66 GHz, 4 MB L3 cache)\*

Up to 3.33 GHz with Intel Turbo Boost Technology

Intel Core i5-540M Processor (2.53 GHz, 3 MB L3 cache)\*

Up to 3.06 GHz with Intel Turbo Boost Technology

Intel Core i5-520M Processor (2.4 GHz, 3 MB L3 cache)\*

Up to 2.93 GHz with Intel Turbo Boost Technology

Intel Core i5-430M Processor (2.26 GHz, 3 MB L3 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 7 Professional Edition 32\*

Genuine Windows 7 Professional Edition 64\*

Genuine Windows 7 Home Premium Edition 32\*

Genuine Windows 7 Home Premium Edition 64\*

Genuine Windows Vista Business 32\*\*

FreeDOS

#### Supported

Genuine Windows 7 Enterprise 32\*

Genuine Windows 7 Enterprise 64\*

Genuine Windows 7 Ultimate 32\*

Genuine Windows 7 Ultimate 64\*

Genuine Windows Vista Enterprise 32\*\*

Genuine Windows Vista Enterprise 64\*\*

#### Certified

SuSE Linux Enterprise Desktop 10

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

\*\* Certain Windows Vista product features require advanced or additional hardware. See: <http://www.microsoft.com/windowsvista/getready/hardwarereqs.mspx> and <http://www.microsoft.com/windowsvista/getready/capable.mspx> for details. Windows Vista Upgrade Advisor can help you determine which features of Windows Vista will run on your computer. To download the tool, visit: <http://www.windowsvista.com/upgradeadvisor>.

### Chipset

Mobile Intel HM57 Express Chipset

### Graphics

Models with discrete graphics:

ATI Mobility Radeon™ HD 4550 with 512 MB dedicated video memory

Microsoft DirectX 10.1 (Shader Model 4.1) and OpenGL 2.1 capable

Models with integrated graphics:

Intel HD Graphics

Microsoft DirectX 10 (Shader Model 4.0) and OpenGL 2.0 capable



### Standard Features

Display	Internal	15.6-inch diagonal LED-backlit HD anti-glare (1366 x 768 resolution) 15.6-inch diagonal LED-backlit HD+ WVA anti-glare (1600 x 900 resolution) HP Privacy Filter support
	External	Up to 32-bit per pixel color depth <b>DisplayPort</b> supports resolutions up to 2560 x 1600, 30-bit color depth at 60 Hz, and full HD (1920 x 1080) monitors, 24-bit color depth at 120 Hz <b>VGA</b> port supports resolutions up to 2048 x 1536 at 75 Hz, and lower resolutions at up to 100 Hz <b>DVI-D</b> (single link) video signal available through DVI port in optional HP Docking Station (sold separately) supports resolutions up to 1600 x 1200 at both full and reduced blanking, and 1920 x 1200 at reduced blanking <b>NOTE:</b> Resolutions are dependent upon monitor capability, and resolution and color depth settings.

Memory	Standard	DDR3 PC3-10600 SDRAM (1333 MHz)* Two SODIMM slots supporting dual-channel memory 1024 MB, 2048 MB, 3072 MB, or 4096 MB
	Maximum	Upgradeable to 8192 MB with 4096 MB SODIMMs in slots 1 and 2
	Dual-channel	Maximized dual-channel performance requires SODIMMs of the same size and speed in both memory slots.

\* With some processors, memory bus runs at a maximum of 1066 MHz.  
**NOTE:** Due to the non-industry standard nature of some third-party memory modules, we recommend HP branded memory to ensure compatibility. If you mix memory speeds, the system will perform at the lower memory speed. Full availability of 4 GB or more of memory requires a Windows 64-bit operating system or Linux. With Windows 32-bit operating systems, the amount of usable memory is dependent upon your configuration, so that above 3 GB all memory may not be available due to system resource requirements.

Communications	Integrated Marvel Gigabit Ethernet PCI Controller (10/100/1000 NIC)* 56K V.92 modem** * The term "10/100/1000" or "Gigabit" Ethernet indicates compliance with IEEE standard 802.3ab for Gigabit Ethernet, and does not connote actual operating speed of 1 Gb/s. For high-speed transmission, connection to a Gigabit Ethernet server and network infrastructure is required. ** Designed for downloads from 56K modem compliant sources. Maximum achievable download transmission rates currently do not reach 56 KB/s, and will vary with line conditions. Modem availability is subject to country regulatory approval.
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## Standard Features

### Wireless Devices

Support for a broad range of secure, integrated wireless LAN and wireless WAN options featuring support for the latest industry standards. Broadband Wireless (WWAN) requires a Windows operating system 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 un2420 EV-DO/HSPA Mobile Broadband Module** Integrated mobile broadband module with Gobi global mobile Internet technology that provides connectivity to both CDMA (EVDO) and UMTS (HSPA) networks. It also provides GPS functionality for various mapping applications and security applications such as Computrace LoJack Pro Premium for HP ProtectTools.  
**NOTE:** Separately purchased mobile network operator service is required. Two 850/900/1575/1800/1900/2100 MHz antennas integrated in the top of the display panel support current and future WWAN technologies.

**All 802.11 integrated wireless LAN options** Wi-Fi Certified\*  
Cisco Compatible Extensions support  
Wired Equivalent Privacy (WEP) support up to 128-bit keys  
Wi-Fi Protected Access (WPA) and WPA2 support  
802.1x authentication support, including EAP-TLS, EAP-TTLS, PEAP-GTC, PEAP-MSCHAPv2, and LEAP  
Advanced Encryption Standard (AES) support  
Dual antennas integrated in the display enclosure

**Intel Centrino Advanced-N 6200 (2x2)** Integrated support for 802.11a, b, g, and n\*  
Up to 300 mbps data rate

**Intel Centrino Wireless-N 1000** Integrated support for 802.11 b, g, and n\*  
Up to 300 mbps data rate

**Broadcom 4322AGN 802.11a/b/g/n Wi-Fi Adapter** Integrated support for 802.11a, b, g, and n  
Up to 300 mbps data rate

**Broadcom 4312G 802.11b/g WiFi Adapter** Integrated support for 802.11 b and g  
Up to 54 mbps data rate

**HP Integrated Module with Bluetooth Wireless Technology** Bluetooth Specification v2.1 compliant  
Works with a wide range of Bluetooth devices

\* In countries where 802.11n is not allowed, this capability is not enabled.

### Keyboard

The HP spill-resistant keyboard is designed using a thin layer of Mylar film under the keyboard and a drain system that funnels fluid through a hole in the bottom of the notebook. This minimizes the risk of damage to sensitive components underneath. 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. Includes an integrated numeric keypad, hotkeys for instant access to power conservation, brightness, and other features. It has 19.05 x 19.05 mm key pitch (center-to-center spacing) and 2.5 mm stroke.



## Standard Features

<b>Touch-sensitive controls</b>	Touch-sensitive controls provide easy access to the following features: HP QuickLook 3, HP QuickWeb, wireless on/off, volume mute, volume down, volume up, calculator button	
<b>Pointing device</b>	Touchpad with scroll zone, two pick buttons Optional pointstick with two additional pointstick buttons	
<b>Expansion card slots</b>	<b>ExpressCard/54 slot</b> or <b>Optional Integrated Smart Card Reader</b> (replaces ExpressCard/54 slot) <b>Media Card Reader</b>	Supports ExpressCard/54 and ExpressCard/34  Compatible with ISO 7816 compliant Smart Cards PC/SC interface support  Supports SD (Secure Digital), HC-SD (High Capacity Secure Digital), MMC (MultiMedia Card), HS-MMC (MultiMedia Card Plus), Sony Memory Stick, Sony Memory Stick Pro, Memory Stick Duo*, xD-Picture card  Additionally, the following cards are supported via passive adapters (sold separately): Mini-Secure Digital (Mini-SD), Transflash (Micro-SD), Reduced size Multimedia card (RS-MMC), Reduced size Dual voltage Multimedia card, MMC Mobile Cards, MMC Micro Cards, Memory Stick Duo (MS Duo)*, Memory Stick Duo Pro (MS Duo Pro)*, Memory Stick M2 Micro  <i>* 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>Internal Storage</b>	<b>Hard drives</b> <b>HP 3D DriveGuard</b> (Windows only) <b>Solid State Drive*</b>	160/250/320/500 GB 7200 rpm SMART SATA II  <b>NOTE:</b> These hard drives are customer removable and will withstand multiple insertion/removal cycles. Up to 15 GB is reserved for the system recovery software.  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.  128 GB/160 GB  <i>* Installation of a Solid State Drive on systems with Windows 7 requires system memory of 2 GB or more.</i>
<b>Upgrade Bay</b>	<b>Fixed 12.7 mm SATA optical drive</b>  <b>Second hard drive</b> <b>Weight saver</b>	Blu-ray ROM DVD+/-RW SuperMulti DL LightScribe Drive DVD+/-RW SuperMulti DL LightScribe Drive DVD-ROM Drive  500 GB 7200 rpm SMART SATA II Hard Drive



## Standard Features

Interfaces	ExpressCard/54 slot	One (or optional Smart Card Reader)
	External monitor	Two – (1) DisplayPort, (1) VGA
	1394a	One
	Stereo microphone in	One
	Stereo headphone/line out	One
	Power connector	One
	RJ-11/modem	One
	RJ-45/Ethernet	One
	USB 2.0	Four
	Serial port	One
	Docking connector	One
	Secondary battery connector	One

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## Audio/Visual

HP Premier Sound™  
Integrated stereo speakers  
Integrated microphone (dual-microphone array when equipped with optional 2 MP webcam)  
Touch-sensitive controls for volume up, volume down, and mute  
Stereo headphone/line out  
Stereo microphone/line in

Optional 2 MP webcam with Business Card Reader software

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



## Standard Features

<b>Software</b>	<b>Preinstalled software with Windows operating system</b>	HP Recovery Manager (available with Windows 7 or Vista only) HP Assistant HP ProtectTools Security Manager HP QuickLaunch Buttons Software HP QuickLook 3 HP QuickWeb HP Power Assistant HP Connection Manager HP Wireless Assistant HP 3D DriveGuard Microsoft Office 2010 preloaded (purchase of a Product Key required to activate a full Office 2010 suite)* McAfee Total Protection** PDF Complete SE Roxio Creator Business 10 (select models) Synaptics Touchpad Driver Microsoft Windows Live Messenger (select models) HP Webcam Software Skype WinZip 12
	<b>Additional software available from the web</b>	HP SoftPaq Download Manager

\* Microsoft Office 2010 Preloaded includes reduced functionality versions of Word and Excel. Purchase of Product Key required to activate full Office 2010 suite available at participating resellers/retailers and <http://www.office.com>.

\*\* 60 day trial period for McAfee Total Protection for Small Business software. Internet access required to receive updates. First update included. Subscription required for updates thereafter.

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<b>HP Recovery Manager</b>	Models shipped with Windows 7 or Windows Vista include HP Recovery Manager. HP Recovery Manager enables fast recovery of the factory preinstalled image if the system becomes corrupted or if important system files are accidentally deleted. Up to 15 GB of the hard drive is reserved for the system recovery software.
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### Standard Features

#### Security

#### Standard Features

HP ProtectTools Security Manager  
Enhanced Pre-Boot Security  
HP SpareKey  
One-Step Logon  
Configuration Control Hardware  
Memory Change Alert  
Ownership Tag  
Setup Password  
DriveLock Password  
TPM 1.2 Embedded Security Chip\*  
TPM Enhanced DriveLock\*  
HP Disk Sanitizer  
HP 3D DriveGuard  
Kensington Lock slot  
Support for Computrace\*\* LoJack Pro for HP ProtectTools

#### Optional Features

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

**HP Fingerprint Sensor** Enhanced sensor scans the fingerprint to uniquely identify and authenticate a person.

**HP Privacy Filter** Narrows viewing area so that screen data is visible only to persons directly in front of the monitor.

**Computrace\*\* LoJack Pro Premium for HP ProtectTools with GPS Tracking** *Subscription based security solution providing the ability to track, initiate physical recovery, conduct asset management, and perform remote data delete by utilizing GPS technology. GPS functionality requires HP un2420 EV-DO/HSPA Mobile Broadband Module.*

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

\*\* The Computrace agent is shipped turned off, and must be activated by customers when they purchase a subscription with terms ranging from one to five years.

For more information on HP security solutions refer to: <http://www.hp.com/go/security>.

#### HP ProtectTools Security Manager

HP ProtectTools Security Manager is the security platform for business notebooks and desktops. The HP ProtectTools Security Manager is an extensible client security console that delivers enhanced security capabilities through add-on software modules. The following modules are available on the hard drive (also downloadable from the web) and can be configured in Software Setup:

- Credential Manager for HP ProtectTools
- Device Access Manager for HP ProtectTools
- Drive Encryption for HP ProtectTools
- File Sanitizer for HP ProtectTools
- Privacy Manager for HP ProtectTools (Chat & Sign)
- Embedded Security for HP ProtectTools
- Java Card Security for HP ProtectTools
- Computrace LoJack Pro for HP ProtectTools



## Standard Features

### Power Supply

Models with discrete graphics:  
 External 90-watt Smart AC adapter  
 Models with integrated graphics:  
 External 65-watt Smart AC adapter

Power cord included is 6-foot (1.8 meter).  
 Total length including external AC adapter is 12 feet (3.66 meter).  
 HP Fast Charge\*

\*HP Fast Charge recharges your battery up to 90% within 90 minutes when the system is off. HP Fast Charge does not apply to the 9-cell primary battery, the 12-cell Ultra-Capacity batteries, or the HP Long Life Battery.

### Battery

<b>Primary battery</b>	9-cell (93 WHr) Li-Ion battery 6-cell (55 WHr) Li-Ion battery 6-cell (47 WHr) Li-Ion battery
<b>Optional HP Long Life Battery*</b>	3-cell (47 WHr) high capacity Li-Ion battery
<b>Optional HP Extended Life Battery</b>	8-cell (52 WHr) high capacity Li-Ion battery
<b>Optional HP Ultra-Capacity Battery</b>	12-cell (95 WHr) high capacity Li-Ion battery

### Battery Life

	Integrated Graphics	9-cell (93 WHr) Primary	6-cell (55 WHr) Primary	6-cell (47 WHr) Primary	HP Long Life Battery (47 WHr)*
<b>Primary battery</b>		Up to 10 hours 30 minutes	Up to 6 hours 15 minutes	Up to 5 hours 30 minutes	**
<b>Primary battery and optional HP Extended Life Battery</b>		Up to 17 hours	Up to 13 hours	**	**
<b>Primary battery and optional HP Ultra-Capacity Battery</b>		Up to 21 hours	Up to 17 hours	**	**
	<b>Discrete Graphics</b>	<b>9-cell (93 WHr) Primary</b>	<b>6-cell (55 WHr) Primary</b>	<b>6-cell (47 WHr) Primary</b>	<b>HP Long Life Battery (47 WHr)*</b>
<b>Primary battery</b>		Up to 7 hours 30 minutes	Up to 4 hours 30 minutes	Up to 3 hours 45 minutes	**
<b>Primary battery and optional HP Extended Life Battery</b>		Up to 12 hours 30 minutes	Up to 9 hours 15 minutes	**	**
<b>Primary battery and optional HP Ultra-Capacity Battery</b>		Up to 15 hours 45 minutes	Up to 13 hours 45 minutes	**	**



## Standard Features

\* The optional HP Long Life Battery takes the place of the primary battery, which must be removed.

\*\* This configuration not tested for battery life.

**NOTE:** Battery life will vary depending on the product model, configuration, loaded applications, features, use, wireless functionality and power management settings. The maximum capacity of the battery will naturally decrease with time and usage. See MobileMark07 battery benchmark [www.bapco.com/products/mobilemark2007](http://www.bapco.com/products/mobilemark2007) for additional details.

**System Standby Time** Up to 1 week

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**Power Conservation** Supports enhanced Intel SpeedStep technology (allows Battery Optimized Mode, Maximum Performance Mode, or Automatic mode)  
ATI PowerPlay technology  
Hibernation  
Standby  
ACPI compliance

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**Docking and Stands** HP 90W Docking Station  
HP 120W Advanced Docking Station  
HP USB 2.0 Docking Station  
HP Essential USB 2.0 Port Replicator  
HP Dual-Monitor Stand  
HP Monitor Stand  
HP Basic Adjustable Stand  
HP Adjustable Notebook Stand

**NOTE:** Some HP Docking stations may not support every feature of some HP Notebook models. Please refer to the individual docking station documentation for specific information about supported features.

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**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. HP Care Pack Services extend service contracts beyond the standard warranties. To choose the right level of service for your HP product, use the HP Care Pack Services Lookup Tool at: <http://www.hp.com/go/lookuptool>. Additional HP Care Pack Services information by product is available at: <http://www.hp.com/hps/carepack>.

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



### Options

Memory	HP 1 GB (DDR3 1333 MHz) SODIMM	AT911AA
	HP 2 GB (DDR3 1333 MHz) SODIMM	AT912AA
	HP 4 GB (DDR3 1333 MHz) SODIMM	AT913AA
<hr/>		
Storage	HP Notebooks USB Diskette Drive	DC361B
	HP Upgrade Bay SATA DVD+/-RW SuperMulti DL LightScribe Drive	AK869AA
	HP 250GB Pocket Media Drive	FE477AA
	HP External USB Drive CD/DVD R/RW	FS943AA
	HP Upgrade Bay SATA 500 GB 7200 rpm Hard Drive	AU097AA
	HP Primary SATA 500 GB 7200 rpm Hard Drive	AU098AA
	HP Primary SATA 320 GB 7200 rpm Hard Drive	AS282AA
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Expansion Solutions	HP 90W Docking Station	VB041AA
	HP 120W Advanced Docking Station	NZ222AA
	HP USB 2.0 Docking Station	FQ834AA
	HP Essential USB 2.0 Port Replicator	AQ731AA
	HP Dual-Monitor Stand	AK084AA
	HP Monitor Stand	PA507AA
	HP Adjustable Notebook Stand	PA508A
	HP Basic Adjustable Stand	AL549AA
<hr/>		
Power	HP 1-Bay Battery Charging Station	RW635AA
	HP 5-Bay Battery Charging Station	RW636AA#ABA
	HP Battery Adapter Kit	KV829AA
	HP Smart 65W Travel AC Adapter	AU155AA
	HP 90W Smart AC Adapter	ED495AA
	HP 90W Smart Combo Adapter	AJ652AA
	HP 6-Cell Li-Ion Primary Battery	KU531AA
	HP 9-Cell Li-Ion Primary Battery	AT908AA
	HP Extended Life Battery	AJ359AA
	HP Ultra-Capacity Battery	AT486AA
	HP Long Life Battery	AU213AA



### Options

<b>Carrying Cases</b>	HP Basic Carrying Case	AJ078AA
	HP Value Nylon Case	RR314AA
	HP Universal Nylon Case	RR315AA
	HP Executive Leather Case	RR316AA
	HP Deluxe Nylon Backpack	RR317AA
	HP Deluxe Roller Case	GD405AA
	HP Basic Backpack	AM863AA
	HP Basic Messenger Carrying Case	AP355AA
	HP Professional Series Carrying Case	AT886AA
	HP Professional Series Backpack	AT887AA
	HP Professional Series Messenger	AT888AA
HP Professional Series Slip Case	AT890AA	

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<b>Security</b>	HP/Kensington MicroSaver Security Lock	PC766A
	HP Docking Station Cable Lock	AU656AA
	HP 15.6" Display Privacy Filter	AU103AA
	HP ExpressCard Smart Card Reader	AJ451AA

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<b>Input/Output Devices</b>	HP PS/2 Keyboard & Mouse Bundle	RC464AA
	HP USB Keyboard & Mouse Bundle	RC465AA
	HP USB Optical Travel Mouse	RH304AA
	HP USB/PS2 Optical 2-Button Scroll Mouse	DC369A
	HP Wireless Mouse	AR085AA
	HP BT Headset	AR084AA
	HP Mobile Audio Speakers	FS944AA
	HP Mobile Productivity Bundle	AQ792AA
	HP Bluetooth ExpressCard Mouse	GK872AA

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<b>Miscellaneous</b>	DisplayPort To DVI-D Adapter	FH973AA
	Promo USB Graphics Adapter	NL571AT
	External USB Modem	GS023AA
	Belkin USB to Serial Adapter	EM449AA



## Memory

DDR3 PC3-10600 SDRAM (1333 MHz)\*  
Two SODIMM slots supporting dual-channel memory  
SODIMM sizes supported: 1024 MB, 2048 MB, and 4096 MB

- Standard Memory**
- 1024 MB (1024 MB x 1)
  - 2048 MB (2048 MB x 1 or 1024 MB x 2)
  - 3072 MB (2048 MB + 1024 MB)
  - 4096 MB (4096 MB x 1 or 2048 MB x 2)

**Optional Memory Upgrades** Support for up to 8192 MB of memory with the installation of optional DDR3 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
2048 MB	2048 MB	Empty
2048 MB	1024 MB	1024 MB
3072 MB	2048 MB	1024 MB
4096 MB	4096 MB	Empty
4096 MB	2048 MB	2048 MB
8192 MB	4096 MB	4096 MB

\* With some processors, memory bus runs at a maximum of 1066 MHz.

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

<b>Memory Upgrades</b>	HP 1 GB (DDR3 1333 MHz) SODIMM	AT911AA
	HP 2 GB (DDR3 1333 MHz) SODIMM	AT912AA
	HP 4 GB (DDR3 1333 MHz) SODIMM	AT913AA



## Storage

### Upgrade Bay Drive Support

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	Quantity Supported	Drive Bay
Blu-ray ROM DVD+/-RW SuperMulti DL LightScribe Drive	One	Upgrade Bay
DVD+/-RW SuperMulti DL LightScribe Drive	One	Upgrade Bay
DVD-ROM Drive	One	Upgrade Bay
500 GB 7200 rpm SMART SATA II Hard Drive	One	Upgrade Bay
Weight Saver	One	Upgrade Bay

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### Internal Storage Device

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	Quantity Supported	Drive Bay
<b>Hard Drives</b>		
500 GB 7200 rpm SMART SATA II Hard Drive	One	Dedicated hard drive bay
320 GB 7200 rpm SMART SATA II Hard Drive	One	Dedicated hard drive bay
250 GB 7200 rpm SMART SATA II Hard Drive	One	Dedicated hard drive bay
160 GB 7200 rpm SMART SATA II Hard Drive	One	Dedicated hard drive bay
<b>Solid State Drive*</b>		
160 GB Solid State Drive	One	Dedicated hard drive bay
128 GB Solid State Drive	One	Dedicated hard drive bay

\* Installation of a Solid State Drive on systems with Windows 7 requires system memory of 2 GB or more.



## Technical Specifications

<b>System Unit</b>	<b>Dimensions (HxWxD)</b>	1.37 in (at front) x 14.62 in x 9.76 in 34.8 mm (at front) x 371.4 mm x 248.0 mm
	<b>Weight</b>	Starting at 5.5 lb (2.51 kg) with weight saver (no optical drive) Starting at 5.81 lb (2.64 kg) with DVD-ROM drive
<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 and hard drive.		
<b>Stand-Alone Power Requirements (AC Power)</b>	Nominal Operating Voltage	18.5 V
	Average Operating Power	Discrete graphics: 22.5 W Integrated graphics: 19.5 W
	Max Operating Power	Discrete graphics: < 90 W Integrated graphics: < 65 W
<b>Temperature</b>	Operating	32° to 95° F (0° to 35° C) (not writing optical) 41° to 95° F (5° to 35° C) (writing optical)
	Non-operating	-4° to 140° F (-20° to 60° C)
<b>Relative Humidity</b>	Operating	10% to 90%, non-condensing
	Non-operating	5% to 95%, 101.6° F (38.7° C) maximum wet bulb temperature
<b>Shock</b>	Operating	125 G, 2 ms, half-sine
	Non-operating	200 G, 2 ms, half-sine
<b>Random Vibration</b>	Operating	0.75 grms
	Non-operating	1.50 grms
<b>Altitude (unpressurized)</b>	Operating	-50 to 10,000 ft (-15.24 to 3,048 m)
	Non-operating	-50 to 40,000 ft (-15.24 to 12,192 m)
<b>Industry Standard Certifications</b>	UL	Yes
	CSA	Yes
	FCC Compliance	Yes
	ENERGY STAR®	Select models*
	EPEAT	Registered Gold in United States**
	ICES	Yes
	GS	Yes
	Australia / NZ A-Tick Compliance	Yes
	CCC	Yes
	Japan VCCI Compliance	Yes
	KCC	Yes
	BSMI	Yes
	CE Marking Compliance	Yes
	BNCI or BELUS	Yes
	CIT	Yes
GOST	Yes	



### Technical Specifications

Saudi Arabian Compliance (ICCP)	Yes
SABS	Yes
UKRSERTCOMPUTER	Yes

\* Configurations of the HP ProBook 6540b that are ENERGY STAR qualified are identified as HP ProBook 6540b ENERGY STAR on HP websites and on [www.energystar.gov](http://www.energystar.gov).

\*\* EPEAT Gold Registered in U.S. EPEAT registration varies by country. See [www.epeat.net](http://www.epeat.net) for registration status by country.

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

#### HP 90W Smart AC Adapter

<b>Dimensions</b>	5.00 x 1.97 x 1.1 in (12.7 x 5.0 x 2.9 cm)
<b>Weight</b>	0.82 lb (370 g)
<b>Input</b>	100 to 240 VAC
	Input Efficiency 83% min at 115 VAC
	Input frequency range 47 to 63 Hz
	Input AC current 1.5 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
<b>Output</b>	Output power 90W
	DC output 19.0V
	Hold-up time 5 msec at 115 VAC input
	Output current limit <11A, Over voltage protection- 29V max automatic shutdown
<b>Connector</b>	3 pin/grounded, mates with interchangeable cords
<b>Environmental Design</b>	Operating temperature 32° to 104° F (0° to 40° C)
	Non-operating (storage) temperature -4° to 149° F (-20° to 65° C)
	Altitude 0 to 10,000 ft (0 to 3,048 m)
	Humidity 20% to 80%
	Storage Humidity 10% to 90%
<b>EMI and Safety Certifications</b>	CE Mark – full compliance with LVD and EMC directives; Worldwide safety standards – IEC60950, EN60950, UL60950, Class1, SELV; Agency approvals – C-UL-US, NORDICS, DENAN, EN55022 Class B, FCC Class B, CISPR22 Class B, CCC, NOM-1 NYCE; MTBF– over 200,000 hours at 25°C ambient condition.



## Technical Specifications

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

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Optional HP Ultra-Capacity Battery	<b>Dimensions (H x W x L)</b>	1.3 x 6.0 x 10.6 in (3.33 x 15.25 x 26.88 cm)	
	<b>Weight</b>	1.77 lb (0.803 kg)	
	<b>Cells/Type</b>	12-cell Lithium-Ion	
	<b>Energy</b>	Watt-hour Capacity	95 WHr
	<b>Temperature</b>	Operating (Charging)	32° to 113° F (0° to 45° C)
		Operating (Discharging)	14° to 140° F (-10° to 60° C)
		Non-operating	-4° to 140° F (-20° to 60° C)
	<b>Battery Re-Charge Time</b>	Smart Adapter	3 to 4 hours
		System ON	4 to 5 hours (depending on system power consumption)
<b>Fuel Gauge</b>	When pressed, LEDs light indicating level of charge remaining on battery		

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## Technical Specifications

Optional HP Extended Life Battery	Dimensions (H x W x L)	1.0 x 3.9 x 8.7 in (2.5 x 10.0 x 22.0 cm)		
	Weight	1.00 lb (0.455 kg)		
	Cells/Type	8-cell Lithium-Ion		
	Energy	Watt-hour Capacity	52 WHr	
	Temperature	Operating (Charging)	32° to 113° F (0° to 45° C)	
		Operating (Discharging)	14° to 140° F (-10° to 60° C)	
		Non-operating	-4° to 140° F (-20° to 60° C)	
	Battery Re-Charge Time	System in OFF mode or Standby	3 hours	
		System ON	3 to 5 hours (depending on system power consumption)	
		HP Fast Charge Technology	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			

Optional HP Long Life Battery	Dimensions (H x W x L)	0.8 x 2.1 x 8.0 in (2.0 x 5.3 x 20.4 cm)		
	Weight	0.71 lb (0.32 kg)		
	Cells/Type	3-cell Lithium-Ion		
	Energy	Watt-hour Capacity	47 WHr	
	Temperature	Operating (Charging)	32° to 113° F (0° to 45° C)	
		Operating (Discharging)	14° to 140° F (-10° to 60° C)	
		Non-operating	-4° to 140° F (-20° to 60° C)	
	Battery Re-Charge Time	System in OFF mode or Standby	2.5 hours	
System ON		3 to 5 hours (depending on system power consumption)		
HP Fast Charge Technology		Charges the battery up to 90% within 90 minutes when system is OFF		

9-Cell (93 WHr) Lithium-Ion battery	Dimensions (H x W x L)	0.8 x 2.9 x 8.3 in (2.0 x 7.3 x 21.0 cm)		
	Weight	1.07 lb (0.488 kg)		
	Cells/Type	9-cell Lithium-Ion		
	Energy	Watt-hour Capacity	93 WHr	
	Temperature	Operating (Charging)	32° to 113° F (0° to 45° C)	
		Operating (Discharging)	14° to 140° F (-10° to 60° C)	
		Non-operating	-4° to 140° F (-20° to 60° C)	
	Battery Re-Charge Time	System in OFF mode or Standby	3 to 4 hours	
System ON		4 to 6 hours (depending on system power consumption)		



## Technical Specifications

<b>6-Cell (55 WHr) Lithium-ion battery</b>	<b>Dimensions (H x W x L)</b>	0.8 x 2.1 x 8.0 in (2.0 x 5.3 x 20.4 cm)	
	<b>Weight</b>	0.71 lb (0.32 kg)	
	<b>Cells/Type</b>	6-cell Lithium-Ion	
	<b>Energy</b>	Watt-hour Capacity	55 WHr
	<b>Temperature</b>	Operating (Charging)	32° to 113° F (0° to 45° C)
		Operating (Discharging)	14° to 140° F (-10° to 60° C)
		Non-operating	-4° to 140° F (-20° to 60° C)
	<b>Battery Re-Charge Time</b>	System in OFF mode or Standby	2.5 hours
		System ON	3 to 5 hours (depending on system power consumption)
		HP Fast Charge Technology	Charges the battery up to 90% within 90 minutes when system is OFF

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<b>6-Cell (47 WHr) Lithium-ion battery</b>	<b>Dimensions (H x W x L)</b>	0.8 x 2.1 x 8.0 in (2.0 x 5.3 x 20.3 cm)	
	<b>Weight</b>	0.659 lb (0.299 kg)	
	<b>Cells/Type</b>	6-cell Lithium-Ion	
	<b>Energy</b>	Watt-hour Capacity	47 WHr
	<b>Temperature</b>	Operating (Charging)	32° to 113° F (0° to 45° C)
		Operating (Discharging)	14° to 140° F (-10° to 60° C)
		Non-operating	-4° to 140° F (-20° to 60° C)
	<b>Battery Re-Charge Time</b>	System in OFF mode or Standby	2.5 hours
		System ON	3 to 5 hours (depending on system power consumption)
		HP Fast Charge Technology	Charges the battery up to 90% within 90 minutes when system is OFF

## Displays

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## Technical Specifications

15.6-inch LED HD (1366 x 768) anti-glare	Active Area (W x H)	13.54 x 7.59 in (34.4 x 19.4 cm)	
	Diagonal Size	15.6 in (39.6cm)	
	Surface Treatment	Anti-glare	
	Contrast Ratio	300:1 (typical)	
	Refresh Rate	60 Hz	
	Brightness	200 nit (typical)	
	Pixel Resolution	Pitch	0.252 mm
		Format	1366 x 768
		Configuration	RGB Stripe
	Backlight	LED	
	PPI	100 ppi	
	Viewing Angle	±30° Horizontal, ±10° Vertical (minimum) 30/30/20/10 (Left/Right/Down/Up) (minimum) or 45/45/35/25 (Left/Right/Down/Up) (typical)	

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15.6-inch LED HD+ WVA (1600 x 900) anti-glare	Active Area (W x H)	13.54 x 7.59 in (34.4 x 19.4 cm)	
	Diagonal Size	15.6 in (39.6 cm)	
	Surface Treatment	Anti-glare	
	Contrast Ratio	300:1 (typical)	
	Refresh Rate	60 Hz	
	Brightness	200 nit (typical)	
	Pixel Resolution	Pitch	0.215 mm
		Format	1600 x 900
		Configuration	RGB Stripe
	Backlight	LED	
	PPI	118 ppi	
	Viewing Angle	±60° Horizontal, ± 50° Vertical (minimum) or ±70° Horizontal, ±60° Vertical (typical)	

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## Internal Storage

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## Technical Specifications

160 GB 2.5-inch SATA Solid State Drive	Weight	78 Grams	
	Capacity	160 GB	
	Height	0.275 in (7 mm)	
	Width	2.75 in (70 mm)	
	Interface	SATA	
	Performance	<b>Maximum Sequential Read</b>	<b>Maximum Sequential Write</b>
		250 MB/s	70 MB/s
	Logical Blocks	312,581,808	
	Operating Temperature	32° to 158°F (0° to 70°C) [case temp]	
Features	ATA Security; ATA-7 ;SATA 2.6; DIPM		

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

500 GB 7200 rpm SATA Hard Drive	Drive Weight	0.25 lbs (115 g)	
	Capacity	500 GB	
	Height	0.37 in (9.5 mm)	
	Width	2.75 in (70 mm)	
	Interface	ATA-8, SATA 2.6, 3.0 Gb/s, NCQ	
	Transfer Rate	<b>Synchronous (maximum)</b>	100 MB/s (Drive Capability)
	Seek Time	<b>Single Track</b>	1.5 ms
	(typical reads, including settling)	<b>Average</b>	11 ms
		<b>Maximum</b>	22 ms
	Rotational Speed	7200 rpm	
	Logical Blocks	976,773,168	
	Operating Temperature	32° to 140° F (0° to 60° C) [case temp]	
	Features	ATA Security	



## Technical Specifications

320 GB 7200 rpm SATA Hard Drive	Drive Weight	0.25 lbs (115 g)	
	Capacity	320 GB	
	Height	0.37 in (9.5 mm) or on some models 0.28 in (7 mm)	
	Width	2.75 in (70 mm)	
	Interface	ATA-8, SATA 2.6, 3.0 Gb/s, NCQ	
	Transfer Rate	<b>Synchronous</b> (maximum) 100 MB/s (Drive Capability)	
	Seek Time (typical reads, including settling)	<b>Single Track</b>	1.5 ms
		<b>Average</b>	11 ms
		<b>Maximum</b>	22 ms
	Rotational Speed	7200 rpm	
	Logical Blocks	625,142,448	
	Operating Temperature	32° to 140° F (0° to 60° C) [case temp]	
Features	ATA Security		

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250 GB 7200 rpm SATA Hard Drive	Drive Weight	0.25 lbs (115g)	
	Capacity	250 GB	
	Height	0.37 in (9.5 mm) or on some models 0.28 in (7 mm)	
	Width	2.75 in (70 mm)	
	Interface	ATA-8, SATA 2.6, 3.0 Gb/s, NCQ	
	Transfer Rate	<b>Synchronous</b> (maximum) 100 MB/s (Drive Capability)	
	Seek Time (typical reads, including settling)	<b>Single Track</b>	1.5 ms
		<b>Average</b>	11 ms
		<b>Maximum</b>	22 ms
	Rotational Speed	7200 rpm	
	Logical Blocks	488,397,168	
	Operating Temperature	32° to 140° F (0° to 60° C) [case temp]	
Features	ATA Security		

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## Technical Specifications

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

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DVD-ROM Drive	Access Times	Random	< 110 ms CD (typical)
			< 110 ms DVD (typical)
	Max Data Transfer Rate	24X CD-ROM	Up to 3,600 KB/s
		8X-DVD	Up to 10,800 KB/s
	Transfer Mode	UDMA Mode 5	
	Interface	Gen 1 SATA	
	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)	None	
	Max Media Capacity (read)	8.5 GB	
	Transport	Tray Loading	

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## Technical Specifications

DVD+/-RW SuperMulti DL LightScribe Drive	<b>Access Times</b>	Random	< 150ms CD (typical) < 160 ms DVD (typical)
	<b>Max Data Transfer Rate</b>	24X CD-ROM	Up to 3,600 KB/s
		8X DVD	Up to 10,800 KB/s
		24X CD-R	Up to 3,600 KB/s
		16X CD-RW	Up to 2,400 KB/s
		8X DVD+R	Up to 10,800 KB/s
		8X DVD+RW	Up to 10,800 KB/s
		8X DVD-R	Up to 10,800 KB/s
		6X DVD-RW	Up to 8100KB/s
		4X - DVD+R Dual Layer	Up to 5,400 KB/s
		4X - DVD-R Dual Layer	Up to 5,400 KB/s
	5X DVD-RAM	Up to 6,750 KB/s	
	<b>Transfer Mode</b>	UDMA Mode 5	
	<b>Interface</b>	Gen 1 SATA	
<b>Supported Media (read)</b>	CD-DA, CD+(E)G, CD-MIDI, CD-TEXT, CD-ROM, CD-ROM XA, MIXED MODE CD, CD-I, CD-I Bridge (Photo-CD, Video CD), Multisession CD (Photo-CD, CD-EXTRA, Portfolio, CD-R, CD-RW), CD-R, CD-RW, DVD-ROM (DVD-5, DVD-9, DVD-10, DVD-18), DVD-R, DVD-RW, DVD+R, DVD+RW, DVD-RAM		
<b>Supported Media (write)</b>	CD-R, CD-RW, DVD+R, DVD+RW, DVD-R, DVD-RW, DVD-RAM, LightScribe		
<b>Max Media Capacity (read)</b>	8.5 GB		
<b>Max Media Capacity (write)</b>	8.5 GB		
<b>Transport</b>	Tray Loading		

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Blu-ray ROM DVD+/-RW SuperMulti DL LightScribe Drive	<b>Access Times</b>	Random	< 190 ms CD-ROM (typical) < 190 ms DVD-ROM (typical) < 230 ms BD-ROM (typical)
	<b>Max Data Transfer Rate</b>	24X CD-ROM	Up to 3600KB/s
		8X DVD-ROM	Up to 10800 KB/s
		16X CD-R	Up to 1,200KB/s
		10X CD-RW	Up to 1500 KB/s
		8X DVD+R	Up to 10800 KB/s
		8X DVD+RW	Up to 10,800KB/s
		8X DVD-R	Up to 10800 KB/s
		6X DVD-RW	Up to 8,100 KB/s
		4X - DVD+R Dual Layer	
		4X - DVD-R Dual Layer	Up to 5400 KB/s
	5X DVD-RAM	Up to 6750 KB/s	



## Technical Specifications

	4X BD-ROM	Up to 18,000KB/s
<b>Transfer Mode</b>	UDMA Mode 5	
<b>Interface</b>	Gen 1 SATA	
<b>Supported Media (read)</b>	CD-DA, CD+(E)G, CD-MIDI, CD-TEXT, CD-ROM, CD-ROM XA, MIXED MODE CD, CD-I, CD-I Bridge (Photo-CD, Video CD), Multisession CD (Photo-CD, CD-EXTRA, Portfolio, CD-R, CD-RW), CD-R, CD-RW, DVD-ROM (DVD-5, DVD-9, DVD-10, DVD-18), DVD-R, DVD-RW, DVD+R, DVD+RW, DVD-RAM, BD-ROM, BD-R, BD-RE	
<b>Supported Media (write)</b>	CD-R, CD-RW, DVD+R, DVD+R(9), DVD+RW, DVD-R, DVD-R(9), DVD-RW, DVD-RAM, LightScribe	
<b>Max Media Capacity (read)</b>	50.0 GB	
<b>Max Media Capacity (write)</b>	8.5 GB	
<b>Transport</b>	Tray Loading	

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## Security

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

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## Audio

<b>Hardware</b>	<b>Implementation</b>	IDT 92HD75B High Definition CODEC
	<b>Touch-Sensitive Volume Controls</b>	Volume up, volume down, and mute
	<b>Full Duplex</b>	Yes
	<b>Microphone In</b>	Stereo
	<b>Headphone/Line Out</b>	Stereo
	<b>Integrated Microphone</b>	Yes, dual-microphone array when equipped with optional webcam



## Technical Specifications

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

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Integrated Stereo Speakers	Power Rating	2 Watts
	Impedance	4 Ohms

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## Communications

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Integrated Marvell 10/100/1000 NIC	<b>Ethernet Features</b>	10 Mbit/s operation (10BASE-T; IEEE 802.3i; IEEE 802.3 clauses 13-14) 100 Mbit/s operation (100BASE-TX; IEEE 802.3u; IEEE 802.3 clauses 21-30) 1000 Mbit/s operation (1000BASE-T; IEEE 802.3z and 802.3ab; IEEE 802.3 clauses 34-42) Auto-Negotiation (Automatic Speed Selection) Full Duplex Operation at all Speeds, Half Duplex operation at 10 and 100 Mbit/s IEEE 802.1p QoS (Quality of Service) Support IEEE 802.3x Flow Control (IEEE 802.3 clauses 31-32; configurable)
	<b>Power Management</b>	ACPI compliant – multiple power modes Situation-sensitive features reduce power consumption
	<b>Performance Features</b>	TCP/IP/UDP Checksum Offload (configurable)
	<b>Manageability</b>	Wake-on-LAN from standby and hibernation (Magic Packet and Microsoft Wake-Up Frame); Wake-on-LAN from off (Magic Packet only) PXE 2.1 Remote Boot Statistics Gathering (SNMP MIB II, Ethernet-like MIB, Ethernet MIB (802.3x, clause 30)) Comprehensive diagnostic and configuration software suite
	<b>Interface</b>	PCI Express x1
	<b>NIC Device Driver Name</b>	Marvell Yukon 88E8072 PCI-E Gigabit Ethernet Controller

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## Technical Specifications

V.92 56K Data/Fax Modem	Form Factor	MDC 1.5 Daughtercard
	Power Management Support	APM Revision 1.2, ACPI
	Approvals/Certifications	UL, CSA, NEMKO, CCIB, Industry Canada, FCC Part 68, CTR21, FCC Part 15 Class B, Canadian ICES-003 Class B, C.I.S.P.R.22, Australian ACA, CE Mark, Other Countries
	Data Mode Capabilities	V.92 data V.8bis V.80 V44, V.42bis, MNP5 (Compression) V.42 (LAPM, MNP2-4) (Error Correction) <b>Optional symbol rates:</b> 2800, 3429 Asymmetric Symbol rates <b>Synchronous primary channel data signaling rates:</b> 3600, 31200 Automatic rate re-negotiation V.34 V.32bis 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

<p><b>HP un2420 EV-DO/HSPA Mobile Broadband Module</b></p>	<p><b>Technology/Operating Bands</b></p>	<p>GSM/GPRS/EDGE: 850MHz(Cell), 900MHz(EGSM), 1800MHz(DCS), 1900MHz (PCS) UMTS/WCDMA with receive diversity: 2100MHz (UTRA FDD Band I), 1900MHz (UTRA FDD Band II), 900MHz (UTRA FDD Band VIII), 850MHz (UTRA FDD Band V) 1xEVDO/1xRTT with receive diversity: 850MHz (Band Class0-Cell), 1900MHz (Band Class1-PCS)</p>
	<p><b>Wireless Protocol Standards</b></p>	<p>GSM/GPRS/EDGE: Class B, Multi-slot operation, coding schemes CS1 – CS4 and MSC1 – MSC9. UMTS/WCDMA: Release 99 and Release 6 CDMA: 1xEVDO Release 0 and Release A, IS-95A, IS-95B, IS-2000</p>
	<p><b>Wireless Parametric Standards</b></p>	<p>Meets or exceeds TIA/EIA IS-98-D</p>
	<p><b>Maximum Data Rates</b></p>	<p>UMTS (HSPA) – 7.2 Mbps (Download ), 2.0 Mbps (Upload) CDMA (EVDO Release A) – 3.1 Mbps (Download), 1.8 Mbps (Upload)</p>
	<p><b>GPS</b></p>	<p>Standalone GPS enabled</p>
	<p><b>GPS Bands</b></p>	<p>L1 – 1575.42 MHz</p>
	<p><b>Maximum Output Power</b></p>	<p>GSM/GPRS/EDGE: 32dBm (+/-1) WCDMA: 24dBm (+/-1) CDMA: 24dBm (+/-1)</p>
	<p><b>Maximum Power Consumption</b></p>	<p>2500mA (peak); 1000mA (average)</p>
	<p><b>Power Consumption, Sleep Mode</b></p>	<p>5 mA</p>
	<p><b>Power Management</b></p>	<p>USB selective suspend Integrated notebook wireless button</p>
	<p><b>Antenna Type</b></p>	<p>Dual high efficiency 5 band antennae with spatial diversity, mounted in the display enclosure</p>
	<p><b>Form Factor</b></p>	<p>PCI-Express MiniCard, USB 2.0 interface</p>
	<p><b>Weight</b></p>	<p>11.5 g</p>
	<p><b>Dimensions (Length x Width x Thickness)</b></p>	<p>2.01 x 1.18 x 0.18 in (51 x 30 x 5 mm)</p>
	<p><b>Voltage, Operating</b></p>	<p>3.3v +/- 10%</p>
	<p><b>Temperature, Operating (from TIA/EIA/IS-98-D)</b></p>	<p>–22° to 140° F (–30° to 60° C) (full RF performance) –22° to 167° F (–30° to 75° C) (reduced RF performance)</p>
	<p><b>Temperature, Non-operating, 96 hours (from MIL-STD 202 Method 108)</b></p>	<p>–40° to 185° F (–40° to 85° C)</p>
	<p><b>Humidity, Non-operating</b></p>	<p>85% relative humidity for 48 hours @ 185° F (85° C) (non-condensing)</p>
	<p><b>Configuration Utilities</b></p>	<p>HP Connection Manager</p>
	<p><b>LED Activity</b></p>	<p>LED Off – Radio Off; Solid LED On – Radio On</p>

Intel Centrino Advanced- N 6200 (2x2) Wireless LAN Standards IEEE 802.11a  
IEEE 802.11b



### Technical Specifications

	IEEE 802.11g IEEE 802.11n*
	* In countries where 802.11n is not allowed, this capability is not enabled.
<b>Interoperability</b>	Wi-Fi certified Cisco Compatible Extensions Program compliant with Microsoft Windows Vista and XP
<b>Frequency Band</b>	2.4 GHz and 5GHz
<b>Antenna Structure</b>	2 transmit; 2 receive (2x2)
<b>Data Rates</b>	802.11a: 6, 9, 12, 18, 24, 36, 48, 54 Mbps 802.11b: 1, 2, 5.5, 11 Mbps 802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps 802.11n: 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 specification
<b>Modulation</b>	Direct Sequence Spread Spectrum DBPSK, DQPSK, CCK, OFDM, BPSK, QPSK, 16-QAM, 64-QAM
<b>Security<sup>1</sup></b>	Authentication: WPA and WPA2, 802.1x (EAP_TLS, TTLS, PEAP, LEAP, EAP-FAST)  Authentication Protocols: PAP, CHAP, TLS, GTC, MS-CHAP, MS-CHAPv2  Encryption: 64 and 128-bit WEP, AES-CCMP, CKIP, TKIP  Support for Cisco Security Features (proven compatibility with Cisco Aironet infrastructure products through the Cisco Compatible Extensions Program Version 4) with Microsoft Windows Vista and XP only.
<b>Sub-channels</b>	Multinational support with frequency bands and channels compliant to local regulations.
<b>Media Access Protocol</b>	CSMA/CA (Collision Avoidance) with ACK
<b>Network Architecture Models</b>	Ad-hoc (Peer to Peer) Infrastructure (Access Point Required)
<b>Roaming</b>	IEEE 802.11 compliant roaming between 2.4GHz band Access Points
<b>Output Power</b> (for CCK and OFDM) <sup>2</sup>	17 dBm max
<b>Power Consumption</b>	Transmit: 2.3 Watts (average, with one spatial streams) Receive: 1 Watt (max with two spatial streams) Idle mode <sup>3</sup> : 35 mW (average) Radio off: 20 mW (max)
<b>Power Management</b>	ACPI compliant power management 802.11 compliant power saving mode
<b>Receiver Sensitivity<sup>4</sup></b>	54 Mbps: -76 dBm, 6 Mbps: -92 dBm
<b>Antenna Connections</b>	2 U.FL type connectors, 50 ohm nominal impedance
<b>Form Factor</b>	PCI-Express Half-MiniCard
<b>Weight</b>	0.0075 lb (3.4 g)
<b>Dimensions</b>	0.12 x 1.06 x 1.18 in (3.1 x 26.8 x 30.0 mm)
<b>Operating Voltage</b>	3.3V +/- 9%



### Technical Specifications

<b>Temperature</b>	Operating	32° to 176° F (0° to 80° C)
	Non-operating	-40° to 176° F (-40° to 80° C)
<b>Humidity</b>	Operating	10% to 90% (non-condensing)
	Non-operating	5% to 90% (non-condensing)
<b>Altitude</b>	Operating	0 to 10,000 ft (3,048 m)
	Non-operating	0 to 50,000 ft (15,240 m)
<b>Configuration Utility<sup>5</sup></b>	Microsoft Windows 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 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><li>● Intel IHV extensions for Windows Vista available to support Cisco Compatible Extensions.</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 (CCK 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 XP. WLAN may also be compatible with certain third-party software supplicants. WLAN supplier IHV extensions required for Cisco Compatible Extensions support for Microsoft Windows Vista.</li></ol>	

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<b>Intel Centrino Wireless-N 1000</b>	<b>Wireless LAN Standards</b>	IEEE 802.11b IEEE 802.11g IEEE 802.11n*  * In countries where 802.11n is not allowed, this capability is not enabled.
	<b>Interoperability</b>	Wi-Fi certified Cisco Compatible Extensions Program compliant with Microsoft Windows Vista and XP
	<b>Frequency Band</b>	2.4 GHz
	<b>Antenna Structure</b>	1 transmit; 2 receive (1x2)
	<b>Data Rates</b>	802.11b: 1, 2, 5.5, 11 Mbps 802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps 802.11n: many 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 specification
	<b>Modulation</b>	Direct Sequence Spread Spectrum DBPSK, DQPSK, CCK, OFDM, BPSK, QPSK, 16-QAM, 64-QAM
	<b>Security<sup>1</sup></b>	Authentication: WPA and WPA2, 802.1x (EAP_TLS, TTLS, PEAP, LEAP, EAP-FAST)



### Technical Specifications

	Authentication Protocols: PAP, CHAP, TLS, GTC, MS-CHAP, MS-CHAPv2 Encryption: 64 and 128-bit WEP, AES-CCMP, CKIP, TKIP
	Support for Cisco Security Features (proven compatibility with Cisco Aironet infrastructure products through the Cisco Compatible Extensions Program Version 4) with Microsoft Windows Vista and XP only.
<b>Sub-channels</b>	Multinational support with frequency bands and channels compliant to local regulations.
<b>Media Access Protocol</b>	CSMA/CA (Collision Avoidance) with ACK
<b>Network Architecture Models</b>	Ad-hoc (Peer to Peer) Infrastructure (Access Point Required)
<b>Roaming</b>	IEEE 802.11 compliant roaming between 2.4GHz band Access Points
<b>Output Power</b> (for CCK and OFDM) <sup>2</sup>	15 dBm typical
<b>Power Consumption</b>	Transmit: 1.4 Watts (average, with one spatial streams) Receive: 1.3 Watts (average with two receive chains) Idle mode <sup>3</sup> : 30 mW (average) Radio off: 20 mW (max)
<b>Power Management</b>	ACPI compliant power management 802.11 compliant power saving mode
<b>Receiver Sensitivity</b> <sup>4</sup>	54 Mbps: -74 dBm, 6 Mbps: -91 dBm
<b>Antenna Connections</b>	2 U.FL type connectors, 50 ohm nominal impedance
<b>Form Factor</b>	PCI-Express Half-MiniCard
<b>Weight</b>	0.0075 lb (3.4 g)
<b>Dimensions</b>	0.12 x 1.06 x 1.18 in (3.1 x 26.8 x 30.0 mm)
<b>Operating Voltage</b>	3.3V +/- 9%
<b>Temperature</b>	Operating 32° to 176° F (0° to 80° C) Non-operating -40° to 176° F (-40° to 80° C)
<b>Humidity</b>	Operating 10% to 90% (non-condensing) Non-operating 5% to 90% (non-condensing)
<b>Altitude</b>	Operating 0 to 10,000 ft (3,048 m) Non-operating 0 to 50,000 ft (15,240 m)
<b>Configuration Utility</b> <sup>5</sup>	Microsoft Windows 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 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><li>● Intel IHV extensions for Windows Vista available to support Cisco Compatible Extensions.</li></ul>
<b>LED Activity</b>	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.



## Technical Specifications

3. In Power Save Polling mode and on battery power.
4. Receiver sensitivity is measured at a packet error rate of 8% for 802.11b (CCK modulation) and a packet error rate of 10% for 802.11a/g (OFDM modulation).
5. WLAN supplier's client utility is required for Cisco Compatible Extensions support with Microsoft Windows XP. WLAN may also be compatible with certain third-party software supplicants. WLAN supplier IHV extensions required for Cisco Compatible Extensions support for Microsoft Windows Vista.

<b>Broadcom 4312G 802.11b/g WiFi Adapter</b>	<b>Wireless LAN Standards</b>	IEEE 802.11b IEEE 802.11g
	<b>Interoperability</b>	Wi-Fi certified Cisco Compatible Extensions Program compliant with Microsoft Windows Vista and XP
	<b>Frequency Band</b>	2.4 GHz
	<b>Data Rates</b>	802.11b: 1, 2, 5.5, 11 Mbps 802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps
	<b>Modulation</b>	Direct Sequence Spread Spectrum DBPSK, DQPSK, CCK, OFDM
	<b>Security<sup>1</sup></b>	Supports 64- and 128-bit WEP, WPA, WPA2, hardware-accelerated AES, 802.1x authentication types EAP-TLS, EAP-TTLS, PEAP-GTC, PEAP-MSCHAPv2, LEAP, EAP-FAST.  Support for Cisco Security Features (proven compatibility with Cisco Aironet infrastructure products through the Cisco Compatible Extensions Program Version 4) with Microsoft Windows Vista and XP only.
	<b>Sub-channels</b>	Multinational support with frequency bands and channels compliant to local regulations.
	<b>Media Access Protocol</b>	CSMA/CA (Collision Avoidance) with ACK
	<b>Network Architecture Models</b>	Ad-hoc (Peer to Peer) Infrastructure (Access Point Required)
	<b>Roaming</b>	IEEE 802.11 compliant roaming between access points
	<b>Output Power (for CCK)<sup>2</sup></b>	17 dBm , nominal
	<b>Output Power (for OFDM; power varies by data rate)<sup>2</sup></b>	15 dBm , nominal
	<b>Power Consumption</b>	Idle associated: 250 mW Idle unassociated: 150 mW Transmit: 2.0 W (max) Receive: 2.0 W (max)
	<b>Power Management</b>	ACPI compliant power management 802.11 compliant power saving mode
	<b>Receiver Sensitivity<sup>3</sup></b>	54 Mbps: -71 dBm, 11 Mbps: -85 dBm , 1 Mbps: -95 dBm
	<b>Antenna type</b>	High efficiency dual band antenna with spatial diversity, mounted in the display enclosure
	<b>Form Factor</b>	PCI-Express Half-MiniCard
	<b>Weight</b>	0.013 lb (6 g)



### Technical Specifications

<b>Dimensions</b>	0.19 x 1.06 x 1.18 in (4.75 x 26.8 x 30 mm)	
<b>Operating Voltage</b>	3.3v +/- 10%	
<b>Temperature</b>	Operating	14° to 149° F (–10° to 65° C)
	Non-operating	–40° to 176° F (–40° to 80° C)
<b>Humidity</b>	Operating	10% to 90% (non-condensing)
	Non-operating	5% to 95% (non-condensing)
<b>Altitude</b>	Operating	0 to 10,000 ft (3,048 m)
	Non-operating	0 to 50,000 ft (15,240 m)
<b>Configuration Utility<sup>4</sup></b>	Microsoft Windows XP Choice of Configuration Utility: <ul style="list-style-type: none"><li>● Microsoft Windows XP Wireless Network Connection Manager</li><li>● Broadcom Wireless Configuration Utility (required for Cisco Compatible Extensions support)</li></ul> Microsoft Windows Vista <ul style="list-style-type: none"><li>● Microsoft Windows Vista Wireless Network Connection Manager</li><li>● Broadcom IHV extensions for Windows Vista available to support Cisco Compatible Extensions.</li></ul>	
<b>LED Activity</b>	LED Off – Radio OFF; Solid LED On – Radio ON	
	<ol style="list-style-type: none"><li>1. Check latest software/driver release for updates on supported security features.</li><li>2. Maximum output power may vary by country according to local regulations.</li><li>3. Receiver sensitivity is measured at a packet error rate of 8% for 802.11b (CCK modulation) and a packet error rate of 10% for 802.11a/g (OFDM modulation).</li><li>4. WLAN supplier's client utility is required for Cisco Compatible Extensions support with Microsoft Windows XP. WLAN may also be compatible with certain third-party software supplicants. WLAN supplier IHV extensions required for Cisco Compatible Extensions support for Microsoft Windows Vista.</li></ol>	

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<b>Broadcom 4322AGN 802.11a/b/g/n WiFi Adapter</b>	<b>Wireless LAN Standards</b>	IEEE 802.11a IEEE 802.11b IEEE 802.11g IEEE 802.11n
	<b>Interoperability</b>	Wi-Fi certified (802.11abg only) Cisco Compatible Extensions Program compliant (802.11abg only) with Microsoft Windows Vista and XP
	<b>Frequency Band</b>	2.4 GHz and 5 GHz
	<b>Data Rates</b>	802.11b: 1, 2, 5.5, 11 Mbps 802.11a/g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps 802.11n: 6, 6.5, 9, 12, 13, 13.5, 18, 19.5, 24, 26, 27, 36, 39, 40.5, 48, 52, 54, 58.5, 65, 78, 81, 104, 108, 117, 121.5, 130, 135, 162, 216, 243, 270, 300 Mbps
	<b>Frequency Support</b>	20 MHz: 2.4 GHz and 5 GHz bands 40 MHz: 2.4 GHz and 5 GHz bands
	<b>Modulation</b>	Direct Sequence Spread Spectrum DBPSK, DQPSK, CCK, OFDM, BPSK, QPSK, 16-QAM, 64-QAM
	<b>Security<sup>1</sup></b>	Supports 64- and 128-bit WEP, WPA, WPA2, hardware-accelerated AES,



### Technical Specifications

	802.1x authentication types EAP-TLS, EAP-TTLS, PEAP-GTC, PEAP-MSCHAPv2, LEAP, EAP-FAST.
	Support for Cisco Security Features (proven compatibility with Cisco Aironet infrastructure products through the Cisco Compatible Extensions Program Version 4) with Microsoft Windows Vista and XP only.
<b>Sub-channels</b>	Multinational support with frequency bands and channels compliant to local regulations.
<b>Media Access Protocol</b>	CSMA/CA (Collision Avoidance) with ACK
<b>Network Architecture Models</b>	Ad-hoc (Peer to Peer) Infrastructure (Access Point Required)
<b>Roaming</b>	IEEE 802.11 compliant roaming between access points
<b>Output Power (for CCK)<sup>2</sup></b>	17 dBm
<b>Output Power (for OFDM; power varies by data rate)<sup>2</sup></b>	15 dBm
<b>Power Consumption</b>	Idle associated: 250 mW Idle unassociated: 150 mW Transmit/Receive 20 MHz channel: 2.0 W (max) Transmit/Receive 40 MHz channel: 2.0 W (max)
<b>Power Management</b>	ACPI compliant power management 802.11 compliant power saving mode
<b>Receiver Sensitivity<sup>3</sup></b>	270 Mbps: -61dBm, 54 Mbps: -72 dBm, 11 Mbps: -85 dBm, 1 Mbps: -92 dBm
<b>Antenna type</b>	High efficiency dual band antenna with spatial diversity, mounted in the display enclosure
<b>Form Factor</b>	PCI-Express Half-MiniCard
<b>Weight</b>	0.013 lb (6 g)
<b>Dimensions</b>	0.19 x 1.06 x 1.18 in (4.75 x 26.8 x 30 mm)
<b>Operating Voltage</b>	3.3v +/- 10%
<b>Temperature</b>	Operating 14° to 149° F (-10° to 65° C) Non-operating -40° to 176° F (-40° to 80° C)
<b>Humidity</b>	Operating 10% to 90% (non-condensing) Non-operating 5% to 95% (non-condensing)
<b>Altitude</b>	Operating 0 to 10,000 ft (3,048 m) Non-operating 0 to 50,000 ft (15,240 m)
<b>Configuration Utility<sup>4</sup></b>	Microsoft Windows XP Choice of Configuration Utility: <ul style="list-style-type: none"><li>• Microsoft Windows XP Wireless Network Connection Manager</li><li>• Broadcom Wireless Configuration Utility (required for Cisco Compatible Extensions support)</li></ul> Microsoft Windows Vista <ul style="list-style-type: none"><li>• Microsoft Windows Vista Wireless Network Connection Manager</li><li>• Broadcom IHV extensions for Windows Vista available to support Cisco Compatible Extensions.</li></ul>



## Technical Specifications

- LED Activity** LED Off – Radio OFF; Solid LED On – Radio ON
1. Check latest software/driver release for updates on supported security features.
  2. Maximum output power may vary by country according to local regulations.
  3. Receiver sensitivity is measured at a packet error rate of 8% for 802.11b (CCK modulation) and a packet error rate of 10% for 802.11a/g (OFDM modulation).
  4. WLAN supplier's client utility is required for Cisco Compatible Extensions support with Microsoft Windows XP. WLAN may also be compatible with certain third-party software supplicants. WLAN supplier IHV extensions required for Cisco Compatible Extensions support for Microsoft Windows Vista.

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<b>HP Integrated Module with Bluetooth 2.1 Wireless Technology</b>	<b>Bluetooth Specification</b>	2.1 Compliant
	<b>Dimensions</b>	1.18 x 0.26 x 0.13 in (30 x 6.5 x 3.25 mm)
	<b>Frequency Band</b>	2402 to 2480 MHz
	<b>Number of Available Channels</b>	79 (1 MHz) available channels
	<b>Data Rates and Throughput</b>	3 Mbps data rate; throughput up to 2.17 Mbps Synchronous Connection Oriented links up to 3, 64 kbps, voice channels Asynchronous Connection Less links 2178.1 kbps/177.1 kbps asymmetric or 1306.9 kbps symmetric
	<b>Transmit Power</b>	-6 dBm to 4 dBm (Bluetooth Class II)
	<b>Receiver Sensitivity</b>	Better than -80 dBm at 0.1 % raw bit error rate
	<b>Power Consumption</b>	Peak (Tx) 264 mW Peak (Rx) 231 mW Sleep <1 mW
	<b>Antenna</b>	Internally integrated within module
	<b>Range</b>	Up 33 ft (10 m)
	<b>Electrical Interface</b>	USB 2.0 compliant Microsoft Windows Plug and Play compliant
	<b>Bluetooth Software Supported</b>	Broadcom Bluetooth for Microsoft Windows Bluetooth Software
	<b>Link Topology</b>	Point to Point, Multipoint Pico Nets up to 7 slaves
	<b>Security</b>	Full support of Bluetooth Security Provisions
	<b>Power Management</b>	Microsoft Windows ACPI, and USB Bus Support Self configurable to optimize power conservation in all operating modes, including Standby, Hold, Park, and Sniff
	<b>Certifications</b>	All necessary regulatory approvals for supported countries, including: FCC (47 CFR) Part 15C, Section 15.247 & 15.249 ETS 300 328, ETS 300 826 Low Voltage Directive IEC950 UL, CSA, and CE Mark
	<b>Temperature</b>	Operating -4° to 158° F (-20° to 70° C) Non-operating -40° to 176° F (-40° to 80° C)



## Technical Specifications

<b>Humidity</b>	Operating	10% to 90%
	Non-operating	5% to 95%
<b>Altitude</b>	Operating	15,000 ft (4,572 m)
	Non-operating	40,000 ft (12,192 m)
<b>Bluetooth Profiles Supported</b>	Serial Port Profile (SPP) <sup>1</sup>	
	Service Discovery Application Profile (SDAP)	
	Dial-Up Networking (DUN) <sup>1,2</sup>	
	Generic Object Exchange Profile (GOEP) <sup>1,2</sup>	
	Object Push Profile (OPP) <sup>1,2</sup>	
	File Transfer Profile (FTP)	
	Synchronization Profile (SYNC)	
	Hard Copy Cable Replacement (HCRP) <sup>1,2</sup>	
	Personal Area Networking Profile (PAN) <sup>1,2</sup>	
	Human Interface Device Profile (HID) <sup>1,2</sup>	
	FAX Profile (FAX)	
	Basic Imaging Profile (BIP) <sup>2</sup>	
	Headset Profile (HSP)	
Hands Free Profile (HFP)		
Advanced Audio Distribution Profile (A2DP)		

<sup>1</sup> indicates the profile is supported by Microsoft Windows XP SP2

<sup>2</sup> indicates the profile is part of Windows Vista

## Environmental Data

### Eco-Label Certifications

This product has received or is in the process of being certified to the following approvals and may be labeled with one or more of these marks:

- US Energy Stars
- IT ECO declaration
- EPEAT - Silver

### System Configuration

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

<b>Energy Consumption</b>	115 VAC	230 VAC	100 VAC
Normal Operation	12.26 W	13.29 W	12.19 W
Sleep (Energy Star low power mode)	0.81 W	0.97 W	0.8 W
Off	0.38 W	0.55 W	0.37 W
<b>Heat Dissipation*</b>	115 VAC	230 VAC	100 VAC
Normal Operation	42 BTU/hr	45 BTU/hr	42 BTU/hr
Sleep	3 BTU/hr	3 BTU/hr	3 BTU/hr
Off	1 BTU/hr	2 BTU/hr	1 BTU/hr

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



## Technical Specifications

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

System Fan Off	Sound Power (LWAd, bels)	Sound Pressure (LpAm, decibels)
Idle	3.2	24.1
Fixed Disk (random writes)	3.2	26.0

System fan is usually off except when charging the battery

**Batteries** This battery(s) in this product comply with EU Directive 2006/66/EC

Batteries used in the product do not contain:

- Mercury greater than 5ppm by weight
- Cadmium greater than 10ppm by weight

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

### Additional information

This product is in compliance with the Restrictions of Hazardous Substances (RoHS) directive - 2002/95/EC.

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

This product is in compliance with California Proposition 65 (State of California; Safe Drinking Water and Toxic Enforcement Act of 1986).

This product is in compliance with the IEEE 1680 (EPEAT) standard at the Silver level, see: [www.epeat.net](http://www.epeat.net)

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

This product contains 0% post consumer recycled plastic (by wt.)

This product is greater than 90% recycle-able when properly disposed of at end of life.

### Packaging Materials

- External:
  - Paper 97 g
- Internal:
  - Polyethylene low density solid 13 g
  - Molded Pulp 100 g
  - Polyethylene low density 4 g
- The Polyethylene low density solid packaging material is made from 100% recycled content.
- The paper packaging material is made from 80% recycled content.



## Technical Specifications

- The Molded Pulp packaging material is made from 80% recycled content.
- The Polyethylene low density packaging material is made from 100% recycled content.

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

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

### Material Usage

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

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

Nickel finishes that release greater than 0.5 micro-grams/cm<sup>2</sup>/week, measured according to EN 1811:1998, are not used on any product surface



## Technical Specifications

<b>End-of-life Management and Recycling</b>	designed to be frequently handled or touched by users. Hewlett-Packard offers end-of-life HP product return and recycling programs in many geographic areas. To recycle your product, please go to: <a href="http://www.hp.com/go/reuse-recycle">http://www.hp.com/go/reuse-recycle</a> or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner.
<b>Hewlett-Packard Corporate Environmental Information</b>	The EU WEEE directive (2002/95/EC) requires manufacturers to provide treatment information for each product type for use by treatment facilities. This information (product disassembly instructions) is posted on the Hewlett Packard web site at: <a href="http://www.hp.com/go/recyclers">http://www.hp.com/go/recyclers</a> . These instructions may be used by recyclers and other WEEE treatment facilities as well as HP OEM customers who integrate and re-sell HP equipment. For more information about HP's commitment to the environment: Global Citizenship Report <a href="http://www.hp.com/hpinfo/globalcitizenship/gcreport/index.html">http://www.hp.com/hpinfo/globalcitizenship/gcreport/index.html</a> Environment website <a href="http://www.hp.com/environment">http://www.hp.com/environment</a> Eco-label certifications <a href="http://www.hp.com/hpinfo/globalcitizenship/environment/productdesign/ecolabels.html">http://www.hp.com/hpinfo/globalcitizenship/environment/productdesign/ecolabels.html</a> ISO 14001 certificates: <a href="http://www.hp.com/hpinfo/globalcitizenship/environment/operations/envmanagement.html">http://www.hp.com/hpinfo/globalcitizenship/environment/operations/envmanagement.html</a>

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