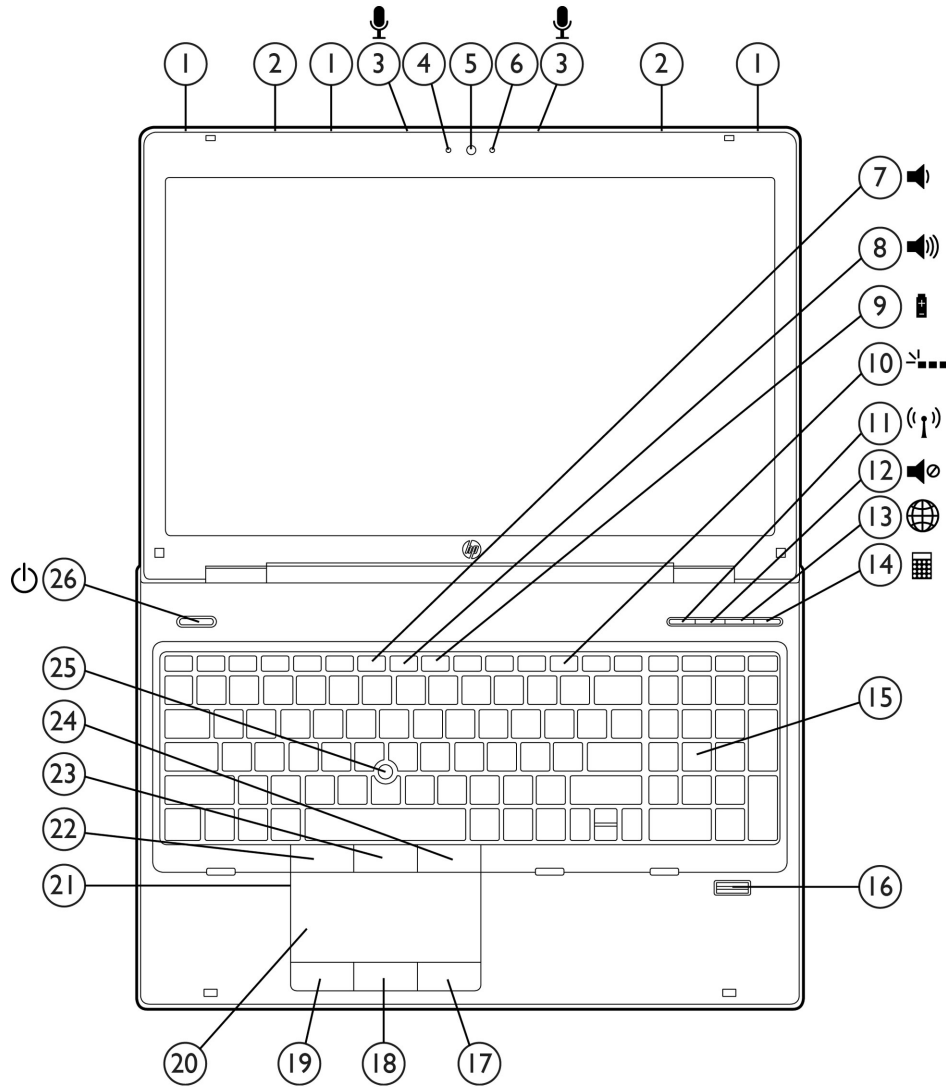


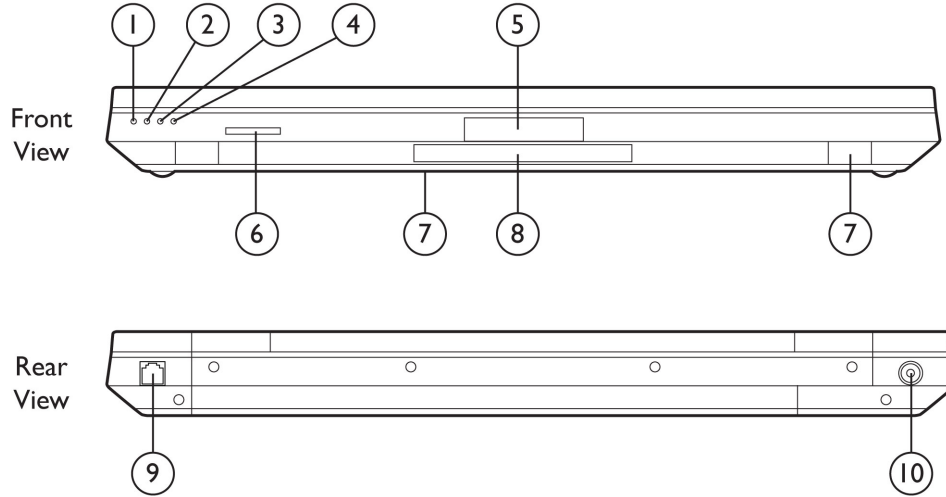
Overview



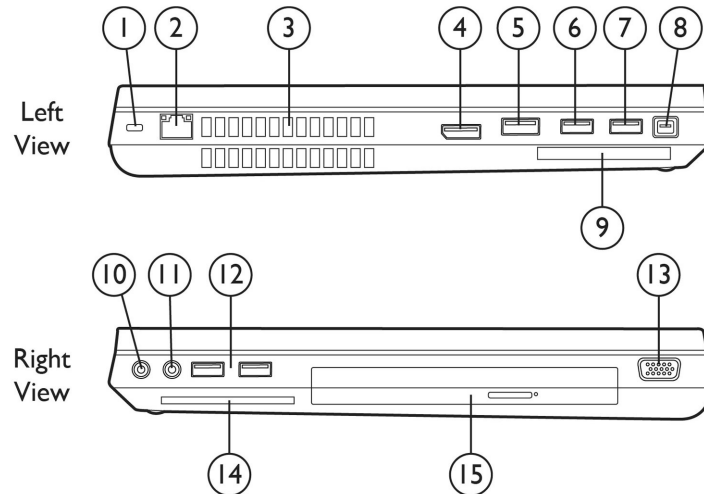
- | | | |
|------------------------------------|---|-------------------------------------|
| 1. WLAN antennas (3) | 10. Optional backlit keyboard function key | 18. Center Touchpad button |
| 2. WWAN antennas (2) | 11. Wireless on/off button with LED indicator | 19. Left Touchpad button |
| 3. Dual-microphone array | 12. Volume mute button with LED indicator | 20. Touchpad with scroll zone |
| 4. Webcam light (with webcam) | 13. HP QuickWeb button with LED indicator | 21. Touchpad on/off button with LED |
| 5. Optional 720p HD webcam | 14. Calculator button with LED indicator | 22. Left Pointstick button |
| 6. Ambient Light Sensor | 15. Numeric keypad | 23. Center Pointstick button |
| 7. Volume down function key | 16. HP Fingerprint Sensor | 24. Right Pointstick button |
| 8. Volume up function key | 17. Right Touchpad button | 25. Pointstick |
| 9. HP Power Assistant function key | | 26. Power button with LED indicator |



Overview



- | | |
|---|----------------------------|
| 1. Wireless LED indicator | 6. Secure Digital/MMC slot |
| 2. Power/standby LED indicator | 7. Stereo speakers |
| 3. Battery charging LED indicator | 8. Vent |
| 4. Hard drive activity / HP 3D DriveGuard LED indicator | 9. RJ-11/modem port |
| 5. Display release latch | 10. Power connector |

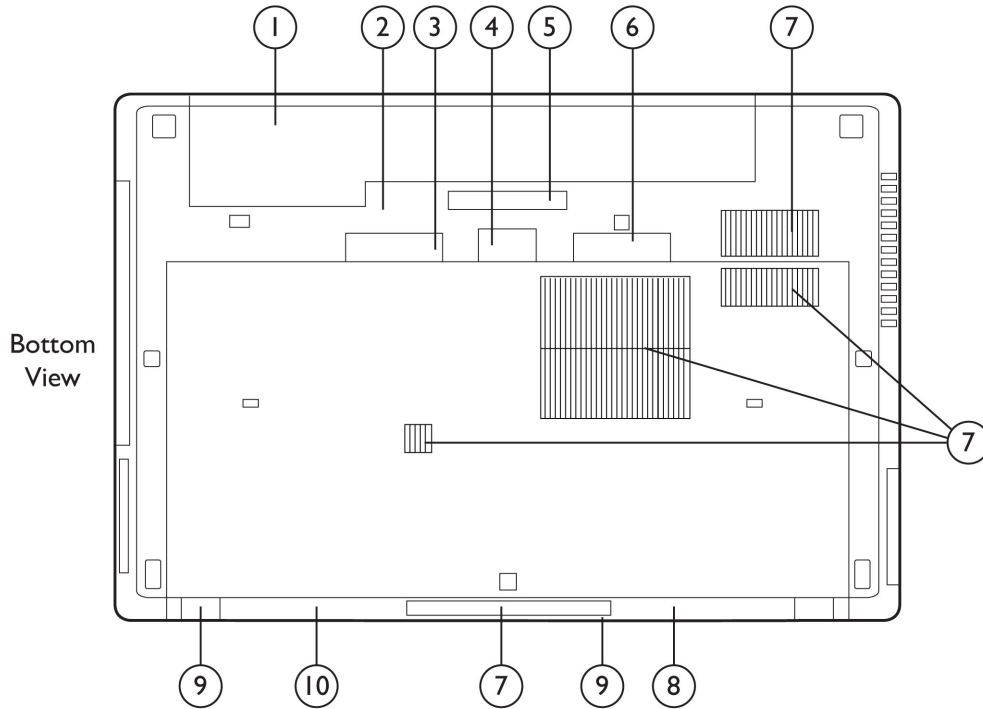


- | | |
|-----------------------------|------------------------------------|
| 1. Security lock slot | 9. ExpressCard/54 slot |
| 2. RJ-45/Ethernet port | 10. Stereo headPHONE/line out |
| 3. Vents | 11. Stereo microphone/line in |
| 4. DisplayPort | 12. (2) USB 3.0 ports |
| 5. eSATA/USB 2.0 combo port | 13. VGA/external monitor connector |
| 6. USB 2.0 port | 14. Smart Card Reader |



Overview

- 7. USB 2.0 charging port
- 8. 1394a port
- 15. Upgrade Bay (optical drive or additional hard drive)



- 1. Battery bay
- 2. SIM slot for WWAN (select models)
- 3. Battery release latch
- 4. Secondary battery connector
- 5. Docking connector
- 6. Bottom cover release latch
- 7. Vents and spill-resistant keyboard drain hole
- 8. Stereo Speakers
- 9. Bluetooth module compartment
- 10. Hard drive, memory, and wireless compartments under bottom cover

* SIM slot is accessed through battery bay.

Overview

At A Glance

- Genuine Windows 7 versions or FreeDOS
- All new chiseled design with enhanced DuraCase, wear-resistant DuraFinish, HP DisplaySafe frame, precision aluminum-alloy hinges, cast titanium-alloy display latches, signature gunmetal color tone, keyboard in full aluminum deck, radial-spun display cover with HP backlit logo, and chemically strengthened glass touchpad
- Designed to meet the military standard MIL-STD-810G for vibration, dust, altitude, and high and low temperature operation*
- Workstation-caliber discrete graphics: AMD FirePro M5950, NVIDIA Quadro 1000M, or NVIDIA Quadro 2000M
- ISV certified to provide fast and reliable performance with workstation applications, including manipulation of 3D textures
- Widescreen 15.6-inch diagonal LED-backlit display:
 - HD+ wide viewing angle, FHD wide viewing angle, or FHD ultra wide viewing angle with HP DreamColor
- HP Performance Advisor for optimal configuration, compatibility and performance
- Up to four SODIMMs on configurations with quad-core processor, for system memory up to 32 GB
- AMD Eyefinity Technology for multi-monitor support
- DisplayPort for high resolution support
- SRS Premium Sound optimized for high fidelity audio
- Choice of 2nd generation Intel® Core™ i7 and i5 processors
- Intel Core i7 with vPro and Core i5 with vPro technology (optional)
- Flexible wireless connectivity options:
 - Optional integrated HP hs2340 HSPA+ Mobile Broadband Module connects to both HSPA and HSPA+ (UMTS) networks and provides GPS functionality
 - Optional integrated HP un2430 EV-DO/HSPA Mobile Broadband Module (Gobi 3000) provides GPS functionality
 - Optional integrated HP lt2510 EV-DO/LTE Mobile Broadband Module (US only)
 - Integrated Intel Centrino® 802.11 a/b/g/n 2x2 or 3x3, or Atheros 802.11 a/b/g/n 3x3 wireless LAN module
 - Bluetooth® v2.1 +EDR
 - HP Connection Manager 4.0
- Security features including HP ProtectTools, with central management across HP and non-HP client PCs
- HP QuickWeb for convenient online access without long boot-up times
- HP Power Assistant allows you to conserve power, stretch battery run time, accurately monitor the energy usage of the PC and up to four select HP external monitors, and report workforce power consumption.
- Upgrade Bay for optical drive or optional second hard drive Choice of 7200 rpm user-removable hard drive up to 750 GB with HP 3D DriveGuard protection, 320 GB Self-Encrypting Drive (SED), or 128/256 GB Solid State Drive
- Choice of battery solutions: 8-cell (83 WHr) or 8-cell (75 WHr) HP Long Life Battery
- Optional external batteries for extended battery life: HP ST09 Extended Life Battery, or HP BB09 Ultra Extended Life Battery.
- BFR/PVC-free**, ENERGY STAR® qualified*** and EPEAT Gold registered in the U.S. EPEAT status varies by country—please see epeat.net.

* Testing was not intended to demonstrate fitness for DOD contracts requirements or for military use. Test results are not a guarantee of future performance under these test conditions.

** Meeting the industry definition of 'BFR/PVC-free' per the iNEMI Position Statement on "Low Halogen" Electronics. Plastic parts incorporated into the chassis generally contain < 1000 ppm (0.1%) of bromine or chlorine. Printed circuit board and substrate laminates generally contain < 1500 ppm (0.15%) of total bromine and chlorine. Service parts after purchase may not be BFR/PVC-free. External accessories, including power supplies, power cords, and peripherals as well as the following customer-configurable internal components: ATT SIM card and DreamColor displays are not BFR/PVC-free.

*** Microsoft Windows is required for ENERGY STAR® qualification. 25% Energy reduction as per listed in the ENERGY STAR official website: www.energystar.gov/index.cfm?fuseaction=find_a_product.showProductGroup&pgw_code=CX



Standard Features (availability may vary by country)

Processors

2nd Generation Intel Core i7 Processors

Intel Core i7-2820QM Processor (2.30 GHz, 8 MB L3 cache, 4 cores/8 threads, 45W)*
Up to 3.40 GHz with Intel Turbo Boost Technology

Intel Core i7-2720QM Processor (2.20 GHz, 6 MB L3 cache, 4 cores/8 threads, 45W)*
Up to 3.30 GHz with Intel Turbo Boost Technology

Intel Core i7-2630QM Processor (2.00 GHz, 6 MB L3 cache, 4 cores/8 threads, 45W)* †
Up to 2.90 GHz with Intel Turbo Boost Technology

Intel Core i7-2620M Processor (2.70 GHz, 4 MB L3 cache, 2 cores/4 threads, 35W)*
Up to 3.40 GHz with Intel Turbo Boost Technology

2nd Generation Intel Core i5 Processors

Intel Core i5-2540M Processor (2.60 GHz, 3 MB L3 cache, 2 cores/4 threads, 35W)*
Up to 3.30 GHz with Intel Turbo Boost Technology

Intel Core i5-2520M Processor (2.50 GHz, 3 MB L3 cache, 2 cores/4 threads, 35W)*
Up to 3.20 GHz with Intel Turbo Boost Technology

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

† Not available with vPro.

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

Operating System

Preinstalled

Genuine Windows 7 Professional 64*
Genuine Windows 7 Home Premium* (limited localizations)
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**
Genuine Windows Vista Business 32**
Genuine Windows Vista Business 64**
Genuine Windows XP Professional 32
Genuine Windows XP Professional 64

Certified

SuSE Linux Enterprise Desktop 11

* 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>.



Standard Features (availability may vary by country)

Chipset Mobile Intel QM67 Express Chipset

Intel Core i5 with vPro/Core i7 with vPro technology capable

Intel Core i5 with vPro and Core i7 with vPro technology is a selectable feature that is available on units configured with select processors, an Intel Centrino® Advanced-N or Ultimate-N WLAN module and a preinstalled Windows operating system. It provides advances in remote manageability, security, energy efficient performance, and wireless connectivity. Intel Active Management Technology 7.0 (iAMT) offers built-in manageability and proactive security for networked notebook PCs, even when they are powered off* or when the operating system is inoperable. It can help identify threats before they reach the network, isolate infected systems, and update PCs regardless of their power state.

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

NOTE: Some functionality of Intel Core i5 with vPro/Core i7 with vPro technology, such as Intel Active Management technology and Intel Virtualization technology, requires additional third- party software in order to run. Availability of future "virtual appliances" applications for Intel Core i5 with vPro/Core i7 with vPro technology is dependent on third- party software providers. Compatibility with future "virtual appliances" is yet to be determined.

Graphics

AMD FirePro M5950 with 1 GB dedicated GDDR5 video memory
Microsoft DirectX 11 (Shader Model 5.0) and OpenGL 4.0 capable
AMD Eyefinity Technology supports up to five independent displays when using an HP Advanced Docking station

NVIDIA Quadro 1000M with 2 GB dedicated DDR3 video memory
Microsoft DirectX 11 (Shader Model 5.0) and OpenGL 4.0 capable
NVIDIA Quadro 2000M with 2 GB dedicated DDR3 video memory
Microsoft DirectX 11 (Shader Model 5.0) and OpenGL 4.0 capable

Display

Internal	15.6-inch diagonal LED-backlit HD+ WVA anti-glare (1600 x 900 resolution) 15.6-inch diagonal LED-backlit FHD WVA anti-glare (1920 x 1080 resolution) 15.6-inch diagonal LED-backlit FHD UWVA anti-glare DreamColor (1920 x 1080 resolution) Ambient Light Sensor Optional HP Privacy Filter
External	Up to 32-bit per pixel color depth DisplayPort 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 VGA port supports resolutions up to 2048 x 1536 at 75 Hz, and lower resolutions at up to 100 Hz DVI-D (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 NOTE: Resolutions are dependent upon monitor capability, and resolution



Standard Features (availability may vary by country)

and color depth settings.

Memory	Standard	DDR3 PC3-10600 SDRAM (1333 MHz) Two or four SODIMM slots supporting dual-channel memory 2 GB, 4 GB, and 8 GB SODIMMs NOTE: Four memory slots only on models with quad-core processor.
	Maximum	Upgradeable to 32 GB with (4) 8 GB SODIMMs
	Dual-channel	Maximized dual-channel performance requires SODIMMs of the same size and speed in both memory slots.

NOTE: Due to the non-industry standard nature of some third-party memory modules, we recommend HP branded memory to ensure compatibility. If you mix memory speeds, the system will perform at the lower memory speed. Full availability of 4 GB 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 Intel 82579LM Gigabit* Network Connection 56K V.92 modem** * The term "10/100/1000" or "Gigabit" Ethernet indicates compatibility with IEEE standard 802.3ab for Gigabit Ethernet, and does not connote actual operating speed of 1 Gb/s. For high-speed transmission, connection to a Gigabit Ethernet server and network infrastructure is required. ** Designed for downloads from 56K modem compliant sources. Maximum achievable download transmission rates currently do not reach 56 KB/s, and will vary with line conditions. Modem availability is subject to country regulatory approval.
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Wireless Devices	Support for a broad range of secure, integrated wireless LAN and wireless WAN options featuring 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 or an after market option. Integrated Bluetooth is also available (factory configurable only) and can be combined with any of the supported wireless LAN and wireless WAN options.
Mobile Broadband options	Two 850/900/1575/1700/1800/1900/2100 MHz antennas integrated in the top of the display panel support current and future WWAN technologies. NOTE: Separately purchased mobile network operator service is required.
HP hs2340 HSPA+ Mobile Broadband Module	Integrated mobile broadband module that provides connectivity to both HSPA and HSPA+ (UMTS) networks. It also provides standalone, Internet and network assisted GPS functionality for various mapping applications and security applications such as Computrace Pro for HP ProtectTools.
HP un2430 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 Pro Premium for HP ProtectTools.



Standard Features (availability may vary by country)

HP Ii2510 EV-DO/LTE Mobile Broadband Module	Integrated mobile broadband module with the latest network technology providing connectivity to both LTE and CDMA (EVDO) networks.
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 Ultimate-N 6300 (3x3)	Integrated support for 802.11a, b, g, and n* 3 transmit, 3 receive antennas Up to 450 mbps data rate
Intel Centrino Advanced-N 6205 (2x2)	Integrated support for 802.11a, b, g, and n* 2 transmit, 2 receive antennas Up to 300 mbps data rate
Atheros HB112AGN 802.11a/b/g/n (3x3) WiFi Adapter	Integrated support for 802.11a, b, g, and n* 3 transmit, 3 receive antennas
HP Integrated Module with Bluetooth 2.1 +EDR Wireless Technology	Bluetooth Specification v2.1 +EDR compliant Works with a wide range of Bluetooth devices

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 a full-pitch key layout with desktop keyboard features, such as editing keys, both left and right control and alt keys, function keys, and 19.05 x 19.05 mm key pitch (center-to-center spacing). U.S. and International key layouts are available. Other features include hot keys for instant access to power conservation and brightness and a separate numeric keypad.

HP DuraKeys	HP DuraKeys is a clear coating applied over the notebook keyboard that helps protect the finish and the printed characters on the keys.
Optional Backlit Keyboard	The optional backlit keyboard for low light environments is toggled on and off with the FN-F12 function key.

Launch Buttons and Function Keys

Separate launch buttons provide easy access to the following features: wireless on/off, volume mute, HP QuickWeb, and calculator launch button. Function keys provide control of the following features: standby mode, external display, volume down, volume up, HP Power Assistant, and display brightness.



Standard Features (availability may vary by country)

Pointing device	Touchpad with on/off button (double-tap to activate/de-activate), two-way scroll, gestures, three pick buttons Pointstick with three additional pointstick buttons
Internal Storage	Hard drives 320/500/750 GB 7200 rpm SMART SATA II 320 GB 7200 rpm SMART SATA II Self Encrypting Drive NOTE: These hard drives are customer removable and will withstand multiple insertion/removal cycles. Up to 15 GB is reserved for the system recovery software. HP 3D DriveGuard (Windows only) 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. Solid State Drive 128/256 GB
Upgrade Bay	Fixed 12.7 mm SATA optical drive Blu-ray R/RE DVD+/-RW SuperMulti DL Drive DVD+/-RW SuperMulti DL Drive DVD-ROM Drive Second hard drive 500 GB 7200 rpm SMART SATA II Hard Drive Supports RAID 1 Mirroring or RAID 0 Striping
Expansion card slots	ExpressCard/54 slot Supports ExpressCard/54 and ExpressCard/34 Integrated Smart Card Reader Compatible with ISO 7816 compliant Smart Cards PC/SC interface support Secure Digital/MMC slot Supports SD (Secure Digital), MMC (MultiMedia Card)
Interfaces	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 3.0 Two USB 2.0 Two (includes one charging port) eSATA/USB 2.0 combo One Docking connector One Secondary battery connector One



Standard Features (availability may vary by country)

Audio/Visual

SRS Premium Sound™
Integrated stereo speakers
Dual-microphone array
Button for volume mute; function keys for volume up and down
Stereo headphone/line out
Stereo microphone/line in

Optional 720p HD webcam

- HD format (widescreen)
 - Supports videoconferencing and still image capture
 - High quality fixed focus lens
 - Video capture at various resolutions up to 1280x720 resolution (720p) and up to 30fps
 - M-JPEG compression supports higher frame rates for video capture and videoconferencing
 - Improved low light sensitivity
 - Improved dynamic range
-

Software

Preinstalled software with Windows operating system

HP Performance Advisor
HP Mobile Display Assistant (with HP DreamColor Technology)
HP Recovery Manager
HP Support Assistant
HP ProtectTools Security Manager
HP ProtectTools for Central Management
HP Hotkey Support
HP QuickWeb
HP Power Assistant
HP Connection Manager 4.0
HP DayStarter
Microsoft Office 2010 preloaded (purchase of a Product Key required to activate a full Office 2010 suite)*
Norton Internet Security 2011**
PDF Complete Special Edition***
Intervideo WinDVD - DVD Player (select models)
Roxio Burn Secure (select models)
Roxio MyDVD 10 SE (select models)
HP Webcam Software (select models)
Skype

Additional software available from the web

HP SoftPaq Download Manager
HP Client Manager Software
HP Client Configuration Management Agent

* 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>.

** Norton Internet Security 2011 includes 60 days of complimentary live updates; subscription required for live updates thereafter. Internet access required to receive updates.

*** PDF Complete Special Edition 60 day trial; purchase license afterwards for full functionality.



Standard Features (availability may vary by country)

Planned Workstation ISV Certifications	MCAD (Mechanical CAD/Architectural Engineering and Construction)	Autodesk AutoCAD Autodesk AutoCAD Mechanical Autodesk AutoCAD Electrical Autodesk Inventor Autodesk AutoCAD Architecture Autodesk AutoCAD Plant3D Autodesk AutoCAD P&ID Autodesk AutoCAD Structural Detailing Autodesk Alias Automotive Autodesk Alias Design Autodesk Alias Surface Autodesk AutoCAD MEP Autodesk AutoCAD Raster Design Autodesk Showcase Autodesk Moldflow Aveva PDMS & Marine Bentley InRoads XM Bentley Microstation Bentley Navigator PTC Creo Elements Direct Dassault Systemes CATIA V5, V6 DS Solidworks ICEM Surf MSC Software MSC.Patran MSC Software SimXpert PTC Pro/ENGINEER Wildfire (Creo Elements Pro & Creo 1.0) SensAble Siemens PLMS NX Siemens PLMS NX I-deas Siemens PLMS Solid Edge Siemens PLMS TeamCenter Visualization Siemens Tecnomatix HSMWorks
	DCC (Digital Content Creation)	Adobe Premiere Adobe After effects Adobe Encore Adobe Photoshop Autodesk 3DS MAX Autodesk MotionBuilder Autodesk Mudbox Autodesk Maya Autodesk SoftImage Avid Media Composer Avid Pro Tools
	GIS (Geographic Information Systems) / Oil and Gas	ESRI ArcGIS Paradigm GoCAD, SKUA Schlumberger Petrel SeismicMicro Technology Kingdom



Standard Features (availability may vary by country)

	Dynamic Graphics Inc. EarthVision, CoVis4D
	Landmark Decision Space Desktop
	Roxar RMS
	Transform TerraSuite
	Headwave Headwave2
	ffA SVI Pro
	Autodesk AutoCAD Map 3D
GIS (Geographic Information Systems) /	Landmark Decision Space Desktop
Oil and Gas (Linux if available)	Paradigm EPOS, GOCAD, SKUA
	Schlumberger GeoFrame
	Dynamic Graphics Inc. EarthVision
	Roxar RMS
	Transform TerraSuite
	Headwave Headwave2
AEC	Autodesk Navisworks Manage
	Autodesk Navisworks Simulate
	Autodesk Navisworks Review
	Autodesk Revit Architecture
	Autodesk Revit MEP
	Autodesk Revit Structure
	Autodesk AutoCAD Civil 3D

NOTE: This is a tentative list, and some certifications may only be completed on specific graphics solutions.

HP Performance Advisor HP Performance Advisor enables optimal configuration of HP Mobile Workstations delivering stability and best performance. HP Performance Advisor will guide your system setup allowing a "custom" configuration that best matches the workstation to user requirements.

HP Recovery Manager 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 20 GB of the hard drive is reserved for the system recovery software.



Standard Features (availability may vary by country)

Security

Standard Features

HP ProtectTools Security Manager (standard modules include)

- Credential Manager
- Computrace* Pro
- Device Access Manager
- Drive Encryption
- Face Recognition (webcam configurations only)
- File Sanitizer
- Privacy Manager
- Embedded Security

HP Fingerprint Sensor
Integrated Smart Card Reader
Enhanced Pre-Boot Security (Multiuser / Multifactor)
HP SpareKey
One-Step Logon
TPM 1.2 Embedded Security Chip**
HP Disk Sanitizer
Security lock slot
Security screw for bottom access door
Support for Intel AT***

Optional Features

HP Privacy Filter

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

Computrace** Pro 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 Mobile Broadband Module.

* 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.

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

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

*** Intel AT security requires a separately purchased Absolute Computrace service subscription and must be activated and configured. Check with Absolute for availability in your country. Intel and HP assume no liability for lost or stolen data and/or systems or any other damages resulting therefrom. See <http://www.intel.com/technology/anti-theft/>



Standard Features (availability may vary by country)

HP ProtectTools Security Manager with Central Management

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 ProtectTools modules are available on the hard drive (also downloadable from the web) and can be configured in Software Setup.

HP ProtectTools is centrally manageable with the capability to manage notebooks from a single point. HP ProtectTools is management ready out of the box, in partnership with Digital Persona. Features address requirements that customers expect from a centrally managed security solution such as user provisioning, credential reset, and credential revocation.

HP ProtectTools provides two separate management solutions, targeted at the enterprise and the SMB:

- Digital Persona Pro AD: Designed for the enterprise customer. Integrates with Active Directory and gives IT Managers the ability to provision users, create login policies based on passwords, biometrics or smartcards. Management features also include remote credential recovery in case the user forgets the password, loses the smartcard or cannot use the fingerprint reader for any reason. In addition, advanced auditing capabilities are also built in. Digital Persona Pro AD is available now.
- Digital Persona Pro Workgroup: Designed for the small business customer. Provides features similar to the Active Directory version, but for workgroups. Workgroup activation is built into HP ProtectTools, and activation of up to 5 seats is completely free.

For more information on Central Management for HP ProtectTools, refer to:
<http://www.hp.com/products/security>.

Power Supply

External HP 120W Smart AC adapter
Slim (148.0 x 75.5 x 25.4mm); Standard (149.5 x 65 x 36mm)

External HP 150W Smart AC adapter
Slim (167.0 x 82.0 x 25.4mm); Standard (167.5 x 70 x 40.5mm)

External HP 200W Smart AC adapter
Slim (172 x 96 x 25.4mm); Standard (170 x 85 x 35mm)

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

Battery

Primary battery	HP 8-cell (83 WHr) Li-Ion battery HP Long Life 8-cell (75 WHr) Li-Ion battery
Secondary battery Options	HP BB09 Ultra Extended Life Notebook Battery (9-cell 100 WHr) HP ST09 Extended Life Notebook Battery (9-cell 73 WHr)



Standard Features (availability may vary by country)

Battery Life	8-cell (83 WHr)	Up to 6 hours and 30 minutes
	with optional HP ST09 Extended Life Notebook Battery	Up to 12 hours and 15 minutes
	with optional HP BB09 Ultra Extended Life Notebook Battery	Up to 14 hours and 45 minutes

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 for additional details.

System Standby Time Up to 1 week

Power Conservation AMD PowerPlay technology
NVIDIA PowerMizer technology
Hibernation
Standby
ACPI compliance

Docking and Stands HP 230W Docking Station
HP 230W Advanced Docking Station
HP USB 2.0 Docking Station
HP Essential USB 2.0 Port Replicator
HP LAN and USB Travel Hub

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.

Service and Support HP Services offers limited 3-year warranty options depending on country. 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 (availability may vary by country)

NOTE: Options/capabilities listed in the QuickSpecs represent those capabilities available through Base Units or Build to Order configurations. The various product features and capabilities will vary in terms of configurable vs. aftermarket options (AMOs). There may be options and capabilities available through CTO that are not available as AMOs.

Memory	HP 2 GB (DDR3 1333 MHz) SODIMM	AT912AA#xxx
	HP 4 GB (DDR3 1333 MHz) SODIMM	AT913AA#xxx
	HP 8 GB (DDR3 1333 MHz) SODIMM	QP013AA#xxx

Storage	HP 250 GB Pocket Media Drive	FE477AA
	HP Mobile USB DVD	XQ543AA
	HP Mobile USB DVDRW	BU516AA
	HP Upgrade Bay SATA 500 GB 7200 rpm Hard Drive	LX733AA#xxx
	HP Primary SATA 500 GB 7200 rpm Hard Drive	AU098AA#xxx
	HP Upgrade Bay DL DVD+/-RW	LZ835AA

Expansion Solutions	HP 230W Docking Station	VB043AA#xxx
	HP 230W Advanced Docking Station	NZ223AA#xxx
	HP USB 2.0 Docking Station	AY052AA#xxx
	HP Essential USB 2.0 Port Replicator	AQ731AA#xxx
	HP LAN and USB Travel Hub	BM868AA#xxx
	HP Display & Notebook Stand	AW662AA#xxx
	HP Adjustable Display Stand	AW663AA#xxx
	HP Adjustable Dual Display Stand	AW664AA#xxx

Power	HP ST09 Extended Life Notebook Battery	QK639AA
	HP BB09 Ultra Extended Life Notebook Battery	QK640AA
	HP VH08XL Long Life Notebook Battery	TBD
	HP 200W Smart AC Adapter	TBD

Carrying Cases	HP Professional Slim Top Load Case	AY530AA
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Security	HP Notebook Combo Lock	AY475AA#xxx
	HP Keyed Cable Lock	BV411AA
	HP 15.6-inch Display Privacy Filter	AU103AA#xxx



Options (availability may vary by country)

Input/Output Devices	HP USB Optical Travel Mouse	RH304AA
	HP USB/PS2 Optical 2-Button Scroll Mouse	DC369A
	HP USB Keyboard & Mouse Bundle	RC465AA#xxx
	HP Notebook Projection Companion	AX325AA#xxx



Technical Specifications

System Unit	Dimensions (HxWxD)	1.36 in (at front)/1.51 in (at rear) x 15.0 in x 10.1 in 34.5 mm (at front)/38.4 mm (at rear) x 382.0 mm x 257.5 mm Height with DreamColor display: 1.44 in / 36.5 mm at front 1.59 in / 40.4 mm at rear
	Weight	Starting at 6.69 lb (3.0 kg) with SSD (no optical drive) Starting at 6.94 lb (3.1 kg) with hard drive and DVD-ROM drive
	NOTE: Height varies depending upon where on the notebook the measurement is made. Weight varies by configuration and components. Weight includes 8-cell battery and WLAN.	
	Stand-Alone Power Requirements (AC Power)	Nominal Operating Voltage 19.5 V Average Operating Power 42 W Max Operating Power < 120 W or < 150 W or < 200 W
	Temperature	Operating 32° to 95° F (0° to 35° C) (not writing optical) 41° to 95° F (5° to 35° C) (writing optical) Non-operating -4° to 140° F (-20° to 60° C)
	Relative Humidity	Operating 10% to 90%, non-condensing Non-operating 5% to 95%, 101.6° F (38.7° C) maximum wet bulb temperature
	Shock	Operating 125 G, 2 ms, half-sine Non-operating 200 G, 2 ms, half-sine
	Random Vibration	Operating 0.75 grms Non-operating 1.50 grms
	Altitude (unpressurized)	Operating -50 to 10,000 ft (-15.24 to 3,048 m) Non-operating -50 to 40,000 ft (-15.24 to 12,192 m)
	Planned Industry Standard Certifications	UL Yes CSA Yes FCC Compliance Yes ENERGY STAR® Select models* EPEAT Gold target** ICES Yes Australia / NZ A-Tick Compliance Yes CCC Yes Japan VCCI Compliance Yes KCC Yes BSMI Yes CE Marking Compliance Yes

* Configurations of the HP EliteBook 8560w that are ENERGY STAR qualified are identified as HP



Technical Specifications

EliteBook 8560w ENERGY STAR on HP websites and on www.energystar.gov.

** EPEAT Registered TBD in U.S. EPEAT registration varies by country. See www.epeat.net for registration status by country.

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

Audio	SRS Premium Sound	
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Hardware	Implementation	IDT 92HD87 High Definition CODEC
	Touch-Sensitive Volume Controls	Volume up, volume down, and mute
	Full Duplex	Yes
	Microphone In	Stereo
	Headphone/Line Out	Stereo
	Integrated Microphone	Yes, dual digital microphone array when equipped with optional webcam

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

Integrated Stereo Speakers	Power Rating	2 Watts
	Impedance	4 Ohms

Power		
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Technical Specifications

HP 200W Slim Smart AC Adapter	Dimensions	6.69 x 3.35 x 1.38 in (17.0 x 8.5 x 3.5 cm)		
	Weight	2.03 lb (920 g)		
	Input	100 to 240 VAC		
		Input Efficiency	87% min at 115 VAC	
		Input frequency range	47 to 63 Hz	
	Output	Input AC current	2.9 A at 90 VAC, 1.45 A at 180 VAC	
		Output power	200W	
		DC output	19.5V	
		Hold-up time	5 msec at 115 VAC input	
		Output current limit	<16A, Over voltage protection- 29V max automatic shutdown	
	Connector	3 pin/grounded, mates with interchangeable cords		
	Environmental Design	Operating temperature	32° to 104° F (0° to 35° 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%	
EMI and Safety Certifications	Storage Humidity	10% to 90%		
	CE Mark- full compliance with LVD and EMC directives; Worldwide safety standards- IEC950, EN60950, UL1950, Class 1, SELV; Agency approvals- C-UL-US, NORDICS, DENAN, EN55022 Class B, FCC Class B, CISPR22 Class B, CCIB, NOM-1 NYCE; MTBF- over 200,000 hours at 25°C ambient condition.			

HP 150W Smart AC Adapter	Dimensions	6.65 x 2.76 x 1.57 in (16.9 x 7.0 x 4.0 cm)		
	Weight	1.54 lb (700 g)		
	Input	100 to 240 VAC		
		Input Efficiency	83% min at 115 VAC	
		Input frequency range	47 to 63 Hz	
	Output	Input AC current	2.2 A at 90 VAC, 1.1 A at 180 VAC	
		Output power	150W	
		DC Output Voltage	19.0V	
		Hold-up time	5 msec at 115 VAC input	
		Output current limit	<15A, Over voltage protection- 29V max automatic shutdown	
	Connector	3 pin/grounded, mates with interchangeable cords		
	Environmental Design	Operating Temperature	32° to 104° F (0° to 35° 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%	



Technical Specifications

	EMI and Safety Certifications	Storage Humidity	10% to 90%	
		CE Mark- full compliance with LVD and EMC directives; Worldwide safety standards- IEC950, EN60950, UL1950, Class 1, SELV; Agency approvals- C-UL-US, NORDICS, DENAN, EN55022 Class B, FCC Class B, CISPR22 Class B, CCIB, NOM-1 NYCE; MTBF- over 200,000 hours at 25°C ambient condition.		
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HP 120W Smart AC Adapter	Weight	1.52 lb (0.69 kg) (adapter)		
		0.29 lb (0.13 kg) (power cord)		
	Dimensions	6.65 x 2.56 x 1.50 in (16.9 x 6.5 x 3.8 cm)		
	Input	Operating Input Voltage	100 to 240 VAC	
		Operating Input Current	PFC Version: 2.20 A at 90 VAC 1.10 A at 180 VAC	
			Non-PFC Version: 2.5 A at 110 VAC 1.25 A at 180 VAC	
		Operating Frequency Range	47 to 63 Hz AC	
	Output	Efficiency	83% minimum at 115 VAC	
		Output power	120 W	
		DC Output Voltage	18.5 V	
	Environmental Design	Operating Temperature	32° to 104° F (0° to 35° C)	
		Non-operating (storage) Temperature	-4° to 149° F (-20° to 65° C)	
		Altitude	0 to 10,000 ft (0 to 3,048 m)	
Humidity		20% to 80%		
	Storage Humidity	10% to 90%		
EMI and Safety Certifications	CE Mark: full compliance with LVD and EMC directives Worldwide safety standards: IEC60950, EN60950, UL60950, Class2, SELV Agency approvals: C-UL-US, NORDICS, DENAN, EN55022 Class B, FCC Class B, CISPR22 Class B, CCC, NOM-1 NYCE, S-Mark, Australian Electric Permit, PSB, eK, BSMI, BNCL, KONCAR, GS, GOST, SASO, SABS, UKRSERTCOMPUTER; MTBF- over 200,000 hours at 25°C ambient condition.			

NOTE: Unless otherwise noted, temperature limits listed in the following component specifications relate to the internal temperatures of these components and not to the environment in which the PC is operating.



Technical Specifications

Optional HP BB09 Ultra Extended Life Notebook Battery	Dimensions (H x W x L)	1.2 x 5.9 x 11.4 in (3x15x29cm)		
	Weight (max)	1.5lb, (.682kg)		
	Cells/Type	Lithium-Ion		
	Energy	Voltage	11.25V	
		Amp-hour capacity	8.85Ah	
		Watt-hour capacity	100Wh	
	Temperature	Operating (Charging)	32° to 113° F (0° to 45° C)	
		Operating (Discharging)	14° to 122° F (-10° to 50° C)	
		Non-operating	-4° to 122° F (-20° to 50° C)	
	Battery Re-Charge Time	System in OFF or Standby Mode	3.5 to 5 hours	
		System ON	4 to 7 hours	
Fuel Gauge LED	Yes			
Warranty	1 year			
Optional Travel Battery Available	NA			

Optional HP ST09 Extended Life Notebook Battery	Dimensions (H x W x L)	1.2 x 6.1 x 12 in (3x15.5x30.5cm)		
	Weight (max)	1.2lb, (.550kg)		
	Cells/Type	Lithium-Ion Polymer		
	Energy	Voltage	11.1V	
		Amp-hour capacity	6.6Ah	
		Watt-hour capacity	73Wh	
	Temperature	Operating (Charging)	32° to 113° F (0° to 45° C)	
		Operating (Discharging)	14° to 122° F (-10° to 50° C)	
		Non-operating	-4° to 122° F (-20° to 50° C)	
	Battery Re-Charge Time	System in OFF or Standby Mode	3.5 to 5 hours	
		System ON	4 to 7 hours	
Fuel Gauge LED	Yes			
Warranty	1 year			
Optional Travel Battery Available	NA			

Displays



Technical Specifications

15.6-inch FHD WVA LED 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	220 nit typical		
	Pixel Resolution	Pitch	0.17925 mm x 0.17925 mm	
		Format	1920x1080	
		Configuration	RGB Stripe	
	Backlight	LED		
	PPI	142		
	Viewing Angle	±60° Horizontal, ±50° Vertical (minimum) 60/60/50/50 (Left/Right/Down/Up) (minimum)		

15.6-inch LED FHD UWVA (1920 x 1080) anti-glare DreamColor	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	800:1 (min)		
	Refresh Rate	48 Hz, 50 Hz and 60 Hz		
	Brightness	210 nits (Typ)		
	Pixel Resolution	Pitch	0.179 mm x 0.179 mm	
		Format	1920 x 1080	
		Configuration	RGB Strip	
	Backlight	RGB LED		
	PPI	142		
	Viewing Angle	±89° Horizontal, ±89° Vertical (typical)		
	Technology Type	30-bit In-Plane Switching (IPS)		
	Color Depth	10-bits/color		
	Display Colors	Over 1 billion colors (native mode)		
	Color Gamut Coverage	CIE1931 (x,y)	CIE 1976 (u',v')	
NTSC		109%	129%	
AdobeRGB		114%	127%	
sRGB	154%	148%		



Technical Specifications

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)		

Internal Storage

750 GB 7200 rpm SATA Hard Drive	Drive Weight	0.25 lbs (115g)	
	Capacity	750 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	Synchronous (maximum)	300 MB/s (Drive Capability)
	Seek Time (typical reads, including settling)	Single Track	1.5 ms
		Average	11 ms
		Maximum	22 ms
	Rotational Speed	7200 rpm	
Logical Blocks	1,465,149,168		
Operating Temperature	32° to 140° F (0° to 60° C) [case temp]		
Features	ATA Security		



Technical Specifications

500 GB 7200 rpm SATA Hard Drive	Drive Weight	0.25 lbs (115g)	
	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	Synchronous (maximum)	300 MB/s (Drive Capability)
	Seek Time (typical reads, including settling)	Single Track	1.5 ms
		Average	11 ms
		Maximum	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		

320 GB 7200 rpm SATA Hard Drive	Drive Weight	0.25 lbs (115 g)	
	Capacity	320 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	Synchronous (maximum)	300 MB/s (Drive Capability)
	Seek Time (typical reads, including settling)	Single Track	1.5 ms
		Average	11 ms
		Maximum	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		

256 GB 2.5-inch SATA Solid State Drive	Drive Weight	73 Grams (Max)			
	Capacity	128 GB			
	Height	0.276 in (7 mm)			
	Width	2.76 in (70 mm)			
	Interface	SATA Gen 2			
	Performance	Maximum Sequential Read	Up to 265 MB/s	Maximum Sequential Write	Up to 220 MB/s
		Logical Blocks	500,118,192		
	Operating Temperature	32° to 158°F (0° to 70°C) [case temp]			
	Features	ATA Security; ATA-7compliant ;SATA 2.6; DIPM; TRIM			



Technical Specifications

128 GB 2.5-inch SATA Solid State Drive	Drive Weight	75 Grams	
	Capacity	128 GB	
	Height	0.276 in (7 mm)	
	Width	2.76 in (70 mm)	
	Interface	SATA Gen 2	
	Performance	Maximum Sequential Read	Maximum Sequential Write
		250 MB/s	140 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; TRIM	

Optical Drives

DVD-ROM Drive	Access Times	Random	< 140 ms CD (typical) < 160 ms DVD (typical)
	Max Data Transfer Rate	24X CD-ROM 8X-DVD	
	Transfer Mode	UDMA Mode 5	
	Interface	Gen 1 SATA	
	Supported Media (read)	CD-DA, 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)	8.5GB	
	Transport	Tray Loading	



Technical Specifications

DVD+/-RW SuperMulti DL Drive	Access Times	Random	< 140ms CD (typical) < 160 ms DVD (typical)
	Max Data Transfer Rate	24X CD-ROM 8X DVD 24X CD-R 24X CD-RW 8X DVD+R 8X DVD+RW 8X DVD-R 6X DVD-RW 6X - DVD+R Dual Layer 6X - DVD-R Dual Layer 5X DVD-RAM	
	Transfer Mode	UDMA Mode 5	
	Interface	Gen 1 SATA	
	Supported Media (read)	CD-DA, 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, DVD+R DL, DVD-R DL	
	Max Media Capacity (read)	8.5 GB	
	Max Media Capacity (write)	8.5 GB	
	Transport	Tray Loading	

Blu-ray R/RE DVD+/-RW SuperMulti DL Drive	Access Times	Random	< 165 ms CD-ROM (typical) < 185 ms DVD-ROM (typical) < 205 ms BD-ROM (typical)
	Max Data Transfer Rate	24X CD-ROM 8X DVD-ROM 24X CD-R 16X CD-RW 8X DVD+R 8X DVD+RW 8X DVD-R 6X DVD-RW 6X DVD+R Dual Layer 6X DVD-R Dual Layer 5X DVD-RAM	



Technical Specifications

	6X BD-ROM
	6X BD-R
	2X BD-RE
Transfer Mode	UDMA Mode 5
Interface	Gen 1 SATA
Supported Media (read)	CD-DA, , 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
Supported Media (write)	CD-R, CD-RW, DVD+R, DVD+R DL, DVD+RW, DVD-R, DVD-R DL, DVD-RW, DVD-RAM, BD-R, BD-RE
Max Media Capacity (read)	50.0 GB
Max Media Capacity (write)	50.0 GB
Transport	Tray Loading

Security

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

Communications



Technical Specifications

Intel® 82579LM Gigabit Ethernet Features Network Connection

10 Mbit/s operation (10BASE-T; IEEE 802.3i; IEEE 802.3 clauses 13-14)
100 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 802.3ab; IEEE 802.3. Clauses 40)
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 802.1q VLAN support
IEEE 802.3x Flow Control (IEEE 802.3 clauses 31-32; configurable)
IEEE 802.3az EEE(Energy Efficient Ethernet)
Jumbo Frame 9K
Auto MDI/MDIX Crossover cable detection

Power Management Performance Features

ACPI compliant - multiple power modes
Energy Detect Low Power Mode(Green Ethernet)
TCP/IP/UDP Checksum Offload (configurable)
Protocol Offload(ARP & NS)
Large send offload and Giant send offload
Receiving Side Scaling
MACSec Offload (802.3ae)
Intel vPro
iSCSI Boot

Manageability

Wake-on-LAN from standby and hibernation (Magic Packet and Microsoft Wake-Up Frame); Wake-on-LAN from off (Magic Packet only)
PXE 2.1 Remote Boot
Statistics Gathering (SNMP MIB II, Ethernet-like MIB, Ethernet MIB (802.3x, clause 30))
Comprehensive diagnostic and configuration software suite
Virtual Cable Doctor for Ethernet cable status

Interface

PCI Express 1.1 x1 to fully support ASPM L0s/L1 and CLKREQ.

NOTE: Intel 82579 PCIe interface is not PCIe compliant. It operates at half of PCIe specification V1.1 (2.5GT/S) speed.

NIC Device Driver Name Intel 82579LM/82579V Ethernet Network Connection



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) 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	

HP un2430 EV-DO/HSPA Mobile Broadband Module	Technology/Operating Bands	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), AWS (UTRA FDD Band IV), 900MHz(UTRA FDD Band VIII), 850MHz (UTRA FDD Band V)
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Technical Specifications

Wireless Protocol Standards	1xEVDO/1xRTT with receive diversity: 850MHz (Band Class0-Cell), 1900MHz (Band Class1-PCS) GSM/GPRS/EDGE: Class A, Multi-slot class 10 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-856, IS-2000
Wireless Parametric Standards	Meets or exceeds TIA/EIA IS-98-D
Maximum Data Rates	UMTS (HSPA) - 14.4 Mbps (Download), 5.76Mbps (Upload) CDMA (EVDO Release A) - 3.1 Mbps (Download), 1.8Mbps (Upload)
GPS	Standalone GPS enabled gpsOneXTRATM™
GPS Bands	L1 - 1575.42 MHz
Maximum Output Power	GSM/GPRS/EDGE: 32dBm (+/-1) WCDMA: 24dBm (+0.7/-2.3) CDMA: 24dBm (+0.7/-2)
Maximum Power Consumption	2750mA (peak); 1100mA (average)
Power Consumption, Idle Not Connected	20 mA
Power Management	USB selective suspend Integrated notebook wireless button
Antenna Type	Dual high efficiency 5 band antennae with spatial diversity, mounted in the display enclosure
Form Factor	PCI-Express MiniCard, USB 2.0 interface
Weight	11.5 g
Dimensions (Length x Width x Thickness)	2.01 x 1.18 x 0.18 in (51 x 30 x 5 mm)
Voltage, Operating	3.3v +/- 10%
Temperature, Operating (from TIA/EIA/IS-98-D)	-22° to 158° F (-30° to 70° C) (full RF performance) -22° to 167° F (-30° to 75° C) (reduced RF performance)
Temperature, Non-operating, 96 hours (from MIL-STD 202 Method 108)	-40° to 185° F (-40° to 85° C)
Humidity, Non-operating	95% relative humidity for 48 hours @ 185° F (85° C) (non-condensing)
Configuration Utilities	HP Connection Manager
LED Activity	LED Off - Radio Off; Solid LED On - Radio On

HP hs2340 HSPA+ Mobile Broadband Module

Technology/Operating Bands	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), 850 MHz
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Technical Specifications

Wireless Protocol Standards	(UTRA FDD Band V) GSM/GPRS/EDGE: Class B, Multi-slot class 10 operation, coding schemes CS1 - CS4 and MSC1 - MSC9. UMTS/WCDMA: Release 99 and Release 7 Advanced Receiver Type 3i
Wireless Parametric Standards	Complies with 3GPP specifications
Maximum Data Rates	UMTS (HSPA) - 21 Mbps (Download), 5.76Mbps (Upload)
GPS	Standalone, A-GPS (Internet- and Network assisted)
GPS Bands	1575.42 MHz (\pm 1.023 MHz)
Maximum Output Power	GSM/EDGE GSM850 & GSM900 bands GPRS: +33 dBm \pm 2 dBm (class 4) EGPRS: +27 dBm \pm 3 dBm (class E2) DCS1800 & PCS1900 bands GPRS: +30 dBm \pm 2 dBm (class 1) EGPRS: +26 dBm +4 / -3 dBm (class E2) UMTS UTRA FDD Bands +24 dBm +4 / -3 dBm (class 3)
Maximum Power Consumption	2000mA (peak); 600mA (average)
Power Consumption, Sleep Mode	5 mA
Power Management	USB selective suspend Integrated notebook wireless button
Antenna Type	Dual high efficiency 5 band antennae with spatial diversity, mounted in the display enclosure
Form Factor	PCI-Express MiniCard, USB 2.0 interface
Weight	< 12 g
Dimensions (Length x Width x Thickness)	2.01 x 1.18 x 0.18 in (51 x 30 x 5 mm)
Voltage, Operating	3.3v +/- 9%
Temperature, Operating	14° to 149° F (-10° to 65° C) (full RF performance) 14° to 167° F (-10° to 75° C) (reduced RF performance)
Temperature, Non-operating, 96 hours (from MIL-STD 202 Method 108)	-22° to 185° F (-30° to 85° C)
Humidity, Non-operating	85% relative humidity for 48 hours @ 185° F (85° C) (non-condensing)
Configuration Utilities	HP Connection Manager
LED Activity	LED Off - Radio Off; Solid LED On - Radio On



Technical Specifications

HP Ic2010 Mobile Broadband Module	Technology/Operating Bands	GSM/GPRS/EDGE: 850MHz(Cell), 900MHz(EGSM), 1800MHz(DCS), 1900MHz (PCS) UMTS/WCDMA with receive diversity: 2100MHz (UTRA FDD Band I), 900MHz(UTRA FDD Band VIII)
	Wireless Protocol Standards	GSM/GPRS/EDGE: Class B, Multi-slot class 10 operation, coding schemes CS1 - CS4 and MSC1 - MSC9. UMTS/WCDMA: Release 99 and Release 6
	Wireless Parametric Standards	Complies with 3GPP specifications
	Maximum Data Rates	UMTS (HSPA) - 7.2 Mbps (Download), 2.0Mbps (Upload)
	GPS	n/a
	GPS Bands	
	Maximum Output Power	GSM/GPRS/EDGE: 32dBm (+/-1) WCDMA: 23dBm (+/-1)
	Maximum Power Consumption	2000mA (peak); 600mA (average)
	Power Consumption, Sleep Mode	5 mA
	Power Management	USB selective suspend Integrated notebook wireless button
	Antenna Type	Dual high efficiency 5 band antennae with spatial diversity, mounted in the display enclosure
	Form Factor	PCI-Express MiniCard, USB 2.0 interface
	Weight	< 10 g
	Dimensions (Length x Width x Thickness)	2.01 x 1.18 x 0.18 in (51 x 30 x 5 mm)
	Voltage, Operating	3.3v +/- 10%
	Temperature, Operating	14° to 149° F (-10° to 65° C) (full RF performance) 14° to 167° F (-10° to 75° C) (reduced RF performance)
	Temperature, Non-operating, 96 hours (from MIL-STD 202 Method 108)	-22° to 185° F (-30° to 85° C)
	Humidity, Non-operating	85% relative humidity for 48 hours @ 185° F (85° C) (non-condensing)
	Configuration Utilities	HP Connection Manager
	LED Activity	LED Off - Radio Off; Solid LED On - Radio On

Intel Centrino Advanced-N 6205	Wireless LAN Standards	IEEE 802.11a IEEE 802.11b IEEE 802.11g IEEE 802.11n*
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Technical Specifications

	<p>* In countries where 802.11n is not allowed, this capability is not enabled.</p>
Interoperability	Wi-Fi certified Cisco Compatible Extensions Program compliant with Microsoft Windows Vista and XP (details at: http://www.hp.com/go/notebooks/WLAN)
Frequency Band	2.4 GHz and 5GHz
Antenna Structure	2 transmit; 2 receive (2x2)
Data Rates	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
Modulation	Direct Sequence Spread Spectrum DBPSK, DQPSK, CCK, OFDM, BPSK, QPSK, 16-QAM, 64-QAM
Security¹	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.
Sub-channels	Multinational support with frequency bands and channels compliant to local regulations.
Media Access Protocol	CSMA/CA (Collision Avoidance) with ACK
Network Architecture Models	Ad-hoc (Peer to Peer) Infrastructure (Access Point Required)
Roaming	IEEE 802.11 compliant roaming between 2.4GHz band Access Points
Output Power (for CCK and OFDM)²	17 dBm max
Power Consumption	Transmit: 2.3 Watts (max, with two spatial streams) Receive: 1 Watt (max with two spatial streams) Idle mode ³ : 35 mW (average) Radio off: 20 mW (max)
Power Management	ACPI compliant power management 802.11 compliant power saving mode
Receiver Sensitivity⁴	54 Mbps: -76 dBm, 6 Mbps: -92 dBm
Antenna Connections	2 U.FL type connectors, 50 ohm nominal impedance
Form Factor	PCI-Express Half-MiniCard
Weight	0.0075 lb (3.4 g)
Dimensions	0.12 x 1.06 x 1.18 in (3.1 x 26.8 x 30.0 mm)
Operating Voltage	3.3V +/- 9%



Technical Specifications

Temperature	Operating	32° to 176° F (0° to 80° C)
	Non-operating	-40° to 176° F (-40° to 80° C)
Humidity	Operating	10% to 90% (non-condensing)
	Non-operating	5% to 90% (non-condensing)
Altitude	Operating	0 to 10,000 ft (3,048 m)
	Non-operating	0 to 50,000 ft (15,240 m)
LED Activity	LED Off - Radio OFF; Solid LED On - Radio ON	

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

Intel Centrino Ultimate-N Wireless LAN Standards 6300

IEEE 802.11a
IEEE 802.11b
IEEE 802.11g
IEEE 802.11n*

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

Interoperability	Wi-Fi certified (802.11bgn only) Cisco Compatible Extensions Program compliant (802.11bgn only) with Microsoft Windows Vista and XP (details at: http://www.hp.com/go/notebooks/WLAN)
Frequency Band	2.4 GHz and 5GHz
Antenna Structure	3 transmit; 3 receive (3x3)
Data Rates	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: many possible data rates, ranging from 6 Mbps to 450 Mbps, depending on the combination of Bandwidth, Modulation Coding Scheme, and Guard Interval used, as defined in IEEE 802.11n specification
Modulation	Direct Sequence Spread Spectrum DBPSK, DQPSK, CCK, OFDM, BPSK, QPSK, 16-QAM, 64-QAM
Security¹	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.



Technical Specifications

Sub-channels	Multinational support with frequency bands and channels compliant to local regulations.
Media Access Protocol	CSMA/CA (Collision Avoidance) with ACK
Network Architecture Models	Ad-hoc (Peer to Peer) Infrastructure (Access Point Required)
Roaming	IEEE 802.11 compliant roaming between Access Points
Output Power (for CCK and OFDM) ²	17 dBm max
Power Consumption	Transmit: 2.4 Watts (max, with three spatial streams) Receive: 1.4 Watts (max with three spatial streams) Idle mode ³ : 35 mW (average) Radio off: 20 mW (max)
Power Management	ACPI compliant power management 802.11 compliant power saving mode
Receiver Sensitivity ⁴	54 Mbps: -76 dBm, 6 Mbps: -92 dBm
Antenna Connections	3 U.FL type connectors, 50 ohm nominal impedance
Form Factor	PCI-Express Half-MiniCard
Weight	0.0075 lb (3.4 g)
Dimensions	0.12 x 1.06 x 1.18 in (3.1 x 26.8 x 30.0 mm)
Operating Voltage	3.3V +/- 9%
Temperature	Operating 32° to 176° F (0° to 80° C) Non-operating -40° to 176° F (-40° to 80° C)
Humidity	Operating 10% to 90% (non-condensing) Non-operating 5% to 90% (non-condensing)
Altitude	Operating 0 to 10,000 ft (3,048 m) Non-operating 0 to 50,000 ft (15,240 m)
LED Activity	LED Off - Radio OFF; Solid LED On - Radio ON

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

Atheros HB112AGN 802.11a/b/g/n 3x3 WiFi Adapter	Wireless LAN Standards	IEEE802.11a IEEE 802.11b IEEE 802.11g IEEE 802.11n
	Interoperability	Wi-Fi certified
	Frequency Band	2.4 GHz and 5GHz



Technical Specifications

Data Rates	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: many possible data rates, ranging from 6 Mbps to 450 Mbps, depending on the combination of Bandwidth, Modulation Coding Scheme, and Guard Interval used, as defined in IEEE 802.11n specification
Modulation	Direct Sequence Spread Spectrum DBPSK, DQPSK, CCK, OFDM, BPSK, QPSK, 16-QAM, 64-QAM
Security¹	Supports 64- and 128-bit WEP, WPA, WPA2, hardware-accelerated AES, 802.1x authentication types EAP-TLS, EAP-TTLS, PEAP-GTC, PEAP-MSCHAPv2, LEAP, EAP-FAST.
Sub-channels	Multinational support with frequency bands and channels compliant to local regulations.
Media Access Protocol	CSMA/CA (Collision Avoidance) with ACK
Network Architecture Models	Ad-hoc (Peer to Peer) Infrastructure (Access Point Required)
Roaming	IEEE 802.11 compliant roaming between access points
Output Power (for CCK and OFDM) ²	17 dBm, nominal
Output Power (for OFDM; power varies by data rate) ²	15 dBm, nominal
Power Consumption	Transmit: 2.0 W (max) Receive: 1.5 W (max) Associated to Access Point, Idle: 300 mW nominal Wireless Button Off: 75 mW nominal
Power Management	ACPI compliant power management 802.11 compliant power saving mode
Receiver Sensitivity³	54 Mbps: -75 dBm, 11 Mbps: -88 dBm, 1 Mbps: -93 dBm
Antenna type	High efficiency antenna with spatial diversity, mounted in the display enclosure
Form Factor	PCI-Express Half-MiniCard
Weight	0.013 lb (6 g)
Dimensions	0.19 x 1.06 x 1.18 in (4.75 x 26.8 x 30 mm)
Operating Voltage	3.3v +/- 9%
Temperature	Operating 14° to 149° F (-10° to 65° C) Non-operating -40° to 176° F (-40° to 80° C)
Humidity	Operating 10% to 90% (non-condensing) Non-operating 5% to 95% (non-condensing)
Altitude	Operating 0 to 10,000 ft (3,048 m) Non-operating 0 to 50,000 ft (15,240 m)
LED Activity	LED Off - Radio OFF; Solid LED On - Radio ON



Technical Specifications

1. Check latest software/driver release for updates on supported security features.
2. Maximum output power may vary by country according to local regulations.
3. Receiver sensitivity is measured at a packet error rate of 8% for 802.11b (CKK modulation) and a packet error rate of 10% for 802.11a/g (OFDM modulation).

HP Integrated Module with Bluetooth 2.1+EDR Wireless Technology	Bluetooth Specification	2.1+EDR Compliant		
	Dimensions	1.18 x 0.26 x 0.13 in (30 x 6.5 x 3.25 mm)		
	Frequency Band	2402 to 2480 MHz		
	Number of Available Channels	79 (1 MHz) available channels		
	Data Rates and Throughput	3 Mbps data rate; throughput up to 2.17 Mbps Synchronous Connection Oriented links up to 3, 64 kbps, voice channels Asynchronous Connection Less links 2178.1 kbps/177.1 kbps asymmetric or 1306.9 kbps symmetric		
	Transmit Power	-6 dBm to 4 dBm (Bluetooth Class II)		
	Receiver Sensitivity	Better than -80 dBm at 0.1 % raw bit error rate		
	Power Consumption	Peak (Tx) 264 mW Peak (Rx) 231 mW Sleep <1 mW		
	Antenna	Internally integrated within module		
	Range	Up 33 ft (10 m)		
	Electrical Interface	USB 2.0 compliant Microsoft Windows Plug and Play compliant		
	Bluetooth Software Supported	Broadcom Bluetooth for Windows Microsoft Windows Bluetooth Software		
	Link Topology	Point to Point, Multipoint Pico Nets up to 7 slaves		
	Security	Full support of Bluetooth Security Provisions		
	Power Management	Microsoft Windows ACPI, and USB Bus Support Self configurable to optimize power conservation in all operating modes, including Standby, Hold, Park, and Sniff		
	Certifications	All necessary regulatory approvals for supported countries, including: FCC (47 CFR) Part 15C, Section 15.247 & 15.249 ETS 300 328, ETS 300 826 Low Voltage Directive IEC950 UL, CSA, and CE Mark		
	Temperature	Operating	-4° to 158° F (-20° to 70° C)	
		Non-operating	-40° to 176° F (-40° to 80° C)	
	Humidity	Operating	10% to 90%	
		Non-operating	5% to 95%	
Altitude	Operating	15,000 ft (4,572 m)		
	Non-operating	40,000 ft (12,192 m)		



Technical Specifications

Bluetooth Profiles Supported	Serial Port Profile (SPP) ¹
	Service Discovery Application Profile (SDAP)
	Dial-Up Networking (DUN) ^{1,2}
	Generic Object Exchange Profile (GOEP) ^{1,2}
	Object Push Profile (OPP) ^{1,2}
	File Transfer Profile (FTP)
	Synchronization Profile (SYNC)
	Hard Copy Cable Replacement (HCRP) ^{1,2}
	Personal Area Networking Profile (PAN) ^{1,2}
	Human Interface Device Profile (HID) ^{1,2,3}
	FAX Profile (FAX)
	Basic Imaging Profile (BIP) ²
	Headset Profile (HSP)
	Hands Free Profile (HFP)
Advanced Audio Distribution Profile (A2DP)	

1. indicates the profile is supported by Microsoft Windows XP SP2
2. 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 STAR®
- IT ECO declaration
- EPEAT - Gold where HP registers commercial notebook products. See <http://www.epeat.net> for registration status in your country.

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"

Energy Consumption	115 VAC	230 VAC	100 VAC
Normal Operation	15.34 W	15.44 W	15.29 W
Sleep (Energy Star low power mode)	1.56 W	1.63 W	1.55 W
Off	0.92 W	0.99 W	0.94 W
Heat Dissipation*	115 VAC	230 VAC	100 VAC
Normal Operation	52 BTU/hr	53 BTU/hr	52 BTU/hr
Sleep	5 BTU/hr	6 BTU/hr	5 BTU/hr
Off	3 BTU/hr	3 BTU/hr	3 BTU/hr

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

Declared Noise Emissions



Technical Specifications

(in accordance with ISO 7779 and ISO 9296)

System Fan Off	Sound Power (LWAd, bels)	Sound Pressure (LpAm, decibels)
Idle	2.9	23
Fixed Disk (random writes)	4.1	33

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 Gold level, see 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 95.2% recycle-able when properly disposed of at end of life.

Packaging Materials

- External:
 - Paper / Cardboard 600 g
- Internal:
 - Polyethylene low density 22 g
 - PET 18 g
- The Paper / Cardboard packaging material is made from 80% recycled content.
- The PET packaging material is made from 80% recycled content.



Technical Specifications

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

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

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

Material Usage

This product does not contain any of the following substances in excess of regulatory limits (for reference of these limits please refer to the HP General Specification of the Environment:

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

- Asbestos
- Certain Azo Colorants
- Certain Brominated Flame Retardants - may not be used as flame retardants in plastics
- Cadmium
- Chlorinated Hydrocarbons
- Chlorinated Paraffins
- Formaldehyde
- Halogenated Diphenyl Methanes
- Lead carbonates and sulfates
- Lead and Lead compounds
- Mercuric Oxide Batteries
- 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 μ grams/cm²/week, measured according to EN 1811:1998, are not used on any product surface designed



Technical Specifications

	to be frequently handled or touched by users.
End-of-life Management and Recycling	Hewlett-Packard offers end-of-life HP product return and recycling programs in many geographic areas. To recycle your product, please go to: http://www.hp.com/go/reuse-recycle or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner.
	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: http://www.hp.com/go/recyclers . 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.
Hewlett-Packard Corporate Environmental Information	For more information about HP's commitment to the environment: Global Citizenship Report http://www.hp.com/hpinfo/globalcitizenship/gcreport/index.html Environment website http://www.hp.com/environment Eco-label certifications http://www.hp.com/hpinfo/globalcitizenship/environment/productdesign/ecolabels.html ISO 14001 certificates: http://www.hp.com/hpinfo/globalcitizenship/environment/operations/envmanagement.html

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