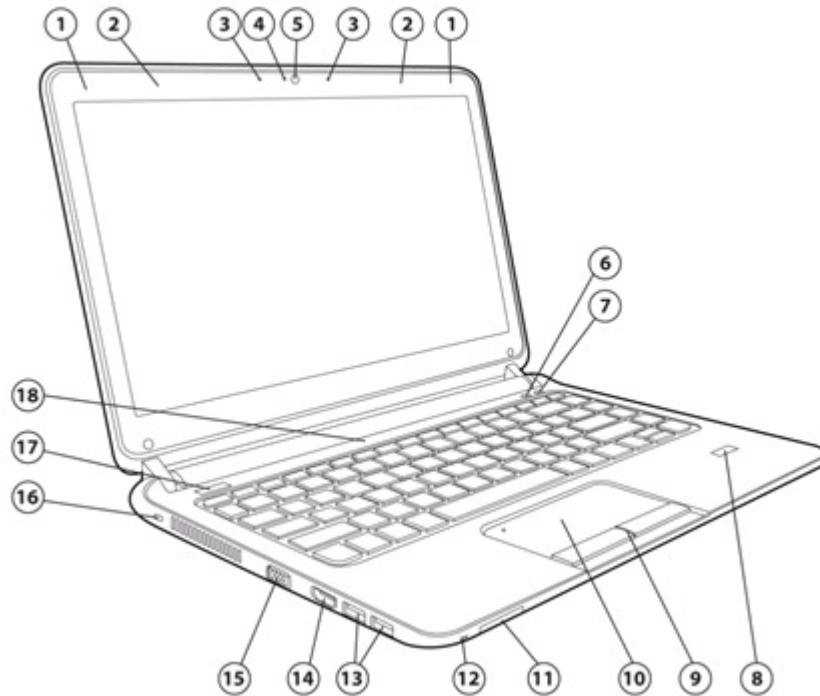


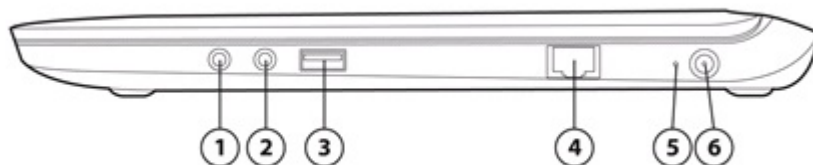
### Overview



- |  |                                       |
|--|---------------------------------------|
| 1. WWAN antennas (2)* (select models only) | 10. Touchpad                          |
| 2. WLAN antennas**                         | 11. Media Card Reader                 |
| 3. Internal microphones (2)                | 12. Hard drive activity LED indicator |
| 4. Webcam light                            | 13. USB 3.0 ports (2)                 |
| 5. Webcam                                  | 14. HDMI port                         |
| 6. Wireless on/off button                  | 15. VGA monitor port                  |
| 7. Speaker mute button                     | 16. Security lock slot                |
| 8. Optional HP Fingerprint Reader          | 17. Power button                      |
| 9. Touchpad pick buttons                   | 18. Speakers (2)                      |

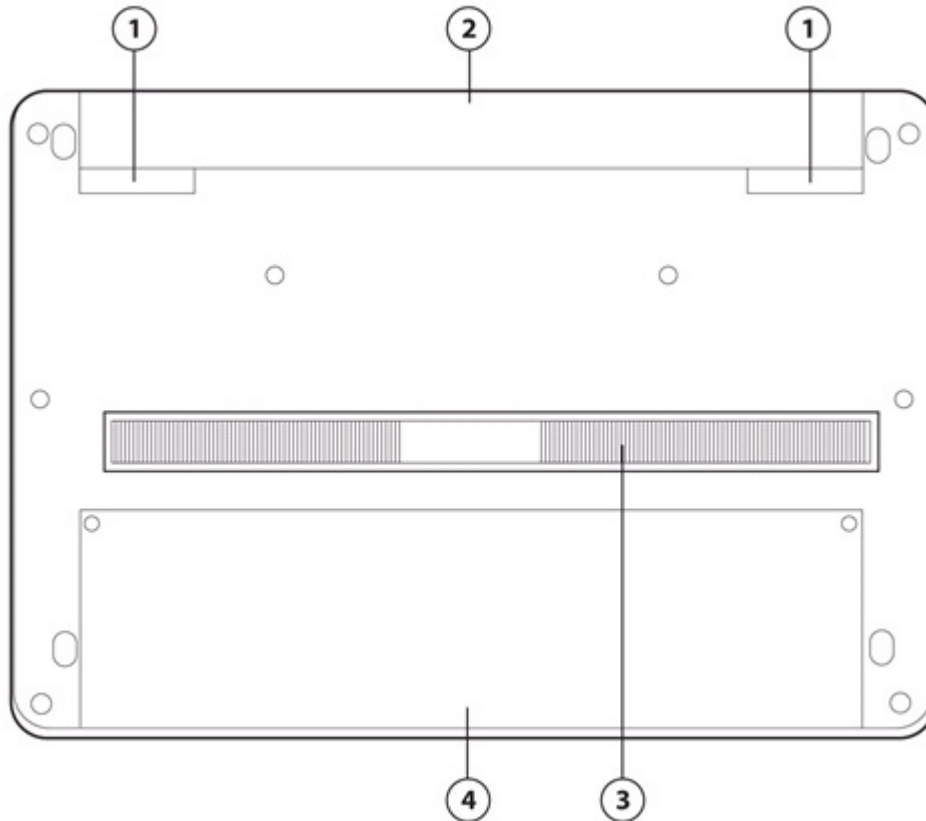
\* The antennas are not visible from the outside of the computer. For optimal transmission, keep the areas immediately around the antennas free from obstructions.

\*\*The number of WLAN antennas in the displays is determined by the WLAN selected.



- |                               |                             |
|-------------------------------|-----------------------------|
| 1. Audio-out (headphone) jack | 4. RJ-45 (network) jack     |
| 2. Audio-in (microphone) jack | 5. AC Adapter/battery light |
| 3. USB 2.0 port               | 6. Power connector          |

### Overview



1. Battery and service door release latches
2. Battery
3. Vents
4. Service door

### At A Glance

- Windows 8 versions, SUSE Linux, or FreeDOS
- Lighter, durable multi-layer soft touch paint and aluminum palmrest help keep system looking good longer
- Full-sized spill-resistant keyboard
- Larger Touchpad with gestures support, on/off button with LED indicator
- Enhanced security features including HP Client Security, optional HP Fingerprint Reader
- Embedded HD webcam with dual-microphone array for video conferencing
- HDMI port for connecting to high-resolution displays; USB 3.0 port
- DTS Sound+ optimized for high fidelity audio
- Widescreen LED-backlit HD display with 16:9 aspect ratio with 13.3 -inch diagonal HD screen
- Choice of 4<sup>th</sup> generation Intel® Dual-Core™ i7, i5, and i3 processors
- Wireless and speaker mute button to conveniently manage the connectivity and speaker.
- Flexible wireless connectivity options:
  - Integrated HP Mobile Broadband Module
  - Integrated 802.11 b/g/n wireless LAN module\*
  - Integrated 802.11 a/b/g/n or b/g/n with Bluetooth 4.0 card\*

## Overview

\* Sold separately or as an optional feature

### Features

#### PRODUCT NAME

HP ProBook 430 G1 Notebook PC

#### OPERATING SYSTEM

<b>Preinstalled</b>	Windows 8 Pro 64*
	Windows 7 Professional (available through downgrade rights from Windows 8 Pro)**
	Windows 8 64*
	Windows 7 Professional 64***
	Windows 7 Home Premium 64***
	Windows 7 Home Basic 64***
	SUSE Linux Enterprise Desktop 11
	FreeDOS

\* Not all features are available in all editions of Windows 8. Systems may require upgraded and/or separately purchased hardware, drivers and/or software to take full advantage of Windows 8 functionality. See <http://www.microsoft.com> for details.

\*\* This system is preinstalled with Windows® 7 Pro software and also comes with a license and media for Windows 8 Pro software. You may only use one version of the Windows software at a time. Switching between versions will require you to uninstall one version and install the other version. You must back up all data (files, photos, etc.) before uninstalling and installing operating systems to avoid loss of your data.

\*\*\* Not all features are available in all editions of Windows 7. This system may require upgraded and/or separately purchased hardware to take full advantage of Windows 7 functionality. See <http://www.microsoft.com/windows/windows-7/> for details.

**NOTE:** Windows 8 downgrade and Windows 7 will be available in Sep 13'.

#### PROCESSOR

##### 4<sup>th</sup> generation Intel® Core Processors

\* Multi-Core is designed to improve performance of certain software products. Not all customers or software applications will necessarily benefit from use of this technology. 64-bit computing on Intel® architecture requires a computer system with a processor, chipset, BIOS, operating system, device drivers, and applications enabled for Intel® 64 architecture. Processors will not operate (including 32-bit operation) without an Intel® 64 architecture-enabled BIOS. Performance will vary depending on your hardware and software configurations. 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.

#### GRAPHICS

Integrated graphics

### Features

#### DISPLAY

**Internal**

13.3" diagonal HD LED-backlit anti-glare (1366 x 768)

**External**

Up to 32-bit per pixel color depth

**VGA**

Port supports resolutions up to 2048 x 1536 external resolution @75 Hz

**HDMI**

Supports direct connection to high-definition displays with up to 1920 x 1200@60Hz resolution and 7-channel audio with one convenient cable (not included)

**NOTE:** HD content required to view HD images.

**NOTE:** Resolutions are dependent upon monitor capability, and resolution and color depth settings.

#### STORAGE AND DRIVES

**Hard Drives**

320/500GB 5400 rpm SMART SATA II HDD;

500 GB 7200 rpm SMART SATA II HDD

**Solid State Drives**

120 GB M.2 Solid State Drive\*

128 GB 2.5" Solid State Drive

**HP 3D DriveGuard (Windows only)**

The hard drive is mounted directly to the notebook frame, reducing the transmission of shock to the hard drive

\* Available in Fall 2013

**NOTE:** For hard drives, GB = 1 billion bytes. Actual formatted capacity is less. Up to 16 GB (for Windows 7) and 36 GB (for Windows 8) of system disk is reserved for the system recovery software.

**NOTE:** For Solid State Drives (SSD), GB=1 billion bytes. Actual formatted capacity is less. Up to 30 GB for Windows 8 is reserved for system recovery software.

#### OPTICAL DRIVES

External Optical Disk Drive

### Features

#### MEMORY

##### Standard

DDR3L 1.35V SDRAM (1600 MHz)  
Two SODIMM slots supporting dual-channel memory  
2 GB, 4 GB, and 8 GB SODIMMs

##### Maximum

Upgradeable to 16384 MB with optional 8192 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.

**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. With Windows Starter 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.

#### NETWORKING/COMMUNICATIONS

##### Wireless

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.

##### Broadband Wireless (WWAN)

HP hs3110 HSPA+ Mobile Broadband Module\*  
HP lt4112 LTE/HSPA+ Gobi 4G\*\* Module\*

##### Wireless LAN (WLAN)

Realtek 802.11 b/g/n (1x1)\*  
Mediatek 802.11 b/g/n (1x1) with Bluetooth® v4.0 combo\*  
Broadcom 802.11 a/b/g/n (2x2) with Bluetooth® v4.0 combo\*  
Intel Dual Band Wireless-AC 3160 802.11 a/b/g/n/ac (1x1) WiFi with Bluetooth 4.0 combo  
Intel Dual Band Wireless-N 7260AN 802.11 a/b/g/n (2x2) WiFi + Bluetooth 4.0 Combo \*

**NOTE:** Supports Bluetooth® v2.1 on Linux operating systems.

##### Communications

Realtek 10/100/1000\*\*\* Ethernet Controller

**NOTE:** Wireless use requires separately purchased service contract. Check with your local vendor for coverage area and availability in your area.

**NOTE:** Wireless access point and Internet service required. Availability of public wireless access points limited.

\* Sold separately or as an optional feature.

\*\* 4G LTE not available in all regions and only available on products featuring Intel processors.

\*\*\* 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.

### Features

#### AUDIO/MULTIMEDIA

##### Audio

DTS Sound+  
Integrated stereo speakers  
Integrated dual-array microphone  
Function keys for microphone mute, volume up, volume down  
Stereo headphone/line out  
Stereo microphone/line in

##### Webcam

720p HD\* webcam

- HD format (widescreen)
- Supports videoconferencing (non-HD) 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
- Skype-ready

\* HD content required to view HD images.

#### KEYBOARDS/POINTING DEVICES/BUTTONS & FUNCTION KEYS

##### Keyboard

The HP spill-resistant keyboard is designed using a thin layer of Mylar film under the keyboard. 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, and function keys. US and International key layouts are available.

##### Pointing Devices

Touchpad with gestures support, on/off button with LED indicator, two-way scroll, two pick buttons

##### Buttons and Function Keys

Separate launch buttons provide easy access to wireless on/off and Volume mute. Function keys provide control of features including: standby mode, display brightness, external display, microphone mute, volume down, and volume up.

#### SOFTWARE AND SECURITY

##### Preinstalled Software with Windows Operating System

HP Wireless Hotspot\*  
HP ePrint\*\*  
SMS Roaming Alert  
HP Mobile Connect  
HP Hotkey support  
HP 3D DriveGuard  
PDF Complete Corporate Edition  
Skype ready\*\*\*  
HP Recovery Manager  
Evernote  
HP Support Assistant  
Buy Office

### Features

Intel Wireless Display\*\*\*\*

**NOTE:** 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 16 GB (for Windows 7) and 36 GB (for Windows 8) of system disk is reserved for the system recovery software.

\* The wireless hotspot application requires an active internet connection and separately purchased data plan. While HP wireless hotspot is active, on-device applications will continue to work and will use the same data plan as the wireless hotspot. Wireless hotspot data usage may incur additional charges. Check with your service provider for plan details. Requires Windows.

\*\*Requires an Internet connection to HP web-enabled printer and HP ePrint account registration (for a list of eligible printers, supported documents and image types and other HP ePrint details, see [hpconnected.com](http://hpconnected.com)). Mobile devices require Internet connection and email capability. May require wireless access point. Separately purchased data plans or usage fees may apply. Print times and connection speeds may vary. Some HP LaserJet printers may require firmware upgrades.

\*\*\*Skype-ready. Skype is not offered in China.

\*\*\*\*Integrated Intel Wi-Di feature is available on select configurations only and requires separately purchased projector, tv or computer monitor with an integrated or external Wi-Di receiver. External Wi-Di receivers connect to the projector, tv or computer monitor via a standard HDMI cable, also sold separately.

### Security

#### Standard

HP Client Security  
Microsoft Defender  
Drive Encryption  
HP BIOS Protection  
Security lock slot

#### Optional

Intel® Anti-Theft (requires a Computrace subscription)\*  
Intel Identity Protection\*\*  
HP Fingerprint reader

**NOTE:** The Computrace agent is shipped turned off, and must be activated by customers when they purchase a subscription. Subscriptions can be purchased for terms ranging multiple years. Service is limited, check with Absolute for availability outside the U.S.

\* Intel Anti-Theft security is supported on Intel Core i processors and 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/>.

\*\* Intel® IPT security requires separate Symantec VIP software service subscription and must be activated and configured. Requires a website that uses Symantec VIP Authentication Service. Requires Microsoft® Windows and a system with vPro or any Ultrabook. Intel® and HP assume no liability for lost or stolen data and/or systems or any other damages resulting therefrom.

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



### Features

#### POWER

##### Power Supply

65W EM Smart AC Adapter

45W Smart AC Adapter

Power cord included is 1.8 m (+/- 0.1 m) or 1.0 m (+/- 0.1 m).

Total length including external AC adapter is 12 feet (3.66 meter).

##### Primary Battery

4-cell (44 WHr) Lithium-Ion battery

##### Battery Life\*

#### Configurations with integrated graphics

##### HP ProBook 430 G1

4-cell (44 WHr) battery

9 hours 30 mins

##### System Standby Time

Up to 11 days

\*Testing conducted by HP consisting of full battery discharge while running a series of productivity scripts against the following applications (which may or may not be included with your particular product): Adobe® AcrobatReader 7.0, Adobe® Illustrator® CS2, Adobe® Photoshop® CS2, Apple® Quicktime 7.1, Intervideo® WinDVD® 8, Macromedia® Flash 8, Microsoft® Office® 2003 Pro, Microsoft® Project 2003, and Winzip® 10.0. Prior to testing, the system was fully charged and set to display brightness of 60 nits, auto dim disabled, wireless off, suspend and hibernate disabled and all other programs, utilities, and services not essential to running the computer system or battery life test. 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.

##### Power Conservation

Supports enhanced Intel SpeedStep technology (allows Battery Optimized Mode, Maximum Performance Mode, or Automatic mode)

Hibernation

Standby

ACPI compliance

#### WEIGHTS & DIMENSIONS

##### Weight

Starting at 3.31 lb (1.50 kg) (weight will vary by configuration)

##### Dimensions (w x d x h)

12.83 x 9.19 x 0.83 in (at rear and at front)

32.6 x 23.35 x 2.1cm (at rear and at front)

**NOTE:** Height varies depending upon where on the notebook the measurement is made. Weight varies by configuration and components. Starting weight requires optional 120 GB SSD drive, planned to be available Fall, 2013.

### Features

#### PORTS/SLOTS

##### Ports

USB 3.0 – Two

USB 2.0 (power port) – One

HDMI 1.4a – One

VGA – One

Stereo microphone input – One

Headphone/line out – One

RJ-45 (Ethernet) – One

Power connector – One

##### Digital Media Slots

Multi Media Reader Slot supporting SD, SDHC, SDXC, Memory Stick, MSXC

#### 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>

### Technical Specifications

#### SYSTEM UNIT

<b>Stand-Alone Power Requirements (AC Power)</b>	<b>Nominal Operating Voltage</b>	19 V
	<b>Average Operating Power</b>	19.19 W
	<b>Max Operating Power</b>	35.84W
<b>Temperature</b>	<b>Operating</b>	32° to 95° F (0° to 35° C) (not writing optical) 41° to 95° F (5° to 35° C) (writing optical)
	<b>Non-operating</b>	-4° to 140° F (-20° to 60° C)
<b>Relative Humidity</b>	<b>Operating</b>	10% to 90%, non-condensing
	<b>Non-operating</b>	5% to 95%, 101.6° F (38.7° C) maximum wet bulb temperature
<b>Shock</b>	<b>Operating</b>	40 G, 2 ms, half-sine
	<b>Non-operating</b>	200 G, 2 ms, half-sine
<b>Random Vibration</b>	<b>Operating</b>	0.75 grms
	<b>Non-operating</b>	1.50 grms
<b>Altitude (unpressurized)</b>	<b>Operating</b>	-50 to 10,000 ft (-15.24 to 3,048 m)
	<b>Non-operating</b>	-50 to 40,000 ft (-15.24 to 12,192 m)
<b>Planned Industry Standard Certifications</b>	<b>UL</b>	Yes
	<b>CSA</b>	Yes
	<b>FCC Compliance</b>	Yes
	<b>ENERGY STAR®</b>	TBD models*
	<b>EPEAT</b>	Registered TBD in United States**
	<b>ICES</b>	Yes
	<b>Australia / NZ A-Tick Compliance</b>	Yes
	<b>CCC</b>	Yes
	<b>Japan VCCI Compliance</b>	Yes
	<b>KC</b>	Yes
	<b>BSMI</b>	Yes
	<b>CE Marking Compliance</b>	Yes
	<b>BNCI or BELUS</b>	Yes
	<b>CIT</b>	Yes
	<b>GOST</b>	Yes
	<b>Saudi Arabian Compliance (ICCP)</b>	Yes
	<b>SABS</b>	Yes
<b>UKRSERTCOMPUTER</b>	Yes	

### Technical Specifications

\* Configurations of the HP ProBook 430 that are ENERGY STAR qualified are identified as HP ProBook 430 ENERGY STAR on HP websites and on [www.energystar.gov](http://www.energystar.gov).

\*\* EPEAT registration varies by country. See [www.epeat.net](http://www.epeat.net) for registration status by country. EPEAT status listed above applies to U.S.

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

### DISPLAY

<b>13.3-inch LED HD (1366 x 768) anti-glare</b>	<b>Active Area (W x H)</b>	11.53 x 6.49 in (29.3 x 16.5 cm)		
	<b>Diagonal Size</b>	13.3 in (33.8cm)		
	<b>Surface Treatment</b>	Anti-glare		
	<b>Contrast Ratio</b>	400:1 (min)		
	<b>Refresh Rate</b>	60 Hz		
	<b>Brightness</b>	200 nit (typical)		
	<b>Pixel Resolution</b>	<b>Pitch</b>	0.215 mm	
		<b>Format</b>	1366 x 768	
		<b>Configuration</b>	RGB Stripe	
	<b>Backlight</b>	LED		
<b>PPI</b>	118 ppi			
<b>Viewing Angle</b>	±30° Horizontal, ±10° Vertical (minimum) 30/30/20/10 (Left/Right/Down/Up) (minimum) or 45/45/35/25 (Left/Right/Down/Up) (typical)			

### STORAGE AND DRIVES

#### Internal Storage

<b>500 GB 7200 rpm SATA Hard Drive</b>	<b>Drive Weight</b>	0.25 lb (115g)		
	<b>Capacity</b>	500 GB		
	<b>Height</b>	0.276 in (7 mm)		
	<b>Width</b>	2.75 in (70 mm)		
	<b>Interface</b>	ATA-8, SATA 2.6, 3.0 Gb/s, NCQ		
	<b>Transfer Rate</b>	<b>Synchronous (maximum)</b>	300 MB/s (Drive Capability)	
	<b>Seek Time</b> (typical reads, including settling)	<b>Single Track</b>	1.5 ms	
		<b>Average</b>	11 ms	
		<b>Maximum</b>	22 ms	
	<b>Rotational Speed</b>	7200 rpm		
<b>Logical Blocks</b>	976,773,168			
<b>Operating Temperature</b>	32° to 140° F (0° to 60° C) [case temp]			
<b>Features</b>	ATA Security			

### Technical Specifications

#### 320 GB 5400 rpm SATA Hard Drive

<b>Drive Weight</b>	0.22 lb (101 g)	
<b>Capacity</b>	320 GB	
<b>Height</b>	0.276 in (7 mm)	
<b>Width</b>	2.75 in (70 mm)	
<b>Interface</b>	ATA-8, SATA 2.6, 3.0 Gb/s, NCQ	
<b>Transfer Rate</b>	<b>Synchronous</b> (maximum) 300 MB/s (Drive Capability)	
<b>Seek Time</b> (typical reads, including settling)	<b>Single Track</b>	3 ms
	<b>Average</b>	13 ms
	<b>Maximum</b>	24 ms
<b>Rotational Speed</b>	5400 rpm	
<b>Logical Blocks</b>	625,142,448	
<b>Operating Temperature</b>	32° to 140° F (0° to 60° C) [case temp]	
<b>Features</b>	ATA Security	

#### 500 GB 5400 rpm SATA Hard Drive

<b>Drive Weight</b>	0.22 lb (101 g)	
<b>Capacity</b>	500 GB	
<b>Height</b>	0.276 in (7 mm)	
<b>Width</b>	2.75 in (70 mm)	
<b>Interface</b>	ATA-8, SATA 2.6, 3.0 Gb/s, NCQ	
<b>Transfer Rate</b>	<b>Synchronous</b> (maximum) 300 MB/s (Drive Capability)	
<b>Seek Time</b> (typical reads, including settling)	<b>Single Track</b>	3 ms
	<b>Average</b>	13 ms
	<b>Maximum</b>	24 ms
<b>Rotational Speed</b>	5400 rpm	
<b>Logical Blocks</b>	976,773,168	
<b>Operating Temperature</b>	32° to 140° F (0° to 60° C) [case temp]	
<b>Features</b>	ATA Security	

### Technical Specifications

<b>SATA 6 Gb/s 128 GB, 2.5-inch Solid State Drive</b>	<b>Drive Weight</b>	73 Grams	
	<b>Capacity</b>	128 GB	
	<b>Height</b>	0.276 in (7 mm)	
	<b>Width</b>	2.76 in (70 mm)	
	<b>Interface</b>	SATA 3 (6 Gb/s)	
	<b>Performance Rate</b>	<b>Maximum Sequential Read</b>	<b>Maximum Sequential Write</b>
		415 MB/s	175 MB/s
	<b>Logical Blocks</b>	250,069,680	
	<b>Operating Temperature</b>	32° to 158°F (0° to 70°C) [case temp]	
	<b>Features</b>	ATA Security; ATA-8; SATA 3.0; DIPM; TRIM	

### SECURITY

<b>HP Fingerprint Sensor</b> (optional)	<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

### NETWORKING/COMMUNICATIONS

### Technical Specifications

<b>Integrated Realtek RTL8151GH-CG 10/100/1000 NIC</b>	<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 802.3ab; IEEE 8023 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
	<b>Power Management Support</b>	ACPI compliant - multiple power modes Situation-sensitive features reduce power consumption Advanced link down power saving for reducing link down power consumption
	<b>Performance Features</b>	TCP/IP/UDP Checksum Offload (configurable) Protocol Offload (ARP & NS) Large send offload and Giant send offload Receiving Side Scaling
	<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 Virtual Cable Doctor for Ethernet cable status
	<b>Interface NIC Device Driver Name</b>	PCI Express 1.1 x1 to fully support ASPM L0s/L1 and CLKREQ Realtek PCIe GBE Ethernet Family Controller
<b>HP hs3110 HSPA+ Mobile Broadband Module*</b>	<b>Technology/Operating Bands</b>	CDMA/1xRTT/EvDO: 800MHz (Cell), 1900MHz (PCS) 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 (UTRA FDD Band V) LTE: 700 MHz (Verizon, Band XIII)
	<b>Mobile Operator</b>	Verizon (US only)
	<b>Wireless Protocol Standards</b>	GSM/GPRS/EDGE: Class B, Multi-slot class 10 operation, coding schemes CS1 - CS4 and MSC1 - MSC9. CDMA: 1xEVDO Release 0 and Release A, IS-95A, IS-95B, IS-856, IS-2000 UMTS/WCDMA: Release 99 and Release 7 LTE: Power Class III as per 3GPP TS 36.101
	<b>Wireless Parametric Standards</b>	Complies with 3GPP specifications Release 8 for LTE
	<b>Maximum Data Rates</b>	EvDO (Revision A) - 3.1 Mbps (Download), 1.8 Mbps (Upload) WCDMA (DC-HSPA+) - 42Mbps (Download) LTE (Category 3) - 100 Mbps (Download ), 50Mbps (Upload)

### Technical Specifications

<b>GPS</b>	Standalone, Assisted, XTRA
<b>GPS Bands</b>	1575.42 MHz ( $\pm$ 1.023 MHz)
<b>Maximum Output Power</b>	GSM/GPRS/EDGE: 32dBm (+/-1) WCDMA: 24dBm (+0.7/-2.3) LTE: +23 dBm (+2.7 dBm/-1.7 dBm) 1xRTT/EvDO: +24 dBm (+0.5 dBm/-1.5 dBm)
<b>Maximum Power Consumption</b>	2700mA (peak)
<b>Power Consumption, Sleep Mode</b>	10 mA
<b>Power Management</b>	USB selective suspend Integrated notebook wireless button
<b>Antenna Type</b>	Dual high efficiency 6 band antennae with spatial diversity, mounted in the display enclosure
<b>Form Factor</b>	PCI-Express MiniCard, USB 2.0 interface
<b>Weight</b>	< 10 g
<b>Dimensions</b> (Length x Width x Thickness)	2.01 x 1.18 x 0.18 in (51 x 30 x 5 mm)
<b>Voltage, Operating</b>	3.3v +/- 9%
<b>Temperature, Operating</b> (from TIA/EIA/IS-98-D)	-4° to 149° F (-20° to 65° C)
<b>Temperature, Non-operating, 96 hours</b> (from MIL-STD 202 Method 108)	-40° to 185° F (-40° to 85° C)
<b>Humidity, Non-operating</b>	85% relative humidity for 48 hours @ 185° F (85° C) (non-condensing)
<b>LED Activity</b>	LED Off - Radio Off; Solid LED On - Radio On
<b>HP It4112 LTE/HSPA+ Gobi 4G Module</b>	<p><b>Technology/Operating bands</b></p> <p>LTE FDD all bands with diversity: 2100 MHz (Band I), 1900 MHz (Band II), 1800 MHz (Band III), 850 MHz (Band V), 2600 MHz (Band VII), 900 MHz (Band VIII), 700 MHz (Band XX, DD800)</p> <p>WCDMA/HSDPA/HSUPA/HSPA+ all bands with diversity: 2100 MHz (Band I), 1900 MHz (Band II), 800 MHz (Band V), 900 MHz (Band VIII)</p> <p>GSM/GPRS/EDGE: 1900 MHz (Band II), 1800 MHz (Band III), 850 MHz (Band V), 900 MHz (Band VIII)</p> <p><b>Wireless protocol standards</b></p> <p>3GPP Release 8 LTE Specification WCDMA R99, 3GPP Release 5, 6 and 7 UMTS Specification</p> <p><b>Wireless parametric standards</b></p> <p>Complies with 3GPP specifications Release 8 for LTE</p> <p><b>Maximum data rates</b></p> <p>LTE (Category 3): 100 Mbps (Download), 50Mbps (Upload) DC-HSPA+: 42 Mbps (Download), 5.76 Mbps (Upload) HSPA+: 21.6 Mbps (Download), 5.76 Mbps (Upload) EDGE: 236.8 kbps (Download), 236.8 kbps (Upload) GPRS: 85.6 kbps(Download), 85.6 kbps (Upload)</p>



### Technical Specifications

<b>GPS</b>	Standalone
<b>GPS bands</b>	1575.42 MHz ( $\pm$ 1.023 MHz), GLONASS 1596-1607MHz
<b>Maximum output power</b>	LTE: +23 dBm (+/- 2 dBm) WCDMA: +23.5 dBm (+/- 1 dBm) GPRS Band II, III: +29.5 dBm (+/- 1 dBm) GPRS Band V, VIII: +32.5 dBm (+/- 1 dBm) EGPRS Band II, III: +26.5 dBm (+/-1.5 dBm) EGPRS Band V, VIII: +27.5 dBm (+/-1.5 dBm)
<b>Maximum power consumption</b>	LTE: 1,200 mA (peak); <900 mA (average) WCDMA: 1,100 mA (peak); <800 mA (average) EGPRS: 2,800 mA (peak); <700 mA (average)
<b>Power consumption, sleep mode</b>	3 mA
<b>Power management</b>	USB selective suspend, Integrated notebook wireless button
<b>Antenna type</b>	Dual high efficiency multi-band antennae with spatial diversity
<b>Form Factor</b>	M.2, USB 2.0 interface
<b>Weight</b>	6 g
<b>Dimensions</b> (Length x Width x Thickness)	42 mm x 30 mm x 2.3 mm
<b>Voltage, Operating</b>	3.135 V to 4.4 V (3.3 V +1.1V/-0.165V)
<b>Temperature, operating</b> (from TIA/EIA/IS-98-D)	14° to 131° F (-10° to 55° C)
<b>Temperature, non-operating, 96 hours</b> (from MIL-STD 202 Method 108)	-40° to 185° F (-40° to 85° C)
<b>Humidity, non-operating</b>	95% relative humidity for 48 hours @ 185° F (85° C) (non-condensing)
<b>LED activity</b>	LED Off - Radio Off; Solid LED On - Radio On
<b>Realtek 802.11 b/g/n (1x1)</b>	
<b>Wireless LAN Standards</b>	IEEE 802.11b IEEE 802.11g IEEE 802.11n
<b>Interoperability</b>	Wi-Fi certified
<b>Frequency Band</b>	2.402 - 2.482 GHz
<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: card will support rates for NSS=1 for RX and TX for 20 MHz channels. Short and long guard interval will be supported.
<b>Modulation</b>	Direct Sequence Spread Spectrum BPSK, QPSK, CCK, 16-QAM, 64-QAM
<b>Security<sup>1</sup></b>	IEEE and WiFi compliant 64 / 128 bit WEP encryption for a/b/g mode only AES-CCMP: 128 bit in hardware 802.1x authentication types WPA, WPA2: 802.1x. WPA-PSK, WPA2-PSK, TKIP, and AES. WPA2 certification

### Technical Specifications

		IEEE 802.11i Cisco Certified Extensions, all versions through V5 WAPI
<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<sup>2</sup></b>		13.5 dBm, nominal
<b>Power Consumption</b>		Transmit: 2.0 W (max) Receive: 1.6 W (max) Associated to Access Point, Idle: 250 mW nominal Wireless Button Off: 100 mW nominal Radio disabled: 75 mW nominal
<b>Power Management</b>		ACPI compliant power management 802.11 compliant power saving mode
<b>Receiver Sensitivity<sup>3</sup></b>		802.11b:-95 dBm (1 Mbps), -93 dBm (2 Mbps), -91 dBm (5.5 Mbps), -88 dBm (11 Mbps)  802.11g:-90 dBm (6 Mbps), -89 dBm (9 Mbps), -87 dBm (12 Mbps), -85 dBm (18 Mbps), -82 dBm (24 Mbps), -79 dBm (36 Mbps), -76 dBm (48 Mbps), -74 dBm (54 Mbps)  802.11n:-70dBm (72.2 Mbps)
<b>Antenna Connections</b>		High efficiency antenna with spatial diversity, mounted in the display enclosure
<b>Form Factor</b>		PCI-Express Half-MiniCard
<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 +/- 9%
<b>Temperature</b>		Operating 14° to 158° F (-10° to 70° 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>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. 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).
<b>Mediatek 802.11 b/g/n (1x1) with Bluetooth® v4.0 combo</b>	<b>Wireless LAN Standards</b>	IEEE 802.11a IEEE 802.11b IEEE 802.11g IEEE 802.11n
	<b>Interoperability</b>	Wi-Fi certified
	<b>Frequency Band</b>	2.402 - 2.482 GHz

### Technical Specifications

<b>Data Rates</b>	<p>802.11b: 1, 2, 5.5, 11 Mbps</p> <p>802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps</p> <p>802.11n: card will support rates for NSS=1 for RX and TX for 20 MHz channels. Short and long guard interval shall be supported.</p>
<b>Modulation</b>	<p>Direct Sequence Spread Spectrum</p> <p>BPSK, QPSK, CCK, 16-QAM, 64-QAM</p>
<b>Security<sup>1</sup></b>	<p>Support for WPA and WPA2</p> <p>Support for CCX version up to and including CCXv5</p> <p>Support for the following EAP types: EAP-TLS, EAP-PEAPv0, EAP-PEAPv1, EAP-PEAPv2, EAP-FAST, EAP-SIM</p> <p>Support for using both machine and user credentials in a single profile. The same profile must be able to be used both before user login and after user login</p> <p>Support the use of Windows Domain credentials</p> <p>IP provider shall have support for an auto-logout to Windows using a PLC and LEAP via the IP provider UI (<a href="http://support.microsoft.com/default.aspx/kb/315231">http://support.microsoft.com/default.aspx/kb/315231</a>).</p> <p>Must have Windows Single Sign On support so that customers can use the WLAN as their primary domain network. With regard to SSO, network association and authentication must occur and be successful before Windows domain authentication is attempted</p> <p>Support for use of the UI client in a user account with limited local security privileges</p> <p>Client service / profile manager must support the WiFi Alliance's WiFi Protected Setup specification.</p> <p>Any credentials saved in a profile must be done securely such that they cannot be re-used by any other user or machine.</p>
<b>Network Architecture Models</b>	<p>Ad-hoc (Peer to Peer)</p> <p>Infrastructure (Access Point Required)</p>
<b>Roaming</b>	IEEE 802.11 compliant roaming between access points
<b>Output Power<sup>2</sup></b>	2.4G:+13.5dBm, minimum
<b>Power Consumption</b>	<p>Transmit: 2.0 W (max)</p> <p>Receive: 1.6 W (max)</p> <p>Associated to Access Point, Idle: 250 mW nominal (WLAN Associated)</p> <p>Wireless Button Off: 100 mW nominal (WLAN unassociated)</p> <p>Radio disabled: 75 mW nominal</p>
<b>Power Management</b>	<p>ACPI and PCI Express compliant power management</p> <p>802.11 compliant power saving mode</p>
<b>Receiver Sensitivity<sup>3</sup></b>	<p>802.11b:-95 dBm (1 Mbps), -93 dBm (2 Mbps), -91 dBm (5.5 Mbps), -88 dBm (11 Mbps)</p> <p>802.11g:-90 dBm (6 Mbps), -89 dBm (9 Mbps), -87 dBm (12 Mbps), -85 dBm (18 Mbps), -82 dBm (24 Mbps), -79 dBm (36 Mbps), -76 dBm (48 Mbps), -74 dBm (54 Mbps)</p> <p>802.11n:-70dBm (72.2 Mbps)</p>
<b>Antenna Connections</b>	Two embedded single band 2.4 antennas
<b>Form Factor</b>	PCI-Express Half-MiniCard

### 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 +/- 9%
<b>Temperature</b>	Operating 14° to 158° F (-10° to 70° 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>LED Activity</b>	LED Off - Radio OFF; Solid LED On - Radio ON
	<ol style="list-style-type: none"><li>1. Check latest software/driver release for updates on supported security features.</li><li>2. Maximum output power may vary by country according to local regulations.</li><li>3. Receiver sensitivity is measured at a packet error rate of 8% for 802.11b (CKK modulation) and a packet error rate of 10% for 802.11a/g (OFDM modulation).</li></ol>
<b>Bluetooth Specification</b>	V4.0 High Speed, V2.1+EDR, backwards compatible with V1.1, 1.2 and 2.0
<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) 330 mW Peak (Rx) 230 mW Sleep <17 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 Windows 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

### Technical Specifications

#### Bluetooth Profiles Supported

Generic Access Profile (GAP)  
 Service Discovery Application Profile (SDAP)  
 Serial Port Profile (SPP)  
 Dial\_Up Networking Profile (DUN)  
 Generic Object Exchange Profile (GOEP)  
 Object Push Profile (OPP)  
 File Transfer Profile (FTP)  
 Synchronization Profile (SYNC)  
 Hard Copy Cable Replacement (HCRP)  
 Personal Area Networking Profile (PAN)  
 Human Interface Device Profile (HID)  
 Generic Audio/Video Distribution Profile (GAVDP)  
 Advanced Audio/Video Distribution Profile (A2DP)  
 FAX Profile (FAX)  
 Basic Imaging Profile (BIP)  
 Headset Profile (HSP)  
 Hands Free Profile (HFP)  
 Basic Printing Profile (BPP)  
 VDP (Video Distribution Profile)  
 AVRCP (Audio Video Remote Control Profile)

#### Broadcom 802.11a/b/g/n (2x2) + Bluetooth™ 4.0 combo

#### Wireless LAN Standards

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

#### Interoperability

Wi-Fi certified

#### Frequency Band

802.11b/g/n

- 2.402 - 2.482 GHz

802.11a/n

- 4.9 - 4.95 GHz (Japan)
- 5.15 - 5.25 GHz
- 5.25 - 5.35 GHz
- 5.47 - 5.725 GHz
- 5.825 - 5.850 GHz
- 2.402 - 2.482 GHz

#### 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: card will support rates for NSS=1 and NSS=2 for RX and TX for 20 and 40 MHz channels. Short and long guard interval shall be supported.

#### Modulation

Direct Sequence Spread Spectrum  
 BPSK, QPSK, CCK, 16-QAM, 64-QAM

#### Security<sup>1</sup>

- IEEE and WiFi compliant 64 / 128 bit WEP encryption for a/b/g mode only
- AES-CCMP: 128 bit in hardware
- 802.1x authentication
- WPA, WPA2: 802.1x. WPA-PSK, WPA2-PSK, TKIP, and AES.

### Technical Specifications

	<ul style="list-style-type: none"> <li>• WPA2 certification</li> <li>• IEEE 802.11i</li> <li>• Cisco Certified Extensions, all versions through V5</li> <li>• WAPI</li> </ul>
<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<sup>2</sup></b>	<ul style="list-style-type: none"> <li>• 2.4G: +13.5dBm minimum</li> <li>• 5G: +12dBm minimum</li> <li>• Maximum output power must be able to achieve modular regulatory certification with notebooks that have antennas &gt;20cm from the user and peak gain of +3dBi at 2.4GHz and +4dBi at 5GHz</li> </ul>
<b>Power Consumption</b>	Transmit: 2.0 W (max) Receive: 1.6 W (max) Idle mode (PSP): 250 mW (WLAN Associated) Idle mode: 100 mW (WLAN unassociated) Radio disabled: 75 mW
<b>Power Management</b>	ACPI and PCI Express compliant power management 802.11 compliant power saving mode
<b>Receiver Sensitivity<sup>3</sup></b>	802.11b: -95 dBm (1 Mbps), -93 dBm (2 Mbps), -91 dBm (5.5 Mbps), -88 dBm (11 Mbps)  802.11a/g: -90 dBm (6 Mbps), -89 dBm (9 Mbps), -87 dBm (12 Mbps), -85 dBm (18 Mbps), -82 dBm (24 Mbps), -79 dBm (36 Mbps), -76 dBm (48 Mbps), -74 dBm (54 Mbps)  802.11n: -69 dBm (72.2 Mbps), -66 dBm (300 Mbps)
<b>Antenna type</b>	High efficiency antenna with spatial diversity, mounted in the display enclosure Two embedded dual band 2.4/5 GHz antennas are provided to the card to support WLAN MIMO communications and Bluetooth communications
<b>Form Factor</b>	PCI-Express Half-MiniCard
<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 +/- 9%
<b>Temperature</b>	Operating 14° to 158° F (-10° to 70° 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>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.
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).

### Technical Specifications

<b>Bluetooth Specification</b>	V4.0 High Speed, V2.1+EDR, backwards compatible with V1.1, 1.2 and 2.0
<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) 330 mW Peak (Rx) 230 mW Sleep <17 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 Windows 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>Bluetooth Profiles Supported</b>	Generic Access Profile (GAP) Service Discovery Application Profile (SDAP) Serial Port Profile (SPP) Dial_Up Networking Profile (DUN) Generic Object Exchange Profile (GOEP) Object Push Profile (OPP) File Transfer Profile (FTP) Synchronization Profile (SYNC) Hard Copy Cable Replacement (HCRP) Personal Area Networking Profile (PAN) Human Interface Device Profile (HID) Generic Audio/Video Distribution Profile (GAVDP) Advanced Audio/Video Distribution Profile (A2DP) FAX Profile (FAX) Basic Imaging Profile (BIP) Headset Profile (HSP) Hands Free Profile (HFP)

### Technical Specifications

Basic Printing Profile (BPP)  
VDP (Video Distribution Profile)  
AVRCP (Audio Video Remote Control Profile)

<b>Intel Dual Band Wireless-N 7260AN 802.11 a/b/g/n (2x2) WiFi + Bluetooth 4.0 Combo Adaptor</b>	<b>Wireless LAN Standards</b>	IEEE 802.11a IEEE 802.11b IEEE 802.11g IEEE 802.11n
	<b>Interoperability</b>	Wi-Fi certified Cisco Compatible Extensions Program compliant with Microsoft Windows 7, Windows Vista and XP (details at: <a href="http://www.hp.com/go/notebooks/WLAN">http://www.hp.com/go/notebooks/WLAN</a> )
	<b>Frequency Band</b>	802.11b/g/n 2.402 - 2.482 GHz 802.11a/n 4.9 - 4.95 GHz (Japan) 5.15 - 5.25 GHz 5.25 - 5.35 GHz 5.47 - 5.725 GHz 5.825 - 5.850 GHz
	<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: card will support rates for NSS=1 and NSS=2 for RX and TX for 20 and 40 MHz channels. Short and long guard interval shall be supported.
	<b>Modulation</b>	Direct Sequence Spread Spectrum CCK, BPSK, QPSK, 16-QAM, 64-QAM
	<b>Security<sup>1</sup></b>	<ul style="list-style-type: none"><li>• IEEE and WiFi compliant 64 / 128 bit WEP encryption for a/b/g mode only</li><li>• AES-CCMP: 128 bit in hardware</li><li>• 802.1x authentication</li><li>• WPA, WPA2: 802.1x. WPA-PSK, WPA2-PSK, TKIP, and AES.</li><li>• WPA2 certification</li><li>• IEEE 802.11i</li><li>• Cisco Certified Extensions, all versions through V5</li><li>• WAPI</li></ul>
	<b>Sub-channels</b>	Multinational support with frequency bands and channels compliant to local regulations.
	<b>Network Architecture Models</b>	Ad-hoc (Peer to Peer) Infrastructure (Access Point Required)
	<b>Roaming</b>	IEEE 802.11 compliant roaming between band Access Points
	<b>Output Power<sup>2</sup></b>	<ul style="list-style-type: none"><li>• 2.4G: +13.5dBm minimum</li><li>• 5G: +12dBm minimum</li></ul>
	<b>Power Consumption</b>	Transmit: 2.0 Watts Receive: 1.6 Watts Idle mode <sup>3</sup> : 250 mW (WLAN Associated) Idle mode: 100 mW (WLAN unassociated) Radio off: 75 mW



### Technical Specifications

<b>Power Management</b>	ACPI and PCI Express compliant power management 802.11 compliant power saving mode	
<b>Receiver Sensitivity<sup>4</sup></b>	802.11g:-90 dBm (6 Mbps), -89 dBm (9 Mbps), -87 dBm (12 Mbps), -85 dBm (18 Mbps), -82 dBm (24 Mbps), -79 dBm (36 Mbps), -76 dBm (48 Mbps), -74 dBm (54 Mbps)	
	802.11b:-95 dBm (1 Mbps), -93 dBm (2 Mbps), -91 dBm (5.5 Mbps), -88 dBm (11 Mbps)	
	802.11g:-90 dBm (6 Mbps), -89 dBm (9 Mbps), -87 dBm (12 Mbps), -85 dBm (18 Mbps), -82 dBm (24 Mbps), -79 dBm (36 Mbps), -76 dBm (48 Mbps), -74 dBm (54 Mbps)	
	802.11n:-69 dBm (150 Mbps), -66 dBm (300 Mbps)	
<b>Antenna Connections</b>	2 U.FL type connectors (output impedance of 50 ± 2 ohms)	
<b>Form Factor</b>	PCI-Express Half-MiniCard	
<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	14° to 158° F (-10° to 70° 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>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.
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.

#### HP Integrated Module with Bluetooth 4.0+EDR Wireless Technology

<b>Bluetooth Specification</b>	4.0+EDR 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>	-1.5 dBm to 4 dBm (Bluetooth Class II)
<b>Receiver Sensitivity</b>	Better than -20 dBm at 0.1 % raw bit error rate

### Technical Specifications

<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 to 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 Windows 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>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)

1. indicates the profile is supported by Microsoft Windows XP SP2

2. indicates the profile is part of Windows Vista

### AUDIO/MULTIMEDIA – DTS SOUND+

### Technical Specifications

<b>Hardware</b>	<b>Implementation</b>	IDT 92HD91
	<b>Function Key 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 digital microphone array when equipped with optional webcam
<b>Audio Output Quality</b>	<b>Frequency Response</b>	20 Hz - 20 kHz
	<b>Signal to Noise Ratio</b>	>85 dB
	<b>Total Harmonic Distortion</b>	0.01%
	<b>Noise Floor</b>	-110 dB
	<b>Play/Record Sampling Rate(s)</b>	8 kHz - 48kHz
	<b>DAC</b>	16, 20 or 24-bit
	<b>ADC</b>	16 or 20-bit
<b>Internal Stereo Speakers</b>	<b>Power Rating</b>	2 Watts
	<b>Impedance</b>	4 ohms

### POWER

<b>HP 65W EM Smart AC Adapter</b>	<b>Dimensions</b>	4.98 x 1.97 x 1.18 in (12.65 x 5.0 x 3.0 cm)		
	<b>Weight</b>	0.62 lb (290 g) max		
	<b>Input</b>	<b>Input</b>	90 to 265 VAC	
		<b>Input Efficiency</b>	87% min at 115 VAC	
		<b>Input frequency range</b>	47 to 63 Hz	
	<b>Output</b>	<b>Input AC current</b>	1.7 A at 90 VAC	
		<b>Output power</b>	65W	
		<b>DC output</b>	19.5V	
		<b>Hold-up time</b>	5 msec at 115 VAC input	
		<b>Output current limit</b>	<11A, Over voltage protection- 29V max automatic shutdown	
		<b>Connector</b>	3 pin/grounded, mates with interchangeable cords	
	<b>Environmental Design</b>	<b>Operating temperature</b>	32° to 95° F (0° to 35° C)	
		<b>Non-operating (storage) temperature</b>	-4° to 185° F (-20° to 85° C)	
<b>Altitude</b>		0 to 10,000 ft (0 to 3,048 m)		

### Technical Specifications

	<b>Humidity</b>	20% to 95%
	<b>Storage Humidity</b>	10% to 95%
<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.	
<b>HP 45W Smart AC Adapter</b>	<b>Dimensions</b>	3.78 x 1.95 x 0.88 in (9.6 x 4.95 x 2.24 cm)
	<b>Input</b>	90 to 265 VAC
	<b>Input Efficiency</b>	87% min at 115 VAC
	<b>Input frequency range</b>	47 to 63 Hz
	<b>Input AC current</b>	1.4 A at 90 VAC and maximum load
	<b>Output</b>	
	<b>Output power</b>	45W
	<b>DC output</b>	19.5V
	<b>Hold-up time</b>	5 msec at 115 VAC input
	<b>Output current limit</b>	<8A, Over voltage protection- 29V max automatic shutdown
	<b>Connector</b>	3 pin/grounded, mates with interchangeable cords
	<b>Environmental Design</b>	
	<b>Operating temperature</b>	32° to 95° F (0° to 35° C)
	<b>Non-operating (storage) temperature</b>	-4° to 121° F (-20° to 85° C)
	<b>Altitude</b>	0 to 16,405 ft (0 to 5,000 m)
	<b>Humidity</b>	0% to 95%
	<b>Storage Humidity</b>	0% to 95%
<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; Reliability - failure rate of less than 0.1% annually within the first three years of operation.	

### Technical Specifications

<b>4-Cell (44 WHr) Lithium-Ion battery</b>	<b>Dimensions (H x W x L)</b>	0.86 x 1.4 x 8.0 in (2.18 x 3.56 x 27.72 cm)		
	<b>Weight (max)</b>	<0.551 lb (250 g)		
	<b>Cells/Type</b>	4-cell Lithium-Ion		
	<b>Energy</b>	<b>Voltage</b>	14.8V DC	
		<b>Amp-hour capacity</b>	2850mAh	
		<b>Watt-hour Capacity</b>	44 WHr	
		<b>Temperature</b>	<b>Operating (Charging)</b>	32° to 113° F (0° to 45° C)
		<b>Operating (Discharging)</b>	14° to 140° F (-10° to 60° C)	
		<b>Non-operating</b>	-4° to 140° F (-20° to 60° C)	
	<b>Battery Re-Charge Time</b>	<b>System in OFF or Standby Mode</b>	2.5 hours	
		<b>System ON</b>	3 to 5 hours (depending on system power consumption)	
		<b>Fuel Gauge LED</b>	No	
	<b>Warranty</b>	1 year		
	<b>Optional Travel Battery Available</b>	No		

### 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 Commercial Notebook model is based on a "Typically Configured Notebook"

<b>Energy Consumption</b>	115 VAC	230 VAC	100 VAC
Normal Operation	6.02 W	6.10 W	5.91 W
Sleep (Energy Star low power mode)	0.52 W	0.60 W	0.51 W
Off	0.30 W	0.37 W	0.28 W
<b>Heat Dissipation*</b>	115 VAC	230 VAC	100 VAC
Normal Operation	21 BTU/hr	21 BTU/hr	20 BTU/hr
Sleep	2 BTU/hr	2 BTU/hr	2 BTU/hr
Off	1 BTU/hr	1 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	3.4	31
Fixed Disk (random writes)	3.4	31

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 (Li-MNO2) = PANDA CR2032  
lithium/manganese dioxide

#### 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](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 96.6 % recycle-able when properly disposed of at end of life.

#### Packaging Materials

- External:
  - PAPER/Cardboard & misc 368 g
  - PAPER/Corrugated 95 g
  - OTHER/OTHER 20 g
- Internal:
  - PLASTIC/Polyethylene low density 17 g
  - PLASTIC/EPE-Expanded Polyethylene 8 g
  - PLASTIC/PET 2.5 g
- The PAPER/Cardboard & misc packing material is made from 80% recycled content
- The PAPER/Cardboard packing material is made from 80% recycled content
- The OTHER/OTHER packing material is made from 80% recycled content

### Technical Specifications

- The PLASTIC/Polyethylene low density packing materials contains at least 65% recycled content
- The PLASTIC/EPE- Expanded Polyethylene packing materials contains at least 65% recycled content
- The PLASTIC/PET packing materials contains at least 65% 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 (PBEBs)
- 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 µgrams/cm<sup>2</sup>/week, measured according to EN 1811:1998, are not used on any product surface designed 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

### Technical Specifications

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>

### **Country of Origin**

China



### Options and Accessories (sold separately and availability may vary by country)

Type	Description	Part #
<b>Cases</b>	HP Business Nylon Backpack (up to 17.3")	BP849AA
	HP Business 4 Wheel Roller Case	H5M93AA
<b>Docking</b>	HP LCD Monitor Stand	QM196AA
	HP Dual Hinge Notebook Stand	AW661AA#xxx
	HP USB 2.0 Port Replicator	H1L07AA#xxx
	HP USB 3.0 Port Replicator	H1L08AA#xxx
<b>Input/Output - Mice</b>	HP Wireless Mobile Mouse	H2L63AA
	HP X4000b Bluetooth Mouse	H3T50AA#xxx
<b>Memory</b>	HP 2GB DDR3L-1600 1.35V SODIMM	H6Y73AA#XXX
	HP 4GB DDR3L-1600 1.35V SODIMM	H6Y75AA#XXX
	HP 8GB DDR3L-1600 1.35V SODIMM	H6Y77AA#XXX
<b>Adapters</b>	90W Slim Combo Adapter	H4A41AA#xxx
	90W w/USB Universal Adapter	H4A43AA#ABA
	90W Smart Auto/Truck Adapter	ED493AA
	HP 65W Slim Adapter	AX727AA#XXX
<b>Security</b>	HP Notebook Combo Lock	AY475AA#XXX
	HP UltraSlim Keyed Cable Lock	H4D73AA
<b>Storage - External Storage</b>	HP Mobile USB DVDRW Non-LS	A2U57AA

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