Overview

HP ProBook 430 Notebook PC
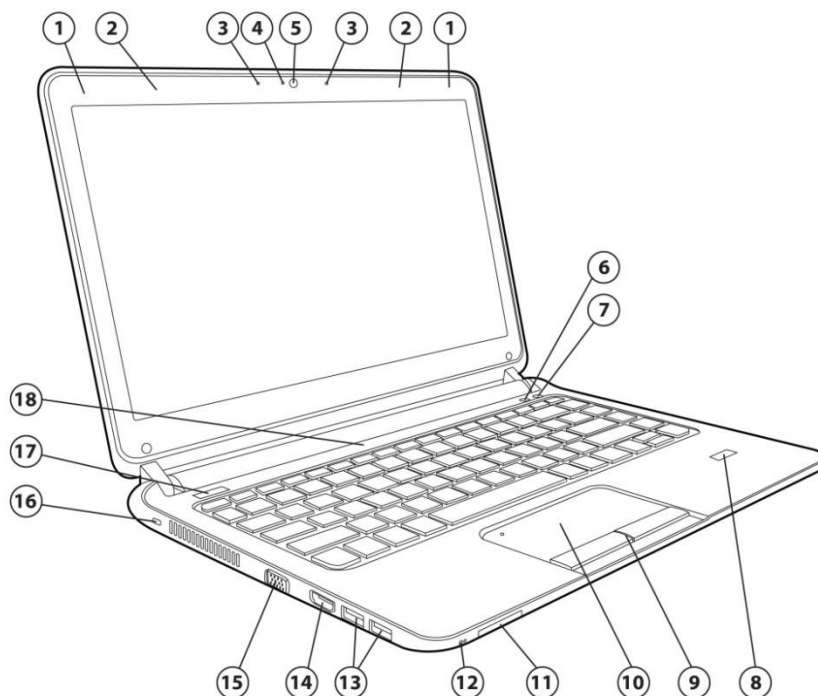

Front

1. WWAN antennas (2)* (select models only)
2. WLAN antennas**
3. Internal microphones (2)
4. Webcam light
5. Webcam
6. Wireless on/off button
7. Speaker mute button
8. Optional HP Fingerprint Reader
9. Touchpad pick buttons

10. Touchpad
11. Media Card Reader
12. Hard drive activity LED indicator
13. USB 3.0 ports (2)
14. HDMI port
15. VGA monitor port
16. Security lock slot
17. Power button
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

QuickSpecs

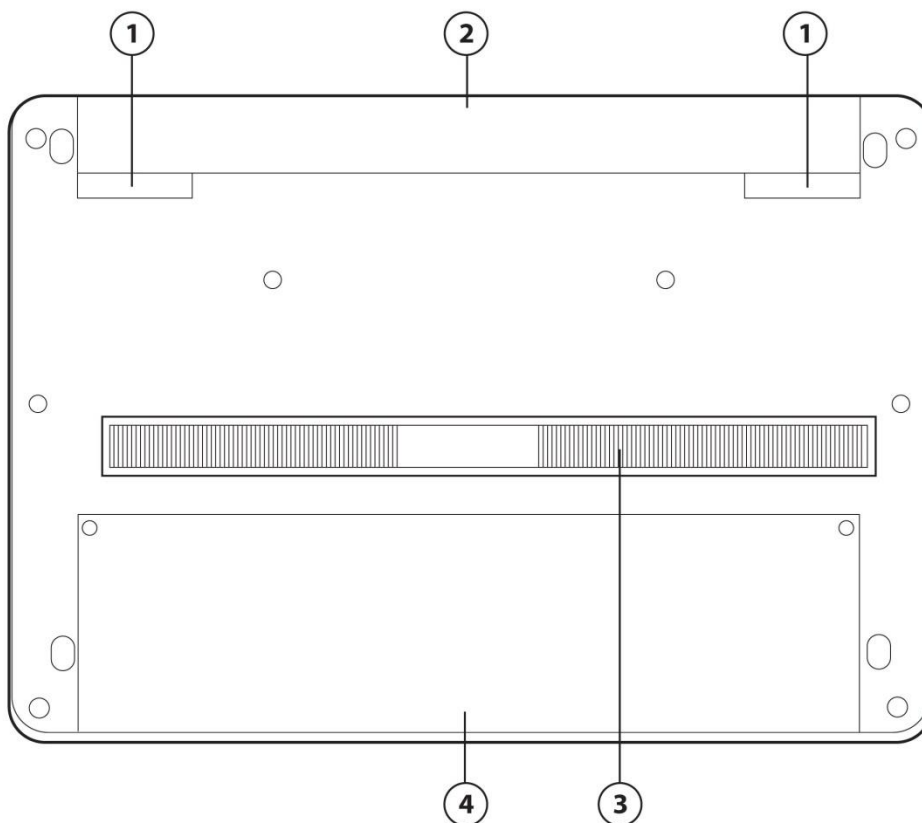*HP Confidential*
HP ProBook 430 Notebook PC
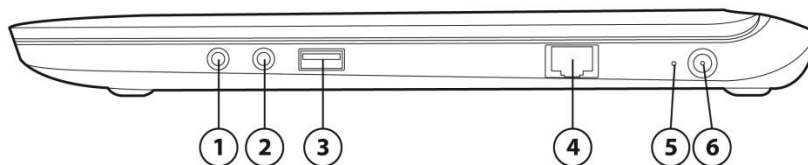
Overview

Right

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

Bottom

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

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Overview

AT A GLANCE

- Windows 8.1 versions, Windows 8, Windows 7 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 ports
- 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 4th 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/AC , a/b/g/n or b/g/n with Bluetooth 4.0 combo card*

    * Sold separately or as an optional feature

Features

PRODUCT NAME

HP ProBook 430 G1 Notebook PC

OPERATING SYSTEM

Preinstalled   Windows 8.1 Pro 64*
            Windows 8.1 64*
            Windows 7 Professional (available through downgrade rights from Windows 8.1 Pro)**
            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 8/8.1. Systems may require upgraded and/or separately purchased hardware, drivers and/or software to take full advantage of Windows 8/8.1 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://windows.microsoft.com/en-us/windows7/products/home for details.

PROCESSOR

   4th generation Intel® Dual-Core™ processors Core i7, i5, and i3
   4th Generation Intel® Core™ i7-4500U (1.8GHz, 4 MB L3 cache, 2 cores)*
    Up to 3.0GHz with Intel Turbo Boost Technology
   4th Generation Intel® Core™ i5-4300U (1.9GHz, 3 MB L3 cache, 2 cores)*
    Up to 2.9GHz with Intel Turbo Boost Technology
   4th Generation Intel® Core™ i5-4250U (1.3GHz, 3 MB L3 cache, 2 cores)*
    Up to 2.6GHz with Intel Turbo Boost Technology
   4th Generation Intel® Core™ i5-4200U (1.6GHz, 3 MB L3 cache, 2 cores)*
    Up to 2.6GHz with Intel Turbo Boost Technology
   4th Generation Intel® Core™ i3-4010U (1.7GHz, 3 MB L3 cache, 2 cores)*
   4th Generation Intel® Core™ i3-4005U (1.7GHz, 3 MB L3 cache, 2 cores)*
   4th Generation Intel® Pentium 3558U (1.7GHz, 2MB L3 cache, 2 cores)*
   4th Generation Intel® Pentium 3556U (1.7GHz, 2MB L3 cache, 2 cores)*
   4th Generation Intel® Celeron 2995U (1.4GHz, 2MB L3 cache, 2 cores)*
   4th Generation Intel® Celeron 2957U (1.4GHz, 2MB L3 cache, 2 cores)*

   * 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

Features

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:
4th Generation Intel® Core™ i7-4500U (1.8GHz, 4 MB L3 cache, 2 cores)/ Intel®HD Graphics 4400
4th Generation Intel® Core™ i5-4300U (1.9GHz, 3 MB L3 cache, 2 cores)/ Intel®HD Graphics 4400
4th Generation Intel® Core™ i5-4250U (1.3GHz, 3 MB L3 cache, 2 cores)/ Intel®HD Graphics 5000
4th Generation Intel® Core™ i5-4200U (1.6GHz, 3 MB L3 cache, 2 cores)/ Intel®HD Graphics 4400
4th Generation Intel® Core™ i3-4010U (1.7GHz, 3 MB L3 cache, 2 cores)/Intel®HD Graphics 4400
4th Generation Intel® Core™ i3-4005U (1.7GHz, 3 MB L3 cache, 2 cores)/Intel®HD Graphics 4400
4th Generation Intel® Pentium 3558U (1.7GHz, 2 MB L3 cache, 2 cores)/Intel®HD Graphics
4th Generation Intel® Pentium 3556U (1.7GHz, 2 MB L3 cache, 2 cores)/Intel®HD Graphics
4th Generation Intel® Celeron 2957U (1.4GHz, 2 MB L3 cache, 2 cores)/Intel®HD Graphics
4th Generation Intel® Celeron 2955U (1.4GHz, 2 MB L3 cache, 2 cores)/Intel®HD Graphics

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

Primary Storage Bay
Hard Drives
320/500/750 GB 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
256 GB 2.5" SED 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

Features

> **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

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)*
Atheros 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-AC 7260AN 802.11 a/b/g/n/ac (2x2) WiFi with Bluetooth 4.0 combo (Non vPro)
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.

Features

* 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.

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

Features

Skype ready***
HP Recovery Manager
Evernote
HP Support Assistant
Buy Office
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. Please 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). 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
TPM 1.2 Embedded Security Chip

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 AntiTheft feature is only available with Intel Core Processors. Intel Identity Protection feature is only available with Intel Core Processors. 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 and Microsoft Windows. Intel® and HP assume no liability for lost or stolen data and/or systems or any other damages resulting therefrom.
** Intel Identity Protection feature is only available with Intel Core Processors. 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 and Microsoft® Windows. Intel® and HP assume no liability for lost or stolen data and/or systems or any other damages resulting therefrom.

Features

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

POWER

Power Supply
65W EM Smart AC Adapter
45W Smart AC Adapter
Power cord included is 1.8m (+/- 0.1m) or 1.0m (+/- 0.1m).
Total length including external AC adapter is 12 feet (3.66 meter).
Primary Battery
4-cell (44 WHr) Lithium-Ion battery
4-cell (40 WHr) Long Life 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 ® Acrobat Reader 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.

PORTS/SLOTS

Features

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

Stand-Alone Power Requirements (AC Power)	**Nominal Operating Voltage**	19 V
	Average Operating Power	19.19 W
	Max Operating Power	35.84W
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**	40 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®	TBD models*
	EPEAT	Registered TBD in United States**
	ICES	Yes
	Australia / NZ A-Tick Compliance	Yes
	CCC	Yes
	Japan VCCI Compliance	Yes
	KC	Yes
	BSMI	Yes
	CE Marking Compliance	Yes
	BNCI or BELUS	Yes
	CIT	Yes
	GOST	Yes
	Saudi Arabian Compliance (ICCP)	Yes
	SABS	Yes
	UKRSERTCOMPUTER	Yes

* 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.
** EPEAT registration varies by country. See 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.

DISPLAYS

13.3-inch LED HD (1366 x 768) anti-glare	**Active Area** (W x H)	11.53 x 6.49 in (29.3 x 16.5 cm)
	Diagonal Size	13.3 in (33.8cm)
	Surface Treatment	Anti-glare
	Contrast Ratio	400:1 (typical)

Technical Specifications

Refresh Rate	60 Hz		
Brightness	200 nit (typical)		
Pixel Resolution	**Pitch**	0.215 mm	
	Format	1366 x 768	
	Configuration	RGB Stripe	
Backlight	LED		
PPI	118 ppi		
Viewing Angle	±30° Horizontal, ±10° Vertical (minimum) 30/30/20/10 (Left/Right/Down/Up) (minimum) or 45/45/35/25 (Left/Right/Down/Up) (typical)		

STORAGE AND DRIVES

Internal Storage

500 GB 7200 rpm SATA Hard Drive	**Drive Weight**	0.25 lbs (115g)	
	Capacity	500 GB	
	Height	0.276 in (7 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 5400 rpm SATA Hard Drive	**Drive Weight**	0.22 lb (101 g	
	Capacity	320 GB	
	Height	0.276 in (7 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**	3 ms
		Average	13 ms
		Maximum	24 ms
	Rotational Speed	5400 rpm	
	Logical Blocks	625,142,448	
	Operating Temperature	32° to 140° F (0° to 60° C) [case temp]	
	Features	ATA Security	

Technical Specifications

500 GB 5400 rpm SATA Hard Drive	Drive Weight	0.22 lb (101 g)	
	Capacity	500 GB	
	Height	0.276 in (7 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**	3 ms
		Average	13 ms
		Maximum	24 ms
	Rotational Speed	5400 rpm	
	Logical Blocks	976,773,168	
	Operating Temperature	32° to 140° F (0° to 60° C) [case temp]	
	Features	ATA Security	
SATA 6 Gb/s 128 GB, 2.5-inch Solid State Drive	Drive Weight	73 Grams	
	Capacity	128 GB	
	Height	0.276 in (7 mm)	
	Width	2.76 in (70 mm)	
	Interface	SATA 3 (6 Gb/s)	
	Performance	**Maximum Sequential Read**	**Maximum Sequential Write**
		415 MB/s	175 MB/s
	Logical Blocks	250,069,680	
	Operating Temperature	32° to 158°F (0° to 70°C) [case temp]	
	Features	ATA Security; ATA-8; SATA 3.0; DIPM; TRIM	

SECURITY

HP Fingerprint Reader (optional)	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

NETWORKING/COMMUNICATIONS

Integrated Realtek RTL8151GH-CG 10/100/1000 NIC	Ethernet Features	10 Mbit/s operation (10BASE-T; IEEE 802.3i; IEEE 802.3 clauses 13-14) 100 Mbit/s operation (100BASE-TX; IEEE 802.3u; IEEE 802.3 clauses 21-30) 1000 Mbit/s operation (1000BASE-T; IEEE 802.3ab; IEEE 8023 clauses 40)

Technical Specifications

		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	ACPI compliant - multiple power modes Situation-sensitive features reduce power consumption Advanced link down power saving for reducing link down power consumption
	Performance Features	TCP/IP/UDP Checksum Offload (configurable) Protocol Offload (ARP & NS) Large send offload and Giant send offload Receiving Side Scaling
	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
	NIC Device Driver Name	Realtek PCIe GBE Ethernet Family Controller
HP hs3110 HSPA+ Mobile Broadband Module*	**Technology/Operating Bands**	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)
	Mobile Operator	Verizon (US only)
	Wireless Protocol Standards	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
	Wireless Parametric Standards	Complies with 3GPP specifications Release 8 for LTE
	Maximum Data Rates	EvDO (Revision A) - 3.1 Mbps (Download), 1.8 Mbps (Upload) WCDMA (DC-HSPA+) - 42Mbps (Download) LTE (Category 3) - 100 Mbps (Download), 50Mbps (Upload)
	GPS	Standalone, Assisted, XTRA
	GPS Bands	1575.42 MHz (± 1.023 MHz)

Technical Specifications

Maximum Output Power	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)
Maximum Power Consumption	2700mA (peak)
Power Consumption, Sleep Mode	10 mA
Power Management	USB selective suspend Integrated notebook wireless button
Antenna Type	Dual high efficiency 6 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 4.5 mm)
Voltage, Operating	3.3v +/- 9%
Temperature, Operating	-4° to 149° F (-20° to 65° C)
Temperature, Non-operating, 96 hours (from MIL-STD 202 Method 108)	-40° to 185° F (-40° to 85° C)
Humidity, Non-operating	85% relative humidity for 48 hours @ 185° F (85° C) (non-condensing)
LED Activity	LED Off - Radio Off; Solid LED On - Radio On
HP lt4112 LTE/HSPA+ Gobi 4G Module	
Technology/Operating bands	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) WCDMA/HSDPA/HSUPA/HSPA+ all bands with diversity: 2100 MHz (Band I), 1900 MHz (Band II), 800 MHz (Band V), 900 MHz (Band VIII) GSM/GPRS/EDGE: 1900 MHz (Band II), 1800 MHz (Band III), 850 MHz (Band V), 900 MHz (Band VIII)
Wireless protocol standards	3GPP Release 8 LTE Specification WCDMA R99, 3GPP Release 5, 6 and 7 UMTS Specification
Wireless parametric standards	Complies with 3GPP specifications Release 8 for LTE
Maximum data rates	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)
GPS	Standalone
GPS bands	1575.42 MHz (± 1.023 MHz), GLONASS 1596–1607MHz
Maximum output power	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)

Technical Specifications

		EGPRS Band II, III: +26.5 dBM (+/-1.5 dBm)
		EGPRS Band V, VIII: +27.5 dBM (+/-1.5 dBm)
	Maximum power consumption	LTE: 1,200 mA (peak); <900 mA (average)
		WCDMA: 1,100 mA (peak); <800 mA (average)
		EGPRS: 2,800 mA (peak); <700 mA (average)
	Power consumption, sleep mode	3 mA
	Power management	USB selective suspend, Integrated notebook wireless button
	Antenna type	Dual high efficiency multi-band antennae with spatial diversity
	Form Factor	M.2, USB 2.0 interface
	Weight	6 g
	Dimensions (Length x Width x Thickness)	42 mm × 30 mm × 2.3 mm
	Voltage, Operating	3.135 V to 4.4 V (3.3 V +1.1V/-0.165V)
	Temperature, operating (from TIA/EIA/IS-98-D)	14° to 131° F (−10° to 55° C)
	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)
	LED activity	LED Off - Radio Off; Solid LED On - Radio On
Realtek 802.11 b/g/n (1x1)	**Wireless LAN Standards**	IEEE 802.11b
		IEEE 802.11g
		IEEE 802.11n
	Interoperability	Wi-Fi certified
	Frequency Band	2.402 – 2.482 GHz
	Data Rates	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.
	Modulation	Direct Sequence Spread Spectrum
		BPSK, QPSK, CCK, 16-QAM, 64-QAM
	Security[1]	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
		IEEE 802.11i
		Cisco Certified Extensions, all versions through V5
		WAPI
	Network Architecture	Ad-hoc (Peer to Peer)
	Models	Infrastructure (Access Point Required)
	Roaming	IEEE 802.11 compliant roaming between access points
	Output Power[2]	13.5 dBm, nominal

Technical Specifications

Power Consumption	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
Power Management	ACPI compliant power management
	802.11 compliant power saving mode
Receiver Sensitivity[3]	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)
Antenna type	High efficiency antenna with spatial diversity, mounted in the display enclosure
Form Factor	PCI-Express Half-MiniCard
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 158° F (−10° to 70° 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	

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).

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

Technical Specifications

	• 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[1]	• 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.
	• WPA2 certification
	• IEEE 802.11i
	• Cisco Certified Extensions, all versions through V5
	• WAPI
Network Architecture Models	Ad-hoc (Peer to Peer)
	Infrastructure (Access Point Required)
Roaming	IEEE 802.11 compliant roaming between access points
Output Power[2]	• 2.4G: +13.5dBm minimum
	• 5G: +12dBm minimum
	• Maximum output power must be able to achieve modular regulatory certification with notebooks that have antennas >20cm from the user and peak gain of +3dBi at 2.4GHz and +4dBi at 5GHz
Power Consumption	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
Power Management	ACPI and PCI Express compliant power management
	802.11 compliant power saving mode
Receiver Sensitivity[3]	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)
Antenna type	High efficiency antenna with spatial diversity, mounted in the display enclosure

QuickSpecs

Technical Specifications

	Two embedded dual band 2.4/5 GHz antennas are provided to the card to support WLAN MIMO communications and Bluetooth communications	
Form Factor	PCI-Express Half-MiniCard	
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 158° F (−10° to 70° 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	

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).

Bluetooth Specification
V4.0 High Speed, V2.1+EDR, backwards compatible with V1.1, 1.2 and 2.0

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) 330 mW
	Peak (Rx) 230 mW
	Sleep <17 mW
Antenna	Internally integrated within module
Range	Up to 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
Bluetooth Profiles Supported	Generic Access Profile (GAP)
	Service Discovery Application Profile (SDAP)
	Serial Port Profile (SPP)

Technical Specifications

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)

Intel Dual Band Wireless-N 7260AN 802.11 a/b/g/n (2x2) WiFi + Bluetooth 4.0 Combo Adaptor	**Wireless LAN Standards**	IEEE 802.11a IEEE 802.11b IEEE 802.11g IEEE 802.11n	
	Interoperability	Wi-Fi certified Cisco Compatible Extensions Program compliant with Microsoft Windows 7, Windows Vista and XP (details at: http://www.hp.com/go/notebooks/WLAN)	
	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
	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: 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 CCK, BPSK, QPSK, 16-QAM, 64-QAM	
	Security[1]	• 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. • WPA2 certification • IEEE 802.11i	

Technical Specifications

- Cisco Certified Extensions, all versions through V5
- WAPI

Sub-channels	Multinational support with frequency bands and channels compliant to local regulations.
Network Architecture Models	Ad-hoc (Peer to Peer) Infrastructure (Access Point Required)
Roaming	IEEE 802.11 compliant roaming between band Access Points
Output Power[2]	- 2.4G: +13.5dBm minimum - 5G: +12dBm minimum
Power Consumption	Transmit: 2.0 Watts Receive: 1.6 Watts Idle mode[3]: 250 mW (WLAN Associated) Idle mode: 100 mW (WLAN unassociated) Radio off: 75 mW
Power Management	ACPI and PCI Express compliant power management 802.11 compliant power saving mode
Receiver Sensitivity[4]	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)
Antenna Connections	2 U.FL type connectors (output impedance of 50 ± 2 ohms)
Form Factor	PCI-Express Half-MiniCard
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

Technical Specifications

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

Bluetooth Specification	4.0+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	-1.5 dBm to 4 dBm (Bluetooth Class II)
Receiver Sensitivity	Better than -20 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 -14° to 158° F (-10° to 70° C)
	Non-operating -40° to 212° F (-40° to 100° C)
Humidity	Operating 0% to 90%
	Non-operating 0% to 95%
Altitude	Operating 15,000 ft (4,572 m)
	Non-operating 40,000 ft (12,192 m)
Bluetooth Profiles Supported	Serial Port Profile (SPP)[1]
	Service Discovery Application Profile (SDAP)
	Dial-Up Networking (DUN)[1,2]

Technical Specifications

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]

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

AUDIO/MULTIMEDIA - DTS SOUND+

Hardware	**Implementation**	IDT 92HD91
	Function Key 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
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

HP 65W EM Smart AC Adapter	**Dimensions**	4.98 x 1.97 x 1.18 in (12.65 x 5.0 x 3.0 cm)
	Weight	0.62 lb (290 g) max

Technical Specifications

Input	90 to 265 VAC	
	Input Efficiency	87% min at 115 VAC
	Input frequency range	47 to 63 Hz
	Input AC current	1.7 A at 90 VAC
Output	Output power	65W
	DC output	19.5V
	Hold-up time	5 msec at 115 VAC input
	Output current limit	<11A, Over voltage protection– 29V max automatic shutdown
Connector	3 pin/grounded, mates with interchangeable cords	
Environmental Design	Operating temperature	32° to 95° F (0° to 35° C)
	Non-operating (storage) temperature	-4° to 185° F (-20° to 85° C)
	Altitude	0 to 10,000 ft (0 to 3,048 m)
	Humidity	20% to 95%
	Storage Humidity	10% to 95%
EMI and Safety Certifications	CE Mark - full compliance with LVD and EMC directives; Worldwide safety standards - IEC60950, EN60950, UL60950, Class1, SELV; Agency approvals - C–UL–US, NORDICS, DENAN, EN55022 Class B, FCC Class B, CISPR22 Class B, CCC, NOM-1 NYCE; MTBF - over 200,000 hours at 25°C ambient condition.	

HP 45W Smart AC Adapter	**Dimensions**	3.78 x 1.95 x 0.88 in (9.6 x 4.95 x 2.24 cm)
	Input	90 to 265 VAC
	Input Efficiency	87% min at 115 VAC
	Input frequency range	47 to 63 Hz
	Input AC current	1.4 A at 90 VAC and maximum load
	Output	**Output power** 45W
		DC output 19.5V
		Hold-up time 5 msec at 115 VAC input
		Output current limit <8A, Over voltage protection– 29V max automatic shutdown
	Connector	3 pin/grounded, mates with interchangeable cords
	Environmental Design	**Operating temperature** 32° to 95° F (0° to 35° C)
		Non-operating (storage) temperature -4° to 121° F (-20° to 85° C)
		Altitude 0 to 16,405 ft (0 to 5,000 m)
		Humidity 0% to 95%
		Storage Humidity 0% to 95%
	EMI and Safety Certifications	CE Mark - full compliance with LVD and EMC directives; Worldwide safety standards - IEC60950, EN60950, UL60950, Class1, SELV; Agency approvals - C–UL–US, NORDICS, DENAN, EN55022 Class B, FCC Class B, CISPR22 Class

Technical Specifications

B, CCC, NOM-1 NYCE; Reliability - failure rate of less than 0.1% annually within the first three years of operation.

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

Energy Consumption	115 VAC	230 VAC	100 VAC
Normal Operation (Short idle)	8.73 W	8.96 W	8.35 W
Normal Operation (Long idle)	6.74 W	6.62 W	6.36 W
Sleep	0.91 W	1.02 W	0.91 W
Off	0.50 W	0.58 W	0.49 W

Note:
Energy efficiency data listed is for an ENERGY STAR® compliant product if offered within the model family. HP computers marked with the ENERGY STAR® Logo are compliant with the applicable U.S. Environmental Protection Agency (EPA) ENERGY STAR® specifications for computers. If a model family does not offer ENERGY STAR® compliant configurations, then energy efficiency data listed is for a

Technical Specifications

typically configured PC featuring a hard disk drive, a high efficiency power supply, and a Microsoft Windows® operating system.

Heat Dissipation*	115 VAC	230 VAC	100 VAC
Normal Operation (Short idle)	30 BTU/hr	31 BTU/hr	29 BTU/hr
Normal Operation (Long idle)	23 BTU/hr	23 BTU/hr	22 BTU/hr
Sleep	3 BTU/hr	3 BTU/hr	3 BTU/hr
Off	2 BTU/hr	2 BTU/hr	2 BTU/hr

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

Declared Noise Emissions (in accordance with ISO 7779 and ISO 9296)	Sound Power (LWAd, bels)	Sound Pressure (LpAm, decibels)
Typically Configured – 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 the 5ppm by weight
  Cadmium greater than 10ppm by weight

Battery size: CR2032 (coin cell)
Battery type: Lithium

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

Packaging Materials
  • External:

Technical Specifications

        ○ PAPER/Corrugated 95 g
        ○ PAPER/Cardboard & misc 368 g
- Internal:
        ○ PLASTIC/EPE-Expanded Polyethylene 8 g
        ○ PLASTIC/Polyethylene low density 17 g
        ○ OTHER/OTHER 20 g
        ○ PLASTIC/PET 2.5 g

- The plastic packaging material contains at least 65 % recycled content.
- The corrugated paper packaging materials contains at least 80% recycled content.

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 µgrams/cm2/week, measured according to EN 1811:1998, are not used on any product surface designed to be frequently handled or touched by users.

Packaging Usage

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.

Technical Specifications

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
Eco-label certifications
http://www8.hp.com/us/en/hp-information/environment/ecolabels.html
ISO 14001 certificates:

http://www.hp.com/hpinfo/globalcitizenship/environment/pdf/PC_GBU_Product_Design_ISO_14K_Certificate.pdf

and

http://www.hp.com/hpinfo/globalcitizenship/environment/pdf/cert.pdf

Country of Origin

China

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

Type	Description	Part #
Cases	HP Business Nylon Backpack (up to 17.3")	BP849AA
	HP Business 4 Wheel Roller Case	H5M93AA
Docking	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
Input/Output – Mice	HP Wireless Mobile Mouse	H2L63AA
	HP X4000b Bluetooth Mouse	H3T50AA#xxx
Input/Output – Keyboards	HP Wireless Mobile Mouse	H4B79AA
	HP X4000b Bluetooth Mouse	H4B80AA
Memory	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
Adapters	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
Security	HP Notebook Combo Lock	AY475AA#XXX
	HP UltraSlim Keyed Cable Lock	H4D73AA
Storage - External Storage	HP Mobile USB DVDRW Non-LS	A2U57AA

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

Summary of Changes

Date of change:	Version History:		Description of change:
June 3, 2014	From vMay'14 to vJune'14	Changed	Added change log