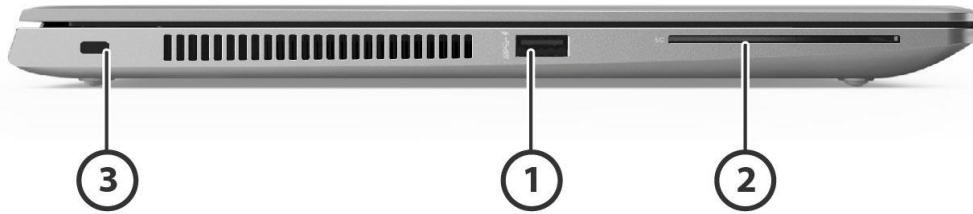## Overview

HP ZBook 14u G5 Mobile Workstation
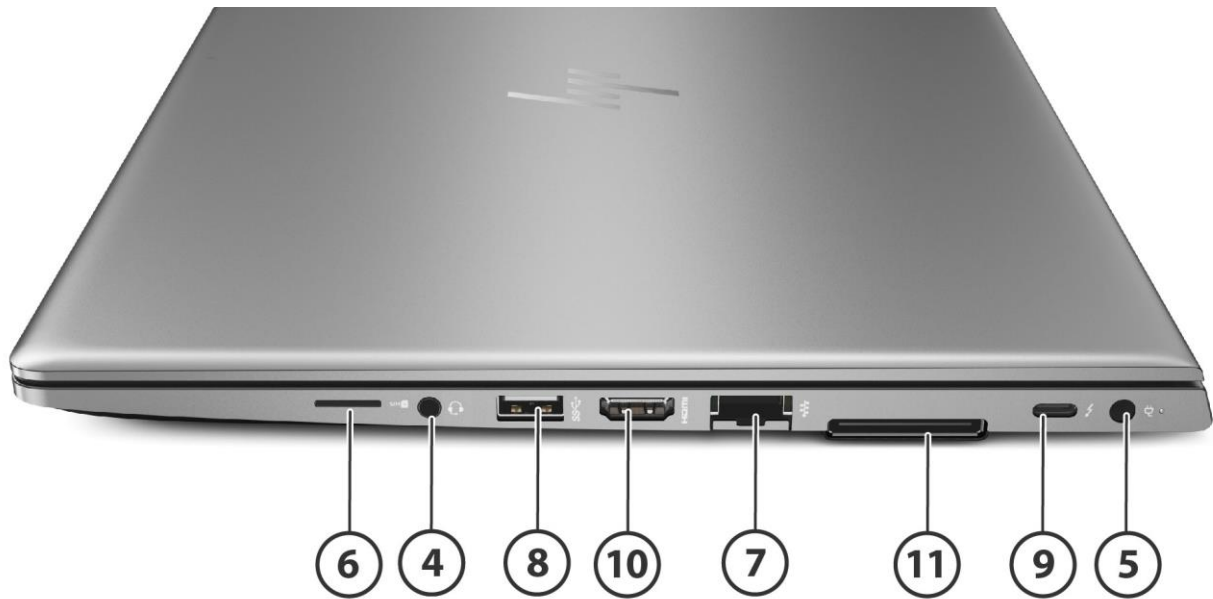

Front

Overview

Left

1. 1 USB 3.0 (charging)
2. 1 smart card reader
3. Security lock slot

Overview

Right

4.	1 headphone/microphone combo	8.	1 USB 3.0
5.	1 power connector	9.	Thunderbolt 3™
6.	1 UHS-II SD card reader	10.	1 HDMI port
7.	1 Ethernet port (RJ-45)	11.	Side Docking connector

Overview

At A Glance

- Windows 10 editions, or FreeDOS
- Value performance form factor and thinner industrial design than previous generation workstation grade products.
- Thin & light value performance industrial design, Casted magnesium-reinforced chassis, top cover frame features soft touch paint with lightweight aluminum insert anodized in HP's new "Turbo Silver" color. Backlight keyboard in full aluminum deck with magnesium bottom reinforcement, chemically strengthened glass touchpad, and updated system functions indicators. HP Spill Resistant Collaboration Keyboard with Durakeys, touchpad buttons with Duracoat finish..
- Designed to pass military standard MIL-STD-810G testing*.
- Workstation-caliber AMD Radeon Pro™ discrete graphics: AMD Radeon Pro™ WX3100 (2 GB dedicated GDDR5); AMD Enduro™ graphics technology.
- ISV certified to provide fast and reliable performance with workstation applications, including manipulation of 3D textures
- Choice of 8th generation Intel® Core™ i7 and i5 processors
- Intel® Core™ i7 with vPro™ and Core™ i5 with vPro™ technology (optional)
- HP Performance Advisor for optimal configuration, compatibility and performance
- Up to two SODIMMs, for system memory up to 32GB
- Supports up to 3 independent displays via internal LCD Panel, system DisplayPort™, system VGA, or using the HP UltraSlim Docking Station or HP Thunderbolt Docking Station. Supports DisplayPort™ 1.2 monitors.
- Bang and Olufsen audio optimized for high fidelity audio with immersive surround sound with deep, rich bass and crystal clear dialog without distortion at high volume
- 3-cell (50 WHr) HP Long Life Battery
- 2 discrete buttons with LED indicator for convenient one touch access: Wireless On/Off, Volume Mute
- Widescreen 14-inch diagonal anti-glare LED-backlit display:
- FHD (1920x1080) ultrawide viewing angle, FHD Touch (1920x1080) standard viewing angle, FHD Touch (1920x1080) standard viewing angle w/ SureView privacy technology, UHD (3840x2160) ultrawide viewing angle
- Supports wireless LAN and wireless WAN options for connectivity on the go.
- One dedicated drive slots. (1) M.2 slot
- Security features including HP Client Security Manager, with central management
- Low halogen, ENERGY STAR® certified and EPEAT® TBD registered in the U.S. EPEAT® status varies by country- please see epeat.net.
- HP BIOS self-healing technology including HP Sure Start to prevent, detect, and remedy known and unknown BIOS attacks.

* MIL STD 810G testing is pending and is not intended to demonstrate fitness for U.S. Department of Defense contract requirements or for military use. Test results are not a guarantee of future performance under these test conditions. Accidental damage requires an optional HP Accidental Damage Protection Care Pack.

NOTE: See important legal disclosures for all listed specs in their respective features sections.

Features

OPERATING SYSTEM

Preinstalled OS   Windows 10 Pro 64*
                             Windows 10 Home 64 High End*

                             FreeDOS 2.0

Supported OS   Windows 10 Enterprise 64*

* Not all features are available in all editions or versions of Windows. Systems may require upgraded and/or separately purchased hardware, drivers, software or BIOS update to take full advantage of Windows functionality. Windows 10 is automatically updated, which is always enabled. ISP fees may apply and additional requirements may apply over time for updates. See http://www.windows.com

NOTE: Your product does not support Windows 8 or Windows 7
In accordance with Microsoft's support policy, HP does not support the Windows® 8 or Windows 7 operating system on products configured with Intel and AMD 7th generation and forward processors or provide any Windows® 8 or Windows 7 drivers on http://www.support.hp.com

PROCESSOR*

7th Generation Intel® Core™ i5 7300U (2.6 GHz, 3 MB cache, 2 cores) * Up to 3.5 GHz with Intel® Turbo Boost Technology
7th Generation Intel® Core™ i5 7200U (2.5 GHz, 3 MB cache, 2 cores) * Up to 3.1 GHz with Intel® Turbo Boost Technology
8th Generation Intel® Core™ i7 8650U (1.9 GHz, 8 MB cache, 4 cores) * Up to 4.2 GHz with Intel® Turbo Boost Technology
8th Generation Intel® Core™ i7 8550U (1.8 GHz, 8 MB cache, 4 cores) * Up to 4.0 GHz with Intel® Turbo Boost Technology
8th Generation Intel® Core™ i5 8350U (1.7 GHz, 6 MB cache, 4 cores) * Up to 3.6 GHz with Intel® Turbo Boost Technology
8th Generation Intel® Core™ i5 8250U (1.6 GHz, 6 MB cache, 4 cores) * Up to 3.4 GHz with Intel® Turbo Boost Technology

* 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. Performance and clock frequency will vary depending on application workload and your hardware and software configurations. Intel's numbering, branding and/or naming is not a measurement of higher performance.

Also note that the Intel® Turbo Boost is based on max GHz for a single core.

Features

CHIPSET

Intel® Kaby Lake Chipset integrated with processor

INTEL® CORE™ I5 WITH VPRO/CORE I7 WITH VPRO TECHNOLOGY CAPABLE

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

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

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

GRAPHICS

Intel® UHD 620 Graphics*

AMD Radeon Pro™ WX3100 (2 GB dedicated GDDR5) **

Microsoft DirectX® 12 (Shader Model 5.0) and OpenGL® 4.3capable

AMD Enduro™ Technology supported.

* HD content required to view HD images
** Supports up to 3 independent displays via internal LCD Panel, system DisplayPort™, system VGA, or using the HP UltraSlim Docking Station DisplayPort™ and VGA ports (sold separately).

DISPLAY

Internal

14.0" diagonal LED backlit FHD UWVA eDP anti-glare (1920 x 1080)
14.0" diagonal LED backlit FHD UWVA eDP+PSR anti-glare (1920 x 1080)
14.0" diagonal Touch LED-backlit FHD UWVA eDP (1920 x 1080)
14.0" diagonal Touch LED-backlit FHD UWVA eDP+PSR, anti-glare + SureView Privacy filter (1920 x 1080)
14.0" diagonal LED backlit UHD UWVA eDP+PSR (3840 x 2160)

External
Up to 30-bit (2^30) per pixel "Deep Color"
(total of 1,073,741,824 color variations)

DisplayPort™ w/MST (Multi-stream Transport)
Supports resolutions up to UHD 3840 x 2160, 24/30-bit color depth at 60 Hz, and WUXGA (1920 x 1200) monitors, with 24/30-bit color depth up to 120 Hz.

Features

DisplayPort™ Features

- Multi-stream Transport (MST): Multi-stream Transport is a DisplayPort™ 1.2 feature that allows daisy chaining of DisplayPort™ 1.2 monitors (requires monitor with DisplayPort™ 1.2 MST capability), or the use of DisplayPort™ 1.2 hubs with MST to achieve a maximum of 3 active displays.

DVI-D (single link)
DVI support requires a DP-to-DVI adapter (sold separately). Dual-Link DVI is supported with an active USB powered adapter (sold separately).

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

STORAGE AND DRIVES

Primary Storage Bay

M.2 SATA SED SSD
512GB SATA-3 SS TLC SSD FIPS-140-2

HP Z Turbo Drive (NVMe PCIe SSD)
256GB PCIe Gen3x4 (NVMe) TLC Solid State Drive
512GB PCIe Gen3x4 (NVMe) TLC Solid State Drive
1TB PCIe Gen3x4 (NVMe) TLC Solid State Drive
256GB PCIe Gen3x4 (NVMe) TLC Solid State Drive Opal 2
512GB PCIe Gen3x4 (NVMe) TLC Solid State Drive Opal 2
256GB PCIe Gen3x4 (NVMe) MLC Solid State Drive
512GB PCIe Gen3x4 (NVMe) MLC Solid State Drive
1TB PCIe Gen3x4 (NVMe) MLC Solid State Drive

* For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to up to 30 GB (for Windows 10) disk is reserved for system recovery software.

Features

DRIVE CONTROLLERS

M.2 Storage Bay (SATA):	SATA-3 for SSD
HP Z Turbo Drive:	PCIe NVMe SSD
RAID:	Not supported

NOTE: Raid 0, 1 supported only on SATA drives.

MEMORY

Standard
32 GB DDR4 1.2V Non ECC SDRAM (Transfer rates up to 2400MT/s)
Two SODIMM slots supporting dual-channel memory
4 GB, 8GB and 16 GB SODIMMs

Maximum
Upgradeable to 32768 MB with optional 16384 MB SODIMMs in 2 slots

Dual-channel
Maximized dual-channel performance requires SODIMMs of the same size and speed in both memory channels.

* Maximum memory capacities assume Windows 64-bit operating systems or Linux. With Windows 32-bit operating systems, memory above 3 GB may not all be available due to system resource requirements.

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.

NETWORKING/COMMUNICATIONS

Communications
Intel® I219-LM Gigabit* Network Connection (vPro configurations)
Intel® I219-V Gigabit* Network Connection (non-vPro configurations)

* 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.

Wireless
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) combined with the supported wireless LAN option.

802.11 Wireless LAN*

Intel® Dual Band Wireless-AC 8265 802.11 a/b/g/n/ac (2x2) WiFi + Bluetooth 4.2 Combo Adaptor* (vPro)
Intel® Dual Band Wireless-AC 8265 802.11 a/b/g/n/ac (2x2) WiFi + Bluetooth 4.2 Combo Adaptor* (non-vPro)

Wireless WAN - Mobile Broadband **

Features

HP lt4120 Qualcomm® Snapdragon™ X5 LTE Mobile Broadband Module (optional)
HP lt4132, LTE/HSPA+ 4G Mobile Broadband Module (optional)

HP hs3210 HSPA+ Mobile Broadband Module (optional)

Near Field Communications (NFC)
HP Module with NXP NFC Controller NPC100

* Wireless cards are optional or add-on features and requires separately purchased wireless access point and internet service. Availability of public wireless access points limited. The specifications for the 802.11ac WLAN are draft specifications and are not final. If the final specifications differ from the draft specifications, it may affect the ability of the notebook to communicate with other 802.11ac WLAN devices.

** WWAN use requires separately purchased service contract. Check with service provider for coverage and availability in your area. Connection speeds will vary due to location, environment, network conditions, and other factors. 4G LTE not available on all products, and in all regions.

AUDIO/MULTIMEDIA

Audio
Bang and Olufsen audio
Integrated stereo speakers
Integrated microphone (dual-microphone array when equipped with optional webcam)
Button for volume mute; function keys for volume up and down
Combo mic-in / stereo headphone-out jack

Webcam
720 HD webcam with IR (Near infrared imaging – optional)
- Microsoft Hello Certification: Microsoft face authentication in Windows 10 is an enterprise-grade identity verification mechanism
- Microsoft Skype for Business1 Certified
- HD format (widescreen 16:9)
- Supports videoconferencing and still image capture
- High quality fixed focus lens
- Video capture at various resolutions up to 1280x720 resolution (720p) and up to 30fps
- M-JPEG compression supports higher frame rates for video capture and videoconferencing
- Improved low light sensitivity
- Improved dynamic range
 * HD content required to view HD images.

KEYBOARDS/POINTING DEVICES/BUTTONS & FUNCTION KEYS

Keyboard
Optional backlit keyboard with Function key control to toggle backlit brightness setting - off/full/half brightness
The HP spill-resistant keyboard is designed using a thin layer of Mylar film under the keyboard and a drain system that funnels fluid through a hole in the bottom of the notebook. This minimizes the risk of damage to sensitive components underneath. The 86-key compatible keyboard features a full-pitch key layout with desktop keyboard features, such as editing keys, both left and right control and alt keys, function keys, and 18.7 x 18.4 mm key pitch (center-to-center spacing). U.S. and International key layouts are available. Other features include hot keys for instant access to power conservation and brightness.

Features

Pointing Devices
Point stick with two additional point stick buttons
Image sensor Clickpad for enhanced performance and improved precision on scroll and gesture

Function Keys
Function keys provide control of the following features: standby mode, external display, volume down, volume up, and display brightness.

F1 - Display Switching
F2 - Blank or SureView
F3 - Brightness Down
F4 - Brightness Up
F5 - Audio Mute
F6 - Volume Down
F7 - Volume Up
F8 - Mic Mute
F9 - Backlit Toggle
F10 - Numlk
F11 - Wireless
F12 - Calendar
>Share/Present
>Call Answer
>Call End

SOFTWARE AND SECURITY

Preinstalled Software with Windows Operating System

BIOS
HP BIOSphere Gen3[1]
HP Sure Start Gen3 [2]
HP DriveLock | HP Automatic DriveLock
BIOS Update via Network
Master Boot Record Security
Power On Authentication
Secure Erase[3]
Absolute Persistence Module[4]
Pre-boot Authentication

Multi Media
Cyberlink Power MediaPlayer CMIT

Communication / Connectivity
HP Mobile Connect Pro[5]
Native Miracast Support[6]
HP LAN-WLAN Protection
HP MAC Address Manager (select models only)
HP Wireless Wakeup (select models only)
HP SureConnect

HP Value Add Software
HP 3D DriveGuard 6
HP ePrint Driver + JetAdvantage[7]

Features

HP Hotkey Support
HP Recovery Manager
HP Jumpstart
HP Support Assistant[12]
HP Noise Cancellation Software
HP Performance Advisor
HP Remote Graphics Software
HP Velocity

Microsoft Products
Buy Office
Bing Search
Skype[8]

Manageability
HP Driver Packs [9]
HP SoftPaq Download Manager (SDM)
HP System Software Manager (SSM) [9]
HP BIOS Config Utility (BCU) [9]
HP Client Catalog [9]
HP Manageability Integration Kit for Microsoft SCCM [10]
HP Image Assistant
LANDESK Management [11]

For more information on HP Client Management Solutions refer to: http://www.hp.com/go/clientmanagement.

Client Security Software
- HP Client Security Suite Gen3[13]
- HP Security Manager (including Credential Manager and Password Manager)
- HP Fingerprint Sensor
- Power On Authentication
- Device Access Manager
- Microsoft Defender [14]
- HP WorkWise[15]

Standard
For Windows 10, Trusted Platform Module (TPM) 2.0 (Infineon SLB9670). Common Criteria EAL4+ Certified.
HP Fingerprint Reader

For more information on HP Client Security Software Suite, refer to http://www.hp.com/go/clientsecurity.

1.   Requires Intel® 7th generation processors
2.   Available on HP Elite and Z products equipped with Intel® 7th generation processors.
3.   For the methods outlined in the National Institute of Standards and Technology Special Publication 800-88. Supported on Elite and Z platforms with BIOS version F.03 or higher
4.   Absolute agent is shipped turned off, and will be activated when customers activate a purchased subscription. Subscriptions can be purchased for terms ranging multiple years. Service is limited, check with Absolute for availability outside the U.S. The Absolute Recovery Guarantee is a limited warranty. Certain conditions apply. For full details visit: http://www.absolute.com/company/legal/agreements/ computrace-agreement. Data Delete is an optional service provided by Absolute Software. If utilized, the Recovery Guarantee is null and void. In order to use the Data Delete service, customers must first sign a Pre-Authorization Agreement and either obtain a PIN or purchase one or more RSA SecurID tokens from Absolute Software.
5.   HP Mobile Connect Pro is only available on preconfigured devices with WWAN. For geographic availability refer to http://www.hp.com/go/mobileconnect

Features

6. Miracast is a wireless technology your PC can use to project your screen to TVs, projectors, and streaming media players that also support Miracast. You can use Miracast to share what you're doing on your PC and present a slide show. For more information: http://windows.microsoft.com/en-us/windows-8/project-wireless-screen-miracast
7. 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 http://www.hp.com/go/eprintcenter). Separately purchased data plans or usage fees may apply. Print times and connection speeds may vary.
8. Skype is not offered in China.
9. Not preinstalled, however available for download at http://www.hp.com/go/clientmanagement
10. HP Manageability Integration Kit can be downloaded from http://www8.hp.com/us/en/ads/clientmanagement/overview.html
11. Subscription required.
12. Requires Windows and Internet Access
13. Requires Windows and Intel® 7th generation processors.
14. Opt in and internet connection required for updates.
15. HP WorkWise smartphone app is available as a free download on the App Store and Google Play. As of September 2017, HP WorkWise will no longer support iOS or iPhone® devices.

Workstation ISV Certifications

Find the latest list of certifications at: http://www.hp.com/go/isv

HP Remote Graphics Software

The remote desktop solution for serious workstation users and their most demanding applications.
Download at: http://www.hp.com/go/RGS

HP Performance Advisor

Get the most out of your HP Workstation on day one—and every day thereafter. Designed for all users regardless of technical background, this ultra-savvy software wizard is the simplest and most effective way to make sure your computer is always operating at its optimum potential.
Download at: http://www.hp.com/go/performanceadvisor

Security

See Software section above.

Other Standard Security Features

Integrated Smart Card Reader
One-Step Logon
Security lock slot
Support for Intel® AT

Optional Security Features

HP Fingerprint Sensor (optional)
Absolute Data Protect* with GPS Tracking - Subscription based security solution providing the ability to track, initiate physical recovery, conduct asset management, and perform remote data delete by utilizing GPS technology. GPS functionality requires HP Mobile Broadband Module.
* The Absolute Data Protect 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.

HP CENTRAL MANAGEMENT

QuickSpecs

Features

HP offers a variety of scalable hardware, software, and BIOS-based security features to help you defend your organization against viruses and other threats. These integrated security features safeguard what matters to you the most - your data, device and identity. Now, be confident your fleet of devices is protected in multiple layers of HP Client Security protection.

HP BIOS Protection keeps you up and running with enhanced protection against virus attacks and other threats. And if the BIOS is accidently compromised, the auto recovery feature automatically restores it to its fully functional state.

HP Sure Start detects and negates a BIOS attack with automatic recovery of the BIOS even when the installation is accidentally compromised (i.e. power outage). When HP Sure Start heals the BIOS an event log is generated that an IT administrator can retrieve so the business is aware of a BIOS attack. Golden copy of BIOS is stored in protected nonvolatile memory providing redundant, hardware-based protection against a new generation of attacks.

An optional fingerprint reader and integrated Smart Card Reader help keep your identity secure. The security cable slot helps keep your notebook physically secure.

You can even permanently destroy data on your hard drive in preparation for your system disposal or redeployment with Secure Erase.

Features

POWER

Power Supply
HP 65W Slim Smart AC Adapter

Primary Battery
HP 3-cell Long Life Polymer Battery (50 WHr)

Battery Life
Battery life up to 10 hours *

System Standby Time
Up to TBD weeks**

*Battery life will vary depending on the product model, configuration, loaded applications, features, use, wireless functionality and power management settings. The maximum capacity of the battery will naturally decrease with time and usage. See MobileMark14 battery benchmark https://bapco.com/products/mobilemark-2014/ for additional details.
** Standby life will vary depending on various factors including battery, Memory, CPU, EC and LAN chip. The maximum capacity of the battery will naturally decrease with time and usage.

Power Conservation
AMD® Polaris™ Technology
Hibernation
Standby
ACPI compliance

ENVIRONMENTAL

US ENERGY STAR®
IT ECO declaration
EPEAT® registered where applicable. EPEAT® registration varies by country. See http://www.epeat.net for registration status by country. See HP's 3rd party option store for solar energy accessory www.hp.com/go/options.

NOTE: 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.

WEIGHTS & DIMENSIONS

Weight

Starting at   3.27 lb (1.48 kg)

Dimensions (w x d x h)

 12.84 x 9.22 x 0.71 in

 326 x 234.3 x 17.9 mm

NOTE: Height varies depending upon where on the notebook the measurement is made. Weight varies by configuration and components. Weight includes 3 cell 46Whr battery, without hard drive and with 256 GB Z Turbo Drive (PCIe SSD).

Features

PORTS/SLOTS

Ports

Left side:

(1) USB 3.0 Charging Port
(1) Security lock slot

Right side:
(1) Thunderbolt 3™
(1) USB 3.0 Port
(1) Headphone/Microphone Combo
(1) RJ-45 / Ethernet
(1) Side Docking connector
(1) Power connector

Digital Media Slots
(1) SD UHS-II Flash Media slot – Supports next generation SD (Secure Digital), backward compatible to SDHC, SDXC
(1) Integrated Smart Card Reader (Compatible with ISO 7816 compliant Smart Cards PC/SC interface support)

SERVICE AND SUPPORT

Limited 3-year or 1-year limited warranty options available, depending on country. Batteries have the same 1-year or 3-year limited warranty as the platform. Optional[1] HP Care Pack Services are extended service contracts which go beyond your standard limited 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/cpc.

1. Sold separately or as an optional feature. Service levels and response times for HP Care Packs may vary depending on your geographic location. Service starts on date of hardware purchase. Restrictions and limitations apply. HP services are governed by the applicable HP terms and conditions of service provided or indicated to Customer at the time of purchase. Customer may have additional statutory rights according to applicable local laws, and such rights are not in any way affected by the HP terms and conditions of service or the HP Limited Warranty provided with your HP Product. Consult your local HP Customer Support Center for details.

Technical Specifications – System Unit

SYSTEM UNIT

Stand-Alone Power Requirements (AC Power)	**Nominal Operating Voltage**	19.5 V dc @ 3.3 A
	Average Operating Power	Windows® 10 (64-bit)
		AMD FirePro™ Graphics
	Max Operating Power	< 65 W
Temperature	**Operating**	32° to 95° F (0° to 35° C) (not writing optical)
		41° to 95° F (5° to 35° C) (writing optical)
	Non-operating	–4° to 140° F (–20° to 60° C)
Relative Humidity	**Operating**	10% to 90%, non-condensing
	Non-operating	5% to 95%, 101.6° F (38.7° C) maximum wet bulb temperature
Shock	**Operating**	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 15,000 ft. (-15.24 to 12,192 m)
Planned Industry Standard Certifications	**UL**	Yes
	CSA	Yes
	FCC Compliance	Yes
	ENERGY STAR®	Select models*
	EPEAT®	Gold target**
	ICES	Yes
	Australia / NZ A-Tick Compliance	Yes
	CCC	Yes
	Japan VCCI Compliance	Yes
	KCC	Yes
	BSMI	Yes
	CE Marking Compliance	Yes
	MIL STD*	Planned

* Configurations of the HP ZBook 14u G5 that are ENERGY STAR® certified are identified as HP ZBook 14u G5 ENERGY STAR® on HP websites and on http://www.energystar.gov.

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

*** MIL STD 810G testing is pending and is not intended to demonstrate fitness for U.S. Department of Defense contract requirements or for military use. Test results are not a guarantee of future performance under these test conditions. Damage under the MIL STD test conditions or any accidental damage requires an optional HP Accidental Damage Protection Care Pack.

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

Technical Specifications – Displays

DISPLAYS

14.0" diagonal LED backlight FHD UWVA IPS eDP Anti-glare (1920 x 1080)			
Dimensions (W x H)	315.41 x 196.17 max. (w/ PCB)		
Active Area	309.37 x 174.02 (mm)		
Weight	225g max		
Surface Treatment	Anti-glare		
Contrast Ratio	600:1 (typical)		
Refresh Rate	60 Hz		
Brightness	340 nits		
Pixel Resolution	**Format**	1920 x 1080 (FHD)	
	Configuration	RGB	
Backlight	LED		
PPI	157		
Viewing Angle	UWVA 85/85/85/85		

14.0" diagonal LED backlight FHD SVA eDP Anti-glare (1920 x 1080)			
Outline Dimensions (W x H x D)	320.9 x 205.6 x 3 (mm) max		
Active Area	309.40 x 173.95 (mm)		
Weight	270 g max		
Diagonal Size	14.0 (inch)		
Surface Treatment	Anti-Glare (AG)		
Contrast Ratio	300:1 (typical)		
Refresh Rate	60 Hz		
Brightness	300 nits		
Pixel Resolution	**Format**	1920 x 1080 (FHD)	
	Configuration	RGB	
Interface	eDP 1.2		
PPI	157		
Viewing Angle	SVA 45/45/25/35		

14.0" diagonal LED backlight FHD SVA eDP (1920 x 1080) Touch with Camera			
Outline Dimensions (W x H x D)	320.9 x 205.6 x 3 (mm) max		
Active Area	309.40 x 173.95 (mm)		
Weight	270 g max		
Diagonal Size	14.0 (inch)		
Surface Treatment	Anti-smudge/fingerprint coating		
Contrast Ratio	300:1 (typical)		
Touch Enabled	Yes		
TSP Type	Capacitive		
Refresh Rate	60 Hz		
Brightness	300 nits		
Pixel Resolution	**Format**	1920 x 1080 (FHD)	

QuickSpecs

Technical Specifications – Displays

	Configuration	RGB	
	Interface	eDP 1.2	
	LCD Mode	TN	
	PPI	157	
	Viewing Angle	SVA 45/45/25/35	
14.0" diagonal LED backlight HD SVA eDP (1366 x 768)	**Active Area** (W x H)	309.4 x 173.95 (mm)	
	Dimensions (W x H)	320.9 x 205.6 (mm) max	
	Weight	290 g max	
	Surface Treatment	Anti-Glare (AG)	
	Contrast Ratio	300:1 (typ)	
	Refresh Rate	60 Hz	
	Brightness	220 nits	
	Pixel Resolution	**Format**	1920 x 1080 (FHD)
		Configuration	RGB
	Backlight	LED	
	PPI	112	
	Viewing Angle	SVA 45/45/25/35	

Technical Specifications – Storage

STORAGE AND DRIVES*

500 GB 5400rpm Self Encrypting Drive (FIPS-140-2) (Opal 2)			
Drive Weight	0.21 lbs (95 g)		
Capacity	500 GB		
Height	0.28 in (7 mm)		
Width	2.75 in (69.85 mm)		
Interface	ATA-8, SATA 3.0		
Transfer Rate	**Synchronous (maximum)**	600 MB/s	
Seek Time (typical reads, including settling)	**Single Track**	1.5 ms	
	Average	12 ms	
	Maximum	21 ms	
Cache	Up to 32MB		
Rotational Speed	7200 rpm		
Logical Blocks	976,773,168		
Operating Temperature	32° to 140° F (0° to 60° C) [top cover temp]		
Features	ATA Security; TCG Opal 2.x, FIPS, S.M.A.R.T., NCQ, Ultra DMA		

500 GB 7200rpm Hard Drive			
Drive Weight	0.20 lbs (92 g) ~ 0.21 lbs (95 g)		
Capacity	500 GB		
Height	0.28 in (7 mm)		
Width	2.75 in (69.85 mm)		
Interface	ATA-8, SATA 3.0		
Transfer Rate	**Synchronous (maximum)**	1.5 ms ~ 2.0 ms	
Seek Time (typical reads, including settling)	**Single Track**	11 ms ~ 13 ms	
	Average	18 ms ~ 22 ms	
	Maximum	1.5 ms ~ 2.0 ms	
Cache	Up to 32 MB		
Rotational Speed	7200 rpm		
Logical Blocks	976,773,168		
Operating Temperature	32° to 140° F (0° to 60° C) [case temp]		
Features	ATA Security, S.M.A.R.T., NCQ, Ultra DMA		

500 GB 7200rpm Self-Encrypting Drive (Opal 2)			
Drive Weight	0.21 lbs (95 g)		
Capacity	500 GB		
Height	0.28 in (7 mm)		
Width	2.75 in (69.85 mm)		
Interface	ATA-8, SATA 3.0		
Transfer Rate	**Synchronous (maximum)**	600 MB/s	
Seek Time (typical reads, including settling)	**Single Track**	1.5 ms	
	Average	12 ms	
	Maximum	21 ms	
Cache	Up to 32MB		
Rotational Speed	7200rpm		
Logical Blocks	976,773,168		
Operating Temperature	32° to 140° F (0° to 60° C) [top cover temp]		
Features	ATA Security; TCG Opal 2.x, S.M.A.R.T., NCQ, Ultra DMA		

1 TB 5400rpm Hard Drive			
Drive Weight	0.21 lbs (94 g)- 0.21 lbs (95 g)		

Technical Specifications – Storage

	Capacity	1 TB	
	Height	0.28 in (7 mm)	
	Width	2.75 in (69.85 mm)	
	Interface	ATA-8, SATA 3.0	
	Transfer Rate	**Synchronous (maximum)**	600 MB/s
	Seek Time (typical reads, including settling)	**Single Track**	2 ms
		Average	12 ms-13 ms
		Maximum	18 ms-22 ms
	Cache	Up to 32MB	
	Rotational Speed	5400 rpm	
	Logical Blocks	1,953,525,168	
	Operating Temperature	32° to 140° F (0° to 60° C) [case temp]	
	Features	ATA Security, S.M.A.R.T., NCQ, Ultra DMA	
500 GB Hybrid, 8 GB cache	**Drive Weight**	0.198 lbs (90 g) ~ 0.20 lbs (92 g)	
	Capacity	500 GB	
	Height	0.28 in (7 mm)	
	Width	2.75 in (69.85 mm)	
	Interface	ATA-8, SATA 3.0	
	Transfer Rate	**Synchronous (maximum)**	600 MB/s
	Seek Time (typical reads, including settling)	**Single Track**	1.5 ms ~ 2 ms
		Average	12 ms ~13 ms
		Maximum	22 ms ~ 32 ms
	Cache	Up to 128MB	
	Rotational Speed	5400 rpm	
	Logical Blocks	976,773,168	
	Operating Temperature	32° to 140° F (0° to 60° C) [case temp]	
	Features	ATA Security, S.M.A.R.T., NCQ, Ultra DMA	
256 GB M2 2280 SATA-3 Self-Encrypting Drive (Opal 2) TLC Solid State Drive	**Drive Weight**	0.02 lb (10 g)	
	Capacity	256 GB	
	Height	0.09 in (2.23 mm)	
	Width	0.87 in (22 mm)	
	Interface	ATA-8, SATA 3.0	
	Performance	**Maximum Sequential Read**	**Maximum Sequential Write**
		Up to 530 MB/s	Up to 515 MB/s
	Logical Blocks	500,118,192	
	Operating Temperature	32° to 158°F (0° to 70°C) [ambient temp]	
	Features	ATA Security; TCG Opal 2.0, DIPM; TRIM; DEVSLP	
HP Z Turbo Drive 512 GB, M.2 NVMe MLC Solid State Drive	**Drive Weight**	0.022 lb (10 g)	
	Capacity	512 GB	
	Height	0.09 in (2.3 mm)	
	Width	0.87 in (22 mm)	
	NAND Type	MLC	
	Form-Factor (I/O)	M.2 2280	

Technical Specifications – Storage

Interface	PCIe NVMe Gen3X4	
Performance	**Maximum Sequential Read**	**Maximum Sequential Write**
	Up to 3000 MB/s	Up to 1500MB/s
Logical Blocks	1,000,215,216	
Operating Temperature	32° to 158°F (0° to 70°C) [ambient temp]	
Features	ATA Security (option), TRIM; L1.2	

HP Z Turbo Drive 1 TB, M.2 NVMe MLC Solid State Drive	**Drive Weight**	0.02 lb (10 g)	
	Capacity	1024 GB	
	Height	0.09 in (2.3 mm)	
	Width	0.87 in (22 mm)	
	NAND Type	MLC	
	Form-Factor (I/O)	M.2 2280	
	Interface	PCIe NVMe Gen3X4	
	Drive Weight	0.02 lb (10 g)	
	Performance	**Maximum Sequential Read**	**Maximum Sequential Write**
		Up to 3,000 MB/s	Up to 2,900 MB/s
	Logical Blocks	2,000,409,264	
	Operating Temperature	32° to 158°F (0° to 70°C) [ambient temp]	
	Features	ATA Security (Option),TRIM; L1.2	
HP Z Turbo Drive 256 GB, M.2 NVMe MLC Solid State Drive	**Drive Weight**	0.02 lb (10 g)	
	Capacity	256 GB	
	Height	0.09 in (2.23 mm)	
	Width	0.87 in (22 mm)	
	NAND Type	MLC	
	Form-Factor (I/O)	M.2 2280	
	Interface	PCIe NVMe Gen3X4	
	Performance	**Maximum Sequential Read**	**Maximum Sequential Write**
		Up to 3,100 MB/s	Up to 1,400 MB/s
	Logical Blocks	500,118,192	
	Operating Temperature	32° to 158°F (0° to 70°C) [ambient temp]	
	Features	ATA Security (Option);TRIM; L1.2	

Technical Specifications – Storage

HP Z Turbo Drive 256 GB, M.2 NVMe TLC Solid State Drive		
Drive Weight	0.02 lb (10 g)	
Capacity	256 GB	
Height	0.09 in (2.3 mm)	
Width	0.87 in (22 mm)	
NAND Type	TLC	
Form-Factor (I/O)	M.2 2280	
Interface	PCIe NVMe Gen3X4	
Performance	**Maximum Sequential Read**	**Maximum Sequential Write**
	Up to 2,600 MB/s	Up to 900 MB/s
Logical Blocks	500,118,192	
Operating Temperature	32° to 158°F (0° to 70°C) [ambient temp]	
Features	ATA Security (Option); TRIM; L1.2	

HP Z Turbo Drive 512 GB, M.2 NVMe TLC Opal 2 Solid State Drive		
Drive Weight	0.02 lb (10 g)	
Capacity	512 GB	
Height	0.09 in (2.3 mm)	
Width	0.87 in (22 mm)	
NAND Type	M.2 2280	
Form-Factor (I/O)	PCIe NVMe Gen3X4	
Interface	0.02 lb (10 g)	
Performance	**Maximum Sequential Read**	**Maximum Sequential Write**
	Up to 2,600 MB/s	Up to 1,400 MB/s
Logical Blocks	1,000,215,216	
Operating Temperature	32° to 158°F (0° to 70°C) [ambient temp]	
Features	ATA Security (Option);TRIM; L1.2	

HP Z Turbo Drive 512 GB, M.2 SATA TLC FIPS Solid State Drive		
Drive Weight	0.02 lb (10 g)	
Capacity	512 GB	
Height	0.09 in (2.3 mm)	
Width	0.87 in (22 mm)	
~~**Generation**~~		
NAND Type	TLC	
Form-Factor (I/O)	M.2 2280	
Interface	ACS-3, SATA 3.2	
Performance	**Maximum Sequential Read**	**Maximum Sequential Write**
	Up to 530 MB/s	Up to 400 MB/s
Logical Blocks	1,000,215,216	
Operating Temperature	32° to 158°F (0° to 70°C) [ambient temp]	
Features	ATA Security; TCG Opal 2.0; FIPS; DIPM; TRIM; DEVSLP	

Technical Specifications – Storage

* For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to up to 30 GB (for Windows 10) disk is reserved for system recovery software.

Technical Specifications – Security

SECURITY

HP Fingerprint Sensor	Voltage	3.0-3.6V
	Operating temperature	14° - 167°F (-10° - 75°C)
	Current consumption image	36mA
	Low latency wait for finger	950 uA
	Capture rate	3000 lines/sec
	ESD Resistance	IEC 6100-4-2 4B (+/-15KV)
	Detection Matrix	200*1 (plus another secondary line); 508 dpi, sensor area 12*3 mm

Technical Specifications – Networking

NETWORKING/COMMUNICATION

Intel® I219-LM Gigabit Network Connection (vPro configurations)		
	Ethernet Features	10 Mbit/s operation (10BASE-T; IEEE 802.3i; IEEE 802.3 clauses 13-14)
		100 10 Mbit/s operation (10BASE-T; IEEE 802.3i; IEEE 802.3 clauses 13-14)
		100 Mbit/s operation (100BASE-TX; IEEE 802.3u; IEEE 802.3 clauses 21-30)
		1000 Mbit/s operation (1000BASE-T; IEEE 802.3ab; IEEE 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
	Power Management	ACPI compliant - multiple power modes
		Energy Detect Low Power Mode(Green Ethernet)
	Performance Features	TCP/IP/UDP Checksum Offload (configurable)
		Protocol Offload(ARP & NS)
		Large send offload and Giant send offload
		Receiving Side Scaling
		MACSec Offload (802.3ae)
		Intel® vPro
		iSCSI Boot
		RSS is kernel based support (e.g. in Win Server 2013)
		Ultra Low Power at cable disconnect (<1mW) enables platform support for connected standby.
	Manageability	Wake-on-LAN from standby and hibernation (Magic Packet and Microsoft Wake-Up Frame); Wake-on-LAN from off (Magic Packet only)
		PXE 2.1 Remote Boot
		Statistics Gathering (SNMP MIB II, Ethernet-like MIB, Ethernet MIB (802.3x, clause 30))
		Comprehensive diagnostic and configuration software suite
		Virtual Cable Doctor for Ethernet cable status
	Interface	PCI Express 1.1 x1 to fully support ASPM L0s/L1 and CLKREQ. **NOTE:** Intel® I219-LM Gigabit interface is not PCIe compliant. It operates at half of PCIe specification V1.1 (2.5GT/S) speed.
	NIC Device Driver Name	Intel® Ethernet Network Connection I219-LM

Technical Specifications – Networking

Intel® I219-V Gigabit Network Connection (Non-vPro configurations)	Ethernet Features	10 Mbit/s operation (10BASE-T; IEEE 802.3i; IEEE 802.3 clauses 13-14) 100 10 Mbit/s operation (10BASE-T; IEEE 802.3i; IEEE 802.3 clauses 13-14) 100 Mbit/s operation (100BASE-TX; IEEE 802.3u; IEEE 802.3 clauses 21-30) 1000 Mbit/s operation (1000BASE-T; IEEE 802.3ab; IEEE 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
	Power Management	ACPI compliant - multiple power modes Energy Detect Low Power Mode(Green Ethernet)
	Performance Features	TCP/IP/UDP Checksum Offload (configurable) Protocol Offload(ARP & NS) Large send offload and Giant send offload Receiving Side Scaling MACSec Offload (802.3ae) Intel Non-vPro iSCSI Boot
	Manageability	Wake-on-LAN from standby and hibernation (Magic Packet and Microsoft Wake-Up Frame); Wake-on-LAN from off (Magic Packet only) PXE 2.1 Remote Boot Statistics Gathering (SNMP MIB II, Ethernet-like MIB, Ethernet MIB (802.3x, clause 30)) Comprehensive diagnostic and configuration software suite Virtual Cable Doctor for Ethernet cable status
	Interface	PCI Express 1.1 x1 to fully support ASPM L0s/L1 and CLKREQ. NOTE: Intel® 82579 PCIe interface is not PCIe compliant. It operates at half of PCIe specification V1.1 (2.5GT/S) speed.
	NIC Device Driver Name	Intel® 82579LM/82579V Ethernet Network Connection

Technical Specifications – Networking

HP lt4132 LTE/HSPA+ 4G Mobile Broadband Module

Technology/Operating bands	LTE: 2100 (Band 1), 1900 (Band 2), 1800 (Band 3) MHz, 850 (Band 5), 2600 (Band 7), 900 (Band 8) MHz, 800 (Band 20), 700 (Band 28) MHz. HSPA+: 2100 (Band 1), 1900 (Band 2), 850 (Band 5), 900 (Band 8) MHz E-GPRS: 1900 (Band 2), 1800 (Band 3), 850 (Band 5), 900 (Band 8) MHz
Wireless protocol standards	3GPP Release 10 LTE Specification CAT.4, 20MHz BW WCDMA R99, 3GPP Release 5, 6, 7 and 8 UMTS Specification E-GPRS: Class B, Multi-slot class 12, coding schemes CS1 - CS4 and MSC1 - MSC9
GPS	Standalone, A-GPS (MS-B and LTO)
GPS bands	1575.42 MHz ± 1.023 MHz, GLONASS 1596-1607MHz
Maximum data rates	LTE: 150 Mbps (Download), 50 Mbps (Upload) DC-HSPA+: 42 Mbps (Download), 5.76 Mbps (Upload) HSPA+: 21Mbps (Download), 5.76 Mbps (Upload) EDGE: 236.8 kbps (Download), 236.8 kbps (Upload) GPRS: 85.6 kbps(Download), 85.6 kbps (Upload)
Maximum output power	LTE: 23 dBm HSPA+: 23.5 dBm E-GPRS 1900/1800: 26 dBm E-GPRS 900/850: 27 dBm GPRS 1900/1800: 29.5 dBm GPRS 900/850: 32.5 dBm
Maximum power consumption	LTE: 1,200 mA (peak); 900 mA (average) HSPA+: 1,100 mA (peak); 800 mA (average) E-GPRS: 2,600 mA (peak); 500 mA (average)
Form Factor	M.2, 3042-S3 Key B
Weight	6 g
Dimensions (Length x Width x Thickness)	42 x 30 x 2.3 mm

* Mobile Broadband is an optional feature. Connection requires wireless data service contract, network support, and is not available in all areas. Contact service provider to determine the coverage area and availability. Connection speeds will vary due to location, environment, network conditions, and other factors. 4G LTE not available on all products or in all countries.

HP hs3210 HSPA+ Mobile Broadband Module*

Technology/Operating bands	HSPA+: 2100 (Band1), 1900 (Band 2), 850 (Band 5), 900 (Band 8) MHz E-GPRS: 1900 (Band 2), 1800 (Band 3), 850 MHz (Band 5), 900 (Band 8) MHz
Wireless protocol standards	WCDMA R99, 3GPP Release 5, 6 and 7 UMTS Specification E-GPRS: Class B, Multi-slot class 33, coding schemes CS1 - CS4 and MSC1 - MSC9
Maximum data rates	HSPA+: 21.6 Mbps (Download), 5.76 Mbps (Upload) E-GPRS: 296 kbps (Download), 236.8 kbps (Upload) GPRS: 107 kbps (Download), 85.6 kbps (Upload)
Maximum output power	HSPA+: 24 dBm E-GPRS 1800/1900: 26 dBm E-GPRS 850/900: 27 dBm

Technical Specifications – Networking

	GPRS 1800/1900: 30 dBm GPRS 850/900: 33 dBm
Maximum power consumption	HSPA+: 1,100 mA (peak); 800 mA (average) E-GPRS: 2,800 mA (peak); 700 mA (average)
Form Factor	M.2, 2242-S3 Key B
Weight	6 g
Dimensions (Length x Width x Thickness)	1.65 x 8.66 x 0.09 in (42 x 22 x 2.38 mm)

* Mobile Broadband is an optional feature. Connection requires wireless data service contract, network support, and is not available in all areas. Contact service provider to determine the coverage area and availability. Connection speeds will vary due to location, environment, network conditions, and other factors.

HP lt4120 Qualcomm® Snapdragon™ X5 LTE Mobile Broadband Module

Technology/Operating bands	LTE: 2100 (Band 1), 1900 (Band 2), 1800 (Band 3), 1700/2100 (Band 4), 850 (Band 5), 2600 (Band 7), 900 (Band 8), 700 (Band 12 lower), 700 (Band 13 upper), 700 (Band 17 lower), 800 (Band 20), 700 (Band 28). HSPA+: 2100 (Band 1), 1900 (Band 2), 1700/2100 (Band 4), 850 (Band 5), 900 (Band 8) MHz EV-DO: 850 (BC0), 1900 (BC1) MHz (Only work with Verizon network) E-GPRS: 1900 (Band 2), 1800 (Band 3), 850 (Band 5), 900 (Band 8) MHz
Wireless protocol standards	3GPP Release 10 LTE Specification CAT.4, 20MHz BW WCDMA R99, 3GPP Release 5, 6, 7 and 8 UMTS Specification 1xEVDO Release 0, A and B. E-GPRS: Class B, Multi-slot class 12, coding schemes CS1 - CS4 and MSC1 - MSC9
GPS	Standalone, A-GPS (MS-A, MS-B and XTRA)
GPS bands	1575.42 MHz ± 1.023 MHz, GLONASS 1596-1607MHz
Maximum data rates	LTE: 150 Mbps (Download), 50 Mbps (Upload) DC-HSPA+: 42 Mbps (Download), 5.76 Mbps (Upload) HSPA+: 21Mbps (Download), 5.76 Mbps (Upload) CDMA 1xRTT: 153.6 kbps (Download), 153.6 kbps (Upload) EVDO Rel.A: 3.1 Mbps (Download), 1.8 Mbps (Upload) EVDO Rel.B: 14.7 Mbps (Download), 5.4Mbps (Upload) EDGE: 236.8 kbps (Download), 236.8 kbps (Upload) GPRS: 85.6 kbps(Download), 85.6 kbps (Upload)
Maximum output power	LTE: 23 dBm HSPA+: 23.5 dBm 1xRTT/EVDO: 24dBm E-GPRS 1900/1800: 26 dBm E-GPRS 900/850: 27 dBm GPRS 1900/1800: 29.5 dBm GPRS 900/850: 32.5 dBm
Maximum power consumption	LTE: 1,200 mA (peak); 900 mA (average) HSPA+: 1,100 mA (peak); 800 mA (average) 1xRTT/EVDO: 1,000 mA (peak); 700 mA (average) E-GPRS: 2,800 mA (peak); 500 mA (average)
Form Factor	M.2, 3042-S3 Key B
Weight	6.2 g

Technical Specifications – Networking

Dimensions (Length x Width x Thickness)	42 x 30 x 2.3 mm

Intel® Dual Band Wireless-AC 8265 802.11 AC/a/b/g/n (2x2) WiFi + Bluetooth® 4.2 Combo Adaptor* (vPro)	**Wireless LAN Standards**	IEEE 802.11a IEEE 802.11b IEEE 802.11g IEEE 802.11n IEEE 802.11n	
	Interoperability	Wi-Fi certified	
	Frequency Band	802.11b/g/n	2.402 - 2.482 GHz **Note:** The FCC has declared as of January 1, 2015 products that utilize passive scanning on channel 12/13 and are capable of transmitting must fully comply with requirements of 15.247 or otherwise disable those channels
		802.11a	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 **Note:** Indonesia only supports 5.725 - 5.825 GHz (CH149 - CH161)
	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: MCS 0 ~ MCS 15, (20MHz, and 40MHz) 802.11ac : MCS0 ~ MCS9, (1SS, and 2SS) (20MHz, 40MHz, and 80MHz)	
	Modulation	Direct Sequence Spread Spectrum CCK, BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM	
	Security[1]	- IEEE and Wi-Fi 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 CCX4 and CCX Lite - WAPI	
	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]	802.11b : +16dBm minimum 802.11g : +14dBm minimum 802.11a : +14dBm minimum 802.11n HT20(2.4GHz) : +13dBm minimum 802.11n HT40(2.4GHz) : +13dBm minimum	

Technical Specifications – Networking

	• 802.11n HT20(5GHz) : +12dBm minimum	
	• 802.11n HT40(5GHz) : +12dBm minimum	
Power Consumption	Transmit: 2.0 Watts (max)	
	Receive: 1.6 Watts (max)	
	Idle mode (PSP): 180 mW (WLAN Associated)	
	Idle mode: 50 mW (WLAN unassociated)	
	Connect Standby: 10mW (WLAN + BT)	
	Radio disabled: 5 mW	
Power Management	ACPI and PCI Express compliant power management	
	802.11 compliant power saving mode	
Receiver Sensitivity[3]	802.11b, 1Mbps : -94dBm maximum	
	802.11b, 11Mbps : -86dBm maximum	
	802.11g, 6Mbps : -88dBm maximum	
	802.11g, 54Mbps : -74dBm maximum	
	802.11a, 6Mbps : -88dBm maximum	
	802.11a, 54Mbps : -74dBm maximum	
	802.11n, MCS07 : -69dBm maximum	
	802.11n, MCS15 : -66dBm maximum	
	802.11ac, 1SS, MCS-0 : -86dBm maximum	
	802.11ac, 1SS, MCS-9 : -61dBm maximum	
	802.11ac, 2SS, MCS-0 : -83dBm maximum	
	802.11ac, 2SS, MCS-9 : -58dBm maximum	
Antenna Type	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 and Bluetooth communications	
Form Factor	PCI-Express M.2 MiniCard	
Dimensions	Type 2230 : 2.3 x 22.0 x 30.0 mm	
	Or	
	Type 1630 : 2.3 x 16.0 x 30.0 mm	
Weight	Type 2230 : 2.8g	
	Or	
	Type 1630 : 2g	
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 Non-operating	0 to 10,000 ft (3,048 m)
		0 to 50,000 ft (15,240 m)
LED Activity	LED Amber – Radio OFF; LED White – Radio ON	

Technical Specifications – Networking

HP Integrated Module with Bluetooth® 4.2 Wireless Technology		
	Bluetooth® Specification	4.2 Compliant
	Frequency Band	2402 to 2480 MHz
	Number of Available Channels	Legacy: 0~79 (1 MHz/CH) BLE: 0~39 (2 MHz/CH)
	Data Rates and Throughput	Legacy: 3 Mbps data rate; throughput up to 2.17 Mbps
		BLE: 1 Mbps data rate; throughput up to 0.2 Mbps
		Legacy: Synchronous Connection Oriented links up to 3, 64 kbps, voice channels
		Legacy: Asynchronous Connection Less links 2178.1 kbps/177.1 kbps asymmetric (3-DH5) or 864 kbps symmetric (3-EV5)
	Transmit Power	The Bluetooth component shall operate as a Class II Bluetooth device with a maximum transmit power of +4 dBm for BR and EDR

Receiver Sensitivity

Modulation	0.01% BER	0.001% BER
GFSK	–80 dBm	–70 dBm
π/4-DQPSK	–80 dBm	–70 dBm
8DPSK	–80 dBm	–70 dBm

	Power Consumption	Peak (Tx) 330 mW Peak (Rx) 230 mW Selective Suspend 17 mW
	Antenna	Internally integrated within module
	Range	Legacy Up to 33 ft (10 m) BLE Up to 99 ft (30 m)
	Electrical Interface	USB 2.0 compliant
	Bluetooth® Software Supported	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 Certifications	Microsoft Windows ACPI, and USB Bus Support
		Self-configurable to optimize power conservation in all operating modes, including Standby, Hold, Park, and Sniff
	Security	All necessary regulatory approvals for supported countries, including:
		FCC (47 CFR) Part 15C, Section 15.247 & 15.249
	Power management certifiactions	ETS 300 328, ETS 300 826 Low Voltage Directive IEC950 UL, CSA, and CE Mark
	Certifications **Bluetooth® Profiles Supported**	Serial Port Profile (SPP)1 Service Discovery Application Profile (SDAP) Dial-Up Networking (DUN)1,2 Generic Object Exchange Profile (GOEP)1,2 Object Push Profile (OPP)1,2 Hard Copy Cable Replacement (HCRP)1,2 Personal Area Networking Profile (PAN)1,2 Human Interface Device Profile (HID)1,2 Hands Free Profile (HFP) Advanced Audio Distribution Profile (A2DP) Audio Video Remote Control Profile (AVRCP)

Technical Specifications – Networking

Bluetooth® V4.2 support feature   V4.2: ESR8 compliant, LE Secure Connection – Basic.

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

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.

Technical Specifications – Networking

Intel® Dual Band Wireless-AC 8265 802.11 AC/a/b/g/n (2x2) WiFi + Bluetooth® 4.2 Combo Adaptor* (non-vPro)	Wireless LAN Standards	IEEE 802.11a IEEE 802.11b IEEE 802.11g IEEE 802.11n IEEE 802.11ac
	Interoperability	Wi-Fi certified
	Frequency Band	802.11b/g/n
		2.402 - 2.482 GHz Note: The FCC has declared as of January 1, 2015 products that utilize passive scanning on channel 12/13 and are capable of transmitting must fully comply with requirements of 15.247 or otherwise disable those channels 802.11a • 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 Note: Indonesia only supports 5.725 - 5.825 GHz (CH149 – CH161)
	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. 802.11ac : MCS0 ~ MCS9, (1SS, and 2SS) (20MHz, 40MHz, and 80MHz)
	Modulation	Direct Sequence Spread Spectrum BPSK, QPSK, CCK, 16-QAM, 64-QAM, 256-QAM
	Security[1]	• IEEE and Wi-Fi 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 CCX4 and CCX Lite • 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]	• 802.11b : +16dBm minimum • 802.11g : +14dBm minimum • 802.11a : +14dBm minimum

Technical Specifications – Networking

- 802.11n HT20(2.4GHz) : +13dBm minimum
- 802.11n HT40(2.4GHz) : +13dBm minimum
- 802.11n HT20(5GHz) : +12dBm minimum
- 802.11n HT40(5GHz) : +12dBm minimum
- 802.11ac 80MHz(5GHz) : +11dBm minimum

Power Consumption	Transmit: 2.0 W (max) Receive: 1.6 W (max) Idle mode (PSP): 180 mW (WLAN Associated) Idle mode: 60 mW (WLAN unassociated) Radio disabled: 30 mW
Power Management	ACPI and PCI Express compliant power management 802.11 compliant power saving mode
Receiver Sensitivity[3]	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 type	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
Form Factor	PCI-Express Half-MiniCard
Dimensions	0.134 x 1.06 x 1.18 in (3.4 x 26.8 x 30 mm)
Weight	3.1g
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 Amber - Radio OFF; LED White - 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).

HP Integrated Module with Bluetooth® 4.2 Wireless Technology

Bluetooth Specification	4.0+EDR Compliant
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

Technical Specifications – Networking

	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	The Bluetooth component shall operate as a Class II Bluetooth device with a maximum transmit power of +4 dBm for BR and EDR
Receiver Sensitivity	Better than -20 dBM at 0.1 % raw bit error rate
Power Consumption	Peak (Tx) 330 mW Peak (Rx) 230 mW Selective Suspend 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	Serial Port Profile (SPP)[1] Service Discovery Application Profile (SDAP) Dial-Up Networking (DUN)[1,2] Generic Object Exchange Profile (GOEP)[1,2] Object Push Profile (OPP)[1,2] File Transfer Profile (FTP) Synchronization Profile (SYNC) Hard Copy Cable Replacement (HCRP)[1,2] Personal Area Networking Profile (PAN)[1,2] Human Interface Device Profile (HID)[1,2] 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
* Wireless access point and internet service required. Availability of public wireless access points limited.

QuickSpecs

Technical Specifications – Networking

Intel® Dual Band Wireless-AC 3168 802.11 ac (1x1) WiFi and Bluetooth® 4.2 Combo Adapter (non-vPro)	**Wireless LAN Standards**	IEEE 802.11a IEEE 802.11b IEEE 802.11g IEEE 802.11n IEEE 802.11ac
	Interoperability	Wi-Fi certified
	Frequency Band	802.11b/g/n • 2.402 – 2.482 GHz **Note:** The FCC has declared as of January 1, 2015 products that utilize passive scanning on channel 12/13 and are capable of transmitting must fully comply with requirements of 15.247 or otherwise disable those channels. 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 **Note:** Indonesia only supports 5.725 - 5.825 GHz (CH149 – CH161)
	Data Rates	• 802.11b: 1, 2, 5.5, 11 Mbps • 802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps • 802.11a: 6, 9, 12, 18, 24, 36, 48, 54 Mbps • 802.11n: MCS 0 ~ MCS 15, (20MHz, and 40MHz) • 802.11ac : MCS0 ~ MCS7, (1SS) (20MHz, 40MHz, and 80MHz)
	Modulation	Direct Sequence Spread Spectrum BPSK, QPSK, CCK, 16-QAM, 64-QAM, 256-QAM
	Security[1]	• IEEE and Wi-Fi 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 CCX4 and CCX Lite • 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]	• 802.11b : +16dBm minimum • 802.11g : +14dBm minimum • 802.11a : +14dBm minimum • 802.11n HT20(2.4GHz) : +13dBm minimum • 802.11n HT40(2.4GHz) : +13dBm minimum • 802.11n HT20(5GHz) : +12dBm minimum • 802.11n HT40(5GHz) : +12dBm minimum • 802.11ac 80MHz(5GHz) : +11dBm minimum
	Power Consumption	Transmit: 2.0 W (max)

Technical Specifications – Networking

	Receive: 1.6 W (max) Idle mode (PSP): 180 mW (WLAN Associated) Idle mode: 60 mW (WLAN unassociated) Radio disabled: 30 mW	
Power Management	ACPI and PCI Express compliant power management 802.11 compliant power saving mode	
Receiver Sensitivity[3]	802.11b, 1Mbps : -94dBm maximum 802.11b, 11Mbps : -86dBm maximum 802.11g, 6Mbps : -88dBm maximum 802.11g, 54Mbps : -74dBm maximum 802.11a, 6Mbps : -86dBm maximum 802.11a, 54Mbps : -72dBm maximum 802.11n, MCS07 : -69dBm maximum 802.11n, MCS15 : -66dBm maximum 802.11ac, 1SS, MCS-0 : -86dBm maximum 802.11ac, 1SS, MCS-9 : -61dBm maximum 802.11ac, 2SS, MCS-0 : -83dBm maximum 802.11ac, 2SS, MCS-9 : -58dBm maximum	
Antenna type	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	
Form Factor	PCI-Express M.2 MiniCard	
Dimensions	Type 2230 : 2.3 x 22.0 x 30.0 mm Or Type 1630 : 2.3 x 16.0 x 30.0 mm	
Weight	Type 2230 : 2.8g Or Type 1630 : 2g	
Operating Voltage	3.3v +/- 9%	
Temperature	Operating Non-operating	14° to 158° F (-10° to 70° C) 40° to 176° F (-40° to 80° C)
Humidity	Operating Non-operating	10% to 90% (non-condensing) 5% to 95% (non-condensing)
Altitude	Operating Non-operating	0 to 10,000 ft (3,048 m) 0 to 50,000 ft (15,240 m)

Near Field Communications (NFC)

Controller	HP Module with NXP NFC Controller NPC100
Supports	• Windows 8, Proximity Events • Windows 7, PC/SC • NFC Forum Compliant • Near Field Communications Controller
Dimensions (L x W x H)	Module 25 mm by 10 mm by 2.0 mm
Chipset	NPC100
System interface	I2C
NFC RF standards	standards ISO/IEC 14443 A ISO/IEC 14443 B ISO/IEC 15693 ISO/IEC 18092 ECMA-340 NFCIP-1 Target and Initiator ECMA-320 NFCIP-2

Technical Specifications – Networking

NFC Forum Support Tag	Type 1, Type 2, Type3 and Type 4, NFCIP-1 and NFCIP-2
Reader	(PCD-VCD) Mode(1) ISO/IEC 14443 A ISO/IEC 14443 B ISO/IEC 15693 MIFARE 1K MIFARE 4K MIFARE DESFire FeliCa Jewel and Topaz cards
Card Emulation	(PICC-VICC)
Mode[1]	ISO/IEC 14443 A ISO/IEC 14443 B and B' MIFARE FeliCa
Frequency	13.56 MHz
NFC Modes Supported	Reader/Writer, Peer-to-Peer
Raw RF Data Rates	106, 212, 424, 848 kbps
Operating temperature	0°C to 70°C
Storage temperature	-20°C to 125°C
Humidity	10-90% operating 5-95% non-operating
Supply Operating voltage	2.97 to 5.5 Volts
I/O Voltage	1.8V or 3.3V
Power Consumption	
Booster enable, VCC_BOOST = 5V) Mode Power Consumption,	VBAT= 3.3V,
	Typical[2] Polling 7.3 mA Detected Test Tag Type 1 Total 283.8 mA Net Module 236.8 mA Detected Test Tag Type 2 Total 288.8 mA Net Module 241.8 mA Detected Test Tag Type 3 Total 287.7 mA Net Module 240.7 mA Detected Test Tag Type 4 Total 282.3 mA Net Module 235.3 mA
Antenna connector	0.5mm pitch, 7 connector FPC. Antenna matching is external to module.
Notes	1. With application or UICC support
	2. Actual Power Consumption is dependent on NFC antenna and matching circuit and on the particular polling sequence and period configured.

Technical Specifications – Audio

AUDIO/MULTIMEDIA – BANG & OLUFSEN

Hardware	Implementation	Conexant CX7501
	Function Key Volume Controls	Volume up, volume down, and mute
	Line In/Line Out	Yes, via dock
	Headphone/Microphone in	Yes combo jack
	Integrated Microphone	Yes, dual digital microphone array when equipped with optional webcam

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

Integrated Stereo Speakers	Power Rating	2 Watts
	Impedance	4 Ohms

Technical Specifications – Power

POWER

HP 65W Smart AC Adapter	Dimensions	107.0x47.0x30.0mm	
	Weight	unit: 250g +/- 10g	
	Input	90 to 265 VAC	
		Input Efficiency	88.0 % at 115 Vac and 89.0 % at 230 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 ms at 115 Vac input
		Output current limit	<11.0A
	AC Connector (Ac Inlet)	C6 (3pin/with grounded, with Smart ID DC connector)	
	AC Connector (Ac Inlet) 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 16,400 ft (0 to 5,000 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 65W Smart AC Adapter EM	Dimensions	102.0x55.0x30.0mm	
	Weight	unit: 350g +/- 10g	
	Input	90 to 265 VAC	
		Input Efficiency	87.0% min at 115 VAC and 230Vac
		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 ms at 115 Vac input
		Output current limit	<11.0A
	AC Connector (Ac Inlet)	C6 (3pin/with grounded, with Smart ID DC connector)	

Technical Specifications – Power

AC Connector (Ac Inlet) 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 16,400 ft (0 to 5,000 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 65W Travel AC Adapter	**Dimensions**	120.0x57.6x16.7mm
	Weight	unit: 250g +/- 10g
	Input	**Input Efficiency**	88.0 % at 115 Vac and 89.0 % at 230Vac
		Input frequency range	47 to 63 Hz
		Input AC current	1.7 A at 90 Vac
	Output	**Output power**	65W
		DC output	19.5V/5V
		Hold-up time	5 ms at 115 Vac input
		Output current limit	<11.0A
	DC Plug	4.5mm/7.4mm tips
	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 16,400 ft (0 to 5,000 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.	

Technical Specifications – Power

HP Long Life 3-cell Polymer Battery (51WHr)	**Dimensions (H x W x L)**	6.8mm x 102.8mm x 198mm	
	Weight	235 g	
	Cells/Type	3cell Lithium-Ion Polymer cell / 506480	
	Energy	Voltage	11.55V
		Amp-hour capacity	4420mAh
		Watt-hour capacity	51wh
	Temperature	Operating (Charging)	32° to 113° F (0° to 45° C)
		Operating (Discharging)	14° to 140° F(-10° to 60° C)
	Fuel Gauge LED	No	
	Warranty	1000 cycles > 65% (at 23˚C)	
	Optional Travel Battery Available	No	

Technical Specifications – Environmental

ENVIRONMENTAL DATA

Eco-Label Certifications & declarations

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:
- IT ECO declaration
- US ENERGY STAR®
- EPEAT <Gold> registered in the United States. 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 Notebook model is based on a "Typically Configured Notebook".

Energy Consumption (in accordance with US ENERGY STAR® test method)	115VAC, 60Hz	230VAC, 50Hz	100VAC, 60Hz
Normal Operation (Short idle)	9.06 W	9.98 W	9.6 W
Normal Operation (Long idle)	7.31 W	7.82 W	8.0 W
Sleep	0.76 W	0.89 W	0.75 W
Off	0.44 W	0.56 W	0.43 W

NOTE:
Energy efficiency data listed is for an ENERGY STAR® certified 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 typically configured PC featuring a hard disk drive, a high efficiency power supply, and a Microsoft Windows® operating system.

Heat Dissipation*	115VAC, 60Hz	230VAC, 50Hz	100VAC, 60Hz
Normal Operation (Short idle)	31 BTU/hr	34 BTU/hr	33 BTU/hr
Normal Operation (Long idle)	25 BTU/hr	27 BTU/hr	27 BTU/hr
Sleep	3 BTU/hr	3 BTU/hr	3 BTU/hr
Off	2 BTU/hr	2 BTU/hr	1 BTU/hr

*NOTE: 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 (L_{WAd}, bels)	Sound Pressure (L_{pAm}, decibels)
Typically Configured – Idle	2.9	20
Fixed Disk – Random writes	2.9	21

Longevity and Upgrading

This product can be upgraded, possibly extending its useful life by several years. Upgradeable features and/or components contained in the product may include:

Spare parts are available throughout the warranty period and or for up to "5" years after the end of production.

Batteries

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

Batteries used in the product do not contain:

Technical Specifications – Environmental

Mercury greater the1ppm by weight
Cadmium greater than 20ppm 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 - 2011/65/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 ISO11469 and ISO1043. - This product contains 0% post-consumer recycled plastic (by wt.) - This product is 96.1% recycle-able when properly disposed of at end of life.

Packaging Materials

External:	PAPER/Cardboard & misc	360.2 g
Internal:	PLASTIC/EPE (Expanded Polyethylene)	29.8 g
	PLASTIC/Polyethylene low density	13.6 g
	PLASTIC/Polypropylene	6 g

The plastic packaging material contains at least 50% recycled content.

The corrugated paper packaging materials contains at least 70% recycled content.

Material Usage

This product does not contain any of the following substances in excess of regulatory limits (refer to the HP General Specification for the Environment at http://www.hp.com/hpinfo/globalcitizenship/environment/pdf/gse.pdf):

- 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
- Nickel – finishes must not be used on the external surface designed to be frequently handled or carried by the user.
- 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

Technical Specifications – Environmental

	• Tributyl Tin (TBT), Triphenyl Tin (TPT), Tributyl Tin Oxide (TBTO)
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.
End-of-life Management and Recycling	HP Inc. 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 HP 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.
HP Inc. 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

QuickSpecs

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

Type	Description	Part #
Memory	HP 4GB DDR4-2400 SODIMM (Core processors only)	Z4Y84AA
	HP 16GB DDR4-2400 SODIMM (Core processors only)	Z4Y86AA
Cases	HP Executive 15.6 Black Top Load	P6N18AA
	HP Business Case (up to 15.6")	H5M92AA
Docking	HP UltraSlim Docking Station	D9Y32AA
	HP 2013 UltraSlim Docking Station TAA (US only)	E5C22AV#ABA
	HP Executive Travel Hub	T0K29AA
	HP Travel Hub	T0K30AA
	HP 3005pr USB 3.0 Port Replicator w/ USB-C Adapter	Y4H06AA
	HP Display and Notebook Stand II	E8G00AA#xxx
	HP USB-Type C™ Elite Dock	X7W54AA
Input/Output – Mice	HP Comfort Grip Mouse	H2L63AA
	HP 3-Button Laser Mouse	H4B81AA#xxx
	HP Ultra Mobile Wireless Mouse	H6F25AA#xxx
	HP X4000 Bluetooth Mouse	H3T50AA#xxx
	HP Slim Bluetooth Mouse	F3J92AA#xxx
	HP Ultrathin Wireless Mouse	L9V78AA
	HP USB Travel Mouse	G1K28AA#xxx
	HP Slim Wireless Keyboard and Mouse	T6L04AA#xxx
	HP USB Essential Keyboard and Mouse	H6L29AA#xxx
	HP Slim USB Keyboard and Mouse	T6T83AA
	HP Wireless (Link-5) Keyboard	T6U20AA#xxx
Power Adapters	HP 65W Slim A/C Adapter w/USB	H6Y82AA
	HP 90W Slim A/C Adapter w/USB	H6Y83AA
	HP 90W Slim Auto Combo AC Adapter w/USB	H6Y84AA
	HP 65W Smart AC Adapter	H6Y89AA
	HP 90W Smart AC Adapter	H6Y90AA
Battery	HP TA03XL Rechargeable Battery	1FN06AA
Adapters	HP USB-C™ to VGA Adapter	N9K76AA
	HP USB-C to USB 3.0	N2Z63AA
	HP USB-C to USB Hub	Z6A00AA
	HP USB-C™ to DisplayPort™ Adapter	N9K78AA
	HP USB-C™ to DisplayPort™ Adapter	N9K78AA
	HP HDMI to DVI adapter	F5A28AA
	DisplayPort™ to DVI Adapter	F7W96AA

QuickSpecs

HP ZBook 14u G5 Mobile Workstation

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

	DisplayPort™ to VGA	F7W97AA
	DisplayPort™ to HDMI 1.4 Adapter	F3W43AA
Wireless	HP lt4120 LTE/EVDO/HSPA+ Gobi™ 4G Mobile Broadband Module	TBD
Collaboration	HP UC Conferencing Keyboard	K8P74AA#xxx
	HP UC Speaker Phone	K7V16AA
	HP UC Wired Headset	K7V17AA
	HP UC Mono Wireless Headset	W3K08AA
	HP UC Duo Wireless Headset	W3K09AA
	HP Stereo 3.5mm Headset	T1A66AA
	HP Stereo USB Headset	T1A67AA
Storage - External Storage	HP External USB DVDRW Drive	F2B56AA
	HP 500GB 7200rpm HDD	F3B97AA
	HP 256GB M2 NVME PCIe SSD (2280)	V3K66AA
	HP 512GB M2 NVME PCIe SSD (2280)	V3K67AA
Security	HP Dual Head Cable Lock (Non-Master key)	T1A64AA
	HP Dual Head Cable Lock (Master Key)	T1A65AA
	HP 15.6" Notebook PC Privacy Filter (non-touch)	J7H71AA
	HP Docking Station Cable Lock	AU656AA#XXX
	HP Essential Combination Lock	T0Y16AA
	HP Combination Lock	T0Y15AA
	HP Keyed Cable Lock	T0Y14AA
	HP 15'6 Privacy Filter (touch panel)	V8Z58AA#xxx

NOTE: External power supplies, power cords, cables and peripherals are not low halogen. Service parts obtained after purchase may not be low halogen.

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Summary of Changes

Date of change:	Version History:		Description of change:
	From v1 to v2		