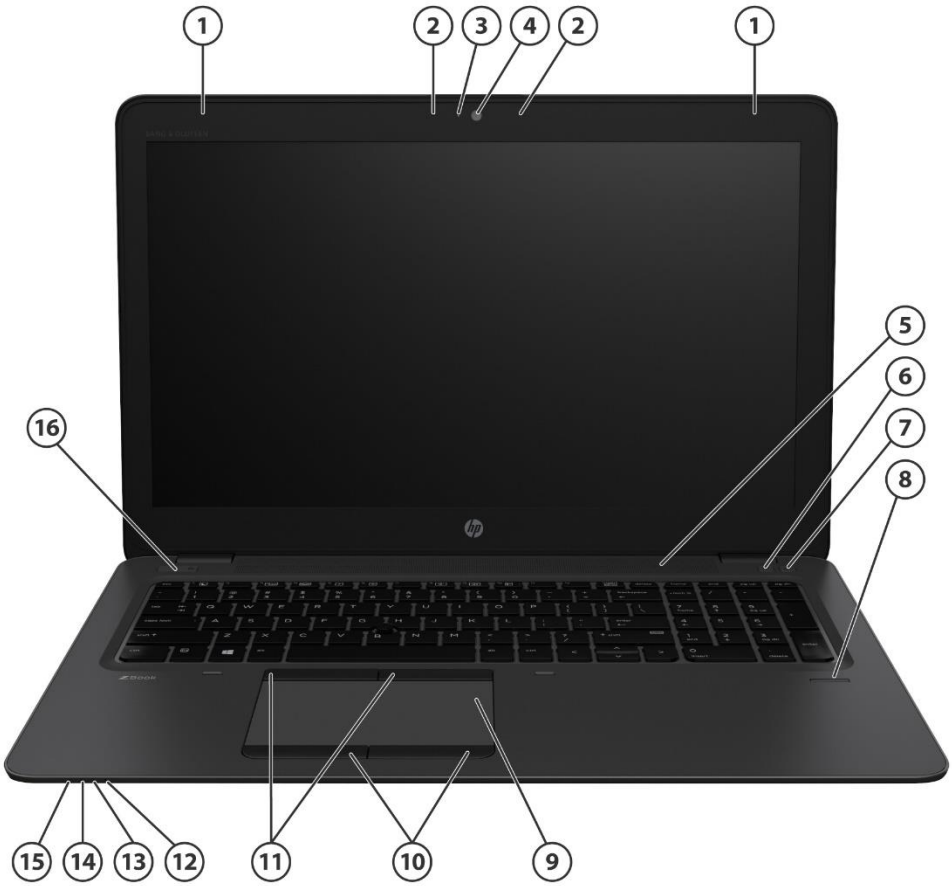
Overview

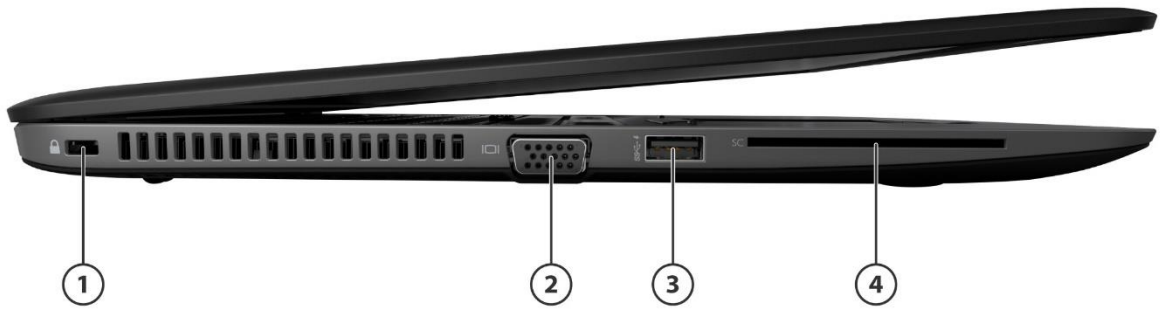
HP ZBook 15u G3 Mobile Workstation



Front

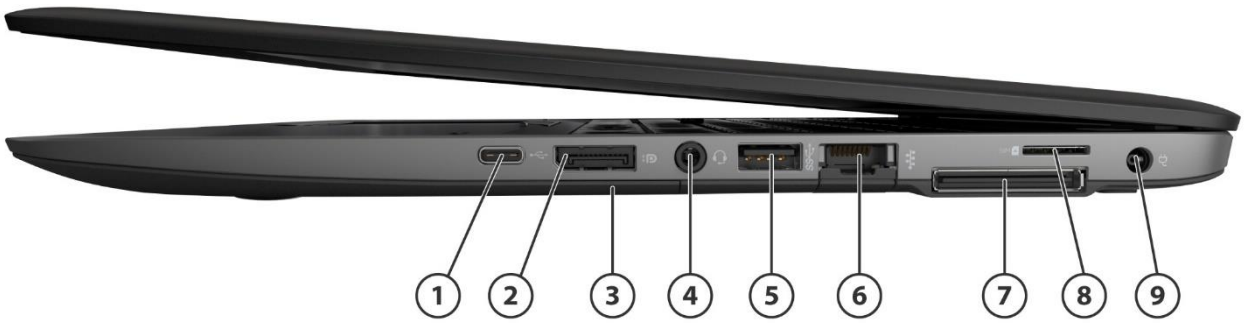
1. Wireless LAN antennas
2. Internal microphones (2)
3. Webcam light
4. Webcam
5. Speakers
6. Wireless On/Off button
7. Volume mute button
8. Fingerprint reader (select models only)
9. Touchpad
10. Lower Touchpad buttons(right and left click buttons)
11. Upper Touchpad buttons (right and left click buttons)
12. Storage light indicator
13. Battery light indicator
14. Power light indicator
15. Wireless light indicator
16. Power button

Overview



Left

1 Security lock slot
2. VGA port
3. USB 3.0 port (charging)
4. Smart Card reader



Right

1. USB 3.1 (Gen 1)
2. DisplayPort
3. SD Card Reader
4. Headphone/Microphone Combo Jack
5. USB 3.0 port
6. RJ-45 / Ethernet
7. Side Docking connector
8. SIM Module Slot
9. Power connector

Overview

At A Glance

- Windows® 10 editions, Windows® 7 editions, Ubuntu Linux®, or FreeDOS
- Full 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 "Space Silver" color with chemical etching. Backlight keyboard in full aluminum deck with magnesium bottom reinforcement, chemically strengthened glass touchpad, and updated system functions indicators. HP Spill Resistant Keyboard with Durakeys, touchpad buttons with Duracoat finish. Diamond cut process showcased around keyboard deck.
- Designed to pass military standard Mil-Std-810G testing.
- Workstation-caliber AMD® FirePro® discrete graphics: AMD® FirePro® W4190M (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 6th 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 DisplayPort and VGA ports (sold separately).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 (46 WHr) HP Long Life Battery
- 2 discrete buttons with LED indicator for convenient one touch access: Wireless On/Off, Volume Mute
- Widescreen 15-inch diagonal anti-glare LED-backlit display:
- FHD (1920x1080) standard viewing angle, FHD (1920x1080) ultrawide viewing angle, UHD (3840x2160) ultrawide viewing angle, or FHD Touch (1920x1080) standard viewing angle
- Supports wireless LAN and wireless WAN options for connectivity on the go.
- Two dedicated drive slots. (1) M.2 slots and (1) 2.5"drive bay. Both can be populated at the same time.
- 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.

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
Windows® 7 Professional 64**
Windows® 7 Professional 64 (available through downgrade rights from Windows 10 Pro)**
FreeDOS 2.0

Supported OS

Windows® 8.1 Enterprise 64*
Windows® 8.1 Professional 64
Windows® 7 Enterprise 32*
Windows® 7 Enterprise 64*
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.microsoft.com
** This system is preinstalled with Windows 7 Professional software and also comes with a license and media for Windows 10 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.

PROCESSOR*

6th Generation Intel® Core™ i7 6600U (2.6 GHz, 4 MB cache, 2 cores)* Up to 3.4 GHz with Intel® Turbo Boost Technology
6th Generation Intel® Core™ i7 6500U (2.5 GHz, 4 MB cache, 2 cores)* Up to 3.1 GHz with Intel® Turbo Boost Technology
6th Generation Intel® Core™ i5 6300U (2.4 GHz, 3 MB cache, 2 cores)* Up to 3.0 GHz with Intel® Turbo Boost Technology
6th Generation Intel® Core™ i5 6200U (2.3 GHz, 3 MB cache, 2 cores)* Up to 2.8 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 is not a measurement of higher performance.

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

CHIPSET

Non-applicable, processor specific

Features

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® HD 5500 Graphics*

AMD® FirePro® W4190M (2 GB dedicated GDDR5)**

Microsoft DirectX 12 (Shader Model 5.0) and OpenGL 4.4 capable

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

15.6" diagonal LED backlit FHD UWVA IPS eDP anti-glare + PSR(Panel Self Refresh) (1920 x 1080);
15.6" diagonal LED backlit FHD SVA eDP anti-glare (1920 x 1080);
15.6" diagonal LED UHD UWVA IPS anti-glare (3840 x 2160)
15.6" diagonal Touch LED-backlit FHD SVA (1920 x 1080)

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

VGA
Port supports resolutions up to 1920 x 1200 at 60 Hz, and lower resolutions up to 75 Hz.

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.

DisplayPort Features

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

SATA, 2.5" Hard Drive*
1 TB 5400 rpm Hard Drive
500 GB 7200 rpm Hard Drive
500 GB 7200 rpm Self Encrypting Drive (Opal2)
500 GB 7200 rpm Self Encrypting Drive FIPS 140-2 compliant
500 GB 5400 rpm Hybrid Drive (8 GB cache)

M.2 SATA Solid State Drive
128 GB SATA-3 TLC Solid State Drive (available in 1H16)

M.2 SATA SED SSD
256 GB SATA-3 Self-Encrypting (Opal 2) MLC Solid State Drive

HP Z Turbo Drive (NVMe PCIe SSD)
256 GB PCIe NVMe Solid State Drive
512 GB PCIe NVMe 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.

NOTE: For Solid State Drives or Hard Drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 30 GB (for Windows 8.1 and 10) is reserved for system recovery software.

DRIVE CONTROLLERS

2.5" Storage Bays and M.2 Storage Bay (SATA):	SATA-3 for HDD and SATA-3 for SSD
HP Z Turbo Drive:	PCIe NVMe SSD
RAID:	0, 1 supported*

NOTE: RAID 0,1 supported. NVMe drives fully support RAID 0 and 1 as data volumes only

Features

MEMORY

Standard
32 GB DDR4 1.35V Non ECC SDRAM (Transfer rates up to 2133MT/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
Integrated Intel® I219-LM Gigabit* Network Connection (vPro configurations)
Intel® WGI219V 10/100/1000 Ethernet (non-vPro configurations)

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 8260 802.11 a/b/g/n/ac (2x2) WiFi + Bluetooth 4.2 Combo Adaptor* (vPro)
Intel® Dual Band Wireless-AC 8260 802.11 a/b/g/n/ac (2x2) WiFi + Bluetooth 4.2 Combo Adaptor* (non-vPro)
Intel® Dual Band Wireless-AC 3165 802.11 ac (1x1) WiFi and Bluetooth 4.0 Combo Adapter (non-vPro)

Wireless WAN - Mobile Broadband **

HP lt4120 Qualcomm® Snapdragon™ X5 LTE Mobile Broadband Module

HP hs3110 HSPA+ Intel® Mobile Broadband Module

* 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.

Features

Features

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
720p HD webcam*

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

* 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 100-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 18.0 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.

Pointing Devices
Touchpad with On/Off button, two-way scroll, gestures, two pick buttons
Point stick with two additional point stick buttons
Image sensor touchpad for enhanced performance and improved precision on scroll and gesture

Buttons and Function Keys
Separate launch buttons provide easy access to the following features: wireless on/off, volume mute. Function keys provide control of the following features: standby mode, external display, volume down, volume up, HP Power Assistant (Windows® 7 only), and display brightness.

Features

SOFTWARE AND SECURITY

Preinstalled Software with Windows Operating System

BIOS
HP BIOSphere[1]
HP Sure Start with Dynamic Protection
HP DriveLock | HP Automatic DriveLock
HP BIOS Protection[2]
BIOS Update via Network
Master Boot Record Security
Power On Authentication
Pre-Boot Security
HP Spare Key[17]
Secure Erase[3]
Hybrid Boot
Measure Boot
Secure Boot
Absolute Persistence Module[4]
Pre-boot Authentication

Multi Media
Cyberlink Power DVD, BD (supports file playback)
Cyberlink YouCam BE (Windows 7 only)

Communication
HP GPS and Location (Windows 7 only)[5]
HP Connection Manager with support for HP Mobile Connect (Windows 7 only)[6]
HP Mobile Connect Pro(Windows 8.1 and Windows 10 only)[6]
Intel® Wireless Display (WiDi) Software for Windows[7]
Native Miracast Support[8]

HP Value Add Software
HP 3D DriveGuard
HP ePrint Driver[9]
HP Hotkey
HP Recovery Manager[16]
HP Recovery Disc Creator
HP Registration App (Windows 8.1 only)
HP Support Assistant
HP Noise Reduction Software
HP Performance Advisor
HP Remote Graphics Software
HP Velocity

3rd Party
Foxit PhantomPDF Express for HP

Microsoft Products
Buy Office
Bing Search
Skype[10]

Manageability
HP Driver Packs[11]

Features

HP SoftPaq Download Manager (SDM)
HP System Software Manager (SSM)[11]
HP BIOS Config Utility (BCU)[11]
HP Client Catalog[11]
HP CIK for Microsoft SCCM[11]
HP Image Assistant[11]
LANDESK Management[12]

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

Client Security Software
HP Client Security

- HP Security Manager (including Credential Manager and Password Manager)
- HP Drive Lock
- HP Fingerprint Sensor
- HP Password Manager
- Absolute Persistence Module
- Power On Authentication

Microsoft Security Essentials[14]
Microsoft Defender[14]

Standard
Trusted Platform Module (TPM) 1.2 Embedded Security Chip (Common Criteria EAL4+ Certified). Field upgradeable to TPM 2.0[15]
HP Fingerprint Reader

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

1 Available only on business PCs with HP BIOS.
2 May require a manual recovery step if all copies of BIOS are compromised or deleted
3 For the methods outlined in the National Institute of Standards and Technology Special Publication 800-88.
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 GPS access requires an unobstructed path to multiple satellites. Performance may be affected if/when used inside of buildings, bridges or heavily congested metropolitan areas. Requires separately purchased GPS navigation software available from multiple GPS applications.
6 HP Mobile Connect Pro is only available on preconfigured devices with WWAN. For geographic availability refer to http://www.hp.com/go/mobileconnect
7 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.
8 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
9 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). Requires optional broadband module. Broadband use requires separately purchased service contract. Check with service provider for coverage and availability in your area. Separately purchased data plans or usage fees may apply. Print times and connection speeds may vary.
10 Skype is not offered in China.
11 Not preinstalled, however available for download at http://www.hp.com/go/clientmanagement
12 Subscription required.
14 Opt in and internet connection required for updates.

Features

15 This product ships with TPM 1.2 with option to upgrade to TPM 2.0. Upgrade utility is expected to be available by the end of 2015 via HP Customer Support
16 Models shipped with Windows 7 include HP Recovery Manager. HP Recovery Manager enables fast recovery of the factory preinstalled image if the system becomes corrupted or if important system files are accidentally deleted. Up to 36 GB (for Windows 7) of system and up to 36 GB (for Windows 10) disk is reserved for system recovery software
17 Requires initial user setup

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

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

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

Features

memory providing redundant, hardware-based protection against a new generation of attacks. This helps to future-proof your technology and business.

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.

POWER

Power Supply

HP 65W Slim Smart AC Adapter

Primary Battery

HP 3-cell Long Life Polymer Battery (46 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 MobileMark12 battery benchmark http://www.bapco.com/products/mobilemark2007 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® Enduro™ 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.

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 4.18 lb. (1.89 kg)

Dimensions (w x d x h)

15.09 x 10.15 x 0.78 in

Features

383.3 x 257.7 x 19.9 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).

PORTS/SLOTS

Ports

Left side:

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

Right side:

(1) USB 3.1 Gen 1
(1) USB 3.0 Port
(1) DisplayPort 1.2
(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 a default one year limited warranty except for Long Life batteries which will have 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.

Sold separately or as an optional feature.

1. 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® 7 (32-bit)**	**Windows® 7 (64-bit)**
		AMD® FirePro® Graphics	16.28 W	16.8 W
	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 40,000 ft. (-15.24 to 12,192 m)		
Planned Industry Standard Certifications	**UL**	Yes		
	CSA	Yes		
	FCC Compliance	Yes		
	ENERGY STAR®	Select models*		
	EPEAT	Gold target**		
	ICES	Yes		
	Australia / NZ A-Tick Compliance	Yes		
	CCC	Yes		
	Japan VCCI Compliance	Yes		
	KCC	Yes		
	BSMI	Yes		
	CE Marking Compliance	Yes		
	MIL STD	Planned		

* Configurations of the HP ZBook 15u G3 that are ENERGY STAR® qualified are identified as HP ZBook 15u G3 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

15.6" diagonal LED-backlit FHD UWVA IPS eDP anti-glare + Panel Self Refresh (PSR) (1920 x 1080)	**Dimensions** (W x H)	13.54 x 7.64in (34.4x19.4 cm)	
	Diagonal Size	15.6 in (39.6 cm)	
	Weight	360g (max)	
	Surface Treatment	Anti-glare	
	Contrast Ratio	600:1 (typical)	
	Refresh Rate	60 Hz	
	Brightness	300 nit (typical)	
	Pixel Resolution	**Format**	1920 x 1080 (FHD)
		Configuration	RGB Stripe
	Backlight	LED	
	PPI	142	
	Viewing Angle	80° Horizontal, ±80° Vertical (minimum) 80/80/80/80 (Left/Right/Down/Up) (min)	
15.6" diagonal LED backlight FHD eDP SVA Anti-glare (1920 x 1080)	**Outline Dimensions** (W x H x D)	360.0 x 224.3 x 3.2 mm max	
	Active Area	344.16 x 193.59 mm	
	Weight	360 max.	
	Diagonal Size	15.6”	
	Surface Treatment	AG	
	Contrast Ratio	400:1 (typ)	
	Refresh Rate	60Hz	
	Brightness	300nits	
	Pixel Resolution	**Format**	1920 x 1080 (FHD)
		Configuration	RGB Stripe
	Interface	eDP 1.2 (2 lane)	
	LCD Mode	TN	
	PPI	142	
	Viewing Angle	SVA 45/45/25/35	
15.6" diagonal LED backlight FHD Slim DP SVA (1920 x 1080) Touch with Camera	**Outline Dimensions** (W x H x D)	360.0 x 224.3 x 3.2 mm max	
	Active Area	344.16 x 193.59 mm	
	Weight	360 max.	
	Diagonal Size	15.6”	
	Surface Treatment	AG/BV	
	Contrast Ratio	500:1 (typ) - BV, 400:1 (typ) - AG	
	Touch Enabled	Yes	
	TSP Type	Capacitive	
	Refresh Rate	60Hz	

Technical Specifications – Displays

15.6-inch UHD UWVA IPS LED anti-glare (3840 x 2160)	**Brightness**	300nits	
	Pixel Resolution	**Format**	1920 x 1080 (FHD)
		Configuration	RGB Stripe
	Interface	eDP 1.2 (2 lane)	
	LCD Mode	TN	
	PPI	142	
	Viewing Angle	SVA 45/45/25/35	
	Active Area (W x H)	13.54 x 7.59 in (34.4 x 19.4 cm)	
	Dimensions (W x H)	15.6 in (39.6 cm)	
	Weight	380 g (max)	
	Surface Treatment	Anti-glare	
	Contrast Ratio	400:1 (typical)	
	Refresh Rate	60 Hz	
	Brightness	300 nit typical	
	Pixel Resolution	**Format**	1920 x 1080 (FHD)
		Configuration	RGB Stripe
	Backlight	LED	
	PPI	141	
	Viewing Angle	85/85/85/85 (Left/Right/Down/Up) (typical)	

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	12ms
		Maximum	18mm-22ms
	Cache	32GB	
	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)**	600 MB/s
	Seek Time (typical reads, including settling)	**Single Track**	1.5ms-2.0ms
		Average	11ms-13ms
		Maximum	18ms-22ms
	Cache	32GB	
	Rotational Speed	7200 rpm	
	Logical Blocks	976,773,168	
	Operating Temperature	32° to 140° F (0° to 60° C) [case temp]	
	Features	ATA Security	
500 GB 7200rpm Self-Encrypting Drive (Opal 2)	**Drive Weight**	0.21 lbs (95 g)	
	Capacity	500GB	
	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**	1.5ms
		Average	12ms
		Maximum	18ms- 22ms
	Cache	32GB	
	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 (99 g)	

Technical Specifications – Storage

	Capacity	1TB	
	Height	0.28 in (7.2 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**	2ms
		Average	12ms-13ms
		Maximum	18ms-23ms
	Cache	Up to 32GB	
	Rotational Speed	5400rpm	
	Logical Blocks	1,953,525,168	
	Operating Temperature	32° to 140° F (0° to 60° C) [case temp]	
	Features	S.M.A.R.T., NCQ, Ultra DMA	
500 GB Hybrid, 8 GB cache	**Drive Weight**	0.21 lb (95 g)	
	Capacity	500 GB	
	Height	0.276 in (7 mm)	
	Width	2.76 in (70.1 mm)	
	Interface	ATA-8, SATA 2.6, 6.0 Gb/s, NCQ	
	Transfer Rate	**Synchronous (maximum)**	600 MB/s (Drive Capability)
	Seek Time (typical reads, including settling)	**Single Track**	2 ms
		Average	12 ms
		Maximum	NIL ms
	Cache	64GB	
	Rotational Speed	5400 rpm	
	Logical Blocks	976,773,168	
	Operating Temperature	32° to 140° F (0° to 60° C) [case temp]	
	Features	ATA Security	
128 GB M2 2280 SATA-3 TLC Solid State Drive	**Drive Weight**	0.019 lb (8.5 g)-0.022 lb (10 g)	
	Capacity	128 GB	
	Height	0.09 in (2.23 mm)- 0.14 in (3.58 mm)	
	Width	0.87 in (22 mm)	
	Interface	ATA-8, SATA 3.0	
	Performance	**Maximum Sequential Read**	**Maximum Sequential Write**
		Up to 540 MB/s	Up to 300 MB/s
	Logical Blocks	250,069,680	
	Operating Temperature	32° to 158°F (0° to 70°C) [ambient temp]	
	Features	ATA Security, DIPM; TRIM; DEVSLP	
256 GB M2 2280 SATA-3 Self-Encrypting Drive (Opal 2) MLC Solid State Drive	**Drive Weight**	0.02 lb (10 g)	
	Capacity	256 GB	
	Height	0.14 in (3.58 mm)- 0.09 in (2.23 mm)	
	Width	0.87 in (22 mm)	
	Interface	ATA-8, SATA 3.0	

Technical Specifications – Storage

	Performance	**Maximum Sequential Read**	**Maximum Sequential Write**
		Up to 540 MB/s	UP to 460 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 PCIe Solid State Drive	**Drive Weight**	0.022 lb (<10 g)	
	Capacity	512 GB	
	Height	0.14 in (3.7 mm	
	Width	0.87 in (22 mm)	
	Generation	SM951 NVMe	
	NAND Type	MLC	
	Form-Factor (I/O)	M.2 2280	
	Interface	PCIe GEN3X4	
	Performance	**Maximum Sequential Read**	**Maximum Sequential Write**
		Up to 2260MB/s	Up to 1600MB/s
	Logical Blocks	1,000,215,216	
	Operating Temperature	32° to 158°F (0° to 70°C) [ambient temp]	
	Features	ATA Security, TRIM; L1.2	

Technical Specifications – Storage

HP Z Turbo Drive 256 GB, M.2 NVMe PCIe Solid State Drive	**Drive Weight**	0.022 lb (<10 g)	
	Capacity	256 GB	
	Height	0.09 in (2.3 mm)	
	Width	0.87 in (22 mm)	
	Generation	SM951 NVMe	
	NAND Type	MLC	
	Form-Factor (I/O)	M.2 2280	
	Interface	PCIe GEN3X4	
	Performance	**Maximum Sequential Read**	**Maximum Sequential Write**
		Up to 2260MB/s	Up to 1260 MB/s
	Logical Blocks	500,118,192	
	Operating Temperature	32° to 158°F (0° to 70°C) [ambient temp]	
	Features	ATA Security,TRIM; L1.2	

*For hard drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 16 GB (for Windows® 7) of system and up to 30 GB (for Windows® 8) disk is reserved for system recovery software.

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

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 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
	Form Factor	M.2, 3042-S3 Key B
	Weight	6.2 g
	Dimensions (Length x Width x Thickness)	1.65 x 1.18 x 0.09 in (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.

Technical Specifications – Networking

HP hs3110 HSPA+ Intel® Mobile Broadband Module*	**Technology/Operating Bands**	LTE: 2100 (Band 1), 1900 (Band 2), 1800 (Band 3), 850 (Band 5), 2600 (Band 7), 900 (Band 8), 800 MHz (Band 20, DD800) 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	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
	GPS	Standalone, A-GPS
	GPS Bands	1575.42 MHz (± 1.023 MHz)
	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 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, 3042-S3 Key B
	Weight	6 g
	Dimensions (Length x Width x Thickness)	1.65 x 1.18 x 0.09 in (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.

Technical Specifications – Networking

Intel® Dual Band Wireless-AC 8260 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 • 802.11n HT20(5GHz) : +12dBm minimum • 802.11n HT40(5GHz) : +12dBm minimum	
	Power Consumption	Transmit: 2.0 Watts (max) Receive: 1.6 Watts (max)	

Technical Specifications – Networking

	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 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)
LED Activity	LED Amber – Radio OFF; LED White – Radio ON	

Technical Specifications – Networking

HP Integrated Module with Bluetooth® 4.0+EDR Wireless Technology	**Bluetooth® Specification**	4.0/4.1/4.2 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	
	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 certificactions	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)

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

Technical Specifications – Networking

Bluetooth® V4.1/V4.2 support feature	V4.1: ESR5/6/7 compliant 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 8260 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

- 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® 4.0+EDR Wireless Technology

Bluetooth Specification	4.0+EDR Compliant
Frequency Band	2402 to 2480 MHz
Number of Available Channels	79 (1 MHz) available channels

Technical Specifications – Networking

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	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.

Technical Specifications – Networking

Intel® Dual Band Wireless-AC 3160 802.11 ac (1x1) WiFi and Bluetooth® 4.0 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	Ad-hoc (Peer to Peer)
	Models	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)

AUDIO/MULTIMEDIA – BANG & OLUFSEN

Hardware	**Implementation**	Conexant CX7501
	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 when equipped with optional webcam
Audio Output Quality	**Frequency Response**	20 Hz - 20 kHz
	Signal to Noise Ratio	106dB (DAC), 102dB (ADC)
	Total Harmonic Distortion	91dB THD+n on LineOut/HP (0.003%)
	Noise Floor	-110 dB
	Play Sampling Rate(s)	Up to 192kHz
	Record Sampling Rate(s)	Up to 96kHz
	DAC	16, 20 or 24-bit
	ADC	16,20 or 24-bit
Integrated Stereo Speakers	**Power Rating**	2 Watts
	Impedance	4 Ohms

POWER

HP 65W Smart AC Adapter	**Dimensions**	4.17 x 1.85 x 1.1 in (10.6 x 4.7 x 2.8 cm)	
	Weight	0.62 lb. (280 g)	
	Input	100 to 240 VAC	
		Input Efficiency	87% min at 115 VAC/230VAC
		Input frequency range	47 to 63 Hz
		Input AC current	1.7 A at 90 VAC, 0.85 A at 180 VAC
	Output	**Output power**	65W
		DC output	18.5V
		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 149° F (-20° to 65° C)
		Altitude	0 to 10,000 ft. (0 to 3,048 m)
		Humidity	20% to 80%
		Storage Humidity	10% to 90%
	EMI and Safety Certifications	CE Mark - full compliance with LVD and EMC directives; Worldwide safety standards - IEC60950, EN60950, UL60950, 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 Long Life 3-cell Polymer Battery (46WHr)	**Dimensions (H x W x L)**	7.8 x 4.01 x 0.3 in(19.89x10.28x0.84 cm)	
	Weight	280 g	
	Cells/Type	3-cell Lithium-Ion Polymer	
	Energy	Voltage	11.1
		Amp-hour capacity	4.504Ah
		Watt-hour capacity	46Wh
	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 or Standby Mode**	3 hours
	Fuel Gauge LED	No	

Technical Specifications – Power

Warranty	1 year or 3 years* *Battery warranty depends on the platform warranty.
Optional Travel Battery Available	No

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® 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 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:

- 1 USB 3.1 Gen 1
- 1 USB 3.0 Port
- 1 DisplayPort 1.2
- 1 SD UHS-II Flash Media slot
- 1 Integrated Smart Card Reader

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:
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

Technical Specifications – Power

- 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
- 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

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 #
Memory	HP 4GB DDR4-2133 SODIMM (Core processors only)	T7B76AA
	HP 8GB DDR4-2133 SODIMM (Core processors only)	T7B77AA
Cases	HP Executive 15.6 Black Top Load	P6N18AA
	HP Business Case(up to 15.6")	H5M92AA
Docking	HP UltraSlim Docking Station	D9Y32AA
	HP Executive Travel Hub	T0K29AA
	HP Travel Hub	T0K30AA
	HP 3005pr USB 3.0 Port Replicator	H1L08AA
Input/Output - Mice	Comfort Grip Mouse	H2L63AA
	HP Stylish USB KB/Mouse	H4B80AA#xxx
	HP Slim Bluetooth Keyboard	H4Q44AA#xxx
	HP 3-Button Laser Mouse	H4B81AA#xxx
	HP USB Essential Keyboard and Mouse	H6L29AA#xxx
	HP Ultra Mobile Wireless Mouse	H6F25AA#xxx
	HP Wireless Keyboard and Mouse	G1K29AA#xxx
	HP X4000 Bluetooth Mouse	H3T50AA#xxx
	HP Slim Bluetooth Mouse	F3J92AA#xxx
	HP USB Smart Card Reader	F6V67AA
	HP Ultrathin Wireless Mouse	L9V78AA
Power Adapters	HP 65W Slim A/C Adapter	H6Y82AA
	HP 90W Slim A/C Adapter	H6Y83AA
	HP 90W Slim Combo AC Adapter w/USB	H6Y84AA
	HP 65W Smart AC Adapter	H6Y89AA
	HP 90W Smart AC Adapter	H6Y90AA
	45W 2-prong 4.5 mm DC jack AC Adapter	L6F60AA#ABJ
Adapters	HP Wireless display adapter	J1V25AA#xxx
	USB dual output graphics adapter	C5U89AA
	HP Conferencing Keyboard	K8P74AA#xxx
	HP Speaker Phone	K7V16AA
	HP Wired Headset	K7V17AA
	HP USB-C™ to VGA Adapter	N9K76AA
	HP USB-C™ to DisplayPort Adapter	N9K78AA
	HDMI to VGA Adapter	H4F02AA
	HDMI to DVI adapter	F5A28AA
	USB-C to DisplayPort Adapter	N9K78AA
	HP External USB Optical Drive	F2B56AA

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

Storage - External Storage	HP 500GB 7200rpm HDD	F3B97AA
	HP 750GB 7200rpm HDD	H2P67AA
	HP 180GB Solid State Drive	H4T75AA
	HP 512GB Solid State Drive	J2V75AA
	HP 256GB SED Solid State Drive (Opal 2)	K1Z11AA
	HP 256GB M2 NVME PCIe SSD (2280)	TBD
	HP 512GB M2 NVME PCIe SSD (2280)	TBD
Security	HP UltraSlim Keyed Cable Lock	H4D73AA
	HP Dual Head Cable Lock (Non-Master key)	T1A64AA
	HP Dual Head Cable Lock (Master Key)	T1A65AA
	HP 15.6" Notebook PC Privacy Filter	J7H71AA

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

Summary of Changes

Date of change:	Version History:		Description of change:
February 10, 2016	From v1 to v2	Added	RAID support and notes in Features; Environmental data and Battery life in Technical Specs section,

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