QuickSpecs

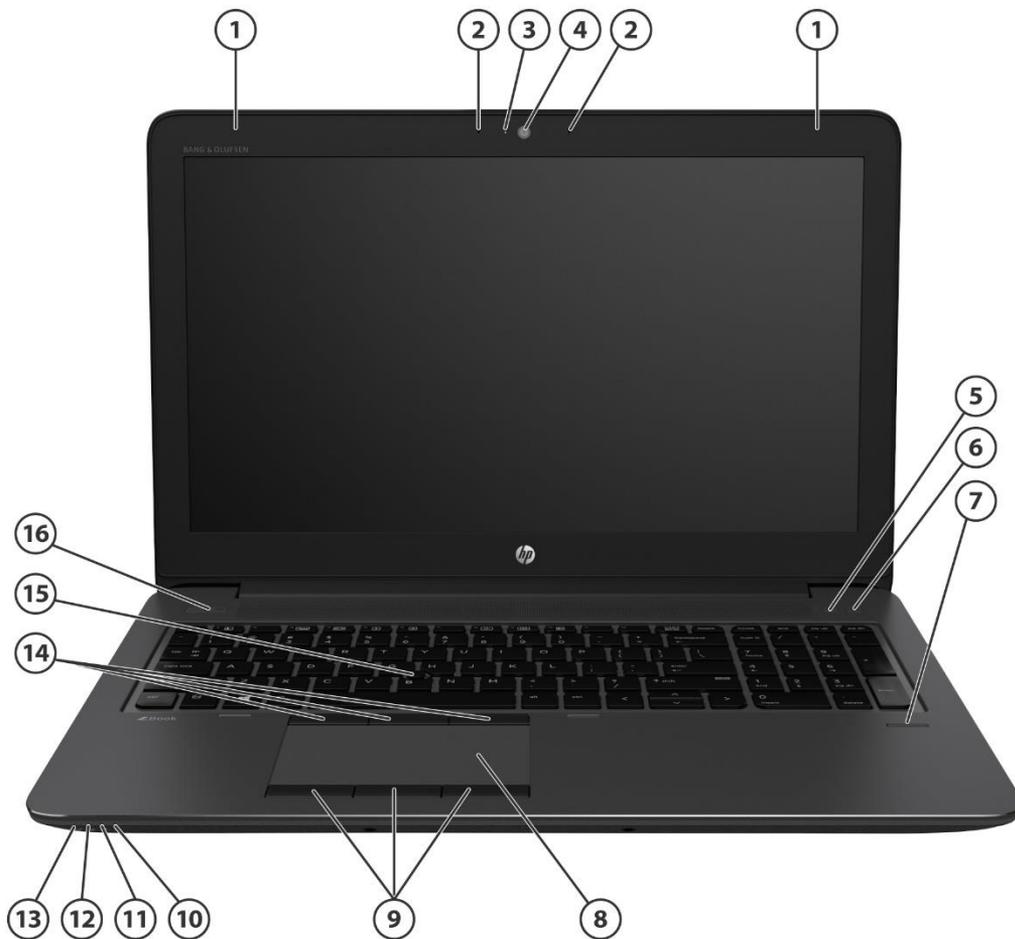## Overview

**HP ZBook 15 G3 Mobile Workstation**

FRONT VIEW

1. WLAN antennas (2)	9. Lower right, center, left touchpad buttons
2. Internal microphone	10. Storage light indicator
3. Webcam light (with webcam)	11. Battery light indicator
4. Webcam	12. Power light indicator
5. Wireless button	13. Wireless light indicator
6. Volume mute button	14. Upper Right, Center, Left Touchpad buttons
7. Fingerprint reader (select models only)	15. Pointstick
8. Touchpad with scroll zone	16. Power button

Overview

LEFT VIEW
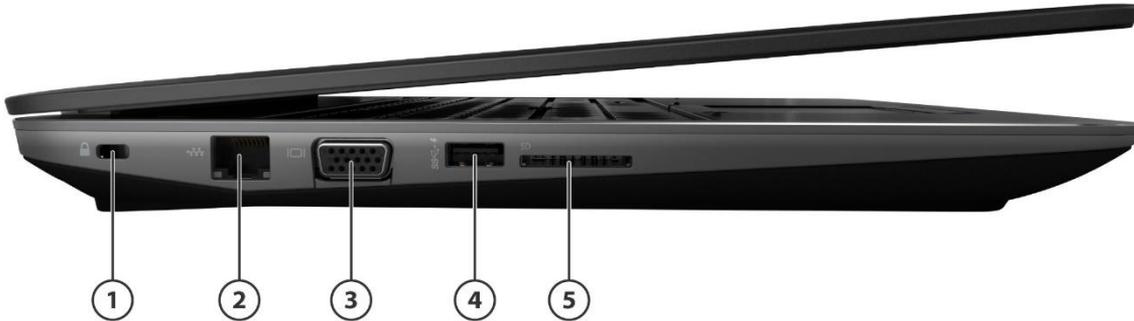
1. Security cable slot
2. RJ-45 (Ethernet)
3. VGA port

4. USB 3.0 port (charging)
5. SD Card reader

RIGHT VIEW
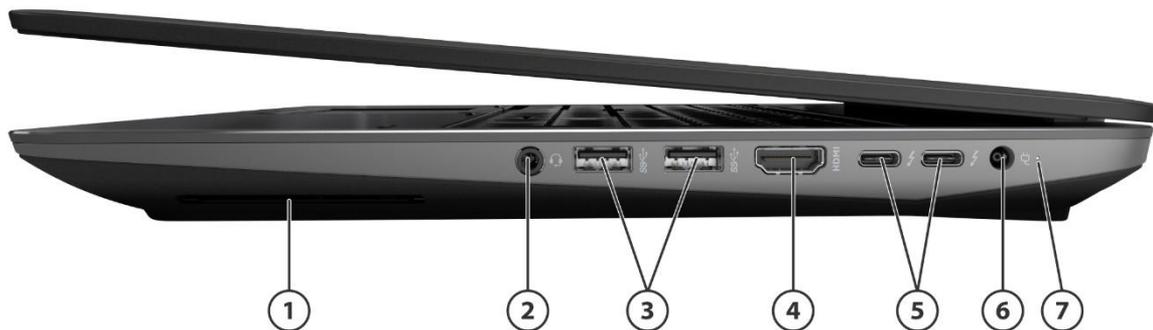
1. Smart Card reader
2. Stereo microphone in / headphone-out combo jack
3. (2) USB 3.0 Ports
4. HDMI 1.4 port

5. (2) Thunderbolt™ 3* ports
6. Power connector
7. Power LED

Overview

BOTTOM VIEW

1.   Speakers

Overview

At A Glance

- Windows® 10 editions, Windows® 7 editions, or FreeDOS
- Mainstream full 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 NVIDIA ® Quadro® discrete graphics: NVIDIA® Quadro® M1000M (2GB GDDR5), AMD FirePro™ W5170M (2GB GDDR5), NVIDIA® Quadro® M2000M (4GB GDDR5); NVIDIA® Optimus or AMD Enduro™ technology.
- Intel Integrated graphics: Intel® HD Graphics 530 integrated on Core™ i7. Intel® HD Graphics P530 and Intel® Iris Pro Graphics P580 integrated on Xeon® processors.
- 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 quad-core or Xeon® processors. Intel® Core™ i7 with vPro, Intel Core™ i5 with vPro technology or Intel Xeon® with vPro technology (optional)
- HP Performance Advisor for optimal configuration, compatibility and performance
- Up to four SODIMMs, for system memory up to 64 GB. ECC memory with Intel Xeon® processors.
- Supports multi-display, including up to four (4) displays without a docking solution, with hybrid graphics enabled. Supports up to six (6) displays with HP Zbook Dock with Thunderbolt™ 3 (sold separately), with hybrid graphics enabled.
- Two (2) Thunderbolt™ 3 ports (supporting DisplayPort 1.2, USB 3.1, PCIe Gen 3 devices) on the new USB-C™ connector, for high speed data/video/audio transfer support.
- 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
- Long life battery solution: 9-cell (90 WHr)
- 2 discrete buttons with LED indicator for convenient one touch access – Wireless On/Off, Volume Mute
- Widescreen 15.6-inch diagonal anti-glare LED-backlit display:
  FHD (1920x1080) standard viewing angle, FHD (1920x1080) ultrawide viewing angle, or UHD (3840x2160) ultrawide viewing angle with HP DreamColor Technology, or FHD Touch (1920x1080) ultrawide viewing angle.
- Wireless connectivity options:
  - Intel® Dual Band Wireless-AC 8260 802.11 AC/a/b/g/n (2x2) WiFi and Bluetooth® 4.2 combo adaptor (vPro) or Intel® Dual Band Wireless-AC 8260 802.11 AC/a/b/g/n (2x2) WiFi and Bluetooth® 4.2 combo (non-vPro)
  - Optional integrated wireless 3G or 4G (LTE) mobile broadband module support
- Three dedicated drive slots. (2) M.2 slots and (1) 2.5" drive bays.
- Security features including HP Client Security Manager, managed via single console.
- Low halogen
- HP BIOS technology, including HP Sure Start to identify and recover from unknown BIOS attacks.

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

Features

OPERATING SYSTEM

Preinstalled	Windows® 10 Pro 64*
	Windows® 10 Home 64
	Windows® 7 Professional 64 (available through downgrade rights from Windows 10 Pro) **
	Windows® 7 Professional 64**
	FreeDOS 2.0
Supported	Windows® 7 Enterprise 64**
	Windows® 8.1 Professional 64**
	Windows® 8.1 Enterprise 64*
	Windows® 10 Enterprise 64**
	Red Hat® Enterprise Linux® Desktop 6, 7

* 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.

NOTE: For detailed OS/hardware support information for Linux®, see: http://www.hp.com/support/linux_hardware_matrix

PROCESSOR*

Intel® Xeon® E3-1545M v5 with Intel® iris Pro Graphics P580 (2.9 GHz, 2133 MHz, 8 MB L3 Cache, 4 cores, 45W) *(Available in 1H16)* Up to 3.8 GHz with Intel® Turbo Boost Technology
Intel® Xeon® E3-1505M v5 with Intel® HD graphics P530 (2.80 GHz, 2133 MHz, 8 MB L3 Cache, 4 cores, 45W)
  Up to 3.70 GHz with Intel® Turbo Boost Technology
Intel® Core™ i7-6820HQ with Intel® HD graphics 530 (2.70 GHz, 2133 MHz, 8 MB L3 Cache, 4 cores, 45W)
  Up to 3.60 GHz with Intel® Turbo Boost Technology
Intel® Core™ i7-6700HQ with Intel® HD graphics 530 (2.60 GHz, 2133 MHz, 6 MB L3 Cache, 4 cores, 45W)
  Up to 3.50 GHz with Intel® Turbo Boost Technology
Intel® Core™ i5-6440HQ with Intel® HD graphics 530 (2.60 GHz, 2133 MHz, 6 MB L3 Cache, 4 cores, 45W)
  Up to 3.50 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

Mobile Intel® CM236

Features

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

Intel® Core™ i5 with vPro, Core™ i7 with vPro and XEON®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 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/Xeon® 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/XEON with vPro technology is dependent on third- party software providers. Compatibility with future "virtual appliances" is yet to be determined.

GRAPHICS

Intel Integrated
Intel® HD graphics 530[1];
Intel® HD graphics P530[1];
Intel® Iris Pro Graphics P580[1]

NOTE 1: HD content required to view HD images.
NOTE 2: Available in hybrid graphics mode only with NVIDIA graphics

Discrete
AMD FirePro™ W5170M with 2 GB dedicated GDDR5 video memory
Microsoft DirectX 12 (Shader Model 5.0) and OpenGL 4.4 capable

NVIDIA® Quadro® M1000M with 2 GB dedicated GDDR5 video memory
Microsoft DirectX 12 (Shader Model 5.0) and OpenGL 4.4 capable

NVIDIA® Quadro® M2000M with 4 GB dedicated GDDR5 video memory
Microsoft DirectX 12 (Shader Model 5.0) and OpenGL 4.4 capable

NOTE: NVIDIA® Quadro® mobile professional graphics support up to four independent displays when using a HP ZBook Dock with Thunderbolt™ 3 (sold separately) or DP 1.2 hubs with MST. AMD FirePro™ professional graphics support up to six independent displays when using an HP ZBook Dock with Thunderbolt™ 3 (sold separately) or DP 1.2 hubs with MST.

NVIDIA® Optimus Technology and AMD Enduro™ Technology supported

NOTE 1: Color management on UHD DreamColor panels is not supported while NVIDIA® Optimus Technology is activated.

DisplayPort 1.2 protocol features supported on Thunderbolt™ 3 ports:

- Legacy displays (HDMI, DVI, VGA) may be attached to Thunderbolt™ port with the use of a certified dongle.
- DisplayPort monitors capable of supporting DisplayPort 1.2 may be directly attached to the Thunderbolt™ port to achieve HBR2 with the use a dongle.

Features

- DisplayPort monitors capable of supporting DP 1.2 may be directly attached to the Thunderbolt™ port to achieve HBR2 with the use a dongle.
- Thunderbolt™ 3 enabled monitors may be directly attached to the Thunderbolt port to achieve HBR2 and MST.
- DisplayPort 1.2 MST feature ("daisy-chain" feature) is supported through Thunderbolt™ 3 port on Thunderbolt™ 3 enabled devices or DisplayPort 1.2 monitors (requires monitor with DisplayPort 1.2 MST capability) with the use of a dongle.
- Up to 2 streams (eight lanes) of DisplayPort 1.2 are supported over a single Thunderbolt™ 3 port. Up to (2) 4K displays 24/30-bit color depth at 60 Hz or (1) 5K display supported over a single Thunderbolt™ 3 port. (Requires Intel certified Thunderbolt™ cable).
- DisplayPort 1.2 w/MST (Multi-stream Transport): Supports resolutions up to Full 4K, 24/30-bit color depth at 60 Hz, and WUXGA (1920 x1200) monitors, 24/30-bit color depth at 120 Hz.

*Thunderbolt™ 3 is superset port supporting DisplayPort 1.2, USB 3.1 Gen 2, and PCIe Gen 3 devices over the new USB-C™ connector. Install all the latest drivers for your Thunderbolt™ device before connecting the device to the Thunderbolt™ port. Thunderbolt™ cable and Thunderbolt™ device (sold separately) must be compatible with Windows. To determine whether your device is Thunderbolt™ Certified for Windows, see https://Thunderbolttechnology.net/products.

Multi-Display Support

Without ZBook Dock with Thunderbolt™ 3:

HP ZBook 15 with hybrid graphics and without the use of the ZBook dock supports up to a maximum of four independent displays. These four displays are the internal panel plus three external displays connected to the VGA and two of the three following ports: HDMI 1.4, Thunderbolt™ 3, Thunderbolt™ 3. HP ZBook 15 configuration with Intel integrated graphics and without the use of the ZBook dock supports up to a maximum of three independent displays. Any three display combination of the system panel, VGA, and two of the three following ports: HDMI, Thunderbolt™ 3, Thunderbolt™ 3.

With ZBook Dock with Thunderbolt™ 3:

The ZBook Dock with Thunderbolt™ 3 dock has Thunderbolt™ 3 port, VGA, and two DisplayPort 1.2. When used together with the HP ZBook 15 configuration with hybrid graphics, a maximum of 6 independent displays are supported. These six displays are internal panel, one external display connected to the system's VGA port and four external displays connected to the ZBook dock's Thunderbolt™ 3, VGA, and two DisplayPort ports. When used together with the HP ZBook 15 configuration with Intel integrated graphics, a maximum of 3 independent displays are supported. Any three display combination of the system panel, system ports and ZBook Dock ports.

Without ZBook Dock with Thunderbolt™ 3 (using DP 1.2 MST)

Multi-stream Transport is a DP 1.2 feature that allows daisy chaining of DP 1.2 monitors that are Thunderbolt 3 enabled (requires built in support of DP 1.2 MST in monitor), or the use of DP 1.2 hubs (Thunderbolt™ 3 enabled) with MST to achieve 6 active displays without a docking station on configurations with hybrid graphics enabled.

* HP ZBook Dock with Thunderbolt™ 3 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 DreamColor (3840 x 2160)
15.6" diagonal Touch LED-backlit FHD UWVA IPS (1920 x 1080)

Features

External
Up to 30-bit (2^30) per pixel "Deep Color"
(total of 1,073,741,824 color variations)
NOTE: Resolutions are dependent upon monitor capability, and resolution and color depth settings.

Features

STORAGE AND DRIVES

(1) 2.5" Storage Bays Hard Drives*
1 TB 5400 rpm SATA
500 GB 7200 rpm SATA
500 GB SATA SSHD (Hybrid Drive) (8 GB cache)
500 GB 7200 rpm SATA SED (Self Encrypting Drive)
500 GB 5400 rpm SATA FIPS 140-2 SED Drive

(2) M.2 SATA SED Solid State DriveS*
256 GB SATA Self Encrypting Drive(SED)
512 GB SATA Self Encrypting Drive(SED)

HP 3D DriveGuard (Windows® only)
The hard drive is mounted directly to the notebook frame, reducing the transmission of shock to the hard drive. Uses three-axis digital motion detection with intelligent sensitivity to help protect the hard drive during normal use from shock and vibration. The digital accelerometer temporarily halts all data transfer and parks the hard drive when abrupt motion is detected.

HP Z Turbo Drive G2 (NVMe PCIe SSD)
256 GB NVMe PCIe SSD
512 GB NVMe PCIe SSD
1 TB NVMe PCIe SSD

*For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 30 GB (for Windows® 8.1/10) is reserved for system recovery software.

DRIVE CONTROLLERS

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

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

MEMORY

Standard
64 GB DDR4 1.2V ECC or Non-ECC SDRAM (With transfer rates up to 2133MT/s)
Four SODIMM slots supporting dual-channel memory
4 GB, 8GB and 16 GB SODIMMs (for Intel® Core™ Processors)
8GB and 16 GB ECC SODIMMs (for Intel® XEON® Processors)

Maximum
Upgradeable to 65536 MB with optional 16384 MB SODIMMs in all 4 slots

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

Features

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

NETWORKING/COMMUNICATIONS

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

Wireless
Support for a broad range of secure, integrated wireless LAN and wireless WAN options featuring support for the latest industry standards. Optional Broadband Wireless (WWAN) requires a Windows® operating system and is available in select countries as a standard, factory configurable feature only. Integrated Bluetooth® is also available (factory configurable only) and can be combined with any of the supported wireless LAN and wireless WAN options.

802.11 Wireless LAN options**

Intel® Dual Band Wireless-AC 8260 802.11 a/b/g/n/ac (2x2) WiFi and Bluetooth® 4.2 combo (vPro)
Intel® Dual Band Wireless-AC 8260 802.11 a/b/g/n/ac (2x2) WiFi and Bluetooth® 4.2 combo (non-vPro)

Wireless WAN - Mobile Broadband options***

HP lt4120 Qualcomm® Snapdragon™ X5 LTE Mobile Broadband Module (optional)

HP hs3110 HSPA+ Intel® Mobile Broadband Module (optional)

*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 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

AUDIO/MULTIMEDIA

Audio
Bang and Olufsen HD 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
Optional 720p HD webcam*

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

* HD content required to view HD images.

KEYBOARDS/POINTING DEVICES/BUTTONS & FUNCTION KEYS

Keyboard
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 18.7 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.

Pointing Devices
Touchpad with On/Off button, two-way scroll, gestures, three pick buttons
Pointstick with three additional pointstick 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, and display brightness.

Features

SOFTWARE AND SECURITY

Preinstalled Software with Windows® Operating System

BIOS

HP BIOSphere[1]
HP Sure Start
HP DriveLock[17] | HP Automatic DriveLock
HP BIOS Protection[2]
BIOS Update via Network
Master Boot Record Security
Power On Authentication
Pre-Boot Security
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

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

Features

3rd Party

Foxit PhantomPDF Express for HP

Microsoft Products

Buy Office
Bing Search
Skype[10]

Manageability

HP Driver Packs[11]
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]
LANDESK Management[12]

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

Client Security Software

HP Security Manager
Microsoft Security Essentials[14]
Microsoft Defender

Standard

TPM 1.2/2.0
(Version 2.0 available 1H'16)
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.

Features

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.

15 Common Criteria EAL4+ Augmented Certified Discrete TPM 1.2 Embedded Security upgradeable to TPM 2.0 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 DriveLock feature only supported with SATA drives. DriveLock feature not supported on HP Z Turbo Drive PCIe SSDs.

Workstation ISV Certifications

See 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.

Features

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 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.

Features

POWER

Power Supply
HP 150W Slim Smart AC adapter
(153 x 66 x 22 mm)

Primary Battery
HP Long Life 9-cell Polymer Battery (90 WHr) *

Battery Life
Battery life up to 15 hours and 45 minutes**

NOTE: Battery is internal and not replaceable by the customer

System Standby Time
Up to TBD weeks***

* Available with 3-year limited warranty only
** Windows® 7 MM014 battery life will vary depending on various factors including 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 http://www.bapco.com 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
NVIDIA® Optimus or AMD Enduro™ technology
Hibernation
Standby
ACPI compliance

ENVIRONMENTAL

US ENERGY STAR ®
IT ECO declaration
EPEAT® registered*
Low Halogen**

*EPEAT® registered where applicable. EPEAT registration varies by country. See www.epeat.net for registration status by country.
**External power supplies, power cords, cables and peripherals are not low halogen. Service parts obtained after purchase may not be low halogen.

WEIGHTS & DIMENSIONS

Weight
Starting at 5.7 lb. (2.59kg.)

QuickSpecs

Features

Dimensions (w x d x h)
15.2 in x 10.4 in x 1.0 in
386 mm x 264 mm x 26 mm

NOTE: Height varies depending upon where on the notebook the measurement is made. Weight varies by configuration and components. Weight includes Quad Core CPU, FHD, Intel® HD graphics, 8GBx1 SODIMM, HP Z Turbo Drive, wLAN/BT, FPR, 9-cell battery, no wWAN.

PORTS/SLOTS

Ports
Left side:
(1) RJ-45 (Ethernet)
(1) VGA
(1) USB 3.0 Charging Port
(1) Security lock slot

Right side:

(1) HDMI 1.4
(2) Thunderbolt™ 3* (Supporting DisplayPort 1.2, USB 3.1 Gen2, PCIe Gen 3 devices)
(1) Stereo microphone in / headphone-out combo jack
(1) Power Connector
(2) USB 3.0

Thunderbolt™ 3

Thunderbolt™3 ports supports DisplayPort 1.2, USB 3.1 Gen 2, and PCIe Gen 3 devices over the new USB-C port connector. The port is compatible with existing DisplayPort displays, devices, and cables. Install all the latest drivers for your Thunderbolt™ device before connecting the device to the Thunderbolt™ port. Thunderbolt™ cable and Thunderbolt™ device (sold separately) must be compatible with Windows®. To determine whether your device is Thunderbolt™ Certified for Windows, see https://thunderbolttechnology.net/products.

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* 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. 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.

QuickSpecs

HP ZBook 15 G3 Mobile Workstation

Technical Specifications – System Unit

SYSTEM UNIT

Stand-Alone Power Requirements (AC Power)	**Nominal Operating Voltage**	19.5 V	
	Average Operating Power	DreamColor	25W (Windows® 7 64-bit)
		Without DreamColor	16.8 W (Windows® 7 64-bit)
	Max Operating Power	< 150 W	
Temperature	**Operating**	32° to 95° F (0° to 35° C)	
	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)	
Industry Standard Certifications	**UL**	Yes	
	CSA	Yes	
	FCC Compliance	Yes	
	ENERGY STAR®	Select models*	
	EPEAT	Gold **	
	ICES	Planned	
	Australia / NZ A-Tick Compliance	Planned	
	CCC	Planned	
	Japan VCCI Compliance	Planned	
	KC	Planned	
	BSMI	Planned	
	CE Marking Compliance	Planned	
	MIL STD 810G	Planned***	

* Configurations of the HP ZBook 15 G3 that are ENERGY STAR® qualified are identified as HP ZBook 15 G3 ENERGY STAR® on HP websites and on http://www.energystar.gov.
** EPEAT® registered where applicable. EPEAT registration varies by country. See http://www.epeat.net for registration status by country.
*** MIL STD 810G testing 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.

QuickSpecs

Technical Specifications - Displays

DISPLAYS

15.6" diagonal LED-backlit FHD UWVA IPS eDP anti-glare + Panel Self Refresh (PSR) (1920 x 1080)			
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	360 g (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	141		
Viewing Angle	85/85/85/85 (Left/Right/Down/Up) (typical)		

15.6-inch diagonal LED backlit FHD SVA eDP anti-glare + Panel Self Refresh (PSR) (1920 x 1080)			
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 1800 (FHD)	
	Configuration	RGB Stripe	
Backlight	LED		
PPI	141		
Viewing Angle	45/45/35/25 (Left/Right/Down/Up) (typical)		

15.6-inch UHD UWVA IPS LED anti-glare + Panel Self Refresh (PSR) Dreamcolor (3840x2160)			
Dimensions (W x H)	13.62 x 7.59 in (3.6 x 19.4 cm)		
Diagonal Size	15.6 in (39.6 cm)		
Weight	345 g (max)		
Surface Treatment	Anti-glare		
Contrast Ratio	1000:1 (min)		
Refresh Rate	60 Hz		
Brightness	270 nit typical		
Pixel Resolution	**Pitch**	0.090 x 0.090 mm	
	Format	3840x2160	
	Configuration	RGB Stripe	
Backlight	LED		
PPI	282		
Viewing Angle	85/85/85/85 (Left/Right/Down/Up) (typical)		
Dimensions (W x H)	13.62 x 7.59 in (36 x 22.4 cm max)		

QuickSpecs

Technical Specifications - Displays

15.6-inch FHD TOUCH UWVA IPS LED (1920x1080)	**Diagonal Size**	15.6 in (39.6 cm)	
	Weight	345 g (max)	
	Contrast Ratio	600:1 (typ)	
	Refresh Rate	60 Hz	
	Brightness	300 nit typ	
	Pixel Resolution	**Format**	1920 x 1080 (FHD)
		Configuration	RGB Stripe
	Backlight	LED	
	PPI	142	
	Viewing Angle	85/85/85/85 (Left/Right/Down/Up) (typical)	

QuickSpecs

Technical Specifications - Storage and Drives

STORAGE AND DRIVES

Internal Storage

1 TB 5400 rpm SATA Hard Drive	Drive Weight	0.21 lbs (94 g)- 0.21 lbs (99 g)	
	Capacity	1 TB	
	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 (Drive Capability)	
	Seek Time (typical reads, including settling)	**Single Track**	2 ms
		Average	12 ms ~ 13 ms
		Maximum	18 ms ~ 23 ms
	Cache	Up To 32 MB	
	Rotational Speed	7200 rpm	
	Logical Blocks	1,465,149,168	
	Operating Temperature	32° to 140° F (0° to 60° C) [top cover temp]	
	Features	ATA Security, S.M.A.R.T., NCQ, Ultra DMA	

500 GB 7200 rpm SATA Hard Drive	Drive Weight	0.20 lbs (92 g) ~ 0.25 lbs (115 g)	
	Capacity	500 GB	
	Height	0.28 in (7 mm)	
	Width	2.75 in (69.85mm)	
	Interface	ATA-8, SATA 3.0	
	Transfer Rate	**Synchronous** (maximum) 600 MB/s (Drive Capability)	
	Seek Time (typical reads, including settling)	**Single Track**	1.5 ms ~ 2 ms
		Average	11 ms ~ 13 ms
		Maximum	18 ms ~ 22 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) [top cover temp]	
	Features	ATA Security, S.M.A.R.T., NCQ, Ultra DMA	

QuickSpecs

Technical Specifications - Security

500 GB 7200 rpm SATA SED FIPS* 140-2 compliant Hard Drive

Drive Weight	0.21 lbs (95g)		
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 (Drive Capability)	
Seek Time (typical reads, including settling)	**Single Track**	1.5 ms	
	Average	12 ms	
	Maximum	18-22 ms	
Cache	32 GB		
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		

* FIPS-certified, hardware-based AES-256 encryption image.

500 GB 7200 rpm SATA Self Encrypting Drive

Drive Weight	0.21 lbs (95g)		
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 (Drive Capability)	
Seek Time (typical reads, including settling)	**Single Track**	2 ms	
	Average	12 ms	
	Maximum	18-22 ms	
Cache	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, TCG OPAL v1.00, S.M.A.R.T., NCQ, Ultra DMA		

500 GB (8 GB cache) Hybrid Drive

Drive Weight	0.21 lbs (95g)		
Capacity	500 GB		
Height	0.28 in (7 mm)		
Width	2.75 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	64 MB		
Rotational Speed	5400 rpm		
Logical Blocks	976,773,168		
Operating Temperature	32° to 140° F (0° to 60° C) [case temp]		

Technical Specifications - Security

	Features	ATA Security

512 GB M2 2280 Self-Encrypting Drive (Opal 2) MLC Solid State Drive	**Drive Weight**	0.02 lb (<10 g)	
	Capacity	512GB	
	Height	0.09 in (2.3mm)	
	Width	0.87 in (22 mm)	
	Interface	ATA-8, SATA 3.0	
	Performance	**Maximum Sequential Read**	
		Up to 540 MB/s	
	Logical Blocks	1,000,215,216	
	Operating Temperature	32° to 158°F (0° to 70°C) [ambient temp]	

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	
	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 1TB, M.2 NVMe PCIe Solid State Drive	**Drive Weight**	0.022 lb (<10 g)	
	Capacity	1TYB	
	Height	0.14 in (3.7 mm	
	Width	0.87 in (22 mm)	
	Generation	XG4 NVMe	
	NAND Type	MLC	
	Form-Factor (I/O)	M.2 2280	
	Interface	PCIe GEN3X4	
	Performance	**Maximum Sequential Read**	**Maximum Sequential Write**
		Up to 2400MB/s	Up to 1500MB/s
	Logical Blocks	2,000,409,264	
	Operating Temperature	32° to 158°F (0° to 70°C) [ambient temp]	
	Features	ATA Security, L1.2	

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	

Technical Specifications - Security

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	

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	**Mobile Voltage Operation**	3.0V-3.6V Single Supply
	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 and Communications

NETWORKING/COMMUNICATIONS

Intel® I219-LM Gigabit Network Connection		
	Ethernet Features	10 Mbit/s operation (10BASE-T; IEEE 802.3; 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)
		IEEE 802.3u 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)
		IEEE 802.1as/1588 conformance
		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 (Receive Side Scaling)
		Ultra Low Power
	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 and Communications

HP hs3110 HSPA+ Intel® 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	6.2g
	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.

HP lt4120 Qualcomm® Snapdragon™ X5 LTE 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

Technical Specifications - Networking and Communications

Wireless protocol standards	3GPP Release 8 LTE Specification 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, GLONASS 1596–1607MHz
Maximum data rates	LTE: 100 Mbps (Download), 50 Mbps (Upload) DC-HSPA+: 42 Mbps (Download), 5.76 Mbps (Upload) HSPA+: 21.6 Mbps (Download), 5.76 Mbps (Upload) EDGE: 236.8 kbps (Download), 236.8 kbps (Upload) GPRS: 85.6 kbps(Download), 85.6 kbps (Upload)
Maximum output power	LTE: 23 dBm HSPA+: 23.5 dBm E-GPRS 1900/1800: 26.5 dBM E-GPRS 900/850: 27.5 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: 2,800 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 and Communications

Intel® Dual Band Wireless-N 8260AC 802.11 a/b/g/n (2x2) WiFi + Bluetooth® 4.2 Combo Adaptor*	**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 does not support this band
	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 WiFi compliant 64 / 128 bit WEP encryption for a/b/g mode only • AES-CCMP: 128 bit in hardware • 802.1x authentication • WPA, WPA2: 802.1x. WPA-PSK, WPA2-PSK, TKIP, and AES. • WPA2 certification • IEEE 802.11i • Cisco Certified Extensions, all versions through 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) : +14dBm minimum 802.11n HT40(2.4GHz) : +12dBm minimum 802.11n HT20(5GHz) : +14dBm minimum 802.11n HT40(5GHz) : +12dBm minimum	
	Power Consumption	Transmit: 2.0 Watts Receive: 1.6 Watts Idle mode:180 mW (WLAN Associated)	

Technical Specifications - Networking and Communications

	Idle mode: 50 mW (WLAN unassociated) Connect Standby: 10 mW (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 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	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® 4.0/4.1/4.2 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

Technical Specifications - Networking and Communications

	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 Legacy			

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
Range	Legacy Up to 33 ft (10 m) BLE Up to 99 ft (30 m)
Electrical Interface	USB 2.0 compliant
Bluetooth® Software Supported **Link Topology**	Microsoft Windows® Bluetooth® Software
Electrical Interface **Bluetooth® Software Supported** **Security**	Point to Point, Multipoint Pico Nets up to 7 slaves 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 **Certifications** **Bluetooth® Profiles Supported**	All necessary regulatory approvals for supported countries, including: FCC (47 CFR) Part 15C, Section 15.247 & 15.249
Power Management Certifications	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)
Bluetooth® V4.1/V4.2 support feature	V4.1: ESR5/6/7 compliant V4.2: ESR8 compliant, LE Secure Connection – Basic.

QuickSpecs

Technical Specifications - Audio and Multimedia

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
Internal Stereo Speaker	Power Rating	2 Watts
	Impedance	4 ohms

QuickSpecs

Technical Specifications - Power

POWER

HP 150W Slim Smart AC Adapter	Dimensions	6.02 x 2.60 x .87 in (153 x 66 x 22 mm)	
	Weight	0.70 lbs (320 g)	
	Input	100 to 240 VAC	
		Input Efficiency	88% min at 115 VAC
		Input frequency range	47 to 63 Hz
		Input AC current	2.9 A at 90 VAC, 1.45 A at 180 VAC
	Output	Output power	150W
		DC output	19.5V
		Hold-up time	5 msec at 115 VAC input
		Output current limit	<16A, Over voltage protection- 29V max automatic shutdown
	Connector	3 pin/grounded, mates with interchangeable cords	
	Environmental Design	Operating temperature	32° to 104° F (0° to 40° 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- IEC950, EN60950, UL1950, Class 1, SELV; Agency approvals- C-UL-US, NORDICS, DENAN, EN55022 Class B, FCC Class B, CISPR22 Class B, CCIB, NOM-1 NYCE; MTBF- over 200,000 hours at 25°C ambient condition.	

HP Long Life 9-cell Polymer Battery (90 WHr)	Dimensions (H x W x L)	0.47 x 4.33 x 10.2 in (1.2 x 11 x 26cm)	
	Weight (max)	1.12lb (420g)	
	Cells/Type	9-cell; Polymer	
	Energy	Voltage	11.4V
		Amp-hour capacity	7.905Ah
		Watt-hour capacity	90Wh
	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
		System ON	3 to 5 hours
	Fuel Gauge LED	No	
	Warranty*	3 year	
	Compatible with optional Travel Battery	N/A	

* 3-year platform warranty is required for a 3-year Long Life Battery warranty.

Technical Specifications - Environmental Data

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)	12.46 W	12.84 W	11.63 W
Normal Operation (Long idle)	8.72 W	8.59 W	8.15 W
Sleep	1.85 W	1.81 W	1.86 W
Off	0.43 W	0.43 W	0.42 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)	43 BTU/hr	44 BTU/hr	40 BTU/hr
Normal Operation (Long idle)	30 BTU/hr	29 BTU/hr	28 BTU/hr
Sleep	6 BTU/hr	6 BTU/hr	6 BTU/hr
Off	1 BTU/hr	1 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	3.1	23
Fixed Disk – Random writes	3.0	23

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:

- 3x USB 3.0 ports
- 1x SD Card reader
- 1x Smart Card reader
- 2x Thunderbolt™ 3 ports
- 4 SODIMM memory slots
- 1x VGA port

Technical Specifications - Environmental Data

- 1 HDMI 1.4 port

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 95.6% recycle-able when properly disposed of at end of life.

Packaging Materials

External:	PAPER/Paper	413.8 g
Internal:	PLASTIC/EPE (Expanded Polyethylene)	50.8 g
	PLASTIC/Polyethylene low density	11.1 g

The plastic packaging material contains at least 68.5% recycled content.

The corrugated paper packaging materials contains at least 75.8% 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)

Technical Specifications - Environmental Data

- 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

QuickSpecs

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
	HP 16GB DDR4-2133 SODIMM (Core™ processors only)	TBD
	HP 8GB DDR4-2133 EEC SODIMM (Xeon® processors only)	V1D58AA
	HP 16GB DDR4-2133 EEC SODIMM (Xeon® processors only)	V1D59AA
Cases	HP Executive 15.6 Black Top Load	P6N18AA
	HP Business Case (up to 15.6")	H5M92AA
Docking	HP ZBook Dock with Thunderbolt™ 3	P5Q58AA
	HP Executive Travel Hub	T0K29AA
	HP Travel Hub	T0K30AA
	HP 3005pr USB 3.0 Port Replicator	H1L08AA
	HP USB-Type C™ Elite Dock	X7W54AA
Input/Output – Mice	HP Comfort Grip Wireless 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#xx
	HP Ultra Mobile Wireless Mouse	H6F25AA#xxx
	HP Wireless Keyboard and Mouse	G1K29AA#xx
	HP X4000 Bluetooth® Mouse	H3T50AA#xxx
	HP Slim Bluetooth® Mouse	F3J92AA#xxx
	HP USB Smart Card Reader	F6V67AA
	HP Ultrathin Wireless Mouse	L9V78AA
	HP Wireless (Link-5) Keyboard	T6U20AA
	HP USB Essential Keyboard and Mouse	H6L29AA#xx
	HP Stereo 3.5mm Headset	T1A66AA
	HP Stereo USB Headset	T1A67AA
Power Adapters	HP 150W Slim A/C Adapter	TBD
	HP 150W Smart AC Adapter (4.5mm)	W2F74AA
Adapters	HP Wireless display adapter	J1V25AA#xxx
	HP dual output wireless 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

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

	USB-C to TB1/TB2	TBD
	7.4 to 4.5mm Adapter	K0Q39AA
Storage - External Storage	HP External USB Optical Drive	F2B56AA
	HP 500GB 7200rpm HDD	F3B97AA
	HP 128GB Solid State Drive	F4P50AA
	HP 180GB Solid State Drive	H4T75AA
	HP 512GB Solid State Drive	J2V75AA
	HP 256GB SED Solid State Drive (Opal 2)	K1Z11AA
	HP 256GB M2 PCIe NVME SSD (2280)	V3K66AA#ABB
	HP 512GB M2 PCIe NVME SSD (2280)	V3K67AA#ABB
	HP 128GB Solid State Drive	F4P50AA
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
	HP Essential Combination Lock	T0Y16AA
	HP Combination Lock	T0Y15AA
	HP Keyed Cable lock	T0Y14AA
	HP Keyed Cable Lock 10mm	T1A62AA

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:
November 25, 2015	From v1 to v2	**Changed**	DisplayPort 1.2 features and ZBook Dock with Thunderbolt 3 in Features section
February 10, 2016	From v2 to v3	**Added**	Intel® Xeon® E3-1545M v5 specs, HDMI 1.4 support, hybrid support for Integrated graphics and NVIDIA, RAID support and notes, Battery life.
		Removed	HP 1 TB 7200 9.5mm SATA HDD
March 31, 2016	From v3 to v4	**Added**	AMO in Options and Accessories
		Changed	Update Bluetooth version from 4.0 to 4.2 (for vPro/non-vPro); 88% min at 115 VAC; Raid 0, 1 supported only on SATA drives; Remove Ubuntu Linux messaging from all Quickspecs; Enviromental Data for Tech Specs; updated battery life and testing to MM14; change the DDR memory spec voltage.
May 1, 2016	From v4 to v5	**Changed**	Update 2.5" storage bay count,
		Removed	DreamColor, HP Z Turbo 1TB, and Iris Pro availability footnotes
June 7, 2016	From v5 to v6	**Added**	HP USB-Type C™ Elite Dock to Options and Accessories
		Changed	Split last bullet "Low Halogen/BIOS in two from At a Glance section, Brightness of UHD panel from 340 to 270 nits
		Removed	footnote on FHD Touch, Displays section 1TB 7200rpm
July 1, 2016	From v6 to v7	**Added**	1 TB Z Turbo, 2.5" 256 SATA SSD, Full HD Touch UHD Panel
July 13, 2016	From v7 to v8	**Added**	HP Drivelock note in Software and Security section.
August 1, 2016	From v8 to v9	**Added**	Red Hat 6 & 7 (Web Support) and link to support matrix, USB-Type C Elite Dock part number in Options
September 1, 2016	From v9 to v10	**Added**	HP 256GB, and 512 2280 part numbers; HP 150W Smart AC Adapter (4.5mm) in Options and accessories.
January 1, 2017	From v10 to v11	**Removed**	15.6-inch FHD TOUCH UWVA antiglare treatment.
March 1, 2018	From v11 to v12	**Added**	Battery note on power supply section