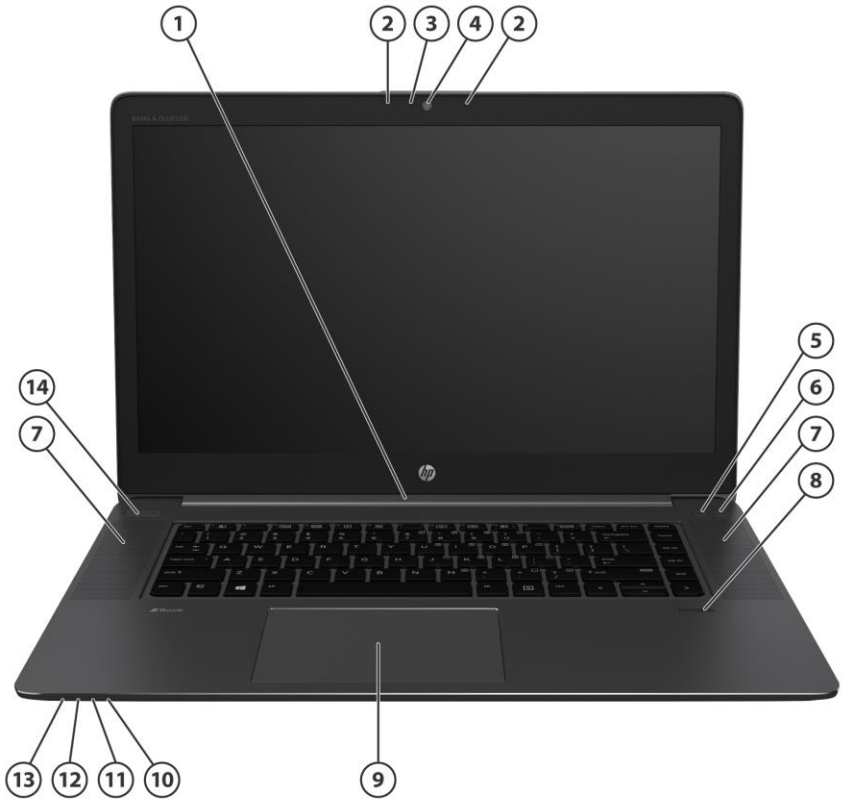
Overview

HP ZBook Studio G3 Mobile Workstation

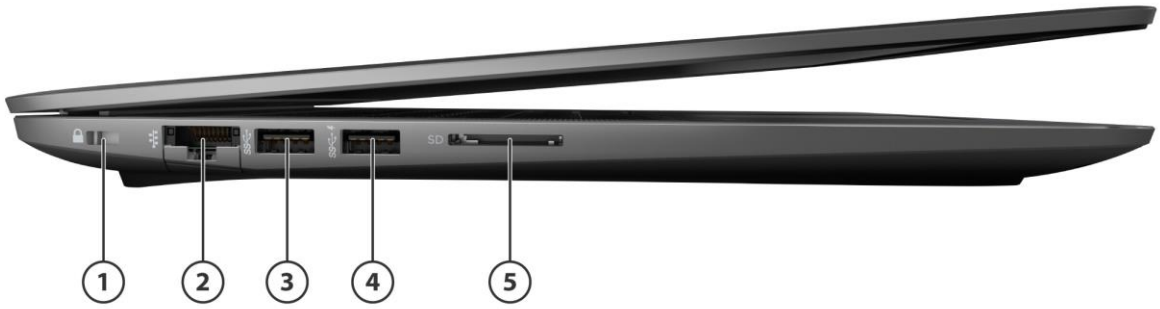
FRONT VIEW



1. WLAN Antennas (2)
2. Internal microphones (2)
3. Webcam Light (with webcam)
4. Optional 720p HD Webcam
5. Wireless button
6. Volume mute button
7. Speakers
8. Fingerprint reader (select models only)
9. Clickpad
10. Storage light indicator
11. Battery light indicator
12. Power light indicator
13. Wireless light indicator
14. Power button

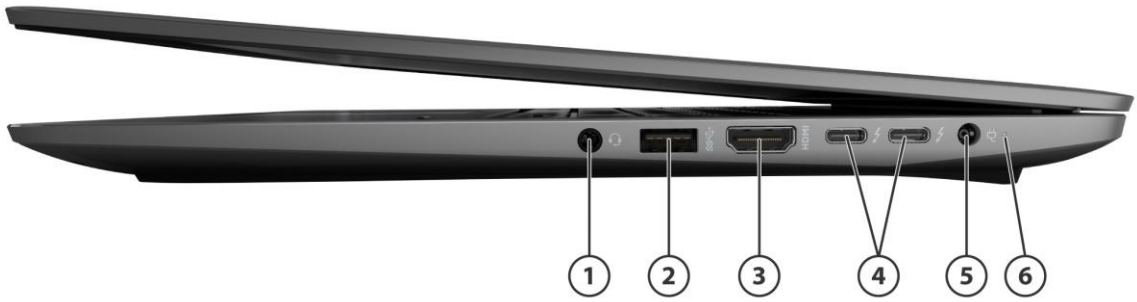
Overview

LEFT VIEW



1. Security lock slot
2. RJ-45 (Ethernet)
3. USB 3.0 port
4. USB 3.0 port Charging
5. SD Card reader

RIGHT VIEW



1. Audio in (microphone) / Audio-out (headphone) jack
2. USB 3.0 port
3. HDMI port
4. (2) Thunderbolt™ 3 ports
5. Power connector
6. Power LED

Overview

At A Glance

- Windows® 10 editions, Windows® 7 editions, or FreeDOS
- Thin & light full performance industrial design, CNC machined top cover and keyboard deck. Top cover anodized in HP's new "Space Silver" color with chemical etching. Bottom housing is constructed out of lightweight magnesium for durability. 2 piece aluminum vented bottom cover for airflow. Backlight keyboard in full aluminum deck, chemically strengthened glass large clickpad, and updated system functions indicators. Diamond cut process showcased around keyboard deck and clickpad.
- HP Spill Resistant Keyboard with Durakeys
- Designed to pass military standard Mil-Std-810G testing
  Workstation-caliber NVIDIA® Quadro® discrete graphics, HP ZBook Studio special edition: NVIDIA® Quadro® M1000M (with 4GB dedicated GDDR5 graphics memory); NVIDIA® Optimus.
- 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 (Note: HD 530 will not be ISV certified)
- Choice of 6th generation Intel® Core™ i7 quad-Core™ or Xeon® processors.
- Intel® Core™ i7 with vPro or Intel® Xeon® with vPro technology (optional)
- HP Performance Advisor for optimal configuration, compatibility and performance
- Up to two SODIMMs, for system memory up to 32GB. ECC memory with Intel® Xeon® processors.
- Supports multi-display, including up to three displays without the use of a docking solution, with hybrid graphics enabled. Supports up to five with HP ZBook Dock with Thunderbolt™ 3 (sold separately), with hybrid graphics enabled.
- Two (2) Thunderbolt™ 3 ports (supporting DP 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: 4-cell (64 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) ultrawide viewing angle, UHD (3840x2160) ultrawide viewing angle, 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® 4.0 combo (vPro) or,
  - Intel® Dual Band Wireless-AC 8260 802.11 ac/a/b/g/n (2x2) WiFi and Bluetooth® 4.0 combo (non-vPro)
- Two dedicated drive slots. (2) M.2 slots. Both can be populated at a time.
- 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® 10 Enterprise 64* Windows® 7 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*

Intel® Xeon®E3-1545M v5 with Intel® Iris Pro Graphics P580 (*Available in 1H16*)

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

*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

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

Intel® 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.

Features

GRAPHICS

Intel Integrated
Intel® HD graphics 530*, [2]
Intel® HD graphics P530*, [2]
Intel® Iris Pro Graphics P580 *(Available 1H16)* [2]

Discrete
HP ZBook Studio special edition: NVIDIA® Quadro® M1000M with 4GB dedicated GDDR5 graphics memory**
Microsoft DirectX 12 (Shader Model 5.0) and OpenGL 4.4 capable

*HD content required to view HD images.

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

NVIDIA® Optimus Technology supported

NOTE 1: Color management on the UHD DreamColor panel is not supported while NVIDIA® Optimus Technology is activated.
NOTE 2: Available in hybrid graphics mode only with NVIDIA graphics.

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.
- 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 Studio with hybrid graphics and without the use of the ZBook dock supports up to a maximum of three independent displays. These three displays are the internal panel plus two external displays connected to two of the three following ports: HDMI, Thunderbolt™ 3, Thunderbolt™ 3. HP ZBook Studio configuration with Intel® integrated graphics and without the use of the ZBook dock supports up to a maximum of three independent displays. These three displays are the internal panel plus two external displays connected to two of the three following ports: HDMI, Thunderbolt™ 3, Thunderbolt™ 3.

Features

With ZBook Dock with Thunderbolt™ 3:

The ZBook Dock with Thunderbolt™ 3 has a Thunderbolt™ 3 port, VGA port, and two DisplayPort 1.2 ports. When used together with the HP ZBook Studio configuration with hybrid graphics, a maximum of 5 independent displays are supported. These five displays are internal panel plus four external displays connected to the ZBook dock's Thunderbolt™ 3, VGA, and two DisplayPort ports. When used together with the HP ZBook Studio configuration with Intel® integrated graphics, a maximum of 3 independent displays are supported.

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

Multi-stream Transport (MST) is a DP 1.2 feature that allows daisy chaining of DP 1.2 monitors (requires built in support of DP 1.2 MST in monitor), or the use of DP 1.2 hubs with MST to achieve 5 active displays without a docking station on configurations with hybrid graphics enabled.

* HP ZBook Dock with Thunderbolt™ 3 sold separately.

DISPLAY

Internal

15.6-inch diagonal LED-backlit FHD UWVA IPS eDP anti-glare + Panel Self Refresh (PSR) (1920 x 1080)
15.6-inch diagonal UHD+ UWVA IPS LED anti-glare (3840x2160)
15.6-inch diagonal UHD UWVA IPS LED anti-glare + Panel Self Refresh (PSR) Dreamcolor (3840x2160) (*available in 1H16*)
15.6" diagonal Touch LED-backlit FHD UWVA IPS (1920 x 1080) (*available in 1H16*)

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.

STORAGE AND DRIVES

HP Z Turbo Drives (NVMe PCIe SSD)
256GB NVMe PCIe SSD
512 GB (NVMe) PCIe SSD
1 TB NVMe PCIe SSD *(Available in 1H16)*

M.2 SATA SSD
128 GB SATA 6 Gb/sec SATA SSD *(Available in 1H16)*

M.2 SATA SED SSD
256 GB SATA Self Encrypting Drive(SED)
512 GB SATA Self Encrypting Drive(SED) *(Available in 1H16)*

*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

M.2 Storage Slots (SATA):	SATA-3 for SSD
HP Z Turbo Drive:	PCIe NVMe SSD
RAID:	0, 1 supported

MEMORY

Standard
32GB DDR4 1.35V ECC or Non-ECC SDRAM (Transfer rates up to 2133MT/s)
Two 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 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.

NOTE 1: Non-ECC memory only available with Intel® Core™ processors. ECC memory only available with Intel® Xeon® processors.

NOTE 2: 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 or LINUX®.

NETWORKING/COMMUNICATIONS

Communications
Integrated Intel® I219-LM Gigabit* Network Connection

Wireless
Secure, integrated wireless LAN options featuring support for the latest industry standards. Integrated Bluetooth® is also available (factory configurable only) and is combined with the supported wireless LAN feature.

802.11 Wireless LAN options

Intel® Dual Band Wireless-AC 8260 802.11 AC/a/b/g/n (2x2) WiFi + Bluetooth® 4.0 Combo Adaptor** (vPro)

Intel® Dual Band Wireless-AC 8260 802.11 AC/a/b/g/n (2x2) WiFi + Bluetooth® 4.0 Combo Adaptor** (non-vPro)

* 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.

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 microphone-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 helps reduce the risk of damage to sensitive components underneath. The 85-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
Large clickpad with On/Off button, two-way scroll, gestures, two integrated buttons within clickpad surface
Image sensor clickpad 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.

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 SpareKey[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 play back)
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]
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.
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

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

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

Features

requires HP Mobile Broadband Module.

* The Absolute Data Protect 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 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 to 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

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

Primary Battery
HP Long Life 4-cell Prismatic Battery (64 WHr) *

Battery Life
Battery life up to 9 hours and 30 minutes**

System Standby Time
Up to TBD weeks***

* Available with 3-year limited warranty only
**Windows® 10 MM12 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
Hibernation
Standby
ACPI compliance

ENVIRONMENTAL

US ENERGY STAR®
IT ECO declaration
EPEAT®

WEIGHTS & DIMENSIONS

Weight
Starting at 4.4 lb (2.00 kg)

Dimensions (w x d x h)
14.76 in x 10.04 in x 0.71 in
375 mm x 255 mm x 18 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, 4GBx1 SODIMM, HP Z Turbo Drive, wLAN/BT, FPR, 4-cell battery.

PORTS/SLOTS

Ports

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

Right side:
(1) Power Connector
(2) Thunderbolt™ 3 (supporting DP 1.2, USB 3.1 Gen2, PCIe Gen 3 devices)
(1) HDMI
(1) USB 3.0
(1) Stereo microphone in / headphone-out combo jack

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)

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	
	Average Operating Power	DreamColor	25 W (Windows® 7 64-bit)
		Without DreamColor	16.8 W (Windows® 7 64-bit)
	Max Operating Power	< 200 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 Studio that are ENERGY STAR® qualified are identified as HP ZBook Studio 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 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 – Storage

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 (34.4 x 19.4 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 UHD UWVA IPS LED anti-glare (3840 x 2160)	**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)	

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 (34.6 x 19.4 cm)	
	Diagonal Size	15.6 in (39.6 cm)	
	Weight	345 g (max)	
	Surface Treatment	Anti-glare	
	Contrast Ratio	1000:1 (typ)	
	Refresh Rate	60 Hz	
	Brightness	340 nit typical	
	Pixel Resolution		
		Format	3840x2160
		Configuration	RGB Stripe
	Backlight	LED	
	PPI	282	
	Viewing Angle	85/85/85/85 (Left/Right/Down/Up) (typical)	

** UHD+ Dreamcolor to be available in 1H16*

STORAGE AND DRIVES

Technical Specifications – Storage

Internal Storage

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	
	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]	
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 (22.1 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	
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 – Storage

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	

* 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/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
Intel® Dual Band Wireless-N 8260AC 802.11 AC/a/b/g/n (2x2) WiFi + Bluetooth® 4.0 Combo Adaptor* (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

Technical Specifications – Networking/Communications

	5.25 - 5.35 GHz 5.47 - 5.725 GHz 5.825 - 5.850 GHz Note: Indonesia no support this band)
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 ~ 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 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 band 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 (max) Receive: 1.6 Watts (max) Idle mode(PSP): 180 mW (WLAN associated) Idle mode: 50 mW (WLAN unassociated) Connect standby: 10mW (WLAN+BT) Radio disabled: 5 mW
Power Management	ACPI and PCI Express compliant power management 802.11 compliant power saving mode
Receiver Sensitivity[3]	802.11b, 1Mbps : -94dBm maximum 802.11b, 11Mbps : -86dBm maximum 802.11g, 6Mbps : -88dBm maximum 802.11g, 54Mbps : -74dBm maximum 802.11a, 6Mbps : -88dBm maximum 802.11a, 54Mbps : -74dBm maximum 802.11n, MCS07 : -69dBm maximum 802.11n, MCS15 : -66dBm maximum

Technical Specifications – Networking/Communications

	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)
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 (CCK 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
Dimensions	1.18 x 0.26 x 0.13 in (30 x 6.5 x 3.25 mm))
Frequency Band	2402 to 2480 MHz
Number of Available Channels	Legacy: 0-79 (1 MHz/CH) BLE: 0-39 (2 MHz/CH)
Data Rates and Throughput	Legacy : 3 Mbps data rate; throughput up to 2.17 Mbps BLE : 1 Mbps data rate; throughput up to 0.2 Mbps Legacy : Synchronous Connection Oriented links up to 3, 64 kbps, voice channels Legacy : Asynchronous Connection Less links 2178.1 kbps/177.1 kbps asymmetric (3-DH5) or 864 kbps symmetric (3-EV5)
Transmit Power	The Bluetooth® component shall operate as a Class II Bluetooth® device with a maximum transmit power of + 4 dBm for BR and EDR.
Receiver Sensitivity	

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

Power Consumption	Peak (Tx) 330 mW Peak (Rx) 230 mW

Technical Specifications – Networking/Communications

	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	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] Hard Copy Cable Replacement (HCRP)[1,2] Personal Area Networking Profile (PAN)[1,2] Human Interface Device Profile (HID)[1,2] 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. 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/Communications

Intel® Dual Band Wireless-N 8260AC 802.11 AC/a/b/g/n (2x2) WiFi + Bluetooth® 4.0 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/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:** No support for this band in Indonesia.
	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 ~ 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 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 band 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 (max)

Technical Specifications – Networking/Communications

	Receive: 1.6 Watts (max) Idle mode(PSP): 180 mW (WLAN associated) Idle mode: 50 mW (WLAN unassociated) Connect standby: 10mW (WLAN+BT) Radio disabled: 5 mW	
Power Management	ACPI and PCI Express compliant power management 802.11 compliant power saving mode	
Receiver Sensitivity[3]	802.11b, 1Mbps : -94dBm maximum 802.11b, 11Mbps : -86dBm maximum 802.11g, 6Mbps : -88dBm maximum 802.11g, 54Mbps : -74dBm maximum 802.11a, 6Mbps : -88dBm maximum 802.11a, 54Mbps : -74dBm maximum 802.11n, MCS07 : -69dBm maximum 802.11n, MCS15 : -66dBm maximum 802.11ac, 1SS, MCS-0 : -86dBm maximum 802.11ac, 1SS, MCS-9 : -61dBm maximum 802.11ac, 2SS, MCS-0 : -83dBm maximum 802.11ac, 2SS, MCS-9 : -58dBm maximum	
Antenna Type	High efficiency antenna with spatial diversity, mounted in the display enclosure Two embedded dual band 2.4/5 GHz antennas are provided to the card to support WLAN MIMO 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)
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 (CCK 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
	Dimensions	1.18 x 0.26 x 0.13 in (30 x 6.5 x 3.25 mm))
	Frequency Band	2402 to 2480 MHz
	Number of Available Channels	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

Technical Specifications – Networking/Communications

	BLE : 1 Mbps data rate; throughput up to 0.2 Mbps Legacy : Synchronous Connection Oriented links up to 3, 64 kbps, voice channels Legacy : Asynchronous Connection Less links 2178.1 kbps/177.1 kbps asymmetric (3-DH5) or 864 kbps symmetric (3-EV5)
Transmit Power	The Bluetooth® component shall operate as a Class II Bluetooth® device with a maximum transmit power of + 4 dBm for BR and EDR.
Receiver Sensitivity	

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

Power Consumption	Peak (Tx) 330 mW Peak (Rx) 230 mW Selective suspend 17 mW
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	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] Hard Copy Cable Replacement (HCRP)[1,2] Personal Area Networking Profile (PAN)[1,2] Human Interface Device Profile (HID)[1,2] 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.

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 – Audio/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**	1 Watts
	Impedance	4 ohms

POWER

HP 150W Slim Smart AC Adapter	**Dimensions**	6.02 x 2.60 x .87 in ((153 x 66 x 22 mm)	
	Weight	1.65 lb (748 g)	
	Input	100 to 240 VAC	
		Input Efficiency	87% 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	200W
		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 4-cell Prismatic Battery (64 WHr)	**Dimensions** (H x W x L)	0.29 x 3.35 x 10.2 in (0.74cm x 8.5cm x 25.8cm)	
	Weight (max)	315g	
	Cells/Type	4-cell; Prismatic	
	Energy	Voltage	15.2V
		Amp-hour capacity	4.21Ah
		Watt-hour capacity	64Wh
	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	
	* 3-year platform warranty is required for a 3-year Long Life Battery warranty.		

ENVIRONMENTAL DATA

Eco-Label Certifications

US ENERGY STAR® ®
IT ECO declaration
EPEAT®

System Configuration

The configuration used for the Energy Consumption and Declared Noise Emissions data for the Commercial Notebook model is based on a "Typically Configured Notebook"

Energy Consumption	**115 VAC**	**230 VAC**	**100 VAC**
Normal Operation	16.64 W	16.78 W	15.87 W
Sleep (ENERGY STAR® low power mode)	1.01 W	1.07 W	1.01 W
Off	0.31 W	0.34 W	0.31 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*	**115 VAC**	**230 VAC**	**100 VAC**
Normal Operation	57 BTU/hr	57 BTU/hr	54 BTU/hr
Sleep	3 BTU/hr	4 BTU/hr	3 BTU/hr
Off	1 BTU/hr	1 BTU/hr	1 BTU/hr

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

Declared Noise Emissions (in accordance with ISO 7779 and ISO 9296)

System Fan Off	Sound Power (LWAd, bels)	Sound Pressure (LpAm, decibels)
Typically Configured - Idle	2.9	23
Fixed Disk – Random writes	2.9	23

Batteries

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

Batteries used in the product do not contain:
Mercury greater the 5ppm by weight
Cadmium greater than 10ppm by weight

Battery size: CR2025 (coin cell)
Battery type: Lithium
Battery size: 6-cell high capacity Lithium-Ion battery (optional 8 cell available)

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).
- Plastics parts weighing over 25 grams used in the product are marked per ISO11469 and

ISO1043.
- This product contains 3.6 % post-consumer recycled plastic (by wt.)
- This product is 95.60 % recycle-able when properly disposed of at end of life.

Packaging Materials
- External:
  - PAPER/Corrugated - 493
- Internal:
  - PLASTIC/EPE (Expanded Polyethylene) - 55 g
  - PLASTIC/Polyethylene low density - 26.6 g
- The PAPER/Corrugated packaging materials contains at least 85% recycled content.
- The PLASTIC/EPE (Expanded Polyethylene) foam packaging material is made from 0 % recycled content.
- The PLASTIC/Polyethylene low density foam packaging material is made from 0 % recycled content.

Material Usage

This product does not contain any of the following substances in excess of regulatory limits (for reference of these limits please refer to the HP General Specification of the Environment(http://www.hp.com/hpinfo/globalcitizenship/environment/supplychain/gen_specifications.html):

- Asbestos
- Certain Azo Colorants
- Certain Brominated Flame Retardants - may not be used as flame retardants in plastics
- Cadmium
- Chlorinated Hydrocarbons
- Chlorinated Paraffins
- Formaldehyde
- Halogenated Diphenyl Methanes
- Lead carbonates and sulfates
- Lead and Lead compounds
- Mercuric Oxide Batteries
- 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.

Technical Specifications – Environmental

- 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
	HP 8GB DDR4-2133 EEC SODIMM (Xeon® processors only)	TBD
	HP 16GB DDR4-2133 EEC SODIMM (Xeon® processors only)	TBD
Cases	HP Executive 15.6 Black Top Load	P6N18AA
	HP Business Case(up to 15.6")	H5M92AA
Docking	HP ZBook 150W TB3 Dock	P5Q58AA
	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 150W Slim A/C Adapter	TBD
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

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

Storage - External	HP External USB Optical Drive	F2B56AA
Storage	HP 256GB 2280 M2 PCIe 3x4 NVME	TBD
	HP 512GB 2280 M2 PCIe 3x4 DS NVME	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:
	From v1 to v2	Changed	DisplayPort 1.2 features and ZBook Dock with Thunderbolt 3 in Features section
December 18, 2015	From v2 to v3	Changed	Docking solution under Options and Accesories
January 20, 2016	From v3 to v4	Changed	NVIDIA® Quadro® M1000M to HP ZBook Studio special edition: NVIDIA® Quadro® M1000M in At a Glance and Graphics section in features.
January 29, 2016	From v4 to v5	Changed	Intel HD graphics messaging in At a Glance.
		Added	Battery life in Features

Copyright © 2015, 2016 HP Development Company, L.P.

The information contained herein is subject to change without notice and is provided "as is" without warranty of any kind. The warranties for HP products are set forth in the express limited warranty statements accompanying such products. Nothing herein should be construed as constituting an additional warranty. HP shall not be liable for technical or editorial errors or omissions contained herein.

Microsoft and Windows are registered trademarks of the Microsoft Group of companies. Intel, Core, Xeon and Thunderbolt are registered trademarks or trademarks of Intel Corporation in the U.S. and/or other countries. Linux is the registered trademark of Linus Torvalds in the U.S. and other countries. Bluetooth is a registered trademark of its proprietor, used by HP Company under license. Adobe is a trademark of Adobe Systems Incorporated. NVIDIA, the NVIDIA logo, Optimus and Quadro are trademarks and/or registered trademarks of NVIDIA Corporation in the U.S. and other countries. Qualcomm and Snapdragon are trademarks of Qualcomm, Inc. registered in the United States and other countries, used with permission. ENERGY STAR is a registered mark of the U.S. Environmental Protection Agency. SD, SDHC, and SDXC, are trademarks or registered trademarks of SD-3C in the United States, other countries or both. USB Type-C and USB-C are trademarks of USB Implementers Forum.