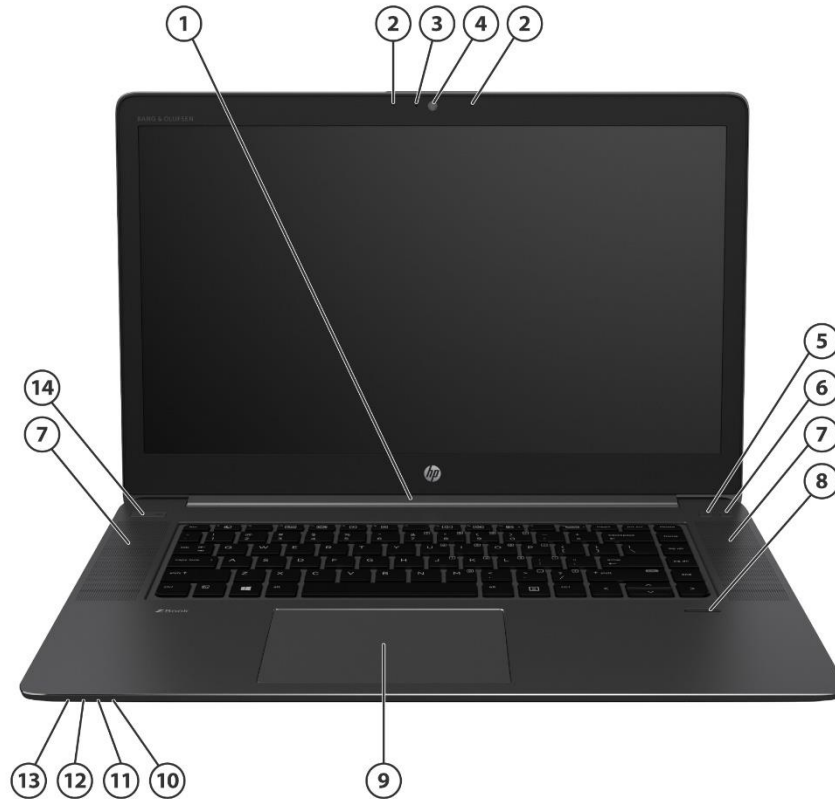


### Overview

### HP ZBook Studio G4 Mobile Workstation

#### FRONT VIEW



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

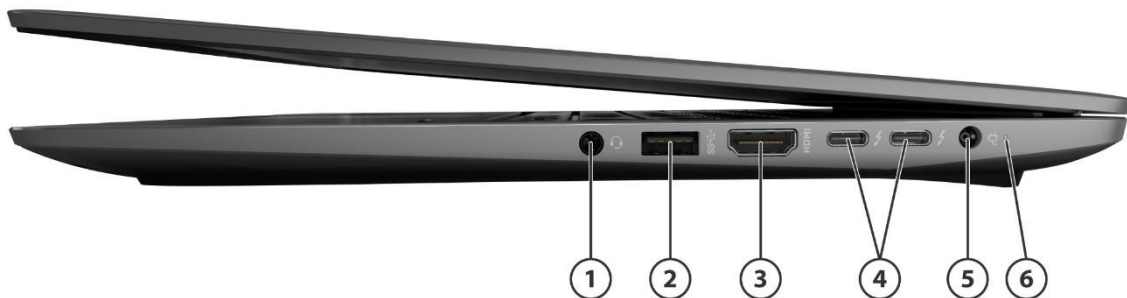
### Overview

#### LEFT VIEW



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

#### RIGHT VIEW



- |   |                             |
|---|-----------------------------|
| 1. Audio in (microphone) / Audio-out (headphone) jack | 4. (2) Thunderbolt™ 3 ports |
| 2. USB 3.0 port                                       | 5. Power connector          |
| 3. HDMI 1.4 port                                      | 6. Power LED                |

### Overview

#### At A Glance

- Windows 10 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. Bottom housing is constructed out of lightweight magnesium for durability. Backlight keyboard in full aluminum deck, chemically strengthened glass large click pad, and updated system functions indicators. Diamond cut process showcased around keyboard deck and click pad.
- HP Spill Resistant Keyboard with Durakeys
- Designed to pass MIL-STD 810G testing
- Workstation-caliber NVIDIA® Quadro® discrete graphics, HP ZBook Studio special edition: NVIDIA® Quadro® M1200M (with 4GB dedicated GDDR5 graphics memory); NVIDIA® Optimus.
- Intel® Integrated graphics: Intel® HD Graphics 630 integrated on Core™ i5 and i7. Intel® HD Graphics, P630 Intel® HD graphics configurable on Intel i5 and i7 processors.
- ISV certified to provide fast and reliable performance with workstation applications, including manipulation of 3D textures (**Note: HD 630 will not be ISV certified**)
- Choice of 7th generation Intel® Core™ i7 and i5 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: optional 4-cell (64 Whr) or 8-cell (92.4 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® 4.2 combo (vPro) or,
  - Intel® Dual Band Wireless-AC 8260 802.11 ac/a/b/g/n (2x2) WiFi and Bluetooth® 4.2 combo (non-vPro)
- Two dedicated drive slots. (2) M.2 slots. Both can be populated at a time with the 64Whr Battery and one at a time with the 92Whr battery.
- Security features including HP Client Security Manager, managed via single console.
- Low halogen HP BIOS technology, including HP Sure Start Gen 3 to identify and recover from unknown BIOS attacks.

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

### Features

#### OPERATING SYSTEM

**Preinstalled**

- Windows 10 Pro 64<sup>1</sup>
- Windows 10 Home 64<sup>1</sup>
- Windows 10 Home Single Language 64<sup>1</sup>

FreeDOS 2.0

**Supported**

- Windows 10 Enterprise 64<sup>1</sup>
- Red Hat Enterprise Linux (RHEL) 7
- Ubuntu Linux 16.04

1. 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>.

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

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#### PROCESSOR\*

Intel<sup>®</sup> Xeon<sup>®</sup>E3-1535M v6 with Intel<sup>®</sup> HD graphics P630 (3.10 GHz, 2400 MHz, 8MB L3 cache, 4 Cores, 45W)  
Up to 4.20 GHz with Intel<sup>®</sup> Turbo Boost Technology

Intel<sup>®</sup> Xeon<sup>®</sup> E3-1505M v6 with Intel<sup>®</sup> HD graphics P630 (3.00 GHz, 2400 MHz, 8 MB L3 Cache, 4 Cores, 45W)  
Up to 4.00 GHz with Intel<sup>®</sup> Turbo Boost Technology

Intel<sup>®</sup> Core<sup>™</sup> i7-7820HQ with Intel<sup>®</sup> HD graphics 630 (2.90 GHz, 2400 MHz, 8 MB L3 Cache, 4 Cores, 45W)  
Up to 3.90 GHz with Intel<sup>®</sup> Turbo Boost Technology

Intel<sup>®</sup> Core<sup>™</sup> i7-7700HQ with Intel<sup>®</sup> HD graphics 630 (2.80 GHz, 2400 MHz, 6 MB L3 Cache, 4 Cores, 45W)  
Up to 3.80 GHz with Intel<sup>®</sup> Turbo Boost Technology

Intel<sup>®</sup> Core<sup>™</sup> i5-7440HQ with Intel<sup>®</sup> HD graphics 630 (2.80 GHz, 2400 MHz, 6 MB L3 Cache, 4 Cores, 45W)  
Up to 3.80 GHz with Intel<sup>®</sup> Turbo Boost Technology

Intel<sup>®</sup> Core<sup>™</sup> i5-7300HQ with Intel<sup>®</sup> HD graphics 630 (2.50 GHz, 2400 MHz, 6 MB L3 Cache, 4 Cores, 45W)  
Up to 3.50 GHz with Intel<sup>®</sup> 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<sup>®</sup> Turbo Boost is based on max GHz for a single core.

### Features

#### **CHIPSET**

Mobile Intel® CM238

### Features

#### **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.

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### Features

#### GRAPHICS

##### **Intel Integrated**

Intel® HD graphics 630\*  
Intel® HD graphics P630\*

##### **Discrete**

NVIDIA® Quadro® M1200M 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.

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#### 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>.

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#### 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 1.4, 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

### Features

the internal panel plus two external displays connected to two of the three following ports: HDMI, Thunderbolt™ 3, Thunderbolt™ 3.

#### **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™ 1.2 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 DisplayPort™ 1.2 monitors (requires built in support of DisplayPort™ 1.2 MST in monitor), or the use of DisplayPort™ 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.

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## 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 DreamColor (3840x2160)\*

15.6-inch diagonal Touch LED-backlit FHD UWVA IPS (1920 x 1080)

### **External**

Up to 30-bit (2<sup>30</sup>) per pixel "Deep Color"  
(total of 1,073,741,824 color variations)

\* UHD+ Dreamcolor planned to be available in 1H17

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

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### Features

#### STORAGE AND DRIVES

##### HP Z Turbo Drives (NVMe PCIe SSD)

256GB PCIe (NVMe) TLC Solid State Drive  
256GB PCIe (NVMe) MLC Solid State Drive  
512GB PCIe (NVMe) MLC Solid State Drive  
512GB PCIe (NVMe) TLC Opal 2 Solide State Drive  
1TB PCIe (NVMe) MLC Solid State Drive

##### M.2 SATA SSD

256 GB SATA-3 Self-Encrypting (Opal 2) MLC Solid State Drive  
512GB SATA-3 SS TLC SSD FIPS-140-2  
128 GB SATA 6 Gb/sec SATA SSD

##### 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 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*

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

#### MEMORY

##### Standard

32GB DDR4 1.2V 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®.

### Features

## 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 8265 802.11 AC/a/b/g/n (2x2) WiFi + Bluetooth® 4.2 Combo Adaptor\*\* (vPro)

Intel® Dual Band Wireless-AC 8265 802.11 AC/a/b/g/n (2x2) WiFi + Bluetooth® 4.2 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.

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## 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.

### Features

#### **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.

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### Features

#### **SOFTWARE AND SECURITY**

##### **Preinstalled Software with Windows® Operating System**

##### **BIOS**

HP BIOSphere Gen3<sup>1</sup>

HP Sure Start Gen3 <sup>2</sup>

HP DriveLock | HP Automatic DriveLock

BIOS Update via Network

Master Boot Record Security

Power On Authentication

Secure Erase<sup>3</sup>

Absolute Persistence Module<sup>4</sup>

Pre-boot Authentication

##### **Multi Media**

Cyberlink Power MediaPlayer

##### **Communication / Connectivity**

HP Mobile Connect Pro<sup>5</sup>

Native Miracast Support<sup>6</sup>

HP LAN-WLAN Protection

HP MAC Address Manager (select models only)

HP Wireless Wakeup (select models only)

HP SureConnect

##### **HP Value Add Software**

HP 3D DriveGuard 6

HP ePrint Driver + JetAdvantage<sup>7</sup>

HP Hotkey Support

HP Recovery Manager

HP Jumpstart

HP Support Assistant<sup>12</sup>

HP Noise Cancellation Software

HP Performance Advisor

HP Remote Graphics Software

HP Velocity

##### **Microsoft Products**

Buy Office

Bing Search

Skype<sup>8</sup>

### Features

#### Manageability

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

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

#### Client Security Software

- HP Client Security Suite Gen3<sup>13</sup>
- HP Security Manager (including Credential Manager and Password Manager)
- HP Fingerprint Sensor
- Power On Authentication
- Device Access Manager

Microsoft Defender<sup>14</sup>

HP WorkWise<sup>15</sup>

#### Standard

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

HP Fingerprint Reader

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

1. Requires Intel® 7th generation processors
2. Available on HP Elite products equipped with Intel® 7th generation processors.
3. For the methods outlined in the National Institute of Standards and Technology Special Publication 800-88. Supported on Elite platforms with BIOS version F.03 or higher
4. Absolute agent is shipped turned off, and will be activated when customers activate a purchased subscription. Subscriptions can be purchased for terms ranging multiple years. Service is limited, check with Absolute for availability outside the U.S. The Absolute Recovery Guarantee is a limited warranty. Certain conditions apply. For full details visit: <http://www.absolute.com/company/legal/agreements/computrace-agreement>. Data Delete is an optional service provided by Absolute Software. If utilized, the Recovery Guarantee is null and void. In order to use the Data Delete service, customers must first sign a Pre-Authorization Agreement and either obtain a PIN or purchase one or more RSA SecurID tokens from Absolute Software.
5. HP Mobile Connect Pro is only available on preconfigured devices with WWAN. For geographic availability refer to <http://www.hp.com/go/mobileconnect>
6. Miracast is a wireless technology your PC can use to project your screen to TVs, projectors, and streaming media players that also support Miracast. You can use Miracast to share what you're doing on your PC and present a slide show. For more information: <http://windows.microsoft.com/en-us/windows-8/project-wireless-screen-miracast>
7. Requires an Internet connection to HP web-enabled printer and HP ePrint account registration (for a list of eligible printers, supported documents and image types and other HP ePrint details, see <http://www.hp.com/go/eprintcenter>). 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.
8. Skype is not offered in China.
9. Not preinstalled, however available for download at <http://www.hp.com/go/clientmanagement>

### Features

10. HP Manageability Integration Kit can be downloaded from <http://www8.hp.com/us/en/ads/clientmanagement/overview.html>
11. Subscription required.
12. Requires Windows and Internet Access
13. Requires Windows and Intel® 7th generation processors.
14. Opt in and internet connection required for updates
15. HP WorkWise smartphone app is available as a free download on the App Store and Google Play

#### **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 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.

### 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 accidentally 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.

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### 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) \*  
HP Long Life 8-cell Polymer Battery (92 WHr) \*

##### Battery Life

Battery life up to 16 hours 47 minutes (with 92Whr battery, FHD panel, Z Turbo Drive, Intel graphics)\*\*  
Battery life up to 15 hours 49 minutes (with 92Whr battery, FHD panel, Z Turbo Drive, NVIDIA M1200, Hybrid graphics)\*\*

##### System Standby Time

Up to TBD weeks\*\*\*

\* Available with 3-year limited warranty only

\*\*Windows 10 MM14 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

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#### ENVIRONMENTAL

US ENERGY STAR®  
IT ECO declaration  
EPEAT®

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#### WEIGHTS & DIMENSIONS

##### Weight

Starting at 4.6 lbs (2.09 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.

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### Features

## 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 DisplayPort™ 1.2, USB 3.1 Gen2, PCIe Gen 3 devices)
- (1) HDMI 1.4
- (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

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## 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<sup>1</sup> 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.

### System Technical Specifications

#### SYSTEM UNIT

<b>Stand-Alone Power Requirements</b> (AC Power)	<b>Nominal Operating Voltage</b>	19.5 V	
	<b>Average Operating Power</b>	DreamColor Without DreamColor	25 W (Windows® 10 64-bit) 16.8 W (Windows® 10 64-bit)
<b>Temperature</b>	<b>Max Operating Power</b>	< 200 W	
	<b>Operating</b>	32° to 95° F (0° to 35° C)	
<b>Relative Humidity</b>	<b>Non-operating</b>	-4° to 140° F (-20° to 60° C)	
	<b>Operating</b>	10% to 90%, non-condensing	
<b>Shock</b>	<b>Non-operating</b>	5% to 95%, 101.6° F (38.7° C) maximum wet bulb temperature	
	<b>Operating</b>	40 G, 2 ms, half-sine	
<b>Random Vibration</b>	<b>Non-operating</b>	200 G, 2 ms, half-sine	
	<b>Operating</b>	0.75 grms	
<b>Altitude</b> (unpressurized)	<b>Non-operating</b>	1.50 grms	
	<b>Operating</b>	-50 to 10,000 ft (-15.24 to 3,048 m)	
<b>Industry Standard Certifications</b>	<b>Non-operating</b>	-50 to 40,000 ft (-15.24 to 12,192 m)	
	<b>UL</b>	Yes	
	<b>CSA</b>	Yes	
	<b>FCC Compliance</b>	Yes	
	<b>ENERGY STAR®</b>	Select models*	
	<b>EPEAT®</b>	Gold **	
	<b>ICES</b>	Planned	
	<b>Australia / NZ A-Tick Compliance</b>	Planned	
	<b>CCC</b>	Planned	
	<b>Japan VCCI Compliance</b>	Planned	
	<b>KC</b>	Planned	
	<b>BSMI</b>	Planned	
	<b>CE Marking Compliance</b>	Planned	
<b>MIL STD 810G</b>	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. See HP's 3rd party option store for solar energy accessory [www.hp.com/go/options](http://www.hp.com/go/options).

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

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

### Technical Specifications – Displays

#### DISPLAYS

**15.6" diagonal LED-backlit FHD UWVA IPS eDP anti-glare + Panel Self Refresh (PSR) (1920 x 1080)**

<b>Active Area (W x H)</b>	13.54 x 7.59 in (34.4 x 19.4 cm)	
<b>Dimensions (W x H)</b>	15.6 in (34.4 x 19.4 cm)	
<b>Weight</b>	360 g (max)	
<b>Surface Treatment</b>	Anti-glare	
<b>Contrast Ratio</b>	600:1 (typical)	
<b>Refresh Rate</b>	60 Hz	
<b>Brightness</b>	300 nit typical	
<b>Pixel Resolution</b>	<b>Format</b>	1920 x 1080 (FHD)
	<b>Configuration</b>	RGB Stripe
<b>Backlight</b>	LED	
<b>PPI</b>	141	
<b>Viewing Angle</b>	85/85/85/85 (Left/Right/Down/Up) (typical)	

**15.6-inch UHD UWVA IPS LED anti-glare (3840 x 2160)**

<b>Active Area (W x H)</b>	13.54 x 7.59 in (34.4 x 19.4 cm)	
<b>Dimensions (W x H)</b>	15.6 in (39.6 cm)	
<b>Weight</b>	380 g (max)	
<b>Surface Treatment</b>	Anti-glare	
<b>Contrast Ratio</b>	400:1 (typical)	
<b>Refresh Rate</b>	60 Hz	
<b>Brightness</b>	270 nit typical	
<b>Pixel Resolution</b>	<b>Format</b>	1920 x 1080 (FHD)
	<b>Configuration</b>	RGB Stripe
<b>Backlight</b>	LED	
<b>PPI</b>	141	
<b>Viewing Angle</b>	85/85/85/85 (Left/Right/Down/Up) (typical)	

**15.6-inch UHD+ UWVA IPS LED anti-glare Dreamcolor\* (3840x2160)**

<b>Dimensions (W x H)</b>	13.62 x 7.59 in (34.6 x 19.4 cm)	
<b>Diagonal Size</b>	15.6 in (39.6 cm)	
<b>Weight</b>	345 g (max)	
<b>Surface Treatment</b>	Anti-glare	
<b>Contrast Ratio</b>	1000:1 (typ)	
<b>Refresh Rate</b>	60 Hz	
<b>Brightness</b>	270 nit typical	
<b>Pixel Resolution</b>	<b>Format</b>	3840x2160
	<b>Configuration</b>	RGB Stripe
<b>Backlight</b>	LED	
<b>PPI</b>	282	
<b>Viewing Angle</b>	85/85/85/85 (Left/Right/Down/Up) (typical)	

### Technical Specifications – Displays

*\* UHD+ Dreamcolor to be available in 1H17*

<b>15.6-inch FHD TOUCH UWVA IPS LED (1920x1080)</b>	<b>Dimensions (W x H)</b>	13.62 x 7.59 in (36 x 22.4 cm max)	
	<b>Diagonal Size</b>	15.6 in (39.6 cm)	
	<b>Weight</b>	345 g (max)	
	<b>Surface Treatment</b>	Anti-glare	
	<b>Contrast Ratio</b>	600:1 (typ)	
	<b>Refresh Rate</b>	60 Hz	
	<b>Brightness</b>	300 nit typ	
	<b>Pixel Resolution</b>	<b>Format</b>	1920 x 1080 (FHD)
		<b>Configuration</b>	RGB Stripe
	<b>Backlight</b>	LED	
	<b>PPI</b>	142	
	<b>Viewing Angle</b>	85/85/85/85 (Left/Right/Down/Up) (typical)	

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### Technical Specifications – Storage and Drives

#### STORAGE AND DRIVES

##### Internal Storage

<b>128 GB M2 2280 SATA-3 TLC Solid State Drive</b>	<b>Drive Weight</b>	0.019 lb (8.5 g)-0.022 lb (10 g)	
	<b>Capacity</b>	128 GB	
	<b>Height</b>	0.09 in (2.23 mm)- 0.14 in (3.58 mm)	
	<b>Width</b>	0.87 in (22 mm)	
	<b>Interface</b>	ATA-8, SATA 3.0	
	<b>Performance</b>	<b>Maximum Sequential Read</b>	<b>Maximum Sequential Write</b>
		Up to 540 MB/s	Up to 300 MB/s
	<b>Logical Blocks</b>	250,069,680	
	<b>Operating Temperature</b>	32° to 158°F (0° to 70°C) [ambient temp]	
	<b>Features</b>	ATA Security, DIPM; TRIM; DEVSLP	

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<b>512 GB M2 2280 SATA-3 Self-Encrypting Drive (Opal 2) MLC Solid State Drive</b>	<b>Drive Weight</b>	0.02 lb (<10 g)	
	<b>Capacity</b>	512GB	
	<b>Height</b>	0.09 in (2.3mm)	
	<b>Width</b>	0.87 in (22 mm)	
	<b>Interface</b>	ATA-8, SATA 3.0	
	<b>Performance</b>	<b>Maximum Sequential Read</b>	
		Up to 540 MB/s	
	<b>Logical Blocks</b>	1,000,215,216	
<b>Operating Temperature</b>	32° to 158°F (0° to 70°C) [ambient temp]		

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<b>256 GB M2 2280 SATA-3 Self-Encrypting Drive (Opal 2) TLC Solid State Drive</b>	<b>Drive Weight</b>	0.02 lb (<10 g)	
	<b>Capacity</b>	256 GB	
	<b>Height</b>	0.14 in (3.58 mm)- 0.09 in (2.23 mm)	
	<b>Width</b>	0.87 in (22 mm)	
	<b>Interface</b>	ATA-8, SATA 3.0	
	<b>Performance</b>	<b>Maximum Sequential Read</b>	<b>Maximum Sequential Write</b>
		Up to 540 MB/s	UP to 460 MB/s
	<b>Logical Blocks</b>	500,118,192	
	<b>Operating Temperature</b>	32° to 158°F (0° to 70°C) [ambient temp]	

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### Technical Specifications – Storage and Drives

<b>SSD 1TB 2280 M2 PCIe-3x4 DS NVMe</b>	<b>Drive Weight</b>	0.022 lb (<10 g)		
	<b>Capacity</b>	1TB		
	<b>Height</b>	0.14 in (3.7 mm)		
	<b>Width</b>	0.87 in (22 mm)		
	<b>Generation</b>	NVMe		
	<b>NAND Type</b>	MLC		
	<b>Form-Factor (I/O)</b>	M.2 2280		
	<b>Interface</b>	PCIe GEN3X4		
	<b>Performance</b>	<b>Maximum Sequential Read</b>	<b>Maximum Sequential Write</b>	
		Up to 2400MB/s	Up to 1500MB/s	
	<b>Logical Blocks</b>	2,000,409,264		
	<b>Operating Temperature</b>	32° to 158°F (0° to 70°C) [ambient temp]		
	<b>Features</b>	ATA Security, L1.2		

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

<b>HP Z Turbo Drive 256 GB, M.2 NVMe MLC Solid State Drive</b>	<b>Drive Weight</b>	0.022 lb. (<10 g)		
	<b>Capacity</b>	256 GB		
	<b>Height</b>	0.09 in (2.3 mm)		
	<b>Width</b>	0.87 in (22.1 mm)		
	<b>Generation</b>	NVMe		
	<b>NAND Type</b>	MLC		
	<b>Form-Factor (I/O)</b>	M.2 2280		
	<b>Interface</b>	PCIe GEN3X4		
	<b>Performance</b>	<b>Maximum Sequential Read</b>	<b>Maximum Sequential Write</b>	
		Up to 2260MB/s	Up to 1260 MB/s	

### Technical Specifications – Storage and Drives

<b>Logical Blocks</b>	500,118,192
<b>Operating Temperature</b>	32° to 158°F (0° to 70°C) [ambient temp]
<b>Features</b>	ATA Security; TRIM; L1.2

#### HP Z Turbo Drive 1 TB, M.2 NVMe MLC Solid State Drive

<b>Drive Weight</b>	0.022 lb (<10 g)
<b>Capacity</b>	1TB
<b>Height</b>	0.09 in (2.3 mm)
<b>Width</b>	0.87 in (22 mm)
<b>Generation</b>	NVMe
<b>NAND Type</b>	MLC
<b>Form-Factor (I/O)</b>	M.2 2280
<b>Interface</b>	PCIe GEN3X4
<b>Performance</b>	<b>Maximum Sequential Read</b> <b>Maximum Sequential Write</b>
	Up to 2260MB/s      Up to 1260 MB/s
<b>Logical Blocks</b>	500,118,192
<b>Operating Temperature</b>	32° to 158°F (0° to 70°C) [ambient temp]
<b>Features</b>	ATA Security, TRIM; L1.2

#### HP Z Turbo Drive 256 GB, M.2 NVMe TLC Solid State Drive

<b>Drive Weight</b>	0.022 lb (<10 g)
<b>Capacity</b>	256 GB
<b>Height</b>	0.09 in (2.3 mm)
<b>Width</b>	0.87 in (22 mm)
<b>Generation</b>	NVMe
<b>NAND Type</b>	TLC
<b>Form-Factor (I/O)</b>	M.2 2280
<b>Interface</b>	PCIe GEN3X4
<b>Performance</b>	<b>Maximum Sequential Read</b> <b>Maximum Sequential Write</b>
	Up to 2600MB/s      Up to 900 MB/s
<b>Logical Blocks</b>	500,118,192
<b>Operating Temperature</b>	32° to 158°F (0° to 70°C) [ambient temp]
<b>Features</b>	ATA Security, TRIM; L1.2

#### HP Z Turbo Drive 512 GB, M.2 NVMe TLC Opal 2 Solid State Drive

<b>Drive Weight</b>	0.022 lb (<10 g)
<b>Capacity</b>	512 GB
<b>Height</b>	0.09 in (2.3 mm)
<b>Width</b>	0.87 in (22 mm)
<b>Generation</b>	NVMe
<b>NAND Type</b>	TLC
<b>Form-Factor (I/O)</b>	M.2 2280
<b>Interface</b>	PCIe GEN3X4

### Technical Specifications – Storage and Drives

	<b>Performance</b>	<b>Maximum Sequential Read</b>	<b>Maximum Sequential Write</b>
		Up to 1800MB/s	Up to 980 MB/s
	<b>Logical Blocks</b>	500,118,192	
	<b>Operating Temperature</b>	32° to 158°F (0° to 70°C) [ambient temp]	
	<b>Features</b>	ATA Security,TRIM; L1.2	
<b>512 GB, M.2 SATA FIPS-140-2 Solid State Drive</b>	<b>Drive Weight</b>	0.022 lb (<10 g)	
	<b>Capacity</b>	512 GB	
	<b>Height</b>	0.09 in (2.3 mm)	
	<b>Width</b>	0.87 in (22 mm)	
	<b>Generation</b>	SM951 NVMe	
	<b>NAND Type</b>	MLC	
	<b>Form-Factor (I/O)</b>	M.2 2280	
	<b>Interface</b>	PCIe GEN3X4	
	<b>Performance</b>	<b>Maximum Sequential Read</b>	<b>Maximum Sequential Write</b>
		Up to 2260MB/s	Up to 1260 MB/s
	<b>Logical Blocks</b>	500,118,192	
	<b>Operating Temperature</b>	32° to 158°F (0° to 70°C) [ambient temp]	
	<b>Features</b>	ATA Security,TRIM; L1.2	

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



### Technical Specifications – Security

#### SECURITY

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

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### Technical Specifications – Networking/Communications

#### NETWORKING/COMMUNICATIONS

<b>Intel® I219-LM Gigabit Network Connection</b>	<b>Ethernet Features</b>	<p>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</p>
	<b>Power Management</b>	<p>ACPI compliant - multiple power modes            Energy Detect Low Power Mode(Green Ethernet)</p>
	<b>Performance Features</b>	<p>TCP/IP/UDP Checksum Offload (configurable)            Protocol Offload( ARP &amp; 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</p>
	<b>Manageability</b>	<p>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</p>
	<b>Interface</b>	<p>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.</p>
	<b>NIC Device Driver Name</b>	<p>Intel® Ethernet Network Connection I219-LM</p>
<b>Intel® Dual Band Wireless-N 8265 AC 802.11 AC/a/b/g/n (2x2) WiFi + Bluetooth® 4.2 Combo Adaptor* (vPro)</b>	<b>Wireless LAN Standards</b>	<p>IEEE 802.11a            IEEE 802.11b            IEEE 802.11g            IEEE 802.11n            IEEE 802.11ac</p>
	<b>Interoperability</b>	<p>Wi-Fi certified</p>
	<b>Frequency Band</b>	<p>802.11b/g/n <span style="float: right;">2.402 - 2.482 GHz</span></p> <p>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.</p> <p>802.11a/n <span style="float: right;">4.9 - 4.95 GHz (Japan) 5.15 - 5.25 GHz</span></p>

### 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<sup>1</sup>

- 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<sup>2</sup>

- 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<sup>3</sup>

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
<b>Antenna Type</b>	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
<b>Form Factor</b>	PCI-Express M.2 MiniCard
<b>Dimensions</b>	Type 2230 : 2.3 x 22.0 x 30.0 mm Or Type 1630 : 2.3 x 16.0 x 30.0 mm
<b>Weight</b>	Type 2230 : 2.8g Or Type 1630 : 2g
<b>Operating Voltage</b>	3.3v +/- 9%
<b>Temperature</b>	Operating 14° to 158° F (-10° to 70° C) Non-operating -40° to 176° F (-40° to 80° C)
<b>Humidity</b>	Operating 10% to 90% (non-condensing) Non-operating 5% to 95% (non-condensing)
<b>Altitude</b>	Operating 0 to 10,000 ft (3,048 m) Non-operating 0 to 50,000 ft (15,240 m)
<b>LED Activity</b>	LED Amber - Radio OFF; LED White - Radio ON
	<ol style="list-style-type: none"> <li>1. Check latest software/driver release for updates on supported security features.</li> <li>2. Maximum output power may vary by country according to local regulations.</li> <li>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).</li> </ol>

#### HP Integrated Module with Bluetooth® 4.2 Wireless Technology

<b>Bluetooth® Specification</b>	4.2 Compliant
<b>Dimensions</b>	1.18 x 0.26 x 0.13 in (30 x 6.5 x 3.25 mm))
<b>Frequency Band</b>	2402 to 2480 MHz
<b>Number of Available Channels</b>	Legacy: 0-79 (1 MHz/CH) BLE: 0-39 (2 MHz/CH)
<b>Data Rates and Throughput</b>	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)
<b>Transmit Power</b>	The Bluetooth® component shall operate as a Class II Bluetooth® device with a maximum transmit power of + 4 dBm for BR and EDR.
<b>Receiver Sensitivity</b>	

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

### Technical Specifications – Networking/Communications

<b>Power Consumption</b>	Peak (Tx) 330 mW Peak (Rx) 230 mW Selective suspend 17 mW
<b>Range</b>	Legacy Up to 33 ft (10 m) BLE Up to 99 ft (30 m)
<b>Electrical Interface</b>	USB 2.0 compliant
<b>Bluetooth® Software Supported</b>	Microsoft Windows® Bluetooth® Software
<b>Link Topology</b>	Point to Point, Multipoint Pico Nets up to 7 slaves
<b>Security</b>	Full support of Bluetooth® Security Provisions
<b>Power Management</b>	Microsoft Windows® ACPI, and USB Bus Support Self-configurable to optimize power conservation in all operating modes, including Standby, Hold, Park, and Sniff
<b>Certifications</b>	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
<b>Bluetooth® Profiles Supported</b>	Serial Port Profile (SPP) <sup>1</sup> Service Discovery Application Profile (SDAP) Dial-Up Networking (DUN) <sup>1,2</sup> Generic Object Exchange Profile (GOEP) <sup>1,2</sup> Object Push Profile (OPP) <sup>1,2</sup> Hard Copy Cable Replacement (HCRP) <sup>1,2</sup> Personal Area Networking Profile (PAN) <sup>1,2</sup> Human Interface Device Profile (HID) <sup>1,2</sup> Advanced Audio Distribution Profile (A2DP) Audio Video Remote Control Profile (AVRCP)
<b>Bluetooth® V4.2 support feature</b>	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 8265 AC  
802.11 AC/a/b/g/n (2x2)  
WiFi + Bluetooth® 4.2  
Combo Adaptor\* (non-  
vPro)**

**Wireless LAN Standards** IEEE 802.11a  
IEEE 802.11b  
IEEE 802.11g  
IEEE 802.11n  
IEEE 802.11ac

**Interoperability** Wi-Fi certified

**Frequency Band** 802.11b/g/n 2.402 - 2.482 GHz

**Note:**

The FCC has declared as of January 1, 2015 products that utilize passive scanning on channel 12/13 and are capable of transmitting must fully comply with requirements of 15.247 or otherwise disable those channels.

802.11a/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<sup>1</sup>**

- 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<sup>2</sup>**

- 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

### Technical Specifications – Networking/Communications

<b>Power Consumption</b>	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	
<b>Power Management</b>	ACPI and PCI Express compliant power management 802.11 compliant power saving mode	
<b>Receiver Sensitivity<sup>3</sup></b>	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	
<b>Antenna Type</b>	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	
<b>Form Factor</b>	PCI-Express M.2 MiniCard	
<b>Dimensions</b>	Type 2230 : 2.3 x 22.0 x 30.0 mm Or Type 1630 : 2.3 x 16.0 x 30.0 mm	
<b>Weight</b>	Type 2230 : 2.8g Or Type 1630 : 2g	
<b>Operating Voltage</b>	3.3v +/- 9%	
<b>Temperature</b>	Operating	14° to 158° F (-10° to 70° C)
	Non-operating	-40° to 176° F (-40° to 80° C)
<b>Humidity</b>	Operating	10% to 90% (non-condensing)
	Non-operating	5% to 95% (non-condensing)
<b>Altitude</b>	Operating	0 to 10,000 ft (3,048 m)
	Non-operating	0 to 50,000 ft (15,240 m)
<b>LED Activity</b>	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® 4.2 Wireless Technology

<b>Bluetooth® Specification</b>	4.2 Compliant
<b>Dimensions</b>	1.18 x 0.26 x 0.13 in (30 x 6.5 x 3.25 mm))
<b>Frequency Band</b>	2402 to 2480 MHz
<b>Number of Available Channels</b>	Legacy: 0-79 (1 MHz/CH) BLE: 0-39 (2 MHz/CH)
<b>Data Rates and Throughput</b>	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)<sup>1</sup>  
 Service Discovery Application Profile (SDAP)  
 Dial-Up Networking (DUN)<sup>1,2</sup>  
 Generic Object Exchange Profile (GOEP)<sup>1,2</sup>  
 Object Push Profile (OPP)<sup>1,2</sup>  
 Hard Copy Cable Replacement (HCRP)<sup>1,2</sup>  
 Personal Area Networking Profile (PAN)<sup>1,2</sup>  
 Human Interface Device Profile (HID)<sup>1,2</sup>  
 Advanced Audio Distribution Profile (A2DP)  
 Audio Video Remote Control Profile (AVRCP)

**Bluetooth® V4.2 support feature**

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

<b>Hardware</b>	<b>Implementation</b>	Conexant CX7700
	<b>Function Key</b>	Volume up, volume down, and mute
	<b>Volume Controls</b>	
	<b>Full Duplex</b>	Yes
	<b>Microphone In</b>	Stereo
	<b>Headphone/Line Out</b>	Stereo
	<b>Integrated Microphone</b>	Yes, dual digital microphone array when equipped with optional webcam
<b>Audio Output Quality</b>	<b>Frequency Response</b>	20 Hz - 20 kHz
	<b>Signal to Noise Ratio</b>	106dB (DAC), 102dB (ADC)
	<b>Total Harmonic Distortion</b>	91dB THD+n on LineOut/HP (0.003%)
	<b>Noise Floor</b>	-110 dB
	<b>Play Sampling Rate(s)</b>	Up to 192kHz
	<b>Record Sampling Rate(s)</b>	Up to 96kHz
	<b>DAC</b>	16, 20 or 24-bit
	<b>ADC</b>	16, 20 or 24-bit
<b>Internal Stereo Speaker</b>	<b>Power Rating</b>	1 Watts
	<b>Impedance</b>	4 ohms

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### Technical Specifications – Power

#### POWER

<b>HP 150W Slim Smart AC Adapter</b>	<b>Dimensions</b>	6.02 x 2.60 x .87 in ((153 x 66 x 22 mm)	
	<b>Weight</b>	0.71 lbs (320 g)	
	<b>Input</b>	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
	<b>Output</b>	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
	<b>Connector</b>	3 pin/grounded, mates with interchangeable cords	
	<b>Environmental Design</b>	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%	
<b>EMI and Safety Certifications</b>	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.		

<b>HP Long Life 4-cell Prismatic Battery (64 WHr)</b>	<b>Dimensions (H x W x L)</b>	0.29 x 3.35 x 10.2 in (0.74cm x 8.5cm x 25.8cm)	
	<b>Weight (max)</b>	315g	
	<b>Cells/Type</b>	4-cell; Prismatic	
	<b>Energy</b>	Voltage	15.2V
		Amp-hour capacity	4.21Ah
		Watt-hour capacity	64Wh
	<b>Temperature</b>	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)
	<b>Battery Re-Charge Time</b>	System in OFF or Standby Mode	3 hours
	System ON	3 to 5 hours	
<b>Fuel Gauge LED</b>	No		
<b>Warranty*</b>	3 year		

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

### Technical Specifications – Power

<b>HP Long Life 8-cell Prismatic Battery (92 WHr)</b>	<b>Dimensions (H x W x L)</b>	0.3 x 13.08 x 3.34 in (0.76 x 33.23 x 8.49cm)		
	<b>Weight (max)</b>	380g		
	<b>Cells/Type</b>	8-cell Polymer		
	<b>Energy</b>	<b>Voltage</b>	15.4V	
		<b>Amp-hour capacity</b>	5.975Ah	
		<b>Watt-hour capacity</b>	92Wh	
	<b>Temperature</b>	<b>Operating (Charging)</b>	32° to 122°F (0° to 50° C)	
		<b>Operating (Discharging)</b>	14° to 140°F (-10° to 60° C)	
		<b>Non-operating</b>	>140° F (>60° C)	
	<b>Battery Re-Charge Time</b>	<b>System in OFF or Standby Mode</b>	3 hours	
		<b>System ON</b>	3 to 5 hours	
	<b>Fuel Gauge LED</b>	No LED		
	<b>Warranty*</b>	3 year		

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

### Technical Specifications – Environmental

#### ENVIRONMENTAL DATA

##### Eco-Label Certifications & declarations

This product has received or is in the process of being certified to the following approvals and may be labeled with one or more of these marks:

- IT ECO declaration
- US ENERGY STAR®
- EPEAT® Gold registered in the United States. See <http://www.epeat.net> for registration status in your country.

##### System Configuration

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

##### Energy Consumption (in accordance with US ENERGY STAR® test method)

	115VAC, 60Hz	230VAC, 50Hz	100VAC, 50Hz
Normal Operation (Sort idle)	14.50 W	15.04 W	14.58 W
Normal Operation (Long idle)	5.75 W	5.63 W	5.87 W
Sleep	0.74 W	0.78 W	0.77 W
Off	0.41 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, 50Hz
Normal Operation (Short idle)	49 BTU/hr	51 BTU/hr	50 BTU/hr
Normal Operation (Long idle)	20 BTU/hr	19 BTU/hr	20 BTU/hr
Sleep	2 BTU/hr	3 BTU/hr	3 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 <sub>WAd</sub> , bels)	Sound Pressure (L <sub>pAm</sub> , decibels)
Typically Configured – Idle	2.8	19
Fixed Disk – Random writes	3.2	24
Optical Drive – Sequential reads		

##### 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:

- 3 USB ports
- 2 Thunderbolt™ 3 ports
- 2 M.2 Storage Slots
- 1 SD Card reader
- 2 SODIMM memory slots
- 1 HDMI 1.4 port

### Technical Specifications – Environmental

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 than 1ppm by weight
- Cadmium greater than 20ppm by weight

Battery size: CR2032 (coin cell)

Battery type: Lithium

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

Battery type:

#### 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](http://www.epeat.net)
- Plastics parts weighing over 25 grams used in the product are marked per ISO11469 and ISO1043.
- This product contains 0.0% post-consumer recycled plastic (by wt.)
- This product is 95.8% recycle-able when properly disposed of at end of life.

#### Packaging Materials

<b>External:</b>	PAPER/Corrugated	379 g
<b>Internal:</b>	PLASTIC/Polyethylene low density - LDPE	11 g
	PLASTIC/Polyethylene Expanded - EPE	33 g
	PLASTIC/Polypropylene - PP	5 g

The plastic packaging material contains at least 81.5% recycled content.

The corrugated paper packaging materials contains at least 80.0% 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

### Technical Specifications – Environmental

- 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, 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.

#### HP, Inc. Corporate Environmental Information

For more information about HP's commitment to the environment:

Global Citizenship Report

<http://www.hp.com/hpinfo/globalcitizenship/gcreport/index.html>

Eco-label certifications

<http://www8.hp.com/us/en/hp-information/environment/ecolabels.html>

ISO 14001 certificates:

<http://h20195.www2.hp.com/V2/GetDocument.aspx?docname=c04755842>  
and

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

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### COUNTRY OF ORIGIN

China

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

Type	Description	Part #
	HP 4GB DDR4-2400 SODIMM (Core processors only)	Z4Y84AA
	HP 8GB DDR4-2400 SODIMM (Core processors only)	Z4Y85AA
	HP 16GB DDR4-2400 SODIMM (Core processors only)	Z4Y86AA
	HP 8GB DDR4-2133 EEC SODIMM (Xeon® processors only)	V1D58AA
	HP 16GB DDR4-2133 EEC SODIMM (Xeon® processors only)	V1D59AA
<b>Cases</b>	HP Executive 15.6 Midnight Top Load	1KM15AA
	HP Business Case (up to 15.6")	H5M92AA
<b>Docking</b>	HP Zbook 150W TB3 Dock	P5Q58AA
	HP Executive Travel Hub	TOK29AA
	HP Travel Hub	TOK30AA
	HP 3005pr USB 3.0 Port Replicator w/USB-C adapter	Y4H06AA
	HP USB-Type C™ Elite Dock	X7W54AA
<b>Input/Output - Mice</b>	Comfort Grip Mouse	H2L63AA
	HP 3-Button Laser Mouse	H4B81AA#xxx
	HP Ultra Mobile Wireless Mouse	H6F25AA#xxx
	HP X4000 Bluetooth® Mouse	H3T50AA#xxx
	HP Slim Bluetooth® Mouse	F3J92AA#xxx
	HP Ultrathin Wireless Mouse	L9V78AA
	HP Wireless (Link-5) Keyboard	T6U20AA
	HP Slim USB Keyboard and Mouse	T6T83AA
	HP Slim Wireless Keyboard and Mouse	T6L04AA
	HP USB Essential Keyboard and Mouse	H6L29AA#xxx
	HP Mobile Hot Spot	M5T50AA
	7.4 to 4.5mm Adapter	K0Q39AA
<b>Power Adapters</b>	HP 150W Slim A/C Adapter	W2F74AA
<b>Adapters</b>	HP Wireless display adapter	J1V25AA#xxx
	HP Conferencing Keyboard	K8P74AA#xxx
	HP Speaker Phone	K7V16AA
	HP UC Wired Headset	K7V17AA
	HP UC Wireless Earpiece	W3K08AA
	HP UC Wireless Duo Headset	W3K09AA
	HP USB-C™ to VGA Adapter	N9K76AA
	HP USB-C™ to DisplayPort Adapter	N9K78AA
	HDMI to DVI adapter	F5A28AA
	HP ZBook Thunderbolt 3, 1M cable	Z4P20AA
<b>Storage - External</b>	HP External USB Optical Drive	F2B56AA

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

<b>Storage</b>	HP 256GB 2280 M2 PCIe 3x4 NVME	V3K66AA
	HP 512GB 2280 M2 PCIe 3x4 DS NVME	V3K67AA
<b>Security</b>	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	TOY16AA
	HP Combination Lock	TOY15AA
	HP Keyed Cable lock	TOY14AA
	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.

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### Summary of Changes

<b>Date of change:</b>	<b>Version History:</b>		<b>Description of change:</b>
<b>April 24, 2017</b>	From v1 to v2	<b>Removed</b>	Integrated Bluetooth compatibility with 4.0, 4.1
<b>July 3, 2017</b>	From v2 to v3	<b>Changed</b>	The HP Long Life 8-cell Battery info under Power section
<b>July 31, 2017</b>	From v3 to v4	<b>Removed</b>	HP Touchpoint Manager from the Software section
<b>September 7, 2017</b>	From v4 to v5	<b>Added</b>	Red Hat Enterprise Linux (RHEL) 7 and Ubuntu Linux 16.04 added to the supported section of operating system.

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