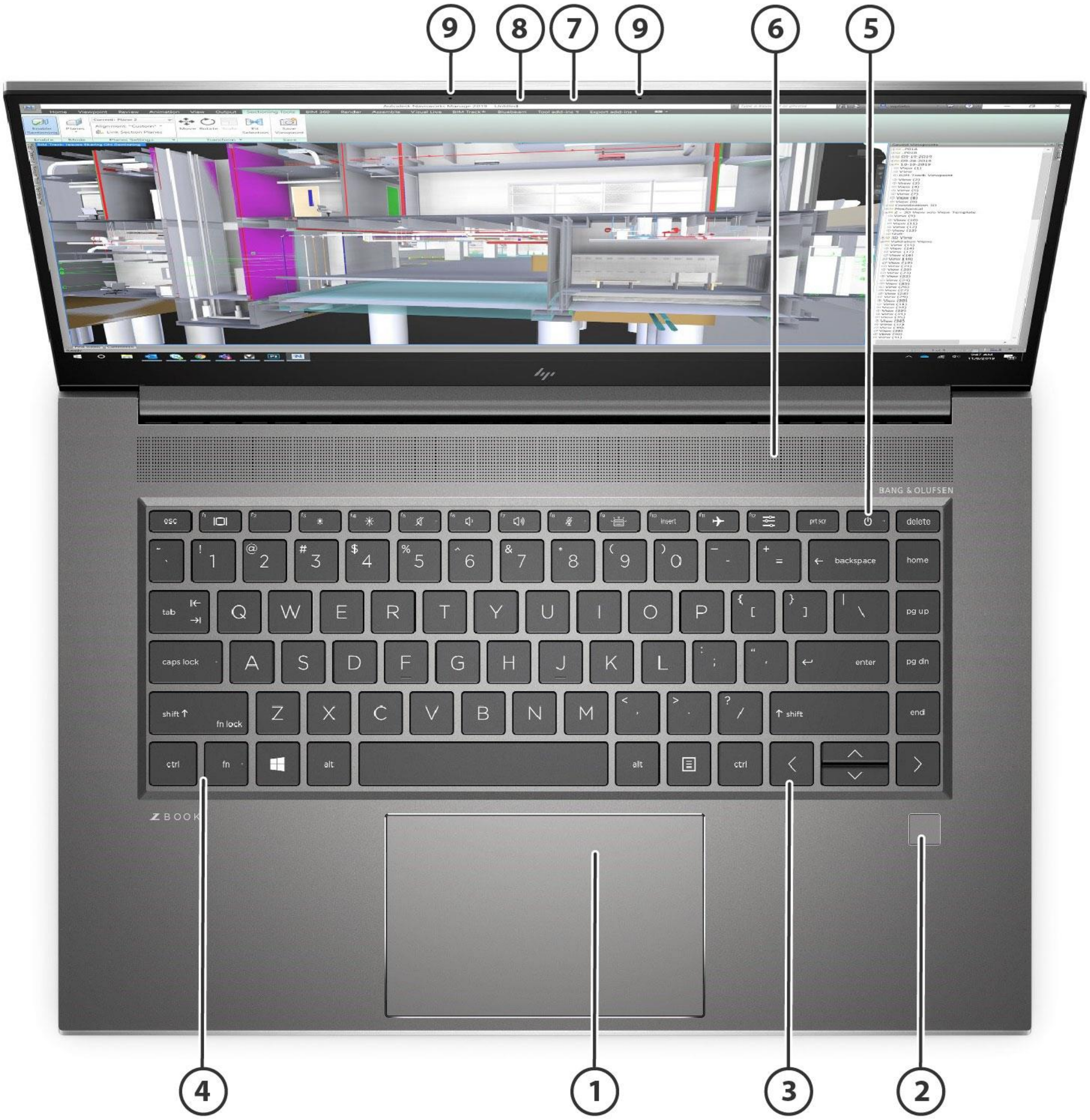
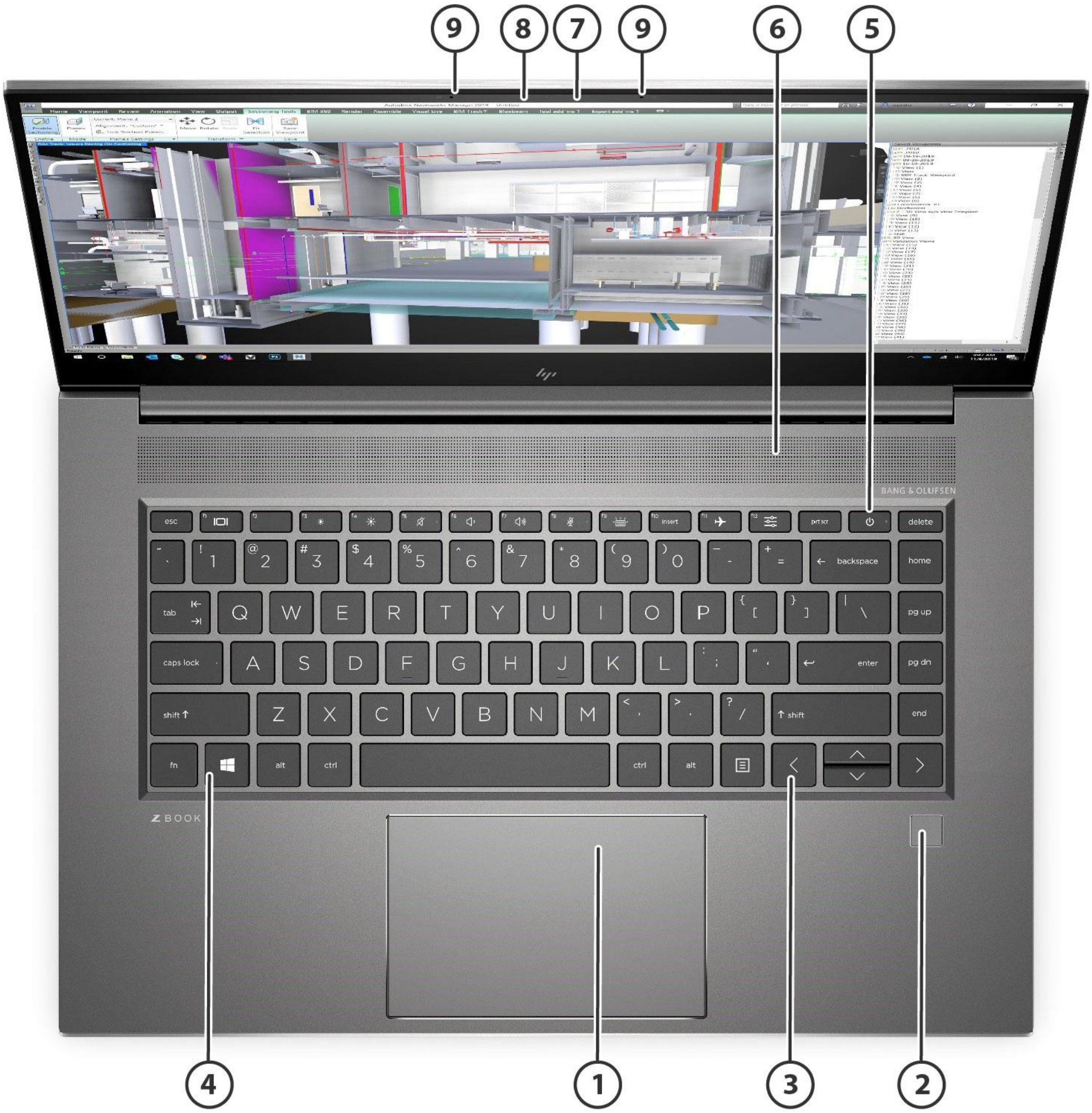
HP ZBook Studio G7 Mobile Workstation



Top View (Premium keyboard layout)

1. Clickpad
2. Fingerprint sensor (optional)
3. HP Premium backlit Keyboard
4. Layout: ctrl, fn, Windows, alt, space bar, alt, menu, ctrl layout
5. Power button (or power on by opening the lid)
6. Speakers
7. Camera
8. IR Camera
9. Microphones

Overview



Top View (Z Command keyboard layout; US Only)

1. Clickpad
2. Fingerprint sensor (optional)
3. HP Z Command backlit Keyboard
4. Layout: fn, Windows, alt, ctrl, space bar, ctrl, alt, menu, layout
5. Power button (or power on by opening the lid)
6. Speakers
7. Camera
8. IR Camera
9. Microphones

Overview

Left

1. Nano security lock slot
2. (1) USB 3.1 Gen 1 Type A charging port
3. Side Vent
4. Headphone/microphone combo jack

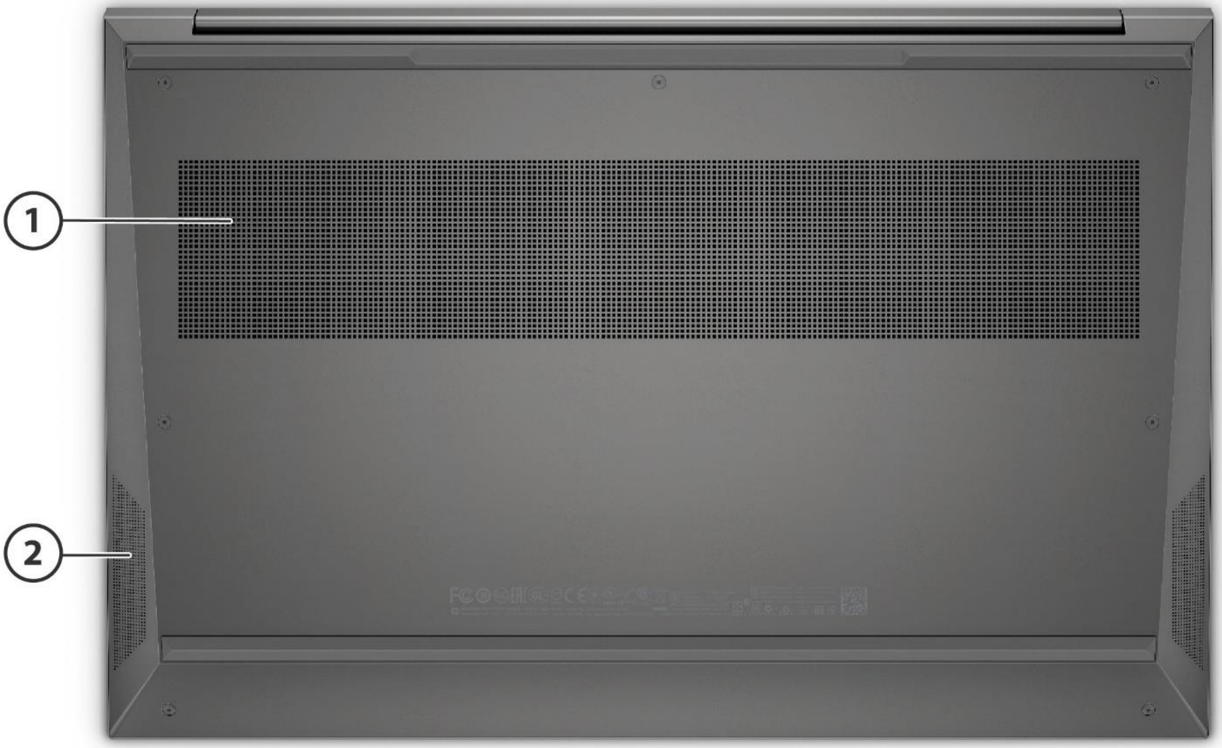
Right (configurations without NVIDIA RTX Graphics)

1. Battery Charging LED
2. 4.5mm AC Power connector
3. (2) USB Type-C® with Thunderbolt™
4. HDMI 2.0 with Discrete Graphics / HDMI 1.4 with UMA graphics (HDMI cable is not included)
5. SD Card Reader (SD Media not included)

Overview

Right (configurations with NVIDIA RTX Graphics)

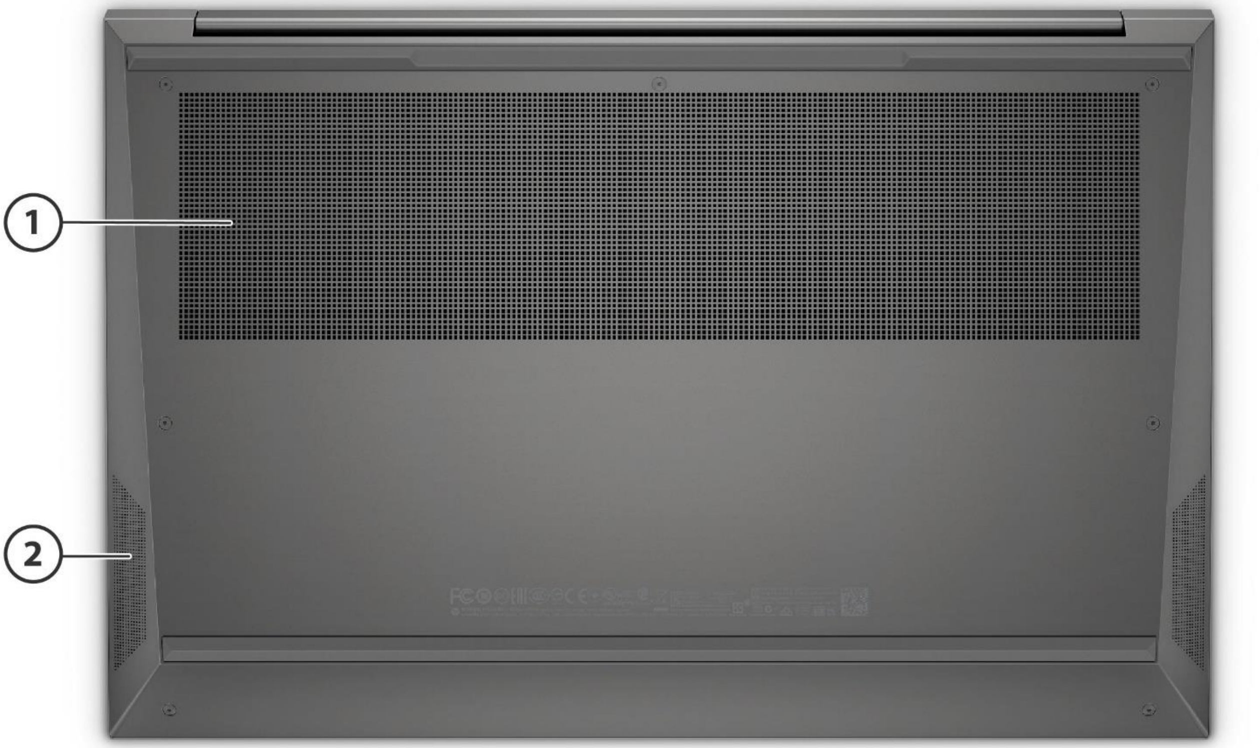
1. Battery Charging LED
2. 4.5mm AC Power connector
3. (2) USB Type-C® with Thunderbolt™
4. mini DisplayPort™ 1.4 (mini DisplayPort cable is not included)
5. SD 4.0 Card Reader (SD Media not included)



Bottom (configurations without NVIDIA RTX Graphics)

1. Fan Venting
2. Speakers

Overview



Bottom (configurations with NVIDIA RTX Graphics)

1. Fan Venting	2. Speakers

Overview

At A Glance

- Work anywhere without compromising on performance or security with Windows 10 Pro[1], powered by HP's collaboration and connectivity technology.
- Experience high-end visualization and seamlessly render your biggest projects with the next generation NVIDIA® Quadro® T-Series and RTX graphics[2]; Certified and supported for the apps you use every day.
- Take multitasking to the next level with up to the 10th gen Intel® Core™ i9 or Intel® Xeon® processor[3,4] designed to handle complex, multithreaded apps like Adobe Premiere Pro®, and with fast clock speeds you can boost your speed on single threaded apps like Autodesk 3ds Max.[5]
- Power through projects with up to 32 GB SDRAM[6] for fast rendering, editing and simulating.
- Blitz through multiple tasks and ditch external drives with up to 2 TB local NVMe storage[7]
- Tirelessly re-engineered from the ground up, this is superior design. Vapor chamber[22] cooling and liquid-crystal polymer thermals equip you to run at max performance. Our astonishingly quiet, comfortable keyboard keeps you in the zone. Check out the *HP ZBOOK CREATE AND ZBOOK STUDIO INNOVATIONS WHITEPAPER* on the grounds up innovations.
- 4 Speakers (2 tweeters and 2 woofers) speakers custom tuned by Bang and Olufsen surround you in a rich sound space so you hear music the way the audio engineers intended. Featuring the most powerful speakers with the greatest levels of bass on any HP notebook.
- Connect to everything you need with a wide-range of connectivity options: Dual USB-C® Thunderbolt™, HDMI[11] (only on configurations without RTX Graphics) or mini DisplayPort™ [11] (only on configurations with RTX graphics), USB 3.1 Type A charging port, headphone jack, and AC port.
- Choice of displays[2]:
  - 39.6 cm (15.6") diagonal 4K UHD (3840 x 2160) IPS eDP + PSR anti-glare, 100% DCI-P3, 600 nits VESA DisplayHDR 400 Certified Next Gen HP DreamColor Panel;
  - 39.6 cm (15.6") diagonal FHD (1920 x 1080) IPS eDP + PSR anti-glare, 100% sRGB at 400 nits low power (1W) panel;
  - 39.6 cm (15.6") diagonal FHD (1920 x 1080) IPS eDP + PSR anti-glare, 72% NTSC at 1000 nits HP Sure View Reflect Integrated Privacy Panel;
  - 39.6 cm (15.6") diagonal 4K UHD (3840 x 2160) UWVA eDP + PSR Brightview 100% DCI-P3, 400 nits OLED VESA DisplayHDR 500 True Black Certified panel with Corning® Gorilla® Glass 6 Touch Screen
- A completely revamped standby system means you're ready to work the moment inspiration strikes. With no sleep mode and no off mode, the modern standby keeps your rig connected and on demand whenever you need it.
- Transfer files over Wi-Fi® up to 3x faster with Wi-Fi 6[12]
- Have confidence with the HP's most secure mobile workstations.[13] Instantly protect against visual hacking with HP Sure View Reflect[14], and defend against firmware and malware attacks with HP Sure Start Gen6[10,15] and HP Sure Sense.[9,16]
- A highly recyclable & lightweight aluminum exterior with 5x the abrasion resistance of painted carbon fiber allows for a more durable, thin, and recyclable device.[21]
- HP ZBook Studio G7 is designed to undergo extensive MIL-STD 810H testing, and has passed 21 of the MIL-STD 810H tests. [17]
- Plug in to greater connectivity at your desktop with the HP Thunderbolt Dock for lightning-fast Thunderbolt™ 3[18] transfers and the flexibility to run up to two external 4K displays. [19, 20]

[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.windows.com.

[2] Sold separately or as an optional feature.
NVIDIA®, the NVIDIA® logo, NVIDIA Turing™ and NVIDIA® GeForce® are trademarks and/or registered trademarks of NVIDIA Corporation in the U.S. and other countries

[3] Multicore is designed to improve performance of certain software products. Not all customers or software applications will necessarily benefit from use of this technology. Performance and clock frequency will vary depending on application workload and your hardware and software configurations. Intel's numbering, branding and/or naming is not a measurement of higher performance.

[4] Intel® Turbo Boost technology requires a PC with a processor with Intel Turbo Boost capability. Intel Turbo Boost performance varies depending on hardware, software and overall system configuration. See www.intel.com/technology/turboboost for more information. "

[5] Adobe and Autodesk software sold separately.

Overview

[6] Up to 32GB memory is an optional, configurable feature.

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

[9] HP Sure Sense requires Windows 10 Pro or Enterprise. See product specifications for availability.

[10] HP Sure Start Gen6 is available on select HP PCs.

[11] miniDisplayPort cables are sold separately; HDMI Cables are sold separately

[12] Wi-Fi 6 offers up to 3x faster file transfer speeds than Wi-Fi® 5 Based on Wi-Fi 5 80MHz and Wi-Fi 6 160MHz minimum requirements when transferring files between two devices connected to the same router. Requires a wireless router, sold separately, that supports 802.11ax (Wi-Fi 6). Only available in countries where 802.11ax is supported

[13] Based on HP's unique and comprehensive security capabilities at no additional cost among desktop workstation vendors as of Sept. 2017 on HP Mobile Workstations with 7th Gen and higher Intel® Processors.

[14] HP Sure View integrated privacy screen is an optional feature that must be configured at purchase.

[16] HP Sure Sense requires Windows 10 Pro or Enterprise. See product specifications for availability.

[17] Testing is not intended to demonstrate fitness of U.S. Department of Defense (DoD) contract requirements or for military use. Test results are not a guarantee of future performance under these test conditions. Accidental damage requires an optional HP Accidental Damage Protection Care Pack.

[18] HP Thunderbolt Dock with Thunderbolt™ 3 sold separately.

[19] External displays sold separately.

[20] Optional hybrid graphics is required to run up to two external 4K displays.

[21] HP Internal Testing conducted on July 2018, using ASTM International Standards Worldwide using test method ASTM D4060

[22] The HP Z VaporForce (vapor chamber) is only available on configurations with NVIDIA® Quadro® RTX Graphics.

NOTE: See important legal disclosures for all listed specs in their respective feature's sections.

OPERATING SYSTEM

Preinstalled OS	Windows 10 Pro 64 - HP recommends Windows 10 Pro for business.[1] Windows 10 Home 64[1] Windows 10 Pro for Workstations 64[1] Ubuntu 20.04[2] FreeDOS 3.0
Supported OS[4]	Windows 10 64 Enterprise
Supported Version	HP tested Windows 10, version 1809 on this platform. For testing information on newer versions of Windows 10, please see: https://support.hp.com/document/c05195282.

[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.windows.com.

[3] Ubuntu 20.04 to be available in the 2nd half of 2020

[4] Support to be tested and documented or web support only.

PROCESSOR

Intel® Xeon® W 10885M with Intel® UHD Graphics (2.4 GHz base frequency, up to 5.3 GHz with Intel® Turbo Boost Technology, 16 MB L3 cache, 8 cores) supporting Intel® vPro® technology [1,2,3,4,5]

10th Generation Intel® Core™ i9 10885H with Intel® UHD Graphics (2.4 GHz base frequency, up to 5.3 GHz with Intel® Turbo Boost Technology, 16 MB L3 cache, 8 cores) supporting Intel® vPro® technology [1,2,3,4,5]

10th Generation Intel® Core™ i7 10850H with Intel® UHD Graphics (2.7 GHz base frequency, up to 5.1 GHz with Intel® Turbo Boost Technology, 12 MB L3 cache, 6 cores) supporting Intel® vPro® technology [1,2,3,4,5]

10th Generation Intel® Core™ i7 10750H with Intel® UHD Graphics (2.6 GHz base frequency, up to 5.0 GHz with Intel® Turbo Boost Technology, 12 MB L3 cache, 6 cores)[1,2,3,4]

10th Generation Intel® Core™ i5 10400H with Intel® UHD Graphics (2.6 GHz base frequency, up to 4.6 GHz with Intel® Turbo Boost Technology, 8 MB L3 cache, 4 cores) supporting Intel® vPro® technology [1,2,3,4,5]

[1] Multicore is designed to improve performance of certain software products. Not all customers or software applications will necessarily benefit from use of this technology. Performance and clock frequency will vary depending on application workload and your hardware and software configurations. Intel's numbering, branding and/or naming is not a measurement of higher performance.

[2] Processor speed denotes maximum performance mode; processors will run at lower speeds in battery optimization mode.

[3] Intel® Turbo Boost performance varies depending on hardware, software and overall system configuration. Energy Efficient Turbo is a power management feature that can lower the maximum core ratio (frequency), if the CPU thinks it can achieve about the same performance as with the maximum turbo frequency. Energy Efficient Turbo feature is disabled in Comet Lake H in order to prioritize performance in DC mode. It can be changed in F10 BIOS settings. See www.intel.com/technology/turboboost for more information.

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

[5] For full Intel® vPro® functionality, Windows, a vPro supported processor, vPro enabled Q370 chipset or higher and vPro enabled WLAN card are required. Some functionality, such as Intel Active management technology and Intel Virtualization technology, requires additional 3rd party software in order to run. Availability of future "virtual appliances" applications for Intel vPro technology is dependent on 3rd party software providers. Compatibility of this generation of Intel vPro technology-based hardware with future "virtual appliances" is yet to be determined.

CHIPSET

Intel® WM490 Chipset

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

Intel® Core™ i5 with vPro®, Core™ i7 with vPro®, Core™ i9 with vPro® and Xeon® with vPro® technology is a selectable feature that is available on units configured with select processors, a qualified Intel® 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.

[1] 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.
[2] Some functionality of Intel® Core™ i5 with vPro®/Core™ i7 with vPro®/Core™ i9 with vPro®/Xeon® with vPro® technology, such as Intel® Active Management technology and Intel® Virtualization technology, requires additional third- party software in order to run. Availability of future "virtual appliances" applications for Intel® Core™ i5 with vPro®/Core i7 with vPro®/XEON® with vPro® technology is dependent on third- party software providers. Compatibility with future "virtual appliances" is yet to be determined.

GRAPHICS

Integrated

Intel® UHD Graphics [1,2,3,4,5,6]

Supports up to 3 displays including the integrated display.

Supports: HD decode, DX12, Intel® Quick Sync Video,

Max resolution for external displays: HDMI 1.4 4096x2304 @30Hz; DisplayPort via USB-C® Thunderbolt™ 4096x2304 @60Hz

Discrete

NVIDIA® Quadro® T1000 supporting Max-Q Design (4 GB GDDR6 dedicated)[2,4,6]

NVIDIA® Quadro® T2000 supporting Max-Q Design (4 GB GDDR6 dedicated) [2,4,6]

NVIDIA® Quadro® RTX 3000 supporting Max-Q Design (6 GB GDDR6 dedicated) [2,6,8]

NVIDIA® Quadro® RTX 4000 supporting Max-Q Design (8 GB GDDR6 dedicated) [2,6,8]

NVIDIA® Quadro® RTX 5000 supporting Max-Q Design (16 GB GDDR6 dedicated) [2,6,8]

Supports up to 4 displays through discrete graphics and dock

Supports: NVIDIA Surround Technology for NVIDIA GeForce Graphics

Max resolution for external displays: HDMI 1.4 4096x2304 @30Hz; DisplayPort via USB-C® Thunderbolt™ 4096x2304 @60Hz

[1] UHD content required to view UHD images.

[2] Both UMA & Discrete configurations support 3 independent displays when on the HP Thunderbolt Dock G2 (sold separately) - Max. resolution = 2.5K @60Hz (DP1) & 2.5K @60Hz (DP2) & FHD (VGA) OR 4K @60Hz (one DP Port) & 4K @60Hz (Type-C® output port using a Type C®-to-DP adapter).

[3] Support HD decode, DX11, DX12, HDMI 1.4, HDCP 2.3 via DP up to 4K @ 60Hz and via HDMI up to 4K @ 30Hz

[4] HDMI cable Sold Separately

[5] Shared video memory (UMA) uses part of the total system memory for video performance. System memory dedicated to video performance is not available for other use by other programs.

[6] GPU configurations may be limited to specific GPU/Memory Configurations.

[8] miniDP cable sold separately.

DISPLAY

Non-touch

- 39.6 cm (15.6") diagonal 4K UHD (3840 x 2160) IPS eDP + PSR anti-glare, 100% DCI-P3, 600 nits VESA DisplayHDR 400 Certified Next Gen HP DreamColor Panel [2,3,5,6]
- 39.6 cm (15.6") diagonal FHD (1920 x 1080) IPS eDP + PSR anti-glare, 100% sRGB at 400 nits (1W) low power panel [2,3,5,6]
- 39.6 cm (15.6") diagonal FHD (1920 x 1080) IPS eDP + PSR anti-glare, 72% NTSC at 1000 nits HP Sure View Reflect Integrated Privacy Panel [2,3,5,6]

Touch

- 39.6 cm (15.6") diagonal 4K UHD (3840 x 2160) UWVA eDP + PSR Brightview 100% DCI-P3, 400 nits OLED VESA DisplayHDR 500 True Black Certified panel with Corning® Gorilla® Glass 6 Touch Screen [2,3,5,6]

HP Virtual Reality[7] Headset (sold separately)

- HP Reverb
- HP Reverb G2

[1] HP Sure View Reflect is optional and must be configured at purchase.
[2] UHD content required to view UHD images.
[3] Resolutions are dependent upon monitor capability, and resolution and color depth settings.
[5] Display options may be limited to specific CPU / GPU Configurations.
[6] VESA DisplayHDR 400 and DisplayHDR 500 True Black certifications are pending.
[7] Virtual Reality content is required to view Virtual Reality images

Features

STORAGE AND DRIVES*

1 M.2 Storage (PCIe NVMe™ SSD) slot[1]
256 GB PCIe® Gen3 x4 NVMe™ M.2 2280 TLC Solid State Drive (SSD)
512 GB PCIe® Gen3 x4 NVMe™ M.2 2280 TLC Solid State Drive (SSD)
1 TB PCIe® Gen3 x4 NVMe™ M.2 2280 TLC Solid State Drive (SSD)
2 TB PCIe® Gen3 x4 NVMe™ M.2 2280 TLC SSD
512 GB PCIe® Gen3 x4 NVMe™ M.2 2280 TLC Self Encrypting (SED) Solid State Drive (SSD)

[1] M.2 Storage Slot does not support SATA drives
* For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 35GB of disk is reserved for system recovery software.

DRIVE CONTROLLERS

M.2 Storage Bay (PCIe NVMe)	PCIe® Gen3 x4 NVMe™ Solid State Drive
SATA	Not supported
RAID	Not supported

MEMORY

Maximum Memory
32 GB DDR4 non-ECC SDRAM[1,2]
Memory soldered down. Supports Dual Channel Memory[3]
System Runs at: 2933

[1] Memory is soldered down and not upgradeable
[2] Memory configurations may be limited to specific CPU / GPU Configurations.
[3] 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.

Features

NETWORKING/COMMUNICATIONS

WLAN

Intel® Wi-Fi 6 AX201 (2x2) and Bluetooth® 5 combo, vPro® [1,2]
Intel® Wi-Fi 6 AX201 (2x2) and Bluetooth® 5 combo, non-vPro® [1]

[1] Wireless access point and Internet service required and sold separately. Availability of public wireless access points limited. The specifications for Wi-Fi 6 (802.11ax 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 802.11ax WLAN devices. Only available in countries where 802.11ax is supported.
[2] Some functionality of vPro®, such as Intel Active management technology and Intel Virtualization technology, requires additional 3rd party software in order to run. Availability of future "virtual appliances" applications for Intel vPro® technology is dependent on 3rd party software providers. Compatibility with future "virtual appliances" is yet to be determined.

AUDIO/MULTIMEDIA

Audio

Audio by Bang & Olufsen, quad speakers (2 tweeters and 2 woofers), HP World Facing Microphone and dual array digital microphones, functions keys for volume up and down, combo microphone/headphone jack, HD audio with 150Hz Bass Roll off

Camera[1,2]

720p HD with Temporal Noise Reduction webcam with IR

[1] HD content required to view HD images.

[2] Windows Hello face authentication utilizes a camera specially configured for near infrared (IR) imaging to authenticate and unlock Windows devices as well as unlock your Microsoft Passport.

Features

KEYBOARDS/POINTING DEVICES/BUTTONS & FUNCTION KEYS

Keyboard
HP Premium Quiet Keyboard, full-size, spill-resistant, backlit, with drain and DuraKeys, clickpad with image sensor and glass surface, multi-touch gestures and taps enabled

HP Premium Quiet Z Command Keyboard[1], full-size, spill-resistant, backlit, with drain and DuraKeys, clickpad with image sensor and glass surface, multi-touch gestures and taps enabled

Pointing Devices
Clickpad with multi-touch gestures enabled, taps enabled as default
Microsoft Precision Touchpad Default Gestures Support

Buttons and Function Keys
Discrete buttons provide easy access to the following features:
F1 – Display Switching
F2 – HP Sure View on/off (if configured)
F3 - Brightness Down
F4 – Brightness Up
F5 – Audio mute
F6 – Volume down
F7 – Volume up
F8 – Microphone mute
F9 – Keyboard backlight
F10 – Insert
F11 – Airplane Mode on/off
F12 – Programmable Key
Print Screen
Power Button on/off
Delete
Fn key lock

Hidden Function Keys:
Fn+R=Break
Fn+S=Sys Rq
Fn+C=Scroll Lock
Fn+W=Pause

[1] Only available in the US, and optional

SOFTWARE AND SECURITY

Workstation ISV Certifications
See the latest list of certifications at: http://www.hp.com/go/isv

HP ZCENTRAL REMOTE BOOST 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
Software
Bing search for IE11
Buy Office

Features

HP Hotkey Support
HP Noise Cancellation Software
HP Performance Advisor[8]
HP Z Central Remote Boost Software[2]
Native Miracast support [4]
HP Connection Optimizer[9]

Security Management
Absolute persistence module [6]
HP Device Access Manager
HP FingerPrint Sensor
HP Manageability Integration Kit[11]
HP Power On Authentication
HP Support Assistant
Security lock slot[12]
Trusted Platform Module TPM 2.0 Embedded Security Chip
Master Boot Record security
Pre-boot authentication
Microsoft Security Defender[10]
HP Client Security Manager[17]
HP BIOSphere Gen6 [5]
HP Sure Recover Gen3 [13]
HP Sure Start Gen6 [5, 15]
HP Secure Erase [16]
HP Sure Sense[18]

BIOS Version
ISO/IEC 19678: 2015 (formerly NIST 800-147) compliant
UEFI version: 2.7

TPM
Model: Infineon SLB9670
Version: 7.63.3353.0
Revision: TPM 2.0
FIPS 140-2 Compliant: Yes with Convert TPM to 2.0 (FIPS 140-2) option

Fingerprint Sensor (Optional)
Voltage: 3.0-3.6V
Operating temperature: -20° - 85°C
Imaging current: 31mA
Wake on finger current: 40 uA
Capture rate: 30ms/frame
ESD Resistance: IEC 6100-4-2 4B (+/-15KV)
Detection Matrix: 363 dpi, sensing area 8x8 mm

Security Features
HP Fingerprint Sensor (optional)[19]
IR Camera with Windows Hello

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

[2] HP Z Central Remote Boost Software does not come preinstalled on Z Workstations but can be downloaded and run on all Z desktop and laptops without license purchase. With non-Z sender devices, purchase of perpetual individual license or perpetual floating license per simultaneously executing versions and purchase of ZCentral Remote Boost Software Support is required. RGS requires Windows, RHEL (7 or 8), UBUNTU 18.04 LTS, or HP ThinPro 7 operating systems. MacOS (10.13 or newer) operating system is only supported on the receiver side. Requires network access. The software is available for download at hp.com/ZCentralRemoteBoost.

Features

[4] 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.

[5] HP BIOSphere Gen6 is available on select HP Pro, Elite and ZBook PCs. See product specifications for details. Features may vary depending on the platform and configurations.

[6] 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.

[8] HP Performance Advisor Software - HP Performance Advisor is ready and waiting to help you get the most out of your HP Workstation from day one—and every day after. Learn more or download at: https://www8.hp.com/us/en/workstations/performance-advisor.html

[9] HP Connection Optimizer requires Windows 10.

[10] Microsoft Defender Opt in and internet connection required for updates.

[11] HP Manageability Integration Kit can be downloaded from http://www.hp.com/go/clientmanagement.

[12] Nano Security lock slot is Lock sold separately.

[13] HP Sure Recover Gen3: See product specifications for availability. Requires an open, wired network connection. You must back up important files, data, photos, videos, etc. before using HP Sure Recover to avoid loss of data. HP Sure Recover (Gen1) does not support platforms with Intel® Optane™.

[15] HP Sure Start Gen6 is available on select HP PCs with Intel processors. See product specifications for availability. Some Sure Start features are limited to Windows Operating System. HP Sure Start end user notifications and HP Sure Start event logging support is limited to Windows Operating system. These features are not supported in Linux.

[16] For the methods outlined in the National Institute of Standards and Technology Special Publication 800-88 "Clear" sanitation method. HP Secure Erase does not support platforms with Intel® Optane™.

[17] HP Client Security Manager Gen5 requires Windows and is available on select HP Pro, Elite and ZBook PCs. See product specifications for details.

[18] HP Sure Sense requires Windows 10 Pro or Enterprise. See product specifications for availability.

[19] HP Fingerprint Sensor is optional.

POWER

Power Supply

Up to 18 hours[1]

HP Long Life 6-cell, 83 Wh Li-ion polymer[2]
Supports battery HP Fast Charge: approximately 50% in 30 minutes

HP Smart 150 W External AC Power Adapter[3]
HP Slim Smart 200 W External AC Power Adapter

[1] Battery life will vary depending on the product model, configuration, loaded applications, features, use, wireless functionality and power management settings. The maximum capacity of the battery will naturally decrease with time and usage. See MobileMark14 battery benchmark https://bapco.com/products/mobilemark-2014/ for additional details.

[2] Supports HP Fast Charge Technology (50% of the charge in 30 minutes)

[3] Not available with NVIDIA Quadro RTX graphics configurations

ENVIRONMENTAL

ENERGY STAR® certified and EPEAT® GOLD registered configurations available[1]

Low halogen[2]

[1] Based on US EPEAT® registration according to IEEE 1680.1-2018 EPEAT®. Status varies by country. Visit www.epeat.net for more information.

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

WEIGHTS & DIMENSIONS

Dimensions (w x d x h)
35.4 x 23.46 x 1.79 cm - non-touch
35.4 x 23.46 x 1.75 cm – touch

13.93 x 9.24 x 0.70 in - non touch
13.93 x 9.24 x 0.69 in - touch

Weights
Starting at 3.84 lbs (1.74kg)

Weight varies by configuration and components.

PORTS/SLOTS

Right side (configurations without NVIDIA Quadro RTX Graphics)
1 4.5mm AC power connector
2 Thunderbolt™ 3 (40Gbps signaling rate) with SuperSpeed USB Type-C® 10Gbps signaling rate (USB Power Delivery, DisplayPort™ 1.2, HP Sleep and Charge) [USB Type-C® with Thunderbolt™ 3]
1 HDMI 2.0
1 SD 4.0 Media Reader[1, 2]

Right side (configurations with NVIDIA Quadro RTX Graphics)
1 4.5mm AC power connector
2 Thunderbolt™ 3 (40Gbps signaling rate) with SuperSpeed USB Type-C® 10Gbps signaling rate (USB Power Delivery, DisplayPort™ 1.2, HP Sleep and Charge) [USB Type-C® with Thunderbolt™ 3]
1 mini DisplayPort™ 1.4 connector
1 SD 4.0 Media Reader[1, 2]

Left side
1 SuperSpeed USB Type-A 5Gbps signaling rate (charging) [USB 3.1 Gen 1 Type A charging]1 headphone/microphone combo

[1] SD Media does not come with the device and requires compatible media in order to use the slot.
[2] SD 4.0 supports next generation secure digital and is compatible to SD, SDHC, SDXC media

SERVICE AND SUPPORT

3-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. Optional1 HP Care Pack Services are extended service contracts which go beyond your standard limited warranties. To choose the right level of service for your HP product, use the HP Care Pack Services Lookup Tool at http://www.hp.com/go/cpc.

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

Technical Specifications – System Unit

SYSTEM UNIT

Stand-Alone Power Requirements (AC Power)	**Nominal Operating Voltage**	19.5 V			
	Average Operating Power(MM14)	4.38W			
	Average Operating Power(idle)	495mW (MSC) , (Idle)	2.693W	System in idle mode + max panel brightness FHD panel : 400nits UHD panel : 600nits	Adapter Safety test condition
	Integrated graphics	45W<CPU (Intel did not define TDP for iGPU)			
	Discrete Graphics	35W			
	Max Operating Power	Discrete < 105W UMA < 45W			
Temperature	**Operating**	32° to 95° F (0° to 35° C) (not writing optical)			
	Non-operating	41° to 95° F (5° to 35° C) (writing optical)			
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			
Maximum Altitude (unpressurized)	**Operating**	-50 to 10,000 ft (-15.24 to 3,048 m)			
	Non-operating	-50 to 40,000 ft (-15.24 to 12,192 m)			
Planned Industry Standard Certifications	**UL**	Yes			
	CSA	Yes			
	FCC Compliance	Yes			
	ENERGY STAR®	Yes			
	EPEAT®	EPEAT® Gold in United States[2]			
	ICES	Yes			
	Australia / NZ A-Tick Compliance	Yes			
	CCC	Yes			
	Japan VCCI Compliance	Yes			
	KCC	Yes			
	BSMI	Yes			
	CE Marking Compliance	Yes			
	MIL STD 810H	Yes, Passed 21 Tests			
	BNCI or BELUS	Yes			
	CIT	Yes			
	Saudi Arabian Compliance (ICCP)	Yes			
	SABS	Yes			

[1] Configurations of the HP ZBook Studio G7 that are ENERGY STAR® qualified are identified as HP ZBook Studio G7 ENERGY STAR on HP websites and on http://www.energystar.gov.

[2] EPEAT® registered where applicable. EPEAT registration varies by country. See http://www.epeat.net for registration status by country. Search keyword generator on HP's 3rd party option store for solar generator accessories at www.hp.com/go/options.

DISPLAYS

15.6" diagonal, 4K UHD (3840 x 2160), IPS, anti-glare, 600 nits, HDR 400, 100% DCI-P3, Next Gen HP DreamColor	**Outline Dimensions** (W x H)	350.22 x 216.37(mm) max	
	Active Area	344.22 x 193.62 (mm)	
	Weight	300g max.	
	Diagonal Size	15.6 inch	
	Thickness	2.6 (mm) max	
	Interface	eDP1.4	
	Surface Treatment	Anti-Glare	
	Touch enabled	No	
	Contrast Ratio	1700:1 (typical)	
	Refresh Rate	60 Hz	
	Brightness	600 nit typical (Panel Only)	
	Pixel Resolution	**Pitch**	3840 x 2160 (UHD)
	Backlight	RGB	
	PPI	LED	
	Color Gamut Coverage	DCI-P3 100%	
	Delta E	<2	
	Color Depth	8 bits + 2 FRC	
	Viewing Angle	UWVA 85/85/85/85	

15.6" diagonal, FHD (1920 x 1080), IPS, anti-glare, 400 nits, low power, 72% NTSClow power (1W) panel	**Outline Dimensions** (W x H)	349.46 x 215.9 max.	
	Active Area	344.16 x 193.59 typ.	
	Weight	310g max	
	Diagonal Size	15.6	
	Thickness	2.6t max.	
	Interface	eDP 1.4	
	Surface Treatment	Anti-glare (AG)	
	Touch enabled	No	
	Contrast Ratio	1200:1 (typ)	
	Refresh Rate	60Hz	
	Brightness	400nit typ.	
	Pixel Resolution	**Pitch**	1920 x 1080 (FHD)
	Backlight	RGB	
	PPI	LED	
	Color Gamut Coverage	sRGB 100%	
	Color Depth	8bit	
	Viewing Angle	UWVA 85/85/85/85	

Technical Specifications – Displays

15.6" diagonal, 4K UHD (3840 x 2160), touch, OLED UWVA, BrightView, Corning® Gorilla® Glass 6, 400 nits, HDR 500, 100% DCI-P3	**Outline Dimensions** (W x H)	348.348×216.202 (mm) max	
	Active Area	344.2176 x 193.6224 (mm)	
	Weight	200g max.	
	Diagonal Size	15.6 (inch)	
	Thickness	2.195(mm) max	
	Interface	eDP 1.4	
	Surface Treatment	Glare (BV)	
	Touch enabled	Yes	
	Contrast Ratio	100,000:1	
	Refresh Rate	60Hz	
	Brightness	400nit (Panel Only)	
	Pixel Resolution	**Pitch**	3840 x 2160 (UHD)
	Backlight	RGB	
	PPI	OLED	
	Color Gamut Coverage	DCI P3 100%	
	Color Depth	8 bits + 2 FRC	
	Viewing Angle	UWVA 85/85/85/85	

15.6" diagonal, FHD (1920 x 1080), IPS, anti-glare, 1000 nits, 72% NTSC, HP Sure View Reflect integrated privacy screen	**Outline Dimensions** (W x H)	349.52 x 205.39 max.	
	Active Area	344.16 x 193.59 typ.	
	Weight	370g max.	
	Diagonal Size	15.6”	
	Thickness	2.6mm / 4.5mm max. (PCB)	
	Interface	eDP	
	Surface Treatment	LCD	
	Touch enabled	Anti-glare (AG)	
	Contrast Ratio	No	
	Refresh Rate	1500:1	
	Brightness	60Hz	
	Pixel Resolution	**Pitch**	1920 x 1080 (FHD)
	Backlight	LED	
	PPI	141	
	Color Gamut Coverage	100% sRGB	
	Color Depth	8 bits	
	Viewing Angle	UWVA 85/85/85/85	

STORAGE AND DRIVES

256 GB PCIe® Gen3 x4 NVMe™ M.2 2280 TLC Solid State Drive (SSD)	**Form Factor**	M.2 2280	
	Capacity	256 GB	
	NAND Type	TLC	
	Height	0.09 in (2.3 mm)	
	Width	0.87 in (22 mm)	
	Weight	0.02 lb (<10 g)	
	Interface	PCIe® Gen3 x4 NVMe™	
	Form Factor	M.2 2280	
	Performance	**Maximum Sequential Read**	**Maximum Sequential Write**
		2580 MB/s~ 2600 MB/s	1000 MB/s~ 1100 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	
		Note: For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 35 GB (for Windows 10) is reserved for system recovery software.	
512 GB PCIe® Gen3 x4 NVMe™ M.2 2280 TLC Self Encrypting (SED) Solid State Drive (SSD)	**Form Factor**	M.2 2280	
	Capacity	512 GB	
	NAND Type	TLC	
	Height	0.09 in (2.3 mm)	
	Width	0.87 in (22 mm)	
	Weight	0.02 lb (<10 g)	
	Interface	PCIe® Gen3 x4 NVMe™	
	Performance	**Maximum Sequential Read**	**Maximum Sequential Write**
		2800 MB/s~ 2900 MB/s	1000 MB/s~ 1800 MB/s
	Logical Blocks	1,000,215,215	
2	**Operating Temperature**	32° to 158°F (0° to 70°C) [ambient temp]	
	Features	ATA Security (Option); TCG Opal 2.0 ; TRIM; L1.2	
		Note: For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 35 GB (for Windows 10) is reserved for system recovery software.	
1 TB PCIe® Gen3 x4 NVMe™ M.2 2280 TLC Solid State Drive (SSD)	**Form Factor**	M.2 2280	
	Capacity	1TB	
	NAND Type	TLC	
	Height	0.09 in (2.3 mm)	
	Width	0.87 in (22 mm)	
	Weight	0.02 lb (<10 g)	
	Interface	PCIe® Gen3 x4 NVMe™	
	Performance	**Maximum Sequential Read**	**Maximum Sequential Write**
		2900 MB/s~ 3000 MB/s	Up to 2000 MB/s
	Logical Blocks	2,000,409,264	
2	**Operating Temperature**	32° to 158°F (0° to 70°C) [ambient temp]	
	Features	ATA Security,TRIM; L1.2	

Technical Specifications – Storage

		Note: For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 35 GB (for Windows 10) is reserved for system recovery software.	
2 TB PCIe® Gen3 x4 NVMe™ M.2 2280 TLC Solid State Drive (SSD	**Form Factor**	M.2 2280	
	Capacity	2 TB	
	NAND Type	TLC	
	Height	0.09 in (2.3 mm)	
	Width	0.87 in (22 mm)	
	Weight	0.02 lb (<10 g)	
	Interface	PCIe® Gen3 x4 NVMe™	
	Performance	**Maximum Sequential Read**	**Maximum Sequential Write**
		Up to 2900MB/s	Up to 2100 MB/s
	Logical Blocks	3,907,029,168	
2	**Operating Temperature**	32° to 158°F (0° to 70°C) [ambient temp]	
	Features	ATA Security,TRIM; L1.2	
		Note: For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 35 GB (for Windows 10) is reserved for system recovery software.	

NETWORKING/COMMUNICATION

Intel® Wi-Fi 64 AX201 and Bluetooth® 5.0 802.11ax (2 x 2) (Supporting gigabit file transfer speeds) vPro®1*	**Wireless LAN Standards**	IEEE 802.11a IEEE 802.11b IEEE 802.11g IEEE 802.11n IEEE 802.11ac IEEE 802.11ax IEEE 802.11d IEEE 802.11e IEEE 802.11h IEEE 802.11i IEEE 802.11k IEEE 802.11r IEEE 802.11v
	Interoperability	Wi-Fi certified
	Frequency Band	802.11b/g/n/ax • 2.402 – 2.482 GHz 802.11a/n/ac/ax • 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
	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, ,80MHz & 160MHz) • 802.11ax : MCS0 ~ MCS11, (1SS and 2SS) (20MHz, 40MHz, ,80MHz & 160MHz)
	Modulation	Direct Sequence Spread Spectrum OFDM, BPSK, QPSK, CCK, 16-QAM, 64-QAM, 256-QAM , 1024QAM
	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 • WAPI
	Network Architecture Models	Ad-hoc (Peer to Peer) Infrastructure (Access Point Required)
	Roaming	IEEE 802.11 compliant roaming between access points
	Output Power[2]	• 802.11b : +18.5dBm minimum • 802.11g : +17.5dBm minimum • 802.11a : +18.5dBm minimum • 802.11n HT20(2.4GHz) : +15.5dBm minimum • 802.11n HT40(2.4GHz) : +14.5dBm minimum • 802.11n HT20(5GHz) : +15.5dBm minimum • 802.11n HT40(5GHz) : +14.5dBm minimum

	• 802.11ac VHT80(5GHz) : +11.5dBm minimum • 802.11ac VHT160(5GHz) : +11.5dBm minimum • 802.11ax HT40(2.4GHz) : +10dBm minimum • 802.11ax VHT160(5GHz) : +10dBm minimum	
Power Consumption	• Transmit mode 2.0 W • Receive mode 1.6 W • Idle mode (PSP) 180 mW (WLAN Associated) • Idle mode 50 mW (WLAN unassociated) • Connected Standby 10mW • Radio disabled 8 mW	
Power Management	ACPI and PCI Express compliant power management 802.11 compliant power saving mode	
Receiver Sensitivity[3]	•802.11b, 1Mbps : -93.5dBm maximum •802.11b, 11Mbps : -84dBm maximum • 802.11a/g, 6Mbps : -86dBm maximum • 802.11a/g, 54Mbps : -72dBm maximum • 802.11n, MCS07 : -67dBm maximum • 802.11n, MCS15 : -64dBm maximum • 802.11ac, MCS0 : -84dBm maximum • 802.11ac, MCS9 : -59dBm maximum •802.11ax, MCS11(HT40): -59dBm maximum •802.11ax, MCS11(VHT160): -58.5dBm 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 with CNVi Interface	
Dimensions	1. Type 2230 : 2.3 x 22.0 x 30.0 mm 2. Type 1216: 1.67 x 12.0 x 16.0 mm	
Weight	1. Type 2230 : 2.8g 2. Type 126: 1.3g	
Operating Voltage	3.3v +/- 9%	
Temperature	Operating	14° to 158° F (-10° to 70° C)
	Non-operating	-40° to 176° F (-40° to 80° C)
Humidity	Operating	10% to 90% (non-condensing)
	Non-operating	5% to 95% (non-condensing)
Altitude	Operating	0 to 10,000 ft (3,048 m)
	Non-operating	0 to 50,000 ft (15,240 m)
LED Activity	LED Amber – Radio Off; LED Off – Radio ON	

HP Integrated Module with Bluetooth 4.0/4.1/4.2/5.0/5.1 Wireless Technology

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 + 9.5 dBm for BR and EDR.
Power Consumption	Peak (Tx): 330 mW Peak (Rx): 230 mW Selective Suspend: 17 mW
Bluetooth Software Supported	Microsoft Windows Bluetooth Software
Link Topology	
Power Management	Microsoft Windows ACPI, and USB Bus Support
Certifications	FCC (47 CFR) Part 15C, Section 15.247 & 15.249
Power Management Certifications	ETS 300 328, ETS 300 826 Low Voltage Directive IEC950 UL, CSA, and CE Mark
Bluetooth Profiles Supported	BT4.1-ESR 5/6/7 Compliance LE Link Layer Ping LE Dual Mode LE Link Layer LE Low Duty Cycle Directed Advertising LE L2CAP Connection Oriented Channels Train Nudging & Interlaced Scan BT4.2 ESR08 Compliance LE Secure Connection- Basic/Full LE Privacy 1.2 –Link Layer Privacy LE Privacy 1.2 –Extended Scanner Filter Policies LE Data Packet Length Extension FAX Profile (FAX) Basic Imaging Profile (BIP)2 Headset Profile (HSP) Hands Free Profile (HFP) Advanced Audio Distribution Profile (A2DP)
Security & Manageability	Intel® vPro® support with appropriate Intel® chipset components

Intel® Wi-Fi 61 AX201 and Bluetooth 5.0 (802.11ax 2 x 2, non-vPro®, supporting gigabit file transfer speeds) nonvPro®	**Wireless LAN Standards**	IEEE 802.11a IEEE 802.11b IEEE 802.11g IEEE 802.11n IEEE 802.11ac IEEE 802.11ax IEEE 802.11d IEEE 802.11e IEEE 802.11h IEEE 802.11i IEEE 802.11k IEEE 802.11r IEEE 802.11v
	Interoperability	Wi-Fi certified
	Frequency Band	802.11b/g/n/ax • 2.402 – 2.482 GHz 802.11a/n/ac/ax • 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
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, ,80MHz & 160MHz) • 802.11ax : MCS0 ~ MCS11, (1SS and 2SS) (20MHz, 40MHz, ,80MHz & 160MHz)
Modulation	Direct Sequence Spread Spectrum OFDM, BPSK, QPSK, CCK, 16-QAM, 64-QAM, 256-QAM , 1024QAM
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 • WAPI
Network Architecture Models	Ad-hoc (Peer to Peer) Infrastructure (Access Point Required)
Roaming	IEEE 802.11 compliant roaming between access points
Output Power[2]	• 802.11b : +18.5dBm minimum • 802.11g : +17.5dBm minimum • 802.11a : +18.5dBm minimum • 802.11n HT20(2.4GHz) : +15.5dBm minimum • 802.11n HT40(2.4GHz) : +14.5dBm minimum • 802.11n HT20(5GHz) : +15.5dBm minimum • 802.11n HT40(5GHz) : +14.5dBm minimum • 802.11ac VHT80(5GHz) : +11.5dBm minimum • 802.11ac VHT160(5GHz) : +11.5dBm minimum • 802.11ax HT40(2.4GHz) : +10dBm minimum • 802.11ax VHT160(5GHz) : +10dBm minimum
Power Consumption	• Transmit mode :2.0 W • Receive mode :1.6 W • Idle mode (PSP) 180 mW (WLAN Associated) • Idle mode :50 mW (WLAN unassociated) • Connected Standby/Modern Standby: 10mW • Radio disabled: 8 mW
Power Management	ACPI and PCI Express compliant power management 802.11 compliant power saving mode
Receiver Sensitivity[3]	•802.11b, 1Mbps : -93.5dBm maximum •802.11b, 11Mbps : -84dBm maximum • 802.11a/g, 6Mbps : -86dBm maximum • 802.11a/g, 54Mbps : -72dBm maximum • 802.11n, MCS07 : -67dBm maximum • 802.11n, MCS15 : -64dBm maximum • 802.11ac, MCS0 : -84dBm maximum • 802.11ac, MCS9 : -59dBm maximum

	•802.11ax, MCS11(HT40): -59dBm maximum •802.11ax, MCS11(VHT160): -58.5dBm 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	
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Weight	1. Type 2230 : 2.8g 2. Type 126: 1.3g	
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	

HP Integrated Module with Bluetooth 4.0/4.1/4.2/5.0/5.1 Wireless Technology

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 + 9.5 dBm for BR and EDR.
Power Consumption	Peak (Tx): 330 mW Peak (Rx): 230 mW Selective Suspend: 17 mW
Bluetooth Software Supported	Microsoft Windows Bluetooth Software
Link Topology	
Power Management	Microsoft Windows ACPI, and USB Bus Support
Certifications	FCC (47 CFR) Part 15C, Section 15.247 & 15.249
Power Management Certifications	ETS 300 328, ETS 300 826 Low Voltage Directive IEC950 UL, CSA, and CE Mark
Bluetooth Profiles Supported	BT4.1-ESR 5/6/7 Compliance LE Link Layer Ping LE Dual Mode LE Link Layer

Technical Specifications – Networking

LE Low Duty Cycle Directed Advertising
LE L2CAP Connection Oriented Channels
Train Nudging & Interlaced Scan
BT4.2 ESR08 Compliance
LE Secure Connection- Basic/Full
LE Privacy 1.2 –Link Layer Privacy
LE Privacy 1.2 –Extended Scanner Filter Policies
LE Data Packet Length Extension
FAX Profile (FAX)
Basic Imaging Profile (BIP)2
Headset Profile (HSP)
Hands Free Profile (HFP)
Advanced Audio Distribution Profile (A2DP)

POWER

150 Watt Smart Slim AC Adapter	**Dimensions**	138x66x22mm	
	Weight	unit: 325g +/- 10g	
	Input	**Input Efficiency**	88% at 115 Vac and 89% at 230Vac
		Input frequency range	47 ~ 63 Hz
		Input AC current	2.7 A at 90 Vac and Maximum Load
	Output	**Output power**	150W
		DC output	19.5V
		Hold-up time	5ms at 115 Vac input
		Output current limit	<16.0A
	Connector	4.5mm Barrel Type	
	Environmental Design	**Operating temperature**	32° to 95° F (0° to 35° C)
		Non-operating (storage) temperature	-4° to 185° F (-20° to 85° C)
		Altitude	0 to 16,400 ft (0 to 5,000 m)
		Humidity	20% to 95%
		Storage Humidity	10% to 95%
	EMI and Safety Certifications	Eg: *CE Mark - full compliance with LVD and EMC directives * Worldwide safety standards - IEC60950, EN60950, UL60950, Class1, SELV; Agency approvals - C-UL-US, NORDICS, DENAN, EN55022 Class B, FCC Class B, CISPR22 Class B, CCC, NOM-1 NYCE. * MTBF - over 200,000 hours at 25°C ambient condition.	

200 Watt Smart Slim AC Adapter	**Dimensions**	152x73x23.5mm	
	Weight	unit: 530g +/- 10g	
	Input	**Input Efficiency**	88% at 115 Vac and 89% at 230Vac
		Input frequency range	47 to 63 Hz
		Input AC current	2.9 A at 90 Vac and Maximum Load
	Output	**Output power**	200W
		DC output	19.5V
		Hold-up time	5ms at 115 Vac input
		Output current limit	<16.0A
	Connector	4.5mm Barrel Type	
	Environmental Design	**Operating temperature**	32° to 95° F (0° to 35° C)

Technical Specifications – Power

	Non-operating (storage) temperature	-4° to 185° F (-20° to 85° C)
	Altitude	0 to 16,400 ft (0 to 5000m)
	Humidity	5% to 95%
	Storage Humidity	5% to 95%
EMI and Safety Certifications	Eg: *CE Mark - full compliance with LVD and EMC directives * Worldwide safety standards - IEC60950, EN60950, UL60950, Class1, SELV; Agency approvals - C-UL-US, NORDICS, DENAN, EN55022 Class B, FCC Class B, CISPR22 Class B, CCC, NOM-1 NYCE. * MTBF - over 200,000 hours at 25°C ambient condition.	

Technical Specifications – Power

HP 6-cell Long Life Li-Ion (83 WHr)	**Dimensions (H x W x L)**	7.78x71.05x316.1 mm (0.306 x 2.797 x 12.44 inch)	
	Weight	0.305kg(0.67lb)	
	Cells/Type	3cell Lithium-Ion Polymer cell	
	Energy	Voltage	11.58V
		Amp-hour capacity	7.17Ah / 6.88Ah
		Watt-hour capacity	83Wh
	Temperature	Operating (Charging)	32˚ to 113˚ F (0˚ to 45˚ C)
		Operating (Discharging)	14˚ to 122˚ F (-10˚ to 60˚ C)
	Fuel Gauge LED	NA	
	Warranty	1-year[6]	
	Optional Travel Battery Available	No	

ENVIRONMENTAL DATA

Eco-Label Certifications & declarations

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

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

System Configuration

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

Energy Consumption (in accordance with US ENERGY STAR® test method)	**115VAC, 60Hz**	**230VAC, 50Hz**	**100VAC, 60Hz**
Normal Operation (Short idle)	9.62 W	10.54 W	9.37 W
Normal Operation (Long idle)	0.95 W	1.07 W	0.98 W
Sleep	0.95 W	1.07 W	0.98 W
Off	0.36 W	0.47 W	0.34 W

NOTE:
Energy efficiency data listed is for an ENERGY STAR® compliant product if offered within the model family. HP computers marked with the ENERGY STAR® Logo are compliant with the applicable U.S. Environmental Protection Agency (EPA) ENERGY STAR® specifications for computers. If a model family does not offer ENERGY STAR® compliant configurations, then energy efficiency data listed is for a typically configured PC featuring a hard disk drive, a high efficiency power supply, and a Microsoft Windows® operating system.

Heat Dissipation*	**115VAC, 60Hz**	**230VAC, 50Hz**	**100VAC, 60Hz**
Normal Operation (Short idle)	32.9004 BTU/hr	36.0468 BTU/hr	32.0454 BTU/hr
Normal Operation (Long idle)	3.249 BTU/hr	3.6594 BTU/hr	3.3516 BTU/hr
Sleep	3.249 BTU/hr	3.6594 BTU/hr	3.3516 BTU/hr
Off	1.2312 BTU/hr	1.6074 BTU/hr	1.1628 BTU/hr

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

Declared Noise Emissions (in accordance with ISO 7779 and ISO 9296)	Sound Power (L_{WAd}, bels)	Sound Pressure (L_{pAm}, decibels)
Typically Configured – Idle	2.5	22
Fixed Disk – Random writes	3.6	35.5

Longevity and Upgrading

This product can be upgraded, possibly extending its useful life by several years. Upgradeable features and/or components contained in the product may include:
• 1 M.2 2280 PCIe Gen 3 x 4 NVMe Solid State Drive Slot (does not support SATA M.2 2280 drives)

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

Batteries

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

Batteries used in the product do not contain:
Mercury greater the1ppm by weight
Cadmium greater than 20ppm by weight

Battery description: CR2032 (coin cell)
Battery type: Lithium

Additional Information

- This product is in compliance with the Restrictions of Hazardous Substances (RoHS) directive - 2011/65/EC.
- This HP product is designed to comply with the Waste Electrical and Electronic Equipment (WEEE) Directive – 2002/96/EC.
- This product is in compliance with California Proposition 65 (State of California; Safe Drinking Water and Toxic Enforcement Act of 1986).
- This product is in compliance with the IEEE 1680 (EPEAT) standard at the gold level, see www.epeat.net
- Plastics parts weighing over 25 grams used in the product are marked per ISO11469 and ISO1043.
- This product contains 7.8% post-consumer recycled plastic (by wt.)
- This product is 96.1% recycle-able when properly disposed of at end of life.

Packaging Materials

External:	PAPER/Corrugated	1292 g
	PAPER/Paper	20 g
	PAPER/Molded pulp	307 g
Internal:	PLASTIC/Polyethylene low density - LDPE	10 g
	PLASTIC/Polyester	10 g
	PLASTIC/Polypropylene - PP	7 g

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

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

Material Usage

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

- Asbestos
- Certain Azo Colorants
- Certain Brominated Flame Retardants – may not be used as flame retardants in plastics
- Cadmium
- Chlorinated Hydrocarbons
- Chlorinated Paraffins
- Formaldehyde
- Halogenated Diphenyl Methanes
- Lead carbonates and sulfates
- Lead and Lead compounds
- Mercuric Oxide Batteries
- Nickel – finishes must not be used on the external surface designed to be frequently handled or carried by the user.
- Ozone Depleting Substances
- Polybrominated Biphenyls (PBBs)
- Polybrominated Biphenyl Ethers (PBBEs)
- Polybrominated Biphenyl Oxides (PBBOs)
- Polychlorinated Biphenyl (PCB)

Technical Specifications – Environmental

- 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

HP offers end-of-life HP product return and recycling programs in many geographic areas. To recycle your product, please go to: http://www.hp.com/go/reuse-recycle or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner.

The EU WEEE directive (2002/95/EC) requires manufacturers to provide treatment information for each product type for use by treatment facilities. This information (product disassembly instructions) is posted on the HP web site at: http://www.hp.com/go/recyclers. These instructions may be used by recyclers and other WEEE treatment facilities as well as HP OEM customers who integrate and re-sell HP equipment.

HP Inc. Corporate Environmental Information

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

Global Citizenship Report
http://www.hp.com/hpinfo/globalcitizenship/gcreport/index.html
Eco-label certifications
http://www8.hp.com/us/en/hp-information/environment/ecolabels.html
ISO 14001 certificates:
http://h20195.www2.hp.com/V2/GetDocument.aspx?docname=c04755842
and
http://www.hp.com/hpinfo/globalcitizenship/environment/pdf/cert.pdf

Date of change:	**Version History:**		**Description of change:**
September 28, 2020	From v1 to v2	Changed	WEIGHTS & DIMENSIONS section
October 1, 2020	From v2 to v3	Changed	At A Glance, STORAGE AND DRIVES and SOFTWARE AND SECURITY sections
November 18, 2020	From v3 to v4	Changed	At A Glance, OPERATING SYSTEM, GRAPHICS, STORAGE AND DRIVES, PORTS/SLOTS sections
December 16, 2020	From v4 to v5	Added	BIOS Version in Software and Security section