QuickSpecs

Overview

HP ZBook Studio G8 Mobile Workstation

Top View

1. Clickpad
2. Fingerprint sensor (optional)
3. HP Premium backlit Keyboard
4. Standard ctrl, fn, Windows, alt, space bar, alt, menu, ctrl layout
5. Power button

6. Speakers
7. Camera
8. IR Camera
9. Microphones

Overview

Left

1. Nano security lock slot
2. USB 3.1 Gen 1 charging port

3. Stereo microphone in / headphone-out combo jack

Right (configurations without NVIDIA RTX Graphics)

1. Battery Charging LED
2. Power connector
3. (2) USB Type-C® with Thunderbolt™ 4

4. HDMI 2.0 port (Cable not included)
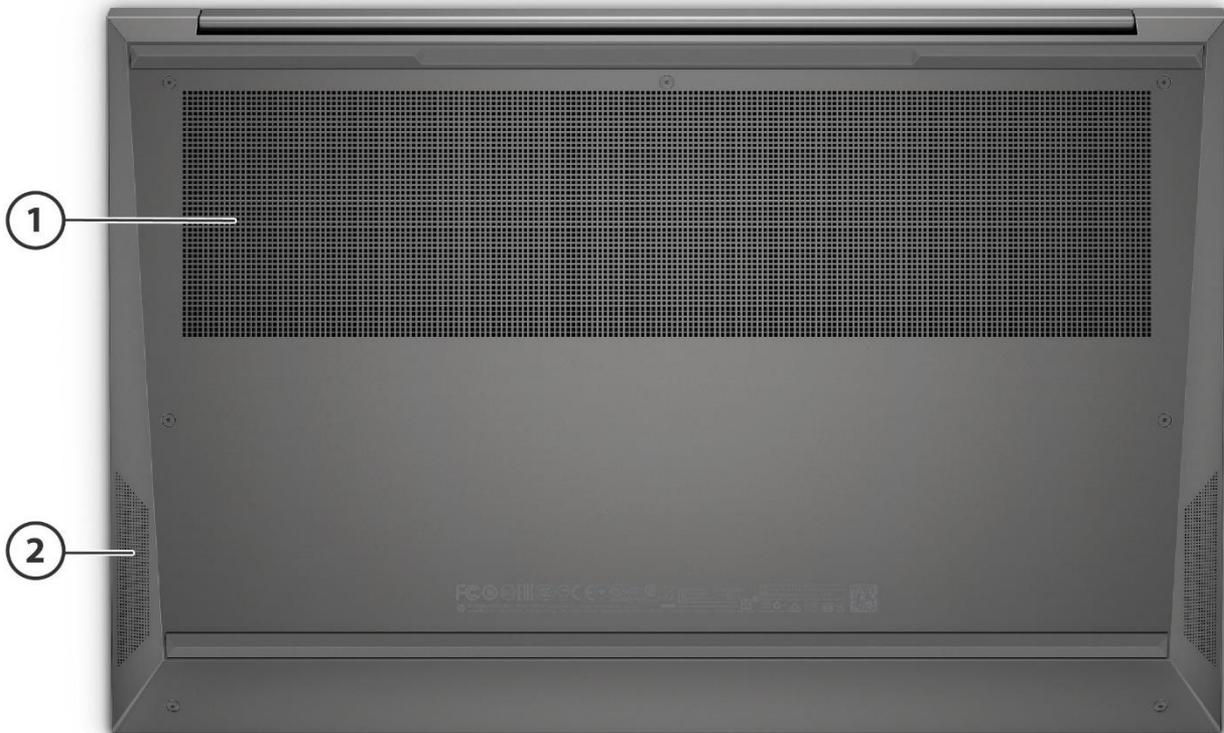5. SD Card Reader (SD Media not included)

Right (configurations with NVIDIA RTX Graphics)

1. Battery Charging LED
2. Power connector
3. (2) USB Type-C® with Thunderbolt™ 4

4. mini DisplayPort™ 1.4 (mini DisplayPort cable is not included)
5. SD Card Reader (SD Media not included)

Overview

Bottom

1. Fan Venting

2. Speakers

QuickSpecs

Overview

At A Glance

- Work anywhere without compromising on performance or security with Windows 10 Pro, powered by HP's collaboration and connectivity technology.
- Experience high-end visualization and seamlessly render your biggest projects with the next generation NVIDIA® GeForce RTX™ graphics.; Certified and supported for the apps you use every day.
- Take multitasking to the next level with the 11th gen Intel® Core™ i9 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.
- Power through projects with up to 32 GB RAM for fast rendering, editing and simulating.
- Blitz through multiple tasks and ditch external drives with up to 2 TB local NVMe storage
- Speakers custom tuned by Bang and Olufsen surround you in a rich sound 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 (not on configs with RTX Graphics), mini DisplayPort™ (only on configurations with RTX graphics), USB 3.0 charging port, headphone jack, and AC port.
- Choice of displays:
  - Next Gen HP DreamColor 39.6 cm (15.6") diagonal 4K UHD IPS HDR 400 eDP + PSR anti-glare, 100% DCI-P3, 600 nits (3840 x 2160)120 Hz;
  - 39.6 cm (15.6") diagonal FHD IPS eDP + PSR anti-glare, 100% sRGB at 400 nits low power (1920 x 1080);
  - 39.6 cm (15.6") diagonal FHD IPS eDP + PSR anti-glare, 72% NTSC at 1000 nits HP Sure View Integrated Privacy Panel (1920 x 1080);
  - 39.6 cm (15.6") diagonal 4K UHD OLED UWVA eDP + PSR Brightview 100% DCI-P3, 400 nits with ambient light sensor (3840 x 2160) multitouch enabled
- 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
- Have confidence with the HP's most secure mobile workstations. Instantly protect against visual hacking with HP Sure View Reflect, and defend against firmware and malware attacks with HP Sure Start Gen6 and HP Sure Sense.
- A highly recyclable & lightweight aluminum exterior with 5x the abrasion resistance of painted carbon fiber allows for a more durable, thin, and recyclable device.
- Our ZBooks are designed to undergo extensive MIL-STD 810H testing.
- Plug in to greater connectivity at your desktop with the HP Thunderbolt Dock for lightning-fast Thunderbolt™ 4 transfers and the flexibility to run more than up to two external 4K displays.

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

Features

OPERATING SYSTEM

Preinstalled OS	Windows 10 Pro 64 - HP recommends Windows 10 Pro for business.[1]
	Windows 10 Home 64[1]
	Ubuntu 20.04[2]
	FreeDOS 3.0
Supported OS[4]	Windows 10 64 Enterprise

[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 is planned to be available in the 2nd half of 2020
[4]Support to be tested and documented or web support only.

PROCESSOR

11th Generation Intel® Core™ i9-11950H with Intel® UHD Graphics (2.6 GHz base frequency, up to 5.0 GHz with Intel® Turbo Boost Technology, 24 MB L3 cache, 8 cores), supports Intel® vPro® Technology; [1,2,3,4,5]

11th Generation Intel® Core™ i9-11900H with Intel® UHD Graphics (2.5 GHz base frequency, up to 4.9 GHz with Intel® Turbo Boost Technology, 24 MB L3 cache, 8 cores); [1,2,3,4,5]

11th Generation Intel® Core™ i7-11850H with Intel® UHD Graphics (2.5 GHz base frequency, up to 4.8 GHz with Intel® Turbo Boost Technology, 24 MB L3 cache, 8 cores), supports Intel® vPro® Technology; [1,2,3,4,5]

11th Generation Intel® Core™ i7-11800H with Intel® UHD Graphics (2.3 GHz base frequency, up to 4.6 GHz with Intel® Turbo Boost Technology, 24 MB L3 cache, 8 cores);[1,2,3,4]

[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 sorder 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 10 Pro 64 bit, a vPro supported processor, vPro enabled chipset, vPro enabled wired LAN and/or WLAN card and TPM 2.0 are required. Some functionality requires additional 3rd party software in order to run. See http://intel.com/vpro

Features

CHIPSET

Intel® WM590 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® 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] For full Intel® vPro® functionality, Windows 10 Pro 64 bit, a vPro supported processor, vPro enabled chipset, vPro enabled wired LAN and/or WLAN card and TPM 2.0 are required. Some functionality requires additional 3rd party software in order to run. See http://intel.com/vpro

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 2.0 4096x2304 @30Hz; DisplayPort via USB-C® Thunderbolt™ 4096x2304 @60Hz, miniDP 1.4

Discrete

NVIDIA® GeForce RTX™ 3060 (6 GB GDDR6 dedicated)

NVIDIA® GeForce RTX™ 3070 (8 GB GDDR6 dedicated)

NVIDIA® GeForce RTX™ 3080 (16 GB GDDR6 dedicated)

NVIDIA® T1200 (4 GB GDDR6 dedicated)[2,4,6,7,9]

NVIDIA RTX™ A2000 (4 GB GDDR6 dedicated)[2,4,6,7,9]

NVIDIA RTX™ A3000 (6 GB GDDR6 dedicated)[2,6,8,9]

NVIDIA RTX™ A4000 (8 GB GDDR6 dedicated)[2,6,8,9]

NVIDIA RTX™ A5000 (16 GB GDDR6 dedicated)[2,6,8,9,10]

Supports up to 4 displays through discrete graphics and dock

Supports: NVIDIA Surround Technology for NVIDIA GeForce Graphics

M Max resolution for external displays: HDMI 2.0 4096x2304 @30Hz; DisplayPort via USB-C® Thunderbolt™ 4096x2304 @60Hz, miniDP 1.4

[1] UHD content required to view UHD images.
[2] Both UMA & Discrete configurations support up to 4 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

Features

[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.
[7]HDMI 2.0 works with Discrete Graphics and drops to HDMI 1.4 with Intel(r) UHD Graphics
[8]miniDP cable sold separately.
[9]HDMI 2.0 connector is provided with Intel® UHD Graphics and/or NVIDIA Quadro T1200 or A2000 configurations; miniDP 1.4 connector is provided with NVIDIA Quadro RTX A3000 or higher configurations
[10]NVIDIA Quadro RTX A5000 graphics option available in 2nd half of 2021

DISPLAY

Non-touch

- Next Gen HP DreamColor 39.6 cm (15.6") diagonal 4K UHD IPS HDR 400 eDP + PSR anti-glare, 100% DCI-P3, 600 nits (3840 x 2160)[2,3,5,6]
- 39.6 cm (15.6") diagonal FHD IPS eDP + PSR anti-glare, 100% sRGB at 400 nits low power (1920 x 1080)[2,3,5,6]
- 39.6 cm (15.6") diagonal FHD IPS eDP + PSR anti-glare, 72% NTSC at 1000 nits HP Sure View Integrated Privacy Panel (1920 x 1080)[1,2,3,5,6,7,8]

Touch

- 39.6 cm (15.6") diagonal 4K UHD OLED UWVA eDP + PSR Brightview 100% DCI-P3, 400 nits with ambient light sensor (3840 x 2160) Multitouch enabled [2,3,5,6,8]

[1] HP Sure View 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 certification are pending.
[7]HP Sure View available in 2nd half of 2020.
[8]Actual brightness will be lower with touchscreen or Sure View.

Features

STORAGE AND DRIVES*

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

256 GB PCIe Gen4 (NVMe™) TLC Solid State Drive**
256 GB PCIe Gen4 (NVMe™) TLC Self Encrypting (SED) OPAL2 Solid State Drive**
512 GB PCIe Gen4 (NVMe™) TLC Solid State Drive**
512 GB PCIe Gen4 (NVMe™) TLC Self Encrypting (SED) OPAL2 Solid State Drive**
1 TB PCIe Gen4 (NVMe™) TLC Solid State Drive**
2 TB PCIe Gen4 (NVMe™) TLC Solid State Drive**

[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.
** Available late September 2021.

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 DDR4-3200 non-ECC SDRAM[1,2]
Memory soldered down. Supports Dual Channel Memory

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

Features

NETWORKING/COMMUNICATIONS

WLAN

Intel® Wi-Fi 6 AX201 (2x2) and Bluetooth® 5.2 combo, vPro® [1]
Intel® Wi-Fi 6 AX201 (2x2) and Bluetooth® 5.2 combo, non-vPro® [1]

[1]Wireless access point and Internet service required and sold separately. Availability of public wireless access points limited. Wi-Fi 6 (802.11ax) is backwards compatible with prior 802.11 specs. The specifications for Wi-Fi 6 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.

AUDIO/MULTIMEDIA

Audio

Audio by Bang & Olufsen, quad stereo speakers, HP World Facing Microphone dual array digital microphone, 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 *Creator Bridge* Keyboard, full-size, spill-resistant, backlit, with drain and DuraKeys, clickpad with image sensor and glass surface, multi-touch gestures and taps enabled

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
HP Hotkey Support
HP Noise Cancellation Software
HP Performance Advisor[8]
HP Z Central Remote Boost Software[2]

Features

Native Miracast support [4]
HP Connection Optimizer[9]
HP Smart Support[20]

Security Management

Absolute persistence module [6]
HP Device Access Manager
HP FingerPrint Sensor
HP Manageability Integration Kit[11]
HP Power On Authentication
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: 7.85
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.
[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.

Features

[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.

[20] HP Smart Support is available to commercial customers through your HP Service Representative and HP Factory Configuration Services; or it can be downloaded at: http://www.hp.com/smart-support. HP Smart Support automatically collects the telemetry necessary upon initial boot of the product to deliver device-level configuration data and health insights.

Features

POWER

Power Supply

Up to 9 hr 30 min[1]

HP Long Life 6-cell, 83 Wh Li-ion polymer[2,4]
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 MobileMark18 battery benchmark https://bapco.com/products/mobilemark-2018/ for additional details.

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

[3] 150W Power Adapter is not available with NVIDIA RTX Graphics or higher configurations

[4] Actual battery Watt-hours (Wh) will vary from design capacity. Battery capacity will naturally decrease with shelf life, time, usage, environment, temperature, system configuration, loaded apps, features, power management settings and other factors.

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.

Features

WEIGHTS & DIMENSIONS

Dimensions (w x d x h)
35.4 x 23.46 x 1.785 cm - non-touch
35.4 x 23.46 x 1.75 cm – touch

13.94 x 9.24 x 0.70 in - non touch
13.94 x 9.24 x 0.69 in – touch

Weights
Starting at 3.95 lbs (1.79kg)

Weight varies by configuration and components.

A deck: Anodized Aluminium with plastic bumper
B deck: Anodized Aluminium for Non-Touch sku; Touch has Corning® Gorilla ® Glass 5
C deck: Anodized Aluminium
D deck: Magnesium Die Cast
Metal Alloy Hinges

PORTS/SLOTS

SD 7.0 Media Reader[1,2,5]

Right side (configurations with NVIDIA Quadro RTX Graphics)
1 4.5mm AC power connector
2 Thunderbolt™ 4 (40Gbps signaling rate) with SuperSpeed USB Type-C® 10Gbps signaling rate
(USB Power Delivery, DisplayPort™ 1.4, HP Sleep and Charge) [USB Type-C® with Thunderbolt™ 4]
1 mini DisplayPort™ 1.4 connector
1 SD 7.0 Media Reader[1,2,5]
1 HDMI 2.0 connector or 1 miniDP1.4 connector;[3,4]
1 HDMI 2.0[3,4]

Left side
1 SuperSpeed USB Type-A 5Gbps signaling rate (charging) [USB 3.1 Gen 1 Type A charging]1 headphone/microphone combo,
1 Stereo microphone in / headphone-out combo jack
1 nano security lock slot

[1] SD Media does not come with the device and requires compatible media in order to use the slot.
[2] SD 7.0 supports next generation secure digital and is compatible to SD, SDHC, SDXC media
[3] HDMI 2.0 works with Discrete Graphics and drops to HDMI 1.4 with Intel(r) UHD Graphics
[4] HDMI 2.0 connector is provided with Intel® UHD Graphics and/or NVIDIA Quadro T1200 or A2000 configurations;
miniDP 1.4 connector is provided with NVIDIA Quadro RTX A3000 or higher configurations
[5] SD4.0 cards will run at SD3 speed for any SD 7.0 host. This is the SD 7.0 standard. SD 7.0 cards availability is expected
around August 2021 (may vary with card vendors)

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. Optional[1] HP Care Pack
Services are extended service contracts which go beyond your standard limited warranties. To choose the right level of
service for your HP product, use the HP Care Pack Services Lookup Tool at http://www.hp.com/go/cpc.

[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

Features

governed by the applicable HP terms and conditions of service provided or indicated to Customer at the time of purchase. Customer may have additional statutory rights according to applicable local laws, and such rights are not in any way affected by the HP terms and conditions of service or the HP Limited Warranty provided with your HP Product. Consult your local HP Customer Support Center for details.

QuickSpecs

Technical Specifications – Displays

DISPLAYS

Panel LCD 15.6-in UHD (3840x2160) Anti-Glare WLED UWVA HDR-400 DCI-P3 100percent cg 600nits eDP 1.4+PSR2 ultraslim NB2X

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	
Panel Technology	IPS	
Surface Treatment	Anti-Glare	
Touch enabled	No	
Contrast Ratio	1200:1 (typical)	
Refresh Rate	120 Hz	
Brightness	600 nit typical (Panel Only)	
Pixel Resolution	**Pitch**	3840 x 2160 (UHD)
Backlight	LED	
Color Gamut Coverage	DCI-P3 100%	
Color Depth	8 bits + 2 FRC	
Viewing Angle	UWVA 85/85/85/85	

Panel LCD 15.6 inch FHD (1920x1080) Anti-Glare WLED UWVA sRGB 100percent cg 400nits eDP 1.4+PSR2 ultraslim Low Power (1W) NWBZ

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	LED	
Color Gamut Coverage	sRGB 100%	
Color Depth	8bit	
Viewing Angle	UWVA 85/85/85/85	

Technical Specifications – Displays

HP SureView Reflect 15.6" diagonal FHD IPS eDP1.3 + PSR anti-glare WLED-backlit and ambient light sensor 1000 nits 72% CG (1920 x 1080)	**Outline Dimensions** (W x H)	349.52 x 205.39 (mm) max
	Active Area	344.16 x 193.59 typ.
	Weight	370g max.
	Diagonal Size	15.6 (inch)
	Thickness	2.6mm / 4.5mm max. (PCB)
	Interface	eDP
	Surface Treatment	Anti-glare (AG)
	Touch enabled	No
	Contrast Ratio	1500:1
	Refresh Rate	60Hz
	Brightness	1000nit
	Pixel Resolution	1920 x 1080
	Backlight	LED
	PPI	141
	Color Gamut Coverage	100% sRGB
	Color Depth	8 bits
	Viewing Angle	UWVA 85/85/85/85

Panel OLED 15.6 inch UHD (3840x2160) BrightView AMOLED UWVA DCI-P3 100percent cg 400nits eDP+PSR ultraslim NWBZ	**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	OLED	
	Color Gamut Coverage	DCI P3 100%	
	Color Depth	8 bits + 2 FRC	
	Viewing Angle	UWVA 85/85/85/85	

*Actual brightness will be lower with touchscreen or Sure View.

Technical Specifications – Storage

STORAGE AND DRIVES

SSD 256GB 2280 M2 PCIe-3x4 SS NVMe TLC	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.

SSD 512GB 2280 PCIe-3x4 NVMe Self Encrypted OPAL2 Three Layer Cell	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.

SSD 1TB 2280 PCIe-3x4 NVMe Three Layer Cell single-sided	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	
	Operating Temperature	32° to 158°F (0° to 70°C) [ambient temp]	
	Features	ATA Security,TRIM; L1.2	

QuickSpecs

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.

SSD 2TB 2280 PCIe-3x4 NVMe Three Layer Cell single-sided

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
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.

SSD 256GB 2280 PCIe-4x4 NVMe Three Layer Cell

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® Gen4 x4 NVMe™

Performance	Maximum Sequential Read	Maximum Sequential Write
	Up to 6,400 MB/s	Up to 2,700 MB/s

Logical Blocks	500,118,192
Operating Temperature	32° to 158°F (0° to 70°C) [ambient temp]
Features	Pyrite 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.

SSD 512GB 2280 PCIe-4x4 NVMe Three Layer Cell

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® Gen4 x4 NVMe™

Performance	Maximum Sequential Read	Maximum Sequential Write
	Up to 6,600 MB/s	Up to 5,100 MB/s

Technical Specifications – Storage

	Logical Blocks	1,000,215,216	
	Operating Temperature	32° to 158°F (0° to 70°C) [ambient temp]	
	Features	Pyrite 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.

SSD 1TB 2280 PCIe-4x4 NVMe Three Layer Cell

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® Gen4 x4 NVMe™

Performance	**Maximum Sequential Read**	**Maximum Sequential Write**
	Up to 7,100 MB/s	Up to 5,200 MB/s

Logical Blocks	2,000,409,264
Operating Temperature	32° to 158°F (0° to 70°C) [ambient temp]
Features	Pyrite 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.

SSD 2TB 2280 PCIe-4x4 NVMe Three Layer Cell

Form Factor	M.2 2280
Capacity	2TB
NAND Type	TLC
Height	0.09 in (2.3 mm)
Width	0.87 in (22 mm)
Weight	0.02 lb (<10 g)
Interface	PCIe® Gen4 x4 NVMe™

Performance	**Maximum Sequential Read**	**Maximum Sequential Write**
	Up to 7,100 MB/s	Up to 5,200 MB/s

Logical Blocks	4,000,797,360
Operating Temperature	32° to 158°F (0° to 70°C) [ambient temp]
Features	Pyrite 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.

256GB PCIe-4x4 2280 NVME Self Encrypted OPAL2 Three Layer Cell Solid State Drive

Form Factor	M.2 2280
Capacity	256 GB
NAND Type	TLC
Height	0.09 in (2.3 mm)
Width	0.87 in (22 mm)

Technical Specifications – Storage

Weight	0.02 lb (<10 g)	
Interface	PCIe® Gen4 x4 NVMe™	
Performance	**Maximum Sequential Read**	**Maximum Sequential Write**
	6,400 MB/s	2,700 MB/s
Logical Blocks	500,118,192	
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.

512GB PCIe-4x4 2280 NVME Self Encrypted OPAL2 Three Layer Cell Solid State Drive		
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® Gen4 x4 NVMe™	
Performance	**Maximum Sequential Read**	**Maximum Sequential Write**
	6,600 MB/s	5,100 MB/s
Logical Blocks	1,000,215,216	
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.

Technical Specifications – Networking

NETWORKING/COMMUNICATION

Intel® Wi-Fi 64 AX201 and Bluetooth® 5.2 802.11ax (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. • WPA3 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

Technical Specifications – Networking

	• 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 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 Off – Radio ON	

HP Integrated Module with Bluetooth 4.0/4.1/4.2/5.0/5.1/5.2 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)

Technical Specifications – Networking

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 Link Topology	Microsoft Windows Bluetooth Software
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

*GbE - 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 access point and Internet service required and sold separately. Availability of public wireless access points limited. Wi-Fi 6 (802.11ax) is backwards compatible with prior 802.11 specs. The specifications for Wi-Fi 6 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.

Intel® Wi-Fi 61 AX201 and Bluetooth 5.2 (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

Technical Specifications – Networking

	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. • WPA3 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

Technical Specifications – Networking

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 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 4.0/4.1/4.2/5.0/5.1/5.2 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 Link Topology	Microsoft Windows Bluetooth Software
Power Management	Microsoft Windows ACPI, and USB Bus Support
Certifications	FCC (47 CFR) Part 15C, Section 15.247 & 15.249

Technical Specifications – Networking

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)

*GbE - 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 access point and Internet service required and sold separately. Availability of public wireless access points limited. Wi-Fi 6 (802.11ax) is backwards compatible with prior 802.11 specs. The specifications for Wi-Fi 6 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.

QuickSpecs

Technical Specifications – Power

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	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.	

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	
	Optional Travel Battery Available	No	

*Actual battery Watt-hours (Wh) will vary from design capacity. Battery capacity will naturally decrease with shelf life, time, usage, environment, temperature, system configuration, loaded apps, features, power management settings and other factors.

QuickSpecs

HP ZBook Studio G8 Mobile Workstation

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®
- US Federal Energy Management Program (FEMP)
- EPEAT□ Gold registered in the United States. See http://www.epeat.net for registration status in your country.
- TCO certified
- China Energy Conservation Program (CECP)
- China State Environmental Protection Administration (SEPA)
- Taiwan Green Mark
- Korea Eco-label
- Japan PC Green label*

Sustainable Impact Specifications

- 15% post-consumer recycled plastic
- External Power Supply 90% Efficiency
- Low halogen
- Outside Box and corrugated cushions are 100% sustainably sourced and recyclable
- Molded Paper Pulp Cushion inside box is 100% sustainably sourced and recyclable
- Bulk packaging available

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 (Short idle)	11.91 W	11.02 W	11.55 W
Normal Operation (Long idle)	1.03 W	1.17 W	1.11 W
Sleep	1.03 W	1.17 W	1.11 W
Off	0.42 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)	41 BTU/hr	38 BTU/hr	40 BTU/hr
Normal Operation (Long idle)	4 BTU/hr	4 BTU/hr	4 BTU/hr
Sleep	4 BTU/hr	4 BTU/hr	4 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.

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Declared Noise Emissions (in accordance with ISO 7779 and ISO 9296)	Sound Power (L_{WAd}, bels)	Sound Pressure (L_{pAm}, decibels)
Typically Configured – Idle	3.1	23
Fixed Disk – Random writes	3.1	24
Optical Drive – Sequential reads	4.8	42

Longevity and Upgrading

This product can be upgraded, possibly extending its useful life by several years. Upgradeable features and/or components contained in the

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

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 is 93.5% recycle-able when properly disposed of at end of life.

Packaging Materials

External:	PAPER/Corrugated	243 g
Internal:	PAPER/paperboard	51 g
	PLASTIC/Polyethylene low density	12 g
	PAPER/Molded pulp	201 g
	PLASTIC/polypropylene	4 g

The plastic packaging material contains at least 60% recycled content.

The corrugated paper packaging materials contains at least 62% recycled content.

RoHS Compliance

HP Inc. complies fully with materials regulations. We were among the first companies to extend the restrictions in the European Union (EU) Restriction of Hazardous Substances (RoHS) Directive to our products worldwide through the HP GSE. HP has contributed to the development of related legislation in Europe, as well as China, India, and Vietnam.

We believe the RoHS directive and similar laws play an important role in promoting industry-wide elimination of substances of concern. We have supported the inclusion of additional substances—including PVC, BFRs, and certain phthalates—in future RoHS legislation that pertains to electrical and electronics products.

We met our voluntary objective to achieve worldwide compliance with the new EU RoHS requirements for virtually all relevant products by July 2013, and we will continue to extend the scope of the commitment to include further restricted substances as regulations continue to evolve.

To obtain a copy of the HP RoHS Compliance Statement, see HP RoHS position statement.

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:

Technical Specifications – Environmental

http://www.hp.com/hpinfo/globalcitizenship/environment/supplychain/gen_specifications.html

- Asbestos
- Certain Azo Colorants
- Certain Brominated Flame Retardants – may not be used as flame retardants in plastics
- Cadmium
- Chlorinated Hydrocarbons
- Chlorinated Paraffins
- Bis(2-Ethylhexyl) phthalate (DEHP)
- Benzyl butyl phthalate (BBP)
- Dibutyl phthalate (DBP)
- Diisobutyl phthalate (DIBP)
- Formaldehyde
- Halogenated Diphenyl Methanes
- Lead carbonates and sulfates
- Lead and Lead compounds
- Mercuric Oxide Batteries
- Nickel – finishes must not be used on the external surface designed to be frequently handled or carried by the user.
- Ozone Depleting Substances
- Polybrominated Biphenyls (PBBs)
- Polybrominated Biphenyl Ethers (PBBEs)
- Polybrominated Biphenyl Oxides (PBBOs)
- Polychlorinated Biphenyl (PCB)
- Polychlorinated Terphenyls (PCT)
- Polyvinyl Chloride (PVC) – except for wires and cables, and certain retail packaging has been voluntarily removed from most applications.
- Radioactive Substances
- Tributyl Tin (TBT), Triphenyl Tin (TPT), Tributyl Tin Oxide (TBTO)

Packaging Usage

HP follows these guidelines to decrease the environmental impact of product packaging:
- Eliminate the use of heavy metals such as lead, chromium, mercury and cadmium in packaging materials.
- Eliminate the use of ozone-depleting substances (ODS) in packaging materials.
- Design packaging materials for ease of disassembly.
- Maximize the use of post-consumer recycled content materials in packaging materials.
- Use readily recyclable packaging materials such as paper and corrugated materials.
- 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.

Technical Specifications – Environmental

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

footnotes

- Percentage of ocean-bound plastic contained in each component varies by product
- Recycled plastic content percentage is based on the definition set in the IEEE 1680.1-2018 standard.
- External power supplies, WWAN modules, power cords, cables and peripherals excluded.
- 100% outer box packaging and corrugated cushions made from sustainably sourced certified and recycled fibers.
- Fiber cushions made from 100% recycled wood fiber and organic materials.

QuickSpecs

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

Type	Description	Part #
Audio	HP UC Speaker Phone	4VW02AA
	HP Thunderbolt Dock Audio Module	3AQ21AA
Memory	HP 4GB 3200MHz DDR4 (pending approval)	286H5AA
	HP 8GB 3200MHz DDR4 (pending approval	286H8AA
	HP 16GB 3200MHz DDR4(pending approval)	286J1AA
Cases	HP 17.3 Business Backpack	2SC67AA
	HP 15.6 Business Top Load	2SC66AA
	HP 17.3 Business Roller Case	2SC68AA
	HP 17.3 Business Slim Top Load	2UW02AA
	HP Prelude Pro Recycle Backpack	1X644AA
	HP Prelude Pro Recycle Top Load	1X645AA
	HP Executive 17.3 Backpack	6KD05AA
	HP Executive 15.6 Top Load	6KD06AA
	HP Executive 15.6 Backpack	6KD07AA
	HP Executive 17.3 Top Load	6KD08AA
	HP Executive 15.6 Leather Top Load	6KD09AA
	HP All in One Carry On Luggage	7ZE80AA
	HP Prelude 15.6 Top Load	1E7D7AA
	HP Prelude 15.6 Backpack	1E7D6AA
	HP Renew Business 17.3 Laptop Backpack	3E2U5AA
	HP Renew Business 17.3 Laptop Bag	3E2U6AA
	HP Renew Business 15.6 Laptop Bag	3E5F8AA
Docking	HP USB-C Dock G5	5TW10AA
	HP TB Dock 230W G2 Cable	3XB95AA
	HP USB-C Mini Dock	1PM64AA
	HP USB-C Travel Hub G2	7PJ38AA
	HP Thunderbolt Dock 230W G2	2UK38AA
	HP TB Dock G2 w/ Combo Cable	3TR87AA
	HP USB-C/A Universal Dock G2	5TW13AA
	HP 4.5mm and USB-C Dock Adapter G2	6LX61AA
	HP TB Dock G2 Combo Cable	3XB96AA
Input/Output - Mice & Keyboard	HP Wireless Rechargeable 950MK Mouse and Keyboard	3M165AA
	HP Slim Wireless Keyboard and Mouse	T6L04AA
	HP Wireless (Link-5) Keyboard	T6U20AA
	HP Wireless Collaboration Keyboard	Z9N39AA
	HP USB Essential Keyboard and Mouse	H6L29AA
	HP Wired Desktop 320MK Mouse and Keyboard	9SR36AA
	HP Comfort Grip Wireless Mouse	H2L63AA
	HP X4000b Bluetooth Mouse	H3T50AA

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

	HP Wired 320M Mouse	9VA80AA
	HP 3-button USB Laser Mouse	H4B81AA
	HP Travel USB Mouse	G1K28AA
	HP Premium Wireless Mouse	1JR31AA
	HP Premium USB Mouse	1JR32AA
	HP Fingerprint Reader USB Mouse	4TS44AA
	HP Travel Bluetooth Mouse	6SP30AA
	HP Presenter Bluetooth Mouse	2CE30AA
	HP Multi-Device 635 Black Wireless Mouse	1D0K2AA
	HP Creator 935 Black Wireless Mouse	1D0K8AA
Power	HP 150W Slim Smart AC Adapter	4SC18AA
	HP 200W Slim Smart AC Adapter	4SC19AA
Adapters	HP USB 3.0 to Gigabit Adapter	N7P47AA
	HDMI to VGA Adapter	H4F02AA
	HP HDMI to DVI Adapter	F5A28AA
	HP USB-C to USB 3.0 Adapter	N2Z63AA
	USB-C to RJ45	V7W66AA
	HP USB-C™ to USB Hub	Z6A00AA
	HP USB-C to VGA Adapter	N9K76AA
	HP USB-C to 4.5mm Adapter	4ST73AA
Storage	HP 1TB TLC PCIe3x4 NVMe M2 SSD	6SK99AA
	HP 2TB TLC PCIe3x4 NVMe M2 SSD	6SL00AA
	HP 256GB PCIe-3x4 NVME M.2 SSD	1D0H6AA
	HP 512GB PCI-e 3x4 NVMe M2 SSD	1D0H7AA
	HP External USB DVDRW Drive	F2B56AA
Security	HP Nano Keyed Cable Lock	1AJ39AA
	HP Sure Key Cable Lock	6UW42AA

Date of change:	Version History:		Description of change:
July 9, 2021	From v1 to v2	**Changed**	PORTS/SLOTS, STORAGE AND DRIVES and NETWORKING/COMMUNICATIONS sections