

### Overview

### HP ZBook Studio G8 Mobile Workstation



#### Top View

- |   |                |
|---|----------------|
| 1. Clickpad   | 6. Speakers    |
| 2. Fingerprint sensor (optional)                                      | 7. Camera      |
| 3. HP Premium backlit Keyboard  | 8. IR Camera   |
| 4. Standard ctrl, fn, Windows, alt, space bar, alt, menu, ctrl layout | 9. Microphones |
| 5. Power button   |                |

### 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)

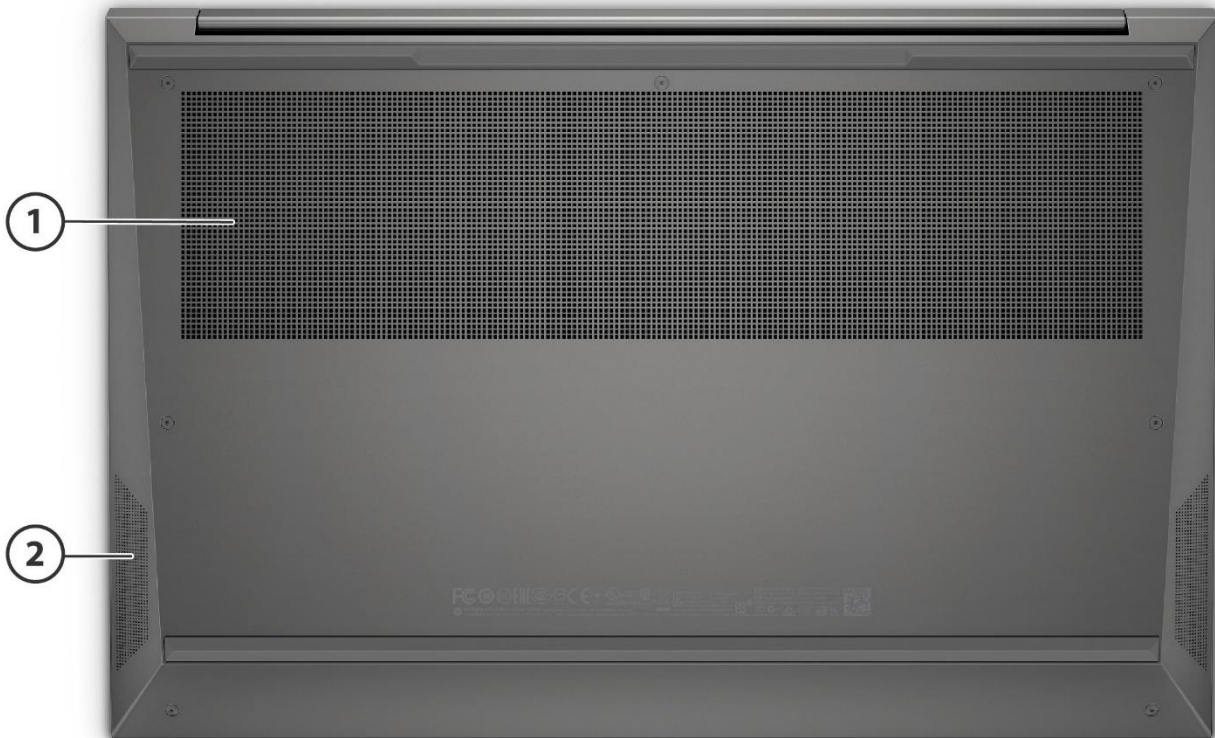
### Overview



#### 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

### 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 11<sup>th</sup> 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

<b>Preinstalled OS</b>	Windows 10 Pro 64 - HP recommends Windows 10 Pro for business. <sup>1</sup> Windows 10 Home 64 <sup>1</sup> Ubuntu 20.04 <sup>2</sup> FreeDOS 3.0
<b>Supported OS<sup>4</sup></b>	Windows 10 64 Enterprise

<sup>1</sup> 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>.

<sup>3</sup> Ubuntu 20.04 is planned to be available in the 2<sup>nd</sup> half of 2020

<sup>4</sup>Support to be tested and documented or web support only.

#### PROCESSOR

11<sup>th</sup> 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; <sup>1,2,3,4,5</sup>

11<sup>th</sup> 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); <sup>1,2,3,4,5</sup>

11<sup>th</sup> 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; <sup>1,2,3,4,5</sup>

11<sup>th</sup> 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);<sup>1,2,3,4</sup>

<sup>1</sup> 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.

<sup>2</sup> Processor speed denotes maximum performance mode; processors will run at lower speeds in battery optimization mode.

<sup>3</sup> 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 order to prioritize performance in DC mode. It can be changed in F10 BIOS settings. See [www.intel.com/technology/turboboost](http://www.intel.com/technology/turboboost) for more information.

<sup>4</sup> 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>.

<sup>5</sup> 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.

<sup>1</sup> 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.

<sup>2</sup> 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 <sup>1,2,3,4,5,6</sup>

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)<sup>2,4,6,7,9</sup>

NVIDIA RTX™ A2000 (4 GB GDDR6 dedicated)<sup>2,4,6,7,9</sup>

NVIDIA RTX™ A3000 (6 GB GDDR6 dedicated)<sup>2,6,8,9</sup>

NVIDIA RTX™ A4000 (8 GB GDDR6 dedicated)<sup>2,6,8,9</sup>

NVIDIA RTX™ A5000 (16 GB GDDR6 dedicated)<sup>2,6,8,9,10</sup>

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

<sup>1</sup> UHD content required to view UHD images.

<sup>2</sup> 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).

<sup>3</sup> 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

<sup>4</sup> HDMI cable Sold Separately

<sup>5</sup> 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.

<sup>6</sup> GPU configurations may be limited to specific GPU/Memory Configurations.

<sup>7</sup> HDMI 2.0 works with Discrete Graphics and drops to HDMI 1.4 with Intel(r) UHD Graphics

<sup>8</sup> miniDP cable sold separately.

<sup>9</sup> 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

<sup>10</sup> NVIDIA Quadro RTX A5000 graphics option available in 2nd half of 2021

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### 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)<sup>2,3,5,6</sup>
- 39.6 cm (15.6") diagonal FHD IPS eDP + PSR anti-glare, 100% sRGB at 400 nits low power (1920 x 1080)<sup>2,3,5,6</sup>
- 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)<sup>1,2,3,5,6,7,8</sup>

#### 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<sup>2,3,5,6,8</sup>

<sup>1</sup> HP Sure View is optional and must be configured at purchase.

<sup>2</sup> UHD content required to view UHD images.

<sup>3</sup> Resolutions are dependent upon monitor capability, and resolution and color depth settings.

<sup>5</sup> Display options may be limited to specific CPU / GPU Configurations.

<sup>6</sup> VESA DisplayHDR 400 certification are pending.

<sup>7</sup> HP Sure View available in 2nd half of 2020.

<sup>8</sup> Actual brightness will be lower with touchscreen or Sure View.

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### Features

#### STORAGE AND DRIVES\*

##### 1 M.2 Storage (PCIe NVMe™ SSD) slot<sup>1</sup>

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

<sup>1</sup>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.

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#### 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<sup>1,2</sup>

Memory soldered down. Supports Dual Channel Memory

<sup>1</sup>Memory is soldered down and not upgradeable

<sup>2</sup>Memory configurations may be limited to specific CPU / GPU Configurations.

### Features

#### NETWORKING/COMMUNICATIONS

##### WLAN

Intel® Wi-Fi 6 AX201 (2x2) and Bluetooth® 5 combo, vPro®<sup>1</sup>  
Intel® Wi-Fi 6 AX201 (2x2) and Bluetooth® 5 combo, non-vPro®<sup>1</sup>

<sup>1</sup>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.

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#### 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<sup>1,2</sup>

720p HD with Temporal Noise Reduction webcam with IR;

<sup>1</sup> HD content required to view HD images.

<sup>2</sup> 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.

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### 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

<sup>1</sup>Only available in the US, and optional

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#### 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<sup>8</sup>

HP Z Central Remote Boost Software<sup>2</sup>

### Features

Native Miracast support<sup>4</sup>  
HP Connection Optimizer<sup>9</sup>  
HP Smart Support<sup>20</sup>

#### Security Management

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

#### 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)<sup>19</sup>  
IR Camera with Windows Hello

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

<sup>2</sup> 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](http://hp.com/ZCentralRemoteBoost).

<sup>4</sup> 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>.

<sup>5</sup> 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

<sup>6</sup> 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.

<sup>8</sup> 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>

<sup>9</sup> HP Connection Optimizer requires Windows 10.

<sup>10</sup> Microsoft Defender Opt in and internet connection required for updates.

<sup>11</sup> HP Manageability Integration Kit can be downloaded from <http://www.hp.com/go/clientmanagement>.

<sup>12</sup> Nano Security lock slot is Lock sold separately.

<sup>13</sup> 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™.

<sup>15</sup> 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.

<sup>16</sup> 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™.

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

<sup>18</sup> HP Sure Sense requires Windows 10 Pro or Enterprise. See product specifications for availability.

<sup>19</sup> HP Fingerprint Sensor is optional.

<sup>20</sup> 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<sup>1</sup>

HP Long Life 6-cell, 83 Wh Li-ion polymer<sup>2,4</sup>

Supports battery HP Fast Charge: approximately 50% in 30 minutes

HP Smart 150 W External AC Power Adapter<sup>3</sup>

HP Slim Smart 200 W External AC Power Adapter

<sup>1</sup> 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.

<sup>2</sup> Supports HP Fast Charge Technology (50% of the charge in 30 minutes)

<sup>3</sup> 150W Power Adapter is not available with NVIDIA RTX Graphics or higher configurations

<sup>4</sup> 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.

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#### ENVIRONMENTAL

ENERGY STAR<sup>®</sup> certified and EPEAT<sup>®</sup> GOLD registered configurations available<sup>1</sup>

Low halogen<sup>2</sup>

<sup>1</sup> Based on US EPEAT<sup>®</sup> registration according to IEEE 1680.1-2018 EPEAT<sup>®</sup>. Status varies by country. Visit [www.epeat.net](http://www.epeat.net) for more information.

<sup>2</sup> 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

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#### PORTS/SLOTS

SD 7.0 Media Reader<sup>1,2</sup>

**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<sup>1,2</sup>

1 HDMI 2.0 connector or 1 miniDP1.4 connector;<sup>3,4</sup>

1 HDMI 2.0<sup>3,4</sup>

**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

<sup>1</sup> SD Media does not come with the device and requires compatible media in order to use the slot.

<sup>2</sup>SD 7.0 supports next generation secure digital and is compatible to SD, SDHC, SDXC media

<sup>3</sup>HDMI 2.0 works with Discrete Graphics and drops to HDMI 1.4 with Intel(r) UHD Graphics

<sup>4</sup>HDMI 2.0 connector is provided with Intel® UHD Graphics and/or NVIDIA Quadro T1 200 or A2000 configurations; miniDP 1.4 connector is provided with NVIDIA Quadro RTX A3000 or higher configurations

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

<sup>1</sup>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



### Features

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 – Displays

#### DISPLAYS

<b>Panel LCD 15.6-in UHD (3840x2160) Anti-Glare WLED UWVA HDR-400 DCI-P3 100percent cg 600nits eDP 1.4+PSR2 ultraslim NB2X</b>	<b>Outline Dimensions (W x H)</b>	350.22 x 216.37(mm) max
	<b>Active Area</b>	344.22 x 193.62 (mm)
	<b>Weight</b>	300g max.
	<b>Diagonal Size</b>	15.6 inch
	<b>Thickness</b>	2.6 (mm) max
	<b>Interface</b>	eDP1.4
	<b>Panel Technology</b>	IPS
	<b>Surface Treatment</b>	Anti-Glare
	<b>Touch enabled</b>	No
	<b>Contrast Ratio</b>	1200:1 (typical)
	<b>Refresh Rate</b>	120 Hz
	<b>Brightness</b>	600 nit typical (Panel Only)
	<b>Pixel Resolution</b>	<b>Pitch</b> 3840 x 2160 (UHD)
	<b>Backlight</b>	LED
	<b>Color Gamut Coverage</b>	DCI-P3 100%
	<b>Color Depth</b>	8 bits + 2 FRC
	<b>Viewing Angle</b>	UWVA 85/85/85/85

<b>Panel LCD 15.6 inch FHD (1920x1080) Anti-Glare WLED UWVA sRGB 100percent cg 400nits eDP 1.4+PSR2 ultraslim Low Power (1W) NWBZ</b>	<b>Outline Dimensions (W x H)</b>	349.46 x 215.9 max.
	<b>Active Area</b>	344.16 x 193.59 typ.
	<b>Weight</b>	310g max
	<b>Diagonal Size</b>	15.6
	<b>Thickness</b>	2.6t max.
	<b>Interface</b>	eDP 1.4
	<b>Surface Treatment</b>	Anti-glare (AG)
	<b>Touch enabled</b>	No
	<b>Contrast Ratio</b>	1200:1 (typ)
	<b>Refresh Rate</b>	60Hz
	<b>Brightness</b>	400nit typ.
	<b>Pixel Resolution</b>	<b>Pitch</b> 1920 x 1080 (FHD)
	<b>Backlight</b>	LED
	<b>Color Gamut Coverage</b>	sRGB 100%
	<b>Color Depth</b>	8bit
	<b>Viewing Angle</b>	UWVA 85/85/85/85

### Technical Specifications – Displays

<b>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)</b>	<b>Outline Dimensions (W x H)</b>	349.52 x 205.39 (mm) max		
	<b>Active Area</b>	344.16 x 193.59 typ.		
	<b>Weight</b>	370g max.		
	<b>Diagonal Size</b>	15.6 (inch)		
	<b>Thickness</b>	2.6mm / 4.5mm max. (PCB)		
	<b>Interface</b>	eDP		
	<b>Surface Treatment</b>	Anti-glare (AG)		
	<b>Touch enabled</b>	No		
	<b>Contrast Ratio</b>	1500:1		
	<b>Refresh Rate</b>	60Hz		
	<b>Brightness</b>	1000nit		
	<b>Pixel Resolution</b>	1920 x 1080		
	<b>Backlight</b>	LED		
	<b>PPI</b>	141		
	<b>Color Gamut Coverage</b>	100% sRGB		
	<b>Color Depth</b>	8 bits		
	<b>Viewing Angle</b>	UWVA 85/85/85/85		
	<b>Panel OLED 15.6 inch UHD (3840x2160) BrightView AMOLED UWVA DCI-P3 100percent cg 400nits eDP+PSR ultraslim NWBZ</b>	<b>Outline Dimensions (W x H)</b>	348.348x216.202 (mm) max	
		<b>Active Area</b>	344.2176 x 193.6224 (mm)	
<b>Weight</b>		200g max.		
<b>Diagonal Size</b>		15.6 (inch)		
<b>Thickness</b>		2.195(mm) max		
<b>Interface</b>		eDP 1.4		
<b>Surface Treatment</b>		Glare (BV)		
<b>Touch enabled</b>		Yes		
<b>Contrast Ratio</b>		100,000:1		
<b>Refresh Rate</b>		60Hz		
<b>Brightness</b>		400nit (Panel Only)*		
<b>Pixel Resolution</b>		<b>Pitch</b>	3840 x 2160 (UHD)	
<b>Backlight</b>		OLED		
<b>Color Gamut Coverage</b>		DCI P3 100%		
<b>Color Depth</b>		8 bits + 2 FRC		
<b>Viewing Angle</b>		UWVA 85/85/85/85		

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

### Technical Specifications – Storage

#### STORAGE AND DRIVES

<b>SSD 256GB 2280 M2 PCIe-3x4 3x4 SS NVMe TLC</b>	<b>Form Factor</b>	M.2 2280		
	<b>Capacity</b>	256 GB		
	<b>NAND Type</b>	TLC		
	<b>Height</b>	0.09 in (2.3 mm)		
	<b>Width</b>	0.87 in (22 mm)		
	<b>Weight</b>	0.02 lb (<10 g)		
	<b>Interface</b>	PCIe® Gen3 x4 NVMe™		
	<b>Form Factor</b>	M.2 2280		
	<b>Performance</b>	<b>Maximum Sequential Read</b>	<b>Maximum Sequential Write</b>	
		2580 MB/s~ 2600 MB/s	1000 MB/s~ 1100 MB/s	
	<b>Logical Blocks</b>	500,118,192		
<b>Operating Temperature</b>	32° to 158°F (0° to 70°C) [ambient temp]			
<b>Features</b>	ATA Security,TRIM; L1.2			
	<b>Note:</b> 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.			

<b>SSD 512GB 2280 PCIe-3x4 NVMe Self Encrypted OPAL2 Three Layer Cell</b>	<b>Form Factor</b>	M.2 2280		
	<b>Capacity</b>	512 GB		
	<b>NAND Type</b>	TLC		
	<b>Height</b>	0.09 in (2.3 mm)		
	<b>Width</b>	0.87 in (22 mm)		
	<b>Weight</b>	0.02 lb (<10 g)		
	<b>Interface</b>	PCIe® Gen3 x4 NVMe™		
	<b>Performance</b>	<b>Maximum Sequential Read</b>	<b>Maximum Sequential Write</b>	
		2800 MB/s~ 2900 MB/s	1000 MB/s~ 1800 MB/s	
	<b>Logical Blocks</b>	1,000,215,215		
	<b>Operating Temperature</b>	32° to 158°F (0° to 70°C) [ambient temp]		
<b>Features</b>	ATA Security (Option); TCG Opal 2.0 ; TRIM; L1.2			
	<b>Note:</b> 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.			

<b>SSD 1TB 2280 PCIe-3x4 NVMe Three Layer Cell single-sided</b>	<b>Form Factor</b>	M.2 2280		
	<b>Capacity</b>	1TB		
	<b>NAND Type</b>	TLC		
	<b>Height</b>	0.09 in (2.3 mm)		
	<b>Width</b>	0.87 in (22 mm)		
	<b>Weight</b>	0.02 lb (<10 g)		
	<b>Interface</b>	PCIe® Gen3 x4 NVMe™		
	<b>Performance</b>	<b>Maximum Sequential Read</b>	<b>Maximum Sequential Write</b>	
		2900 MB/s~ 3000 MB/s	Up to 2000 MB/s	
	<b>Logical Blocks</b>	2,000,409,264		
	<b>Operating Temperature</b>	32° to 158°F (0° to 70°C) [ambient temp]		
<b>Features</b>	ATA Security,TRIM; L1.2			

### Technical Specifications – Storage

**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.

**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

<p><b>Intel® Wi-Fi 64 AX201 and Bluetooth® 5.0 802.11ax (2 x 2) (Supporting gigabit file transfer speeds)** vPro®<sup>1</sup></b></p>	<p><b>Wireless LAN Standards</b></p>	<p>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</p>
	<p><b>Interoperability</b></p>	<p>Wi-Fi certified</p>
	<p><b>Frequency Band</b></p>	<p>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</p>
	<p><b>Data Rates</b></p>	<p>• 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 &amp; 160MHz)          • 802.11ax : MCS0 ~ MCS11, (1SS and 2SS) (20MHz, 40MHz, ,80MHz &amp; 160MHz)</p>
	<p><b>Modulation</b></p>	<p>Direct Sequence Spread Spectrum          OFDM, BPSK, QPSK, CCK, 16-QAM, 64-QAM, 256-QAM , 1024QAM</p>
	<p><b>Security<sup>1</sup></b></p>	<p>• 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</p>
	<p><b>Network Architecture Models</b></p>	<p>Ad-hoc (Peer to Peer)          Infrastructure (Access Point Required)</p>
	<p><b>Roaming</b></p>	<p>IEEE 802.11 compliant roaming between access points</p>
	<p><b>Output Power<sup>2</sup></b></p>	<p>• 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</p>

### Technical Specifications – Networking

<b>Power Consumption</b>	<ul style="list-style-type: none"> <li>• 802.11ac VHT80(5GHz) : +11.5dBm minimum</li> <li>• 802.11ac VHT160(5GHz) : +11.5dBm minimum</li> <li>• 802.11ax HT40(2.4GHz) : +10dBm minimum</li> <li>• 802.11ax VHT160(5GHz) : +10dBm minimum</li> </ul>
<b>Power Management</b>	<ul style="list-style-type: none"> <li>• Transmit mode 2.0 W</li> <li>• Receive mode 1.6 W</li> <li>• Idle mode (PSP) 180 mW (WLAN Associated)</li> <li>• Idle mode 50 mW (WLAN unassociated)</li> <li>• Connected Standby 10mW</li> <li>• Radio disabled 8 mW</li> </ul>
<b>Receiver Sensitivity<sup>3</sup></b>	<p>ACPI and PCI Express compliant power management 802.11 compliant power saving mode</p> <ul style="list-style-type: none"> <li>•802.11b, 1Mbps : -93.5dBm maximum</li> <li>•802.11b, 11Mbps : -84dBm maximum</li> <li>• 802.11a/g, 6Mbps : -86dBm maximum</li> <li>• 802.11a/g, 54Mbps : -72dBm maximum</li> <li>• 802.11n, MCS07 : -67dBm maximum</li> <li>• 802.11n, MCS15 : -64dBm maximum</li> <li>• 802.11ac, MCS0 : -84dBm maximum</li> <li>• 802.11ac, MCS9 : -59dBm maximum</li> <li>•802.11ax, MCS11(HT40): -59dBm maximum</li> <li>•802.11ax, MCS11(VHT160): -58.5dBm maximum</li> </ul>
<b>Antenna Type</b>	<p>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</p>
<b>Form Factor</b>	PCI-Express M.2 MiniCard with CNVi Interface
<b>Dimensions</b>	<p>1. Type 2230 : 2.3 x 22.0 x 30.0 mm 2. Type 1216: 1.67 x 12.0 x 16.0 mm</p>
<b>Weight</b>	<p>1. Type 2230 : 2.8g 2. Type 126: 1.3g</p>
<b>Operating Voltage</b>	3.3v +/- 9%
<b>Temperature</b>	<p>Operating 14° to 158° F (-10° to 70° C) Non-operating -40° to 176° F (-40° to 80° C)</p>
<b>Humidity</b>	<p>Operating 10% to 90% (non-condensing) Non-operating 5% to 95% (non-condensing)</p>
<b>Altitude</b>	<p>Operating Non-operating 0 to 10,000 ft (3,048 m) 0 to 50,000 ft (15,240 m)</p>
<b>LED Activity</b>	LED Amber – Radio Off; LED Off – Radio ON
<b>HP Integrated Module with Bluetooth 4.0/4.1/4.2/5.0/5.1 Wireless Technology</b>	
<b>Frequency Band</b>	2402 to 2480 MHz
<b>Number of Available Channels</b>	<p>Legacy : 0~79 (1 MHz/CH) BLE : 0~39 (2 MHz/CH)</p>
<b>Data Rates and Throughput</b>	<p>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)</p>



### Technical Specifications – Networking

<b>Transmit Power</b>	The Bluetooth component shall operate as a Class II Bluetooth device with a maximum transmit power of + 9.5 dBm for BR and EDR.
<b>Power Consumption</b>	Peak (Tx): 330 mW Peak (Rx): 230 mW Selective Suspend: 17 mW
<b>Bluetooth Software Supported Link Topology</b>	Microsoft Windows Bluetooth Software
<b>Power Management</b>	Microsoft Windows ACPI, and USB Bus Support
<b>Certifications</b>	FCC (47 CFR) Part 15C, Section 15.247 & 15.249
<b>Power Management Certifications</b>	ETS 300 328, ETS 300 826 Low Voltage Directive IEC950 UL, CSA, and CE Mark
<b>Bluetooth Profiles Supported</b>	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)
<b>Security &amp; Manageability</b>	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 5.0 (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

### Technical Specifications – Networking

	IEEE 802.11k IEEE 802.11r IEEE 802.11v
<b>Interoperability</b>	Wi-Fi certified
<b>Frequency Band</b>	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
<b>Data Rates</b>	• 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)
<b>Modulation</b>	Direct Sequence Spread Spectrum OFDM, BPSK, QPSK, CCK, 16-QAM, 64-QAM, 256-QAM , 1024QAM
<b>Security<sup>1</sup></b>	• 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
<b>Network Architecture Models</b>	Ad-hoc (Peer to Peer) Infrastructure (Access Point Required)
<b>Roaming</b>	IEEE 802.11 compliant roaming between access points
<b>Output Power<sup>2</sup></b>	• 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
<b>Power Consumption</b>	• 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
<b>Power Management</b>	ACPI and PCI Express compliant power management 802.11 compliant power saving mode

### Technical Specifications – Networking

<b>Receiver Sensitivity<sup>3</sup></b>	<ul style="list-style-type: none"> <li>• 802.11b, 1Mbps : -93.5dBm maximum</li> <li>• 802.11b, 11Mbps : -84dBm maximum</li> <li>• 802.11a/g, 6Mbps : -86dBm maximum</li> <li>• 802.11a/g, 54Mbps : -72dBm maximum</li> <li>• 802.11n, MCS07 : -67dBm maximum</li> <li>• 802.11n, MCS15 : -64dBm maximum</li> <li>• 802.11ac, MCS0 : -84dBm maximum</li> <li>• 802.11ac, MCS9 : -59dBm maximum</li> <li>• 802.11ax, MCS11(HT40): -59dBm maximum</li> <li>• 802.11ax, MCS11(VHT160): -58.5dBm maximum</li> </ul>				
<b>Antenna Type</b>	<p>High efficiency antenna with spatial diversity, mounted in the display enclosure</p> <p>Two embedded dual band 2.4/5 GHz antennas are provided to the card to support WLAN MIMO communications and Bluetooth communications</p>				
<b>Form Factor</b>	PCI-Express M.2 MiniCard with CNVi Interface				
<b>Dimensions</b>	<ol style="list-style-type: none"> <li>1. Type 2230 : 2.3 x 22.0 x 30.0 mm</li> <li>2. Type 1216: 1.67 x 12.0 x 16.0 mm</li> </ol>				
<b>Weight</b>	<ol style="list-style-type: none"> <li>1. Type 2230 : 2.8g</li> <li>2. Type 126: 1.3g</li> </ol>				
<b>Operating Voltage</b>	3.3v +/- 9%				
<b>Temperature</b>	<table border="0"> <tr> <td>Operating</td> <td>14° to 158° F (-10° to 70° C)</td> </tr> <tr> <td>Non-operating</td> <td>-40° to 176° F (-40° to 80° C)</td> </tr> </table>	Operating	14° to 158° F (-10° to 70° C)	Non-operating	-40° to 176° F (-40° to 80° C)
Operating	14° to 158° F (-10° to 70° C)				
Non-operating	-40° to 176° F (-40° to 80° C)				
<b>Humidity</b>	<table border="0"> <tr> <td>Operating</td> <td>10% to 90% (non-condensing)</td> </tr> <tr> <td>Non-operating</td> <td>5% to 95% (non-condensing)</td> </tr> </table>	Operating	10% to 90% (non-condensing)	Non-operating	5% to 95% (non-condensing)
Operating	10% to 90% (non-condensing)				
Non-operating	5% to 95% (non-condensing)				
<b>Altitude</b>	<table border="0"> <tr> <td>Operating</td> <td>0 to 10,000 ft (3,048 m)</td> </tr> <tr> <td>Non-operating</td> <td>0 to 50,000 ft (15,240 m)</td> </tr> </table>	Operating	0 to 10,000 ft (3,048 m)	Non-operating	0 to 50,000 ft (15,240 m)
Operating	0 to 10,000 ft (3,048 m)				
Non-operating	0 to 50,000 ft (15,240 m)				
<b>LED Activity</b>	LED Amber – Radio OFF; LED White – Radio ON				
<b>HP Integrated Module with Bluetooth 4.0/4.1/4.2/5.0/5.1 Wireless Technology</b>					
<b>Frequency Band</b>	2402 to 2480 MHz				
<b>Number of Available Channels</b>	<p>Legacy : 0~79 (1 MHz/CH)</p> <p>BLE : 0~39 (2 MHz/CH)</p>				
<b>Data Rates and Throughput</b>	<p>Legacy : 3 Mbps data rate; throughput up to 2.17 Mbps</p> <p>BLE : 1 Mbps data rate; throughput up to 0.2 Mbps</p> <p>Legacy : Synchronous Connection Oriented links up to 3, 64 kbps, voice channels</p> <p>Legacy : Asynchronous Connection Less links 2178.1 kbps/177.1 kbps asymmetric (3-DH5) or 864 kbps symmetric (3-EV5)</p>				
<b>Transmit Power</b>	The Bluetooth component shall operate as a Class II Bluetooth device with a maximum transmit power of + 9.5 dBm for BR and EDR.				
<b>Power Consumption</b>	<p>Peak (Tx): 330 mW</p> <p>Peak (Rx): 230 mW</p> <p>Selective Suspend: 17 mW</p>				
<b>Bluetooth Software Supported</b>	Microsoft Windows Bluetooth Software				
<b>Link Topology</b>					
<b>Power Management</b>	Microsoft Windows ACPI, and USB Bus Support				
<b>Certifications</b>	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.

### Technical Specifications – Power

#### POWER

<b>150 Watt Smart Slim AC Adapter</b>	<b>Dimensions</b>	138x66x22mm	
	<b>Weight</b>	unit: 325g +/- 10g	
	<b>Input</b>	<b>Input Efficiency</b>	88% at 115 Vac and 89% at 230Vac
		<b>Input frequency range</b>	47 ~ 63 Hz
		<b>Input AC current</b>	2.7 A at 90 Vac and Maximum Load
	<b>Output</b>	<b>Output power</b>	150W
		<b>DC output</b>	19.5V
		<b>Hold-up time</b>	5ms at 115 Vac input
		<b>Output current limit</b>	<16.0A
	<b>Connector</b>	4.5mm Barrel Type	
	<b>Environmental Design</b>	<b>Operating temperature</b>	32° to 95° F (0° to 35° C)
		<b>Non-operating (storage) temperature</b>	-4° to 185° F (-20° to 85° C)
		<b>Altitude</b>	0 to 16,400 ft (0 to 5,000 m)
		<b>Humidity</b>	5% to 95%
		<b>Storage Humidity</b>	5% to 95%
	<b>EMI and Safety Certifications</b>	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.	

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

### Technical Specifications – Power

<b>Non-operating (storage) temperature</b>	-4° to 185° F (-20° to 85° C)
<b>Altitude</b>	0 to 16,400 ft (0 to 5000m)
<b>Humidity</b>	5% to 95%
<b>Storage Humidity</b>	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

<b>HP 6-cell Long Life Li-Ion (83 WHr)*</b>	<b>Dimensions (H x W x L)</b>	7.78x71.05x316.1 mm (0.306 x 2.797 x 12.44 inch)	
	<b>Weight</b>	0.305kg(0.67lb)	
	<b>Cells/Type</b>	3cell Lithium-Ion Polymer cell	
	<b>Energy</b>	Voltage	11.58V
		Amp-hour capacity	7.17Ah / 6.88Ah
		Watt-hour capacity	83Wh
	<b>Temperature</b>	Operating (Charging)	32° to 113° F (0° to 45° C)
		Operating (Discharging)	14° to 122° F (-10° to 60° C)
	<b>Fuel Gauge LED</b>	NA	
	<b>Warranty</b>	1-year	
	<b>Optional Travel Battery Available</b>	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.



### 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<sup>™</sup> 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.

### Technical Specifications – Environmental

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

Sound Power  
( $L_{WAd}$ , bels)

Sound Pressure  
( $L_{pAm}$ , decibels)

Typically Configured – Idle  
Fixed Disk – Random writes  
Optical Drive – Sequential reads

3.1  
3.1  
4.8

23  
24  
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](http://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

<b>External:</b>	PAPER/Corrugated	243 g
<b>Internal:</b>	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](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.

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

Type	Description	Part #
<b>Audio</b>	HP UC Speaker Phone	4VW02AA
	HP Thunderbolt Dock Audio Module	3AQ21AA
<b>Memory</b>	HP 4GB 3200MHz DDR4 (pending approval)	286H5AA
	HP 8GB 3200MHz DDR4 (pending approval)	286H8AA
	HP 16GB 3200MHz DDR4( pending approval)	286J1AA
<b>Cases</b>	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	
<b>Docking</b>	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	
<b>Input/Output - Mice &amp; Keyboard</b>	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
<b>Power</b>	HP 150W Slim Smart AC Adapter	4SC18AA
	HP 200W Slim Smart AC Adapter	4SC19AA
<b>Adapters</b>	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
<b>Storage</b>	HP 1TB TLC PCIe3x4 NVMe M2 SSD	6SK99AA
	HP 2TB TLC PCIe3x4 NVMe M2 SSD	6SL00AA
	HP 256GB PCIe-3x4 NVME M.2 SSD	1DOH6AA
	HP 512GB PCI-e 3x4 NVMe M2 SSD	1DOH7AA
	HP External USB DVDRW Drive	F2B56AA
<b>Security</b>	HP Nano Keyed Cable Lock	1AJ39AA
	HP Sure Key Cable Lock	6UW42AA

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Date of change:	Version History:		Description of change:
	From v1 to v2		