

### Overview

### HP ZBook Studio G10 Mobile Workstation PC



#### Right

1. Ambient Light Sensor (Optional)
2. Top Facing Microphone (2)
3. Webcam LED
4. IR Camera
5. HD Camera
6. IR Camera LEDs
7. Clickpad
8. Camera Privacy Key
9. Nano Security Lock slot
10. Super Speed USB Type-A 5Gbps signaling rate (charging)
11. SuperSpeed USB Type-C® 10Gbps signaling rate (Power Delivery Out, Display Out)
12. microSD 7.1 media card reader
13. Woofer
14. Fingerprint Sensor (Optional)
15. Speakers

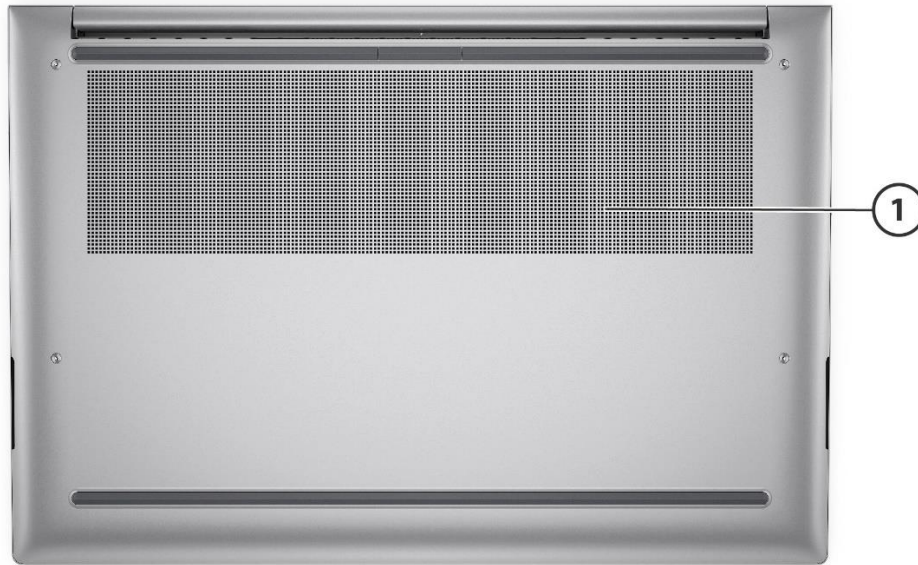
### Overview



#### Left

1. Power Charging indicator
2. Power connector
3. (2) Thunderbolt™ 4 with USB4™ Type-C® 40Gbps signaling rate (USB Power Delivery, DisplayPort™ 1.4, HP Sleep and Charge)
4. headphone/microphone combo
5. Woofer

### Overview



### Bottom

1. Fan Venting
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### Overview

#### At A Glance

- Your multi-tasking and productivity with up to Intel vPro® with 13th Gen Intel® Core™ i9 processor designed to handle complex, multithreaded apps.
- DDR5 5600MHz and 4800MHz SODIMM memory and PCIe Gen4 SSDs provide fast access to your work
- Tackle your biggest projects with a choice of up to NVIDIA RTX™ 4000 Ada Laptop GPU or GeForce RTX™ 4080 Laptop GPU; certified for pro apps.
- Accelerate your workflow. Power through projects with up to 64 GB RAM for fast rendering, editing, and visual effects performance.
- Used to working on a Mac? Now you can choose the Z Command Keyboard, which replicates a Mac layout, for a seamless switch.
- Preinstalled with Ubuntu 22.04 or FreeDOS
- Choice of displays:
  - 40.6 cm (16") diagonal, 4K WQUXGA (3840 x 2400), 120 Hz, IPS, anti-glare, 500 nits, 100% DCI-P3, HP DreamColor
  - 40.6 cm (16") diagonal, 4K WQUXGA (3840 x 2400), OLED, multitouch-enabled, UWVA, BrightView, Corning® Gorilla® Glass 5, Low Blue Light, 400 nits, 100% DCI-P3
  - 40.6 cm (16") diagonal, WUXGA (1920 x 1200), IPS, narrow bezel, anti-glare, Low Blue Light, 400 nits, low power, 100% sRGB
  - 40.6 cm (16") diagonal, WUXGA (1920 x 1200), IPS, anti-glare, 1000 nits, 72% NTSC, HP Sure View Reflect integrated privacy screen
- HP RGB Keyboard with Z Light Space
- HP Vaporforce Thermals including new curved metal blade design
- HP Long Life 6-cell, 86 Wh polymer battery with HP Fast Charge; Charge 50% battery life in 30 minutes of charging
- Undergoes 21 MIL-STD 810H tests
- HP Presence, a portfolio of conferencing and collaboration solutions for people to truly work together and feel connected
- Designed to support all HP docking options including the HP Thunderbolt 280W G4 Dock w/Combo Cable

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

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### Features

#### OPERATING SYSTEM

<b>Preinstalled OS</b>	Windows 11 Pro - HP recommends Windows 11 Pro <sup>2</sup> Windows 11 Home - HP recommends Windows 11 Pro <sup>2</sup> Windows 11 Pro (preinstalled with Windows 10 Pro Downgrade) <sup>2,3</sup> Ubuntu 22.04 <sup>4</sup> FreeDOS 3.0
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<sup>2</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 is automatically updated and enabled. High speed internet and Microsoft account required. ISP fees may apply and additional requirements may apply over time for updates. See <http://www.windows.com>.

<sup>3</sup> This system is preinstalled with Windows 10 Pro software and also comes with a license for Windows 11 Pro software and provision for recovery software. You may only use one version of the Windows software at a time. Switching between versions will require you to uninstall one version and install the other version. You must back up all data (files, photos, etc.) before uninstalling and installing operating systems to avoid loss of your data.

<sup>4</sup> For detailed Linux® OS/hardware support information, see: [http://www.hp.com/linux\\_hardware\\_matrix](http://www.hp.com/linux_hardware_matrix)

**NOTE:** Your product does not support Windows 8 or Windows 7. 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>. A full list of HP products and the Windows 10 versions tested is available on the HP support website. <https://support.hp.com/us-en/document/c05195282>

#### PROCESSOR

13<sup>th</sup> Generation Intel® Core™ i9-13900H with Intel® UHD Graphics (1.9 GHz E-core base frequency, 2.6 GHz P-core base frequency, up to 4.1 GHz E-core Max Turbo frequency, up to 5.4 GHz P-core Max Turbo frequency, 24 MB cache, 6 P-cores and 8 E-cores, 20 threads) supports Intel® vPro® Technology <sup>1,2,3,4,5</sup>

13<sup>th</sup> Generation Intel® Core™ i7-13800H with Intel® UHD Graphics (1.8 GHz E-core base frequency, 2.5 GHz P-core base frequency, up to 4 GHz E-core Max Turbo frequency, up to 5.2 GHz P-core Max Turbo frequency, 24 MB cache, 6 P-cores and 8 E-cores, 20 threads) supports Intel® vPro® Technology <sup>1,2,3,4,5</sup>

13<sup>th</sup> Generation Intel® Core™ i7-13700H with Intel® UHD Graphics (1.8 GHz E-core base frequency, 2.4 GHz P-core base frequency, up to 3.7 GHz E-core Max Turbo frequency, up to 5.0 GHz P-core Max Turbo frequency, 24 MB cache, 6 P-cores and 8 E-cores, 20 threads)<sup>1,2,3,4</sup>

13<sup>th</sup> Generation Intel® Core™ i5-13600H with Intel® UHD Graphics (2.1 GHz E-core base frequency, 2.8 GHz P-core base frequency, up to 3.6 GHz E-core Max Turbo frequency, up to 4.8 GHz P-core Max Turbo frequency, 18 MB cache, 6 P-cores and 8 E-cores, 16 threads) supports Intel® vPro® Technology <sup>1,2,3,4,5</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. 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>.

### Features

<sup>5</sup> Intel vPro® requires Windows 10 Pro 64 bit or higher, a vPro supported processor, vPro enabled chipset, vPro enabled wired LAN and/or Wi-Fi 6E WLAN and TPM 2.0. Some functionality requires additional 3rd party software in order to run. Features of vPro® Essentials and Enterprise vary. See <http://intel.com/vpro>

### Features

#### CHIPSET

Integrated with processor

#### INTEL® CORE™ i5 WITH VPRO®/CORE™ i7 WITH VPRO®/ CORE™ i9 WITH VPRO® TECHNOLOGY CAPABLE

Intel® Core™ i5 with vPro®, Intel® 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>1,2</sup>

<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> Intel vPro® requires Windows 10 Pro 64 bit or higher, a vPro supported processor, vPro enabled chipset, vPro enabled wired LAN and/or Wi-Fi 6E WLAN and TPM 2.0. Some functionality requires additional 3rd party software in order to run. Features of vPro® Essentials and Enterprise vary. See <http://intel.com/vpro>

#### GRAPHICS

##### Integrated

Intel® UHD Graphics<sup>1,2,3,4</sup>

##### Discrete<sup>2,5,6,7,8,9</sup>

NVIDIA RTX 4000 Ada Generation Laptop GPU (12 GB DDR5 dedicated)

NVIDIA RTX 3000 Ada Generation Laptop GPU (8 GB DDR5 dedicated)

NVIDIA RTX 2000 Ada Generation Laptop GPU (8 GB DDR5 dedicated)

NVIDIA RTX A1000 6GB Laptop GPU (6 GB DDR5 dedicated)

NVIDIA GeForce RTX® 4080

NVIDIA GeForce RTX® 4070

##### Supports

Support HD decode, DX12, HDMI 2.0b, HDCP 2.3<sup>3</sup>

<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 2.0, HDCP 2.3 via DP up to 4K @ 60Hz and via HDMI up to 4K @ 60Hz

<sup>4</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>5</sup> NVIDIA dGPU: Support HD decode, DX12, Multi-Function USB-C port, DP 1.4, HDCP 2.3, DP max resolution up to 5K@60Hz and 8K@60Hz (With DSC), HDMI 2.1 support up to 4K@60Hz and 8K@60Hz (with DSC and FRL).

### Features

<sup>6</sup> Discrete configurations support 4 independent displays (both Intel and NVIDIA Graphic cards, DIS mode need to close lid or only 3 displays max are supported externally. Max. resolution = 4K@60Hz (Type-C output port using a Type C-to-DP adapter), 4K@60Hz (Type-C output port using a Type C-to-DP adapter), or 4K @60Hz (mDP1) & 4K @60Hz (HDMI).

<sup>7</sup> GPU configurations may be limited to specific GPU/Memory Configurations

<sup>8</sup> Intel GPU and NVIDIA® RTX A1000 Laptop GPU: Support HD decode, DX12, Multi-Function USB-C port, DP 1.4, HDCP 2.3, DP max resolution up to 5K@60Hz and 8K@60Hz (With DSC), HDMI 2.1 support up to 4K@60Hz and 8K@60Hz (with DSC and FRL)

<sup>9</sup> MiniDP cable sold separately and If both DP streams are used by Type-C ports, Mini-DP is inactive on RTX A1000 and 2000 Ada SKUs as HW limitation.

### DISPLAY

#### Non-touch

- 16.0" WQUXGA DreamColor (3840 x 2400) Anti-Glare UWVA LED DCI-P3 NB2Y 500 eDP1.4 w/o PSR 100 120Hz bent LCD Panel<sup>1,3,6,8</sup>
- 16.0" WUXGA (1920 x 1200) Anti-Glare UWVA WLED+LBL sRGB NB2Y 400 eDP 1.4+PSR2 Low-Power 100 bent LCD Panel<sup>1,3,6,8</sup>
- 16.0" WUXGA (1920 x 1200), IPS, anti-glare, 1000 nits, 72% NTSC, HP Sure View Reflect integrated privacy screen<sup>1,3,5,6,7,8</sup>

#### Touch

- 16.0" WQUXGA (3840 x 2400) BrightView UWVA DCI-P3 NBZ2 400 eDP 1.4+PSR 100 bent OLED Panel<sup>1,3,5,6,8</sup>

#### DisplayPort™ 1.4

#### Displays support

Supports up to 4 displays through the HP Thunderbolt 280W G4 Dock

#### Display Size

16.0"  
40.64 cm (16")

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

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

<sup>5</sup>Actual brightness will be lower with touchscreen or Sure View.

<sup>6</sup>UHD content required to view UHD images.

<sup>8</sup>Display options may be limited to specific CPU / GPU Configurations.



### Features

#### DOCKING

<b>Docking station model #1</b>	HP Thunderbolt 280W G4 Dock w/Combo Cable
<b>Total number of supported displays (incl.the notebook display)</b>	4
<b>Max.resolutions supported</b>	Dual 4K @30Hz or dual 4K UHD @ 60Hz is supported Single 8K@ 30Hz (multiple tiles) for Thunderbolt hosts Non-TBT hosts DP 1.4 in high res mode(1) 8K video single cable@30Hz
<b>Dock Connectors</b>	2xDP, 1xVGA, 1xTB, 1xUSB-C alt-mode
<b>Technical limitations</b>	Thunderbolt Hosts: Maximum of (4) displays with maximum resolution of 5K@ 30Hz running Thunderbolt host. Max resolution possible is dual 8K displays @ 60Hz running Thunderbolt host or running a non-Thunderbolt host in High Resolution mode @30Hz Non-Thunderbolt hosts: The highest resolution for dual displays running a non-Thunderbolt host in multi-function mode is (1) 5K dual cable (using both DP ports) +(1) 4K on USB-C DP port Non-Thunderbolt hosts support (3) displays with a max resolution of: (2) 5K single cable + (1) 4K UHD @ 60 Hz in high resolution mode. In multi-function mode the maximum resolution for (3) displays is (2) 5K single cable @ 30Hz + (1) 4K UHD @ 30Hz.

### Features

#### STORAGE AND DRIVES\*

**Maximum Storage**

4 TB PCIe Gen4x4 M.2

**PCIe® NVMe™ M.2 2280 Storage**

4 TB PCIe® Gen4x4 NVMe™ M.2 SSD TLC

2 TB PCIe® Gen4x4 NVMe™ M.2 SSD TLC

1 TB PCIe® Gen4x4 NVMe™ M.2 SSD TLC

512 GB PCIe® Gen4x4 NVMe™ M.2 SSD TLC

1 TB PCIe® Gen4x4 NVMe™ SED SSD

512 GB PCIe® Gen4x4 NVMe™ SED SSD

**DRIVE CONTROLLERS**

M.2 Storage Bay (PCIe NVMe): PCIe® Gen4 x4 lanes NVMe™ Solid State Drive

\* 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.

**NOTE:** SSD/SODIMM will be CSR-B

#### DRIVE CONTROLLERS

M.2 Storage Bay (PCIe NVMe)

RAID:

PCIe® Gen4 x4 lanes NVMe™ Solid State Drive

Not supported

#### MEMORY

**Maximum Memory**

64 GB DDR5-4800 non-ECC SODIMM

64 GB DDR5-5600 non-ECC SODIMM

RAM Support – 16GB, 32GB, 64GB

**Memory**

16GB (2x8GB) DDR5 4800

32GB (2x16GB) DDR5 4800

64GB (2x32GB) DDR5 4800

16GB (2x8GB) DDR5 5600

32GB (2x16GB) DDR5 5600

64GB (2x32GB) DDR5 5600

**Memory Slots**

2 SODIMM

1 DIMM per channel; support up to 5600MHz

DDR5 5600 SODIMMS, system runs at 5200MT/s

Supports Dual Channel Memory

**NOTE:** Due to the non-industry standard nature of some third-party memory modules, we recommend HP branded memory to ensure compatibility. If you mix memory speeds, the system will perform at the lower memory speed.

**NOTE:** SSD/SODIMM requires low to moderate technical skills required to replace

**NOTE:** FreeDOS is limited to 32GB MAX ex-factory. Customer can add RAM, but should not uninstall their FreeDOS rev., but can upgrade.

### Features

#### NETWORKING/COMMUNICATIONS

##### WLAN<sup>1</sup>

Intel® Wi-Fi CERTIFIED 6E AX211 (2x2) and Bluetooth® 5.3 wireless card, vPro®

Intel® Wi-Fi CERTIFIED 6E AX211 (2x2) and Bluetooth® 5.3 wireless card, non-vPro®

<sup>1</sup>Wi-Fi 6E requires a Wi-Fi 6E router, sold separately, and Windows 11 to function in the 6GHz band. Availability of public wireless access points limited. Wi-Fi 6E is backwards compatible with prior 802.11 specs. And available in countries where Wi-Fi 6E is supported.

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#### AUDIO/MULTIMEDIA

##### Audio

Audio by Bang & Olufsen, Quad-speaker audio (2 tweeters & 2 woofers), 2 Top Facing Microphone dual array digital microphones, functions keys for volume up and down, combo microphone/headphone jack, HD audio with 200Hz Bass Roll off

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

720p HD IR camera

<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 RGB Z Command Keyboard – spill-resistant, per-key RGB backlit keyboard and DuraKeys

HP Premium Quiet Keyboard – spill-resistant, backlit keyboard and DuraKeys

**NOTE:** RGB will only function after Zlight Space is activated

**NOTE:** Ubuntu will not function with RGB as Zlight Space is WinApp. No Ubuntu support

##### Pointing Devices

Clickpad with image sensor and glass surface supporting multi-touch gestures and taps

##### Function Keys

ESC: system information

F1 – Display Switching

F2 – Blank or Privacy

F3 – Brightness Down

F4 – Brightness Up

F5 – Audio Mute

F6 – Volume Down

F7 – Volume Up

F8 – Mic Mute

F9 – Blank or Backlight Toggle (for backlit keyboard)

F10 – Insert

F11 – Airplane Mode

F12 – Camera Privacy Key

Power Button (with LED)

delete

##### Hidden Keys

home

end

Fn+R – Break

Fn+S – Sys Rq

Fn+C – Scroll Lock

Fn+left/right arrow

Privacy Key

\*HP RGB Z Command Keyboard only available in the US, UK, France, and Germany. Not available with Privacy Panel.

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#### SOFTWARE AND SECURITY

##### Software

HP Easy Clean<sup>28</sup>

HP PC Hardware Diagnostics Windows

Touchpoint Customizer for Commercial

myHP app

HP Smart Support<sup>19</sup>

HP Mac Address Manager

HP Hotkey Support

HP Support Assistant<sup>1</sup>

HP Notifications

HP Privacy Settings

HP Power Manager<sup>5</sup>

Buy Microsoft Office (Sold separately)

Bing search for IE11

HP Noise Cancellation Software

### Features

Native Miracast support<sup>2</sup>  
HP Z Light Space<sup>31</sup>  
Data Science Stack<sup>32</sup>  
HP Services Scan<sup>33</sup>  
Battery Health Manager<sup>18</sup>

#### Manageability Features

HP Connect for Microsoft Endpoint Manager<sup>21</sup>  
HP Image Assistant Gen5 (download)  
HP Manageability Integration Kit (download)<sup>8</sup>  
HP Client Management Script Library (download)  
HP Patch Assistant (download)<sup>22</sup>  
HP Driver Packs (download)<sup>30</sup>  
HP Cloud Recovery<sup>23</sup>  
HP Client Catalog (download)

#### Security Management

##### HP Wolf Security for Business<sup>24</sup> includes:

HP Sure Click<sup>25</sup>  
HP Sure Sense<sup>16</sup>  
HP Sure Run Gen5<sup>26</sup>  
HP Sure Recover Gen5<sup>10</sup>  
HP Sure Start Gen7<sup>12</sup>  
HP Tamper Lock<sup>6</sup>  
HP Sure Admin<sup>14</sup>  
HP Client Security Manager Gen7<sup>15</sup>  
HP Device Access Manager  
HP Power On Authentication  
Master Boot Record security  
Pre-boot authentication  
Windows Defender  
Microsoft Bitlocker Encryption  
Nano Security Lock Slot<sup>9</sup>  
Wolf Pro Security<sup>29</sup>

#### BIOS

HP BIOSphere Gen6<sup>3</sup>  
HP Secure Erase<sup>13</sup>  
Absolute Persistence Module<sup>4</sup>  
HP DriveLock & Automatic DriveLock  
BIOS Update via Network  
HP Wake on WLAN  
Fingerprint Sensor (select models)<sup>27</sup>  
Secured-Core PC Enable<sup>17</sup>  
Trusted Platform Module TPM 2.0 Embedded Security Chip

#### BIOS Version

ISO/IEC 19678: 2015 (formerly NIST 800-147) compliant  
UEFI version: 2.7  
UEFI Class 3

#### TPM

Model: Infineon SLB9672 or STMicroelectronics ST33HTPH2X32AHE4  
Version: 2.0  
Revision: 1.38  
FIPS 140-2 Compliant: Yes with Convert TPM to 2.0 (FIPS 140-2) option

### Features

#### 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>27</sup>

<sup>1</sup> HP Support Assistant requires Windows and Internet access.

<sup>2</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>3</sup> HP BIOSphere Gen6 features may vary depending on the platform and configurations.

<sup>4</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>5</sup> HP Power Manager requires Windows 10 and higher and can be downloaded from the Microsoft Store.

<sup>6</sup> HP Tamper Lock must be enabled by the customer or your administrator.

<sup>7</sup> Microsoft Defender Opt in and internet connection required for updates.

<sup>8</sup> HP Manageability Integration Kit can be downloaded from <https://ftp.ext.hp.com/pub/caps-softpaq/cmit/HPMIK.html>.

<sup>9</sup> Nano Security lock slot is Lock sold separately.

<sup>10</sup> HP Sure Recover Gen5 is available on select HP PCs and requires Windows 10 and an open network connection. You must back up important files, data, photos, videos, etc. before using HP Sure Recover to avoid loss of data. Network based recovery using Wi-Fi is only available on PCs with Intel Wi-Fi Module

<sup>11</sup> HP Sure Recover with Embedded Reimaging Gen3 is an optional feature which must be configured at purchase with a base unit that has the On System Recovery (OSR) module. See product specifications for availability. You must back up important files, data, photos, videos, etc. before use to avoid loss of data. HP Sure Recover with Embedded Reimaging (Gen1) does not support platforms with Intel® Optane™.

<sup>12</sup> HP Sure Start Gen 7 is available on select HP PCs and workstations. See product specifications for availability.

<sup>13</sup> Secure Erase – 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>14</sup> HP Sure Admin requires Windows 11, HP BIOS, HP Manageability Integration Kit from <http://www.hp.com/go/clientmanagement> and HP Sure Admin Local Access Authenticator smartphone app from the Android or Apple store.

<sup>15</sup> HP Client Security Manager Gen7 requires Windows and is available on select HP Pro, Elite and ZBook PCs. See product specifications for details.

<sup>16</sup> HP Sure Sense is available on select HP PCs with Windows 10 Pro, Windows 10 Enterprise, Windows 11 Pro, or Windows 11 Enterprise OS.

<sup>17</sup> Secured-core PC requires an Intel® vPro® or AMD Ryzen™ Pro processor. Requires 8 GB or more system memory. Secured-core PC functionality can be enabled from the factory.

<sup>18</sup> Depending on the version available for your device and the setting you select, HP Battery Health Manager (BHM) will use a proprietary set of algorithms to optimize battery health during the life of the battery. New Commercial Notebooks come equipped with BHM set to “Let HP Manage My Battery Health” as the default. This setting will reduce charge capacity over time to optimize battery health and mitigate factors that can accelerate battery degradation. As a result of this reduction, battery runtime will decrease over time as available charge capacity is reduced. HP may, at any time, update HP Battery Health Manager to improve available settings, functionality, and performance. Refurbished products may have customized default settings to optimize user experience. For additional information on updating or modifying HP Battery Health Manager settings, please go to [HP.COM/SUPPORT/BATTERY](http://HP.COM/SUPPORT/BATTERY).

<sup>19</sup> HP Smart Support requires HP TechPulse to be installed. For more information about how to enable or to download HP Smart Support, please visit <http://www.hp.com/smart-support>.

<sup>21</sup> HP Connect for Microsoft Endpoint Manager is available from the Azure Market Place for HP Pro, Elite, Z and Point-of-Sale PCs managed with Microsoft Endpoint Manager. Subscription to Microsoft Endpoint Manager required and sold separately. Network connection required.

### Features

- <sup>22</sup> HP Patch Assistant available on select HP PCs with the HP Manageability Kit that are managed through Microsoft System Center Configuration Manager. HP Manageability Integration Kit can be downloaded from <http://www8.hp.com/us/en/ads/clientmanagement/overview.html>.
- <sup>23</sup> HP Cloud Recovery is available for Z by HP, HP Elite and Pro desktops and laptops PCs with Intel® or AMD processors and requires an open, wired network connection. **NOTE:** You must back up important files, data, photos, videos, etc. before use to avoid loss of data. Detail please refer to: <https://support.hp.com/us-en/document/c05115630>.
- <sup>24</sup> HP Wolf Security for Business requires Windows 10 or higher, includes various HP security features and is available on HP Pro, Elite, RPOS and Workstation products. See product details for included security features.
- <sup>25</sup> HP Sure Click requires Windows 10 Pro or higher or Enterprise. See [https://bit.ly/2PrLT6A\\_SureClick](https://bit.ly/2PrLT6A_SureClick) for complete details.
- <sup>26</sup> HP Sure Run Gen5 is available on select HP PCs and requires Windows 10 and higher.
- <sup>27</sup> HP Fingerprint Reader is an optional feature that requires Windows 10 IoT and must be configured at purchase.
- <sup>28</sup> HP Easy Clean requires Windows 10 RS3 and higher and will disable the keyboard, touchscreen, and clickpad only. Ports are not disabled. See user guide for cleaning instructions.
- <sup>29</sup> HP Wolf Pro Security Edition is available preloaded on select SKUs, and, depending on the HP product purchased, includes a license with a term length communicated to you at purchase and in your order confirmation email. The HP Wolf Pro Security Edition software is licensed under the license terms of the HP Wolf Security Software – End-User license Agreement (EULA) that can be found at: [https://support.hp.com/us-en/document/ish\\_3875769-3873014-16](https://support.hp.com/us-en/document/ish_3875769-3873014-16) as that EULA is modified by the following: 7. Term. Unless otherwise terminated earlier pursuant to the terms contained in this EULA, the license for the HP Wolf Pro Security Edition is effective upon 4 months after the date the HP Product was shipped by HP and will continue for the term communicated to you at purchase and in your order confirmation email (“Initial Term”). At the end of the Initial Term you may either (a) purchase a renewal license for the HP Wolf Pro Security Edition from HP.com, HP Sales or an HP Channel Partner, or (b) continue using the standard versions of HP Sure Click and HP Sure Sense at no additional cost with no future software updates or HP Support. Notwithstanding the foregoing, the license shall expire no later than one year after the fixed term of the subject license ends.
- <sup>30</sup> HP Driver Packs not preinstalled, however available for download at <http://www.hp.com/go/clientmanagement>.
- <sup>31</sup> Optional feature that requires RGB keyboard at hardware purchase.
- <sup>32</sup> Available on select skus only.
- <sup>33</sup> HP Services Scan is provided with Windows Update on select products and will check entitlement on each hardware device to determine if an HP TechPulse-enabled service has been purchased, and will download applicable software automatically. HP TechPulse is a telemetry and analytics platform that provides critical data around devices and applications. For full system requirements or to disable this feature, please visit <http://www.hpdaas.com/requirements> . Not applicable in China.

### Features

#### POWER

##### Power Supply

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

HP Slim Smart 200W External Right Angle AC Power Adapter

##### Battery

HP XL-Long Life 86Whr Polymer Fast Charge 6 cell<sup>4</sup>

##### Battery Recharge Time

Supports battery HP fast charge: approximately 50% in 30 minutes<sup>2</sup>

##### Battery life<sup>1</sup>

Up to 19:36 hrs (UMA, Intel H, 400 nits, 2\*4GB, 512GB SSD)

<sup>1</sup> MM18 battery life will vary depending on various factors including product model, configuration, loaded applications, features, use, wireless functionality, and power management settings. The maximum capacity of the battery will naturally decrease with time and usage. See [www.bapco.com](http://www.bapco.com) for additional details.

<sup>2</sup> Recharge up to 50% within 30 minutes when the system is off or in standby mode. Power adapter with a minimum capacity of 65 watts is required. After charging has reached 50% capacity, charging will return to normal. Charging time may vary +/- 10% due to System tolerance.

<sup>3</sup> 150W Power Adapter is not available in India

<sup>4</sup> For new batteries, actual battery Watt-hours (Wh) may differ from the design capacity and may have a full charge capacity that differs by up to 10, which is typical for lithium-ion batteries. Battery capacity naturally decreases over time and with use, depending on several factors such as battery health management settings, shelf life, temperature, environment, loaded apps, features, system configuration, and power settings.

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#### ENVIRONMENTAL

ENERGY STAR® certified

EPEAT® Gold in the U.S. <sup>1</sup>

Low halogen<sup>2</sup>

<sup>1</sup> Based on US EPEAT® registration according to IEEE 1680.1-2018 EPEAT®. EPEAT® 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)**

35.6 x 24.2 x 1.9 cm (non-touch)

14.02 x 9.54 x 0.76 in (non-touch)

35.6 x 24.2 x 1.8 cm (touch)

14.02 x 9.54 x 0.72 in (touch)

**Weights\***

Starting Weight: 3.81 lbs (1.73kg)

Weight varies by configuration and components.

\*Weight will vary by configuration. Does not include power adapter.

#### PORTS/SLOTS

**Expansion Slots**

MicroSD SD7.1 supports next generation secure digital and is compatible to SD, SDHC, SDXC, SDUC media

**Left side**

1 power connector

2 Thunderbolt™ 4 with USB4™ Type-C® 40Gbps signaling rate (USB Power Delivery, DisplayPort™ 1.4, HP Sleep and Charge)

1 headphone/microphone combo

**Right side**

1 SuperSpeed USB Type-A 5Gbps signaling rate (charging)

1 SuperSpeed USB Type-C® 10Gbps signaling rate (USB Power Delivery, DisplayPort™ 1.4) \*

1 nano security lock slot

\* Multi-Function USB-C port works with Discrete Graphics and Intel® Iris Xe Graphics.

#### SERVICE AND SUPPORT

1-year warranty and 90-day software limited warranty options depending on country. Batteries have a default 1-year limited warranty except for HP Long Life batteries which will follow the one warranty of the platform. Refer to <http://www.hp.com/support/batterywarranty/> for additional battery information. On-site service and extended coverage is also available. HP Care Pack Services are optional extended service contracts that go beyond the 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> HP Care Packs are sold separately. 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. For details, visit <http://www.hp.com/go/cpc>. HP services are governed by the applicable HP terms and conditions of service provided or indicated to Customer at the time of purchase. Customer may have additional statutory rights according to applicable local laws, and such rights are not in any way affected by the HP terms and conditions of service or the HP Limited Warranty provided with your HP Product.

#### SYSTEM UNIT

<b>Stand-Alone Power Requirements (AC Power)</b>	<b>Nominal Operating Voltage</b>	19V
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### Features

	<b>Average Operating Power(idle)</b>	System in hybrid mode
	<b>Max Operating Power</b>	A1000/A2000/A3500/RTX4070 <40W A4000/RTX4080 <80W
<b>Temperature</b>	<b>Operating</b>	32° to 95° F (0° to 35° C), System performance may be reduced above 32°C (89.6°F). No sustained direct exposure to sunlight.
	<b>Non-operating</b>	-4-140°F (-20 – 60°C)
<b>Relative Humidity</b>	<b>Operating</b>	10% to 90%, non-condensing
	<b>Non-operating</b>	5% to 95%; 38.7C (101.6F) maximum wet bulb temperature; non-condensing.
<b>Shock</b>	<b>Operating</b>	40 G, 2 ms, half-sine
	<b>Non-operating</b>	200 G, 2 ms, half-sine
<b>Random Vibration</b>	<b>Operating</b>	0.75 grms
	<b>Non-operating</b>	1.50 grms
<b>Maximum Altitude (unpressurized)</b>	<b>Operating</b>	3048m (10,000ft)
	<b>Non-operating</b>	12192m (40,000ft)
<b>Temperature Derating with Altitude</b>	<b>Operating</b>	1.8°F / 1000 ft (1°C / 304.8 m)
<b>Planned Industry Standard Certifications</b>	<b>Regulatory Model Number</b>	HSN-152C
	<b>UL</b>	Yes
	<b>CSA</b>	Yes
	<b>FCC Compliance</b>	Yes
	<b>ENERGY STAR®</b>	Selected models
	<b>EPEAT®</b>	EPEAT Gold in United States
	<b>ICES</b>	Yes
	<b>Australia / NZ A-Tick Compliance</b>	Yes
	<b>CCC</b>	Yes
	<b>Japan VCCI Compliance</b>	Yes
	<b>KCC</b>	Yes
	<b>BSMI</b>	Yes
	<b>CE Marking Compliance</b>	Yes
	<b>MIL STD 810H</b>	Yes
	<b>BNCI or BELUS</b>	Yes
	<b>CIT</b>	Yes
	<b>EAC</b>	Yes
	<b>Saudi Arabian Compliance (ICCP)</b>	Yes
	<b>SABS</b>	Yes

<sup>1</sup>Configurations of the HP Zbook Studio G10 Mobile Workstation PC that are ENERGY STAR® qualified are identified as HP Zbook Studio G10 Mobile Workstation PC ENERGY STAR on HP websites and on <http://www.energystar.gov>.

<sup>2</sup>Based on US EPEAT® registration according to IEEE 1680.1-2018 EPEAT®. Status varies by country. Visit [www.epeat.net](http://www.epeat.net) for more information.

### Technical Specifications – Displays

#### DISPLAYS

**16.0 in WQUXGA (3840 x 2400) BrightView UWVA DCI-P3 NBZ2 400 eDP 1.4+PSR 100 bent OLED Panel**

<b>Active Area (W x H, mm)</b>	344.448 x 215.280 (typ)	
<b>Dimensions (W x H, mm)</b>	348.578 x 224.310 (max)	
<b>Diagonal Size (inch)</b>	16	
<b>Thickness (body/PCB, mm)</b>	1.242 / 3.143 (max)	
<b>Weight (g)</b>	230 (max)	
<b>Interface</b>	eDP1.4	
<b>Surface Treatment</b>	Bright View	
<b>Contrast Ratio</b>	100,000:1 (typ)	
<b>Refresh Rate (Hz)</b>	60 (typ)	
<b>Brightness (nits)</b>	400 (typ)	
<b>P.P.I.</b>	283	
<b>Pixel Resolution</b>	<b>Pitch</b>	3840 x 2400 (WQUXGA)
	<b>Format</b>	RGB
<b>Backlight</b>	OLED	
<b>Color Gamut Coverage</b>	DCI-P3 100%	
<b>Color Depth</b>	8	
<b>Viewing Angle</b>	UWVA 85/85/85/85	
<b>Power Consumption (W, EBL@ 150nits max /200nits max)</b>	6.10 (max) / 7.40 (max)	
<b>Low Blue Light</b>	Yes	
<b>Touch Enabled</b>	Yes	
<b>Touch Point Supported</b>	10-point multi-touch	
<b>Pen Enabled</b>	No	

\*All specifications represent the typical specifications provided by HP's component manufacturers; actual performance may vary either higher or lower.

**16.0 in WQUXGA DreamColor (3840 x 2400) Anti-Glare UWVA LED DCI-P3 NB2Y 500 eDP1.4 w/o PSR 100 120Hz bent LCD Panel**

<b>Active Area (W x H, mm)</b>	344.680 x 215.420 (typ)	
<b>Dimensions (W x H, mm)</b>	349.980 x 225.420 (max)	
<b>Diagonal Size (inch)</b>	16	
<b>Thickness (body/PCB, mm)</b>	2.3 / 4.1(max)	
<b>Weight (g)</b>	300 (max)	
<b>Interface</b>	eDP1.4	
<b>Surface Treatment</b>	Anti-Glare	
<b>Contrast Ratio</b>	1200:1 (typ)	
<b>Refresh Rate (Hz)</b>	120 (typ)	
<b>Brightness (nits)</b>	500 (typ)	
<b>P.P.I.</b>	283	
<b>Pixel Resolution</b>	<b>Pitch</b>	3840 x 2400 (WQUXGA)
	<b>Format</b>	RGB
<b>Backlight</b>	WLED	
<b>Color Gamut Coverage</b>	DCI-P3 100%	

### Technical Specifications – Displays

<b>Delta E</b>	<2
<b>Color Depth</b>	8
<b>Viewing Angle</b>	UWVA 89/89/89/89
<b>Power Consumption (W, EBL@ 150nits max /200nits max)</b>	4.98 (max)/ 5.84 (max)
<b>Low Blue Light</b>	No
<b>Touch Enabled</b>	No
<b>Touch Point Supported</b>	No
<b>Pen Enabled</b>	No

\*All specifications represent the typical specifications provided by HP's component manufacturers; actual performance may vary either higher or lower.

#### 16.0 in WUXGA (1920 x 1200) Anti-Glare UWVA WLED+LBL sRGB NB2Y 400 eDP 1.4+PSR2 Low-Power 100 bent LCD Panel

<b>Active Area (W x H, mm)</b>	344.678 x 215.424 (typ)	
<b>Dimensions (W x H, mm)</b>	350.680 x 226.470 (max)	
<b>Diagonal Size (inch)</b>	16	
<b>Thickness (body/PCB, mm)</b>	2.6 / 4.6 (max)	
<b>Weight (g)</b>	330 (max)	
<b>Interface</b>	eDP1.4	
<b>Surface Treatment</b>	Anti-Glare	
<b>Contrast Ratio</b>	1000:1 (typ)	
<b>Refresh Rate (Hz)</b>	60 (typ)	
<b>Brightness (nits)</b>	400 (typ)	
<b>P.P.I.</b>	142	
<b>Pixel Resolution</b>	<b>Pitch</b>	1920 x1200 (WUXGA)
	<b>Format</b>	RGB
<b>Backlight</b>	WLED	
<b>Color Gamut Coverage</b>	sRGB 100%	
<b>Color Depth</b>	8	
<b>Viewing Angle</b>	UWVA 89/89/89/89	
<b>Power Consumption (W, EBL@ 150nits max /200nits max)</b>	1.60 (max)/ 1.95 (max)	
<b>Low Blue Light</b>	Yes	
<b>Touch Enabled</b>	No	
<b>Touch Point Supported</b>	No	
<b>Pen Enabled</b>	No	

\*All specifications represent the typical specifications provided by HP's component manufacturers; actual performance may vary either higher or lower.

#### 16.0 in WUXGA (1920 x 1200) Anti-Glare UWVA WLED+LBL sRGB NB2Y 1000 eDP 1.3+PSR 100 PrivacyG4 Plus bent LCD Panel

<b>Active Area (W x H, mm)</b>	344.680 x 215.420 (typ)	
<b>Dimensions (W x H, mm)</b>	349.980 x 225.420 (max)	
<b>Diagonal Size (inch)</b>	16	
<b>Thickness (body/PCB, mm)</b>	2.2 / 3.9 (max)	
<b>Weight (g)</b>	310 (max)	
<b>Interface</b>	eDP1.3	

### Technical Specifications – Displays

<b>Surface Treatment</b>	Anti-Glare
<b>Contrast Ratio</b>	1500:1 (typ)
<b>Refresh Rate (Hz)</b>	60 (typ)
<b>Brightness (nits)</b>	1000 (typ)
<b>P.P.I.</b>	142
<b>Pixel Resolution</b>	<b>Pitch</b> 1920 x1200 (WUXGA)
	<b>Format</b> RGB
<b>Backlight</b>	WLED
<b>Color Gamut Coverage</b>	sRGB 100%
<b>Color Depth</b>	8
<b>Viewing Angle</b>	UWVA 85/85/85/85
<b>Power Consumption (W, EBL@ 150nits max /200nits max)</b>	N/A
<b>Low Blue Light</b>	Yes
<b>Touch Enabled</b>	No
<b>Touch Point Supported</b>	No
<b>Pen Enabled</b>	No

\*All specifications represent the typical specifications provided by HP's component manufacturers; actual performance may vary either higher or lower.

### Technical Specifications – Storage

#### STORAGE AND DRIVES

<b>4TB PCIe-4x4 2280 NVMe Three Layer Cell double-sided M.2 Solid State Drive</b>	<b>Form Factor</b>	M.2 2280		
	<b>Capacity</b>	4TB		
	<b>NAND Type</b>	TLC		
	<b>Height</b>	0.14 in (3.5mm)		
	<b>Width</b>	0.87 in (22 mm)		
	<b>Weight</b>	15g		
	<b>Interface</b>	PCIe NVMe Gen4X4		
	<b>Performance</b>	<b>Minimum Sequential Read</b>	<b>Minimum Sequential Write</b>	
		6400 MB/s ±10%	5000 MB/s ±10%	
	<b>Logical Blocks</b>	8,001,594,720		
	<b>Operating Temperature</b>	32° to 158°F (0° to 70°C) [ambient temp]		
<b>Features</b>	Pyrite 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 2TB 2280 PCIe-4x4 NVMe Three Layer Cell</b>	<b>Form Factor</b>	M.2 2280		
	<b>Capacity</b>	2 TB		
	<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 NVMe Gen4X4		
	<b>Performance</b>	<b>Minimum Sequential Read</b>	<b>Minimum Sequential Write</b>	
		6400 MB/s ±10%	5000 MB/s ±10%	
	<b>Logical Blocks</b>	4,000,797,360		
	<b>Operating Temperature</b>	32° to 158°F (0° to 70°C) [ambient temp]		
<b>Features</b>	Pyrite 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-4x4 NVMe Three Layer Cell</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 NVMe Gen4X4		
	<b>Performance</b>	<b>Minimum Sequential Read</b>	<b>Minimum Sequential Write</b>	
		6400 MB/s ±10%	5000 MB/s ±10%	
	<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>	Pyrite 2.0; TRIM; L1.2			

### Technical Specifications – Storage

**NOTE:** For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 35 GB (for Windows 10) is reserved for system recovery software.

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

<b>Form Factor</b>	M.2 2280	
<b>Capacity</b>	512GB	
<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 NVMe Gen4X4	
<b>Performance</b>	<b>Minimum Sequential Read</b>	<b>Minimum Sequential Write</b>
	6400 MB/s ±10%	3500 MB/s ±10%
<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>	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.

#### 512GB PCIe-4x4 2280 NVME Self Encrypted OPAL2 Three Layer Cell Solid State Drive

<b>Form Factor</b>	M.2 2280	
<b>Capacity</b>	512GB	
<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 NVMe Gen4X4	
<b>Performance</b>	<b>Minimum Sequential Read</b>	<b>Minimum Sequential Write</b>
	6400 MB/s ±10%	3500 MB/s ±10%
<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>	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.

#### 1TB PCIe-4x4 2280 NVME Self Encrypted OPAL2 Three Layer Cell Solid State Drive

<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 NVMe Gen4X4	
<b>Performance</b>	<b>Minimum Sequential Read</b>	<b>Minimum Sequential Write</b>
	6400 MB/s ±10%	5000 MB/s ±10%
<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>	TCG Opal 2.0; TRIM; L1.2	

### Technical Specifications – Storage

**NOTE:** For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 35 GB (for Windows 10) is reserved for system recovery software.



### Technical Specifications – Networking

#### NETWORKING/COMMUNICATION

<p><b>Intel AX211 Wi-Fi 6E + Bluetooth® 5.3 M.2 160MHz CNVi World-Wide WLAN vPro</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          • 5.955 – 6.415 GHz          • 6.435 – 6.515 GHz          • 6.535 – 6.875 GHz          • 6.895 – 7.115 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: max 300Mbps          • 802.11ac : 1733Mbps          • 802.11ax : max 2.4Gbps</p>
	<p><b>Modulation</b></p>	<p>Direct Sequence Spread Spectrum</p>
	<p><b>Security<sup>1</sup></b></p>	<p>OFDM, BPSK, QPSK, CCK, 16-QAM, 64-QAM, 256-QAM, 1024QAM          • IEEE and WiFi compliant 64 / 128 bit WEP encryption for a/b/g mode only          • AES-CCMP: 128 bit in hardware          • 802.1x authentication          • WPA, WPA2: 802.1x. WPA-PSK, WPA2-PSK, TKIP, and AES.          • WPA2 certification          • WPA3 certification          • IEEE 802.11i          • WAPI</p>
	<p><b>Network Architecture Models</b></p>	<p>Ad-hoc (Peer to Peer)</p> <p>Infrastructure (Access Point Required)</p>
	<p><b>Roaming</b></p>	<p>IEEE 802.11 compliant roaming between access points</p>

### Technical Specifications – Networking

<b>Output Power<sup>2</sup></b>	<ul style="list-style-type: none"> <li>• 802.11b : +17dBm minimum</li> <li>• 802.11g : +16dBm minimum</li> <li>• 802.11a : +17dBm minimum</li> <li>• 802.11n HT20(2.4GHz) : +14dBm minimum</li> <li>• 802.11n HT40(2.4GHz) : +13dBm minimum</li> <li>• 802.11n HT20(5GHz) : +14dBm minimum</li> <li>• 802.11n HT40(5GHz) : +13dBm minimum</li> <li>• 802.11ac VHT80(5GHz) : +10dBm minimum</li> <li>• 802.11ac VHT160(5GHz) : +10dBm minimum</li> <li>• 802.11ax HE40(2.4GHz) : +12dBm minimum</li> <li>• 802.11ax HE80(5GHz) : +10dBm minimum</li> <li>• 802.11ax HE160(5GHz) : +10dBm minimum</li> </ul>				
<b>Power Consumption</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>Power Management</b>	ACPI and PCI Express compliant power management 802.11 compliant power saving mode				
<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(VHT80) : -84dBm maximum</li> <li>• 802.11ac, MCS9(VHT80) : -59dBm maximum</li> <li>• 802.11ac, MCS9(VHT160) : -58.5dBm maximum</li> <li>•802.11ax, MCS11(HE40): -57dBm maximum</li> <li>•802.11ax, MCS11(HE80): -54dBm maximum</li> <li>•802.11ax, MCS11(HE160): -53.5dBm maximum</li> </ul>				
<b>Antenna Type</b>	High efficiency antenna with spatial diversity, mounted in the display enclosure  Two embedded dual band 2.4/5 GHz antennas are provided to the card to support WLAN MIMO communications and Bluetooth communications				
<b>Form Factor</b>	PCI-Express M.2 MiniCard				
<b>Dimensions</b>	<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 1216: 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 Off – Radio ON				

### Technical Specifications – Networking

#### **HP Integrated Module with Bluetooth 4.0/4.1/4.2/5.0/5.1/5.2/5.3 Wireless Technology**

<b>Frequency Band</b>	2402 to 2480 MHz
<b>Number of Available Channels</b>	Legacy : 0~79 (1 MHz/CH) BLE : 0~39 (2 MHz/CH)
<b>Data Rates and Throughput</b>	Legacy : 3 Mbps data rate; throughput up to 2.17 Mbps BLE : 1 Mbps data rate; throughput up to 0.2 Mbps Legacy : Synchronous Connection Oriented links up to 3, 64 kbps, voice channels Legacy : Asynchronous Connection Less links 2178.1 kbps/177.1 kbps asymmetric (3-DH5) or 864 kbps symmetric (3-EV5)
<b>Transmit Power</b>	The Bluetooth component shall operate as a Class II Bluetooth device with a maximum transmit power of + 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</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
<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) BT5.2 ESR9/10 Compliance LE Advertisement Extensions Channel Selection Algo Limited High Duty Cycle Non-Connectable Advertising 2Mbps LE LE Long Range

\* Wi-Fi 6E requires a Wi-Fi 6E router, sold separately, and Windows 11 to function in the 6GHz band. Availability of public wireless access points limited. Wi-Fi 6E is backwards compatible with prior 802.11 specs. And available in countries where Wi-Fi 6E is supported.

[2] Check latest software/driver release for updates on supported security features.

### Technical Specifications – Networking

[3] The FCC has declared as of September 1, 2014 products that utilize passive scanning on channel 12/13 and are capable of transmitting must fully comply with requirements of 15.247 or otherwise disable those channels.

[4] Receiver sensitivity is measured at a packet error rate of 8% for 802.11b (CKK modulation) and a packet error rate of 10% for 802.11a/g (OFDM modulation).

<b>Intel AX211 Wi-Fi 6E + Bluetooth® 5.3 M.2 160MHz CNVi World-Wide WLAN non-vPro</b>	<b>Wireless LAN Standards</b>	<ul style="list-style-type: none"> <li>IEEE 802.11a</li> <li>IEEE 802.11b</li> <li>IEEE 802.11g</li> <li>IEEE 802.11n</li> <li>IEEE 802.11ac</li> <li>IEEE 802.11ax</li> <li>IEEE 802.11d</li> <li>IEEE 802.11e</li> <li>IEEE 802.11h</li> <li>IEEE 802.11i</li> <li>IEEE 802.11k</li> <li>IEEE 802.11r</li> <li>IEEE 802.11v</li> </ul>
	<b>Interoperability</b>	Wi-Fi certified
	<b>Frequency Band</b>	802.11b/g/n/ax <ul style="list-style-type: none"> <li>• 2.402 – 2.482 GHz</li> </ul> 802.11a/n/ac/ax <ul style="list-style-type: none"> <li>• 4.9 – 4.95 GHz (Japan)</li> <li>• 5.15 – 5.25 GHz</li> <li>• 5.25 – 5.35 GHz</li> <li>• 5.47 – 5.725 GHz</li> <li>• 5.825 – 5.850 GHz</li> <li>• 5.955 – 6.415 GHz</li> <li>• 6.435 – 6.515 GHz</li> <li>• 6.535 – 6.875 GHz</li> <li>• 6.895 – 7.115 GHz</li> </ul>
	<b>Data Rates</b>	<ul style="list-style-type: none"> <li>• 802.11b: 1, 2, 5.5, 11 Mbps</li> <li>• 802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps</li> <li>• 802.11a: 6, 9, 12, 18, 24, 36, 48, 54 Mbps</li> <li>• 802.11n: max 300Mbps</li> <li>• 802.11ac : 1733Mbps</li> <li>• 802.11ax : max 2.4Gbps</li> </ul>
	<b>Modulation</b>	Direct Sequence Spread Spectrum
	<b>Security<sup>1</sup></b>	OFDM, BPSK, QPSK, CCK, 16-QAM, 64-QAM, 256-QAM, 1024QAM <ul style="list-style-type: none"> <li>• IEEE and WiFi compliant 64 / 128 bit WEP encryption for a/b/g mode only</li> <li>• AES-CCMP: 128 bit in hardware</li> <li>• 802.1x authentication</li> <li>• WPA, WPA2: 802.1x. WPA-PSK, WPA2-PSK, TKIP, and AES.</li> <li>• WPA2 certification</li> <li>• WPA3 certification</li> <li>• IEEE 802.11i</li> <li>• WAPI</li> </ul>

### Technical Specifications – Networking

<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>	<ul style="list-style-type: none"> <li>• 802.11b : +17dBm minimum</li> <li>• 802.11g : +16dBm minimum</li> <li>• 802.11a : +17dBm minimum</li> <li>• 802.11n HT20(2.4GHz) : +14dBm minimum</li> <li>• 802.11n HT40(2.4GHz) : +13dBm minimum</li> <li>• 802.11n HT20(5GHz) : +14dBm minimum</li> <li>• 802.11n HT40(5GHz) : +13dBm minimum</li> <li>• 802.11ac VHT80(5GHz) : +10dBm minimum</li> <li>• 802.11ac VHT160(5GHz) : +10dBm minimum</li> <li>• 802.11ax HE40(2.4GHz) : +12dBm minimum</li> <li>• 802.11ax HE80(5GHz) : +10dBm minimum</li> <li>• 802.11ax HE160(5GHz) : +10dBm minimum</li> </ul>
<b>Power Consumption</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>Power Management</b>	ACPI and PCI Express compliant power management 802.11 compliant power saving mode
<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(VHT80) : -84dBm maximum</li> <li>• 802.11ac, MCS9(VHT80) : -59dBm maximum</li> <li>• 802.11ac, MCS9(VHT160) : -58.5dBm maximum</li> <li>•802.11ax, MCS11(HE40): -57dBm maximum</li> <li>•802.11ax, MCS11(HE80): -54dBm maximum</li> <li>•802.11ax, MCS11(HE160): -53.5dBm maximum</li> </ul>
<b>Antenna Type</b>	High efficiency antenna with spatial diversity, mounted in the display enclosure
	Two embedded dual band 2.4/5 GHz antennas are provided to the card to support WLAN MIMO communications and Bluetooth communications
<b>Form Factor</b>	PCI-Express M.2 MiniCard
<b>Dimensions</b>	1. Type 2230 : 2.3 x 22.0 x 30.0 mm 2. Type 1216: 1.67 x 12.0 x 16.0 mm
<b>Weight</b>	1. Type 2230 : 2.8g 2. Type 1216: 1.3g
<b>Operating Voltage</b>	3.3v +/- 9%
<b>Temperature</b>	Operating 14° to 158° F (-10° to 70° C) Non-operating -40° to 176° F (-40° to 80° C)
<b>Humidity</b>	Operating 10% to 90% (non-condensing) Non-operating 5% to 95% (non-condensing)

### Technical Specifications – Networking

<b>Altitude</b>	Operating Non-operating	0 to 10,000 ft (3,048 m) 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 4.0/4.1/4.2/5.0/5.1/5.2/5.3 Wireless Technology</b>		
<b>Frequency Band</b>	2402 to 2480 MHz	
<b>Number of Available Channels</b>	Legacy : 0~79 (1 MHz/CH) BLE : 0~39 (2 MHz/CH)	
<b>Data Rates and Throughput</b>	Legacy : 3 Mbps data rate; throughput up to 2.17 Mbps BLE : 1 Mbps data rate; throughput up to 0.2 Mbps Legacy : Synchronous Connection Oriented links up to 3, 64 kbps, voice channels Legacy : Asynchronous Connection Less links 2178.1 kbps/177.1 kbps asymmetric (3-DH5) or 864 kbps symmetric (3-EV5)	
<b>Transmit Power</b>	The Bluetooth component shall operate as a Class II Bluetooth device with a maximum transmit power of + 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</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	
<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) BT5.2 ESR9/10 Compliance LE Advertisement Extensions Channel Selection Algo Limited High Duty Cycle Non-Connectable Advertising	

### Technical Specifications – Networking

2Mbps LE  
LE Long Range

#### Security & Manageability

Intel® vPro® support with appropriate Intel® chipset components

\* Wi-Fi 6E requires a Wi-Fi 6E router, sold separately, and Windows 11 to function in the 6GHz band. Availability of public wireless access points limited. Wi-Fi 6E is backwards compatible with prior 802.11 specs. And available in countries where Wi-Fi 6E is supported.

[2] Check latest software/driver release for updates on supported security features.

[3] The FCC has declared as of September 1, 2014 products that utilize passive scanning on channel 12/13 and are capable of transmitting must fully comply with requirements of 15.247 or otherwise disable those channels.

[4] Receiver sensitivity is measured at a packet error rate of 8% for 802.11b (CKK modulation) and a packet error rate of 10% for 802.11a/g (OFDM modulation).

### AUDIO

<b>HD Stereo Codec</b>	Realtek ALC3315
<b>Audio I/O Ports</b>	Headset: CTIA only and Headphone-out
<b>Internal Speaker Amplifier</b>	Cirrus Logic High-Efficiency Boosted Class D Amplifier
<b>Multi-streaming Capable</b>	Playback multi-streaming can be enabled in the audio control panel to allow independent audio. Following MSFT Behaviour
<b>Sampling</b>	DAC: 44.1k/48kHz ADC: 48kHz
<b>Wavetable Syntheses</b>	
<b>Analog Audio</b>	Support 3.5mm Headset: CTIA only and Headphone-out
<b># of Channels on Line-Out</b>	
<b>Internal Speaker</b>	Yes

### FINGERPRINT SENSOR

<b>Sensor vendor</b>	Synaptics FS7604
<b>Sensor type</b>	Capacitive
<b>DPI resolution</b>	363DPI
<b>Scan area</b>	7.4x6mm sensor area
<b>False Rejection Rate</b>	<1%
<b>False Acceptance Rate</b>	1:50K FAR
<b>Mobile Voltage Operation</b>	Mobile Voltage Operation: 3.0V to 3.6V
<b>Operating Temperature</b>	Operating Temperature: 0~60°C
<b>Current Consumption Image</b>	Current Consumption Image : 100mA Max
<b>Low Latency Wait For Finger</b>	Low Latency Wait For Finger: 260 uA
<b>Capture Rate</b>	Capture Rate: <30msec per image
<b>ESD Resistance</b>	ESD Resistance: IEC 61000-4-2 4B (+/-15KV)
<b>Detection Matrix</b>	Detection Matrix: 363 dpi / 7.4x6mm sensor area

### Technical Specifications – Networking

#### POWER

<b>HP 150W Slim 4.5 mm PFC Right Angle Smart (3-pin) AC Power 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>Output</b>	<b>Input AC current</b>	2.7 A at 90 Vac and Maximum Load
		<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>DC Plug</b>	4.5mm Barrel Type
		<b>Connector</b>	C6
	<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 5000m)
<b>Humidity</b>		5% to 95%	
<b>Storage Humidity</b>		5% to 95%	
<b>EMI and Safety Certifications</b>	<b>Eg:</b>		
		<p>*CE Mark – full compliance with LVD and EMC directives</p> <p>* Worldwide safety standards – IEC60950-1 and/or IEC62368-1, EN60950-1 and/or EN62368-1, UL60950-1 and/or UL62368-1, Class1, SELV; Agency approvals – C-UL-US, NORDICS, DENAN, EN55032 Class B, FCC Class B, CISPR32 Class B, CCC, NOM-001 NYCE.</p> <p>* MTBF – over 200,000 hours at 25°C ambient condition.</p>	



### Technical Specifications – Power

<b>HP 200W Slim 4.5 mm PFC Right Angle Smart (3-pin) AC Power Adapter</b>	<b>Dimensions</b>	152x73x23.5mm	
	<b>Weight</b>	unit: 510g +/- 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>Output</b>	<b>Input AC current</b>	2.7 A at 90 Vac and Maximum Load
		<b>Output power</b>	200W
	<b>Connector</b>	<b>DC output</b>	19.5V
		<b>Hold-up time</b>	5ms at 115 Vac input
		<b>Output current limit</b>	<21.0A
		<b>DC Plug</b>	4.5mm Barrel Type
		<b>Environmental Design</b>	C14
		<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 5000m)
<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 – IEC60950-1 and/or IEC62368-1, EN60950-1 and/or EN62368-1, UL60950-1 and/or UL62368-1, Class1, SELV; Agency approvals – C-UL-US, NORDICS, DENAN, EN55032 Class B, FCC Class B, CISPR32 Class B, CCC, NOM-001 NYCE. * MTBF – over 200,000 hours at 25°C ambient condition.		
<b>86Whr XL-Long Life Polymer Fast Charge 6 cell Battery</b>	<b>Dimensions (H x W x L)</b>	299.15*81.2*8.14 mm(11.7*3.2*0.32 inch)	
	<b>Weight</b>	0.339kg+/-0.010kg (0.75lb+/-0.02lb)	
	<b>Cells/Type</b>	6-cell Lithium-Ion Polymer cell / 684467	
	<b>Energy</b>	<b>Voltage</b>	11.58V
		<b>Amp-hour capacity</b>	7.130Ah / 7.428Ah
		<b>Watt-hour capacity</b>	86Wh
	<b>Temperature</b>	<b>Operating (Charging)</b>	32° to 113° F (0° to 45° C)
		<b>Operating (Discharging)</b>	14° to 140° F (-10° to 60° C)
	<b>Fuel Gauge LED</b>	NA	
	<b>Warranty</b>	Refer to products warranty	
<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.

Refer to <http://www.hp.com/support/batterywarranty/> for battery warranty information.

**NOTE:** batteries are not customer replaceable.

### 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

- Product Carbon Footprint (hp.com)
- Ocean-bound plastic in Speaker
- 24.5% post-consumer recycled plastic
- 80% recycled metal
- 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)	14.37 W	14.63 W	14.23 W
Normal Operation (Long idle)	1.37 W	1.39 W	1.26 W
Sleep	1.37 W	1.39 W	1.26 W
Off	0.46 W	0.47 W	0.46 W

##### NOTE:

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

##### Heat Dissipation\*

	115VAC, 60Hz	230VAC, 50Hz	100VAC, 50Hz
Normal Operation (Short idle)	49.1 BTU/hr	50 BTU/hr	48.7 BTU/hr
Normal Operation (Long idle)	4.7 BTU/hr	4.8 BTU/hr	4.3 BTU/hr
Sleep	4.7 BTU/hr	4.8 BTU/hr	4.3 BTU/hr
Off	1.6 BTU/hr	1.6 BTU/hr	1.6 BTU/hr

### Technical Specifications – Environmental

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

Declared Noise Emissions (in accordance with ISO 7779 and ISO 9296)	Sound Power ( $L_{Wad}$ , bels)	Sound Pressure ( $L_{pAm}$ , decibels)
Typically Configured – Idle	3.2	24.4
Fixed Disk – Random writes	3.4	27
Optical Drive – Sequential reads	4.1	33.9

**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 97.7% recycle-able when properly disposed of at end of life.

#### Packaging Materials

<b>External:</b>	PAPER/Corrugated	4g
	PAPER/Molded Pulp	78g
	PAPER/Paper	358g
<b>Internal:</b>	PLASTIC/Polyethylene low density – LDPE	21g

The plastic packaging material contains at least 0.0% recycled content.

The corrugated paper packaging materials contains at least 54.0% 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](#).

### Technical Specifications – Environmental

#### Material Usage

This product does not contain any of the following substances in excess of regulatory limits (refer to the HP General Specification for the Environment at [http://www.hp.com/hpinfo/globalcitizenship/environment/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 Hewlett Packard web site at: <http://www.hp.com/go/recyclers>.

### Technical Specifications – Environmental

These instructions may be used by recyclers and other WEEE treatment facilities as well as HP OEM customers who integrate and re-sell HP equipment.

#### HP Inc. Corporate Environmental Information

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

Global Citizenship Report

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

Eco-label certifications

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

ISO 14001 certificates:

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

and

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

#### 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.
- Recycled metal is expressed as a percentage of the total weight of the metal according to ISO 14021 definitions for metal parts over 25 grams

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

Type	Description	Part #
<b>Bags and Cases</b>	HP Prelude Pro Recycle Backpack	1X644AA
	HP Prelude Pro Recycle Top Load	1X645AA
	HP Prelude 15.6 Top Load	1E7D7AA
	HP Prelude 15.6 Top Load	2Z8P4AA
	HP Prelude 15.6 Top Load	50P31AA
	HP Prelude 15.6 Backpack	1E7D6AA
	HP Prelude 15.6 Backpack	2Z8P3AA
	HP Prelude 15.6 Backpack	50P32AA
	HP Renew Business 17.3 Laptop Backpack	3E2U5AA
	HP Renew Business 17.3 Laptop Bag	3E2U6AA
	HP Renew Business 15.6 Laptop Bag	3E5F8AA
	HP Renew Executive 16 Laptop Backpack	6B8Y1AA
	HP Renew Executive 16 Laptop Bag	6B8Y2AA
	<b>Docking</b>	HP Thunderbolt 280W G4 Dock w/Combo Cable
<b>Dongle</b>	HP USB-C to USB 3.0 Adapter	N2Z63AA
	HP USB-C to DisplayPort Adapter	N9K78AA
	HP USB-C to VGA Adapter	N9K76AA
	HP USB-C to VGA Adapter	P7Z54AA
	HP USB-C to HDMI 2.0 Adapter	1WC36AA
	HP USB-C to HDMI 2.0 Adapter	2PC54AA
	HP USB-C to RJ45 Adapter G2	4Z527AA
	HP USB-C to RJ45 Adapter G2	4Z534AA
	HP USB 3.0 to Gig RJ45 Adapter G2	4Z7Z7AA
HP USB-C to USB-C 100W Cable	5AR72AA	
<b>Keyboard/Mouse</b>	HP 320K Wired Keyboard	9SR37AA
	HP 125 Wired Keyboard	266C9AA
	HP 975 USB+ Bluetooth Dual-Mode Wireless Keyboard	3Z726AA
	HP 455 Programmable Wireless Keyboard	4R177AA
	HP 355 Compact Multi-Device Keyboard	69Z59AA
	HP Wireless Rechargeable 950MK Mouse and Keyboard	3M165AA
	HP Wired Desktop 320MK Mouse and Keyboard	9SR36AA
	HP 235 Wireless Mouse and Keyboard Combo	1Y4D0AA
	HP 225 Wired Mouse and Keyboard Combo	286J4AA
	HP 225 Antimicrobial Wired Mouse and Keyboard Combo	286K3AA
	HP 655 Wireless Keyboard and Mouse Combo	4R009AA
	HP 155 Wired Mouse and Keyboard Combo	5B8C0AA
	HP Wired 320M Mouse	9VA80AA
	HP Premium Wireless Mouse	1JR31AA
	HP Travel Bluetooth Mouse	6SP30AA
HP Multi-Device 635 Black Wireless Mouse	1DOK2AA	

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

	HP Creator 935 Black Wireless Mouse	1D0K8AA
	HP 235 Slim Wireless Mouse	4E407AA
	HP 128 LSR Wired Mouse	265D9AA
	HP 125 Wired Mouse	265A9AA
	HP 435 Multi-Device Wireless Mouse	3B4Q5AA
	HP 155 Wired Mouse	5B8B7AA
	HP 715 Rechargeable Multi-Device Bluetooth Mouse	6E6F0AA
	HP 925 Ergonomic Vertical Wireless Mouse	6H1A5AA
<b>Hub</b>	HP USB-C to USB-A Hub	Z6A00AA
<b>Audio/Video</b>	HP USB G2 Stereo Headset	428H5AA
	HP USB G2 Stereo Headset	428K6AA
	HP 3.5mm G2 Stereo Headset	428H6AA
	HP 3.5mm G2 Stereo Headset	428K7AA
	HP 365 Bluetooth Speaker	567D3AA
	HP 325 FHD USB-A Webcam	53X27AA
	HP 965 4K Streaming Webcam	695J5AA
<b>Optical device</b>	HP USB External DVDRW Drive	F2B56AA
	HP USB External DVDRW Drive	Y3T76AA
<b>Power Adapter</b>	HP 150W Slim Smart 4.5mm AC Adapter	45C18AA
	HP Zbook 200W Slim Smart 4.5mm AC Adapter	491C7AA
	HP Zbook 230W Slim Smart 4.5mm AC Adapter	6E6M1AA
<b>Storage</b>	HP 512GB PCIe-4x4 NVMe M.2 Solid State Drive	5R8X9AA
	HP 1TB PCIe-4x4 NVMe M.2 Solid State Drive	5R8Y0AA
	HP 2TB PCIe-4x4 NVMe TLC M.2 Solid State Drive	6D8L6AA
<b>Security</b>	HP Nano Keyed Cable Lock	1AJ39AA
	HP Nano Master Keyed Cable Lock	1AJ40AA
	HP Sure Key Cable Lock	6UW42AA
	HP Nano Combination Cable Lock	63B28AA
	HP Essential Nano Combination Cable Lock	63B31AA

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<b>Date of change:</b>	<b>Version History:</b>		<b>Description of change:</b>
May 22, 2023	From v1 to v2	Changed	STORAGE AND DRIVES section
May 26, 2023	From v2 to v3	Changed	PORTS/SLOTS section
June 5, 2023	From v3 to v4	Changed	POWER, WEIGHTS & DIMENSIONS sections
June 6, 2023	From v4 to v5	Changed	STORAGE AND DRIVES section
July 5, 2023	From v5 to v6	Changed	ENVIRONMENTAL DATA section
July 13, 2023	From v6 to v7	Changed	PROCESSOR section
July 25, 2023	From v7 to v8	Changed	DISPLAY section
August 1, 2023	From v8 to v9	Changed	ENVIRONMENTAL DATA section
September 7, 2023	From v9 to v10	Changed	KEYBOARDS/POINTING DEVICES/BUTTONS & FUNCTION KEYS section
September 25, 2023	From v10 to v11	Changed	SOFTWARE AND SECURITY section
June 12, 2024	From v11 to v12	Changed	SOFTWARE AND SECURITY section
July 18, 2024	From v12 to v13	Changed	GRAPHICS section