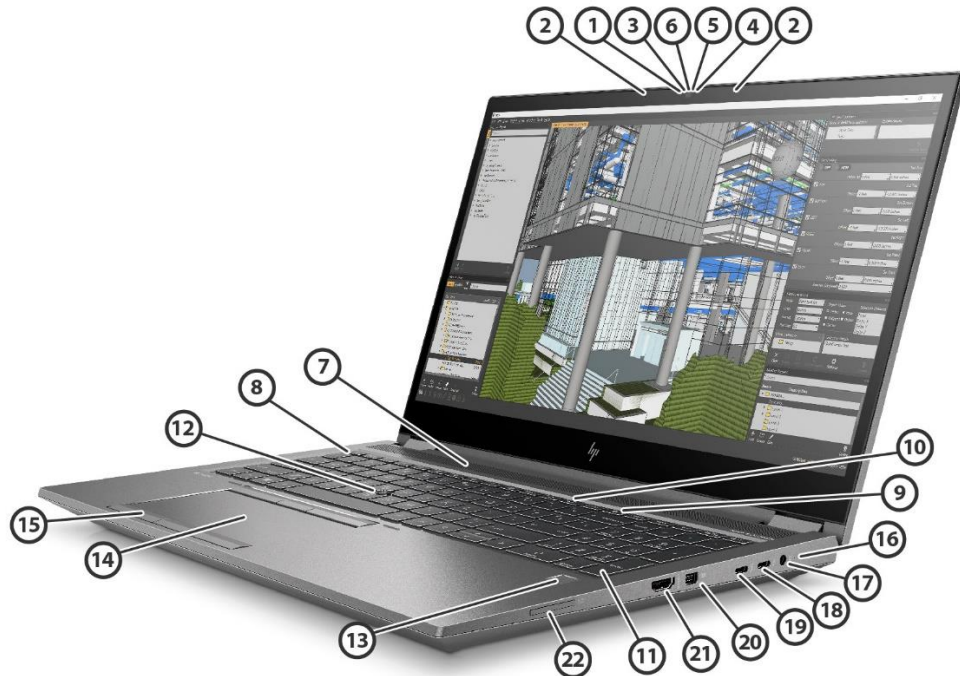


### Overview

### HP ZBook Fury 15.6 Inch G8 Mobile Workstation PC



1. Ambient Light Sensor
2. Internal Microphones (optional)
3. Camera LEDs (optional)
4. HD Camera (optional)
5. IR Camera (optional)
6. Camera Cover (optional)
7. Speakers with Discrete Amplifier
8. Function Keys (changes with configured options)
9. Power button
10. HP Programmable Key
11. Numeric Keypad
12. Pointstick

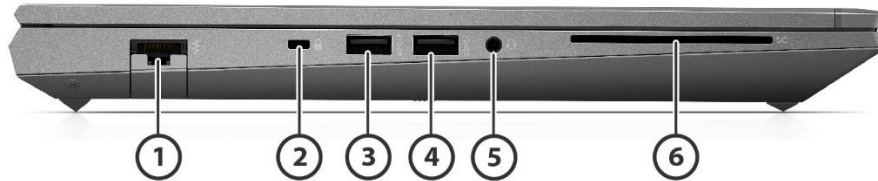
#### Right

13. Fingerprint Sensor (optional)
14. Touchpad
15. 3-button Touchpad
16. Indicator LEDs: Power light, Wireless light, Storage usage light
17. Power connector
18. USB Type-C® with Thunderbolt™ 4<sup>1</sup>
19. USB Type-C® with Thunderbolt™ 4<sup>1</sup>
20. Mini DisplayPort™ 1.4 with Discrete Graphics <sup>2</sup>
21. HDMI port
22. SD Card Reader

<sup>1</sup>SuperSpeed USB 20Gbps is not available with Thunderbolt™ 4.

<sup>2</sup> Mini DisplayPort™ 1.4 with discrete, 1.2 with UMA.

### Overview



#### Left

1. RJ-45
2. Nano security lock slot
3. USB 3.1 Gen 1 Charging Port
4. USB 3.1 Gen 1
5. Audio Combo Jack
6. Smart Card Reader

### Overview

#### At A Glance

- Work anywhere without compromising on performance or security with Windows 10 Pro <sup>1</sup>, powered by HP's collaboration and connectivity technology.
- Accelerate your workflow. Power through projects with up to 128 GB RAM <sup>2</sup> for fast rendering, editing and visual effects performance.
- Take multitasking to the next level with the Intel® Core™ i9 processor <sup>3</sup> designed to handle complex, multithreaded apps like Adobe® Premier Pro, and with fast clock speeds you can boost your speed on single threaded apps like Autodesk 3ds Max.<sup>4</sup>
- Run demanding professional apps with the newest generation Intel® Xeon® processors <sup>5</sup> for powerful performance and productivity.
- Experience high-end visualization and seamlessly render your biggest projects with the next generation NVIDIA® Ampere architecture with NVIDIA® T-Series and RTX A graphics<sup>19</sup>; Certified and supported for the apps you use every day.
- Strenuously tested to meet software certification and deliver superb performance with leading software providers, including Autodesk and Adobe® <sup>6</sup>.
- Blitz through multiple tasks and ditch external drives with up to 8 TB <sup>7</sup>, local PCIe NVMe storage - up to 21x faster than standard HDD and 6x faster than SATA SSD <sup>9</sup>.
- Instantly protect against visual hacking with HP Sure View <sup>10</sup>, and defend against firmware and malware attacks with HP Sure Start <sup>11</sup> and HP Sure Sense <sup>12</sup>, and have peace of mind with multi-factor authentication- including an infrared camera and fingerprint scanner <sup>13</sup>.
- Enhanced transfer and upload speeds via dual Thunderbolt™ 4 ports. Get wide-ranging connectivity options to ensure maximum device interaction: USB 3.0, HDMI, mDP, SD card, Smart Card Reader and more.
- Designed for ultimate durability, this ZBook undergoes brutal MIL-STD 810H <sup>14</sup> tests to help ensure this PC keeps rolling through your workday.
- Plug in to greater connectivity at your desktop with the HP Thunderbolt Dock for lightning-fast Thunderbolt™ 4 <sup>15</sup> transfers and the flexibility to run more than up to 2 external 4k <sup>16,17</sup>.
- Improve connectivity while on Wi-Fi® with HP Extended Range Wireless LAN that allows greater distance from transmission point and fast data throughput at shorter ranges <sup>18</sup>.

**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 <sup>2</sup> - HP recommends Windows® 11 Pro <sup>2</sup> Windows® 11 Home - HP recommends Windows 11 Pro for business <sup>2</sup> Windows® 11 Home Single Language - HP recommends Windows 11 Pro for business <sup>2</sup> Windows® 11 Pro (Windows® 11 Enterprise available with a Volume Licensing Agreement) <sup>2</sup> Windows® 10 Pro (available through downgrade rights from Windows® 11 Pro) <sup>2,3</sup> Windows® 11 Pro for Workstations <sup>2</sup> Windows® 10 Pro for Workstations (available through downgrade rights from Windows® 11 Pro for Workstations) <sup>2,3</sup> Windows® 10 Pro <sup>1,2</sup> Windows® 10 Home - HP recommends Windows 11 Pro for business <sup>1,2</sup> Windows® 10 Home Single Language - HP recommends Windows 11 Pro for business <sup>1,2</sup> Windows® 10 Pro (Windows® 10 Enterprise available with a Volume Licensing Agreement) <sup>1,2</sup> Windows® 10 Pro for Workstations <sup>2</sup> FreeDOS 3.0 Ubuntu Linux 20.04 <sup>4</sup>
<b>Web support OS</b>	Red Hat® Enterprise Linux® 8 <sup>4</sup> Windows® 10 Enterprise 64 <sup>2</sup>
<b>Supported Version</b>	HP tested Windows 10, version 1909 on this platform. For testing information on newer versions of Windows 10, please see <a href="https://support.hp.com/document/c05195282">https://support.hp.com/document/c05195282</a>

<sup>1</sup> Device comes with Windows 10 and a free Windows 11 upgrade or may be preloaded with Windows 11. Upgrade timing may vary by device. Features and app availability may vary by region. Certain features require specific hardware (see Windows 11 Specifications).

<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)

**PROCESSOR**

11<sup>th</sup> Generation Intel® Xeon® W-11955M vPro® with Intel® UHD Graphics (2.6 GHz base frequency, up to 5.0 GHz with Intel® Turbo Boost Technology, 24 MB cache, 8 cores)<sup>1,2,3,4,5</sup>

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

11<sup>th</sup> Generation Intel® Core™ i5-11500H vPro® with Intel® UHD Graphics (2.9 GHz base frequency, up to 4.6 GHz with Intel® Turbo Boost Technology, 12 MB L3 cache, 6 cores)<sup>1,2,3,4,5</sup>

### Features

<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 Comet Lake H in order to prioritize performance in DC mode. It can be changed in F10 BIOS settings. See

[www.intel.com/technology/turboboost](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

Mobile Intel® TigerLake PCH-H, WM 590

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

Intel® Core™ i5 with vPro™, Core™ i7 with vPro™, Core™ i9 with vPro™ and Xeon® with vPro™ technology is a selectable feature that is available on units configured with select processors, a qualified Intel® WLAN module and a preinstalled Windows® operating system. It provides advances in remote manageability, security, energy efficient performance, and wireless connectivity. Intel® Active Management Technology (iAMT) offers built-in manageability and proactive security for networked mobile workstations, even when they are powered off\* or when the operating system is inoperable. It can help identify threats before they reach the network, isolate infected systems, and update regardless of their power state. <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> 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</sup>

##### Discrete

NVIDIA Graphic options:

NVIDIA RTX™ A5000 (16 GB GDDR6 dedicated) <sup>1,2,3,4,5,7</sup>

NVIDIA RTX™ A4000 (8 GB GDDR6 dedicated) <sup>1,2,3,4,5,7</sup>

NVIDIA RTX™ A3000 (6 GB GDDR6 dedicated) <sup>1,2,3,4,5,7</sup>

NVIDIA RTX™ A2000 (4 GB GDDR6 dedicated) <sup>1,2,3,4,5</sup>

NVIDIA® T1200 (4 GB GDDR6 dedicated) <sup>1,2,3,4,5</sup>

AMD Graphic options:

AMD Radeon Pro W6600M (8 GB GDDR6 dedicated) <sup>1,2,3,4,5,7</sup>

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

<sup>2</sup> Support HD decode, DX11, DX12, HDMI 2.0b, HDCP 2.3 via DP up to 4K @ 60Hz and via HDMI up to 4K @ 60Hz (NVIDIA RTX™ A5000, RTX A4000, RTX A3000, RTX A2000, AMD Radeon Pro W6600M support HDMI 2.1 with FRL)

<sup>3</sup> HDMI cable Sold Separately

<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> miniDP cable sold separately.

<sup>6</sup> GPU configurations may be limited to specific panel options

<sup>7</sup> The HP custom vapor chamber (Z VaporForce) is only available on configurations with NVIDIA® RTX™ A3000 graphics and greater or AMD Radeon graphics

### Features

#### Multi Display Support

##### Without HP Thunderbolt™ Dock G2

UMA Graphics: Unit supports up to 4 independent displays. Any combination of displays outputs may be used except one of Thunderbolt™ 4 and HDMI.

Hybrid Graphics: Unit supports up to 5 simultaneous displays (4 from dGPU + 1 from iGPU). Any combination of displays outputs may be used except when using one USBC and HDMI are exclusive

**NOTE:** If Thunderbolt™ only port on the dock is connected, then the three external displays will not function.

##### With HP Thunderbolt™ Dock G2

UMA Graphics: Unit supports up to 4 simultaneous displays. Any combination of displays outputs may be used except one of Thunderbolt™ 4 and HDMI.

Hybrid Graphics (NVIDIA): Unit supports up to 5 simultaneous displays (4 from dGPU + 1 from iGPU). Any combination of displays outputs may be used except when using one USBC and HDMI are exclusive

Hybrid Graphics (AMD): Unit supports up to 5 simultaneous displays (5 from dGPU + 1 from iGPU). Any combination of displays outputs may be used except when using one USBC and HDMI are exclusive

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

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## DISPLAY

### Non-touch

- 15.6" diagonal FHD (1920 x 1080) IPS eDP1.2 anti-glare WLED-backlit and ambient light sensor 250 nits 45% NTSC<sup>1,2</sup>
- 15.6" diagonal FHD (1920 x 1080) IPS eDP1.3 + PSR anti-glare WLED-backlit and ambient light sensor 400 nits 72% NTSC<sup>1,2</sup>
- 15.6" diagonal FHD (1920 x 1080) IPS eDP1.3 + PSR anti-glare WLED-backlit and ambient light sensor 1000 nits 72% NTSC Next Gen HP SureView Reflect<sup>1,2,5,7</sup>
- Next Gen HP Dream Color display 15.6" diagonal UHD (3840 x 2160) IPS 120Hz eDP1.4 + PSR2 anti-glare BV LED-backlit and ambient light sensor 600 nits 100% DCI-P3<sup>1,2,3</sup>

### Touch

- 15.6" diagonal UHD (3840 x 2160) IPS eDP1.4 + PSR2 WLED-backlit touch screen with Corning® Gorilla® Glass 5 and ambient light sensor 600 nits 100% DCI-P3<sup>1,2,3,7</sup>

### HP Virtual Reality<sup>6</sup> Headset (sold separately)

- HP Reverb
- HP Reverb G2

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

<sup>2</sup> Resolutions are dependent upon monitor capability, and resolution and color depth settings.

<sup>3</sup> Display options may be limited to specific GPU Configurations.

<sup>5</sup> HP Sure View Reflect is optional and must be configured at purchase.

<sup>6</sup> Virtual Reality content is required to view Virtual Reality images

<sup>7</sup> Actual brightness will be lower with Sure View or touchscreen.

### Features

#### STORAGE AND DRIVES\*

##### Max Storage

8TB through four M.2 NVMe drives

6TB through two M.2 NVMe drives and one 2.5" SATA drive

##### (up to 1) HDD Storage (SATA 3.2)<sup>4</sup>

500 GB 7200 rpm SATA FIPS 140-2 SED HDD

500 GB 7200 rpm SATA HDD

1 TB 7200 rpm SATA HDD

2 TB 5400 rpm SATA HDD

##### (up to 4) M.2 Storage (NVMe™ PCIe SSD)

256 GB PCIe (NVMe™) TLC Solid State Drive

256 GB PCIe (NVMe™) TLC Self Encrypting (SED) Solid State Drive

512 GB PCIe (NVMe™) TLC Solid State Drive

512 GB PCIe (NVMe™) TLC Self Encrypting (SED) Solid State Drive

1 TB PCIe (NVMe™) TLC Solid State Drive<sup>3</sup>

1 TB PCIe (NVMe™) TLC Self Encrypting (SED) Solid State Drive

2 TB PCIe (NVMe™) TLC Solid State Drive<sup>3</sup>

2 TB PCIe (NVMe™) TLC Self Encrypting (SED) Solid State Drive

256 GB PCIe Gen4 (NVMe™) TLC Solid State Drive<sup>5,\*\*</sup>

256 GB PCIe Gen4 (NVMe™) TLC Self Encrypting (SED) OPAL2 Solid State Drive<sup>5,\*\*</sup>

512 GB PCIe Gen4 (NVMe™) TLC Solid State Drive<sup>5,\*\*</sup>

512 GB PCIe Gen4 (NVMe™) TLC Self Encrypting (SED) OPAL2 Solid State Drive<sup>5,\*\*</sup>

1 TB PCIe Gen4 (NVMe™) TLC Solid State Drive<sup>5,\*\*</sup>

2 TB PCIe Gen4 (NVMe™) TLC Solid State Drive<sup>5,\*\*</sup>

<sup>1</sup>Storage slot 1-4 can support NVMe protocol

<sup>2</sup>Storage slot 1, 3 and 4 can support SATA protocol

<sup>3</sup>Only storage slots 1-3 can support RAID

<sup>4</sup>System is preset to Modern Standby Disconnected with factory preinstall image

<sup>5</sup>PCIe Gen4 drives will only work at PCIe Gen3 speed.

\* For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 35GB of disk is reserved for system recovery software.

\*\* Available late September 2021.

#### DRIVE CONTROLLERS

M.2 Storage Bay (PCIe NVMe)

PCIe Gen 3 x 4 lanes NVMe Solid State Drive

RAID:

RAID 0 and RAID 1 support<sup>1</sup>

<sup>1</sup> Support only available with 1TB + 1TB M.2 storage or 2TB + 2TB M.2 storage combinations

<sup>2</sup> Not available if slots if storage slots 3 or 4 are selected



### Features

#### MEMORY

**Maximum Memory<sup>2,3,5</sup>**

128 GB DDR4-3200 non-ECC SDRAM

128 GB DDR4-3200 ECC SDRAM

4 DDR4 SODIMMS<sup>4</sup>

Supports Dual Channel Memory<sup>1</sup>

Memory must be populated in the following order: DIMM1, DIMM3, DIMM2, DIMM4

Slots are customer accessible / upgradeable

<sup>1</sup>Maximized dual-channel performance requires SODIMMs of the same size and speed in both memory channels.

<sup>2</sup>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.

<sup>3</sup>Transfer rates up to 3200 MT/s for nECC and ECC memory combinations when memory suppliers are consistent. If suppliers are not consistent, speeds may drop to 2933 MT/s for nECC and 2933 MT/s for ECC memory combinations. A custom configuration including part number AY104AV can be used to lock in a consistent vendor.

<sup>4</sup>Intel® allows architectures designed with four DIMM slots to run at 3200 MT/s

<sup>5</sup>Maximum memory capacities assume Windows 64-bit operating systems. With Windows 32-bit operating systems, memory above 3 GB may not all be available due to system resource requirements.

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### Features

#### NETWORKING/COMMUNICATIONS

##### LAN

Intel® I219-LM GbE, vPro™<sup>1</sup>  
Intel® I219-V GbE, non-vPro™<sup>1</sup>

<sup>1</sup>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.

##### WLAN

Intel® Wi-Fi 6 AX201 (2x2) and Bluetooth® 5.2 combo, vPro™ <sup>1</sup>  
Intel® Wi-Fi 6 AX201 (2x2) and Bluetooth® 5.2 combo, non-vPro™ <sup>1,2</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.

<sup>2</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.

##### WWAN<sup>1</sup>

Intel® XMM™ 7360 LTE Advanced CAT 9<sup>3</sup>

Nano SIM card slot<sup>2,3</sup>

A removable SIM is an orderable option for selected 4G LTE notebooks. The removable physical eSIM is placed on the SIM tray on the notebook like a standard SIM card. The removable eSIM is programmable and is not limited to a single carrier. You must add eSIM profile to connect to the internet using cellular data.

<sup>1</sup> WWAN use requires separately purchased service contract. Check with service provider for coverage and availability in your area. Connection speeds will vary due to location, environment, network conditions, and other factors. 4G LTE not available on all products, and in all regions.

<sup>2</sup> All units have an internal SIM card slot but 'For WWAN' base units ship with antennas.

<sup>3</sup> Works with Windows 10 only.

##### Optional Near Field Communication (NFC) module

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#### AUDIO/MULTIMEDIA

##### Audio

Audio by Bang & Olufsen, dual stereo speakers, HP World Facing Microphone dual array digital microphone<sup>1</sup>, functions keys for volume up and down, combo microphone/headphone jack, HD audio

<sup>1</sup>Dual-microphone array when equipped with optional webcam and optional world facing microphone.

##### Camera<sup>1, 2, 3</sup>

720p HD webcam with IR

720p HD webcam

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

### Features

<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.

<sup>3</sup> Camera-configured options come with a Privacy Shutter

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### Features

#### KEYBOARDS/POINTING DEVICES/BUTTONS & FUNCTION KEYS

##### Keyboard

HP Premium Quiet Keyboard, full-size, spill-resistant, backlit, a Programmable Key, with sperate numeric keypad, HP DuraKey, touchpad with glass surface, multi-touch gestures and taps enabled

##### Pointing Devices

Dual pointstick; Touchpad with multi-touch gestures enabled, taps enabled as default; Microsoft Precision Touchpad Default Gestures Support

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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

Adobe Creative Cloud Bundle  
Bing search for IE11  
Buy Office  
Data Science Stack  
HP Admin  
HP Connection Optimizer<sup>20,9</sup>  
HP Cloud Recovery<sup>21</sup>  
HP Easy Clean  
HP PC Hardware Diagnostics  
HP Privacy Settings  
HP Hotkey Support  
HP JumpStart  
HP Noise Cancellation Software  
HP Performance Advisor<sup>8</sup>  
HP QuickDrop<sup>22</sup>  
HP Recovery Manager  
HP Remote Graphics Software  
HP Smart Support<sup>19</sup>  
HP Support Assistant<sup>1</sup>  
HP ZCentral Remote Boost 2020 Software for Z workstation<sup>23,2</sup>  
Native Miracast support  
Tile Application

##### Security Management

Absolute persistence module<sup>32,6</sup>  
HP BIOSphere Gen6<sup>30,5</sup>  
HP Client Security Suite Gen7<sup>16</sup>  
HP Device Access Manager  
HP FingerPrint Sensor  
HP Manageability Integration Kit<sup>24,11</sup>

### Features

HP Power On Authentication  
HP Secure Erase<sup>31</sup>  
HP Security Manager  
HP Secure Platform  
HP Sure Click<sup>26</sup>  
HP Sure Recover Gen4<sup>28,13</sup>  
HP Sure Run<sup>27</sup>  
HP Sure Sense<sup>25,17</sup>  
HP Sure Start Gen6<sup>29,14</sup>  
HP SureView Reflect;  
HP Tamper Lock  
Master Boot Record security;  
Microsoft Defender<sup>10</sup>  
Pre-boot authentication  
Nano security lock slot<sup>12</sup>  
Smartcard Reader - Alcor AU9560 (FIPS 201 Compliant)  
Trusted Platform Module TPM 2.0 Embedded Security Chip with Windows 10 (Common Criteria EAL4+ Certified)(FIPS 140-2 Level 2 Certified)<sup>33</sup>  
Windows Secured Core

#### 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

#### Smartcard Reader

Model Number: Alcor AU9560  
FIPS 201 Compliant: Yes

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

<sup>1</sup> HP Support Assistant - Requires Windows and Internet Access.

<sup>2</sup> HP ZCentral Remote Boost Sender does not come preinstalled on Z Workstations but can be downloaded and run on all Z desktop and laptops without license purchase through 2022. 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. ZCentral Remote Boost Sender for non-Z Hardware requires a license and Windows 10, RHEL/CentOS (7 or 8), or UBUNTU 18.04 or 20.04 LTS operating systems. macOS (10.14 or newer) operating system and ThinPro 7.2 are only supported on the receiver side. Requires network access. The software is available for download at [hp.com/ZCentralRemoteBoost](http://hp.com/ZCentralRemoteBoost).

<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. <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.

### Features

<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>14</sup> HP Sure Start Gen6 is available on select HP PCs with Intel processors. See product specifications for availability.

<sup>15</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>16</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>17</sup> HP Sure Sense requires Windows 10. See product specifications for availability.

<sup>18</sup> Wireless access point and Internet service required and sold separately. Availability of public wireless access points limited.

<sup>19</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.

<sup>20</sup> HP Connection Optimizer requires Windows 10.

<sup>21</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>22</sup> HP QuickDrop requires Internet access and Windows 10 PC preinstalled with HP QuickDrop app and either an Android device (phone or tablet) running Android 7 or higher with the Android HP QuickDrop app, and /or an iOS device (phone or tablet) running iOS 12 or higher with the iOS HP QuickDrop app.

<sup>23</sup> HP ZCentral Remote Boost Sender does not come preinstalled on Z Workstations but can be downloaded and run on all Z desktop and laptops without license purchase through 2022. 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. ZCentral Remote Boost Sender for non-Z Hardware requires a license and Windows 10, RHEL/CentOS (7 or 8), or UBUNTU 18.04 or 20.04 LTS operating systems. macOS (10.14 or newer) operating system and ThinPro 7.2 are only supported on the receiver side. Requires network access. The software is available for download at [hp.com/ZCentralRemoteBoost](http://hp.com/ZCentralRemoteBoost).

<sup>24</sup> HP Manageability Integration Kit can be downloaded from <http://www.hp.com/go/clientmanagement>.

<sup>25</sup> HP Sure Sense is available on select HP PCs and is not available with Windows10 Home.

<sup>26</sup> HP Sure Click requires Windows 10. See [https://bit.ly/2PrLT6A\\_SureClick](https://bit.ly/2PrLT6A_SureClick) for complete details.

<sup>27</sup> HP Sure Run is available on select HP PCs and requires Windows 10.

<sup>28</sup> HP Sure Recover Gen4 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>29</sup> HP Sure Start Gen6 is available on select HP PCs.

<sup>30</sup> HP BIOSphere Gen6 features may vary depending on the platform and configuration.

<sup>31</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>32</sup> Absolute firmware module is shipped turned off and can only be activated with the purchase a license subscription and full activation of the software agent. License subscriptions can be purchased for terms ranging multiple years. Service is limited, check with Absolute for availability outside the U.S. Certain conditions apply. For full details visit: <https://www.absolute.com/about/legal/agreements/absolute/>.

<sup>33</sup> TPM 2.0 is limited on HP ThinPro/HP Smart Zero, and functionality is dependent upon use of a customer-enabled application that can locate the TPM chip.

### Features

#### POWER

##### Power Supply

120 W Slim Smart external AC power adapter  
150 W Slim Smart external AC power adapter  
200 W UltraSlim Smart external AC power adapter

##### Primary Battery

HP Long Life 8-cell, 94 Wh Li-ion polymer<sup>2,4</sup>

**Note:** batteries are customer replaceable.

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

MM18: Up to 10 hours and 18 minutes

120 W power adapter is configurable with Intel UMA graphics  
150 W power adapter is configurable with NVIDIA® T1200 and RTX A2000 configurations  
200 W power adapter is configurable with NVIDIA RTX A3000<sup>3</sup> or higher and AMD configurations

##### Power to System

Up to 100 W via USB-C® (up to 75 W on non HP machines) Separate AC power needed for HP ZBooks that require more than 100 W power delivered via USB-C® alt mode.

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

<sup>3</sup>The HP custom vapor chamber (Z VaporForce) is only available on configurations with NVIDIA® RTX™ A3000 graphics and greater or AMD Radeon graphics

<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® certified and EPEAT® registered where applicable.<sup>1</sup>

Low halogen<sup>2</sup>

<sup>1</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.

<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)**

36.1 x 24.25 x 2.595 cm

14.21 x 9.55 x 1.0222 in

**Max. hinge open angle on:** 180°

**Weights**

Starting at 2.35kg (5.18 lb)

Weight varies by configuration and components.

A deck: Anodized Aluminum + plastic antenna cover + magnesium inner structure

B deck: ; Plastic bezel + Touch has Corning® Gorilla® Glass 5 (option)

C deck: Anodized Aluminum + magnesium inner structure

D deck: Magnesium Die Cast

E door: Magnesium Die Cast

Metal Alloy Hinges

**Note:**

A = Top

B = Panel Area

C = Keyboard/Touchpad surface

D = Bottom

#### PORTS/SLOTS

**Left side<sup>6</sup>**

1 RJ-45

1 SuperSpeed USB Type-A 5Gbps signaling rate (charging) [USB 3.1 Gen 1 Type A charging]

1 SuperSpeed USB Type-A 5Gbps signaling rate [USB 3.1 Gen 1 Type A]

1 headphone/microphone combo

1 smart card reader

**Right side<sup>6</sup>**

1 power connector

2 USB Type-C® (Thunderbolt™ 4<sup>8</sup>, pass through support DisplayPort™ 1.4<sup>2</sup>, USB 4, with BC 1.2)

1 Mini DisplayPort™ 1.4 with Discrete Graphics<sup>2</sup>

1 HDMI 2.0b or HDMI 2.1 (depends on graphics selection)<sup>1,3,4,5,7</sup>

1 SD 7.0 Media Card Reader<sup>9</sup>

<sup>1</sup> HDMI port-cable not included.

<sup>2</sup> Mini DisplayPort™ 1.4 with discrete, 1.2 with UMA.

<sup>3</sup> HDMI 2.0b with NVIDIA T1200 and UMA (NVIDIA RTX™ A5000, RTX A4000, RTX A3000, RTX A2000, AMD Radeon Pro W6600M support HDMI 2.1 with FRL)

<sup>4</sup> When both USB Type-C® are in use, HDMI cannot be detected

<sup>5</sup> When one USB Type-C® is in use, HDMI can be detected if USB Type-C® in use is assigned to different channel

<sup>6</sup> When product is under heavy power loading, performance may be reduced to prevent battery drain. Disconnecting USB devices will restore system performance

<sup>7</sup> HDMI 2.1 not supported with T1200/UMA GPU

<sup>8</sup> SuperSpeed USB 20Gbps is not available with Thunderbolt™ 4.

<sup>9</sup> SD4.0 cards will run at SD3 speed for any SD 7.0 host. This is the SD 7.0 standard.

#### SERVICE AND SUPPORT



### Features

HP Services offers 3-year and 1-year limited warranties and 90 day software limited warranty options 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. 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>Sold separately or as an optional feature. Service levels and response times for HP Care Packs may vary depending on your geographic location. Service starts on date of hardware purchase. Restrictions and limitations apply. HP services are governed by the applicable HP terms and conditions of service provided or indicated to Customer at the time of purchase. Customer may have additional statutory rights according to applicable local laws, and such rights are not in any way affected by the HP terms and conditions of service or the HP Limited Warranty provided with your HP Product. Consult your local HP Customer Support Center for details.

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### CERTIFICATION AND COMPLIANCE

Energy Efficiency Compliance  
Energy Efficiency Compliance

ENERGY STAR® certified  
EPEAT® GOLD

### Technical Specifications – System Unit

#### SYSTEM UNIT

<b>Stand-Alone Power Requirements (AC Power)</b>	<b>Nominal Operating Voltage</b>	19.5V
	<b>Average Operating Power(idle)</b>	System in idle mode + max panel brightness Adapter Safety test condition
<b>Temperature</b>	<b>Discrete Graphics Max Operating Power</b>	80W <200W
	<b>Operating</b>	32° to 95° F (0° to 35° C) (No sustained direct exposure to sunlight)
	<b>Non-operating</b>	-4° to 140° F (-20° to 60° C)
<b>Relative Humidity</b>	<b>Operating</b>	10% to 90%, non-condensing
	<b>Non-operating</b>	5% to 95%, 101.6° F (38.7° C) 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>	10,000 ft. (3,048 m)
	<b>Non-operating</b>	40,000 ft. (12,192 m)
<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>UL</b>	Yes
	<b>CSA</b>	Yes
	<b>FCC Compliance</b>	Yes
	<b>ENERGY STAR®</b>	Yes
	<b>EPEAT®</b>	Yes
	<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>GOST</b>	Yes
<b>Saudi Arabian Compliance (ICCP)</b>	Yes	
<b>UKRSERTCOMPUTER</b>	Yes	

<sup>1</sup>Configurations of the HP ZBook Fury 15.6 inch G8 that are ENERGY STAR® qualified are identified as HP ZBook Fury 15.6 inch G8 ENERGY STAR on HP websites and on <http://www.energystar.gov>.

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

### Technical Specifications – Displays

#### DISPLAYS

<b>15.6" diagonal FHD IPS eDP1.2 anti-glare WLED-backlit and ambient light sensor 250 nits 45% NTSC (1920 x 1080)</b>	<b>Outline Dimensions (W x H)</b>	350.96 x 216.65 mm (max)		
	<b>Active Area</b>	344.16 x 193.59 mm (typ.)		
	<b>Weight</b>	370 g (max)		
	<b>Diagonal Size</b>	15.6 inch		
	<b>Thickness</b>	3.2 mm (max)		
	<b>Interface</b>	eDP 1.2		
	<b>Panel Technology</b>	IPS		
	<b>Surface Treatment</b>	Anti-Glare		
	<b>Touch Enabled</b>	No		
	<b>Contrast Ratio</b>	600:1 (typ.)		
	<b>Refresh Rate</b>	60 Hz		
	<b>Brightness</b>	250nits		
	<b>Pixel Resolution</b>	<b>Format</b>	1920 x 1080 (FHD)	
		<b>Configuration</b>	RGB	
	<b>Backlight</b>	LED		
	<b>PPI</b>	166		
	<b>Color Gamut Coverage</b>	45% NTSC		
	<b>Color Depth</b>	6 bits + Hi FRC		
	<b>Viewing Angle</b>	UWVA 85/85/85/85		

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

<b>15.6" diagonal FHD IPS eDP1.3 + PSR anti-glare WLED-backlit and ambient light sensor 400 nits 72% NTSC (1920 x 1080)</b>	<b>Outline Dimensions (W x H)</b>	350.96 x 216.75 mm (max)		
	<b>Active Area</b>	344.16 x 193.59 mm (typ.)		
	<b>Weight</b>	370 g (max)		
	<b>Diagonal Size</b>	15.6 inch		
	<b>Thickness</b>	3.2 mm (max)		
	<b>Interface</b>	eDP 1.3 + PSR		
	<b>Panel Technology</b>	IPS		
	<b>Surface Treatment</b>	Anti-Glare		
	<b>Touch Enabled</b>	No		
	<b>Contrast Ratio</b>	600:1 (typ.)		
	<b>Refresh Rate</b>	60 Hz		
	<b>Brightness</b>	400 nits		
	<b>Pixel Resolution</b>	<b>Format</b>	1920 x 1080 (FHD)	
		<b>Configuration</b>	RGB	
	<b>Backlight</b>	LED		
	<b>PPI</b>	142		
	<b>Color Gamut Coverage</b>	72% NTSC		
	<b>Color Depth</b>	6 bits + Hi FRC		
	<b>Viewing Angle</b>	UWVA 85/85/85/85		

### Technical Specifications – Displays

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

<b>Next Gen HP SureView Reflect 15.6" diagonal FHD IPS eDP1.3 + PSR anti-glare WLED-backlit and ambient light sensor 1000 nits 72% NTSC (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>Panel Technology</b>	IPS	
	<b>Surface Treatment</b>	Anti-Glare	
	<b>Touch Enabled</b>	No	
	<b>Contrast Ratio</b>	1500:1 (typ.)	
	<b>Refresh Rate</b>	60Hz	
	<b>Brightness</b>	1000 nits	
	<b>Pixel Resolution</b>	<b>Pitch</b>	1920 x 1080 (FHD)
		<b>Format</b>	RGB
	<b>Backlight</b>	LED	
	<b>PPI</b>	141	
<b>Color Gamut Coverage</b>	72% NTSC		
<b>Color Depth</b>	8 bits		
<b>Viewing Angle</b>	UWVA 85/85/85/85		

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

<b>Next Gen HP Dream Color display 15.6" diagonal UHD IPS 120Hz eDP1.4 + PSR2 anti-glare BV LED-backlit and ambient light sensor 600 nits 100% DCI-P3 (3840 x 2160)</b>	<b>Outline Dimensions (W x H)</b>	350.22 x 216.27 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>	eDP 1.4 + PSR2	
	<b>Panel Technology</b>	IPS	
	<b>Surface Treatment</b>	Anti-Glare	
	<b>Touch Enabled</b>	No	
	<b>Contrast Ratio</b>	1200:1 (typ.)	
	<b>Refresh Rate</b>	120Hz	
	<b>Brightness</b>	600 nits	
	<b>Pixel Resolution</b>	<b>Pitch</b>	3840 x 2160 (UHD)
		<b>Format</b>	RGB
	<b>Backlight</b>	LED	
	<b>PPI</b>	282	
<b>Color Gamut Coverage</b>	100% DCI-P3		
<b>Delta E</b>	<2		
<b>Color Depth</b>	8 bits		

### Technical Specifications – Displays

**Viewing Angle** UWVA 85/85/85/85

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

**15.6" diagonal UHD (3840 x 2160) IPS HDR 400 eDP1.4 + PSR2 WLED-backlit touch screen with Corning® Gorilla® Glass 5 and ambient light sensor 600 nits 100% DCI-P3**

**Outline Dimensions (W x H)** 350.22 x 216.27 mm (max)

**Active Area** 344.22 x 193.62 (mm)

**Weight** 300g max.

**Diagonal Size** 15.6 inch

**Thickness** 2.6 (mm) max

**Interface** eDP 1.4 + PSR2

**Panel Technology** IPS

**Surface Treatment** Anti-Glare

**Touch Enabled** Yes

**Contrast Ratio** 1200:1 (typ.)

**Refresh Rate** 120Hz

**Brightness** 600 nits

**Pixel Resolution** **Pitch** 3840 x 2160 (UHD)

**Format** RGB

**Backlight** LED

**PPI** 282

**Color Gamut Coverage** 100% DCI-P3

**Delta E** <2

**Color Depth** 8 bits

**Viewing Angle** UWVA 85/85/85/85

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>256GB PCIe NVMe TLC M.2 2280 Solid State Drive</b>	<b>Form Factor</b>	M.2 2280		
	<b>Drive Weight</b>	0.02 lb (10 g)		
	<b>Capacity</b>	256GB		
	<b>NAND Type</b>	TLC		
	<b>Height</b>	2.3 mm Max		
	<b>Width</b>	0.87 in (22 mm)		
	<b>Interface</b>	PCIe® Gen3 x4 NVMe™		
	<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		
	<p>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.</p> <p>Slot 1 – 4 supports up to PCIe Gen 3 speeds</p>			
<b>256GB PCIe NVMe TLC M.2 2280 SED Opal 2 Solid State Drive</b>	<b>Form Factor</b>	M.2 2280		
	<b>Drive Weight</b>	0.02 lb (10 g)		
	<b>Capacity</b>	256GB		
	<b>NAND Type</b>	TLC		
	<b>Height</b>	2.3 mm Max		
	<b>Width</b>	0.87 in (22 mm)		
	<b>Interface</b>	PCIe® Gen3 x4 NVMe™		
	<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 (Option); TCG Opal 2.0 ; TRIM; L1.2		
	<p>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.</p> <p>Slot 1 – 4 supports up to PCIe Gen 3 speeds</p>			
<b>512GB PCIe NVMe TLC M.2 2280 Solid State Drive</b>	<b>Form Factor</b>	M.2 2280		
	<b>Drive Weight</b>	0.02 lb (10 g)		
	<b>Capacity</b>	512GB		
	<b>NAND Type</b>	TLC		
	<b>Height</b>	2.3 mm Max		
	<b>Width</b>	0.87 in (22 mm)		
	<b>Interface</b>	PCIe® Gen3 x4 NVMe™		
	<b>Performance</b>	<b>Maximum Sequential Read</b>	<b>Maximum Sequential Write</b>	
		3400 MB/s	2956 MB/s	
	<b>Logical Blocks</b>	1,000,215,216		
	<b>Operating Temperature</b>	32° to 158°F (0° to 70°C) [ambient temp]		
	<b>Features</b>	ATA Security, TRIM; L1.2		

### Technical Specifications – Storage

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.

Slot 1 – 4 supports up to PCIe Gen 3 speeds

<b>512TB PCIe NVMe TLC M.2 2280 SED Opal 2 Solid State Drive</b>	<b>Form Factor</b>	M.2 2280	
	<b>Drive Weight</b>	0.02 lb (10 g)	
	<b>Capacity</b>	512GB	
	<b>NAND Type</b>	TLC	
	<b>Height</b>	2.3 mm Max	
	<b>Width</b>	0.87 in (22 mm)	
	<b>Interface</b>	PCIe® Gen3 x4 NVMe™	
	<b>Performance</b>	<b>Maximum Sequential Read</b>	<b>Maximum Sequential Write</b>
		3400 MB/s	2500 MB/s
	<b>Logical Blocks</b>	1,000,215,216	
<b>Operating Temperature</b>	32° to 158°F (0° to 70°C) [ambient temp]		
<b>Features</b>	ATA Security (Option); TCG Opal 2.0 ; TRIM; L1.2		

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.

Slot 1 – 4 supports up to PCIe Gen 3 speeds

<b>1TB PCIe NVMe TLC M.2 2280 Solid State Drive</b>	<b>Form Factor</b>	M.2 2280	
	<b>Drive Weight</b>	0.02 lb (10 g)	
	<b>Capacity</b>	1TB	
	<b>NAND Type</b>	TLC	
	<b>Height</b>	2.3 mm Max	
	<b>Width</b>	0.87 in (22 mm)	
	<b>Interface</b>	PCIe® Gen3 x4 NVMe™	
	<b>Performance</b>	<b>Maximum Sequential Read</b>	<b>Maximum Sequential Write</b>
		3480 MB/s	2800 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		
<b>Available in RAID 1 config</b>	Yes		

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.

Slot 1 – 4 supports up to PCIe Gen 3 speeds

<b>2TB PCIe NVMe TLC M.2 2280 Solid State Drive</b>	<b>Form Factor</b>	M.2 2280	
	<b>Drive Weight</b>	0.02 lb (10 g)	
	<b>Capacity</b>	2TB	
	<b>NAND Type</b>	TLC	
	<b>Height</b>	2.3 mm Max	
	<b>Width</b>	0.87 in (22 mm)	
	<b>Interface</b>	PCIe® Gen3 x4 NVMe™	
	<b>Performance</b>	<b>Maximum Sequential Read</b>	<b>Maximum Sequential Write</b>
		3180 MB/s	2920 MB/s

### Technical Specifications – Storage

<b>Logical Blocks</b>	3,907,029,168
<b>Operating Temperature</b>	32° to 158°F (0° to 70°C) [ambient temp]
<b>Features</b>	ATA Security, TRIM; L1.2
<b>Available in RAID 1 config</b>	Yes

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.

Slot 1 – 4 supports up to PCIe Gen 3 speeds

#### 500GB SATA 2.5" HDD

<b>Form Factor</b>	2.5"
<b>Drive Weight</b>	0.21 lbs (95 g)
<b>Capacity</b>	500GB
<b>Height</b>	0.28 in (7 mm)
<b>Width</b>	2.75 in (69.85 mm)
<b>Interface</b>	ATA-8, SATA 3.0
<b>Performance</b>	<b>Maximum Sequential Read</b> <b>Maximum Sequential Write</b> 120MB/s                                      120MB/s

<b>Logical Blocks</b>	976,773,168
<b>Operating Temperature</b>	32° to 140° F (0° to 60° C) [case temp]
<b>Features</b>	ATA Security; S.M.A.R.T., NCQ, Ultra DMA, DIPM, HIPM
<b>Notes:</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.	

#### 500GB SATA 2.5" SED HDD - FIPS-140-2

<b>Form Factor</b>	2.5"
<b>Drive Weight</b>	0.21 lbs (95 g)
<b>Capacity</b>	500GB
<b>Height</b>	0.28 in (7 mm)
<b>Width</b>	2.75 in (69.85 mm)
<b>Interface</b>	ATA-8, SATA 3.0
<b>Performance</b>	<b>Maximum Sequential Read</b> <b>Maximum Sequential Write</b> 120MB/s                                      120MB/s

<b>Logical Blocks</b>	976,773,168
<b>Operating Temperature</b>	32° to 140° F (0° to 60° C) [case temp]
<b>Features</b>	ATA Security; S.M.A.R.T., NCQ, Ultra DMA, DIPM, HIPM
<b>Notes:</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.	

#### 1TB SATA 2.5" HDD

<b>Form Factor</b>	2.5"
<b>Drive Weight</b>	0.21 lbs (95 g)
<b>Capacity</b>	1TB
<b>Height</b>	0.28 in (7 mm)
<b>Width</b>	2.75 in (69.85 mm)
<b>Interface</b>	ATA-8, SATA 3.0
<b>Performance</b>	<b>Maximum Sequential Read</b> <b>Maximum Sequential Write</b> 120MB/s                                      120MB/s

<b>Logical Blocks</b>	1,953,525,168
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### Technical Specifications – Storage

	<b>Operating Temperature</b>	32° to 140° F (0° to 60° C) [case temp]		
	<b>Features</b>	ATA Security; S.M.A.R.T., NCQ, Ultra DMA, DIPM, HIPM		
		<b>Notes:</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>2TB SATA 2.5" HDD</b>	<b>Form Factor</b>	2.5"		
	<b>Drive Weight</b>	0.21 lbs (95 g)		
	<b>Capacity</b>	2TB		
	<b>Height</b>	0.28 in (7 mm)		
	<b>Width</b>	2.75 in (69.85 mm)		
	<b>Interface</b>	ATA-8, SATA 3.0		
	<b>Performance</b>	<b>Maximum Sequential Read</b>	<b>Maximum Sequential Write</b>	
		100MB/s	100MB/s	
	<b>Logical Blocks</b>	3,907,029,168		
	<b>Operating Temperature</b>	32° to 140° F (0° to 60° C) [case temp]		
	<b>Features</b>	ATA Security; S.M.A.R.T., NCQ, Ultra DMA, DIPM, HIPM		
		<b>Notes:</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>1TB PCIe NVMe TLC M.2 2280 SED Opal 2 Solid State Drive</b>	<b>Form Factor</b>	M.2 2280		
	<b>Drive Weight</b>	0.02 lb (10 g)		
	<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>Interface</b>	PCIe® Gen3 x4 NVMe™		
	<b>Performance</b>	<b>Maximum Sequential Read</b>	<b>Maximum Sequential Write</b>	
		Up to 3500 MB/s	Up to 3000 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 (Option); TCG Opal 2.0; TRIM; L1.2;		
		<b>Notes:</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>2TB PCIe NVMe TLC M.2 2280 SED Opal 2 Solid State Drive</b>	<b>Form Factor</b>	M.2 2280		
	<b>Drive Weight</b>	0.02 lb (10 g)		
	<b>Capacity</b>	2TB		
	<b>NAND Type</b>	TLC		
	<b>Height</b>	0.09 in (2.3 mm)		
	<b>Width</b>	0.87 in (22 mm)		
	<b>Interface</b>	PCIe® Gen3 x4 NVMe™		
	<b>Performance</b>	<b>Maximum Sequential Read</b>	<b>Maximum Sequential Write</b>	

### Technical Specifications – Storage

Up to 3500 MB/s                      Up to 3000 MB/s

**Logical Blocks**                      4,000,797,360  
**Operating Temperature**        32° to 158°F (0° to 70°C) [ambient temp]  
**Features**                              ATA Security (Option); TCG Opal 2.0; TRIM; L1.2;

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

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

**Form Factor**                          M.2 2280  
**Capacity**                              256 GB  
**NAND Type**                          TLC  
**Height**                                0.09 in (2.3 mm)  
**Width**                                 0.87 in (22 mm)  
**Weight**                                0.02 lb (<10 g)  
**Interface**                            PCIe® Gen4 x4 NVMe™

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

**Logical Blocks**                      500,118,192  
**Operating Temperature**        32° to 158°F (0° to 70°C) [ambient temp]  
**Features**                              Pyrite 2.0; TRIM; L1.2;

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

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

**Form Factor**                          M.2 2280  
**Capacity**                              512 GB  
**NAND Type**                          TLC  
**Height**                                0.09 in (2.3 mm)  
**Width**                                 0.87 in (22 mm)  
**Weight**                                0.02 lb (<10 g)  
**Interface**                            PCIe® Gen4 x4 NVMe™

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

**Logical Blocks**                      1,000,215,216  
**Operating Temperature**        32° to 158°F (0° to 70°C) [ambient temp]  
**Features**                              Pyrite 2.0; TRIM; L1.2;

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

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

**Form Factor**                          M.2 2280  
**Capacity**                              1TB  
**NAND Type**                          TLC  
**Height**                                0.09 in (2.3 mm)

### Technical Specifications – Storage

<b>Width</b>	0.87 in (22 mm)
<b>Weight</b>	0.02 lb (<10 g)
<b>Interface</b>	PCIe® Gen4 x4 NVMe™

<b>Performance</b>	<b>Maximum Sequential Read</b>	<b>Maximum Sequential Write</b>
	Up to 7,100 MB/s	Up to 5,200 MB/s

**Logical Blocks** 2,000,409,264

**Operating Temperature** 32° to 158°F (0° to 70°C) [ambient temp]

**Features** Pyrite 2.0; TRIM; L1.2;

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

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

<b>Form Factor</b>	M.2 2280
<b>Capacity</b>	2TB
<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® Gen4 x4 NVMe™

<b>Performance</b>	<b>Maximum Sequential Read</b>	<b>Maximum Sequential Write</b>
	Up to 7,100 MB/s	Up to 5,200 MB/s

**Logical Blocks** 4,000,797,360

**Operating Temperature** 32° to 158°F (0° to 70°C) [ambient temp]

**Features** Pyrite 2.0; TRIM; L1.2;

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

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

<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® Gen4 x4 NVMe™

<b>Performance</b>	<b>Maximum Sequential Read</b>	<b>Maximum Sequential Write</b>
	6,400 MB/s	2,700 MB/s

**Logical Blocks** 500,118,192

**Operating Temperature** 32° to 158°F (0° to 70°C) [ambient temp]

**Features** ATA Security (Option); TCG Opal 2.0; TRIM; L1.2;

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

### Technical Specifications – Storage

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

<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® Gen4 x4 NVMe™

<b>Performance</b>	<b>Maximum Sequential Read</b>	<b>Maximum Sequential Write</b>
	6,600 MB/s	5,100 MB/s

**Logical Blocks** 1,000,215,216

**Operating Temperature** 32° to 158°F (0° to 70°C) [ambient temp]

**Features** ATA Security (Option); TCG Opal 2.0; TRIM; L1.2;

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

### Technical Specifications – Networking

#### NETWORKING/COMMUNICATION

<b>Intel i219LM 10/100/1000 Integrated NIC vPro™</b>	<b>Connector</b>	RJ-45
	<b>System Interface</b>	PCI(Intel proprietary) + SMBus
	<b>Data rates supported</b>	10 Mbit/s operation (10BASE-T; IEEE 802.3i; IEEE 802.3 clauses 13-14) 100 Mbit/s operation (100BASE-TX; IEEE 802.3u; IEEE 802.3 clauses 21-30) 1000 Mbit/s operation (1000BASE-T; IEEE 802.3ab; IEEE 8023 clauses 40) Auto-Negotiation (Automatic Speed Selection) Full Duplex Operation at all Speeds, Half Duplex operation at 10 and 100 Mbit/s
	<b>IEEE Compliance</b>	IEEE 802.1p QoS (Quality of Service) Support IEEE 802.1q VLAN support IEEE 802.3x Flow Control (IEEE 802.3 clauses 31-32; configurable) IEEE 802.3az EEE (Energy Efficient Ethernet)
	<b>Performance</b>	TCP/IP/UDP Checksum Offload (configurable) Protocol Offload (ARP & NS) Large send offload and Giant send offload Receiving Side Scaling(Hash Mode Only) Jumbo Frame 9K
	<b>Power consumption</b>	Cable Disconnection: 25mW 100Mbps Full Run: 450mW 1000bp Full Run: 1000mW WoL Enable(S3/S4/S5): 50mW WoL Disable(S3/S4/S5): 25mW
	<b>Power Management</b>	ACPI compliant – multiple power modes Situation-sensitive features reduce power consumption Advanced link down power saving for reducing link down power consumption
	<b>Management Interface IT Manageability</b>	Auto MDI/MDIX Crossover cable detection Wake-on-LAN from modem standby or sleep state (Magic Packet and Microsoft Wake-Up Frame); Wake-on-LAN from off (Magic Packet only) PXE 2.1 Remote Boot Statistics Gathering (SNMP MIB II, Ethernet-like MIB, Ethernet MIB (802.3x, clause 30)) Comprehensive diagnostic and configuration software suite Virtual Cable Doctor for Ethernet cable status
	<b>Security &amp; Manageability</b>	Intel® vPro™ support with appropriate Intel® chipset components

<b>Intel i219v 10/100/1000 Integrated NIC non- vPro™</b>	<b>Connector</b>	RJ-45
	<b>System Interface</b>	PCI(Intel proprietary) + SMBus
	<b>Data rates supported</b>	10 Mbit/s operation (10BASE-T; IEEE 802.3i; IEEE 802.3 clauses 13-14) 100 Mbit/s operation (100BASE-TX; IEEE 802.3u; IEEE 802.3 clauses 21-30) 1000 Mbit/s operation (1000BASE-T; IEEE 802.3ab; IEEE 8023 clauses 40) Auto-Negotiation (Automatic Speed Selection) Full Duplex Operation at all Speeds, Half Duplex operation at 10, 100 & 1000 Mbit/s
<b>IEEE Compliance</b>	IEEE 802.1p QoS (Quality of Service) Support IEEE 802.1q VLAN support	

### Technical Specifications – Networking

	IEEE 802.3x Flow Control (IEEE 802.3 clauses 31-32; configurable)
	IEEE 802.3az EEE (Energy Efficient Ethernet)
	IEEE 802.3i 10BASE-T
	IEEE 802.3u 100BASE-TX
	IEEE 802.3ab 1000BASE-T
	IEEE 802.3bz 2.5GBASE-T
<b>Performance</b>	TCP/IP/UDP Checksum Offload (configurable) Protocol Offload (ARP & NS) Large send offload and Giant send offload Receiving Side Scaling(Hash Mode only) Jumbo Frame 9K
<b>Power consumption</b>	Cable Disconnection: 25mW 100Mbps Full Run: 450mW 1000bp Full Run: 1000mW WoL Enable(S3/S4/S5): 50mW WoL Disable(S3/S4/S5): 25mW
<b>Power Management</b>	ACPI compliant – multiple power modes Situation-sensitive features reduce power consumption Advanced link down power saving for reducing link down power consumption
<b>Management Interface IT Manageability</b>	Auto MDI/MDIX Crossover cable detection Wake-on-LAN from modem standby or sleep state (Magic Packet and Microsoft Wake-Up Frame); Wake-on-LAN from off (Magic Packet only) PXE 2.1 Remote Boot Statistics Gathering (SNMP MIB II, Ethernet-like MIB, Ethernet MIB (802.3x, clause 30)) Comprehensive diagnostic and configuration software suite Virtual Cable Doctor for Ethernet cable status

### NFC (Near Field Communication) module (optional)

<b>Dimensions (L x W x H)</b>	Module 50 mm by 23 mm by 2.89 mm
<b>Chipset</b>	SiM3U156+SiM3U154+AMS3911
<b>System interface</b>	USB 2.0
<b>System interface (I/O)</b>	Audio signal output on card read
<b>NFC RF standards (In reading CSN)</b>	ISO/IEC 14443 A ISO/IEC 14443 B ISO/IEC 15693 ISO/IEC 18092 ECMA-340 NFCIP-1
<b>NFC Forum Support Reader Mode</b>	Tag Type 1, Type 2, Type3 and Type 4 in reading CSN 13.56MHz: ISO/IEC 14443 A ISO/IEC 14443 B ISO/IEC 15693 MIFARE 1K MIFARE 4K MIFARE DESFire FeliCa Topaz cards

### Technical Specifications – Networking

HID iClass ISO  
 125kHz:  
 HID Prox UID  
 AWID UID  
 CASI-RUSCO UID  
 EM 410x UID  
 Indana ASP/ASP+ UID

**Frequency** 13.56MHz and 125kHz

**NFC Modes Supported** Reader

**Raw RF Data Rates** 106, 212 kbps

**Operating temperature** -30°C to 70°C

**Storage temperature** -40°C to 80°C

**Humidity** 10-90% operating  
 5-95% non-operating

**Supply Operating voltage** 4.35 to 5.25 Volts

**Power Consumption** **Mode** Power Consumption, Typical

**Polling** 75mA

**Communication** 85mA

**Antenna** 13.56MHz/125kHz combo antenna. Antenna connector, 0.5mm pitch, 16pin connector FPC.

**Intel Wi-Fi 6 AX201 + BT5.2 (802.11ax 2x2, non-vPro, supporting gigabit data rate)\*\* non-vPro**

**Wireless LAN Standards** IEEE 802.11a  
 IEEE 802.11b  
 IEEE 802.11g  
 IEEE 802.11n  
 IEEE 802.11ac  
 IEEE 802.11ax  
 IEEE 802.11d  
 IEEE 802.11e  
 IEEE 802.11h  
 IEEE 802.11i  
 IEEE 802.11k  
 IEEE 802.11r  
 IEEE 802.11v

**Interoperability** Wi-Fi certified

**Frequency Band** 802.11b/g/n/ax  
 • 2.402 – 2.482 GHz  
 802.11a/n/ac/ax  
 • 4.9 – 4.95 GHz (Japan)  
 • 5.15 – 5.25 GHz  
 • 5.25 – 5.35 GHz  
 • 5.47 – 5.725 GHz  
 • 5.825 – 5.850 GHz

**Data Rates** • 802.11b: 1, 2, 5.5, 11 Mbps  
 • 802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps  
 • 802.11a: 6, 9, 12, 18, 24, 36, 48, 54 Mbps  
 • 802.11n: MCS 0 ~ MCS 15, (20MHz, and 40MHz)  
 • 802.11ac : MCS0 ~ MCS9, (1SS, and 2SS) (20MHz, 40MHz, ,80MHz & 160MHz)

### Technical Specifications – Networking

<b>Modulation</b>	<ul style="list-style-type: none"><li>• 802.11ax : MCS0 ~ MCS11, (1SS and 2SS) (20MHz, 40MHz, ,80MHz &amp; 160MHz)</li></ul> Direct Sequence Spread Spectrum OFDM, BPSK, QPSK, CCK, 16-QAM, 64-QAM, 256-QAM , 1024QAM
<b>Security<sup>1</sup></b>	<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 and WPA3 certification</li><li>• IEEE 802.11i</li><li>• WAPI</li></ul>
<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 : +18.5dBm minimum</li><li>• 802.11g : +17.5dBm minimum</li><li>• 802.11a : +18.5dBm minimum</li><li>• 802.11n HT20(2.4GHz) : +15.5dBm minimum</li><li>• 802.11n HT40(2.4GHz) : +14.5dBm minimum</li><li>• 802.11n HT20(5GHz) : +15.5dBm minimum</li><li>• 802.11n HT40(5GHz) : +14.5dBm minimum</li><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 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 : -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>	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 with CNVi Interface



### Technical Specifications – Networking

<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 126: 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)
<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 Off – Radio ON
<b>HP Integrated Module with Bluetooth 4.0/4.1/4.2/5.0/5.1/5.2 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)

### Technical Specifications – Networking

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.

\*Wi-Fi 6 is designed to support gigabit data rate when transferring files between two devices connected to the same router. Requires a wireless router, sold separately, that supports 80MHz and higher channels.

\*\*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.

<b>Intel Wi-Fi 6 AX201 + BT5.2 (802.11ax 2x2, vPro, supporting gigabit data rate*)** vPro</b>	<b>Wireless LAN Standards</b>	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
	<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> </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: MCS 0 ~ MCS 15, (20MHz, and 40MHz)</li> <li>• 802.11ac : MCS0 ~ MCS9, (1SS, and 2SS) (20MHz, 40MHz, ,80MHz &amp; 160MHz)</li> <li>• 802.11ax : MCS0 ~ MCS11, (1SS and 2SS) (20MHz, 40MHz, ,80MHz &amp; 160MHz)</li> </ul>
	<b>Modulation</b>	Direct Sequence Spread Spectrum OFDM, BPSK, QPSK, CCK, 16-QAM, 64-QAM, 256-QAM, 1024QAM
	<b>Security<sup>1</sup></b>	<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 and WPA3 certification</li> </ul>

### Technical Specifications – Networking

<b>Network Architecture Models</b>	<ul style="list-style-type: none"> <li>• IEEE 802.11i</li> <li>• WAPI</li> </ul>
<b>Roaming</b>	Ad-hoc (Peer to Peer)
<b>Output Power<sup>2</sup></b>	Infrastructure (Access Point Required) IEEE 802.11 compliant roaming between access points <ul style="list-style-type: none"> <li>• 802.11b : +18.5dBm minimum</li> <li>• 802.11g : +17.5dBm minimum</li> <li>• 802.11a : +18.5dBm minimum</li> <li>• 802.11n HT20(2.4GHz) : +15.5dBm minimum</li> <li>• 802.11n HT40(2.4GHz) : +14.5dBm minimum</li> <li>• 802.11n HT20(5GHz) : +15.5dBm minimum</li> <li>• 802.11n HT40(5GHz) : +14.5dBm minimum</li> <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 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/Modern Standby: 10mW</li> <li>• Radio disabled: 8 mW</li> </ul>
<b>Power Management</b>	ACPI and PCI Express compliant power management
<b>Receiver Sensitivity<sup>3</sup></b>	802.11 compliant power saving mode <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>	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 with CNVi Interface
<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 126: 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)
<b>Altitude</b>	Operating Non-operating 0 to 10,000 ft (3,048 m) 0 to 50,000 ft (15,240 m)

### Technical Specifications – Networking

<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 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)
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**Security & Manageability** Intel® vPro™ support with appropriate Intel® chipset components

\*GbE - The term "10/100/1000" or "Gigabit" Ethernet indicates compatibility with IEEE standard 802.3ab for Gigabit Ethernet, and does not connote actual operating speed of 1 Gb/s. For high-speed transmission, connection to a Gigabit Ethernet server and network infrastructure is required.

\*Wi-Fi 6 is designed to support gigabit data rate when transferring files between two devices connected to the same router. Requires a wireless router, sold separately, that supports 80MHz and higher channels.

### Technical Specifications – Networking

\*\*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.

#### Intel® XMM™ 7360 LTE-Advanced CAT9 (Pandora)\*

<b>Technology/Operating bands</b>	FDD LTE: 2100 (Band 1), 1900 (Band 2), 1800 (Band 3), 1700/2100 (Band 4), 850 (Band 5), 2600 (Band 7), 900 (Band 8), 1400 (Band 11), 700 (Band 12 lower), 700 (Band 13 upper), 700 (Band 17 lower), 850 (Band 18 lower), 850 (Band 19 upper), 800 (Band 20), 1400 (Band 21), 850 (Band 26), 700 (Band 28), 700 (Band 29 RX only), 2300 (Band 30), 1700/2100 (Band 66). TDD LTE: 2600 (Band 38), 1900 (Band 39), 2400 (Band 40), 2500 (Band 41). HSPA+: 2100 (Band 1), 1900 (Band 2), 1700/2100 (Band 4), 850 (Band 5), 900 (Band 8) MHz
<b>Wireless protocol standards</b>	3GPP Release 11 LTE Specification CAT.9, DL 60MHz BW throughput up to 450Mbps; UL 20MHz throughput up to 50Mbps WCDMA R99, 3GPP Release 5, 6, 7 and 8 UMTS Specification
<b>GPS</b>	Standalone, A-GPS (MS-A, MS-B)
<b>GPS bands</b>	1575.42 MHz ± 1.023 MHz, GLONASS 1596-1607MHz, Beidou 1561.098 MHz
<b>Maximum data rates</b>	LTE: 450 Mbps (Download), 50 Mbps (Upload) DC-HSPA+: 42 Mbps (Download), 5.76 Mbps (Upload) HSPA+: 21Mbps (Download), 5.76 Mbps (Upload)
<b>Maximum output power</b>	LTE: 23 dBm HSPA+: 23.5 dBm
<b>Maximum power consumption</b>	LTE: 1,200 mA (peak); 900 mA (average) HSPA+: 1,100 mA (peak); 800 mA (average)
<b>Form Factor</b>	M.2, 3042-S3 Key B
<b>Weight</b>	5.8 g
<b>Dimensions</b> (Length x Width x Thickness)	42 x 30 x 2.3 mm

\* Mobile Broadband is an optional feature and requires configuration at purchase. Connection requires wireless data service contract, network support, and is not available in all areas. Contact service provider to determine the coverage area and availability. Connection speeds will vary due to location, environment, network conditions, and other factors. 4G LTE not available on all products or in all countries.

#### Near Field Communications Controller (optional)

<b>Dimensions (L x W x H)</b>	Module 25 mm by 10 mm by 2.0 mm
<b>Chipset</b>	NPC100
<b>System interface</b>	I2C
<b>NFC RF standards</b>	ISO/IEC 14443 A ISO/IEC 14443 B ISO/IEC 15693 ISO/IEC 18092 ECMA-340 NFCIP-1 Target and Initiator ECMA-320 NFCIP-2
<b>NFC Forum Support</b>	Tag Type 1, Type 2, Type3 and Type 4, NFCIP-1 and NFCIP-2
<b>Reader (PCD-VCD) Mode(1)</b>	ISO/IEC 14443 A ISO/IEC 14443 B

### Technical Specifications – Networking

	ISO/IEC 15693
	MIFARE 1K
	MIFARE 4K
	MIFARE DESFire
	FeliCa
	Jewel and Topaz cards
<b>Card Emulation (PICC-VICC) Mode(1)</b>	ISO/IEC 14443 A ISO/IEC 14443 B and B' MIFARE FeliCa
<b>Frequency</b>	13.56 MHz
<b>NFC Modes Supported</b>	Reader/Writer, Peer-to-Peer
<b>Raw RF Data Rates</b>	106, 212, 424, 848 kbps
<b>Operating temperature</b>	0°C to 70°C
<b>Storage temperature</b>	-20°C to 125°C
<b>Humidity</b>	10-90% operating 5-95% non-operating
<b>Supply Operating voltage</b>	4.35 to 5.25 Volts
<b>I/O Voltage</b>	1.8V or 3.3V
<b>Power Consumption</b>	<b>Booster enable, VBAT= 3.3V, VCC_BOOST = 5V) Mode Power Consumption, Typical</b>
	<b>Polling</b> 7.3 mA
	<b>Detected Test Tag Type 1</b> Total 283.8 mA Net Module 236.8 mA
	<b>Detected Test Tag Type 2</b> Total 288.8 mA Net Module 241.8 mA
	<b>Detected Test Tag Type 3</b> Total 287.7 mA Net Module 240.7 mA
	<b>Detected Test Tag Type 4</b> Total 282.3 mA Net Module 235.3 mA
<b>Antenna</b>	Antenna connector, 0.5mm pitch, 7 connector FPC. Antenna matching is external to module.

### Technical Specifications – Power

#### POWER

<b>120 Watt Slim Smart AC Adapter</b>	<b>Dimensions</b>	138x68.5x25.4mm	
	<b>Weight</b>	unit: 350g +/- 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>	1.7 A at 90 Vac and Maximum Load
	<b>Output</b>	<b>Output power</b>	120W
		<b>DC output</b>	19.5V
		<b>Hold-up time</b>	5ms at 115 Vac input
		<b>Output current limit</b>	<18.0A
	<b>Connector</b>	C5	
	<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.	
	*Can only be configured with Intel UMA Graphics option		

<b>150 Watt Slim Smart 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>	C5	
<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.

\*Can only be configured with NVIDIA T1200 and A2000 Graphics option

#### 200 Watt UltraSlim Smart AC Adapter

<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 ~ 63 Hz
	<b>Input AC current</b>	2.9 A at 90 Vac and Maximum Load
	<b>Output</b>	<b>Output power</b>
<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>	C13	
<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>	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 100,000 hours at 25°C ambient condition.	

\*Can only be configured with RTX A3000, RTX A4000, RTX A5000 Graphics and Radeon W6600M Graphics option



### Technical Specifications – Power

<b>HP Long Life 8-cell Polymer (94Wh) Battery</b>	<b>Weight</b>	414.5g		
	<b>Cells/Type</b>	8 cell		
	<b>Energy</b>	Voltage	11.55V	
		Amp-hour capacity	4.15Ah	
	<b>Temperature</b>	Operating (Charging)	0° to 60° C	
		Operating (Discharging)	-20° to 70° C	
	<b>Fuel Gauge LED</b>	NA		
	<b>Warranty</b>	Depends on system offering		
	<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 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

- 10% 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)	13.73 W	13.82 W	13.88 W
Normal Operation (Long idle)	1.68 W	1.80 W	1.76 W
Sleep	1.68 W	1.80 W	1.76 W
Off	0.43 W	0.44 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)	47 BTU/hr	47 BTU/hr	47 BTU/hr
Normal Operation (Long idle)	6 BTU/hr	6 BTU/hr	6 BTU/hr
Sleep	6 BTU/hr	6 BTU/hr	6 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

2.6

13.8

Fixed Disk – Random writes

2.7

15.8

Optical Drive – Sequential reads

2.9

19.5

#### Longevity and Upgrading

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

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 94% recycle-able when properly disposed of at end of life.

#### Packaging Materials

<b>External:</b>	PAPER/Corrugated	306 g
<b>Internal:</b>	PAPER/Molded pulp	181 g
	PLASTIC/Polyethylene low density	13 g
	PLASTIC/polypropylene	5 g

The plastic packaging material contains at least 57% recycled content.

The corrugated paper packaging materials contains at least 59% 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 [http://www.hp.com/hpinfo/globalcitizenship/environment/supplychain/gen\\_specifications.html](http://www.hp.com/hpinfo/globalcitizenship/environment/supplychain/gen_specifications.html))

### Technical Specifications – Environmental

):

- 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>. 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

- 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>Displays</b>	HP Z32 31.5" 4k UHD Display	1AA81A8#XXX
	HP Z38c 37.5" Curved Display	Z4W65A8#XXX
<b>Case</b>	HP Essential Top Load Case (up to 15.6")	H2W17AA
	HP Essential Backpack (up to 15.6")	H1D24AA
	HP Executive 17.3 Backpack	6KD05AA
	HP Executive 17.3 Top Load	6KD08AA
	HP Business Case(up to 15.6")	2SC66AA
	HP Executive 15.6 Midnight Top Load	1KM15AA
	HP Exec 15.6 Midnight Backpack	1KM16AA
	HP Executive 15.6 Black Leather Top Load	1LG83AA
	HP 17.3 Business Backpack	2SC67AA
	HP 17.3 Business Slim Top Load	2UW02AA
	HP Prelude Pro Recycle Backpack	1X644AA
	HP Prelude Pro Recycle Top Load	1X645AA
	HP Executive 15.6 Top Load	6KD06AA
	HP Executive 15.6 Backpack	6KD07AA
	HP Executive 15.6 Leather Top Load	6KD09AA
	HP Prelude 15.6 Top Load	1E7D7AA
	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 Accessories</b>	HP TB Audio Module (comp with Hook dock)	3AQ21AA
	HP TB Dock G2 Combo Cable (this is 230W) comp with Hook dock	3XB96AA
<b>Docking station</b>	HP TB Dock G2 w/ Combo Cable (this is 230W)	3TR87AA
	HP Thunderbolt Dock 230W G2	2UK38AA
	HP USB-C/A Universal Dock G2 Power Not Supported on Mobile Workstations <sup>1</sup>	5TW13AA
	HP USB-C Dock G5 Power Not Supported on Mobile Workstation <sup>1</sup>	5TW10AA
	HP TB Dock 120W G2 w/ Audio <sup>1</sup>	3YE87AA
<sup>1</sup> Up to 100 W via USB-C® (up to 75 W on non HP machines) Separate AC power needed for HP ZBooks that require more than 100 W power delivered via USB-C® alt mode.		
<b>Input/Output - Mice</b>	HP Comfort Grip Wireless Mouse (See Link 5 Tab)	H2L63AA
	HP 3-button USB Laser Mouse	H4B81AA
	HP Bluetooth Travel Mouse	6SP30AA
	HP USB Travel Mouse	G1K28AA
	HP Wireless Premium Mouse (See Link 5 Tab)	1JR31AA
	HP Elite Presenter Mouse	2CE30AA
	HP Comfort Grip Wireless Mouse (See Link 5 Tab)	H2L63AA
	HP X4000b Bluetooth Mouse	H3T50AA
HP Wired 320M Mouse	9VA80AA	

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

	HP 435 Multi-Device Wireless Mouse	3B4Q5AA
<b>Input/Output - Keyboard</b>	HP Wired Desktop 320MK Mouse and Keyboard	9SR36AA
	HP Slim Wireless Keyboard and Mouse	T6L04AA
	HP 320K Wired Keyboard	9SR37AA
	HP Wireless Rechargeable 950MK Mouse and Keyboard	3M165AA
<b>Input/Output - Adapter</b>	HP USB-C to USB-A Hub	Z6A00AA
	HDMI to VGA Adapter	H4F02AA
	HP HDMI to DVI Adapter	F5A28AA
	HP USB-C to USB 3.0 Adapter	N2Z63AA
	HP USB-C to DisplayPort Adapter	N9K78AA
	HP USB-C to VGA Adapter	N9K76AA
	HP Single miniDP-to-DP Adapter Cable	2MY05AA
	HP Elite USB-C Hub	4WX89AA
	HP USB-C to HDMI 2.0 Adapter	1WC36AA
<b>Collaboration</b>	HP BT UC Wireless Duo Headset	W3K09AA
<b>Memory</b>	HP 8GB DDR4 3200 1.2v SODIMM Memory	286H8AA
	HP 16GB DDR4 3200 1.2v SODIMM Memory	286J1AA
	HP 32GB DDR4 2666 SODIMM Memory	6NX83AA
	HP 8GB DDR4 2666 SODIMM ECC Memory	4UY11AA
	HP 16GB DDR4 2666 SODIMM ECC Memory	4UY12AA
<b>Power - A/C Adapter</b>	HP 150W 4.5 mm Smart AC Power Adapter	4SC18AA
	HP 200W 4.5 mm AC Power Adapter	4SC19AA
	HP ZBook 200W Slim Smart 4.5mm AC Adapter	491C7AA
<b>Power - Battery</b>	HP ZBook 94Whr AL Battery	49J06AA
<b>Security</b>	HP Sure Key Cable Lock	6UW42AA
	HP Nano Keyed Cable Lock	1AJ39AA
	HP Nano Dual Head Keyed Cable Lock	1AJ41AA
<b>Storage - External</b>	HP USB DVD-Writer ODD	Y3T76AA
<b>Storage - HDD 2.5"</b>	HP 500GB 7200 RPM HDD 2.5"	4A1H1AA
	HP 1TB 7200 RPM HDD 2.5"	4A1H2AA
	HP 2TB 5400 RPM HDD 2.5"	4A1H3AA
<b>Storage - SS M2</b>	HP 1TB 2280 PCIe-3x4 NVME TLC M.2 SSD	6SK99AA
	HP 2GB 2280 PCIe-3x4 NVME TLC M.2 SSD	6SL00AA
	HP 256GB PCIe-3x4 NVME M.2 SSD	1DOH6AA

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

	HP 512GB PCI-e 3x4 NVMe M2 SSD	1D0H7AA
	HP ZBook Fury G7/G8 HDD & SSD Brackets	48Z98AA
<b>WWAN</b>	HP XMM 7360 LTE-Advance WWAN	3FB01AA

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<b>Date of change:</b>	<b>Version History:</b>		<b>Description of change:</b>
August 11, 2021	From v1 to v2	<b>Changed</b>	DISPLAY and WEIGHTS & DIMENSIONS sections
August 17, 2021	From v2 to v3	<b>Changed</b>	POWER section
August 18, 2021	From v3 to v4	<b>Changed</b>	Product Name
August 25, 2021	From v4 to v5	<b>Changed</b>	POWER and Options and Accessories sections
September 10, 2021	From v5 to v6	<b>Changed</b>	POWER section
September 17, 2021	From v6 to v7	<b>Changed</b>	PORTS/SLOTS and STORAGE AND DRIVES sections
September 21, 2021	From v7 to v8	<b>Changed</b>	Options and Accessories section
September 27, 2021	From v8 to v9	<b>Changed</b>	Technical Specifications – Power section
October 4, 2021	From v9 to v10	<b>Changed</b>	MEMORY section
October 6, 2021	From v10 to v11	<b>Changed</b>	MEMORY section
October 22, 2021	From v11 to v12	<b>Changed</b>	MEMORY section
November 11, 2021	From v12 to v13	<b>Changed</b>	OPERATING SYSTEM section
November 23, 2021	From v13 to v14	<b>Changed</b>	OPERATING SYSTEM and SYSTEM UNIT sections
December 3, 2021	From v14 to v15	<b>Changed</b>	SOFTWARE AND SECURITY section
December 15, 2021	From v15 to v16	<b>Changed</b>	OPERATING SYSTEM and MEMORY sections
December 23, 2021	From v16 to v17	<b>Changed</b>	NETWORKING/COMMUNICATIONS section
January 18, 2022	From v17 to v18	<b>Changed</b>	DISPLAY section
May 13, 2022	From v18 to v19	<b>Changed</b>	Multi Display Support section
June 13, 2022	From v19 to v20	<b>Changed</b>	MEMORY section