

### Overview

### HP ZBook Fury G10 Mobile Workstation PC



1. Ambient Light Sensor (Optional)
2. Top Facing Microphone (2)
3. Webcam LED (Optional)
4. IR Camera (Optional)
5. HD Camera (Optional)
6. Camera Shutter
7. IR Camera LEDs (Optional)
8. 3-Button Touchpad

#### Right

9. Power Button
10. Nano Security Lock slot
11. RJ45
12. 1 SuperSpeed USB Type-A 5Gbps signaling rate
13. 1 SuperSpeed USB Type-A 5Gbps signaling rate (charging)
14. headphone/microphone combo
15. SmartCard Reader
16. Fingerprint Sensor (Optional)

### Overview

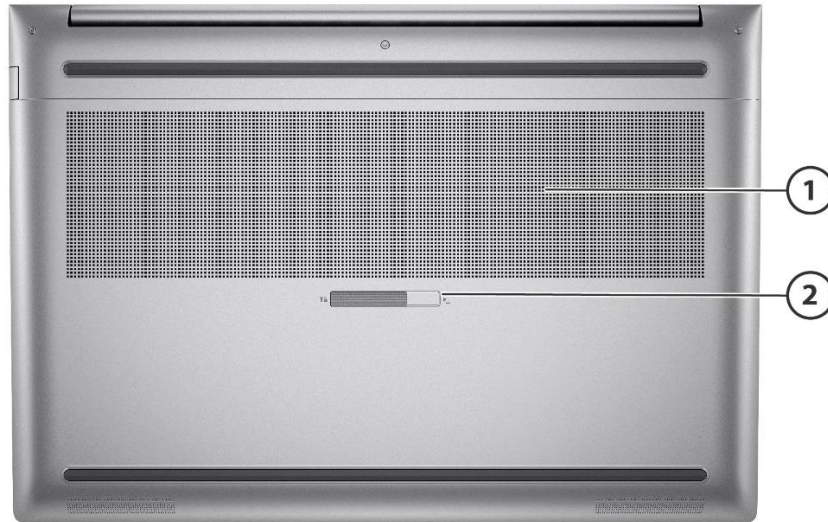


#### Left

- |  |                          |
|--|--------------------------|
| 1. Power Charging indicator  | 4. mDP port <sup>1</sup> |
| 2. Power connector   | 5. HDMI port             |
| 3. (2) Thunderbolt™ 4 with USB4™ Type-C® 40Gbps signaling rate (USB Power Delivery, DisplayPort™ 1.4, HP Sleep and Charge) | 6. SD 7.0 Card Reader    |

<sup>1</sup>If both DP streams are used by Type-C® ports, Mini-DP is inactive on RTX A1000 and 2000 Ada SKUs

### Overview



### Bottom

1. Fan Venting

2. Service Door Latch

### Overview

#### At A Glance

- Crank up your multi-tasking and productivity with a desktop-class processor on a mobile device. With an Intel® Core™ processor and NVIDIA RTX™ professional graphics simultaneously tackle model training and deep learning or 3D animation and VFX.
- Accelerate your workflow. Power through projects with up to 128 GB RAM ECC Memory for fast rendering, editing and visual effects performance.
- Keep cool under any workload with HP Vaporforce Thermals, with curved metal blades, that help protect your workstation from overheating, so you can cut through your heaviest workloads with peak processing power.
- Move around without losing viewers' attention during video calls with HP Auto Frame. Now with a 88-degree field of view, the 5MP camera and audio follow as you move within the camera's frame.
- Long battery life can get you through a day of meetings without plugging in. Quickly recharge your PC with HP Fast Charge. You'll get up to 50% battery life in just 30 minutes of charging.
- Multiple ports for maximum productivity. Enhanced transfer and upload speeds via dual Thunderbolt™ 4 ports. Get wide-ranging connectivity options: USB 4.0, HDMI, mDP, SD card, Smart Card Reader and more.
- Detect if someone has tried to open the back cover of your device with Tamper Lock
- Choice of touch and non-touch displays
- Choice of displays [2]:
  - Non-Touch:
    - 39.6 cm (15.6") diagonal, FHD (1920 x 1080), IPS, anti-glare, 250 nits, 45% NTSC;
    - 40.6 cm (16") diagonal, WQUXGA (3840 x 2400), 120 Hz, IPS, anti-glare, eDP + PSR, micro-edge, 500 nits, 100% DCI-P3, HP DreamColor
    - 40.6 cm (16") diagonal, WUXGA (1920 x 1200), IPS, anti-glare, eDP + PSR, micro-edge, 400 nits, 100% sRGB;
    - 40.6 cm (16") diagonal, WUXGA (1920 x 1200), IPS, anti-glare, eDP + PSR, micro-edge, 1000 nits, 100% sRGB, HP Sure View integrated privacy screen
  - Touch:
    - 40.6 cm (16") diagonal, WQUXGA (3840 x 2400), OLED, touch, BrightView, eDP + PSR, micro-edge, Low Blue Light, 400 nits, 100% DCI-P3
- Have confidence in what you see on screen with an optional HP DreamColor Display with 100% DCI-P3 color gamut and a 120Hz refresh rate you get smooth motion for high-speed videos.
- The 16:10 aspect ratio reduces the need to scroll by showing 11% more vertical content than a 16:9 aspect ratio display. See more of your project without minimizing program menus or toolbars.
- Our ZBooks are designed to undergo extensive MIL-STD 810H testing
- With Z Light Space software, customize your keyboard lighting with the RGB per-key LED backlighting. For commonly used software apps, like Adobe Photoshop, AutoCAD or SOLIDWORKS, use pre-loaded color-maps or create your own.
- HP Wolf Security for Business creates a hardware-enforced, always-on, resilient defense. From the BIOS to the browser, above, in, and below the OS, these constantly evolving solutions help protect your PC from modern threats.

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

## Features

**OPERATING SYSTEM**

<b>Preinstalled OS</b>	Windows 11 Pro - HP recommends Windows 11 Pro <sup>2</sup> Windows 11 Home - HP recommends Windows 11 Pro <sup>2</sup> Windows 11 Pro (preinstalled with Windows 10 Pro Downgrade) <sup>2,3</sup> Ubuntu 22.04 <sup>4</sup> FreeDOS 3.0
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<sup>2</sup> Not all features are available in all editions or versions of Windows. Systems may require upgraded and/or separately purchased hardware, drivers, software or BIOS update to take full advantage of Windows functionality. Windows is automatically updated and enabled. High speed internet and Microsoft account required. ISP fees may apply and additional requirements may apply over time for updates. See <http://www.windows.com>.

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

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

**NOTE:** Your product does not support Windows 8 or Windows 7. In accordance with Microsoft's support policy, HP does not support the Windows<sup>®</sup> 8 or Windows 7 operating system on products configured with Intel<sup>®</sup> and AMD<sup>®</sup> 7th generation and forward processors or provide any Windows<sup>®</sup> 8 or Windows 7 drivers on <http://www.support.hp.com>. A full list of HP products and the Windows 10 versions tested is available on the HP support website. <https://support.hp.com/us-en/document/c05195282>

**PROCESSOR**

13<sup>th</sup> Generation Intel<sup>®</sup> Core™ i9-13950HX with Intel<sup>®</sup> UHD Graphics (1.6 GHz E-core base frequency, 2.2 GHz P-core base frequency, up to 4 GHz E-core Max Turbo frequency, up to 5.5 GHz P-core Max Turbo frequency, 36 MB L3 cache, 8 P-cores and 16 E-cores, 32 threads) supports Intel<sup>®</sup> vPro<sup>®</sup> Technology <sup>1,2,3,4,5</sup>

13<sup>th</sup> Generation Intel<sup>®</sup> Core™ i7-13850HX with Intel<sup>®</sup> UHD Graphics (1.5 GHz E-core base frequency, 2.2 GHz P-core base frequency, up to 3.8 GHz E-core Max Turbo frequency, up to 5.3 GHz P-core Max Turbo frequency, 30 MB L3 cache, 8 P-cores and 12 E-cores, 28 threads) supports Intel<sup>®</sup> vPro<sup>®</sup> Technology <sup>1,2,3,4,5</sup>

13<sup>th</sup> Generation Intel<sup>®</sup> Core™ i7-13700HX with Intel<sup>®</sup> UHD Graphics (1.5 GHz E-core base frequency, 2.1 GHz P-core base frequency, up to 3.7 GHz E-core Max Turbo frequency, up to 5.0 GHz P-core Max Turbo frequency, 30 MB L3 cache, 8 P-cores and 8 E-cores, 24 threads) <sup>1,2,3,4</sup>

13<sup>th</sup> Generation Intel<sup>®</sup> Core™ i5-13600HX with Intel<sup>®</sup> UHD Graphics (1.9 GHz E-core base frequency, 2.6 GHz P-core base frequency, up to 3.6 GHz E-core Max Turbo frequency, up to 4.8 GHz P-core Max Turbo frequency, 24 MB L3 cache, 6 P-cores and 8 E-cores, 20 threads) supports Intel<sup>®</sup> vPro<sup>®</sup> Technology <sup>1,2,3,4,5</sup>

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

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

<sup>3</sup> Intel<sup>®</sup> Turbo Boost performance varies depending on hardware, software and overall system configuration. See [www.intel.com/technology/turboboost](http://www.intel.com/technology/turboboost) for more information.

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

### Features

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

### Features

#### CHIPSET

Intel® WM790

#### INTEL® CORE™ I5 WITH VPRO®/CORE™ I7 WITH VPRO®/ CORE™ I9 WITH VPRO® TECHNOLOGY CAPABLE

Intel® Core™ i5 with vPro®, Core™ i7 with vPro®, and Core™ i9 with vPro® technology is a selectable feature that is available on units configured with select processors, a qualified Intel® WLAN module and a preinstalled Windows® operating system. It provides advances in remote manageability, security, energy efficient performance, and wireless connectivity. Intel® Active Management Technology (iAMT) offers built-in manageability and proactive security for networked mobile workstations, even when they are powered off\* or when the operating system is inoperable. It can help identify threats before they reach the network, isolate infected systems, and update regardless of their power state.<sup>1,2</sup>

<sup>1</sup> Requires a Windows operating system, network hardware and software, connection with a power source, and a direct (non-VPN) corporate network connection which is either cable or wireless LAN.

<sup>2</sup> Intel vPro® requires Windows 10 Pro 64 bit or higher, a vPro supported processor, vPro enabled chipset, vPro enabled wired LAN and/or Wi-Fi 6E WLAN and TPM 2.0. Some functionality requires additional 3<sup>rd</sup> party software in order to run. Features of vPro® Essentials and Enterprise vary. See <http://intel.com/vpro>

#### GRAPHICS

##### Integrated

Intel® UHD Graphics<sup>1,2,3,4</sup>

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

NVIDIA RTX™ 5000 Ada Generation Laptop GPU (16 GB DDR5 GDDR6 dedicated)

NVIDIA RTX™ 4000 Ada Generation Laptop GPU (12 GB DDR5 GDDR6 dedicated)

NVIDIA RTX™ 3500 Ada Generation Laptop GPU (12 GB DDR5 GDDR6 dedicated)

NVIDIA RTX™ 2000 Ada Generation Laptop GPU (8 GB DDR5 GDDR6 dedicated)

NVIDIA RTX™ A1000 6GB Laptop GPU (6 GB DDR5 GDDR6 dedicated)

##### Supports

DIS: Support HD decode, DX12, HDMI 2.1, HDCP 2.3

UMA: Support HD decode, DX12, HDMI 2.0 aka HDMI 2.1 TMDS, HDCP 2.3

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

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

<sup>3</sup> Support HD decode, DX11, DX12, HDMI 2.0, HDCP 2.3 via DP up to 4K @ 60Hz and via HDMI up to 4K @ 60Hz

<sup>4</sup> Shared video memory (UMA) uses part of the total system memory for video performance. System memory dedicated to video performance is not available for other use by other programs.

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



### Features

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

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

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

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

#### <sup>10</sup> NOTES:

NVIDIA Feature: Discrete Graphics (RTX 3500 Ada, 4000 Ada, 5000 Ada) can turn "ECC ON" with the VRAM

- NV Control Panel should have the following selectable option:
  - Change ECC State
- Native Display: There is no option to Change ECC State in NV Control Panel
- External Display: There is an option to Change ECC State in NV Control Panel
- Software Driver solution available in Q3 2022

**NOTE:** The HP custom vapor chamber (Z VaporForce) is only available on configurations with NVIDIA RTX™ A3000 Laptop GPU and higher GFX .

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## DISPLAY

### Non-touch

- 16.0" diagonal, WUXGA (1920 x 1200), IPS, anti-glare, 1000 nits, 72% NTSC, HP Sure View Reflect integrated privacy screen<sup>1,3,5,6,7,8</sup>
- 16.0" diagonal, WUXGA (1920 x 1200), IPS, narrow bezel, anti-glare, WLED+LBL, 400 nits, low power, 100% sRGB<sup>1,3,6,8</sup>
- 16.0" diagonal, 4K WQUXGA (3840 x 2400), 120 Hz, IPS, UWVA, anti-glare, 500 nits, 100% DCI-P3, HP DreamColor<sup>1,3,6,8,\*</sup>
- 15.6" diagonal FHD (1920x1080) Anti-Glare WLED UWVA, 45% NTSC, 250 nits eDP 1.2 w/o PSR bent Narrow Bezel<sup>1,3,6,8</sup>

### Touch

- 16.0" diagonal, 4K WQUXGA (3840 x 2400), OLED, LBL, multitouch-enabled, UWVA, BrightView, TS, Corning® Gorilla® Glass 5, 400 nits, 100% DCI-P3<sup>1,3,5,6,7,8</sup>
- 16.0" diagonal, WUXGA (1920 x 1200), touch, IPS anti-glare, micro-edge, 400 nits, sRGB 100% eDP 1.4+PSR2<sup>1,3,5,6,7,8</sup>

### Displays support

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

### Display Size

16.0"  
40.64 cm (16")  
15.6"  
39.62 cm (15.6")

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

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

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

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

<sup>7</sup>HP Sure View is optional and must be configured at purchase. It operates in landscape orientation.

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

\*DreamColor display not available with WWAN



### Features

#### DOCKING

<b>Docking station model #1</b>	HP Thunderbolt 280W G4 Dock w/Combo Cable
<b>Total number of supported displays (incl.the notebook display)</b>	4
<b>Max.resolutions supported</b>	Dual 4K @30Hz or dual 4K UHD @ 60Hz is supported Single 8K @30Hz (multiple tiles) for Thunderbolt hosts Non-TBT hosts DP 1.4 in high-res mode (1) 8K video single cable @30Hz
<b>Dock Connectors</b>	2xDP, 1xHDMI, 1xTB, 1xUSB-C Alt Mode
<b>Technical limitations</b>	Thunderbolt Hosts: Exception: HDMI port Maximum of (4) displays with maximum resolution of 5K@ 30Hz running Thunderbolt host. Max resolution possible is dual 8K displays @ 60Hz running Thunderbolt host or running a non-Thunderbolt host in High Resolution mode @30Hz  Non-Thunderbolt hosts: The highest resolution for dual displays running a non-Thunderbolt host in multi-function mode is (1) 5K dual cable (using both DP ports) +(1) 4K on USB-C DP port Non-Thunderbolt hosts: support (3) displays with a max resolution of: (2) 5K single cable + (1) 4K UHD @ 60 Hz in high resolution mode. In multi-function mode the maximum resolution for (3) displays is (2) 5K single cable @ 30Hz + (1) 4K UHD @ 30Hz.
<b>Docking station model #2</b>	HP Elite USB-C Dock G5
<b>Total number of supported displays (incl.the notebook display)</b>	3
<b>Max.resolutions supported</b>	Three 1680x1050 @ 60 Hz Dual 2K @ 60Hz Single 4K @ 60Hz (3840 x 1440)
<b>Dock Connectors</b>	1xHDMI, 2xDP
<b>Technical limitations</b>	
<b>Docking station model #3</b>	HP USB-C Universal Dock G2
<b>Total number of supported displays (incl.the notebook display)</b>	3
<b>Max.resolutions supported</b>	Dual 4K @ 60Hz Single 5K @ 60Hz
<b>Dock Connectors</b>	1xHDMI, 2xDP
<b>Technical limitations</b>	

### Features

#### STORAGE AND DRIVES\*

##### Maximum Storage

12 TB PCIe Gen4x4 M.2

##### PCIe® NVMe™ M.2 2280 Storage

4 TB PCIe® Gen4x4 NVMe™ M.2 SSD TLC

2 TB PCIe® Gen4x4 NVMe™ M.2 SSD TLC

2 TB PCIe® Gen4x4 NVMe™ SED SSD

1 TB PCIe® Gen4x4 NVMe™ M.2 SSD TLC

1 TB PCIe® Gen4x4 NVMe™ SED SSD

512 GB PCIe® Gen4x4 NVMe™ M.2 SSD TLC

512 GB PCIe® Gen4x4 NVMe™ SED SSD

##### Storage Slots

4 M.2 Solid State Drive

##### DRIVE CONTROLLERS

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

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

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

#### DRIVE CONTROLLERS

M.2 Storage Bay (PCIe NVMe)

PCIe® Gen4 x4 lanes NVMe™ Solid State Drive

RAID:

Supported RAID 0, RAID 1\*, RAID 5 and RAID 10\*\*

\*RAID 0, RAID 1 not supported on Opal SSD

\*\*RAID 5 and RAID 10 are not available out of factory but can be configured by the end-user. RAID 5, RAID 10 not supported on Opal SSD, no 4TB SSD

#### MEMORY

##### Maximum Memory

128 GB DDR5-4800 ECC SODIMM

128 GB DDR5-5600 non-ECC SODIMM

RAM Support – 8GB, 16GB, 32GB, 64GB, 128GB

##### Memory

8GB (1x8GB) DDR5 4800

16GB (1x16GB) DDR5 4800

16GB (2x8GB) DDR5 4800

32GB (1x32GB) DDR5 4800

32GB (2x16GB) DDR5 4800

32GB (4x8GB) DDR5 4800

64GB (2x32GB) DDR5 4800

64GB (4x16GB) DDR5 4800

128GB (4x32GB) DDR5 4800

8GB (1x8GB) DDR5 5600

16GB (1x16GB) DDR5 5600

16GB (2x8GB) DDR5 5600

32GB (1x32GB) DDR5 5600

32GB (2x16GB) DDR5 5600

### Features

32GB (4x8GB) DDR5 5600  
 64GB (2x32GB) DDR5 5600  
 64GB (4x16GB) DDR5 5600  
 128GB (4x32GB) DDR5 5600  
 16GB (1x16GB) DDR5 4800 ECC  
 32GB (1x32GB) DDR5 4800 ECC  
 32GB (2x16GB) DDR5 4800 ECC  
 64GB (2x32GB) DDR5 4800 ECC  
 64GB (4x16GB) DDR5 4800 ECC  
 128GB (4x32GB) DDR5 4800 ECC

#### Memory Slots

4 SODIMM  
 2 DIMMs per channel; support up to 4000 MT/s  
 DDR5 SODIMMS, system runs at 4000 MT/s  
 Supports Dual Channel Memory

#### Memory Speed

Memory DDR5-4800 SODIMM.

Memory DDR5-5600 SODIMM.

Intel® 13<sup>th</sup> Gen Core™ HX-Series Processors: Memory transfer speed will be 3600 MT/s or 4000 MTs under identical DIMM conditions.

Current identical DIMM conditions:

- 2 DIMM per Channel (with 2 Rank DDR5 module): 3600 MT/s
- 2 DIMM per Channel (with 1 Rank DDR module): 4000 MT/s
- 1 DIMM per Channel (with either 1 Rank or 2 Rank DDR module): 4000 MT/s

**NOTE:** DIMM per Channel is DPC

**NOTE:** 8GB and 16GB DIMM are 1 Rank module

**NOTE:** 32GB DIMM is 2 Rank module

DIMM1	DIMM2	DIMM3	DIMM4	Memory Speed	DIMM / Channel	Availability
√				1 Rank: 4000 MT/s 2 Rank: 4000 MT/s	1 DPC	Configuration available from factory
√	√			1 Rank: 4000 MT/s 2 Rank: 4000 MT/s	1 DPC	Configuration available from factory
√	√	√		1 Rank: 4000 MT/s 2 Rank: 3600 MT/s	2 DPC	Configuration not available from factory
√	√	√	√	1 Rank: 4000 MT/s 2 Rank: 3600 MT/s	2 DPC	Configuration available from factory

#### Mixing Memory DIMM Vendors/Suppliers

Mixing memory DIMM supplier and/or capacity may cause a downgrade in memory speed , signal integrity or functional issues.

Mixing memory Rank (1 Rank and 2 Rank from table above) in the same channel will cause the memory speed to drop to 2000 MHz and could encounter an unstable condition.

Recommendation: Do not install different Rank memory modules in the same channel.

#### Memory Installation Sequence

Intel® 12<sup>th</sup> Gen Core™ HX-Series Processors have specific population (installation sequence) rules. To avoid a no-boot issue, there is/are DIMM population installation sequence requirements for cases where only one DIMM is populated per channel, then the furthest memory connector from the CPU should be populated first.

### Features

Memory installation sequence is labeled on the memory shielding cover or User Guide. Memory must be installed in correct sequence.

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

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

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

**NOTE:** Transfer rates up to 4000 MT/s for nECC and ECC memory combinations when memory suppliers are consistent. If suppliers are not consistent, speeds may drop to 2000 MT/s for nECC and 2000 MT/s for ECC memory combinations. A custom configuration including part number AY104AV can be used to lock in a consistent vendor.

**NOTE:** Intel® allows architectures designed with four DIMM slots to run at 4000 MT/s

**NOTE:** Maximized dual-channel performance requires SODIMMs of the same size and speed in both memory channels.

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### Features

#### NETWORKING/COMMUNICATIONS

##### LAN<sup>1</sup>

Intel® I219-LM GbE, vPro®  
Intel® I219-V GbE, non-vPro®

<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<sup>1</sup>

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

<sup>1</sup>Wi-Fi 6E requires a Wi-Fi 6E router, sold separately, and Windows 11 to function in the 6GHz band. Availability of public wireless access points limited. Wi-Fi 6E is backwards compatible with prior 802.11 specs. And available in countries where Wi-Fi 6E is supported. Not supported with Windows 10.

##### WWAN

Intel® XMM™ 7560 LTE Advanced Pro<sup>1</sup>  
Intel® 5G Solution 5000<sup>2</sup>

<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>Intel 5G module is optional and must be configured at the factory. Module designed for 5G NR NSA (non-standalone) networks as carriers deploy Evolved-Universal Terrestrial Radio Access New Radio Dual Connectivity (ENDC) with both 100Mhz of 5G NR and LTE channel bandwidth, using 256QAM 4x4 as defined by 3GPP. Module requires activation and separately purchased service contract. Check with service provider for coverage and availability in your area. Data connection, upload and download speeds will vary due to network, location, environment, network conditions, and other factors. Backwards compatible to 4G LTE and 3G HSPA technologies. 5G module planned to be available in select platforms and select countries, where carrier supported.

##### NFC

NFC Mirage module NXP NPC300 I2C

#### AUDIO/MULTIMEDIA

##### Audio

Audio by Bang & Olufsen, 2 speakers with discrete amplifier, 3 Internal Microphone (2 Front, 1 Back) dual array digital microphones, functions keys for volume up and down, combo microphone/headphone jack, HD audio with 200Hz Bass Roll off

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

5MP+IR Camera 13<sup>th</sup> Gen (88 deg FOV)

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

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

### Features

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

##### Keyboard

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

HP RGB Keyboard – Full-size, per-key RGB backlit keyboard

**NOTE:** RGB will only function after Z Light Space Software is activated

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

##### Pointing Devices

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

##### Function Keys

ESC: system information

F1 – Display Switching

F2 – Blank or Privacy

F3 – Brightness Down

F4 – Brightness Up

F5 – Audio Mute

F6 – Volume Down

F7 – Volume Up

F8 – Mic Mute

F9 – Blank or Backlight Toggle (for backlit keyboard)

F10 – Insert

F11 – Airplane Mode

F12 – HP Command Center

Power Button (with LED)

delete

##### Hidden Keys

home

end

Fn+R – Break

Fn+S – Sys Rq

Fn+C – Scroll Lock

Fn+left/right arrow

e-shutter key

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#### SOFTWARE AND SECURITY

##### Software

HP Easy Clean<sup>28</sup>

HP PC Hardware Diagnostics Windows

Touchpoint Customizer for Commercial

myHP app

HP Smart Support<sup>19</sup>

HP Mac Address Manager

HP Hotkey Support

HP Support Assistant<sup>1</sup>

HP Notifications

HP Privacy Settings

HP Power Manager<sup>5</sup>

Buy Microsoft Office (Sold separately)

Bing search for IE11

HP Noise Cancellation Software

Native Miracast support<sup>2</sup>

17- month Adobe<sup>®</sup> free trial offer<sup>29</sup>

### Features

HP Z Light Space<sup>31</sup>  
Data Science Stack<sup>32</sup>

#### Manageability Features

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

#### Security Management

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

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

#### BIOS

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

#### BIOS Version

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

#### Security

##### TPM

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

#### Fingerprint Sensor (Optional)

Voltage: 3.0-3.6V



### Features

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

#### Security Features

HP Fingerprint Sensor (optional)<sup>27</sup>

#### Smartcard Reader

Model number: Alcor AU9560  
FIPS 201 Compliant: Yes

**Does the BIOS implement the ISO/IEC 19678:2015 (formerly NIST 800-147) guidelines?:** Yes

UEFI version: 2.7  
Class: Class 3

**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> Miracast is a wireless technology your PC can use to project your screen to TVs, projectors, and streaming media players that also support Miracast. You can use Miracast to share what you're doing on your PC and present a slide show. For more information: <http://windows.microsoft.com/en-us/windows-8/project-wireless-screen-miracast>.

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

<sup>4</sup> Absolute agent is shipped turned off, and will be activated when customers activate a purchased subscription. Subscriptions can be purchased for terms ranging multiple years. Service is limited, check with Absolute for availability outside the U.S. The Absolute Recovery Guarantee is a limited warranty. Certain conditions apply. For full details visit:

<http://www.absolute.com/company/legal/agreements/computrace-agreement>. Data Delete is an optional service provided by Absolute Software. If utilized, the Recovery Guarantee is null and void. In order to use the Data Delete service, customers must first sign a Pre-Authorization Agreement and either obtain a PIN or purchase one or more RSA SecurID tokens from Absolute Software.

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

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

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

<sup>8</sup> HP Manageability Integration Kit can be downloaded from <http://www.hp.com/go/clientmanagement>.

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

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

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

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

<sup>13</sup> Secure Erase – For the methods outlined in the National Institute of Standards and Technology Special Publication 800-88 “Clear” sanitation method. HP Secure Erase does not support platforms with Intel® Optane.

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

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

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

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

<sup>18</sup> HP Smart Support requires HP TechPulse to be installed. For more information about how to enable or to download HP Smart Support, please visit <http://www.hp.com/smart-support> .

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

<sup>22</sup> HP Patch Assistant available on select HP PCs with the HP Manageability Kit that are managed through Microsoft System Center Configuration Manager. HP Manageability Integration Kit can be downloaded from <http://www8.hp.com/us/en/ads/clientmanagement/overview.html>.

### Features

<sup>23</sup> HP Cloud Recovery is available for Z by HP, HP Elite and Pro desktops and laptops PCs with Intel® or AMD processors and requires an open, wired network connection. **NOTE:** You must back up important files, data, photos, videos, etc. before use to avoid loss of data. Detail please refer to: <https://support.hp.com/us-en/document/c05115630>.

<sup>24</sup> HP Wolf Security for Business requires Windows 10 or higher, includes various HP security features and is available on HP Pro, Elite, RPOS and Workstation products. See product details for included security features.

<sup>25</sup> HP Sure Click requires Windows 10 Pro or higher or Enterprise. See [https://bit.ly/2PrLT6A\\_SureClick](https://bit.ly/2PrLT6A_SureClick) for complete details.

<sup>26</sup> HP Sure Run Gen5 is available on select HP PCs and requires Windows 10 and higher.

<sup>27</sup> HP Fingerprint Reader is an optional feature that requires Windows 10 IoT and must be configured at purchase.

<sup>28</sup> HP Easy Clean requires Windows 10 RS3 and higher and will disable the keyboard, touchscreen, and clickpad only. Ports are not disabled. See user guide for cleaning instructions.

<sup>29</sup> Offer available worldwide (excluding China and embargoed countries or other countries identified as restricted by applicable law or regulation) to new and existing subscribers who are 18+. Click on the Adobe icon in the start menu to redeem a 1-month free trial membership for select Adobe software. The software is tied to the device and is not transferrable. If you would like to sign up for an auto-renewing subscription, you can provide your payment method at sign-up. By adding a payment method, your subscription will automatically renew at the then current rate on your renewal date until you cancel. If you cancel before the end of the one-month free trial, you won't be charged. You can cancel your subscription anytime via your Adobe Account page or by contacting Customer Support. Please see current prices for Adobe Spark and the remaining Adobe products available in this offer. Offer not available to Education, OEM, or volume licensing customers. Subject to availability where the recipient resides. Additional terms and conditions may apply. VOID WHERE PROHIBITED OR RESTRICTED BY LAW.

<sup>30</sup> HP Driver Packs not preinstalled, however available for download at <http://www.hp.com/go/clientmanagement>.

<sup>31</sup> Optional feature that requires RGB keyboard at hardware purchase.

<sup>32</sup> Available on select skus only.

### Features

#### POWER

##### Power Supply

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

HP Slim Smart 200W External Right Angle AC Power Adapter

HP Slim Smart 230W External Right Angle AC Power Adapter

##### Battery

HP XL-Long Life 95Whr Polymer Fast Charge 8 cell<sup>4</sup>

##### Battery Recharge Time

Supports battery HP Fast Charge: approximately 50% in 30 minutes<sup>2</sup>

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

Up to 17:14 hrs (UMA)

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

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

<sup>3</sup> 150W Power Adapter is not available with NVIDIA RTX™ 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<sup>3</sup>

EPEAT® registered where applicable. EPEAT® registration varies by country. See [www.epeat.net](http://www.epeat.net) for registration status by country.<sup>1</sup>

IEEE 1680.1-2018 EPEAT®

Low halogen<sup>2</sup>

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

<sup>2</sup> External power supplies, power cords, cables and peripherals are not low halogen. Service parts obtained after purchase may not be low halogen.

<sup>3</sup> Configurations of the HP Zbook Fury G10 Mobile Workstation PC that are ENERGY STAR® certified are identified as HP Zbook Fury G10 Mobile Workstation PC ENERGY STAR on HP websites and on <http://www.energystar.gov>.

### Features

#### WEIGHTS & DIMENSIONS

**Dimensions (w x d x h)**

36.3 x 25.0 x 2.86 cm (WLAN)

14.29 x 9.86 x 1.12 in (WLAN)

36.3 x 25.0 x 2.77 cm (WWAN)

14.29 x 9.86 x 1.09 in (WWAN)

**Weights\***

Starting at 5.173 lbs (2.350 kg) (UMA)

Weight varies by configuration and components.

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

#### PORTS/SLOTS

MicroSD 7.1 SD7.0 Media Card Reader supports next generation secure digital and is compatible to SD, SDHC, SDXC, SDUC media

**Left side**

1 power connector

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

1 SD 7.1 Media Card Reader

1 Mini DisplayPort™ 1.4 with UMA and Discrete Graphics

1 HDMI 2.1 (depends on graphics selection) HDMI2.0 for UMA, HDMI2.1 for Discrete.

**Right side**

1 headphone/microphone combo

1 RJ-45

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

1 SuperSpeed USB Type-A 5Gbps signaling rate

1 nano security lock slot

1 smart card reader

#### SERVICE AND SUPPORT

HP Services offers 1-year warranty and 90 day software limited warranty options depending on country. All batteries have a default one year limited warranty except for HP Long Life batteries which will follow the one or three year warranty of the platform. Refer to <http://www.hp.com/support/batterywarranty/> for additional battery information. On-site service and extended coverage is also available. HP Care Pack Services are optional extended service contracts that go beyond the standard limited warranties. To choose the right level of service for your HP product, use the HP Care Pack Services Lookup Tool at: <https://cpc2.ext.hp.com/>.

<sup>1</sup> HP Care Packs are sold separately. Service levels and response times for HP Care Packs may vary depending on your geographic location. Service starts on date of hardware purchase. Restrictions and limitations apply. For details, visit <http://www.hp.com/go/cpc>. HP services are governed by the applicable HP terms and conditions of service provided or indicated to Customer at the time of purchase. Customer may have additional statutory rights according to applicable local laws, and such rights are not in any way affected by the HP terms and conditions of service or the HP Limited Warranty provided with your HP Product.

#### SYSTEM UNIT

### Features

<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>Integrated graphics</b>	CPU < 55W
	<b>Discrete Graphics</b>	Nvidia RTX A1000/A2000< 45W Nvidia RTX A3000/A4000/A5000< 80W
	<b>Max Operating Power</b>	< 230W
<b>Temperature</b>	<b>Operating</b>	32° to 95° F (0° to 35° C), System performance may be reduced above 32°C (89.6°F). No sustained direct exposure to sunlight.
	<b>Non-operating</b>	-4-140°F (-20 – 60°C)
<b>Relative Humidity</b>	<b>Operating</b>	10% to 90%, non-condensing
	<b>Non-operating</b>	5% to 95%; 38.7C (101.6F) maximum wet bulb tempera-ture; non-condensing.
<b>Shock</b>	<b>Operating</b>	40 G, 2 ms, half-sine
	<b>Non-operating</b>	200 G, 2 ms, half-sine
<b>Random Vibration</b>	<b>Operating</b>	0.75 grms
	<b>Non-operating</b>	1.50 grms
<b>Maximum Altitude (unpressurized)</b>	<b>Operating</b>	3048m (10,000ft)
	<b>Non-operating</b>	12192m (40,000ft)
<b>Temperature Derating with Altitude</b>	<b>Operating</b>	1.8°F / 1000 ft (1°C / 304.8 m)
<b>Planned Industry Standard Certifications</b>	<b>Regulatory Model Number</b>	HSN-I56C
	<b>UL</b>	Yes
	<b>CSA</b>	Yes
	<b>FCC Compliance</b>	Yes
	<b>ENERGY STAR®</b>	Selected models
	<b>EPEAT®</b>	EPEAT Gold in United States
	<b>ICES</b>	Yes
	<b>Australia / NZ A-Tick Compliance</b>	Yes
	<b>CCC</b>	Yes
	<b>Japan VCCI Compliance</b>	Yes
	<b>KC</b>	Yes
	<b>BSMI</b>	Yes
	<b>CE Marking Compliance</b>	Yes
	<b>MIL STD 810H</b>	Yes
	<b>BNCI or BELUS</b>	Yes
	<b>CIT</b>	Yes
	<b>GOST</b>	Yes
<b>Saudi Arabian Compliance (ICCP)</b>	Yes	
<b>SABS</b>	Yes	

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

### Features

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

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### Technical Specifications – Displays

#### DISPLAYS

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

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

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

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

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



### Technical Specifications – Displays

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

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

#### 16.0 in WUXGA (1920 x 1200) Anti-Glare UWVA WLED+LBL sRGB NB2Y 1000 eDP 1.3+PSR 100 Privacy G4 Plus bent LCD Panel

<b>Active Area (W x H, mm)</b>	344.680 x 215.420 (typ)	
<b>Dimensions (W x H, mm)</b>	349.980 x 225.420 (max)	
<b>Diagonal Size (inch)</b>	16	
<b>Thickness (body/PCB, mm)</b>	2.2 / 3.9 (max)	
<b>Weight (g)</b>	310 (max)	
<b>Interface</b>	eDP 1.3	
<b>Surface Treatment</b>	Anti-Glare	
<b>Contrast Ratio</b>	1500:1 (typ)	
<b>Refresh Rate (Hz)</b>	60 (typ)	
<b>Brightness (nits)</b>	1000 (typ)	
<b>P.P.I.</b>	142	
<b>Pixel Resolution</b>	<b>Pitch</b>	1920 x1200 (WUXGA)
	<b>Format</b>	RGB
<b>Backlight</b>	WLED	
<b>Color Gamut Coverage</b>	sRGB 100%	
<b>Color Depth</b>	8	
<b>Viewing Angle</b>	UWVA 85/85/85/85	
<b>Power Consumption (W, EBL@ 150nits max /200nits max)</b>	N/A	
<b>Low Blue Light</b>	Yes	
<b>Touch Enabled</b>	No	
<b>Touch Point Supported</b>	No	
<b>Pen Enabled</b>	No	

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

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

<b>Active Area (W x H, mm)</b>	344.678 x 215.424 (typ)	
<b>Dimensions (W x H, mm)</b>	350.680 x 226.470 (max)	
<b>Diagonal Size (inch)</b>	16	
<b>Thickness (body/PCB, mm)</b>	2.6 / 4.6 (max)	
<b>Weight (g)</b>	330 (max)	
<b>Interface</b>	eDP1.4	

### Technical Specifications – Displays

<b>Surface Treatment</b>	Anti-Glare	
<b>Contrast Ratio</b>	1000:1 (typ)	
<b>Refresh Rate (Hz)</b>	60 (typ)	
<b>Brightness (nits)</b>	400 (typ)	
<b>P.P.I.</b>	142	
<b>Pixel Resolution</b>	<b>Pitch</b>	1920 x1200 (WUXGA)
	<b>Format</b>	RGB
<b>Backlight</b>	WLED	
<b>Color Gamut Coverage</b>	sRGB 100%	
<b>Color Depth</b>	8	
<b>Viewing Angle</b>	UWVA 89/89/89/89	
<b>Power Consumption (W, EBL@ 150nits max /200nits max)</b>	1.60 (max)/ 1.95 (max)	
<b>Low Blue Light</b>	Yes	
<b>Touch Enabled</b>	Yes	
<b>Touch Point Supported</b>	10-point multi-touch	
<b>Pen Enabled</b>	No	

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

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

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

### Technical Specifications – Displays

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

<b>Panel LCD 15.6 inch FHD (1920x1080) Anti-Glare WLED UWVA 45percent cg 250nits eDP 1.2 w/o PSR bent NWBZ</b>	<b>Active Area (W x H, mm)</b>	344.16 x 193.59 mm (typ.)		
	<b>Dimensions (W x H, mm)</b>	350.96 x 205.54 mm (max)		
	<b>Diagonal Size (inch)</b>	15.6 inch		
	<b>Thickness (body/PCB, mm)</b>	3.0 mm/ 5.0 mm (w/PCB) (max)		
	<b>Weight (g)</b>	370 g (max)		
	<b>Interface</b>	eDP 1.2 (2 lane)		
	<b>Surface Treatment</b>	Anti-Glare		
	<b>Contrast Ratio</b>	600:1 (typ.)		
	<b>Refresh Rate (Hz)</b>	60 Hz		
	<b>Brightness (nits)</b>	250 nits		
	<b>P.P.I.</b>	142		
	<b>Pixel Resolution</b>	<b>Pitch</b>	1920 x 1080 (FHD)	
		<b>Format</b>	RGB Stripe	
	<b>Backlight</b>	LED		
	<b>Color Gamut Coverage</b>	NTSC 45%		
	<b>Color Depth</b>	6 bits (Hi FRC supportive w/ condition to enable)		
	<b>Viewing Angle</b>	UWVA 85/85/85/85		
	<b>Power Consumption (W, EBL@ 150nits max /200nits max)</b>	2.62 (max) / 3.27 (max)		
	<b>Low Blue Light</b>	No		
	<b>Touch Enabled</b>	No		
<b>Touch Point Supported</b>	No			
<b>Pen Enabled</b>	No			

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

### Technical Specifications – Storage

#### STORAGE AND DRIVES

<b>4TB PCIe-4x4 2280 NVMe Three Layer Cell double-sided M.2 Solid State Drive</b>	<b>Form Factor</b>	M.2 2280		
	<b>Capacity</b>	4TB		
	<b>NAND Type</b>	TLC		
	<b>Height</b>	0.14 in (3.6 mm)		
	<b>Width</b>	0.87 in (22 mm)		
	<b>Weight</b>	15g		
	<b>Interface</b>	PCIe NVMe Gen4X4		
	<b>Performance</b>	<b>Minimum Sequential Read</b>	<b>Minimum Sequential Write</b>	
		6400 MB/s ±10%	5000 MB/s ±10%	
		<b>Logical Blocks</b>	8,001,594,720	
	<b>Operating Temperature</b>	32° to 158°F (0° to 70°C) [ambient temp]		
	<b>Features</b>	Pyrite 2.0; TRIM; L1.2		
		<b>NOTE:</b> For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 35 GB (for Windows) is reserved for system recovery software.		
<b>SSD 2TB 2280 PCIe-4x4 NVMe Three Layer Cell</b>	<b>Form Factor</b>	M.2 2280		
	<b>Capacity</b>	2 TB		
	<b>NAND Type</b>	TLC		
	<b>Height</b>	0.09 in (2.3 mm)		
	<b>Width</b>	0.87 in (22 mm)		
	<b>Weight</b>	0.02 lb (10 g)		
	<b>Interface</b>	PCIe NVMe Gen4X4		
	<b>Performance</b>	<b>Minimum Sequential Read</b>	<b>Minimum Sequential Write</b>	
		6400 MB/s ±10%	5000 MB/s ±10%	
		<b>Logical Blocks</b>	4,000,797,360	
	<b>Operating Temperature</b>	32° to 158°F (0° to 70°C) [ambient temp]		
	<b>Features</b>	Pyrite 2.0; TRIM; L1.2		
		<b>NOTE:</b> For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 35 GB (for Windows) is reserved for system recovery software.		
<b>SSD 1TB 2280 PCIe-4x4 NVMe Three Layer Cell</b>	<b>Form Factor</b>	M.2 2280		
	<b>Capacity</b>	1TB		
	<b>NAND Type</b>	TLC		
	<b>Height</b>	0.09 in (2.3 mm)		
	<b>Width</b>	0.87 in (22 mm)		
	<b>Weight</b>	0.02 lb (10 g)		
	<b>Interface</b>	PCIe NVMe Gen4X4		
	<b>Performance</b>	<b>Minimum Sequential Read</b>	<b>Minimum Sequential Write</b>	
		6400 MB/s ±10%	5000 MB/s ±10%	
		<b>Logical Blocks</b>	2,000,409,264	
	<b>Operating Temperature</b>	32° to 158°F (0° to 70°C) [ambient temp]		
	<b>Features</b>	Pyrite 2.0; TRIM; L1.2		

### Technical Specifications – Storage

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

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

<b>Form Factor</b>	M.2 2280
<b>Capacity</b>	512GB
<b>NAND Type</b>	TLC
<b>Height</b>	0.09 in (2.3 mm)
<b>Width</b>	0.87 in (22 mm)
<b>Weight</b>	0.02 lb (10 g)
<b>Interface</b>	PCIe NVMe Gen4X4
<b>Performance</b>	<b>Minimum Sequential Read</b> <b>Minimum Sequential Write</b>
	6400 MB/s ±10%                      3500 MB/s ±10%
<b>Logical Blocks</b>	1,000,215,215
<b>Operating Temperature</b>	32° to 158°F (0° to 70°C) [ambient temp]
<b>Features</b>	Pyrite 2.0; TRIM; L1.2

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

#### 2TB PCIe-4x4 2280 NVME Self Encrypted OPAL2 Three Layer Cell Solid State Drive

<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 NVMe Gen4X4
<b>Performance</b>	<b>Minimum Sequential Read</b> <b>Minimum Sequential Write</b>
	6400 MB/s ±10%                      5000 MB/s ±10%
<b>Logical Blocks</b>	4,000,797,360
<b>Operating Temperature</b>	32° to 158°F (0° to 70°C) [ambient temp]
<b>Features</b>	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) is reserved for system recovery software.

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

<b>Form Factor</b>	M.2 2280
<b>Capacity</b>	1TB
<b>NAND Type</b>	TLC
<b>Height</b>	0.09 in (2.3 mm)
<b>Width</b>	0.87 in (22 mm)
<b>Weight</b>	0.02 lb (10 g)
<b>Interface</b>	PCIe NVMe Gen4X4
<b>Performance</b>	<b>Minimum Sequential Read</b> <b>Minimum Sequential Write</b>
	6400 MB/s ±10%                      5000 MB/s ±10%
<b>Logical Blocks</b>	2,000,409,264
<b>Operating Temperature</b>	32° to 158°F (0° to 70°C) [ambient temp]
<b>Features</b>	TCG Opal 2.0; TRIM; L1.2

### Technical Specifications – Storage

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

<b>Form Factor</b>	M.2 2280
<b>Capacity</b>	512GB
<b>NAND Type</b>	TLC
<b>Height</b>	0.09 in (2.3 mm)
<b>Width</b>	0.87 in (22 mm)
<b>Weight</b>	0.02 lb (10 g)
<b>Interface</b>	PCIe NVMe Gen4X4
<b>Performance</b>	<b>Minimum Sequential Read</b> <b>Minimum Sequential Write</b>
	6400 MB/s ±10%                      3500 MB/s ±10%
<b>Logical Blocks</b>	1,000,215,215
<b>Operating Temperature</b>	32° to 158°F (0° to 70°C) [ambient temp]
<b>Features</b>	TCG Opal 2.0; TRIM; L1.2

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

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

### Technical Specifications – Networking

#### NETWORKING/COMMUNICATION

**Intel AX211 Wi-Fi 6E +BT Wireless LAN Standards**  
**5.3 M.2 160MHz CNVi**  
**WLAN vPro®**

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**  
**Frequency Band**

Wi-Fi certified  
 802.11b/g/n/ax  
 • 2.402 – 2.482 GHz  
 802.11a/n/ac/ax  
 • 4.9 – 4.95 GHz (Japan)  
 • 5.15 – 5.25 GHz  
 • 5.25 – 5.35 GHz  
 • 5.47 – 5.725 GHz  
 • 5.825 – 5.850 GHz  
 • 5.955 – 6.415 GHz  
 • 6.435 – 6.515 GHz  
 • 6.535 – 6.875 GHz  
 • 6.895 – 7.115 GHz

**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: max 300Mbps  
 • 802.11ac : 1733Mbps  
 • 802.11ax : max 2.4Gbps

**Modulation**

Direct Sequence Spread Spectrum

**Security<sup>1</sup>**

OFDM, BPSK, QPSK, CCK, 16-QAM, 64-QAM, 256-QAM, 1024QAM  
 • IEEE and WiFi compliant 64 / 128 bit WEP encryption for a/b/g mode only  
 • AES-CCMP: 128 bit in hardware  
 • 802.1x authentication  
 • WPA, WPA2: 802.1x. WPA-PSK, WPA2-PSK, TKIP, and AES.  
 • WPA2 certification  
 • WPA3 certification  
 • IEEE 802.11i  
 • WAPI

**Network Architecture Models**

Ad-hoc (Peer to Peer)

**Roaming**

Infrastructure (Access Point Required)  
 IEEE 802.11 compliant roaming between access points



### Technical Specifications – Networking

<b>Output Power<sup>2</sup></b>	<ul style="list-style-type: none"> <li>• 802.11b : +17dBm minimum</li> <li>• 802.11g : +16dBm minimum</li> <li>• 802.11a : +17dBm minimum</li> <li>• 802.11n HT20(2.4GHz) : +14dBm minimum</li> <li>• 802.11n HT40(2.4GHz) : +13dBm minimum</li> <li>• 802.11n HT20(5GHz) : +14dBm minimum</li> <li>• 802.11n HT40(5GHz) : +13dBm minimum</li> <li>• 802.11ac VHT80(5GHz) : +10dBm minimum</li> <li>• 802.11ac VHT160(5GHz) : +10dBm minimum</li> <li>• 802.11ax HE40(2.4GHz) : +12dBm minimum</li> <li>• 802.11ax HE80(5GHz) : +10dBm minimum</li> <li>• 802.11ax HE160(5GHz) : +10dBm minimum</li> </ul>				
<b>Power Consumption</b>	<ul style="list-style-type: none"> <li>• Transmit mode 2.0 W</li> <li>• Receive mode 1.6 W</li> <li>• Idle mode (PSP) 180 mW (WLAN Associated)</li> <li>• Idle mode 50 mW (WLAN unassociated)</li> <li>• Connected Standby 10mW</li> <li>• Radio disabled 8 mW</li> </ul>				
<b>Power Management</b>	ACPI and PCI Express compliant power management 802.11 compliant power saving mode				
<b>Receiver Sensitivity<sup>3</sup></b>	<ul style="list-style-type: none"> <li>• 802.11b, 1Mbps : -93.5dBm maximum</li> <li>• 802.11b, 11Mbps : -84dBm maximum</li> <li>• 802.11a/g, 6Mbps : -86dBm maximum</li> <li>• 802.11a/g, 54Mbps : -72dBm maximum</li> <li>• 802.11n, MCS07 : -67dBm maximum</li> <li>• 802.11n, MCS15 : -64dBm maximum</li> <li>• 802.11ac, MCS0(VHT80) : -84dBm maximum</li> <li>• 802.11ac, MCS9(VHT80) : -59dBm maximum</li> <li>• 802.11ac, MCS9(VHT160) : -58.5dBm maximum</li> <li>• 802.11ax, MCS11(HE40): -57dBm maximum</li> <li>• 802.11ax, MCS11(HE80): -54dBm maximum</li> <li>• 802.11ax, MCS11(HE160): -53.5dBm maximum</li> </ul>				
<b>Antenna Type</b>	High efficiency antenna with spatial diversity, mounted in the display enclosure  Two embedded dual band 2.4/5 GHz antennas are provided to the card to support WLAN MIMO communications and Bluetooth communications				
<b>Form Factor</b>	PCI-Express M.2 MiniCard				
<b>Dimensions</b>	<ol style="list-style-type: none"> <li>1. Type 2230 : 2.3 x 22.0 x 30.0 mm</li> <li>2. Type 1216: 1.67 x 12.0 x 16.0 mm</li> </ol>				
<b>Weight</b>	<ol style="list-style-type: none"> <li>1. Type 2230 : 2.8g</li> <li>2. Type 1216: 1.3g</li> </ol>				
<b>Operating Voltage</b>	3.3v +/- 9%				
<b>Temperature</b>	<table> <tr> <td>Operating</td> <td>14° to 158° F (-10° to 70° C)</td> </tr> <tr> <td>Non-operating</td> <td>-40° to 176° F (-40° to 80° C)</td> </tr> </table>	Operating	14° to 158° F (-10° to 70° C)	Non-operating	-40° to 176° F (-40° to 80° C)
Operating	14° to 158° F (-10° to 70° C)				
Non-operating	-40° to 176° F (-40° to 80° C)				
<b>Humidity</b>	<table> <tr> <td>Operating</td> <td>10% to 90% (non-condensing)</td> </tr> <tr> <td>Non-operating</td> <td>5% to 95% (non-condensing)</td> </tr> </table>	Operating	10% to 90% (non-condensing)	Non-operating	5% to 95% (non-condensing)
Operating	10% to 90% (non-condensing)				
Non-operating	5% to 95% (non-condensing)				
<b>Altitude</b>	<table> <tr> <td>Operating</td> <td>0 to 10,000 ft (3,048 m)</td> </tr> <tr> <td>Non-operating</td> <td>0 to 50,000 ft (15,240 m)</td> </tr> </table>	Operating	0 to 10,000 ft (3,048 m)	Non-operating	0 to 50,000 ft (15,240 m)
Operating	0 to 10,000 ft (3,048 m)				
Non-operating	0 to 50,000 ft (15,240 m)				
<b>LED Activity</b>	LED Amber – Radio Off; LED Off – Radio ON				

### Technical Specifications – Networking

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

<b>Frequency Band</b>	2402 to 2480 MHz
<b>Number of Available Channels</b>	Legacy : 0~79 (1 MHz/CH) BLE : 0~39 (2 MHz/CH)
<b>Data Rates and Throughput</b>	Legacy : 3 Mbps data rate; throughput up to 2.17 Mbps BLE : 1 Mbps data rate; throughput up to 0.2 Mbps Legacy : Synchronous Connection Oriented links up to 3, 64 kbps, voice channels Legacy : Asynchronous Connection Less links 2178.1 kbps/177.1 kbps asymmetric (3-DH5) or 864 kbps symmetric (3-EV5)
<b>Transmit Power</b>	The Bluetooth component shall operate as a Class II Bluetooth device with a maximum transmit power of + 9.5 dBm for BR and EDR.
<b>Power Consumption</b>	Peak (Tx): 330 mW Peak (Rx): 230 mW Selective Suspend: 17 mW
<b>Bluetooth Software Supported</b>	Microsoft Windows Bluetooth Software
<b>Link Topology</b>	
<b>Power Management</b>	Microsoft Windows ACPI, and USB Bus Support
<b>Certifications</b>	FCC (47 CFR) Part 15C, Section 15.247 & 15.249
<b>Power Management Certifications</b>	ETS 300 328, ETS 300 826
<b>Certifications</b>	Low Voltage Directive IEC950 UL, CSA, and CE Mark
<b>Bluetooth Profiles Supported</b>	BT4.1-ESR 5/6/7 Compliance LE Link Layer Ping LE Dual Mode LE Link Layer LE Low Duty Cycle Directed Advertising LE L2CAP Connection Oriented Channels Train Nudging & Interlaced Scan BT4.2 ESR08 Compliance LE Secure Connection- Basic/Full LE Privacy 1.2 –Link Layer Privacy LE Privacy 1.2 –Extended Scanner Filter Policies LE Data Packet Length Extension FAX Profile (FAX) Basic Imaging Profile (BIP)2 Headset Profile (HSP) Hands Free Profile (HFP) Advanced Audio Distribution Profile (A2DP) BT5.2 ESR9/10 Compliance LE Advertisement Extensions Channel Selection Algo Limited High Duty Cycle Non-Connectable Advertising 2Mbps LE LE Long Range

\*Wi-Fi 6E requires a Wi-Fi 6E router, sold separately, and Windows 11 to function in the 6GHz band. Availability of public wireless access points limited. Wi-Fi 6E is backwards compatible with prior 802.11 specs. And available in countries where Wi-Fi 6E is supported. Not supported with Windows 10.

### Technical Specifications – Networking

**Intel AX211 Wi-Fi 6E +BT Wireless LAN Standards**  
**5.3 M.2 160MHz CNVi**  
**WLAN non-vPro®**

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  
 • 5.955 – 6.415 GHz  
 • 6.435 – 6.515 GHz  
 • 6.535 – 6.875 GHz  
 • 6.895 – 7.115 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: max 300Mbps  
 • 802.11ac : 1733Mbps  
 • 802.11ax : max 2.4Gbps

**Modulation**

Direct Sequence Spread Spectrum

OFDM, BPSK, QPSK, CCK, 16-QAM, 64-QAM, 256-QAM, 1024QAM

**Security<sup>1</sup>**

• IEEE and WiFi compliant 64 / 128 bit WEP encryption for a/b/g mode only  
 • AES-CCMP: 128 bit in hardware  
 • 802.1x authentication  
 • WPA, WPA2: 802.1x. WPA-PSK, WPA2-PSK, TKIP, and AES.  
 • WPA2 certification  
 • WPA3 certification  
 • IEEE 802.11i  
 • WAPI

**Network Architecture Models**

Ad-hoc (Peer to Peer)

Infrastructure (Access Point Required)

**Roaming**

IEEE 802.11 compliant roaming between access points

**Output Power<sup>2</sup>**

• 802.11b : +17dBm minimum  
 • 802.11g : +16dBm minimum  
 • 802.11a : +17dBm minimum  
 • 802.11n HT20(2.4GHz) : +14dBm minimum  
 • 802.11n HT40(2.4GHz) : +13dBm minimum

### Technical Specifications – Networking

	<ul style="list-style-type: none"> <li>• 802.11n HT20(5GHz) : +14dBm minimum</li> <li>• 802.11n HT40(5GHz) : +13dBm minimum</li> <li>• 802.11ac VHT80(5GHz) : +10dBm minimum</li> <li>• 802.11ac VHT160(5GHz) : +10dBm minimum</li> <li>• 802.11ax HE40(2.4GHz) : +12dBm minimum</li> <li>• 802.11ax HE80(5GHz) : +10dBm minimum</li> <li>• 802.11ax HE160(5GHz) : +10dBm minimum</li> </ul>
<b>Power Consumption</b>	<ul style="list-style-type: none"> <li>• Transmit mode 2.0 W</li> <li>• Receive mode 1.6 W</li> <li>• Idle mode (PSP) 180 mW (WLAN Associated)</li> <li>• Idle mode 50 mW (WLAN unassociated)</li> <li>• Connected Standby 10mW</li> <li>• Radio disabled 8 mW</li> </ul>
<b>Power Management</b>	ACPI and PCI Express compliant power management 802.11 compliant power saving mode
<b>Receiver Sensitivity<sup>3</sup></b>	<ul style="list-style-type: none"> <li>•802.11b, 1Mbps : -93.5dBm maximum</li> <li>•802.11b, 11Mbps : -84dBm maximum</li> <li>• 802.11a/g, 6Mbps : -86dBm maximum</li> <li>• 802.11a/g, 54Mbps : -72dBm maximum</li> <li>• 802.11n, MCS07 : -67dBm maximum</li> <li>• 802.11n, MCS15 : -64dBm maximum</li> <li>• 802.11ac, MCS0(VHT80) : -84dBm maximum</li> <li>• 802.11ac, MCS9(VHT80) : -59dBm maximum</li> <li>• 802.11ac, MCS9(VHT160) : -58.5dBm maximum</li> <li>•802.11ax, MCS11(HE40): -57dBm maximum</li> <li>•802.11ax, MCS11(HE80): -54dBm maximum</li> <li>•802.11ax, MCS11(HE160): -53.5dBm maximum</li> </ul>
<b>Antenna Type</b>	High efficiency antenna with spatial diversity, mounted in the display enclosure  Two embedded dual band 2.4/5 GHz antennas are provided to the card to support WLAN MIMO communications and Bluetooth communications
<b>Form Factor</b>	PCI-Express M.2 MiniCard
<b>Dimensions</b>	1. Type 2230 : 2.3 x 22.0 x 30.0 mm 2. Type 1216: 1.67 x 12.0 x 16.0 mm
<b>Weight</b>	1. Type 2230 : 2.8g 2. Type 1216: 1.3g
<b>Operating Voltage</b>	3.3v +/- 9%
<b>Temperature</b>	Operating 14° to 158° F (-10° to 70° C) Non-operating -40° to 176° F (-40° to 80° C)
<b>Humidity</b>	Operating 10% to 90% (non-condensing) Non-operating 5% to 95% (non-condensing)
<b>Altitude</b>	Operating Non-operating 0 to 10,000 ft (3,048 m) 0 to 50,000 ft (15,240 m)
<b>LED Activity</b>	LED Amber – Radio OFF; LED White – Radio ON
<b>HP Integrated Module with Bluetooth 4.0/4.1/4.2/5.0/5.1/5.2/5.3 Wireless Technology</b>	
<b>Frequency Band</b>	2402 to 2480 MHz
<b>Number of Available Channels</b>	Legacy : 0~79 (1 MHz/CH) BLE : 0~39 (2 MHz/CH)

### Technical Specifications – Networking

<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</b>	ETS 300 328, ETS 300 826
<b>Certifications</b>	Low Voltage Directive IEC950 UL, CSA, and CE Mark

<b>Bluetooth Profiles Supported</b>	BT4.1-ESR 5/6/7 Compliance LE Link Layer Ping LE Dual Mode LE Link Layer LE Low Duty Cycle Directed Advertising LE L2CAP Connection Oriented Channels Train Nudging & Interlaced Scan BT4.2 ESR08 Compliance LE Secure Connection- Basic/Full LE Privacy 1.2 –Link Layer Privacy LE Privacy 1.2 –Extended Scanner Filter Policies LE Data Packet Length Extension FAX Profile (FAX) Basic Imaging Profile (BIP)2 Headset Profile (HSP) Hands Free Profile (HFP) Advanced Audio Distribution Profile (A2DP) BT5.2 ESR9/10 Compliance LE Advertisement Extensions Channel Selection Algo Limited High Duty Cycle Non-Connectable Advertising 2Mbps LE LE Long Range
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**Security & Manageability** Intel® vPro® support with appropriate Intel® chipset components

\*Wi-Fi 6E requires a Wi-Fi 6E router, sold separately, and Windows 11 to function in the 6GHz band. Availability of public wireless access points limited. Wi-Fi 6E is backwards compatible with prior 802.11 specs. And available in countries where Wi-Fi 6E is supported. Not supported with Windows 10.

### Technical Specifications – Networking

#### Intel® 5G Solution 5000

##### Technology/Operating bands

##### WCDMA/HSPA+ operating bands:

Band 1: 1920 to 1980 MHz (UL), 2110 to 2170 MHz (DL)  
Band 2: 1850 to 1910 MHz (UL), 1930 to 1990 MHz (DL)  
Band 4: 1710 to 1755 MHz (UL), 2110 to 2155 MHz (DL)  
Band 5: 824 to 849 MHz (UL), 869 to 894 MHz (DL)  
Band 8: 880 to 915 MHz (UL), 925 to 960 MHz (DL)

##### LTE FDD/TDD operating bands:

Band 1: 1920 to 1980 MHz (UL), 2110 to 2170 MHz (DL)  
Band 2: 1850 to 1910 MHz (UL), 1930 to 1990 MHz (DL)  
Band 3: 1710 to 1785 MHz (UL), 1805 to 1880 MHz (DL)  
Band 4: 1710 to 1755 MHz (UL), 2110 to 2155 MHz (DL)  
Band 5: 824 to 849 MHz (UL), 869 to 894 MHz (DL)  
Band 7: 2500 to 2570 MHz (UL), 2620 to 2690 MHz (DL)  
Band 8: 880 to 915 MHz (UL), 925 to 960 MHz (DL)  
Band 12: 699 to 716 MHz (UL), 729 to 746 MHz (DL)  
Band 13: 777 to 787 MHz (UL), 746 to 756 MHz (DL)  
Band 14: 788 to 798 MHz (UL), 758 to 768 MHz (DL)  
Band 17: 704 to 716 MHz (UL), 734 to 746 MHz (DL)  
Band 18: 815 to 830 MHz (UL), 860 to 875 MHz (DL)  
Band 19: 830 to 845 MHz (UL), 875 to 890 MHz (DL)  
Band 20: 832 to 862 MHz (UL), 791 to 821 MHz (DL)  
Band 25: 1850 to 1915 MHz (UL), 1930 to 1995 MHz (DL)  
Band 26: 814 to 849 MHz (UL), 859 to 894 MHz (DL)  
Band 28: 703 to 748 MHz (UL), 758 to 803 MHz (DL)  
Band 29: 717 to 728 MHz (DL)  
Band 30: 2305 to 2315 MHz (UL) 2350 to 2360 MHz (DL)  
Band 32: 1452 to 1496 MHz (DL)  
Band 34: 2010 to 2025 MHz (UL/DL)  
Band 38: 2570 to 2620 MHz (UL/DL)  
Band 39: 1880 to 1920 MHz (UL/DL)  
Band 40: 2300 to 2400 MHz (UL/DL)  
Band 41: 2496 to 2690 MHz (UL/DL)  
Band 42: 3400 to 3600 MHz (UL/DL)  
Band 43: 3400 to 3800 MHz (UL/DL)  
Band 46: 5150 to 5925 MHz (DL)  
Band 48: 3550 to 3700 MHz (UL/DL)  
Band 66: 1710 to 1800 MHz (UL), 2110 to 2200 MHz (DL)  
Band 71: 663 to 698 MHz (UL), 617 to 652 MHz (DL)

##### 5G NR Sub 6GHz

n1: 1920 to 1980 MHz (UL), 2110 to 2170 MHz (DL)  
n2: 1850 to 1910 MHz (UL), 1930 to 1990 MHz (DL)  
n3: 1710 to 1785 MHz (UL), 1805 to 1880 MHz (DL)  
n5: 824 to 849 MHz (UL), 869 to 894 MHz (DL)  
n7: 2500 to 2570 MHz (UL), 2620 to 2690 MHz (DL)  
n8: 880 to 915 MHz (UL), 925 to 960 MHz (DL)  
n20: 832 to 862 MHz (UL), 791 to 821 MHz (DL)  
n25: 1850 to 1915 MHz (UL), 1930 to 1995 MHz (DL)  
n28: 703 to 748 MHz (UL), 758 to 803 MHz (DL)  
n38: 2570 to 2620 MHz (UL/DL)  
n40: 2300 to 2400 MHz (UL/DL)  
n41: 2496 to 2690 MHz (UL/DL)  
n48: 3550 to 3700 MHz (UL/DL)  
n66: 1710 to 1800 MHz (UL), 2110 to 2200 MHz (DL)

### Technical Specifications – Networking

	n71: 663 to 698 MHz (UL), 617 to 652 MHz (DL) n77: 3300 to 4200 MHz (UL/DL) n78: 3300 to 3800 MHz (UL/DL) n79: 4400 to 5000 MHz (UL/DL)
<b>Wireless protocol standards</b>	5G NR Air Interface 3GPP Rel15 5G NR sub-6 LTE Rel14 20 layers and 2 Gbps downlink (DL) throughput – 4 × 4 MIMO across 5x CA 200 Mbps/uplink (UL) throughput – 40 MHz ULCA and 256 QAM 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>	GPS: L1 (1575.42MHz) GLONASS: L1 (1602MHz) BeidouB1(1561.098MHz) Galileo E1 (1575.42) QZSS(1575.42 MHz)
<b>Maximum Data Rates</b>	SA 5G/NR sub-6 Peak: DL4.67Gbps/ UL 1.25Gbps 5G NSA sub 6G : DL: 3.8 Gbps/UL 700Mbps LTE: ue-CategoryDL 19, (DL : 1.6 Gbps ) ue-CategoryUL 13 , (UL: 150Mbps) DC-HSPA+: 42 Mbps (Download), 11.5 Mbps (Upload)
<b>Maximum Output Power</b>	LTE: 23 dBm in all band except B41 LTE B41 HPUE = 26dBm NR: 23 dBm in all band except n41, n77, n78 and n79 LTE n41, n77, n78 and n79 HPUE = 26dBm HSPA+: 23.5 dBm
<b>Maximum Power Consumption</b>	5G Sub 6 : 2500 mA LTE : 1,300 mA (peak) ; 1100 mA (average) HSPA+ : 1,100 mA (peak) ; 800 mA (average)
<b>Form Factor</b>	M.2, 3042-S3 Key B
<b>Weight</b>	8 g
<b>Dimensions</b> (Length x Width x Thickness)	52 mm × 30 mm × 2.6 mm
<b>eSIM</b>	Support

\* Intel® 5G module is optional and must be configured at the factory. Module designed for 5G NR NSA (non-standalone) networks as carriers deploy Evolved-Universal Terrestrial Radio Access New Radio Dual Connectivity (ENDC) with both 100Mhz of 5G NR and LTE channel bandwidth, using 256QAM 4x4 as defined by 3GPP. Module requires activation and separately purchased service contract. Check with service provider for coverage and availability in your area. Data connection, upload and download speeds will vary due to network, location, environment, network conditions, and other factors. Backwards compatible to 4G LTE and 3G HSPA technologies. 5G module planned to be available in select platforms and select countries, where carrier supported.

#### Intel® XMM™ 7560 R+ LTE-Advanced Pro

<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), 700 (Band 12 lower), 700 (Band 13 upper), 700 (Band 14 upper), 700 (Band 17 lower), 850 (Band 18 lower), 850 (Band 19 upper), 800 (Band 20), 1900 (Band 25), 850 (Band 26), 700 (Band 28), 700 (Band 29 RX only), 2300 (Band 30), 1700/2100 (Band 66), 600 (band 71). TDD LTE: 2100 (Band 34), 2600 (Band 38), 1900 (Band 39), 2400 (Band 40), 2500 (Band 41), 3500
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### Technical Specifications – Networking

	(Band 42), 3700 (Band 43), 3700 (band 48), 5200 (Band 46 RX only) MHz; 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 12 LTE Specification DL-CAT.16, DL 100MHz BW throughput up to 978Mbps; UL-CAT.13 40MHz throughput up to 150Mbps WCDMA R99, 3GPP Release 5, 6, 7 and 8 UMTS Specification
<b>GPS</b>	Standalone GPS/Beidou/Glonass, 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: 978 Mbps (Download), 150 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 in all band except B41 LTE B41 HPUE = 26dBm 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>	6 g
<b>Dimensions</b> (Length x Width x Thickness)	42 x 30 x 2.3 mm
<b>eSIM</b>	Support

\*Mobile Broadband is an optional feature. 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.

### NFC Mirage module (NXP NPC300 I2C 10mmx17mm)

<b>Dimensions (L x W x H)</b>	Module 25 mm by 10 mm by 2.0 mm
<b>Chipset</b>	NPC300
<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 Reader (PCD-VCD) Mode(1)</b>	Tag Type 1, Type 2, Type3 and Type 4, NFCIP-1 and NFCIP-2 ISO/IEC 14443 A ISO/IEC 14443 B 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'



### Technical Specifications – Networking

		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, VCC_BOOST = 5V) Mode Power Consumption, Typical</b>	VBAT= 3.3V, <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.
<b>Intel® I219-LM 1 Gigabit Network Connection LOM (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

### Technical Specifications – Networking

	Advanced link down power saving for reducing link down power consumption
<b>Management Interface</b>	Auto MDI/MDIX Crossover cable detection
<b>IT Manageability</b>	Wake-on-LAN from modern 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 1 Gigabit Network Connection LOM (non-vPro®)</b>	<b>Connector</b>	RJ-45
	<b>System Interface</b>	PCI(Intel proprietary) + SMBus
	<b>Data rates supported</b>	1. 10 Mbit/s operation (10BASE-T; IEEE 802.3i; IEEE 802.3 clauses 13-14) 2. 100 Mbit/s operation (100BASE-TX; IEEE 802.3u; IEEE 802.3 clauses 21-30) 3. 1000 Mbit/s operation (1000BASE-T; IEEE 802.3ab; IEEE 802.3 clauses 40) 4. 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 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</b>	Auto MDI/MDIX Crossover cable detection
	<b>IT Manageability</b>	Wake-on-LAN from modern 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))

### Technical Specifications – Networking

Comprehensive diagnostic and configuration software suite  
Virtual Cable Doctor for Ethernet cable status

**Security & Manageability** Intel® non-vPro® support with appropriate Intel® chipset components

#### Qualcomm 9205

#### Technology/Operating bands

FDD LTE: 2100 (Band 1), 1900 (Band 2), 1800 (Band 3), 1700/2100 (Band 4), 850 (Band 5), 900 (Band 8), 700 (Band 12 lower), 700 (Band 13 upper), 700 (Band 14 upper), 850 (Band 18 lower), 850 (Band 19 upper), 800 (Band 20), 1900 (Band 25), 850 (Band 26), 800 (Band 27), 700 (Band 28), 1700/2100 (Band 66), 700 (band 85) MHz.  
GSM/GPRS/EGPRS: 850, 900, 1800, 1900MHz.

#### Wireless protocol standards

- 3GPP TS 51.010-1 V10.5.0: Mobile Station (MS) conformance specification; Part 1: Conformance specification
- 3GPP TS 36.521-1 V14.3.0: User Equipment (UE) conformance specification; Radio transmission and reception; Part 1: Conformance testing
- 3GPP TS 21.111 V10.0.0: USIM and IC card requirements
- 3GPP TS 51.011 V4.15.0: Specification of the Subscriber Identity Module -Mobile Equipment (SIM-ME) interface
- 3GPP TS 31.102 V10.11.0: Characteristics of the Universal Subscriber Identity Module (USIM) application
- 3GPP TS 31.11 V10.16.0: Universal Subscriber Identity Module (USIM) Application Toolkit (USAT)
- 3GPP TS 36.124 V10.3.0: Electro Magnetic Compatibility (EMC) requirements for mobile terminals and ancillary equipment
- 3GPP TS 27.007 V10.0.8: AT command set for User Equipment (UE)
- 3GPP TS 27.005 V10.0.1: Use of Data Terminal Equipment – Data Circuit terminating Equipment (DTE – DCE) interface for Short Message Service (SMS) and Cell Broadcast Service (CBS)

#### GPS

Standalone GPS/Beidou/Glonass, A-GPS (MS-A, MS-B)

#### GPS Bands

1575.42 MHz ± 1.023 MHz, GLONASS 1596-1607MHz, Beidou 1561.098 MHz

#### Maximum Data Rates

LTE FDD: 375 Kbps (Download), 1119 Kbps (Upload)

GSM:

- GPRS: 107 Kbps (Download), 85.6 Kbps (Upload)

- EGPRS: 296 Kbps (Download), 236.8 Kbps (Upload)

#### Maximum Output Power

LTE: 21.5 dBm in all band

GSM:34dBm

#### Maximum Power Consumption

LTE : 1,200 mA (peak) ; 900 mA (average)

HSPA+ : 1,100 mA (peak) ; 800 mA (average)

#### Form Factor

M.2, 2242-S3 Key B

#### Weight

5.5 g

#### Dimensions

(Length x Width x Thickness)

22 x 42 x 2.3 mm

#### eSIM

Support

### Technical Specifications – Networking

#### AUDIO

<b>HD Stereo Codec</b>	ALC3315
<b>Audio I/O Ports</b>	Headset connector supports a CTIA
<b>Internal Speaker Amplifier</b>	Using External AMP for 41Internal speaker.
<b>Multi-streaming Capable Sampling</b>	Playback multi-streaming can be enabled in the audio control panel to allow independent audio. Streams to be sent to/from the front and rear jacks or integrated speaker.
<b>Wavetable Syntheses</b>	DAC: 48000Hz  ADC: Internal MIC: 48000Hz External MIC: 44100Hz
<b>Analog Audio</b>	Support 3.5mm Headset : CTIA only and Headphone-out
<b># of Channels on Line-Out</b>	No line out
<b>Internal Speaker</b>	Yes

#### POWER

<b>HP 150W Slim 4.5 mm PFC Right Angle Smart (3-pin) AC Power Adapter</b>	<b>Dimensions</b>	138x66x22mm	
	<b>Weight</b>	unit: 325g +/- 10g	
	<b>Input</b>	<b>Input Efficiency</b>	88% at 115 Vac and 89% at 230Vac
		<b>Input frequency range</b>	47 ~ 63 Hz
	<b>Output</b>	<b>Input AC current</b>	2.7 A at 90 Vac and Maximum Load
		<b>Output power</b>	150W
		<b>DC output</b>	19.5V
		<b>Hold-up time</b>	5ms at 115 Vac input
		<b>Output current limit</b>	<16.0A
		<b>DC Plug</b>	4.5mm Barrel Type
		<b>Connector</b>	C6
	<b>Environmental Design</b>	<b>Operating temperature</b>	32° to 95° F (0° to 35° C)
		<b>Non-operating (storage) temperature</b>	-4° to 185° F (-20° to 85° C)
		<b>Altitude</b>	0 to 16,400 ft (0 to 5000m)
		<b>Humidity</b>	5% to 95%
<b>EMI and Safety Certifications</b>	<b>Storage Humidity</b>	5% to 95%	
	<b>Eg:</b>	Eg: *CE Mark – full compliance with LVD and EMC directives * Worldwide safety standards – IEC60950-1 and/or IEC62368-1, EN60950-1 and/or EN62368-1, UL60950-1 and/or UL62368-1 , Class1, SELV; Agency approvals – C-UL-US, NORDICS, DENAN, EN55032 Class B, FCC Class	

### Technical Specifications – Networking

B, CISPR32 Class B, CCC, NOM-001 NYCE.

\* MTBF – over 200,000 hours at 25°C ambient condition.

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### Technical Specifications – Power

<b>HP 200W Slim 4.5 mm PFC Right Angle Smart (3-pin) AC Power Adapter</b>	<b>Dimensions</b>	152x73x23.5mm	
	<b>Weight</b>	unit: 510g +/- 10g	
	<b>Input</b>	<b>Input Efficiency</b>	88% at 115 Vac and 89% at 230Vac
		<b>Input frequency range</b>	47 ~ 63 Hz
	<b>Output</b>	<b>Input AC current</b>	2.7 A at 90 Vac and Maximum Load
		<b>Output power</b>	200W
		<b>DC output</b>	19.5V
		<b>Hold-up time</b>	5ms at 115 Vac input
		<b>Output current limit</b>	<21.0A
		<b>DC Plug</b>	4.5mm Barrel Type
		<b>Connector</b>	C14
	<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 – IEC60950-1 and/or IEC62368-1, EN60950-1 and/or EN62368-1, UL60950-1 and/or UL62368-1, Class1, SELV; Agency approvals – C-UL-US, NORDICS, DENAN, EN55032 Class B, FCC Class B, CISPR32 Class B, CCC, NOM-001 NYCE. * MTBF – over 200,000 hours at 25°C ambient condition.		
<b>HP 230W Slim 4.5 mm PFC Right Angle Smart (3-pin) AC Power Adapter</b>	<b>Dimensions</b>	180x88x25.4mm	
	<b>Weight</b>	unit: 650g +/- 10g	
	<b>Input</b>	<b>Input Efficiency</b>	88% at 115 Vac and 89% at 230Vac
		<b>Input frequency range</b>	47 ~ 63 Hz
	<b>Output</b>	<b>Input AC current</b>	3.5 A at 90 Vac and Maximum Load
		<b>Output power</b>	230W
		<b>DC output</b>	19.5V
		<b>Hold-up time</b>	5ms at 115 Vac input
		<b>Output current limit</b>	<25.0A
		<b>DC Plug</b>	4.5mm Barrel Type
		<b>Connector</b>	C14
	<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%	

### Technical Specifications – Power

#### EMI and Safety Certifications

Eg:

\*CE Mark – full compliance with LVD and EMC directives

\* Worldwide safety standards – IEC60950-1 and/or IEC62368-1, EN60950-1 and/or EN62368-1, UL60950-1 and/or UL62368-1, Class1, SELV;

Agency approvals – C-UL-US, NORDICS, DENAN, EN55032 Class B, FCC Class B, CISPR32 Class B, CCC, NOM-001 NYCE.

\* MTBF – over 200,000 hours at 25°C ambient condition.

#### 95Whr XL-Long Life Polymer Fast Charge 8 cell Battery

#### Dimensions (H x W x L)

314.2x59.4x16.91 mm (12.37x2.34x0.67 inch)

#### Weight

0.396kg +/-0.010kg (0.875lb +/-0.02lb)

#### Cells/Type

8-cell Lithium-Ion Polymer cell / 624266

#### Energy

Voltage 15.44V/ 17.72V

Amp-hour capacity 5.907Ah /6.154Ah

Watt-hour capacity 95Wh

#### Temperature

Operating (Charging) 32° to 113° F (0° to 45° C)

Operating (Discharging) 14° to 140° F (-10° to 60° C)

#### Fuel Gauge LED

NA

#### Warranty

Refer to products warranty

#### Optional Travel Battery Available

No

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

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

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

### Technical Specifications – Environmental

#### ENVIRONMENTAL DATA

##### Eco-Label Certifications & declarations

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

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

##### Sustainable Impact Specifications

- Product Carbon Footprint (hp.com)
- Ocean-bound plastic in Speaker
- 25% post-consumer recycled plastic
- 80% recycled metal
- External Power Supply 90% Efficiency
- Low halogen
- Outside Box and corrugated cushions are 100% sustainably sourced and recyclable
- Molded Paper Pulp Cushion inside box is 100% sustainably sourced and recyclable
- Bulk packaging available

##### System Configuration

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

##### Energy Consumption (in accordance with US ENERGY STAR® test method)

	115VAC, 60Hz	230VAC, 50Hz	100VAC, 50Hz
Normal Operation (Short idle)	11.09 W	11.11 W	10.94 W
Normal Operation (Long idle)	NA	NA	NA
Sleep	NA	NA	NA
Off	0.41 W	0.43 W	0.4 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)	37.9 BTU/hr	38 BTU/hr	37.4 BTU/hr
Normal Operation (Long idle)	NA	NA	NA
Sleep	NA	NA	NA
Off	1.4 BTU/hr	1.5 BTU/hr	1.4 BTU/hr



### Technical Specifications – Environmental

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

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

	Sound Power ( $L_{Wad}$ , bels)	Sound Pressure ( $L_{pAm}$ , decibels)
Typically Configured – Idle	3.3	26.6
Fixed Disk – Random writes	3.4	28.6
Optical Drive – Sequential reads	3.4	27.3

#### Longevity and Upgrading

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

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

#### Additional Information

- This product is in compliance with the Restrictions of Hazardous Substances (RoHS) directive – 2011/65/EC.
- This HP product is designed to comply with the Waste Electrical and Electronic Equipment (WEEE) Directive – 2002/96/EC.
- This product is in compliance with California Proposition 65 (State of California; Safe Drinking Water and Toxic Enforcement Act of 1986).
- This product is in compliance with the IEEE 1680 (EPEAT) standard at the Gold level, see [www.epeat.net](http://www.epeat.net)
- Plastics parts weighing over 25 grams used in the product are marked per ISO11469 and ISO1043.
- This product is 93.3% recycle-able when properly disposed of at end of life.

#### Packaging Materials

<b>External:</b>	PAPER/Corrugated	291 g
	PAPER/Corrugated	72 g
	PAPER/Molded Pulp	160 g
	PAPER/Paper	3 g
<b>Internal:</b>	PLASTIC/Polyethylene low density – LDPE	17 g

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

The corrugated paper packaging materials contains at least 55.0% recycled content.

#### RoHS Compliance

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

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

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

### Technical Specifications – Environmental

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)):

- 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.

### Technical Specifications – Environmental

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.

#### HP Inc. Corporate Environmental Information

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

Global Citizenship Report

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

Eco-label certifications

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

ISO 14001 certificates:

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

and

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

#### Footnotes

- Percentage of ocean-bound plastic contained in each component varies by product
- Recycled plastic content percentage is based on the definition set in the IEEE 1680.1-2018 standard.
- External power supplies, WWAN modules, power cords, cables and peripherals excluded.
- 100% outer box packaging and corrugated cushions made from sustainably sourced certified and recycled fibers.
- Fiber cushions made from 100% recycled wood fiber and organic materials.
- Plastic cushions are made from >90% recycled plastic.}
- Recycled metal is expressed as a percentage of the total weight of the metal according to ISO 14021 definitions for metal parts over 25 grams

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

Type	Description	Part #
<b>Bags</b>	HP Prelude Pro Recycle Backpack	1X644AA
	HP Prelude Pro Recycle Top Load	1X645AA
	HP Prelude 15.6 Top Load	1E7D7AA
	HP Prelude 15.6 Top Load	2Z8P4AA
	HP Prelude 15.6 Top Load	50P31AA
	HP Prelude 15.6 Backpack	1E7D6AA
	HP Prelude 15.6 Backpack	2Z8P3AA
	HP Prelude 15.6 Backpack	50P32AA
	HP Renew Business 17.3 Laptop Backpack	3E2U5AA
	HP Renew Business 17.3 Laptop Bag	3E2U6AA
	HP Renew Business 15.6 Laptop Bag	3E5F8AA
	HP Renew Executive 16 Laptop Backpack	6B8Y1AA
	HP Renew Executive 16 Laptop Bag	6B8Y2AA
	HP Travel 25 Liter 15.6 Iron Gray Laptop Backpack	6B8U4AA
	HP Travel 25 Liter 15.6 Iron Gray Laptop Backpack	6H2D8AA
	HP Travel 18 Liter 15.6 Iron Gray Laptop Backpack	6B8U6AA
	HP Travel 18 Liter 15.6 Iron Gray Laptop Backpack	6H2D9AA
<b>Docking</b>	HP USB-C Dock G5	26D32AA
	HP USB-C Dock G5	5TW10AA
	HP Thunderbolt Dock Audio Module	3AQ21AA
	HP 120W Thunderbolt Dock	2UK37AA
	HP 120W Thunderbolt Dock	6HP48AA
	HP Thunderbolt Dock 230W G2	2UK38AA
	HP TB Dock G2 w/ Combo Cable	3TR87AA
	HP USB-C/A Universal Dock G2	5TW13AA
	HP TB Dock G2 Combo Cable	3XB96AA
	HP USB-C/A Universal Dock G2 TAA	7UP88AA
	HP Thunderbolt 280W TAA G4 Dock w/Combo Cable	4J0J9AA
HP Thunderbolt 280W G4 Dock w/Combo Cable 3yr	72Y43AA	
<b>Input/Output</b>	HP HDMI to VGA Adapter	H4F02AA
	HP USB-C to USB 3.0 Adapter	N2Z63AA
	HP USB-C to DisplayPort Adapter	N9K78AA
	HP USB-C to VGA Adapter	N9K76AA
	HP USB-C to VGA Adapter	P7Z54AA
	HP USB-C to HDMI 2.0 Adapter	2PC54AA
	HP 7.4 mm to 4.5 DC dongle	K0Q39AA
	HP USB-C to HDMI 2.0 Adapter	1WC36AA
	HP USB-C to RJ45 Adapter G2	4Z527AA
	HP USB-C to RJ45 Adapter G2	4Z534AA
	HP USB 3.0 to Gig RJ45 Adapter G2	4Z7Z7AA
	HP USB-C to USB-C 100W Cable	5AR72AA

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

<b>Keyboard/Mouse</b>	HP 320K Wired Keyboard	9SR37AA
	HP 125 Wired Keyboard	266C9AA
	HP 975 USB+BT Dual-Mode Wireless Keyboard	3Z726AA
	HP 455 Programmable Wireless Keyboard	4R177AA
	HP Wireless Rechargeable 950MK Mouse and Keyboard	3M165AA
	HP Wired Desktop 320MK Mouse and Keyboard	9SR36AA
	HP 235 Wireless Mouse and Keyboard Combo	1Y4D0AA
	HP 225 Wired Mouse and Keyboard Combo	286J4AA
	HP 655 Wireless Keyboard and Mouse Combo	4R009AA
	HP Wired 320M Mouse	9VA80AA
	HP Premium Wireless Mouse	1JR31AA
	HP Travel Bluetooth Mouse	6SP30AA
	HP Multi-Device 635 Black Wireless Mouse	1D0K2AA
	HP Creator 935 Black Wireless Mouse	1D0K8AA
	HP 128 LSR Wired Mouse	265D9AA
	HP 125 Wired Mouse	265A9AA
	HP 435 Multi-Device Wireless Mouse	3B4Q5AA
	HP 355 Compact Multi-Device Keyboard	692S9AA
	HP 155 Wired Mouse	5B8B7AA
	HP 715 Rechargeable Multi-Device Bluetooth Mouse	6E6F0AA
HP 925 Ergonomic Vertical Wireless Mouse	6H1A5AA	
<b>Hub</b>	HP USB-C Mini Dock	1PM64AA
	HP USB-C Travel Hub G2	7PJ38AA
	HP Universal USB-C Multiport Hub	50H55AA
	HP Universal USB-C Multiport Hub	50H98AA
<b>Audio/Video</b>	HP USB G2 Stereo Headset	428H5AA
	HP USB G2 Stereo Headset	428K6AA
	HP 3.5mm G2 Stereo Headset	428H6AA
	HP 3.5mm G2 Stereo Headset	428K7AA
	HP 365 BT Speaker	567D3AA
	HP 325 FHD USB-A Webcam	53X27AA
	HP 965 4K Streaming Webcam	695J5AA
<b>Power</b>	HP Zbook 200W Slim Smart 4.5mm AC Adapter	491C7AA
	HP Zbook 230W Slim Smart 4.5mm AC Adapter	6E6M1AA
<b>Memory</b>	HP 32GB DDR5 4800 SODIMM Memory	5S4C0AA
	HP 32GB DDR5 (1x32GB) 4800 SODIMM ECC Memory	6D8T4AA
	HP 16GB DDR5 (1x16GB) 4800 SODIMM ECC Memory	6D8T0AA
	HP 16GB DDR5 4800 SODIMM Memory	5S4C4AA
	HP 8GB DDR5 4800 SODIMM Memory	5S4C3AA

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

<b>Storage</b>	HP USB External DVDRW Drive	F2B56AA
	HP USB External DVDRW Drive	Y3T76AA
	HP 512GB PCIe-4x4 NVMe M.2 Solid State Drive	5R8X9AA
	HP 1TB PCIe-4x4 NVMe M.2 Solid State Drive	5R8Y0AA
	HP 2TB PCIe-4x4 NVMe TLC M.2 Solid State Drive	6D8L6AA
<b>Security</b>	HP Nano Keyed Cable Lock	1AJ39AA
	HP Nano Master Keyed Cable Lock	1AJ40AA
	HP Sure Key Cable Lock	6UW42AA
	HP Nano Combination Cable Lock	63B28AA
	HP Essential Nano Combination Cable Lock	63B31AA

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<b>Date of change:</b>	<b>Version History:</b>		<b>Description of change:</b>
May 2, 2023	From v1 to v2	Changed	PROCESSOR, ENVIRONMENTAL DATA, POWER, WEIGHTS & DIMENSIONS sections
May 8, 2023	From v2 to v3	Changed	DISPLAY section
June 6, 2023	From v3 to v4	Changed	STORAGE AND DRIVES section
July 5, 2023	From v4 to v5	Changed	PROCESSOR section
July 13, 2023	From v5 to v6	Changed	PROCESSOR section
August 1, 2023	From v6 to v7	Changed	ENVIRONMENTAL DATA section
August 7, 2023	From v7 to v8	Changed	Image page 1