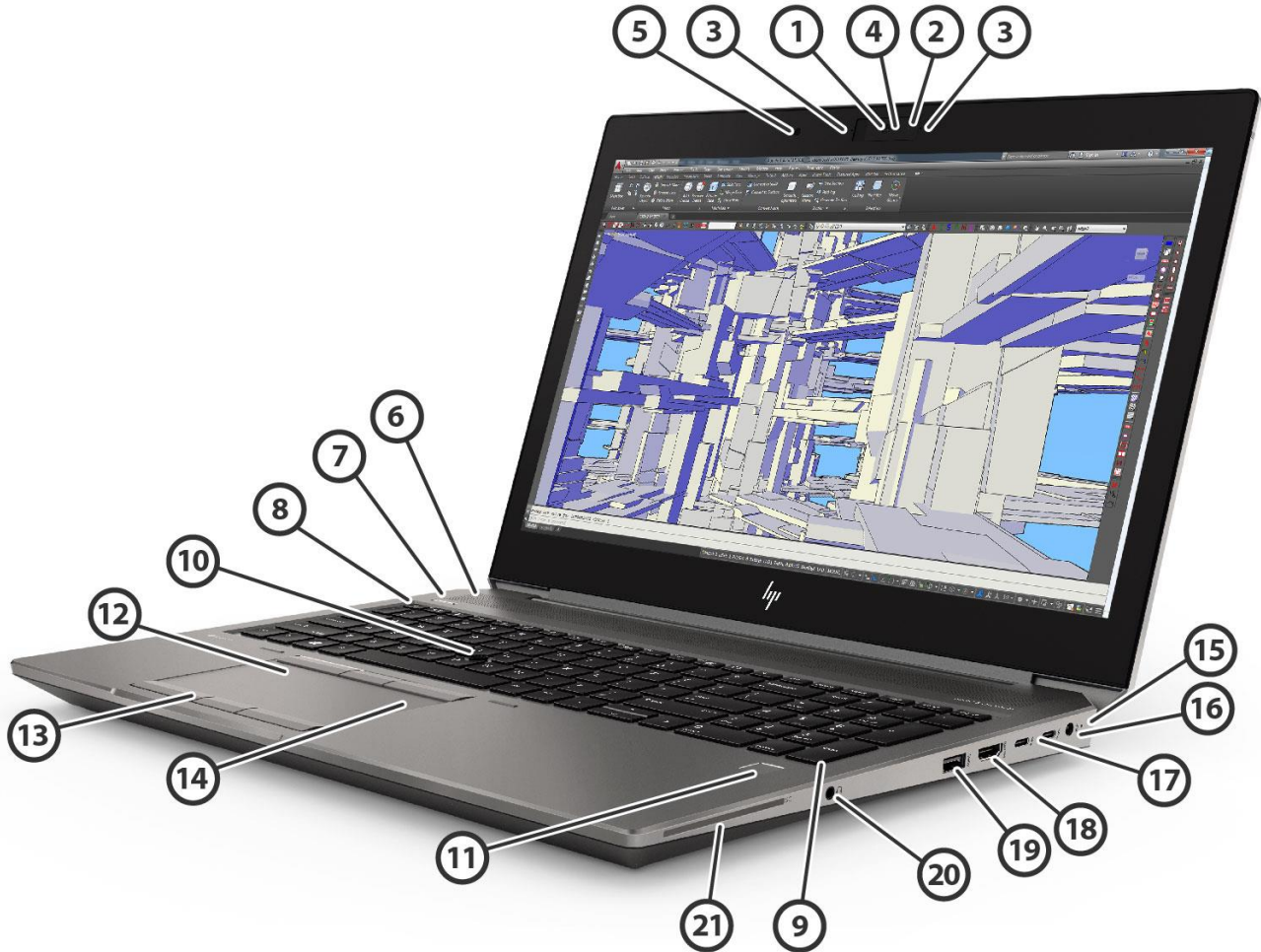


### Overview

### HP ZBook 15 G6 Mobile Workstation



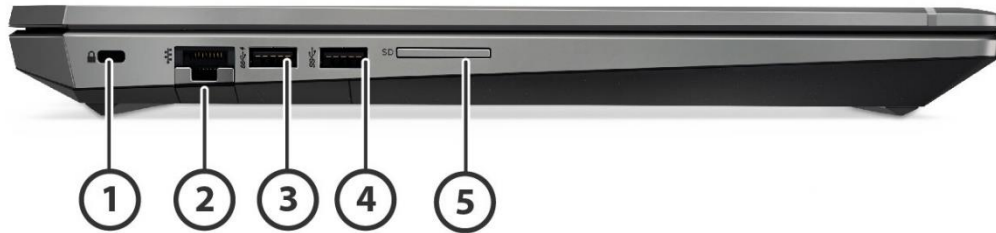
- 1. Webcam and IR Camera (optional)
- 2. Webcam LED (optional)
- 3. Internal microphones
- 4. IR Camera LEDs (optional)
- 5. Ambient light sensor (optional)
- 6. Speakers with discrete amps
- 7. Power button
- 8. Collaboration Keys
- 9. Numeric Keypad
- 10. Pointstick
- 11. Fingerprint Sensor

#### Left

- 12. Clickpad
- 13. 3-button Touchpad
- 14. Integrated Color Calibration Sensor
- 15. Indicator LEDs: Power light, Wireless light, Storage usage light
- 16. Power connector
- 17. 2 USB Type-C™ with Thunderbolt™
- 18. HDMI port (cable not included)
- 19. USB 3.1 Gen 1 port
- 20. Audio combo jack
- 21. Smart Card Reader

**Note:** All units have a SIM card slot and icon but units that do not support WWAN are shipped with a non-removable SIM slot plug

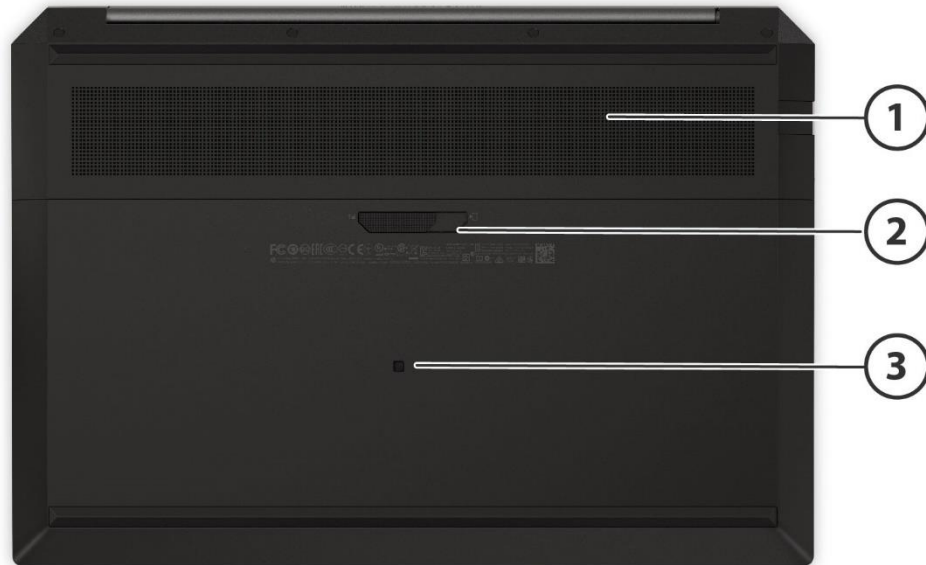
### Overview



#### Right

1. Security lock slot (lock sold separately)
2. Ethernet port
3. USB 3.1 Gen 1 charging port
4. USB 3.1 Gen 1
5. SD UHS-II flash media slot

### Overview



### Bottom

1. Fan Venting
2. Tool less access
3. Keyboard liquid drain

### Overview

#### At A Glance

- Work anywhere without compromising on performance or security with Windows 10 Pro <sup>1</sup>, powered by HP's collaboration and connectivity technology.
- Accelerate your workflow. Power through projects with up to 128 GB RAM <sup>2</sup> for fast rendering, editing and visual effects performance.
- Take multitasking to the next level with the 9th gen Intel® Core™ i9 processor <sup>3</sup> designed to handle complex, multithreaded apps like Adobe Premier Pro, and with fast clock speeds you can boost your speed on single threaded apps like Autodesk 3ds Max. <sup>4</sup>
- Run demanding professional apps with the newest generation Intel® Xeon® processors <sup>5</sup> for powerful performance and productivity.
- Render the most demanding projects and experience virtual immersion with the next generation of VR-ready NVIDIA Quadro® graphics.
- Strenuously tested to meet software certification and deliver superb performance with leading software providers, including Autodesk and Adobe.
- Bring your projects to life with one billion colors on the stunning 600 nit, 4K UHD HP DreamColor display.<sup>6</sup> Maintain color accuracy with a built-in color calibration system.
- Blitz through multiple tasks and ditch external drives with up to 6 TB storage. Three (3) dedicated drive slots, two (2) M.2 slots, and one (1) 2.5" drive bays<sup>7</sup>. Optional RAID 1 (mirroring) configuration from HP.
- Our ZBooks are designed to undergo extensive MIL-STD 810G testing.<sup>8</sup>
- Plug in to greater connectivity at your desktop with the HP Thunderbolt Dock for lightning-fast Thunderbolt™ 3 <sup>9</sup> transfers and the flexibility to run up to two external 4K displays. <sup>10</sup>
- Accidents happen - which is why we designed our keyboard with a drain hole, so minor spills flow out the bottom for easy cleanup.
- Easy-to-remove rear panel allows for future expansion via 3 (2x M.2, 1x 2.5) storage slots. 4 million separate custom configurations to choose from will meet the demands of engineers and designers to ensure extended device lifetime.
- State-of-the-art thermal design keeps your processor and graphics card cool and quiet even under the most heavy workloads, so you get maximum performance for the long haul.
- HP Extended Range Wireless LAN isolates the wireless antenna to improve signal integrity and range, minimizing interruptions so you can work all day without a hitch.
- No need to risk riding someone else's network when you have your own. Built-in 4G LTE leverages the SIM card from your wireless provider for enhanced security. <sup>11</sup>
- Leave password-only authentication behind with HP Client Security Manager Gen4 <sup>12</sup> and Windows Hello.

<sup>1</sup> Not all features are available in all editions or versions of Windows. Systems may require upgraded and/or separately purchased hardware, drivers, software or BIOS update to take full advantage of Windows functionality. Windows 10 is automatically updated, which is always enabled. ISP fees may apply and additional requirements may apply over time for updates. See <http://www.windows.com>.

<sup>2</sup> Up to 128GB memory is an optional, configurable feature.

<sup>3</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>4</sup> Adobe Premier Pro and Autodesk 3ds Max sold separately.

<sup>5</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>6</sup> DreamColor display required for 1 billion colors and is an optional or add on feature.

<sup>7</sup> For hard drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 30GB (for Windows 10) of system disk is reserved for system recovery software.

### Overview

<sup>8</sup> MIL-STD-810G testing is pending. Testing is not intended to demonstrate fitness of U.S. Department of Defense (DoD) contract requirements or for military use. Test results are not a guarantee of future performance under these test conditions. Accidental damage requires an optional HP Accidental Damage Protection Care Pack.

<sup>9</sup> HP ZBook Dock with Thunderbolt™ 3 sold separately.

<sup>10</sup> Hybrid graphics setting is required to run up to two external 4K displays.

<sup>11</sup> WWAN module is an optional feature, requires configuration at purchase and 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, in all regions.

<sup>12</sup> HP Client Security Manager Gen4 requires Windows and Intel® or AMD 8th generation processors.

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

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### Features

#### OPERATING SYSTEM

<b>Preinstalled OS</b>	Windows 10 Pro 64 – HP recommends Windows 10 Pro <sup>1</sup> Windows 10 Pro for Workstations 64 <sup>1</sup> Windows 10 Home 64 <sup>1</sup> Windows 10 Home Single Language 64 <sup>1</sup> Windows 10 China Government Edition <sup>1</sup> FreeDOS Red Hat® Enterprise Linux® 7 - Web support only <sup>2</sup>
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<sup>1</sup> Not all features are available in all editions or versions of Windows. Systems may require upgraded and/or separately purchased hardware, drivers, software or BIOS update to take full advantage of Windows functionality. Windows 10 is automatically updated, which is always enabled. ISP fees may apply and additional requirements may apply over time for updates. See <http://www.windows.com>

<sup>2</sup>Red Hat® Enterprise Linux® 7 - web support only. For detailed Linux® OS/hardware support information, see: [http://www.hp.com/linux\\_hardware\\_matrix](http://www.hp.com/linux_hardware_matrix)

#### PROCESSOR

9<sup>th</sup> Generation Intel® Core™ i5-9300H with Intel® UHD Graphics 630 (2.4 GHz base frequency, up to 4.1 GHz with Intel® Turbo Boost Technology, 8 MB cache, 4 cores)<sup>2,3,4,5</sup>

9<sup>th</sup> Generation Intel® Core™ i5-9400H vPro™ with Intel® UHD Graphics 630 (2.5 GHz base frequency, up to 4.3 GHz with Intel® Turbo Boost Technology, 8 MB cache, 4 cores)<sup>2,3,4,5,6</sup>

9<sup>th</sup> Generation Intel® Core™ i7-9750H with Intel® UHD Graphics 630 (2.6 GHz base frequency, up to 4.5 GHz with Intel® Turbo Boost Technology, 12 MB cache, 6 cores)<sup>2,3,4,5</sup>

9<sup>th</sup> Generation Intel® Core™ i7-9850H vPro™ with Intel® UHD Graphics 630 (2.6 GHz base frequency, up to 4.6 GHz with Intel® Turbo Boost Technology, 12 MB cache, 6 cores)<sup>2,3,4,5,6</sup>

9<sup>th</sup> Generation Intel® Core™ i9-9880H vPro™ with Intel® UHD Graphics 630 (2.3 GHz base frequency, up to 4.8 GHz with Intel® Turbo Boost Technology, 16 MB cache, 8 cores)<sup>2,3,4,5,6</sup>

9<sup>th</sup> Generation Intel® Xeon® E-2286M vPro™ with Intel® UHD Graphics P630 (2.4 GHz base frequency, up to 5.0 GHz with Intel® Turbo Boost Technology, 16 MB cache, 8 cores)<sup>2,3,4,5,6</sup>

<sup>2</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>3</sup> Processor speed denotes maximum performance mode; processors will run at lower speeds in battery optimization mode.

<sup>4</sup> Intel® Turbo Boost performance varies depending on hardware, software and overall system configuration. See <http://www.intel.com/technology/turboboost> for more information.

<sup>5</sup> In accordance with Microsoft's support policy, HP does not support the Windows 8 or Windows 7 operating system on products configured with Intel and AMD 7th generation and forward processors or provide any Windows 8 or Windows 7 drivers on <http://www.support.hp.com>.

<sup>6</sup> Some functionality of vPro, such as Intel Active management technology and Intel Virtualization technology, requires additional 3rd party software in order to run. Availability of future "virtual appliances" applications for Intel vPro technology is dependent on 3rd party software providers. Compatibility with future "virtual appliances" is yet to be determined.

### Features

#### CHIPSET

Chipset is integrated with processor

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

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

<sup>1</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> Some functionality of Intel® Core™ i5 with vPro™/Core™ i7 with vPro™/Core™ i9 with vPro™/Xeon® with vPro™ technology, such as Intel® Active Management technology and Intel® Virtualization technology, requires additional third-party software in order to run. Availability of future "virtual appliances" applications for Intel® Core™ i5 with vPro™/Core™ i7 with vPro™/Core™ i9 with vPro™/XEON® with vPro™ technology is dependent on third-party software providers. Compatibility with future "virtual appliances" is yet to be determined.

#### GRAPHICS

##### Integrated

Intel® UHD Graphics 630<sup>1</sup>

Intel® UHD Graphics P630<sup>1</sup>

##### Discrete

NVIDIA® Quadro® T1000 with 4 GB dedicated GDDR5 video memory

NVIDIA® Quadro® T2000 with 4 GB dedicated GDDR5 video memory

NVIDIA® Quadro® RTX3000 with 6 GB dedicated GDDR6 video memory

<sup>1</sup> Intel® Integrated graphics: Intel® UHD Graphics 630 integrated on Core™ i7 processors and Intel® UHD Graphics P630 integrated on Xeon® processors.

##### Multi-Display Support

###### Without HP Thunderbolt Dock G2:

HP ZBook 15 with hybrid graphics and without the use of HP Thunderbolt™ Dock G2 supports up to a maximum of four independent displays. These four displays are the internal panel plus three external displays connected to HDMI and two Thunderbolt™ 3 ports. HP ZBook 15 configuration with Intel® integrated graphics supports up to a maximum of three independent displays. These three displays are connected to HDMI and two Thunderbolt™ 3 ports.

###### With HP Thunderbolt Dock G2:

The HP Thunderbolt™ Dock G2 has Thunderbolt™ 3 port, VGA, two DisplayPort™ and a USB-C port. When used together with the HP ZBook 15 configuration with hybrid graphics, a maximum of five independent displays are supported or three, UHD displays. These five displays include the internal panel, external display connected to the system's HDMI port and three

### Features

external displays connected to HP Thunderbolt™ Dock G2's Thunderbolt™ 3, VGA, or DisplayPort™ ports. When used together with the HP ZBook 15 configuration with Intel® integrated graphics, a maximum of 3 independent displays are supported. Any three display combination of the system panel, system ports and ZBook Dock ports may be used.

## DISPLAY

### Non-touch

- HP SureView Integrated Privacy Display Gen3 15.6" diagonal FHD eDP + PSR anti-glare WLED-backlit 1000 nits 72% sRGB (1920 x 1080) <sup>1,2,4</sup>
- HP Dream Color display 15.6" diagonal UHD anti-glare WLED-backlit 600 nits 100% DCI P3 (3840 x 2160) <sup>3,4</sup>
- 15.6" diagonal UHD eDP + PSR anti-glare WLED-backlit 400 nits 72% sRGB (3840 x 2160) <sup>3,4</sup>
- 15.6" diagonal FHD eDP + PSR anti-glare WLED-backlit 400 nits 72% sRGB (1920 x 1080) <sup>4</sup>
- 15.6" diagonal FHD eDP anti-glare WLED-backlit 250 nits 45% sRGB (1920 x 1080) <sup>4</sup>

### Touch

- HP SureView Integrated Privacy Display Gen3 15.6" diagonal FHD eDP + PSR anti-glare WLED-backlit touch screen with Corning® Gorilla® Glass 5 1000 nits 72% sRGB (1920 x 1080) <sup>1,2,4</sup>
- 15.6" diagonal UHD eDP + PSR anti-glare WLED-backlit touch screen with Corning® Gorilla® Glass 5 and ambient light sensor 400 nits 72% sRGB (3840 x 2160) <sup>3,4</sup>

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

<sup>2</sup> HP Sure View available on 2nd half of 2019

<sup>3</sup> UHD content required to view UHD images.

<sup>4</sup> Resolutions are dependent upon monitor capability, and resolution and color depth settings.

## STORAGE AND DRIVES\*

### M.2 SATA Solid State Drive

512 GB M.2 SATA FIPS-140-2 Solid State Drive

### NVMe PCIe SSD

256 GB PCIe (NVMe) M.2 Solid State Drive

512 GB PCIe (NVMe) M.2 Solid State Drive

1 TB PCIe (NVMe) M.2 Solid State Drive

2 TB PCIe (NVMe) M.2 Solid State Drive

512 GB PCIe (NVMe) M.2 SED Solid State Drive

### 2.5" Storage Bay Drives

500 GB 7200rpm SATA FIPS 140-2 SED HDD

500 GB 7200 rpm SATA HDD

1 TB 7200 rpm SATA HDD

2 TB 5400 rpm SATA HDD

256 GB SATA TLC SSD

1 TB SATA TLC SSD

### Cache Memory

16 GB PCIe® NVMe™ Intel® Optane™ Memory for storage acceleration<sup>1,2</sup>

<sup>1</sup>Intel® Optane™ memory is sold separately. Intel® Optane™ memory system acceleration does not replace or increase the DRAM in your system. Available for HP commercial desktops and notebooks and for select HP workstations (HP Z240 Tower/SFF, Z2 Mini, ZBook Studio, 15 and 17 G5) and requires a SATA HDD, 7th Gen or higher Intel® Core™ processor or Intel



### Features

® Xeon® processor E3-1200 V6 product family or higher, BIOS version with Intel® Optane™ supported, Windows 10 version 1703 or higher, M.2 type 2280-S1-B-M connector on a PCH Remapped PCIe Controller and Lanes in a x2 or x4 configuration with B-M keys that meet NVMe™ Spec 1.1, and an Intel® Rapid Storage Technology (Intel® RST) 15.5 driver.

² Intel® Optane™ memory system acceleration does not replace or increase the DRAM in your system.

\* For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to up to 30 GB (for Windows 10) disk is reserved for system recovery software.

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### DRIVE CONTROLLERS

M.2 Storage Bay (SATA):

SATA-3 for Solid State Drive

PCIe NVMe SSD:

PCIe Gen 3 x 4 lanes NVMe Solid State Drive

RAID 0:

support on PCIe Gen 3x4\*

RAID 1:

support on PCIe Gen 3x4

\*RAID 0 is configured through BIOS. Not available through factory.

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### Features

#### MEMORY

**Maximum Memory<sup>4</sup>**

128 GB DDR4-2667 non-ECC SDRAM<sup>1</sup>

64 GB DDR4-2667 ECC SDRAM<sup>1</sup>

DDR4 SODIMMS<sup>3</sup>

Supports Dual Channel Memory<sup>2</sup>

Slots 3 and 4 are customer accessible / upgradeable

<sup>1</sup> Due to the non-industry standard nature of some third-party memory modules, we recommend HP branded memory to ensure compatibility. If you mix memory speeds, the system will perform at the lower memory speed.

<sup>2</sup> Maximized dual-channel performance requires SODIMMs of the same size and speed in both memory channels.

<sup>3</sup> Intel® allows architectures designed with four DIMM slots to run at 2400 MT/s

<sup>4</sup> Maximum memory capacities assume Windows 64-bit operating systems. With Windows 32-bit operating systems, memory above 3 GB may not all be available due to system resource requirements.

#### NETWORKING/COMMUNICATIONS

**LAN<sup>1</sup>**

Integrated Intel® I219-LM GbE, vPro™

Integrated 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® Dual Band Wi-Fi 6 AX200 (2x2) and Bluetooth® 5 combo, vPro™;

Intel® Dual Band Wi-Fi 6 AX200 (2x2) and Bluetooth® 5 combo, non-vPro™

<sup>1</sup> Wireless cards are optional or add-on features and requires separately purchased wireless access point and internet service. Availability of public wireless access points limited. The specifications for the 802.11ax WLAN are draft specifications and are not final. If the final specifications differ from the draft specifications, it may affect the ability of the notebook to communicate with other 802.11ax WLAN devices.

**WWAN<sup>1</sup>**

Intel® XMM™ 7360 LTE-Advanced

<sup>1</sup> WWAN is an optional feature and requires factory configuration and 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.

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

#### AUDIO/MULTIMEDIA

**Audio**

### Features

HP tuned Bang & Olufsen, dual stereo speakers, HP World Facing Microphone supporting HP Noise Reduction software, dual array digital microphone, functions keys for volume up and down, combo microphone/headphone jack, HD audio, HP Clear Sound Amp

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

1080p FHD webcam with IR camera

720p HD webcam

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

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

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## KEYBOARDS/POINTING DEVICES/BUTTONS & FUNCTION KEYS

### Keyboard

HP Collaboration Keyboard, full-size, spill-resistant, backlit, with drain and DuraKeys, clickpad with glass surface, multi-touch gestures and taps enabled.

### Pointing Devices

Dual pointstick

Clickpad with multi-touch gestures enabled, taps enabled as default

Microsoft Precision Touchpad Default Gestures Support

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## SOFTWARE AND SECURITY

### Software

Bing search for IE11

Buy Office

HP Connection Optimizer<sup>7</sup>

HP Hotkey Support

HP JumpStart

HP Mobile Connect Pro<sup>4</sup>

HP Noise Cancellation Software

HP Performance Advisor<sup>6</sup>

HP Recovery Manager

HP Cloud Recover

HP Remote Graphics Software<sup>2</sup>

HP Support Assistant<sup>1</sup>

Native Miracast support<sup>5</sup>

Skype for Business Certified<sup>3</sup>

### Security Management

Absolute persistence module<sup>9</sup>

HP Client Security Suite Gen 5<sup>12</sup>

HP Device Access Manager

HP FingerPrint Sensor

HP Manageability Integration Kit<sup>21</sup>

HP Power On Authentication

HP Security Manager

HP BIOSphere Gen5<sup>8,10</sup>

HP Sure Recover Gen2<sup>19</sup>

HP Sure Start Gen5<sup>17</sup>

### Features

HP Sure Sense<sup>20</sup>

Master Boot Record security

Pre-boot authentication

Secure Erase<sup>18</sup>

Security lock slot<sup>13</sup>

Trusted Platform Module TPM 2.0 (version: 7.85) Embedded Security Chip (**FIPS 140-2 Compliant**), Model SLB9670 VQ2.0

Microsoft Defender<sup>11</sup>

**Smartcard Reader - Alcor AU9560 (FIPS 201 Compliant)**

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

1. HP Support Assistant requires Windows and Intel® 8th generation processors.

2. HP Remote Graphics Software - The remote desktop solution for serious workstation users and their most demanding applications. Download at: <http://www.hp.com/go/RGS>.

3. Skype is not offered in China.

4. HP Mobile Connect Pro is only available on preconfigured devices with WWAN. For geographic availability refer to <http://www.hp.com/go/mobileconnect>.

5. 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>.

6. HP Performance Advisor Software - HP Performance Advisor is ready and waiting to help you get the most out of your HP Workstation from day one—and every day after. Learn more or download at: <https://www8.hp.com/us/en/workstations/performance-advisor.html>

7. HP Connection Optimizer requires Windows 10.

8. HP BIOSphere - Requires Intel® 8th generation processors. HP Sure Start Gen5 - Available on HP Elite and HP Z Workstation products equipped with Intel® 8th generation processors.

9. 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.

10. HP BIOSphere Gen5 is available on select HP Pro and Elite PCs. See product specifications for details. Features may vary depending on the platform and configurations.

11. Microsoft Defender Opt in and internet connection required for updates.

12. HP Client Security Manager Gen5 requires Windows and is available on select HP Pro, Elite and Z PCs. See product specifications for details.

13. Security lock slot is Lock sold separately.

16. Requires Windows and Internet Access

17 HP Sure Start Gen4 is available on select HP PCs with Intel processors. See product specifications for availability.

18. 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™.

19. HP Sure Recover Gen2: See product specifications for availability. Requires an open, wired network connection. Not available on platforms with multiple internal storage drives. You must back up important files, data, photos, videos, etc. before using HP Sure Recover to avoid loss of data. HP Sure Recover (Gen1) does not support platforms with Intel® Optane™.

20. HP Sure Sense requires Windows 10. See product specifications for availability.

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

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## POWER

### Power Supply



### Features

Up to 17 hours and 45 minutes<sup>1</sup>

HP Long Life 4-cell, 90 Wh Li-ion polymer

150 W Slim Smart AC power adapter

<sup>1</sup> Battery life will vary depending on the product model, configuration, loaded applications, features, use, wireless functionality and power management settings. The maximum capacity of the battery will naturally decrease with time and usage. See MobileMark14 battery benchmark <https://bapco.com/products/mobilemark-2014/> for additional details.

<sup>2</sup> Supports HP Fast Charge Technology

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### ENVIRONMENTAL

ENERGY STAR® 7.1 certified and EPEAT® 2019 registered <sup>1</sup>

Low halogen<sup>2</sup>

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

<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.

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### WEIGHTS & DIMENSIONS

#### Dimensions (w x d x h)

37.6 x 26.4 x 2.6 cm

14.8 x 10.4 x 1 in

#### Weights

Starting at 2.6 kg

Weight varies by configuration and components.

Starting at 5.7 lb

Weight varies by configuration and components.

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### Features

#### PORTS/SLOTS

- 1 smart card reader
- 1 SD media card reader

##### Left side

- Security lock slot (lock sold separately)
- 1 RJ-45
- 1 USB 3.1 Gen 1 charging port
- 1 USB 3.1 Gen 1

##### Right side

- 1 Power connector
- 2 USB Type-C™ (Thunderbolt™ 3, pass through support DisplayPort™ 1.4<sup>3</sup>, USB3.1 Gen 2, with BC 1.2)
- 1 HDMI 2.0b<sup>1,2</sup>
- 1 USB 3.1 Gen 1
- 1 headphone/microphone combo

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

<sup>2</sup> HDMI 2.0b with discrete, 1.4 with UMA

<sup>3</sup> Mini DisplayPort 1.4 with discrete, 1.2 with UMA

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#### SERVICE AND SUPPORT

HP Services offers 3-year or 1-year limited warranties and 90 day software limited warranty options depending on country. Batteries have a default one year limited warranty except for Long Life batteries which will have same 1-year or 3-year limited warranty as the platform. Refer to <http://www.hp.com/support/batterywarranty/> for additional battery information. On-site service and extended coverage is also available. HP Care Pack Services are optional extended service contracts that go beyond the standard limited warranties. To choose the right level of service for your HP product, use the HP Care Pack Services Lookup Tool at: <http://www.hp.com/go/cpc>.

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

### Technical Specifications – System Unit

#### SYSTEM UNIT

<b>Stand-Alone Power Requirements (AC Power)</b>	<b>Nominal Operating Voltage</b>	19.5V
	<b>Max Operating Power</b>	<150W
<b>Temperature</b>	<b>Operating</b>	32° to 95° F (0° to 35° C)
	<b>Non-operating</b>	-4° to 140° F (-20° to 60° C)
<b>Relative Humidity</b>	<b>Operating</b>	10% to 90%, non-condensing
	<b>Non-operating</b>	5% to 95%, 101.6° F (38.7° C) maximum wet bulb temperature
<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>Altitude (unpressurized)</b>	<b>Operating</b>	-50 to 10,000 ft (-15.24 to 3,048 m)
	<b>Non-operating</b>	-50 to 40,000 ft (-15.24 to 12,192 m)
<b>Planned Industry Standard Certifications</b>	<b>UL</b>	Yes
	<b>CSA</b>	Yes
	<b>FCC Compliance</b>	Yes
	<b>ENERGY STAR®</b>	Yes
	<b>EPEAT® 2019</b>	Yes
	<b>ICES</b>	Yes
	<b>Australia / NZ A-Tick Compliance</b>	Yes
	<b>CCC</b>	Yes
	<b>Japan VCCI Compliance</b>	Yes
	<b>KCC</b>	Yes
	<b>BSMI</b>	Yes
	<b>CE Marking Compliance</b>	Yes
	<b>MIL STD 810G</b>	Yes
	<b>BNCI or BELUS</b>	Yes
	<b>GOST</b>	Yes
<b>Saudi Arabian Compliance (ICCP)</b>	Yes	
<b>UKRSERTCOMPUTER</b>	Yes	

<sup>1</sup>Configurations of the HP ZBOOK 15 G6 that are ENERGY STAR® qualified are identified as HP ZBOOK 15 G6 ENERGY STAR® on HP websites and on <http://www.energystar.gov>.

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

### Technical Specifications – Displays

#### DISPLAYS

**HP 15.6" diagonal FHD flat LED backlit Ultra-Wide Viewing Angle (1920 x 1080)**

<b>Outline Dimensions (W x H)</b>	350.96 x 216.75 mm (max)	
<b>Active Area</b>	344.16 x 193.59 mm (typ.)	
<b>Weight</b>	385 g (max)	
<b>Diagonal Size</b>	15.6 inch	
<b>Thickness</b>	3.2 mm (panel side) / 3.4 mm (PCBA Side) (max)	
<b>Interface</b>	eDP 1.2	
<b>Surface Treatment</b>	Anti-Glare	
<b>Touch enabled</b>	No	
<b>Contrast Ratio</b>	600:1 (typ.)	
<b>Refresh Rate</b>	60 Hz	
<b>Brightness</b>	250 nits	
<b>Pixel Resolution</b>	<b>Format</b>	1920 x 1080 (FHD)
	<b>Configuration</b>	RGB
<b>Backlight</b>	LED	
<b>PPI</b>	142	
<b>Color Gamut Coverage</b>	45%	
<b>Color Depth</b>	6 bits	
<b>Viewing Angle</b>	UWVA 85/85/85/85	

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

**HP 15.6" diagonal FHD flat LED backlit Ultra-Wide Viewing Angle with Ambient Light Sensor (1920 x 1080)**

<b>Outline Dimensions (W x H)</b>	350.96 x 216.75 mm (max)	
<b>Active Area</b>	344.16 x 193.59 mm (typ.)	
<b>Weight</b>	370 g (max)	
<b>Diagonal Size</b>	15.6 inch	
<b>Thickness</b>	3.2 mm (max)	
<b>Interface</b>	eDP 1.4a + PSR (4 lane / 5.4Gbps) (MBO support)	
<b>Surface Treatment</b>	Anti-Glare	
<b>Touch enabled</b>	No	
<b>Contrast Ratio</b>	600:1 (typ.)	
<b>Refresh Rate</b>	60 Hz	
<b>Brightness</b>	400 nits	
<b>Pixel Resolution</b>	<b>Format</b>	1920 x 1080 (FHD)
	<b>Configuration</b>	RGB
<b>Backlight</b>	LED	
<b>PPI</b>	142	
<b>Color Gamut Coverage</b>	72%	
<b>Color Depth</b>	6 bits (Hi FRC supportive w/ condition to enable)	
<b>Viewing Angle</b>	UWVA 85/85/85/85	



### Technical Specifications – Displays

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

**HP Dream Color 15.6" diagonal UHD flat RG phosphors and BLED backlit Ultra-Wide Viewing Angle (3840 x 2160)**

<b>Outline Dimensions (W x H)</b>	350.22 x 216.37 max. (W/ PCB)	
<b>Active Area</b>	344.22 x 193.62 typ.	
<b>Weight</b>	300g max	
<b>Diagonal Size</b>	15.6"	
<b>Thickness</b>	2.6mm max.	
<b>Interface</b>	eDP 1.4	
<b>Panel Technology</b>	IPS	
<b>Surface Treatment</b>	Anti-Glare	
<b>Touch enabled</b>	No	
<b>Contrast Ratio</b>	1700:1 (typ) - AG	
<b>Refresh Rate</b>	60Hz	
<b>Brightness</b>	600 nits	
<b>Pixel Resolution</b>	<b>Pitch</b>	0.02988 mm X 0.08964 mm
	<b>Format</b>	3840 x 2160 (UHD)
	<b>Configuration</b>	RGB stripe
<b>Backlight</b>	LED	
<b>PPI</b>	282	
<b>Color Gamut Coverage</b>	DCI-P3 100%	
<b>Color Depth</b>	8 bit + Hi FRC	
<b>Viewing Angle</b>	UWVA 85/85/85/85	

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

**HP Sure View 15.6" diagonal FHD flat LED backlit Ultra-Wide Viewing Angle (1920 x 1080)**

<b>Outline Dimensions (W x H)</b>	350.96 x 216.95 mm (max)	
<b>Active Area</b>	344.2176 x 193.6224 mm (typ.)	
<b>Diagonal Size</b>	15.6 inch	
<b>Thickness</b>	3.2 mm (panel side) / 3.4 mm (PCBA Side) (max)	
<b>Interface</b>	eDP 1.3 + PSR (2 lane)	
<b>Surface Treatment</b>	Anti-Glare for non-touch	
<b>Touch enabled</b>	Configurable option	
<b>Refresh Rate</b>	60Hz	
<b>Brightness</b>	1000 nits	
<b>Pixel Resolution</b>	<b>Format</b>	1920x1080 (FHD)
	<b>Configuration</b>	RGB
<b>Backlight</b>	LED	
<b>Color Gamut Coverage</b>	72%	
<b>Color Depth</b>	8 bits (Hi FRC supportive w/ condition to enable)	
<b>Viewing Angle</b>	UWVA 85/85/85/85	

### Technical Specifications – Displays

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

**Note:** Anti-Glare surface treatment only available with non-touch option

**HP 15.6" diagonal UHD  
backlit Ultra-Wide  
Viewing Angle with  
Ambient Light Sensor  
(3840x2160)**

<b>Outline Dimensions (W x H)</b>	350.96 x 216.95 mm (max)
<b>Active Area</b>	344.2176 x 193.6224 mm (typ.)
<b>Weight</b>	320 g (max)
<b>Diagonal Size</b>	15.6 inch
<b>Thickness</b>	2.6 mm (max)
<b>Interface</b>	eDP 1.3 + PSR (4 lane/5.4Gbps), (MBO Support)
<b>Surface Treatment</b>	Anti-Glare for non-touch
<b>Touch enabled</b>	Configurable option
<b>Contrast Ratio</b>	1200:1 (typ.)
<b>Refresh Rate</b>	60 Hz
<b>Brightness</b>	400 nits
<b>Pixel Resolution</b>	<b>Format</b> 3840x2160 (UHD) <b>Configuration</b> RGB
<b>Backlight</b>	LED
<b>PPI</b>	282
<b>Color Gamut Coverage</b>	72%
<b>Color Depth</b>	8 bits (Hi FRC supportive w/ condition to enable)
<b>Viewing Angle</b>	UWVA 85/85/85/85

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

**Note:** Anti-Glare surface treatment only available with non-touch option

### Technical Specifications – Storage

#### STORAGE AND DRIVES\*

<b>512GB SATA-3 TLC M.2 2280 Solid State Drive - FIPS-140-2</b>	<b>Form Factor</b>	M.2 2280		
	<b>Drive Weight</b>	0.02 lb (10 g)		
	<b>Capacity</b>	512GB		
	<b>Generation</b>	1100		
	<b>NAND Type</b>	TLC		
	<b>Height</b>	2.6 mm Max		
	<b>Width</b>	0.87 in (22 mm)		
	<b>Interface</b>	ACS-3, SATA 3.2		
	<b>Performance</b>	<b>Maximum Sequential Read</b>	<b>Maximum Sequential Write</b>	
		530	400	
	<b>Logical Blocks</b>	1,000,215,216		
	<b>Operating Temperature</b>	32° to 158°F (0° to 70°C) [ambient temp]		
	<b>Features</b>	"ATA Security; TCG Opal 2.0; FIPS		

**Note:** For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 30 GB (for Windows 10) is reserved for system recovery software.

<b>256GB PCIe NVMe TLC M.2 2280 Solid State Drive</b>	<b>Form Factor</b>	M.2 2280		
	<b>Drive Weight</b>	0.02 lb (10 g)		
	<b>Capacity</b>	256GB		
	<b>NAND Type</b>	TLC		
	<b>Height</b>	0.09 in (2.3 mm)		
	<b>Width</b>	0.87 in (22 mm)		
	<b>Interface</b>	PCIe NVMe Gen3X4		
	<b>Performance</b>	<b>Maximum Sequential Read</b>	<b>Maximum Sequential Write</b>	
		Up to 3000 MB/s	Around 1300 ~ 1600 MB/s	
	<b>Logical Blocks</b>	500,118,192		
	<b>Operating Temperature</b>	32° to 158°F (0° to 70°C) [ambient temp]		
	<b>Features</b>	ATA Security; TRIM; L1.2		

**Note:** For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 30 GB (for Windows 10) is reserved for system recovery software.

<b>512GB PCIe NVMe TLC M.2 2280 Solid State Drive</b>	<b>Form Factor</b>	M.2 2280		
	<b>Drive Weight</b>	0.02 lb (10 g)		
	<b>Capacity</b>	512GB		
	<b>NAND Type</b>	TLC		
	<b>Height</b>	0.09 in (2.3 mm)		
	<b>Width</b>	0.87 in (22 mm)		
	<b>Interface</b>	PCIe NVMe Gen3X4		
	<b>Performance</b>	<b>Maximum Sequential Read</b>	<b>Maximum Sequential Write</b>	
		Around 2700 ~ 3400 MB/s	Around 1390 ~ 2500 MB/s	
	<b>Logical Blocks</b>	1,000,215,215		
	<b>Operating Temperature</b>	32° to 158°F (0° to 70°C) [ambient temp]		
	<b>Features</b>	ATA Security; 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 30 GB (for Windows 10) is reserved for system recovery software.

<b>1TB PCIe NVMe TLC M.2 2280 Solid State Drive</b>	<b>Form Factor</b>	M.2 2280	
	<b>Drive Weight</b>	0.02 lb (10 g)	
	<b>Capacity</b>	1TB	
	<b>NAND Type</b>	TLC	
	<b>Height</b>	0.09 in (2.3 mm)	
	<b>Width</b>	0.87 in (22 mm)	
	<b>Interface</b>	PCIe NVMe Gen3X4	
	<b>Performance</b>	<b>Maximum Sequential Read</b>	<b>Maximum Sequential Write</b>
		Around 3200 ~ 3480 MB/s	Around 2400 ~ 2800 MB/s
	<b>Logical Blocks</b>	2,000,409,264	
	<b>Operating Temperature</b>	32° to 158°F (0° to 70°C) [ambient temp]	
<b>Features</b>	ATA Security; TRIM; L1.2		

**Notes:** For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 30 GB (for Windows 10) is reserved for system recovery software.

RAID 1 Configuration requires 2 NVMe PCIe M.2 drives; both drives must be the same capacity and only available on NVMe technology.

<b>2TB PCIe NVMe TLC M.2 2280 Solid State Drive</b>	<b>Form Factor</b>	M.2 2280	
	<b>Drive Weight</b>	0.02 lb (10 g)	
	<b>Capacity</b>	2TB	
	<b>NAND Type</b>	TLC	
	<b>Height</b>	0.09 in (2.3 mm)	
	<b>Width</b>	0.87 in (22 mm)	
	<b>Interface</b>	PCIe NVMe Gen3X4	
	<b>Performance</b>	<b>Maximum Sequential Read</b>	<b>Maximum Sequential Write</b>
		3000 MB/s	2100 MB/s
	<b>Logical Blocks</b>	3,907,029,168	
	<b>Operating Temperature</b>	32° to 158°F (0° to 70°C) [ambient temp]	
<b>Features</b>	TRIM; L1.2		

**Notes:** For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 30 GB (for Windows 10) is reserved for system recovery software.

RAID 1 Configuration requires 2 NVMe PCIe M.2 drives; both drives must be the same capacity and only available on NVMe technology.

<b>512GB PCIe NVMe TLC M.2 2280 Opal 2 Solid State Drive</b>	<b>Form Factor</b>	M.2 2280	
	<b>Drive Weight</b>	0.02 lb (10 g)	
	<b>Capacity</b>	512GB	
	<b>NAND Type</b>	TLC	
	<b>Height</b>	0.09 in (2.3 mm)	
	<b>Width</b>	0.87 in (22 mm)	
	<b>Interface</b>	PCIe NVMe Gen3X4	
	<b>Performance</b>	<b>Maximum Sequential Read</b>	<b>Maximum Sequential Write</b>

### Technical Specifications – Storage

560 MB/s 530 MB/s

**Logical Blocks** 1,000,215,215  
**Operating Temperature** 32° to 158°F (0° to 70°C) [ambient temp]  
**Features** DIPM; TRIM; DEVSLP

**Notes:** For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 30 GB (for Windows 10) is reserved for system recovery software.

**500GB 7200 rpm SATA  
2.5" Self-Encrypting  
Hard Disk Drive - FIPS-  
140-2**

**Form Factor** 2.5"  
**Drive Weight** 0.20 lbs (92 g) ~ 0.21 lbs (95 g)  
**Capacity** 500 GB  
**NAND Type** RosewoodX BP FIPS  
**Height** 0.28 in (7 mm)  
**Width** 2.75 in (69.85 mm)  
**Interface** ATA-8, SATA 3.0  
**Transfer Rate** **Synchronous (maximum)** 600 MB/s  
**Seek Time**  
**(typical reads, including settling)** **Single Track** 1.5ms  
**Average** 13ms  
**Maximum** 32ms  
**Cache** 128MB  
**Rotational Speed** 7200rpm  
**Logical Blocks** 976,773,168  
**Operating Temperature** 32° to 140° F (0° to 60° C) [case temp]  
**Features** S.M.A.R.T., NCQ, Ultra DMA, TRIM

**Note:** For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 30 GB (for Windows 10) is reserved for system recovery software.

**500GB 7200 rpm SATA  
2.5" Hard Disk Drive**

**Form Factor** 2.5"  
**Drive Weight** 0.20 lbs (92 g) ~ 0.21 lbs (95 g)  
**Capacity** 500 GB  
**Height** 0.28 in (7 mm)  
**Width** 2.75 in (69.85 mm)  
**Interface** ATA-8, SATA 3.0  
**Transfer Rate** **Synchronous (maximum)** 600 MB/s  
**Seek Time**  
**(typical reads, including settling)** **Single Track** 2 ~ 1.5 ms  
**Average** 11 ~ 13 ms  
**Maximum** 18 ~ 22 ms  
**Cache** Up to 32 MB  
**Rotational Speed** 7200rpm  
**Logical Blocks** 976,773,168  
**Operating Temperature** 32° to 140° F (0° to 60° C) [top cover temp]  
**Features** S.M.A.R.T., NCQ, Ultra DMA

**Note:** For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 30 GB (for Windows 10) is reserved for system recovery software.

### Technical Specifications – Storage

<b>1TB 7200 rpm SATA 2.5" Hard Disk Drive</b>	<b>Form Factor</b>	2.5"		
	<b>Drive Weight</b>	0.198 lbs (90g)		
	<b>Capacity</b>	1TB		
	<b>NAND Type</b>	RosewoodX BP		
	<b>Height</b>	0.28 in (7 mm)		
	<b>Width</b>	2.75 in (69.85 mm)		
	<b>Interface</b>	ATA-8, SATA 3.0		
	<b>Transfer Rate</b>	<b>Synchronous (maximum)</b>	600 MB/s	
	<b>Seek Time (typical reads, including settling)</b>	<b>Single Track</b>	1.5ms	
		<b>Average</b>	13ms	
		<b>Maximum</b>	32ms	
	<b>Cache</b>	128MB		
	<b>Rotational Speed</b>	7200rpm		
	<b>Logical Blocks</b>	1,953,525,168		
	<b>Operating Temperature</b>	32° to 140° F (0° to 60° C) [top cover temp]		
<b>Features</b>	S.M.A.R.T., NCQ, Ultra DMA, TRIM			
<b>Note:</b> For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 30 GB (for Windows 10) is reserved for system recovery software.				
<b>256GB SATA TLC 2.5" Solid State Drive</b>	<b>Form Factor</b>	2.5"		
	<b>Drive Weight</b>	0.17 lb (78 g)		
	<b>Capacity</b>	256GB		
	<b>NAND Type</b>	TLC		
	<b>Height</b>	0.28 in (7 mm)		
	<b>Width</b>	2.75 in (69.85 mm)		
	<b>Interface</b>	ATA-8, SATA 3.0		
	<b>Performance</b>	<b>Maximum Sequential Read</b>	<b>Maximum Sequential Write</b>	
		560 MB/s	530 MB/s	
	<b>Logical Blocks</b>	500,118,192		
<b>Operating Temperature</b>	32° to 158°F (0° to 70°C) [ambient temp]			
<b>Features</b>	DIPM; TRIM; DEVSLP			
<b>Note:</b> For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 30 GB (for Windows 10) is reserved for system recovery software.				
<b>1TB SATA TLC 2.5" Solid State Drive</b>	<b>Form Factor</b>	2.5"		
	<b>Drive Weight</b>	0.17 lb (78 g)		
	<b>Capacity</b>	1TB		
	<b>NAND Type</b>	TLC		
	<b>Height</b>	0.28 in (7 mm)		
	<b>Width</b>	2.75 in (69.85 mm)		
	<b>Interface</b>	ATA-8, SATA 3.0		
	<b>Performance</b>	<b>Maximum Sequential Read</b>	<b>Maximum Sequential Write</b>	
560 MB/s		530 MB/s		

### Technical Specifications – Storage

<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>	DIPM; TRIM; DEVSLP

**Note:** For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 30 GB (for Windows 10) is reserved for system recovery software.

### Technical Specifications – Networking

#### NETWORKING/COMMUNICATION

<b>Intel® i219LM 10/100/1000 Integrated NIC</b>	<b>Connector</b>	RJ-45
	<b>System Interface</b>	PCI(Intel proprietary) + SMBus
	<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 Jumbo Frame 9K
	<b>Power consumption</b>	Cable Disconnection: 25mW 100Mbps Full Run: 450mW 1000bp Full Run: 1000mW WoL Enable(S3/S4/S5): 50mW WoL Disable(S3/S4/S5): 25mW
	<b>Power Management</b>	ACPI compliant – multiple power modes Situation-sensitive features reduce power consumption Advanced link down power saving for reducing link down power consumption
	<b>Management Interface IT Manageability</b>	Auto MDI/MDIX Crossover cable detection Wake-on-LAN from standby and hibernation (Magic Packet and Microsoft Wake-Up Frame); Wake-on-LAN from off (Magic Packet only) PXE 2.1 Remote Boot Statistics Gathering (SNMP MIB II, Ethernet-like MIB, Ethernet MIB (802.3x, clause 30)) Comprehensive diagnostic and configuration software suite Virtual Cable Doctor for Ethernet cable status
	<b>Security &amp; Manageability</b>	Intel® vPro™ support with appropriate Intel® chipset components

<b>Intel® i219v 10/100/1000 Integrated NIC</b>	<b>Connector</b>	RJ-45
	<b>System Interface</b>	PCI(Intel proprietary) + SMBus
	<b>IEEE Compliance</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>Performance</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>Power consumption</b>	TCP/IP/UDP Checksum Offload (configurable) Protocol Offload (ARP & NS) Large send offload and Giant send offload Receiving Side Scaling Jumbo Frame 9K



### Technical Specifications – Networking

<b>Power Management</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>Management Interface</b>	ACPI compliant – multiple power modes Situation-sensitive features reduce power consumption Advanced link down power saving for reducing link down power consumption
<b>IT Manageability</b>	Auto MDI/MDIX Crossover cable detection

<b>Intel® Dual Band Wi-Fi 6 AX200 (2x2) and Bluetooth® 5 combo vPro™</b>	<b>Wireless LAN Standards</b>	IEEE 802.11a IEEE 802.11b IEEE 802.11g IEEE 802.11n IEEE 802.11ac IEEE 802.11ax IEEE 802.11d IEEE 802.11e IEEE 802.11h IEEE 802.11i IEEE 802.11k IEEE 802.11r IEEE 802.11v
	<b>Interoperability</b>	Wi-Fi certified
	<b>Frequency Band</b>	802.11b/g/n/ax • 2.402 – 2.482 GHz 802.11a/n/ac/ax • 4.9 – 4.95 GHz (Japan) • 5.15 – 5.25 GHz • 5.25 – 5.35 GHz • 5.47 – 5.725 GHz • 5.825 – 5.850 GHz
	<b>Data Rates</b>	• 802.11b: 1, 2, 5.5, 11 Mbps • 802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps • 802.11a: 6, 9, 12, 18, 24, 36, 48, 54 Mbps • 802.11n: MCS 0 ~ MCS 15, (20MHz, and 40MHz) • 802.11ac : MCS0 ~ MCS9, (1SS, and 2SS) (20MHz, 40MHz, ,80MHz & 160MHz) • 802.11ax : MCS0 ~ MCS11, (1SS and 2SS) (20MHz, 40MHz, ,80MHz & 160MHz)
	<b>Modulation</b>	Direct Sequence Spread Spectrum
		OFDM, BPSK, QPSK, CCK, 16-QAM, 64-QAM, 256-QAM , 1024QAM
	<b>Security<sup>1</sup></b>	• IEEE and WiFi compliant 64 / 128 bit WEP encryption for a/b/g mode only • AES-CCMP: 128 bit in hardware • 802.1x authentication • WPA, WPA2: 802.1x. WPA-PSK, WPA2-PSK, TKIP, and AES. • WPA2 certification • IEEE 802.11i

### Technical Specifications – Networking

<b>Network Architecture Models</b>	<ul style="list-style-type: none"> <li>• Cisco Certified Extensions, all versions through CCX4 and CCX Lite</li> <li>• WAPI</li> </ul> <p>Ad-hoc (Peer to Peer)</p> <p>Infrastructure (Access Point Required)</p>				
<b>Roaming</b>	IEEE 802.11 compliant roaming between access points				
<b>Output Power<sup>2</sup></b>	<ul style="list-style-type: none"> <li>• 802.11b : +18.5dBm minimum</li> <li>• 802.11g : +17.5dBm minimum</li> <li>• 802.11a : +18.5dBm minimum</li> <li>• 802.11n HT20(2.4GHz) : +15.5dBm minimum</li> <li>• 802.11n HT40(2.4GHz) : +14.5dBm minimum</li> <li>• 802.11n HT20(5GHz) : +15.5dBm minimum</li> <li>• 802.11n HT40(5GHz) : +14.5dBm minimum</li> <li>• 802.11ac VHT80(5GHz) : +11.5dBm minimum</li> <li>• 802.11ac VHT160(5GHz) : +11.5dBm minimum</li> <li>• 802.11ax HT40(2.4GHz) : +10dBm minimum</li> <li>• 802.11ax VHT160(5GHz) : +10dBm minimum</li> </ul>				
<b>Power Consumption</b>	<ul style="list-style-type: none"> <li>• Transmit mode 2.0 W</li> <li>• Receive mode 1.6 W</li> <li>• Idle mode (PSP) 180 mW (WLAN Associated)</li> <li>• Idle mode 50 mW (WLAN unassociated)</li> <li>• Connected Standby 10mW</li> <li>• Radio disabled 8 mW</li> </ul>				
<b>Power Management</b>	ACPI and PCI Express compliant power management 802.11 compliant power saving mode				
<b>Receiver Sensitivity<sup>3</sup></b>	<ul style="list-style-type: none"> <li>•802.11b, 1Mbps : -93.5dBm maximum</li> <li>•802.11b, 11Mbps : -84dBm maximum</li> <li>• 802.11a/g, 6Mbps : -86dBm maximum</li> <li>• 802.11a/g, 54Mbps : -72dBm maximum</li> <li>• 802.11n, MCS07 : -67dBm maximum</li> <li>• 802.11n, MCS15 : -64dBm maximum</li> <li>• 802.11ac, MCS0 : -84dBm maximum</li> <li>• 802.11ac, MCS9 : -59dBm maximum</li> <li>•802.11ax, MCS11(HT40): -59dBm maximum</li> <li>•802.11ax, MCS11(VHT160): -58.5dBm maximum</li> </ul>				
<b>Antenna Type</b>	High efficiency antenna with spatial diversity, mounted in the display enclosure  Two embedded dual band 2.4/5 GHz antennas are provided to the card to support WLAN MIMO communications and Bluetooth communications				
<b>Form Factor</b>	PCI-Express M.2 MiniCard				
<b>Dimensions</b>	<ol style="list-style-type: none"> <li>1. Type 2230 : 2.3 x 22.0 x 30.0 mm</li> <li>2. Type 1216: 1.67 x 12.0 x 16.0 mm</li> </ol>				
<b>Weight</b>	<ol style="list-style-type: none"> <li>1. Type 2230 : 2.8g</li> <li>2. Type 126: 1.3g</li> </ol>				
<b>Operating Voltage</b>	3.3v +/- 9%				
<b>Temperature</b>	<table border="0"> <tr> <td>Operating</td> <td>14° to 158° F (-10° to 70° C)</td> </tr> <tr> <td>Non-operating</td> <td>-40° to 176° F (-40° to 80° C)</td> </tr> </table>	Operating	14° to 158° F (-10° to 70° C)	Non-operating	-40° to 176° F (-40° to 80° C)
Operating	14° to 158° F (-10° to 70° C)				
Non-operating	-40° to 176° F (-40° to 80° C)				
<b>Humidity</b>	<table border="0"> <tr> <td>Operating</td> <td>10% to 90% (non-condensing)</td> </tr> <tr> <td>Non-operating</td> <td>5% to 95% (non-condensing)</td> </tr> </table>	Operating	10% to 90% (non-condensing)	Non-operating	5% to 95% (non-condensing)
Operating	10% to 90% (non-condensing)				
Non-operating	5% to 95% (non-condensing)				

### Technical Specifications – Networking

<b>Altitude</b>	Operating Non-operating	0 to 10,000 ft (3,048 m) 0 to 50,000 ft (15,240 m)
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#### HP Integrated Module with Bluetooth 4.0/4.1/4.2/5.0 Wireless Technology

<b>Bluetooth Specification</b>	4.0/4.1/4.2/5.0 Compliant
<b>Frequency Band</b>	2402 to 2480 MHz
<b>Number of Available Channels</b>	Legacy : 0~79 (1 MHz/CH) BLE : 0~39 (2 MHz/CH)
<b>Data Rates and Throughput</b>	Legacy : 3 Mbps data rate; throughput up to 2.17 Mbps BLE : 1 Mbps data rate; throughput up to 0.2 Mbps Legacy : Synchronous Connection Oriented links up to 3, 64 kbps, voice channels Legacy : Asynchronous Connection Less links 2178.1 kbps/177.1 kbps asymmetric (3-DH5) or 864 kbps symmetric (3-EV5)
<b>Transmit Power</b>	The Bluetooth component shall operate as a Class II Bluetooth device with a maximum transmit power of + 9.5 dBm for BR and EDR.
<b>Power Consumption</b>	Peak (Tx): 330 mW Peak (Rx): 230 mW Selective Suspend: 17 mW
<b>Bluetooth Software Supported</b>	Microsoft Windows Bluetooth Software
<b>Link Topology</b>	
<b>Power Management</b>	Microsoft Windows ACPI, and USB Bus Support
<b>Certifications</b>	FCC (47 CFR) Part 15C, Section 15.247 & 15.249
<b>Power Management Certifications</b>	ETS 300 328, ETS 300 826 Low Voltage Directive IEC950 UL, CSA, and CE Mark
<b>Bluetooth Profiles Supported</b>	BT4.1-ESR 5/6/7 Compliance LE Link Layer Ping LE Dual Mode LE Link Layer LE Low Duty Cycle Directed Advertising LE L2CAP Connection Oriented Channels Train Nudging & Interlaced Scan BT4.2 ESR08 Compliance LE Secure Connection- Basic/Full LE Privacy 1.2 –Link Layer Privacy LE Privacy 1.2 –Extended Scanner Filter Policies LE Data Packet Length Extension FAX Profile (FAX) Basic Imaging Profile (BIP)2 Headset Profile (HSP) Hands Free Profile (HFP) Advanced Audio Distribution Profile (A2DP)
<b>Security &amp; Manageability</b>	Intel® vPro™ support with appropriate Intel® chipset components

### Technical Specifications – Networking

**Intel® Dual Band Wi-Fi 6 AX200 (2x2) and Bluetooth® 5 combo, non-vPro™**

<b>Wireless LAN Standards</b>	<ul style="list-style-type: none"> <li>IEEE 802.11a</li> <li>IEEE 802.11b</li> <li>IEEE 802.11g</li> <li>IEEE 802.11n</li> <li>IEEE 802.11ac</li> <li>IEEE 802.11ax</li> <li>IEEE 802.11d</li> <li>IEEE 802.11e</li> <li>IEEE 802.11h</li> <li>IEEE 802.11i</li> <li>IEEE 802.11k</li> <li>IEEE 802.11r</li> <li>IEEE 802.11v</li> </ul>
<b>Interoperability</b>	Wi-Fi certified
<b>Frequency Band</b>	<ul style="list-style-type: none"> <li>802.11b/g/n/ax                             <ul style="list-style-type: none"> <li>• 2.402 – 2.482 GHz</li> </ul> </li> <li>802.11a/n/ac/ax                             <ul style="list-style-type: none"> <li>• 4.9 – 4.95 GHz (Japan)</li> <li>• 5.15 – 5.25 GHz</li> <li>• 5.25 – 5.35 GHz</li> <li>• 5.47 – 5.725 GHz</li> <li>• 5.825 – 5.850 GHz</li> </ul> </li> </ul>
<b>Data Rates</b>	<ul style="list-style-type: none"> <li>• 802.11b: 1, 2, 5.5, 11 Mbps</li> <li>• 802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps</li> <li>• 802.11a: 6, 9, 12, 18, 24, 36, 48, 54 Mbps</li> <li>• 802.11n: MCS 0 ~ MCS 15, (20MHz, and 40MHz)</li> <li>• 802.11ac : MCS0 ~ MCS9, (1SS, and 2SS) (20MHz, 40MHz, ,80MHz &amp; 160MHz)</li> <li>• 802.11ax : MCS0 ~ MCS11, (1SS and 2SS) (20MHz, 40MHz, ,80MHz &amp; 160MHz)</li> </ul>
<b>Modulation</b>	<p>Direct Sequence Spread Spectrum                      OFDM, BPSK, QPSK, CCK, 16-QAM, 64-QAM, 256-QAM                      , 1024QAM</p>
<b>Security<sup>1</sup></b>	<ul style="list-style-type: none"> <li>• IEEE and WiFi compliant 64 / 128 bit WEP encryption for a/b/g mode only</li> <li>• AES-CCMP: 128 bit in hardware</li> <li>• 802.1x authentication</li> <li>• WPA, WPA2: 802.1x. WPA-PSK, WPA2-PSK, TKIP, and AES.</li> <li>• WPA2 certification</li> <li>• IEEE 802.11i</li> <li>• Cisco Certified Extensions, all versions through CCX4 and CCX Lite</li> <li>• WAPI</li> </ul>
<b>Network Architecture Models</b>	<p>Ad-hoc (Peer to Peer)                      Infrastructure (Access Point Required)</p>
<b>Roaming</b>	IEEE 802.11 compliant roaming between access points
<b>Output Power<sup>2</sup></b>	<ul style="list-style-type: none"> <li>• 802.11b : +18.5dBm minimum</li> <li>• 802.11g : +17.5dBm minimum</li> <li>• 802.11a : +18.5dBm minimum</li> <li>• 802.11n HT20(2.4GHz) : +15.5dBm minimum</li> <li>• 802.11n HT40(2.4GHz) : +14.5dBm minimum</li> <li>• 802.11n HT20(5GHz) : +15.5dBm minimum</li> <li>• 802.11n HT40(5GHz) : +14.5dBm minimum</li> <li>• 802.11ac VHT80(5GHz) : +11.5dBm minimum</li> <li>• 802.11ac VHT160(5GHz) : +11.5dBm minimum</li> </ul>

### Technical Specifications – Networking

	<ul style="list-style-type: none"> <li>• 802.11ax HT40(2.4GHz) : +10dBm minimum</li> <li>• 802.11ax VHT160(5GHz) : +10dBm minimum</li> </ul>
<b>Power Consumption</b>	<ul style="list-style-type: none"> <li>• Transmit mode 2.0 W</li> <li>• Receive mode 1.6 W</li> <li>• Idle mode (PSP) 180 mW (WLAN Associated)</li> <li>• Idle mode 50 mW (WLAN unassociated)</li> <li>• Connected Standby 10mW</li> <li>• Radio disabled 8 mW</li> </ul>
<b>Power Management</b>	ACPI and PCI Express compliant power management 802.11 compliant power saving mode
<b>Receiver Sensitivity<sup>3</sup></b>	<ul style="list-style-type: none"> <li>• 802.11b, 1Mbps : -93.5dBm maximum</li> <li>• 802.11b, 11Mbps : -84dBm maximum</li> <li>• 802.11a/g, 6Mbps : -86dBm maximum</li> <li>• 802.11a/g, 54Mbps : -72dBm maximum</li> <li>• 802.11n, MCS07 : -67dBm maximum</li> <li>• 802.11n, MCS15 : -64dBm maximum</li> <li>• 802.11ac, MCS0 : -84dBm maximum</li> <li>• 802.11ac, MCS9 : -59dBm maximum</li> <li>• 802.11ax, MCS11(HT40): -59dBm maximum</li> <li>• 802.11ax, MCS11(VHT160): -58.5dBm maximum</li> </ul>
<b>Antenna Type</b>	High efficiency antenna with spatial diversity, mounted in the display enclosure
	Two embedded dual band 2.4/5 GHz antennas are provided to the card to support WLAN MIMO communications and Bluetooth communications
<b>Form Factor</b>	PCI-Express M.2 MiniCard
<b>Dimensions</b>	1. Type 2230 : 2.3 x 22.0 x 30.0 mm 2. Type 1216: 1.67 x 12.0 x 16.0 mm
<b>Weight</b>	1. Type 2230 : 2.8g 2. Type 126: 1.3g
<b>Operating Voltage</b>	3.3v +/- 9%
<b>Temperature</b>	Operating 14° to 158° F (-10° to 70° C) Non-operating -40° to 176° F (-40° to 80° C)
<b>Humidity</b>	Operating 10% to 90% (non-condensing) Non-operating 5% to 95% (non-condensing)
<b>Altitude</b>	Operating Non-operating 0 to 10,000 ft (3,048 m) 0 to 50,000 ft (15,240 m)
<b>LED Activity</b>	LED Amber – Radio OFF; LED White – Radio ON
<b>HP Integrated Module with Bluetooth 4.0/4.1/4.2/5.0 Wireless Technology</b>	
<b>Bluetooth Specification</b>	4.0/4.1/4.2/5.0 Compliant
<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)

### Technical Specifications – Networking

<b>Transmit Power</b>	The Bluetooth component shall operate as a Class II Bluetooth device with a maximum transmit power of + 9.5 dBm for BR and EDR.
<b>Power Consumption</b>	Peak (Tx): 330 mW Peak (Rx): 230 mW Selective Suspend: 17 mW
<b>Bluetooth Software Supported Link Topology</b>	Microsoft Windows Bluetooth Software
<b>Power Management</b>	Microsoft Windows ACPI, and USB Bus Support
<b>Certifications</b>	FCC (47 CFR) Part 15C, Section 15.247 & 15.249
<b>Power Management Certifications</b>	ETS 300 328, ETS 300 826 Low Voltage Directive IEC950 UL, CSA, and CE Mark
<b>Bluetooth Profiles Supported</b>	BT4.1-ESR 5/6/7 Compliance LE Link Layer Ping LE Dual Mode LE Link Layer LE Low Duty Cycle Directed Advertising LE L2CAP Connection Oriented Channels Train Nudging & Interlaced Scan BT4.2 ESR08 Compliance LE Secure Connection- Basic/Full LE Privacy 1.2 –Link Layer Privacy LE Privacy 1.2 –Extended Scanner Filter Policies LE Data Packet Length Extension FAX Profile (FAX) Basic Imaging Profile (BIP)2 Headset Profile (HSP) Hands Free Profile (HFP) Advanced Audio Distribution Profile (A2DP)

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

<b>Technology/Operating bands</b>	FDD LTE: 2100 (Band 1), 1900 (Band 2), 1800 (Band 3), 1700/2100 (Band 4), 850 (Band 5), 2600 (Band 7), 900 (Band 8), 1400 (Band 11), 700 (Band 12 lower), 700 (Band 13 upper), 700 (Band 17 lower), 850 (Band 18 lower), 850 (Band 19 upper), 800 (Band 20), 1400 (Band 21), 850 (Band 26), 700 (Band 28), 700 (Band 29 RX only), 2300 (Band 30), 1700/2100 (Band 66). TDD LTE: 2600 (Band 38), 1900 (Band 39), 2400 (Band 40), 2500 (Band 41). HSPA+: 2100 (Band 1), 1900 (Band 2), 1700/2100 (Band 4), 850 (Band 5), 900 (Band 8) MHz
<b>Wireless protocol standards</b>	3GPP Release 11 LTE Specification CAT.9, DL 60MHz BW throughput up to 450Mbps; UL 20MHz throughput up to 50Mbps WCDMA R99, 3GPP Release 5, 6, 7 and 8 UMTS Specification
<b>GPS</b>	Standalone, A-GPS (MS-A, MS-B)
<b>GPS Bands</b>	1575.42 MHz ± 1.023 MHz, GLONASS 1596-1607MHz, Beidou 1561.098 MHz
<b>Maximum Data Rates</b>	LTE: 450 Mbps (Download), 50 Mbps (Upload) DC-HSPA+: 42 Mbps (Download), 5.76 Mbps (Upload) HSPA+: 21Mbps (Download), 5.76 Mbps (Upload)

### Technical Specifications – Networking

<b>Maximum Output Power</b>	LTE: 23 dBm HSPA+: 23.5 dBm
<b>Maximum Power Consumption</b>	LTE: 1,200 mA (peak); 900 mA (average) HSPA+: 1,100 mA (peak); 800 mA (average)
<b>Form Factor</b>	M.2, 3042-S3 Key B
<b>Weight</b>	5.8 g
<b>Dimensions</b> (Length x Width x Thickness)	42 x 30 x 2.3 mm

\* Mobile Broadband is an optional feature and requires factory configuration. 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.

### Technical Specifications – Networking

#### NXP NPC300 Near Field Communication module

<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</b>	Tag Type 1, Type 2, Type3 and Type 4, NFCIP-1 and NFCIP-2	
<b>Reader (PCD-VCD) Mode(1)</b>	ISO/IEC 14443 A ISO/IEC 14443 B ISO/IEC 15693 MIFARE 1K MIFARE 4K MIFARE DESFire FeliCa Jewel and Topaz cards	
<b>Card Emulation (PICC-VICC) Mode(1)</b>	ISO/IEC 14443 A ISO/IEC 14443 B and B' MIFARE FeliCa	
<b>Frequency</b>	13.56 MHz	
<b>NFC Modes Supported</b>	Reader/Writer, Peer-to-Peer	
<b>Raw RF Data Rates</b>	106, 212, 424, 848 kbps	
<b>Operating temperature</b>	0°C to 70°C	
<b>Storage temperature</b>	-20°C to 125°C	
<b>Humidity</b>	10-90% operating 5-95% non-operating	
<b>Supply Operating voltage</b>	4.35 to 5.25 Volts	
<b>I/O Voltage</b>	1.8V or 3.3V	
<b>Power Consumption</b>	<b>Booster enable,</b>	VBAT= 3.3V,
	<b>VCC_BOOST = 5V)</b>	Typical Polling 7.3 mA
	<b>Mode Power</b>	Detected Test Tag Type 1 Total 283.8 mA
	<b>Consumption,</b>	Net Module 236.8 mA
		Detected Test Tag Type 2 Total 288.8 mA
		Net Module 241.8 mA
		Detected Test Tag Type 3 Total 287.7 mA
		Net Module 240.7 mA
		Detected Test Tag Type 4 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.	

### POWER



### Technical Specifications – Networking

<b>150 Watt Slim Smart AC Adapter</b>	<b>Dimensions</b>	138x66x22mm	
	<b>Weight</b>	unit: 325g +/- 10g	
	<b>Input</b>	<b>Input Efficiency</b>	88% at 115 Vac and 89% at 230Vac
		<b>Input frequency range</b>	47 ~ 63 Hz
	<b>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>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 5,000 m)
		<b>Humidity</b>	5% to 95%
		<b>Storage Humidity</b>	5% to 95%
	<b>EMI and Safety Certifications</b>	Eg: *CE Mark - full compliance with LVD and EMC directives * Worldwide safety standards - IEC60950, EN60950, UL60950, Class 1, SELV; Agency approvals - C-UL-US, NORDICS, DENAN, EN55022 Class B, FCC Class B, CISPR22 Class B, CCC, NOM-1 NYCE. * MTBF - over 100,000 hours at 25°C ambient condition.	

### Technical Specifications – Networking

<b>HP Long Life 4-cell Polymer (90Wh) Battery</b>	<b>Dimensions (H x W x L)</b>	L 258mm x W 63.2mm x 13.24mm	
	<b>Weight</b>	372 (+/-10) g	
	<b>Cells/Type</b>	4-cell; Polymer	
	<b>Energy</b>	Voltage	15.4V
		Amp-hour capacity	5.55Ah/5.844Ah
		Watt-hour capacity	90Wh
	<b>Temperature</b>	Operating (Charging)	0° to 45° C
		Operating (Discharging)	-10° to 60° C
	<b>Fuel Gauge LED</b>	NA	
	<b>Warranty<sup>1</sup></b>	Refer to <a href="http://www.hp.com/support/batterywarranty/">http://www.hp.com/support/batterywarranty/</a> for battery warranty information.	
<b>Optional Travel Battery Available</b>	No		

<sup>1</sup> Batteries have a default one-year limited warranty except for Long Life batteries which will have same 1-year or 3-year limited warranty as the platform.

### 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®
- EPEAT®2019 Gold registered in the United States\*

##### 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”.

\*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.

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

	115VAC, 60Hz	230VAC, 50Hz	100VAC, 60Hz
Normal Operation (Short idle)	TBD	TBD	TBD
Normal Operation (Long idle)	TBD	TBD	TBD
Sleep	TBD	TBD	TBD
Off	TBD	TBD	TBD

##### 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, 60Hz
Normal Operation (Short idle)	TBD	TBD	TBD
Normal Operation (Long idle)	TBD	TBD	TBD
Sleep	TBD	TBD	TBD
Off	TBD	TBD	TBD

\*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 <sub>WAd</sub> , bels)	Sound Pressure (L <sub>pAm</sub> , decibels)
Typically Configured – Idle	TBD	TBD
Fixed Disk – Random writes	TBD	TBD

##### Longevity and Upgrading

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

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

##### Batteries

This battery(s) in this product comply with EU Directive 2006/66/EC

Batteries used in the product do not contain:

- Mercury greater the 1ppm by weight
- Cadmium greater than 20ppm by weight

### Technical Specifications – Environmental

Battery description: CR2032 (coin cell)  
 Battery type: Lithium

#### 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 contains 9.0% post-consumer recycled plastic (by wt.)
- This product is 96.9% recycle-able when properly disposed of at end of life.
- 

#### Packaging Materials

<b>External:</b>	PAPER/Corrugated	TBD
<b>Internal:</b>	PLASTIC/Polyethylene Expanded - EPE	TBD
	PLASTIC/Polypropylene - PP	TBD
	PLASTIC/Polyethylene low density - LDPE	TBD

The plastic packaging material contains at least 50% recycled content.

The corrugated paper packaging materials contains at least 70% recycled content.

#### 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/pdf/gse.pdf>):

- Asbestos
- Certain Azo Colorants
- Certain Brominated Flame Retardants – may not be used as flame retardants in plastics
- Cadmium
- Chlorinated Hydrocarbons
- Chlorinated Paraffins
- 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, has been voluntarily removed from most applications.
- Radioactive Substances
- Tributyl Tin (TBT), Triphenyl Tin (TPT), Tributyl Tin Oxide (TBTO)

### Technical Specifications – Environmental

#### 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

Hewlett-Packard offers end-of-life HP product return and recycling programs in many geographic areas. To recycle your product, please go to: <http://www.hp.com/go/reuse-recycle> or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner.

The EU WEEE directive (2002/95/EC) requires manufacturers to provide treatment information for each product type for use by treatment facilities. This information (product disassembly instructions) is posted on the Hewlett Packard web site at: <http://www.hp.com/go/recyclers>. These instructions may be used by recyclers and other WEEE treatment facilities as well as HP OEM customers who integrate and re-sell HP equipment.

#### 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://www.hp.com/hpinfo/globalcitizenship/environment/pdf/PC\\_GBU\\_Product\\_Design\\_ISO\\_14K\\_Certificate.pdf](http://www.hp.com/hpinfo/globalcitizenship/environment/pdf/PC_GBU_Product_Design_ISO_14K_Certificate.pdf)

and

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

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

Type	Description	Part #
<b>Displays</b>	HP Z27n G2 27" QHD Display	1J510A8#XXX
	HP Z32 31.5" 4k UHD Display	1AA81A8#XXX
<b>Cases</b>	HP Essential Top Load Case (up to 15.6")	H2W17AA
	HP Essential Backpack (up to 15.6")	H1D24AA
	HP Business Backpack (up to 17.3")	2SC67AA
	HP Business Case (up to 15.6")	2SC66AA
	HP Business Slim Top Load (up to 17.3")	2UW02AA
	HP Executive 15.6 Midnight Top Load	1KM15AA
	HP Exec 15.6 Midnight Backpack	1KM16AA
	HP Exec 17.3 Midnight Backpack	1KM17AA
	HP Executive 15.6 Black Leather Top Load	1LG83AA
<b>Docking Accessories</b>	HP Adjustable Dual Monitor Stand	AW664AA
	HP Adjustable Display Stand	AW663AA
	HP Display and Notebook Stand II	E8G00AA
	HP Monitor Stand	M9X76AA
	HP Dual Hinge II Notebook Stand	E8F99AA
	HP Hot Desk Stand (up to 32" monitor)	W3Z73AA
	HP Hot Desk Stand Monitor Arm (for use with W3Z73AA; supports two 24" monitors)	W3Z74AA
	HP TB Audio Module	3AQ21AA
	HP TB dock G2 Combo Cable (for 230W)	3XB96AA
<b>Docking station</b>	HP TB Dock G2 230W	2UK38AA
	HP TB Dock G2 230W W/ Combo Cable	3TR87AA
	HP USB Travel Dock	TOK30AA
	HP USB-C™ Mini Dock - power not supported on Mobile Workstations	1PM64AA
	HP USB-C™ Universal Dock - power not supported on Mobile Workstations or USB-data only ports	1MK33AA
	HP USB-C™ Dock G4 - Power Not Supported on Mobile Workstations	3FF69AA
	HP USB-C/A Universal Dock G2 Power Not Supported on Mobile Workstations	5TW13AA
	HP USB-C™ Dock G5 Power Not Supported on Mobile Workstations	5TW10AA
<b>Input/Output - Mice</b>	HP Comfort Grip Wireless Mouse	H2L63AA
	HP 3-button USB Laser Mouse	H4B81AA
	HP Slim Bluetooth Mouse	F3J92AA
	HP USB Travel Mouse	G1K28AA
	HP Wireless Premium Mouse	1JR31AA
	HP Elite Presenter Mouse	2CE30AA
<b>Input/Output - Keyboard</b>	HP Slim USB Keyboard and Mouse	T6T83AA
	HP Slim Wireless Keyboard and Mouse	T6L04AA

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

<b>Input/Output - Adapter</b>	HP USB-C™ to USB-A Hub	Z6A00AA
	HDMI to VGA Adapter	H4F02AA
	HP HDMI to DVI Adapter	F5A28AA
	HP USB-C™ to USB 3.0 Adapter	N2Z63AA
	HP USB-C™ to DisplayPort Adapter	N9K78AA
	HP USB-C™ to VGA Adapter	N9K76AA
<b>Collaboration</b>	HP UC Wired Headset	K7V17AA
<b>Memory</b>	HP 8GB 2666Mhz DDR4	4VN06AA
	HP 16GB 2666Mhz DDR4	4VN07AA
	HP 8GB 2666MHz DDR4 ECC	4UY11AA
	HP 16GB 2666MHz DDR4 ECC	4UY12AA
<b>Power - A/C Adapter</b>	HP 150W Smart AC Adapter (4.5mm)	4SC18AA
	HP ZBook 15 G5/G6 Battery	4ME79AA
<b>Adapter Dongle</b>	HP 7.4mm to 4.5mm DC Dongle	KOQ39AA
<b>Security</b>	HP Essential Combination Lock	TOY16AA
	HP Keyed Cable Lock 10mm	T1A62AA
	HP Dual Head Keyed Cable Lock	T1A64AA
<b>Storage - External</b>	HP External USB DVDRW Drive	F2B56AA
<b>Storage - SS M2</b>	HP 256GB PCIe 3x4 NVMe SSD (2280)	V3K66AA
	HP 512GB PCIe 3x4 NVMe DS SSD (2280)	V3K67AA

### Summary of Changes

<b>Date of change:</b>	<b>Version History:</b>		<b>Description of change:</b>
June 27, 2019	From v1 to v2	Added	Multi-Display Support section
July 8, 2019	From v2 to v3	Changed	Options and Accessories
July 23, 2019	From v3 to v4	Changed	Software and Service sections
September 5, 2019	From v4 to v5	Changed	Format pages 4, 10, 13 and 15



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