Overview

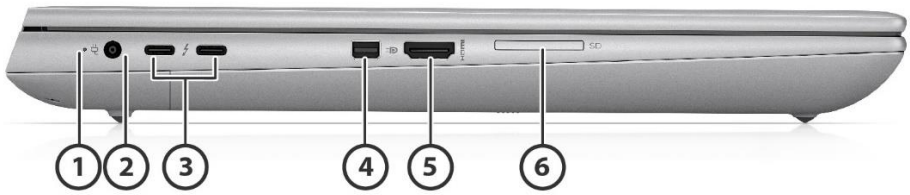
HP ZBook Fury G9 Mobile Workstation PC

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

Right

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

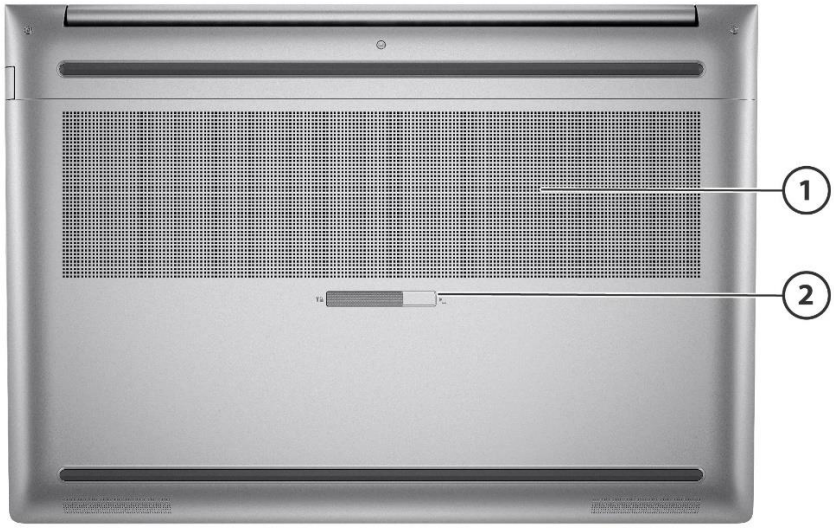
Overview



Left

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

Overview



Bottom

1. Inlet (Vents)
2. Service Door Latch

Overview

At A Glance

- Desktop Power on the Go with an Intel® 12th Gen Processor
- Work anywhere without compromising on performance or security with Windows 11 Pro, powered by HP's collaboration and connectivity technology.
- Accelerate your workflow. Power through projects with up to 128 GB RAM ECC Memory for fast rendering, editing and visual effects performance.
- Take multitasking to the next level with the Intel® Core™ i9 processor 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.
- Fast rendering. Desktop Class processor on a mobile form factor with NVIDIA or AMD Professional Graphics
- Easy upgrades & re-provisioning. Multiple ports for maximum productivity
- 16:10 aspect ratio (only available on 16"); Low Blue Light optional.
- HP Dreamcolor. 100% DCI-P3 1 Billion Colors, 120 Hz Refresh Rate (Low Blue Light)
- Enhanced audio, 5MP CAMERA + IR.
- HP Auto Frame to allow intelligent face tracking
- Multiple ports for maximum productivity
- Choice of touch and non-touch displays
- Keep cool under any workload with HP Vaporforce Thermals, with new curved metal blades
- Detect if someone has tried to open the back cover of your device with Tamper Lock
- Instantly protect against visual hacking with HP Sure View, and defend against firmware and malware attacks with HP Sure Start and HP Sure Sense, and have peace of mind with multi-factor authentication- including an infrared camera and fingerprint scanner.
- Enhanced transfer and upload speeds via dual Thunderbolt™ 4 ports. Get wide-ranging connectivity options to ensure maximum device interaction: USB 4.0, HDMI, mDP, SD card, Smart Card Reader and more.
- Designed for ultimate durability, this ZBook undergoes 21 MIL-STD 810H testing to help ensure this PC keeps rolling through your workday.
- Work without limits in any location with up to 128GB of DDR5 RAM and up to 12TB of local PCIe storage.

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

Features

OPERATING SYSTEM

Preinstalled OS

Windows 11 Pro - HP recommends Windows 11 Pro[2]
Windows 11 Home - HP recommends Windows 11 Pro[2]
Windows 11 Pro (preinstalled with Windows 10 Pro Downgrade)[2,3]
Ubuntu 20.04[4]
FreeDOS 3.0

[2] 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.
[3]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.
[4] For detailed Linux® OS/hardware support information, see: http/www.hp.com/linux_hardware_matrix

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

PROCESSOR

12th Generation Intel® Core™ i9-12950HX with Intel® UHD Graphics (1.7 GHz E-core base frequency, 2.3 GHz P-core base frequency, up to 3.6 GHz E-core Max Turbo Frequency, up to 5.0 GHz P-core Max Turbo frequency, 30MB L3 cache, 8 P-cores and 8 E-cores, 24 Threads); supports Intel® vPro® Technology [1,2,3,4,5]

12th Generation Intel® Core™ i9-12900HX with Intel® UHD Graphics (1.7 GHz E-core base frequency, 2.3 GHz P-core base frequency, up to 3.6 GHz E-core Max Turbo Frequency, up to 5.0 GHz P-core Max Turbo frequency, 30MB L3 cache, 8 P-cores and 8 E-cores, 24 Threads) [1,2,3,4]

12th Generation Intel® Core™ i7-12850HX with Intel® UHD Graphics (1.5 GHz E-core base frequency, 2.1 GHz P-core base frequency, up to 3.4 GHz E-core Max Turbo Frequency, up to 4.8 GHz P-core Max Turbo frequency, 25MB L3 cache, 8 P-cores and 8 E-cores, 24 Threads); supports Intel® vPro® Technology [1,2,3,4,5]

12th Generation Intel® Core™ i7-12800HX with Intel® UHD Graphics (1.5 GHz E-core base frequency, 2.0 GHz P-core base frequency, up to 3.4 GHz E-core Max Turbo Frequency, up to 4.8 GHz P-core Max Turbo frequency, 25MB L3 cache, 8 P-cores and 8 E-cores, 24 Threads) [1,2,3,4]

12th Generation Intel® Core™ i5-12600HX with Intel® UHD Graphics (1.8 GHz E-core base frequency, 2.5 GHz P-core base frequency, up to 3.3 GHz E-core Max Turbo Frequency, up to 4.6 GHz P-core Max Turbo frequency, 18MB L3 cache, 4 P-cores and 8 E-cores, 16 Threads); supports Intel® vPro® Technology [1,2,3,4,5]

[1] 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.
[2] Processor speed denotes maximum performance mode; processors will run at lower speeds in battery optimization mode.
[3] Intel® Turbo Boost performance varies depending on hardware, software and overall system configuration. See www.intel.com/technology/turboboost for more information.

Features

[4] 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.

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

Features

CHIPSET

Intel® WM690

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.[1,2]

[1] 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.
[2] Intel vPro® requires Windows 10 Pro 64 bit or higher, a vPro supported processor, vPro enabled chipset, vPro enabled wired LAN and/or Wi-Fi 6E WLAN and TPM 2.0. Some functionality requires additional 3rd party software in order to run. Features of vPro® Essentials and Enterprise vary. See http://intel.com/vpro

GRAPHICS

Integrated

Intel® UHD Graphics [1, 2, 3, 4]

Discrete [5, 6, 7, 8, 9]

NVIDIA RTX™ A1000 Laptop GPU (4GB GDDR6 dedicated)
NVIDIA RTX™ A2000 8GB Laptop GPU (8GB GDDR6 dedicated)
NVIDIA RTX™ A3000 12GB Laptop GPU (12GB GDDR6 dedicated)[10]
NVIDIA RTX™ A4500 Laptop GPU (16GB GDDR6 dedicated)[10]
NVIDIA RTX™ A5500 Laptop GPU (16GB GDDR6 dedicated)[10]

AMD Radeon™ PRO 6600M Graphics (8 GB GDDR6 dedicated)

Supports

Support HD decode, DX12, HDMI 2.0b, HDCP 2.3

[1] UHD content required to view UHD images.

[2] 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).

[3] Support HD decode, DX11, DX12, HDMI 1.4, HDCP 2.3 via DP up to 4K @ 60Hz and via HDMI up to 4K @ 30Hz

[4] 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.

[5] Others NVIDIA dGPU: Support HD decode, DX12, HDMI 2.1, mDP 1.4, HDCP 2.3 via DP up to 5K@60Hz(W/o DSC) or 8K@60(With DSC and requires 2 display heads)

[6] 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

Features

adapter), 4K@60Hz (Type-C output port using a Type C-to-DP adapter), OR 4K @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).

[7] GPU configurations may be limited to specific GPU/Memory Configurations

[8] 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)

[9] MiniDP cable sold separately.

[10] **NOTES:**
NVIDIA Feature: Discrete Graphics (RTX A3000, A4500, A5500) 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 .

DISPLAY

Non-touch

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

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[1,3,5,6,7,8]
- 16.0" diagonal, WUXGA (1920 x 1200), touch, IPS anti-glare, micro-edge, 400 nits, sRGB 100% eDP 1.4+PSR2[1,3,5,6,7,8]

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

[1]HD content required to view HD images.
[3]Resolutions are dependent upon monitor capability, and resolution and color depth settings.
[5]Actual brightness will be lower with touchscreen or Sure View.
[6]UHD content required to view UHD images.
[7]HP Sure View is optional and must be configured at purchase. It operates in landscape orientation.
[8]Display options may be limited to specific CPU / GPU Configurations.

Features

DOCKING

Docking station model #1	HP Thunderbolt 280W G4 Dock w/Combo Cable For DP1.4 Platforms
Total number of supported displays (incl.the notebook) display)	4
Max.resolutions supported	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
Dock Connectors	2xDP, 1xHDMI, 1xTB, 1xUSB-C Alt Mode
Technical limitations	Thunderbolt Hosts: Maximum of (4) displays with maximum resolution of 5K@ 30Hz running Thunderbolt host. Max resolution possible is dual 8K displays @ 60Hz running Thunderbolt host or running a non-Thunderbolt host in High Resolution mode @30Hz Non-Thunderbolt hosts: The highest resolution for dual displays running a non-Thunderbolt host in multi-function mode is (1) 5K dual cable (using both DP ports) +(1) 4K on USB-C DP port Non-Thunderbolt hosts: support (3) displays with a max resolution of: (2) 5K single cable + (1) 4K UHD @ 60 Hz in high resolution mode. In multi-function mode the maximum resolution for (3) displays is (2) 5K single cable @ 30Hz + (1) 4K UHD @ 30Hz.
Docking station model #2	HP USB-C Dock G5
Total number of supported displays (incl.the notebook) display)	3
Max.resolutions supported	Dual 5K@ 30Hz + (1) 4K UHD (multi-function mode)
Dock Connectors	1xHDMI, 2xDP
Technical limitations	Highest resolution with dual displays is two 8K@ 60Hz host in High Resolution mode. Three maximum displays supported are two 5K@ 30 Hz on DP ports plus one 4K UHD@ 30 Hz on HDMI in multi-function mode The highest resolution for a non-Thunderbolt host in Multi-function mode is a single 5K dual cable (using both DP ports) + (1) 4K on HDMI port .
Docking station model #3	HP USB-C/A Universal Dock G2
Total number of supported displays (incl.the notebook) display)	3
Max.resolutions supported	Triple 4K UHD@ 60Hz
Dock Connectors	1xHDMI, 2xDP
Technical limitations	The best resolution for dual or triple displays is 4K UHD@ 60Hz. For use with the USB-A adapter that comes in the box the maximum number of displays supported is (2) 4k x 60 Hz on the Type-A Gen 1 connection from the host

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
256 GB PCIe® Gen4x4 NVMe™ M.2 SSD TLC
256 GB PCIe® Gen4x4 NVMe™ SED SSD

Storage Slots
4 M.2 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 non-ECC SODIMM
RAM Support – 8GB, 16GB, 32GB, 64GB, 128GB
128 GB DDR5-4800 ECC SODIMM

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

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

Features

Memory Speed
Memory DDR5-4800 SODIMM.
Intel® 12th 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® 12th 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.
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.

Features

NETWORKING/COMMUNICATIONS

LAN[1]

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

[1]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[1]

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

[1]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[1]
Intel® XMM™ 7560 LTE Advanced Pro Cat 16
Intel® 5G Solution 5000

[1]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.

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[1, 2]

5MP+IR Camera

[1] HD content required to view HD images.
[2] 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 Backlit Toggle
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

SOFTWARE AND SECURITY

Software
HP Quick Drop[18]
HP Easy Clean[28]
HP PC Hardware Diagnostics Windows
Touchpoint Customizer for Commercial
myHP
HP Smart Support[19]
HP Mac Address Manager
HP Hotkey Support
HP Support Assistant[1]
HP Notifications
HP Privacy Settings
HP Power Manager
Buy Microsoft Office (Sold separately)
Bing search for IE11
HP Noise Cancellation Software
HP Performance Advisor[5]

Features

Native Miracast support[2]
17- month Adobe® free trial offer[29]
HP Z Light Space
Data Science Stack

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

Security Management
HP Wolf Security for Business[24] includes:
HP Sure Click[25]
HP Sure Sense[16]
HP Sure Run Gen5[26]
HP Sure Recover Gen5[10]
HP Sure Start Gen7[12]
HP Tamper Lock
HP Sure Admin[14]
HP Client Security Manager Gen7[15]
HP Device Access Manager
HP Power On Authentication
Master Boot Record security
Pre-boot authentication
Windows Defender
MS Bitlocker Encryption
Nano Security Lock Slot[9]

BIOS
HP BIOSphere Gen6[3]
HP Secure Erase[13]
Absolute Persistence Module[4]
HP DriveLock & Automatic DriveLock
BIOS Update via Network
HP Wake on WLAN
Fingerprint Sensor (select models)[27]
Secured-Core PC Enable[17]
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: Infineon SLB9672
Version: 2.0
Revision: 1.38
FIPS 140-2 Compliant: Yes with Convert TPM to 2.0 (FIPS 140-2) option

Features

Fingerprint Sensor (Optional)
Voltage: 3.0-3.6V
Operating temperature: -20° - 85°C
Imaging current: 31mA
Wake on finger current: 40 uA
Capture rate: 30ms/frame
ESD Resistance: IEC 6100-4-2 4B (+/-15KV)
Detection Matrix: 363 dpi, sensing area 8x8 mm

Security Features
HP Fingerprint Sensor (optional)[27]

Smartcard Reader
Model number: Alcor AU9560
FIPS 201 Compliant: Yes

Is the BIOS on this notebook ISO/IEC 19678:2015 (formerly NIST 800-147) compliant?: 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**.**

[1] HP Support Assistant requires Windows and Internet access.
[2] 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.
[3] HP BIOSphere Gen6 features may vary depending on the platform and configurations.
[4] 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.
[5] HP Performance Advisor Software – HP Performance Advisor is ready to help you get the most out of your HP Workstation from day one—and every day after. Learn more or download at: http://hp.com/PerformanceAdvisor
[7] Microsoft Defender Opt in and internet connection required for updates.
[8] HP Manageability Integration Kit can be downloaded from http://www8.hp.com/us/en/ads/clientmanagement/overview.html
[9] Nano Security lock slot is Lock sold separately.
[10] 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
[11] 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™.
[12] HP Sure Start Gen 7 is available on select HP PCs and workstations. See product specifications for availability.
[13] 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.
[14] 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.
[15] HP Client Security Manager Gen7 requires Windows and is available on the select HP PCs.
[16] HP Sure Sense requires Windows 11 Pro or Enterprise and supports Microsoft Internet Explorer, Google Chrome™, and Chromium™. Supported attachments include Microsoft Office (Word, Excel, PowerPoint) and PDF files in read only mode, when Microsoft Office or Adobe Acrobat are installed.
[17] 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.
[18] HP Quick Drop requires Internet access and Windows 10 or higher PC preinstalled with HP QuickDrop app and either an Android device (phone or tablet) running Android 7 or higher with the Android HP QuickDrop app, and /or an iOS device (phone or tablet) running iOS 12 or higher with the iOS HP QuickDrop app.

Features

[19] HP Smart Support automatically collects the telemetry necessary upon initial boot of the product to deliver device-level configuration data and health insights and is available preinstalled on select products, thru HP Factory Configuration Services; or it can be downloaded. For more information about how to enable HP Smart Support or for download, please visit http://www.hp.com/smart-support.
[21] 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.
[22] 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.
[23] 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.
[24] 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.
[25] HP Sure Click requires Windows 10 Pro or higher or Enterprise. See https://bit.ly/2PrLT6A_SureClick for complete details.
[26] HP Sure Run Gen5 is available Windows 10 and higher on select based HP Pro, Elite and Workstation PCs with select Intel® or AMD processors
[27] HP Fingerprint Reader is an optional feature that requires Windows 10 IoT and must be configured at purchase.
[28] 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.
[29] 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.
[30]HP Driver Packs not preinstalled, however available for download at http://www.hp.com/go/clientmanagement.

Features

POWER

Power Supply

HP Slim Smart 150W External Right Angle AC Power Adapter[3]
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[4]

Battery Recharge Time

Supports battery HP Fast Charge: approximately 50% in 30 minutes[2]

Battery life[1]

Up to 15:30 hrs (UMA)

[1] Battery life will vary depending on the product model, configuration, loaded applications, features, use, wireless functionality and power management settings. The maximum capacity of the battery will naturally decrease with time and usage. See MobileMark18 battery benchmark https://bapco.com/products/mobilemark-2018/ for additional details.

[2] 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.

[3]150W Power Adapter is not available with NVIDIA RTX™ Graphics

[4] 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.

ENVIRONMENTAL

ENERGY STAR® certified[3]
EPEAT® registered where applicable. EPEAT ® registration varies by country. See www.epeat.net for registration status by country.[1]
IEEE 1680.1-2018 EPEAT®
Low halogen[2]

[1] Based on US EPEAT® registration according to IEEE 1680.1-2018 EPEAT®. EPEAT® status varies by country. Visit www.epeat.net for more information.
[2] External power supplies, power cords, cables and peripherals are not low halogen. Service parts obtained after purchase may not be low halogen.
[3]Configurations of the HP Zbook Fury G9 Mobile Workstation PC that are ENERGY STAR® certied are identified as HP Zbook Fury G9 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 9.52 x 1.12 in (WLAN)

36.3 x 25.0 x 2.77 cm (WWAN)
14.29 x 9.52 x 1.09 in (WWAN)

Weights*
Starting at 5.273 lbs (2.394 kg) (UMA)
Weight varies by configuration and components.

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

PORTS/SLOTS

MicroSD 7.0 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 7.0 Media Card Reader
1 Mini DisplayPort™ 1.4 with UMA and Discrete Graphics
1 HDMI 2.1 (depends on graphics selection)

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 3-year and 1-year warranty and 90 day software limited warranty options depending on country. 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: http://www.hp.com/go/cpc.

[1] 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.

FIPS Compliant	
• Hard Drives	No

Features

• FIPS Compliant TPM (FIPS 140-2)	FIPS 140-2 Level 2 Certified
• Smart Card Reader	FIPS 201
TPM Model	SLB9672
• Version and Revision?	VU2.0 FW15.21
Is TPM embedded security chip FIPS 140-2 certified?	Yes
UEFI BIOS Version	2.7
UEFI Class 2 or Class 3	Class 3
What is the model and make of our SmartCard Reader?	Alcor AU9560
UL Certification	Yes
FCC Compliance	Yes
Energy Star	ENERGY STAR® certified
EPEAT	EPEAT® GOLD
Weight	Starting at 5.46 lbs (non-touch)

SYSTEM UNIT

Stand-Alone Power Requirements (AC Power)	**Nominal Operating Voltage**	19.5V
	Average Operating Power(idle)	System in hybrid mode High-end 15.0W Mid-range 8.8W
	Integrated graphics	CPU < 55W
	Discrete Graphics	Nvidia RTX A1000/A2000< 35W Nvidia RTX A3000/A4000/A5000< 80W AMD Radeon Pro W6600M <80W
	Max Operating Power	< 230W
Temperature	**Operating**	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.
	Non-operating	-4-140°F (-20 – 60°C)
Relative Humidity	**Operating**	10% to 90%, non-condensing
	Non-operating	5% to 95%; 38.7C (101.6F) maximum wet bulb tempera-ture; non-condensing.
Shock	**Operating**	40 G, 2 ms, half-sine
	Non-operating	200 G, 2 ms, half-sine
Random Vibration	**Operating**	0.75 grms
	Non-operating	1.50 grms
Maximum Altitude (unpressurized)	**Operating**	3048m (10,000ft)
	Non-operating	12192m (40,000ft)
Temperature Derating with Altitude	**Operating**	1.8°F / 1000 ft (1°C / 304.8 m)
Planned Industry Standard Certifications	**Regulatory Model Number**	HSN-152C
	UL	Yes
	CSA	Yes
	FCC Compliance	Yes

Features

ENERGY STAR®	Selected models
EPEAT®	EPEAT Gold in United States
ICES	Yes
Australia / NZ A-Tick Compliance	Yes
CCC	Yes
Japan VCCI Compliance	Yes
KCC	Yes
BSMI	Yes
CE Marking Compliance	Yes
MIL STD 810H	Yes
BNCI or BELUS	Yes
CIT	Yes
EAC	Yes
Saudi Arabian Compliance (ICCP)	Yes
SABS	Yes

[1]Configurations of the HP Zbook Fury G9 Mobile Workstation PC that are ENERGY STAR® certied are identified as HP Zbook Fury G9 Mobile Workstation PC ENERGY STAR on HP websites and on http://www.energystar.gov.
[2] Based on US EPEAT® registration according to IEEE 1680.1-2018 EPEAT®. Status varies by country. Visit www.epeat.net for more information.

DISPLAYS

16 in WQUXGA (3840 x 2400) BrightView UWVA DCI-P3 NBZ2 400 eDP 1.4+PSR 100 bent OLED Panel	**Active Area (W x H, mm)**	344.448 x 215.280 (typ)	
	Dimensions (W x H, mm)	348.578 x 224.310 (max)	
	Diagonal Size (inch)	16	
	Thickness (body/PCB, mm)	1.242 / 3.143 (max)	
	Weight (g)	230 (max)	
	Interface	eDP1.4	
	Surface Treatment	Bright View	
	Contrast Ratio	100,000:1 (typ)	
	Refresh Rate (Hz)	60 (typ)	
	Brightness (nits)	400 (typ)	
	P.P.I.	283	
	Pixel Resolution	**Pitch**	3840 x 2400 (WQUXGA)
		Format	RGB
	Backlight	OLED	
	Color Gamut Coverage	DCI-P3 100%	
	Color Depth	8	
	Viewing Angle	UWVA 85/85/85/85	
	Power Consumption (W, EBL@ 150nits max /200nits max)	6.10 (max) / 7.40 (max)	
	Low Blue Light	Yes	
	Touch Enabled	Yes	
	Touch Point Supported	10-point multi-touch	
	Pen Enabled	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	**Active Area (W x H, mm)**	344.680 x 215.420 (typ)	
	Dimensions (W x H, mm)	349.980 x 225.420 (max)	
	Diagonal Size (inch)	16	
	Thickness (body/PCB, mm)	2.3 / 4.1(max)	
	Weight (g)	300 (max)	
	Interface	eDP1.4	
	Surface Treatment	Anti-Glare	
	Contrast Ratio	1200:1 (typ)	
	Refresh Rate (Hz)	120 (typ)	
	Brightness (nits)	500 (typ)	
	P.P.I.	283	
	Pixel Resolution	**Pitch**	3840 x 2400 (WQUXGA)
		Format	RGB
	Backlight	WLED	
	Color Gamut Coverage	DCI-P3 100%	

Technical Specifications – Displays

	Delta E	<2	
	Color Depth	8	
	Viewing Angle	UWVA 89/89/89/89	
	Power Consumption (W, EBL@ 150nits max /200nits max)	4.98 (max)/ 5.84 (max)	
	Low Blue Light	No	
	Touch Enabled	No	
	Touch Point Supported	No	
	Pen Enabled	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	**Active Area (W x H, mm)**	344.680 x 215.420 (typ)	
	Dimensions (W x H, mm)	349.980 x 225.420 (max)	
	Diagonal Size (inch)	16	
	Thickness (body/PCB, mm)	2.2 / 3.9 (max)	
	Weight (g)	310 (max)	
	Interface	eDP 1.3	
	Surface Treatment	Anti-Glare	
	Contrast Ratio	1500:1 (typ)	
	Refresh Rate (Hz)	60 (typ)	
	Brightness (nits)	1000 (typ)	
	P.P.I.	142	
	Pixel Resolution	**Pitch**	1920 x1200 (WUXGA)
		Format	RGB
	Backlight	WLED	
	Color Gamut Coverage	sRGB 100%	
	Color Depth	8	
	Viewing Angle	UWVA 85/85/85/85	
	Power Consumption (W, EBL@ 150nits max /200nits max)	N/A	
	Low Blue Light	Yes	
	Touch Enabled	No	
	Touch Point Supported	No	
	Pen Enabled	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	**Active Area (W x H, mm)**	344.678 x 215.424 (typ)	
	Dimensions (W x H, mm)	350.680 x 226.470 (max)	
	Diagonal Size (inch)	16	
	Thickness (body/PCB, mm)	2.6 / 4.6 (max)	
	Weight (g)	330 (max)	
	Interface	eDP1.4	

Technical Specifications – Displays

	Surface Treatment	Anti-Glare	
	Contrast Ratio	1000:1 (typ)	
	Refresh Rate (Hz)	60 (typ)	
	Brightness (nits)	400 (typ)	
	P.P.I.	142	
	Pixel Resolution	**Pitch**	1920 x1200 (WUXGA)
		Format	RGB
	Backlight	WLED	
	Color Gamut Coverage	sRGB 100%	
	Color Depth	8	
	Viewing Angle	UWVA 89/89/89/89	
	Power Consumption (W, EBL@ 150nits max /200nits max)	1.60 (max)/ 1.95 (max)	
	Low Blue Light	Yes	
	Touch Enabled	Yes	
	Touch Point Supported	10-point multi-touch	
	Pen Enabled	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	**Active Area (W x H, mm)**	344.678 x 215.424 (typ)	
	Dimensions (W x H, mm)	350.680 x 226.470 (max)	
	Diagonal Size (inch)	16	
	Thickness (body/PCB, mm)	2.6 / 4.6 (max)	
	Weight (g)	330 (max)	
	Interface	eDP1.4	
	Surface Treatment	Anti-Glare	
	Contrast Ratio	1000:1 (typ)	
	Refresh Rate (Hz)	60 (typ)	
	Brightness (nits)	400 (typ)	
	P.P.I.	142	
	Pixel Resolution	**Pitch**	1920 x1200 (WUXGA)
		Format	RGB
	Backlight	WLED	
	Color Gamut Coverage	sRGB 100%	
	Color Depth	8	
	Viewing Angle	UWVA 89/89/89/89	
	Power Consumption (W, EBL@ 150nits max /200nits max)	1.60 (max)/ 1.95 (max)	
	Low Blue Light	Yes	
	Touch Enabled	No	
	Touch Point Supported	No	
	Pen Enabled	No	

Technical Specifications – Displays

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

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

4TB PCIe-4x4 2280 NVMe Three Layer Cell double-sided M.2 Solid State Drive	**Form Factor**	M.2 2280	
	Capacity	4TB	
	NAND Type	TLC	
	Height	0.14 in (3.6 mm)	
	Width	0.87 in (22 mm)	
	Weight	15g	
	Interface	PCIe NVMe Gen4X4	
	Performance	**Maximum Sequential Read**	**Maximum Sequential Write**
		6400 MB/s ±20%	5000 MB/s ±20%
	Logical Blocks	8,001,594,720	
	Operating Temperature	32° to 158°F (0° to 70°C) [ambient temp]	
	Features	Pyrite 2.0; TRIM; L1.2	
		NOTE: For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 35 GB (for Windows) is reserved for system recovery software.	
SSD 2TB 2280 PCIe-4x4 NVMe Three Layer Cell	**Form Factor**	M.2 2280	
	Capacity	2 TB	
	NAND Type	TLC	
	Height	0.09 in (2.3 mm)	
	Width	0.87 in (22 mm)	
	Weight	0.02 lb (10 g)	
	Interface	PCIe NVMe Gen4X4	
	Performance	**Maximum Sequential Read**	**Maximum Sequential Write**
		6400 MB/s ±20%	5000 MB/s ±20%
	Logical Blocks	4,000,797,360	
	Operating Temperature	32° to 158°F (0° to 70°C) [ambient temp]	
	Features	Pyrite 2.0; TRIM; L1.2	
		NOTE: For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 35 GB (for Windows) is reserved for system recovery software.	
SSD 1TB 2280 PCIe-4x4 NVMe Three Layer Cell	**Form Factor**	M.2 2280	
	Capacity	1TB	
	NAND Type	TLC	
	Height	0.09 in (2.3 mm)	
	Width	0.87 in (22 mm)	
	Weight	0.02 lb (10 g)	
	Interface	PCIe NVMe Gen4X4	
	Performance	**Maximum Sequential Read**	**Maximum Sequential Write**
		6400 MB/s ±20%	5000 MB/s ±20%
	Logical Blocks	2,000,409,264	
	Operating Temperature	32° to 158°F (0° to 70°C) [ambient temp]	
	Features	Pyrite 2.0; TRIM; L1.2	

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	**Form Factor**	M.2 2280	
	Capacity	512GB	
	NAND Type	TLC	
	Height	0.09 in (2.3 mm)	
	Width	0.87 in (22 mm)	
	Weight	0.02 lb (10 g)	
	Interface	PCIe NVMe Gen4X4	
	Performance	**Maximum Sequential Read**	**Maximum Sequential Write**
		6400 MB/s ±20%	3500 MB/s ±20%
	Logical Blocks	1,000,215,215	
	Operating Temperature	32° to 158°F (0° to 70°C) [ambient temp]	
	Features	Pyrite 2.0; TRIM; L1.2	
		NOTE: For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 35 GB (for Windows) is reserved for system recovery software.	
SSD 256GB 2280 PCIe-4x4 NVMe Three Layer Cell	Form Factor	M.2 2280	
	Capacity	256GB	
	NAND Type	TLC	
	Height	0.09 in (2.3 mm)	
	Width	0.87 in (22 mm)	
	Weight	0.02 lb (10 g)	
	Interface	PCIe NVMe Gen4X4	
	Performance	**Maximum Sequential Read**	**Maximum Sequential Write**
		4000 MB/s ±20%	2000 MB/s ±20%
	Logical Blocks	500,118,192	
	Operating Temperature	32° to 158°F (0° to 70°C) [ambient temp]	
	Features	Pyrite 2.0; TRIM; L1.2	
		NOTE: For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 35 GB (for Windows) is reserved for system recovery software.	
2TB PCIe-4x4 2280 NVME Self Encrypted OPAL2 Three Layer Cell Solid State Drive	**Form Factor**	M.2 2280	
	Capacity	2TB	
	NAND Type	TLC	
	Height	0.09 in (2.3 mm)	
	Width	0.87 in (22 mm)	
	Weight	0.02 lb (10 g)	
	Interface	PCIe NVMe Gen4X4	
	Performance	**Maximum Sequential Read**	**Maximum Sequential Write**
		6400 MB/s ±20%	5000 MB/s ±20%
	Logical Blocks	4,000,797,360	
	Operating Temperature	32° to 158°F (0° to 70°C) [ambient temp]	
	Features	TCG Opal 2.0; TRIM; L1.2	

Technical Specifications – Storage

		NOTE: For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 35 GB (for Windows) is reserved for system recovery software.	
1TB PCIe-4x4 2280 NVME Self Encrypted OPAL2 Three Layer Cell Solid State Drive	**Form Factor**	M.2 2280	
	Capacity	1TB	
	NAND Type	TLC	
	Height	0.09 in (2.3 mm)	
	Width	0.87 in (22 mm)	
	Weight	0.02 lb (10 g)	
	Interface	PCIe NVMe Gen4X4	
	Performance	**Maximum Sequential Read**	**Maximum Sequential Write**
		6400 MB/s ±20%	5000 MB/s ±20%
	Logical Blocks	2,000,409,264	
	Operating Temperature	32° to 158°F (0° to 70°C) [ambient temp]	
	Features	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.	
512GB PCIe-4x4 2280 NVME Self Encrypted OPAL2 Three Layer Cell Solid State Drive	**Form Factor**	M.2 2280	
	Capacity	512GB	
	NAND Type	TLC	
	Height	0.09 in (2.3 mm)	
	Width	0.87 in (22 mm)	
	Weight	0.02 lb (10 g)	
	Interface	PCIe NVMe Gen4X4	
	Performance	**Maximum Sequential Read**	**Maximum Sequential Write**
		6400 MB/s ±20%	3500 MB/s ±20%
	Logical Blocks	1,000,215,215	
	Operating Temperature	32° to 158°F (0° to 70°C) [ambient temp]	
	Features	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.	
256GB PCIe-4x4 2280 NVME Self Encrypted OPAL2 Three Layer Cell Solid State Drive	**Form Factor**	M.2 2280	
	Capacity	256GB	
	NAND Type	TLC	
	Height	0.09 in (2.3 mm)	
	Width	0.87 in (22 mm)	
	Weight	0.02 lb (10 g)	
	Interface	PCIe NVMe Gen4X4	
	Performance	**Maximum Sequential Read**	**Maximum Sequential Write**
		4000 MB/s ±20%	2000 MB/s ±20%
	Logical Blocks	500,118,192	
	Operating Temperature	32° to 158°F (0° to 70°C) [ambient temp]	
	Features	TCG Opal 2.0; TRIM; L1.2	

Technical Specifications – Storage

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

Technical Specifications – Networking

NETWORKING/COMMUNICATION

Intel AX211 Wi-Fi 6E +BT 5.3 M.2 160MHz CNVi WLAN vPro®	**Wireless LAN Standards**	IEEE 802.11a IEEE 802.11b IEEE 802.11g IEEE 802.11n IEEE 802.11ac IEEE 802.11ax IEEE 802.11d IEEE 802.11e IEEE 802.11h IEEE 802.11i IEEE 802.11k IEEE 802.11r IEEE 802.11v
	Interoperability	Wi-Fi certified
	Frequency Band	802.11b/g/n/ax • 2.402 – 2.482 GHz 802.11a/n/ac/ax • 4.9 – 4.95 GHz (Japan) • 5.15 – 5.25 GHz • 5.25 – 5.35 GHz • 5.47 – 5.725 GHz • 5.825 – 5.850 GHz • 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[1]	• 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

Technical Specifications – Networking

Output Power[2]	• 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 • 802.11n HT20(5GHz) : +14dBm minimum • 802.11n HT40(5GHz) : +13dBm minimum • 802.11ac VHT80(5GHz) : +10dBm minimum • 802.11ac VHT160(5GHz) : +10dBm minimum • 802.11ax HE40(2.4GHz) : +12dBm minimum • 802.11ax HE80(5GHz) : +10dBm minimum • 802.11ax HE160(5GHz) : +10dBm minimum
Power Consumption	• Transmit mode 2.0 W • Receive mode 1.6 W • Idle mode (PSP) 180 mW (WLAN Associated) • Idle mode 50 mW (WLAN unassociated) • Connected Standby 10mW • Radio disabled 8 mW
Power Management	ACPI and PCI Express compliant power management 802.11 compliant power saving mode
Receiver Sensitivity[3]	•802.11b, 1Mbps : -93.5dBm maximum •802.11b, 11Mbps : -84dBm maximum • 802.11a/g, 6Mbps : -86dBm maximum • 802.11a/g, 54Mbps : -72dBm maximum • 802.11n, MCS07 : -67dBm maximum • 802.11n, MCS15 : -64dBm maximum • 802.11ac, MCS0(VHT80) : -84dBm maximum • 802.11ac, MCS9(VHT80) : -59dBm maximum • 802.11ac, MCS9(VHT160) : -58.5dBm maximum •802.11ax, MCS11(HE40): -57dBm maximum •802.11ax, MCS11(HE80): -54dBm maximum •802.11ax, MCS11(HE160): -53.5dBm maximum
Antenna Type	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
Form Factor	PCI-Express M.2 MiniCard
Dimensions	1. Type 2230 : 2.3 x 22.0 x 30.0 mm 2. Type 1216: 1.67 x 12.0 x 16.0 mm
Weight	1. Type 2230 : 2.8g 2. Type 1216: 1.3g
Operating Voltage	3.3v +/- 9%
Temperature	Operating 14° to 158° F (-10° to 70° C) Non-operating -40° to 176° F (-40° to 80° C)
Humidity	Operating 10% to 90% (non-condensing) Non-operating 5% to 95% (non-condensing)
Altitude	Operating Non-operating 0 to 10,000 ft (3,048 m) 0 to 50,000 ft (15,240 m)
LED Activity	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	
Frequency Band	2402 to 2480 MHz
Number of Available Channels	Legacy : 0~79 (1 MHz/CH) BLE : 0~39 (2 MHz/CH)
Data Rates and Throughput	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)
Transmit Power	The Bluetooth component shall operate as a Class II Bluetooth device with a maximum transmit power of + 9.5 dBm for BR and EDR.
Power Consumption	Peak (Tx): 330 mW Peak (Rx): 230 mW Selective Suspend: 17 mW
Bluetooth Software Supported	Microsoft Windows Bluetooth Software
Link Topology	
Power Management	Microsoft Windows ACPI, and USB Bus Support
Certifications	FCC (47 CFR) Part 15C, Section 15.247 & 15.249
Power Management Certifications	ETS 300 328, ETS 300 826 Low Voltage Directive IEC950 UL, CSA, and CE Mark
Bluetooth Profiles Supported	BT4.1-ESR 5/6/7 Compliance LE Link Layer Ping LE Dual Mode LE Link Layer LE Low Duty Cycle Directed Advertising LE L2CAP Connection Oriented Channels Train Nudging & Interlaced Scan BT4.2 ESR08 Compliance LE Secure Connection- Basic/Full LE Privacy 1.2 –Link Layer Privacy LE Privacy 1.2 –Extended Scanner Filter Policies LE Data Packet Length Extension FAX Profile (FAX) Basic Imaging Profile (BIP)2 Headset Profile (HSP) Hands Free Profile (HFP) Advanced Audio Distribution Profile (A2DP) 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 5.3 M.2 160MHz CNVi WLAN non-vPro®	**Wireless LAN Standards**	IEEE 802.11a IEEE 802.11b IEEE 802.11g IEEE 802.11n IEEE 802.11ac IEEE 802.11ax IEEE 802.11d IEEE 802.11e IEEE 802.11h IEEE 802.11i IEEE 802.11k IEEE 802.11r IEEE 802.11v
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Security & Manageability	Intel® vPro® support with appropriate Intel® chipset components

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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) 5GNR 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)
Wireless protocol standards	5GNR 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
GPS	Standalone, A-GPS (MS-A, MS-B)
GPS Bands	GPS: L1 (1575.42MHz) GLONASS: L1 (1602MHz) BeidouB1(1561.098MHz) Galileo E1 (1575.42) QZSS(1575.42 MHz)
Maximum Data Rates	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)
Maximum Output Power	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
Maximum Power Consumption	5G Sub 6 : 2500 mA LTE : 1,300 mA (peak) ; 1100 mA (average) HSPA+ : 1,100 mA (peak) ; 800 mA (average)
Form Factor	M.2, 3042-S3 Key B
Weight	8 g
Dimensions (Length x Width x Thickness)	52 mm × 30 mm × 2.6 mm

* 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

Technology/Operating bands	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 (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

Technical Specifications – Networking

Wireless protocol standards	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
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: 978 Mbps (Download), 150 Mbps (Upload) DC-HSPA+: 42 Mbps (Download), 5.76 Mbps (Upload) HSPA+: 21Mbps (Download), 5.76 Mbps (Upload)
Maximum Output Power	LTE: 23 dBm in all band except B41 LTE B41 HPUE = 26dBm HSPA+: 23.5 dBm
Maximum Power Consumption	LTE : 1,200 mA (peak) ; 900 mA (average) HSPA+ : 1,100 mA (peak) ; 800 mA (average)
Form Factor	M.2, 3042-S3 Key B
Weight	6 g
Dimensions (Length x Width x Thickness)	42 x 30 x 2.3 mm

* 4G LTE module is optional, must be configured at the factory, requires activation and separately purchased service contract. Check with service provider for coverage and availability in your area. Connection, upload and download speeds will vary due to network, location, environment, network conditions, and other factors. 4G LTE not available on all products, in all regions.

NFC Mirage module (NXP NPC300 I2C 10mmx17mm)

Dimensions (L x W x H)	Module 25 mm by 10 mm by 2.0 mm
Chipset	NPC300
System interface	I2C
NFC RF standards	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
NFC Forum Support	Tag Type 1, Type 2, Type3 and Type 4, NFCIP-1 and NFCIP-2
Reader (PCD-VCD) Mode(1)	ISO/IEC 14443 A ISO/IEC 14443 B ISO/IEC 15693 MIFARE 1K MIFARE 4K MIFARE DESFire FeliCa Jewel and Topaz cards
Card Emulation (PICC-VICC) Mode(1)	ISO/IEC 14443 A ISO/IEC 14443 B and B' MIFARE FeliCa
Frequency	13.56 MHz
NFC Modes Supported	Reader/Writer, Peer-to-Peer
Raw RF Data Rates	106, 212, 424, 848 kbps

Technical Specifications – Networking

	Operating temperature	0°C to 70°C		
	Storage temperature	-20°C to 125°C		
	Humidity	10-90% operating 5-95% non-operating		
	Supply Operating voltage	4.35 to 5.25 Volts		
	I/O Voltage	1.8V or 3.3V		
	Power Consumption	**Booster enable, VCC_BOOST = 5V) Mode Power Consumption, Typical**	VBAT= 3.3V,	
			Polling	7.3 mA
			Detected Test Tag Type 1	Total 283.8 mA 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
	Antenna	Antenna connector, 0.5mm pitch, 7 connector FPC. Antenna matching is external to module.		
Intel® I219-LM 1 Gigabit Network Connection LOM (vPro®)	**Connector**	RJ-45		
	System Interface	PCI(Intel proprietary) + SMBus		
	Data rates supported	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		
	IEEE Compliance	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)		
	Performance	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		
	Power consumption	Cable Disconnection: 25mW 100Mbps Full Run: 450mW 1000bp Full Run: 1000mW WoL Enable(S3/S4/S5): 50mW WoL Disable(S3/S4/S5): 25mW		
	Power Management	ACPI compliant – multiple power modes Situation-sensitive features reduce power consumption Advanced link down power saving for reducing link down power consumption		
	Management Interface	Auto MDI/MDIX Crossover cable detection		
	IT Manageability	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
	Security & Manageability	Intel® vPro® support with appropriate Intel® chipset components

Intel® I219v 1 Gigabit Network Connection LOM (non-vPro®)	**Connector**	RJ-45
	System Interface	PCI(Intel proprietary) + SMBus
	Data rates supported	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
	IEEE Compliance	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 1000BAE-T IEEE 802.3bz 2.5GBASE-T
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Technical Specifications – Networking

AUDIO

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

FINGERPRINT SENSOR

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

POWER

HP 150W Slim 4.5 mm PFC Right Angle Smart (3-pin) AC Power Adapter	**Dimensions**	138x66x22mm	
	Weight	unit: 325g +/- 10g	
	Input	**Input Efficiency**	88% at 115 Vac and 89% at 230Vac
		Input frequency range	47 ~ 63 Hz
		Input AC current	2.7 A at 90 Vac and Maximum Load
	Output	**Output power**	150W
		DC output	19.5V
		Hold-up time	5ms at 115 Vac input

Technical Specifications – Networking

	Output current limit	<16.0A
	DC Plug	4.5mm Barrel Type
Connector	C6	
Environmental Design	**Operating temperature**	32° to 95° F (0° to 35° C)
	Non-operating (storage) temperature	-4° to 185° F (-20° to 85° C)
	Altitude	0 to 16,400 ft (0 to 5000m)
	Humidity	5% to 95%
	Storage Humidity	5% to 95%
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.	

Technical Specifications – Power

HP 200W Slim 4.5 mm PFC Right Angle Smart (3-pin) AC Power Adapter	**Dimensions**	152x73x23.5mm	
	Weight	unit: 510g +/- 10g	
	Input	**Input Efficiency**	88% at 115 Vac and 89% at 230Vac
		Input frequency range	47 ~ 63 Hz
		Input AC current	2.7 A at 90 Vac and Maximum Load
	Output	**Output power**	200W
		DC output	19.5V
		Hold-up time	5ms at 115 Vac input
		Output current limit	<21.0A
		DC Plug	4.5mm Barrel Type
	Connector	C14	
	Environmental Design	**Operating temperature**	32° to 95° F (0° to 35° C)
		Non-operating (storage) temperature	-4° to 185° F (-20° to 85° C)
		Altitude	0 to 16,400 ft (0 to 5000m)
		Humidity	5% to 95%
		Storage Humidity	5% to 95%
	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.	
HP 230W Slim 4.5 mm PFC Right Angle Smart (3-pin) AC Power Adapter	**Dimensions**	180x88x25.4mm	
	Weight	unit: 650g +/- 10g	
	Input	**Input Efficiency**	88% at 115 Vac and 89% at 230Vac
		Input frequency range	47 ~ 63 Hz
		Input AC current	3.5 A at 90 Vac and Maximum Load
	Output	**Output power**	230W
		DC output	19.5V
		Hold-up time	5ms at 115 Vac input
		Output current limit	<25.0A
		DC Plug	4.5mm Barrel Type
	Connector	C14	
	Environmental Design	**Operating temperature**	32° to 95° F (0° to 35° C)
		Non-operating (storage) temperature	-4° to 185° F (-20° to 85° C)
		Altitude	0 to 16,400 ft (0 to 5000m)
		Humidity	5% to 95%
		Storage Humidity	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.

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® • Based on US EPEAT® Gold registration according to IEEE 1680.1-2018 EPEAT®. EPEAT® status varies by country. Visit www.epeat.net for more information
Sustainable Impact Specifications	• 35% post-consumer recycled plastic[2] • External Power Supply 90% Efficiency • Low halogen[3] • Outside Box and corrugated cushions are 100% sustainably sourced and recyclable[4] • Molded Paper Pulp Cushion inside box is 100% sustainably sourced and recyclable[5] • 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)	11.66 W	11.81 W	11.85 W
Normal Operation (Long idle)	5.28 W	5.33 W	5.4 W
Sleep	1.04 W	1.08 W	1.1 W
Off	0.41 W	0.42 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)	39.9 BTU/hr	40.4 BTU/hr	40.5 BTU/hr
Normal Operation (Long idle)	18.1 BTU/hr	18.2 BTU/hr	18.5 BTU/hr
Sleep	3.6 BTU/hr	3.7 BTU/hr	3.8 BTU/hr
Off	1.4 BTU/hr	1.4 BTU/hr	1.4 BTU/hr

***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	2.9	20.8
Fixed Disk – Random writes	2.9	21.0
Optical Drive – Sequential reads	2.9	21.0

Technical Specifications – Environmental

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
- 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

External:	PAPER/Corrugated	363 g
	PAPER/Molded Pulp	160 g
	PAPER/Paper	3 g
Internal:	PLASTIC/Polyethylene low density – LDPE	17 g

The plastic packaging material contains at least 100% recycled content.

The corrugated paper packaging materials contains at least 35.6% recycled content.

RoHS Compliance

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

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

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

To obtain a copy of the HP RoHS Compliance Statement, see HP RoHS position statement.

Material Usage

This product does not contain any of the following substances in excess of regulatory limits (refer to the HP General Specification for the Environment at http://www.hp.com/hpinfo/globalcitizenship/environment/supplychain/gen_specifications.html):

- Asbestos
- Certain Azo Colorants
- Certain Brominated Flame Retardants – may not be used as flame retardants in plastics
- Cadmium
- Chlorinated Hydrocarbons

- Chlorinated Paraffins
- Bis(2-Ethylhexyl) phthalate (DEHP)
- Benzyl butyl phthalate (BBP)
- Dibutyl phthalate (DBP)
- Diisobutyl phthalate (DIBP)
- Formaldehyde
- Halogenated Diphenyl Methanes
- Lead carbonates and sulfates
- Lead and Lead compounds
- Mercuric Oxide Batteries
- Nickel – finishes must not be used on the external surface designed to be frequently handled or carried by the user.
- Ozone Depleting Substances
- Polybrominated Biphenyls (PBBs)
- Polybrominated Biphenyl Ethers (PBBEs)
- Polybrominated Biphenyl Oxides (PBBOs)
- Polychlorinated Biphenyl (PCB)
- Polychlorinated Terphenyls (PCT)
- Polyvinyl Chloride (PVC) – except for wires and cables, and certain retail packaging has been voluntarily removed from most applications.
- Radioactive Substances
- Tributyl Tin (TBT), Triphenyl Tin (TPT), Tributyl Tin Oxide (TBTO)

Packaging Usage

HP follows these guidelines to decrease the environmental impact of product packaging:

- Eliminate the use of heavy metals such as lead, chromium, mercury and cadmium in packaging materials.
- Eliminate the use of ozone-depleting substances (ODS) in packaging materials.
- Design packaging materials for ease of disassembly.
- Maximize the use of post-consumer recycled content materials in packaging materials.
- Use readily recyclable packaging materials such as paper and corrugated materials.
- Reduce size and weight of packages to improve transportation fuel efficiency.
- Plastic packaging materials are marked according to ISO 11469 and DIN 6120 standards.

End-of-life Management and Recycling

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

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

Technical Specifications – Environmental

HP Inc. Corporate Environmental Information	For more information about HP's commitment to the environment: Global Citizenship Report http://www.hp.com/hpinfo/globalcitizenship/gcreport/index.html Eco-label certifications http://www8.hp.com/us/en/hp-information/environment/ecolabels.html ISO 14001 certificates: http://h20195.www2.hp.com/V2/GetDocument.aspx?docname=c04755842 and http://www.hp.com/hpinfo/globalcitizenship/environment/pdf/cert.pdf
Footnotes	[2]Recycled plastic content percentage is based on the definition set in the IEEE 1680.1-2018 standard. [3]External power supplies, WWAN modules, power cords, cables and peripherals excluded. [4]100% outer box packaging and corrugated cushions made from sustainably sourced certified and recycled fibers. [5]Fiber cushions made from 100% recycled wood fiber and organic materials.

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

Type	Description	Part #
	HP Prelude Pro Recycle Backpack	1X644AA
	HP Prelude Pro Recycle Top Load	1X645AA
	HP Executive 17.3 Backpack	6KD05AA
	HP Executive 15.6 Top Load	6KD06AA
	HP Executive 15.6 Backpack	6KD07AA
	HP Executive 17.3 Top Load	6KD08AA
	HP Executive 15.6 Leather Top Load	6KD09AA
	HP 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
Docking	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 120W G4 Dock	4J0A2AA
	HP Thunderbolt 280W G4 Dock w/Combo Cable	4J0G4AA
Input/Output	HP HDMI to VGA Adapter	H4F02AA
	HP HDMI to DVI Adapter	F5A28AA
	HP USB-C to USB 3.0 Adapter	N2Z63AA
	HP USB-C to DisplayPort Adapter	N9K78AA
	HP USB-C to VGA Adapter	N9K76AA
	HP 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 Single miniDP-to-DP Adapter Cable	2MY05AA
Keyboard/Mouse	HP 320K Wired Keyboard	9SR37AA
	HP 125 Wired Keyboard	266C9AA
	HP 975 USB+BT Dual-Mode Wireless Keyboard	3Z726AA

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

	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
Hub	HP USB-C Mini Dock	1PM64AA
	HP USB-C Travel Hub G2	7PJ38AA
	HP USB-C to USB-A Hub	Z6A00AA
	HP Universal USB-C Multiport Hub	50H55AA
	HP Universal USB-C Multiport Hub	50H98AA
Audio	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
Power	HP Zbook 200W Slim Smart 4.5mm AC Adapter	491C7AA
Storage	HP USB External DVDRW Drive	F2B56AA
	HP USB External DVDRW Drive	Y3T76AA
Security	HP Nano Keyed Cable Lock	1AJ39AA
	HP Nano Master Keyed Cable Lock	1AJ40AA
	HP Sure Key Cable Lock	6UW42AA

Date of change:	Version History:		Description of change:
May 31, 2022	From v1 to v2	Changed	Format
June 17, 2022	From v2 to v3	Changed	POWER and WEIGHTS & DIMENSIONS sections
June 23, 2022	From v3 to v4	Changed	NETWORKING/COMMUNICATIONS section
June 29, 2022	From v4 to v5	Changed	POWER section
July 8, 2022	From v5 to v6	Changed	WEIGHTS & DIMENSIONS, NETWORKING/COMMUNICATIONS and PROCESSOR sections
		Removed	HP RGB Z Command Keyboard reference
July 11, 2022	From v6 to v7	Changed	PORTS/SLOTS section
September 15, 2022	From v7 to v8	Removed	Tile App for Software
December 1, 2022	From v8 to v9	Changed	DRIVE CONTROLLERS section
December 7, 2022	From v9 to v10	Changed	Format
December 14, 2022	From v10 to v11	Changed	DISPLAY section