

Overview

HP ZBook Fury 16 G11 Mobile Workstation PC



1. Ambient Light Sensor (Optional)
2. Internal Microphones (2)
3. Webcam LED (Optional)
4. Webcam
5. Camera Shutter
6. IR Camera (Optional)
7. IR Camera LEDs (Optional)
8. Glass Clickpad

Right

9. Power Button Key
10. Nano Security Lock Slot (Lock sold separately)
11. RJ45
12. SuperSpeed USB Type-A 5Gbps signaling rate
13. SuperSpeed USB Type-A 5Gbps signaling rate
14. Audio Combo Jack
15. Smartcard Reader
16. Touch Fingerprint Sensor (Select models)

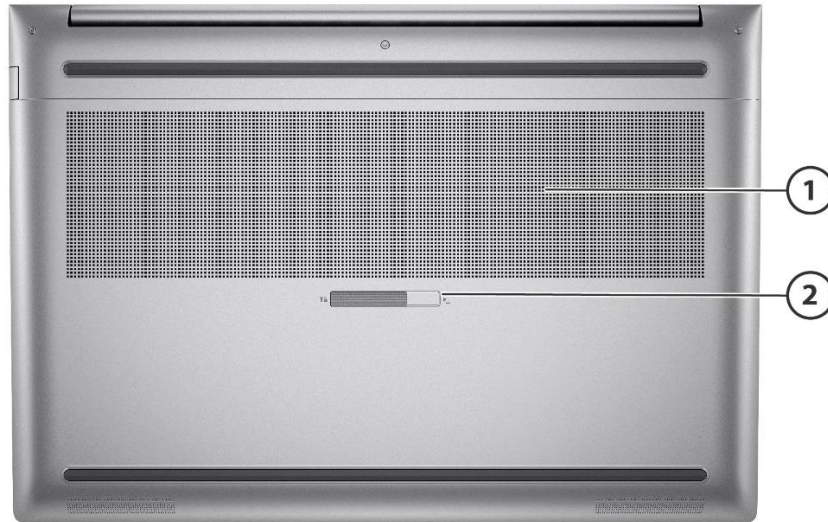
Overview



Left

1. LED Indicator
2. Power connector
3. Thunderbolt™ 4 with USB4 Type-C® 40Gbps signaling rate (USB Power Delivery, DisplayPort™ 1.4)1
4. mDP port
5. HDMI 2.1 Port (Cable not included)
6. SD Card Reader

Overview



Bottom

1. Fan Venting

2. Service Door Latch

Overview

At A Glance

- Preinstalled with Windows 11 versions, FreeDOS, or Ubuntu Linux
- 16:10 ratio screen reduces the need to scroll by showing more vertical content than 16:9
- Choice of displays:
 - 40.6 cm (16") diagonal, WUXGA (1920 x 1200), IPS, anti-glare, eDP + PSR, micro-edge, 400 nits, 100% sRGB
 - 40.6 cm (16") diagonal, WQUXGA (3840 x 2400), 120 Hz, IPS, anti-glare, eDP + PSR, micro-edge, 500 nits, 100% DCI-P3, HP DreamColor
 - 40.6 cm (16") diagonal, WUXGA (1920 x 1200), IPS, anti-glare, eDP + PSR, micro-edge, 1000 nits, 100% sRGB, HP Sure View integrated privacy screen
 - 40.6 cm (16") diagonal, WQUXGA (3840 x 2400), OLED, touch, BrightView, eDP + PSR, micro-edge, Low Blue Light, 400 nits, 100% DCI-P3
 - 40.6 cm (16") diagonal, WUXGA (1920 x 1200), IPS, touch, BrightView, eDP + PSR, micro-edge, 400 nits, 100% Srgb
- HP Wolf Security for Business creates a hardware-enforced, always-on, resilient defense.
- Connectivity with optional HP 5000 5G Solution WWAN available world-wide, and Thunderbolt™ Docking (Dock sold separately)
- Undergoes MIL-STD 810H tests
- Supports fast charging (50% in 30 minutes) with no impact on battery recharge cycles
- Designed to support all HP docking options including the HP Universal Dock G5

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 for business ¹ Windows 11 Home 64 - HP recommends Windows 11 Pro for business ¹ FreeDOS 3.0 Ubuntu Linux 22.04 |
|------------------------|---|

¹ 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>.

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

13th Gen Intel[®] Core™ i9-13950HX with Intel[®] UHD Graphics (1.6 GHz E-core base frequency, 2.2 GHz P-core base frequency, up to 4.0 GHz E-core Max Turbo frequency, up to 5.5 GHz P-core Max Turbo frequency, 36 MB L3 cache, 8 P-cores and 16 E-cores, 32 threads), supports Intel[®] vPro[®] Technology ^{1,2,3,4,5}

Intel[®] Core™ 14th Gen i9-14900HX with Intel[®] UHD Graphics (1.6 GHz E-core base frequency, 2.2 GHz P-core base frequency, up to 4.1 GHz E-core Max Turbo frequency, up to 5.8 GHz P-core Max Turbo frequency, 36 MB L3 cache, 8 P-cores and 16 E-cores, 32 threads) ^{1,2,3,4,5}

13th Gen Intel[®] Core™ i7-13850HX with Intel[®] UHD Graphics (1.5 GHz E-core base frequency, 2.1 GHz P-core base frequency, up to 3.8 GHz E-core Max Turbo frequency, up to 5.3 GHz P-core Max Turbo frequency, 30 MB L3 cache, 8 P-cores and 12 E-cores, 28 threads), supports Intel[®] vPro[®] Technology ^{1,2,3,4,5}

Intel[®] Core™ 14th Gen i7-14700HX with Intel[®] UHD Graphics (1.5 GHz E-core base frequency, 2.1 GHz P-core base frequency, up to 3.9 GHz E-core Max Turbo frequency, up to 5.5 GHz P-core Max Turbo frequency, 33 MB L3 cache, 8 P-cores and 12 E-cores, 24 threads) ^{1,2,3,4,5}

13th Gen Intel[®] Core™ i5-13600HX with Intel[®] UHD Graphics (1.9 GHz E-core base frequency, 2.6 GHz P-core base frequency, up to 3.6 GHz E-core Max Turbo frequency, up to 4.8 GHz P-core Max Turbo frequency, 24 MB L3 cache, 6 P-cores and 8 E-cores, 20 threads), supports Intel[®] 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 Intel Turbo Boost performance varies depending on hardware, software and overall system configuration. See <http://www.intel.com/technology/turboboost> for more information.

³ 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>

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 Processor speed denotes maximum performance mode; processors will run at lower speeds in battery optimization mode.

Features

CHIPSET

Intel WM790 Chipset

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

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

GRAPHICS

Integrated

Intel® UHD Graphics^{1,3}

Supports

Support HD decode, D3D12 API, DP1.4, HDMI 2.1, HDCP 2.3
GFX arch up to 96EU

Discrete

NVIDIA RTX™ 5000 Ada Generation Laptop GPU (16 GB GDDR6 dedicated)^{1,2};
NVIDIA RTX™ 4000 Ada Generation Laptop GPU (12 GB GDDR6 dedicated)^{1,2};
NVIDIA RTX™ 3500 Ada Generation Laptop GPU (12 GB GDDR6 dedicated)^{1,2};
NVIDIA RTX™ 2000 Ada Generation Laptop GPU (8 GB GDDR6 dedicated)^{1,2};
NVIDIA RTX™ 1000 Ada Generation Laptop GPU (6 GB GDDR6 dedicated)^{1,2}

Supports

RTX 5000 / RTX 4000 / RTX 3500 Support Memory ECC
Support HDMI 2.1, DP1.4, HDCP 1.4, 2.3
Support CUDA, Dynamic Boost

¹ Both UMA & Discrete configurations support 4 independent displays when on the HP Thunderbolt Dock 280W G4 w/Combo Cable (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).

² HDMI cable Sold Separately

DISPLAY

Non-touch

- 40.6 cm (16") diagonal, WUXGA (1920 x 1200), IPS, anti-glare, eDP + PSR, micro-edge, 400 nits, 100% sRGB^{1,3}

Features

- 40.6 cm (16") diagonal, WQUXGA (3840 x 2400), 120 Hz, IPS, anti-glare, eDP + PSR, micro-edge, 500 nits, 100% DCI-P3, HP DreamColor^{1,3}
- 40.6 cm (16") diagonal, WUXGA (1920 x 1200), IPS, anti-glare, eDP + PSR, micro-edge, 1000 nits, 100% sRGB, HP Sure View integrated privacy screen^{1,3,4,5}

Touch

- 40.6 cm (16") diagonal, WQUXGA (3840 x 2400), OLED, touch, BrightView, eDP + PSR, micro-edge, Low Blue Light, 400 nits, 100% DCI-P3^{1,3,4,5}
- 40.6 cm (16") diagonal, WUXGA (1920 x 1200), IPS, touch, BrightView, eDP + PSR, micro-edge, 400 nits, 100% Srgb^{1,3,4,5}

Displays support

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

For more information, please reference the following ZBook docking whitepaper:

<https://h20195.www2.hp.com/v2/GetDocument.aspx?docname=4AA5-2657ENW>

Display Size

16"

40.64 cm (16")

¹HD content required to view HD images.

²HDMI cable sold separately.

³Resolutions are dependent upon monitor capability, and resolution and color depth settings.

⁴HP Sure View Reflect integrated privacy screen is an optional feature that must be configured at purchase and is designed to function in landscape orientation.

⁵Actual brightness will be lower with touchscreen or Sure View.

Features

DOCKING

| | |
|---|--|
| Docking station model #1 | HP Thunderbolt 280W G4 Dock w/Combo Cable |
| 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 |

Features

STORAGE AND DRIVES*

Maximum Storage

16TB

PCIe® NVMe™ M.2 2280 Storage

4 TB PCIe® Gen4x4 NVMe™ M.2 SSD TLC
2 TB PCIe® Gen4x4 NVMe™ M.2 SSD TLC
2 TB PCIe® Gen4x4 NVMe™ SED SSD
1 TB PCIe® Gen4x4 NVMe™ M.2 SSD TLC
1 TB PCIe® Gen4x4 NVMe™ SED SSD
512 GB PCIe® Gen4x4 NVMe™ M.2 SSD TLC
512 GB PCIe® Gen4x4 NVMe™ SED SSD

Storage Slots

4 M.2 Solid State Drive

Drive Controllers

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

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

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.

MEMORY

Maximum Memory

128 GB DDR5-5600 ECC SODIMM
128 GB DDR5-5600 non-ECC SODIMM

Memory

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

Memory Slots

Features

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

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

Features

NETWORKING/COMMUNICATIONS

Ethernet

Intel® I219LM (vPro®) GbE PCIe NIC
Intel® I219V (non-vPro®) GbE PCIe NIC

WLAN

Intel® Wi-Fi 7 BE200 + Bluetooth® 5.4 wireless card vPro® WW WLAN^{1,2}
Intel® Wi-Fi 7 BE200 + Bluetooth® 5.4 wireless card non-vPro® WW WLAN¹

¹Wi-Fi 7: Wireless access point and Internet service required and sold separately. Availability of public wireless access points limited. Wi-Fi 7 (802.11BE) functionality requires compatible Windows 11 OS, compatible processor, and separately purchased Wi-Fi 7 router to support backwards compatibility with prior 802.11 specs. Available in countries where Wi-Fi 7 is supported. The specification for 802.11BE is a draft specification and is not final. If the final specification differs from the draft specification, it may affect the ability of the device to communicate with other 802.11BE devices.

²Intel 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>

WWAN

HP 5000 5G Solution WWAN²
HP 4000 4G LTE-Advanced Pro Cat 16³

Nano SIM card slot^{4,5}

²5G 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.

³Gigabit class Category 16 4G LTE module is optional and must be configured at the factory. Module designed for up to 1 Gbps download speeds as carriers deploy 5 carrier aggregation and 100Mhz channel bandwidth, requires activation and separately purchased service contract. Backwards compatible to HSPA 3G technologies. 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.

⁴All units have an internal SIM card slot but 'For WWAN' base units ship with antennas.

⁵Works with Windows 10 only.

LPWAN

Qualcomm 9205 LTE-M (CAT-M1 fSVC) (no Internet)*

*LPWAN (Mobile Narrowband - MNB) cards support the HP Protect & Trace with Wolf Connect service, but do not support mobile broadband/Internet use.

Near Field Communication (NFC) module

No Near Field Communication (NFC) module¹
NFC Mirage WNC XRAV-1

¹Sold separately or as an optional feature.

Features

AUDIO/MULTIMEDIA

Audio

Audio Tuning by Poly Studio

Dual stereo speakers with discrete amps

HP World Facing Microphone dual array digital microphones

Camera¹

5MP+IR Camera

Sensors

ALS (ambient light sensor)

Hall effect Sensor

¹ Sold separately or as an optional feature.

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

HP Privacy Keyboard – Full-size, backlit Privacy keyboard (required with Privacy panel)

Pointing Devices

Three button Touchpad

Function Keys

ESC: system information

F1 - Display Switching

F2 - Blank or Privacy

F3 - Brightness Down

F4 - Brightness Up

F5 - Audio Mute

F6 - Volume Down

F7 - Volume Up

F8 - Mic Mute

F9 - Blank or Backlight Toggle (for backlit keyboard)

F10 - Insert

F11 - Airplane Mode

F12 - HP Command Center

Power Button (with LED)

Delete

Microsoft Copilot key**

Hidden Keys

home

end

Fn+R - Break

Fn+S - Sys Rq

Fn+C - Scroll Lock

Fn+left/right arrow

*Backlit keyboard is an optional feature.

**Requires Windows 11 and an NPU. Timing of feature delivery and availability varies by market and device. Requires Microsoft account to log in. Where Copilot in Windows is not available, the Copilot key will lead to the Bing search engine. See <http://aka.ms/WindowsAIFeatures>

SOFTWARE AND SECURITY

Software

HP Easy Clean²

HP PC Hardware Diagnostics Windows

Touchpoint Customizer for Commercial

HP Smart Support¹⁸

HP Mac Address Manager

HP Hotkey Support

HP Support Assistant¹

HP Notifications

HP Privacy Settings

HP Power Manager¹⁹

Buy Microsoft Office (Sold separately)

Bing search for IE11

HP Noise Cancellation Software

Features

HP Z Light Space
Data Science Stack²⁰ (optional on select skus)
Battery Health Manager²¹

Manageability Features

HP Connect for Microsoft Endpoint Manager²⁶
HP Image Assistant Gen5 (download)
HP Manageability Integration Kit (download)¹²
HP Client Management Script Library (download)
HP Patch Assistant (download)²⁷
HP Driver Packs (download)
HP Cloud Recovery²⁸
HP Client Catalog (download)

Security Management

HP Wolf Security for Business¹⁵ includes:

HP Sure Click⁵
HP Sure Sense¹¹
HP Sure Run Gen5⁹
HP Sure Recover Gen6⁸
HP Sure Start Gen7¹³
HP Tamper Lock¹⁴
HP Sure Admin⁴
HP Client Security Manager Gen7³
HP Device Access Manager
HP Power On Authentication
Master Boot Record security
Pre-boot authentication
Windows Defender
Microsoft Bitlocker Encryption
Nano Security Lock Slot
Wolf Pro Security²⁵

BIOS

HP BIOSphere Gen6⁶
HP Secure Erase¹⁷
Absolute Persistence Module⁷
HP DriveLock & Automatic DriveLock
BIOS Update via Network
HP Wake on WLAN
Fingerprint Sensor (select models)³²
Secured-Core PC Enable¹⁶
Trusted Platform Module TPM 2.0 Embedded Security Chip

Security

TPM

Model: Infineon SLB9672VU2.0
Version: 15.21
Revision: TPM 2.0
FIPS 140-2 Compliant: Yes

Model: IFX SLB9672
Version: FW 15.22
Revision: N/A
FIPS 140-2 Compliant: Yes

Features

Smartcard Reader

Model Number: Alcor AU9560

FIPS 201 Compliant: Yes

¹ HP Support Assistant - Requires Windows and Internet Access.

² 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.

³ HP Client Security Manager Gen7 requires Windows and is available on select HP Pro, Elite and ZBook PCs. See product specifications for details.

⁴ HP Sure Admin requires Windows 10, 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.

⁵ HP Sure Click requires Windows 10 Pro or higher or Enterprise. See https://bit.ly/2PrLT6A_SureClick for complete details.

⁶ HP BIOSphere Gen6 is available on select HP Pro, Elite and ZBook PCs. See product specifications for details. Features may vary depending on the platform and configurations.

⁷ 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.

⁸ HP Sure Recover Gen6 with Embedded Reimaging is an optional feature which requires Windows 10 and higher must be configured at purchase. You must back up important files, data, photos, videos, etc. before use to avoid loss of data. Network based recovery using Wi-Fi is only available on PCs with Intel Wi-Fi Module

⁹ HP Sure Run Gen5 is available on select HP PCs and requires Windows 10 and higher.

¹⁰ HP Connection Optimizer requires Windows 10 and Windows 11.

¹¹ HP Sure Sense is available on select HP PCs with Windows 10 Pro, Windows 10 Enterprise, Windows 11 Pro, or Windows 11 Enterprise OS.

¹² HP Manageability Integration Kit can be downloaded from <https://ftp.ext.hp.com/pub/caps-softpaq/cmit/HPMIK.html>.

¹³ HP Sure Start Gen7 is available on select HP PCs and requires Windows 10 and higher

¹⁴ HP Tamper Lock must be enabled by the customer or your administrator.

¹⁵ HP Wolf Security for Business requires Windows 10 or 11 Pro 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.

¹⁶ 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.

¹⁷ HP 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™.

¹⁸ HP Smart Support requires HP TechPulse to be installed. For more information about how to enable or to download HP Smart Support, please visit <http://www.hp.com/smart-support>. HP Services Scan is provided thru Windows Update and will check entitlement on each hardware device to determine if an HP TechPulse-enabled service has been purchased, and will download applicable software automatically. HP TechPulse is a telemetry and analytics platform that provides critical data around devices and applications and is not sold as a standalone service. HP follows stringent GDPR privacy regulations and is ISO27001, ISO27701, ISO27017 and SOC2 Type2 certified for Information Security. Internet access is required. For full system requirements or to disable this feature, please visit <http://www.hpdaas.com/requirements>.

¹⁹ HP Power Manager requires Windows 10 and higher and can be downloaded from the Microsoft Store.

²⁰ HP Easy Clean requires Windows 10 and higher and can be downloaded from the Microsoft store.

²¹ Depending on the version available for your device and the setting you select, HP Battery Health Manager (BHM) will use a proprietary set of algorithms to optimize battery health during the life of the battery. New Commercial Notebooks come equipped with BHM set to "Let HP Manage My Battery Health" as the default. This setting will reduce charge capacity over time to optimize battery health and mitigate factors that can accelerate battery degradation. As a result of this reduction, battery runtime will decrease over time as available charge capacity is reduced. HP may, at any time, update HP Battery Health Manager to improve available settings, functionality, and performance. Refurbished products may have customized default settings to optimize user experience. For additional information on updating or modifying HP Battery Health Manager settings, please go to HP.COM/SUPPORT/BATTERY.

²⁵ HP Wolf Pro Security Edition is available preloaded on select SKUs, and, depending on the HP product purchased, includes a license with a term length communicated to you at purchase and in your order confirmation email. The HP Wolf Pro Security Edition software is licensed under the license terms of the HP Wolf Security Software - End-User license Agreement (EULA) that can be found at: https://support.hp.com/us-en/document/ish_3875769-3873014-16 as that EULA is modified by the following: 7. Term. Unless otherwise terminated earlier pursuant to the terms contained in this EULA, the license for the HP Wolf Pro Security Edition is effective upon 4 months after the date the HP Product was shipped by HP and will continue for the term communicated to you at purchase and in your order

Features

confirmation email (“Initial Term”). At the end of the Initial Term you may either (a) purchase a renewal license for the HP Wolf Pro Security Edition from HP.com, HP Sales or an HP Channel Partner, or (b) continue using the standard versions of HP Sure Click and HP Sure Sense at no additional cost with no future software updates or HP Support. Notwithstanding the foregoing, the license shall expire no later than one year after the fixed term of the subject license ends.

²⁶ 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.

²⁷ 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>.

²⁸ 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>.

³² HP Fingerprint Reader is an optional feature.

Features

POWER

Power Supply

HP Slim Smart 150W External Right Angle AC Power Adapter²

HP Slim Smart 200W External Right Angle AC Power Adapter²

HP Slim Smart 230W External Right Angle AC Power Adapter²

Not Included AC Adapter²

Battery

95Whr XL-Long Life Polymer Fast Charge* 8 cell Battery^{3,4}

Power Cord

1.83m Sticker Conventional Straight HF Power Cord

1.0m Premium Power Cord Sticker

1.0m Sticker Conventional Straight HF Power Cord

1.0m Premium Power Cord Sticker

Not Included Power Cord

Battery life

UMA

Up to 13:00 hrs¹

Discrete

TBD¹

*Recharges up to 50% within 30 minutes when the system is off or in standby mode when used with the power adapter provided with the notebook. Power adapter minimum of 65 watts required for battery capacities 56Whr or less. Power adapter minimum of 100 watts required for battery capacities greater than 56Whr and less than 83Whr. Power adapter minimum of 120 watts required for battery capacities greater than 83Whr and less than 100Whr. After charging has reached 90% capacity, charging speed will return to normal. Charging time may vary +/-10% due to System tolerance.

¹ battery life will vary depending on various factors including product model, configuration, loaded applications, features, use, wireless functionality, and power management settings. The maximum capacity of the battery will naturally decrease with time and usage. See www.bapco.com for additional details.

² Availability may vary by country.

³Battery is internal and not replaceable by customer. Serviceable by warranty.

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

Features

WEIGHTS & DIMENSIONS

Dimensions (w x d x h)

36.3 x 25.0 x 2.86 cm (non-touch)

14.29 x 9.86 x 1.12 in (non-touch)

36.3 x 25.0 x 2.77 cm (touch)

14.29 x 9.86 x 1.09 in (touch)

Weights***Product Weight- 95Whr**

Starting at 5.173 lbs (2.350 kg) (UMA)

Weight varies by configuration and components.

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

PORTS/SLOTS

Left side

1 power connector

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

1 SD 7.1 Media Card Reader

1 Mini DisplayPort™ 1.4 with UMA and Discrete Graphics

1 HDMI 2.1 (depends on graphics selection)**

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

MicroSD 7.1 supports next generation secure digital and is compatible to SD, SDHC, SDXC, SDUC media

*SuperSpeed USB 20Gbps is not available with Thunderbolt™ 4.

**HDMI cable sold separately.

Features

SERVICE AND SUPPORT

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>.

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

Certification and Compliance

ENERGY STAR® certified

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*

*External power supplies, power cords, cables and peripherals are not Low Halogen. Service parts obtained after purchase may not be Low Halogen.

SYSTEM UNIT

| | | |
|--|--------------------------------------|--|
| Stand-Alone Power Requirements (AC Power) | Nominal Operating Voltage | 19.5V |
| | Average Operating Power(idle) | System in idle mode |
| | Integrated graphics | CPU < 55W |
| | Discrete Graphics | Nvidia RTX A1000/A2000< 45W Nvidia RTX A3000/A4000/A5000< 80W |
| Temperature | Max Operating Power | < 230W |
| | 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. |
| Relative Humidity | Non-operating | -4° to 140° F (-20° to 60° C) |
| | Operating | 10% to 90%, non-condensing |
| | Non-operating | 5% to 95% (38.7° C (101.6° F) maximum wet bulb tempera-ture; non-condensing) |
| Shock | Operating | 40 G, 2 ms, half-sine |
| | Non-operating | 200G, 2ms, half sine |
| Random Vibration | Operating | 0.75grms |
| | Non-operating | 1.50grms |
| Maximum Altitude (unpressurized) | Operating | 3048m (10,000ft) |
| | Non-operating | 12192m (40,000ft) |

Features

| Planned Industry Standard Certifications | Regulatory Model Number | HSN-I50C |
|---|---------------------------------|-----------------------------|
| | CSA/UL 62368-1 | Yes |
| | CSA | Yes |
| | FCC/ICES/CISPR/VCCI | Yes |
| | ENERGY STAR® | Selected models |
| | EPEAT Gold | EPEAT Gold in United States |
| | TCO | Yes |
| | China CCC/SRRC | Yes |
| | Korea KCC/KC/KES | Yes |
| | Taiwan BSMI/NCC | Yes |
| | CE MARKING | Yes |
| | EAEU compliance | Yes |
| | CITC | Yes |
| | GOST | Yes |
| | Saudi Arabian Compliance | Yes |
| | Ukraine NsoC/TEC | Yes |

¹Configurations of the HP Zbook Fury 16 G11 Mobile Workstation PC that are ENERGY STAR® qualified are identified as HP Zbook Fury 16 G11 Mobile Workstation PC ENERGY STAR on HP websites and on <http://www.energystar.gov>.

²Based on US EPEAT® registration according to IEEE 1680.1-2018 EPEAT®. Status varies by country. Visit www.epeat.net for more information.

Technical Specifications – Displays

DISPLAYS

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

| | | |
|---|-------------------------|----------------------|
| 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.

16.0 in WQUXGA DRM (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 | |

Technical Specifications – Displays

| | |
|---|------------------------|
| Color Gamut Coverage | DCI-P3 100% |
| Color Depth | 8 |
| Viewing Angle | UWVA 85/85/85/85 |
| 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 PrivacyG4 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.

16.0 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.

16.0 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.

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 | 0.09 in (2.3 mm) | |
| | Width | 0.87 in (22 mm) | |
| | Weight | 15g | |
| | Interface | PCIe NVMe Gen4X4 | |
| | Performance | Minimum Sequential Read | Minimum 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 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 | Minimum Sequential Read | Minimum 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 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 | Minimum Sequential Read | Minimum 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 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 | Minimum Sequential Read Minimum 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 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 | Minimum Sequential Read Minimum 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 |

NOTE: For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 35 GB 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 | Minimum Sequential Read Minimum 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 |

Technical Specifications – Storage

**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 | Minimum Sequential Read Minimum 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 is reserved for system recovery software.

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

Technical Specifications – Networking

NETWORKING/COMMUNICATION

| | | |
|--|---|--|
| 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 802.3 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 1000bps 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 embedded eSIM | Intel® vPro® support with appropriate Intel® chipset components Support |

| | | |
|--|--|---|
| Intel® I219v 1 Gigabit Network Connection LOM (non-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 802.3 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 | |

Technical Specifications – Networking

| | |
|---|--|
| | IEEE 802.3x Flow Control (IEEE 802.3 clauses 31-32; configurable) |
| | IEEE 802.3az EEE (Energy Efficient Ethernet) |
| | IEEE 802.3i 10BASE-T |
| | IEEE 802.3u 100BASE-TX |
| | IEEE 802.3ab 1000BASE-T |
| | IEEE 802.3bz 2.5GBASE-T |
| 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 1000bps 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 embedded eSIM | Intel® vPro® support with appropriate Intel® chipset components Support |

Intel BE200 Wi-Fi 7 + Bluetooth® 5.4 wireless card M.2 320MHz PCIe World-wide 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 Frequency Band

Wi-Fi certified
802.11b/g/n/ax/be
• 2.402 – 2.482 GHz
802.11a/n/ac/ax/be
• 4.9 – 4.95 GHz (Japan)
• 5.15 – 5.25 GHz
• 5.25 – 5.35 GHz
• 5.47 – 5.725 GHz

Technical Specifications – Networking

| | |
|------------------------------------|--|
| | <ul style="list-style-type: none">• 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 | <ul style="list-style-type: none">• 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• 802.11be : max 5.76Gbps |
| Modulation | Direct Sequence Spread Spectrum OFDM, BPSK, QPSK, CCK, 16-QAM, 64-QAM, 256-QAM, 1024QAM, 4096QAM |
| Security¹ | <ul style="list-style-type: none">• IEEE and WiFi compliant 64 / 128 bit WEP encryption for a/b/g mode only• AES-CCMP: 128 bit in hardware• 802.1x authentication• WPA, WPA2: 802.1x. WPA-PSK, WPA2-PSK, TKIP, and AES.• WPA2 certification• WPA3 certification• IEEE 802.11i• WAPI |
| Network Architecture Models | Ad-hoc (Peer to Peer) Infrastructure (Access Point Required) |
| Roaming | IEEE 802.11 compliant roaming between access points |
| Output Power² | <ul style="list-style-type: none">• 802.11b, 1Mbps : +17dBm minimum• 802.11g, 6Mbps : +16dBm minimum• 802.11a, 6Mbps : +17dBm minimum• 802.11n, MCS7(HT20) : +14dBm minimum• 802.11n, MCS7(HT40) : +13.5dBm 30nterna• 802.11ac MCS9(VHT20) : 13.5dBm minimum• 802.11ac MCS9(VHT40) : +13.5dBm minimum• 802.11ac MCS9(VHT80) : +12.5dBm minimum• 802.11ac MCS9(VHT160) : +10.5dBm minimum• 802.11ax MCS11(HE20)(6GHz) : +11.5dBm minimum• 802.11ax MCS11(HE40)(6GHz) : +7.5dBm minimum• 802.11ax MCS11(HE80)(6GHz) : +7.5dBm minimum• 802.11ax MCS11(HE160)(6GHz) : +7.5dBm minimum• 802.11be MCS13(EHT20)(6GHz) : 11.5dBm• 802.11be MCS13(EHT40)(6GHz) : 7.5dBm• 802.11be MCS13(EHT80)(6GHz) : 7.5dBm• 802.11be MCS13(EHT160)(6GHz) : 6.5dBm• 802.11be MCS13(EHT320)(6GHz) : 4.5dBm |
| Power Consumption | <ul style="list-style-type: none">• Transmit mode 3.4 W• Receive mode 1.8 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 |

Technical Specifications – Networking

| | |
|--|--|
| Receiver Sensitivity³ | <ul style="list-style-type: none"> •802.11b, 1Mbps : -93.5dBm maximum •802.11b, 11Mbps : -85dBm maximum •802.11a/g, 6Mbps : -90.5dBm maximum •802.11a/g, 54Mbps : -72.5dBm maximum •802.11n, MCS0(HT20) : -90dBm maximum •802.11n, MCS7(HT20) : -71.5dBm maximum •802.11n, MCS0(HT40) : -88.5dBm maximum •802.11n, MCS7(HT40) : -68.5dBm maximum •802.11ac, MCS9(VHT20) : -88.5dBm maximum •802.11ac, MCS9(VHT40) : -65.5dBm maximum •802.11ac, MCS9(VHT80) : -60.5dBm maximum •802.11ac, MCS9(VHT160) : -58.5dBm maximum •802.11ax, MCS11(HE20)(6GHz) : -59.5dBm maximum •802.11ax, MCS11(HE40)(6GHz) : -56.5dBm maximum •802.11ax, MCS11(HE80)(6GHz) : -53.5dBm maximum •802.11ax, MCS11(HE160)(6GHz) : -51.5dBm maximum •802.11be, MCS13(EHT20)(6GHz) : -55.5dBm maximum •802.11be, MCS13(EHT40)(6GHz) : -53.5dBm maximum •802.11be, MCS13(EHT80)(6GHz) : -51.5dBm maximum •802.11be, MCS13(EHT160)(6GHz) : -48.5dBm maximum •802.11be, MCS13(EHT320)(6GHz) : -45.5dBm maximum |
| Antenna Type | High efficiency antenna with spatial diversity Two embedded tri-band 2.4/5/6 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 : 3.07g 2. Type 1216: 0.75g |
| Operating Voltage | 3.3v +/- 5% |
| Temperature | Operating 14° to 158° F (-10° to 70° C) Non-operating -40° to 176° F (-40° to 70° C) |
| Humidity | Operating 10% to 90% (non-condensing) Non-operating 5% to 95% (non-condensing) |
| Altitude | Operating Non- 0 to 10,000 ft (3,048 m) operating 0 to 50,000 ft (15,240 m) |
| LED Activity | LED Amber – Radio Off; LED Off – Radio ON |
| HP Integrated Module with Bluetooth 4.0/4.1/4.2/5.0/5.1/5.2/5.3/5.4 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 I Bluetooth device with a maximum transmit power of +15.5 dBm for BR and +13dBm for EDR. |

Technical Specifications – Networking

| | |
|--|---|
| Power Consumption | Peak (Tx): 330 mW Peak (Rx): 230 mW Selective Suspend: 17 mW |
| Bluetooth Software Supported | 1. Microsoft Windows Bluetooth Software 2. Linux/Chrome OS Bluetooth Software. |
| Link Topology | |
| Power Management | ACPI and PCI Express compliant power management 802.11 compliant power saving mode FCC (47 CFR) Part 15C/E, Section 15.247, 15.249, 15.407 |
| Certifications | ETSI 300 328, ETSI 301 893, ETSI 303 687 |
| Power Management Certifications | ETS 300 328, ETS 300 826 Low Voltage Directive IEC950 UL, CSA, and CE Mark |
| Bluetooth Profiles Supported | Bluetooth® 4.1-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 Bluetooth® 4.2 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) Bluetooth® 5.2 ESR9/10 Compliance LE Advertisement Extensions Channel Selection Algo Limited High Duty Cycle Non-Connectable Advertising 2Mbps LE LE Long Range Bluetooth® 5.3 Host to Controller Encryption Key Control Enhancements Compliance to the latest Errata Section 12.3 of Bluetooth® 5.3 specification |

[1] Wi-Fi 7: Wireless access point and Internet service required and sold separately. Availability of public wireless access points limited. Wi-Fi 7 (802.11BE) functionality requires compatible Windows 11 OS, compatible processor, and separately purchased Wi-Fi 7 router to support backwards compatibility with prior 802.11 specs. Available in countries where Wi-Fi 7 is supported. The specification for 802.11BE is a draft specification and is not final. If the final specification differs from the draft specification, it may affect the ability of the device to communicate with other 802.11BE devices.

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

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

Technical Specifications – Networking

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

| | | |
|---|--|---|
| Intel BE200 Wi-Fi 7 + Bluetooth® 5.4 wireless card M.2 320MHz PCIe World-wide WLAN non-vPro® [1] | Wireless LAN Standards | IEEE 802.11a IEEE 802.11b IEEE 802.11g IEEE 802.11n IEEE 802.11ac IEEE 802.11ax IEEE 802.11be IEEE 802.11d IEEE 802.11e IEEE 802.11h IEEE 802.11i IEEE 802.11k IEEE 802.11r IEEE 802.11v |
| | Interoperability Frequency Band | Wi-Fi certified 802.11b/g/n/ax/be <ul style="list-style-type: none"> • 2.402 – 2.482 GHz 802.11a/n/ac/ax/be <ul style="list-style-type: none"> • 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 | <ul style="list-style-type: none"> • 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 • 802.11be : max 5.76Gbps |
| | Modulation | Direct Sequence Spread Spectrum OFDM, BPSK, QPSK, CCK, 16-QAM, 64-QAM, 256-QAM, 1024QAM, 4096QAM |
| | Security¹ | <ul style="list-style-type: none"> • 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 |

Technical Specifications – Networking

| | |
|---|---|
| Network Architecture Models | Ad-hoc (Peer to Peer) Infrastructure (Access Point Required) |
| Roaming | IEEE 802.11 compliant roaming between access points |
| Output Power² | <ul style="list-style-type: none">• 802.11b, 1Mbps : +17dBm minimum• 802.11g, 6Mbps : +16dBm minimum• 802.11a, 6Mbps : +17dBm minimum• 802.11n, MCS7(HT20) : +14dBm minimum• 802.11n, MCS7(HT40) : +13.5dBm 34nterna• 802.11ac MCS9(VHT20) : 13.5dBm minimum• 802.11ac MCS9(VHT40) : +13.5dBm minimum• 802.11ac MCS9(VHT80) : +12.5dBm minimum• 802.11ac MCS9(VHT160) : +10.5dBm minimum• 802.11ax MCS11(HE20)(6GHz) : +11.5dBm minimum• 802.11ax MCS11(HE40)(6GHz) : +7.5dBm minimum• 802.11ax MCS11(HE80)(6GHz) : +7.5dBm minimum• 802.11ax MCS11(HE160)(6GHz) : +7.5dBm minimum• 802.11be MCS13(EHT20)(6GHz) : 11.5dBm• 802.11be MCS13(EHT40)(6GHz) : 7.5dBm• 802.11be MCS13(EHT80)(6GHz) : 7.5dBm• 802.11be MCS13(EHT160)(6GHz) : 6.5dBm• 802.11be MCS13(EHT320)(6GHz) : 4.5dBm |
| Power Consumption | <ul style="list-style-type: none">• Transmit mode 3.4 W• Receive mode 1.8 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 Sensitivity³ | <ul style="list-style-type: none">• 802.11b, 1Mbps : -93.5dBm maximum• 802.11b, 11Mbps : -85dBm maximum• 802.11a/g, 6Mbps : -90.5dBm maximum• 802.11a/g, 54Mbps : -72.5dBm maximum• 802.11n, MCS0(HT20) : -90dBm maximum• 802.11n, MCS7(HT20) : -71.5dBm maximum• 802.11n, MCS0(HT40) : -88.5dBm maximum• 802.11n, MCS7(HT40) : -68.5dBm maximum• 802.11ac, MCS9(VHT20) : -88.5dBm maximum• 802.11ac, MCS9(VHT40) : -65.5dBm maximum• 802.11ac, MCS9(VHT80) : -60.5dBm maximum• 802.11ac, MCS9(VHT160) : -58.5dBm maximum• 802.11ax, MCS11(HE20)(6GHz) : -59.5dBm maximum• 802.11ax, MCS11(HE40)(6GHz) : -56.5dBm maximum• 802.11ax, MCS11(HE80)(6GHz) : -53.5dBm maximum• 802.11ax, MCS11(HE160)(6GHz) : -51.5dBm maximum• 802.11be, MCS13(EHT20)(6GHz) : -55.5dBm maximum• 802.11be, MCS13(EHT40)(6GHz) : -53.5dBm maximum• 802.11be, MCS13(EHT80)(6GHz) : -51.5dBm maximum• 802.11be, MCS13(EHT160)(6GHz) : -48.5dBm maximum• 802.11be, MCS13(EHT320)(6GHz) : -45.5dBm maximum |
| Antenna Type | High efficiency antenna with spatial diversity Two embedded tri-band 2.4/5/6 GHz antennas are provided to the |

Technical Specifications – Networking

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|--|--|
| | 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 : 3.07g 2. Type 1216: 0.75g |
| Operating Voltage | 3.3v +/- 5% |
| Temperature | Operating 14° to 158° F (–10° to 70° C) Non-operating –40° to 176° F (–40° to 70° C) |
| Humidity | Operating 10% to 90% (non-condensing) Non-operating 5% to 95% (non-condensing) |
| Altitude | Operating Non- 0 to 10,000 ft (3,048 m) operating 0 to 50,000 ft (15,240 m) |
| LED Activity | LED Amber – Radio OFF; LED OFF – Radio ON |
| HP Integrated Module with Bluetooth 4.0/4.1/4.2/5.0/5.1/5.2/5.3/5.4 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 1 Bluetooth device with a maximum transmit power of +15.5 dBm for BR and +13dBm for EDR. |
| Power Consumption | Peak (Tx): 330 mW Peak (Rx): 230 mW Selective Suspend: 17 mW |
| Bluetooth Software Supported | 1. Microsoft Windows Bluetooth Software 2. Linux/Chrome OS Bluetooth Software. |
| Link Topology | |
| Power Management | ACPI and PCI Express compliant power management 802.11 compliant power saving mode FCC (47 CFR) Part 15C/E, Section 15.247, 15.249, 15.407 |
| Certifications | ETSI 300 328, ETSI 301 893, ETSI 303 687 |
| Power Management Certifications | ETS 300 328, ETS 300 826 Low Voltage Directive IEC950 UL, CSA, and CE Mark |
| Bluetooth Profiles Supported | Bluetooth® 4.1-ESR 5/6/7 Compliance LE Link Layer Ping LE Dual Mode LE Link Layer LE Low Duty Cycle Directed Advertising |

Technical Specifications – Networking

LE L2CAP Connection Oriented Channels
Train Nudging & Interlaced Scan
Bluetooth® 4.2 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)
Bluetooth® 5.2
ESR9/10 Compliance
LE Advertisement Extensions
Channel Selection Algo
Limited High Duty Cycle Non-Connectable Advertising
2Mbps LE
LE Long Range
Bluetooth® 5.3
Host to Controller Encryption Key Control Enhancements
Compliance to the latest Errata Section 12.3 of Bluetooth® 5.3 specification

[1] Wi-Fi 7: Wireless access point and Internet service required and sold separately. Availability of public wireless access points limited. Wi-Fi 7 (802.11BE) functionality requires compatible Windows 11 OS, compatible processor, and separately purchased Wi-Fi 7 router to support backwards compatibility with prior 802.11 specs. Available in countries where Wi-Fi 7 is supported. The specification for 802.11BE is a draft specification and is not final. If the final specification differs from the draft specification, it may affect the ability of the device to communicate with other 802.11BE devices.

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

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

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

* 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.

HP 5G Sub-6 Cat 19 WWAN eSIM

Technology/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)

Technical Specifications – Networking

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)
n30: 2305 to 2315 MHz (UL) 2350 to 2360 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)
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

NR Sub6G rel15
200MHz 2 DLCA, 256 QAM
200MHz 2 ULCA, 256 QAM
15KHz/30KHz SCS for FDD/TDD
LTE Rel15
100MHz 5 DLCA, 256 QAM
40MHz 2 ULCA, 256 QAM
UMTS Rel8

GPS

GPS only support L1 C/A)

GPS bands

GPS: L1 (1575.42MHz)

Technical Specifications – Networking

| | |
|---|---|
| | GLONASS: L1 (1602MHz) BeidouB1(1561.098MHz) Galileo E1 (1575.42) QZSS(1575.42 MHz) |
| Maximum data rates | Sub-6 SA Peak DL 4.67Gbps/UL 1.25Gbps Sub-6 NSA Peak DL 3.74Gbps/UL 835Mbps LTE Peak DL 1.6Gbps (CAT19)/UL 211Mbps (CAT18) UMTS/HSPA+ DL DC-HSPA+: 42 Mbps (CAT24)/UL 11.5 Mbps (CAT7) |
| Maximum output power | 23 dBm in all band except (n30 = 22dBm & n48=21dBm & n77=25dBm & n41/n77/n78 = 26dBm) LTE: 23 dBm in all band except (B30 = 22dBm & B48=21 dBm & B41=26dBm) UMTS: 23.5 dBm |
| Maximum power consumption | 3500 mA (peak) ; 1674mA (average) |
| Form Factor | M.2, 3052-S3 Key B |
| Weight | 8.7g |
| Dimensions (Length x Width x Thickness) | 52 mm x 30 mm x 2.3 mm |
| embedded eSIM | Support |

* 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.

HP 4G LTE-A Pro Cat16 WWAN eSIM

| | |
|------------------------------------|---|
| 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) |
|------------------------------------|---|

Technical Specifications – Networking

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 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)

Wireless protocol standards

3GPP LTE Rel15
 LTE Specification, 100MHz 5 DLCA, 256 QAM, DL 1.0Gbps (CAT16)/ 40MHz 2 ULCA, 256 QAM, UL 211Mbps (CAT18)
 WCDMA 3GPP Release 8 UMTS Specification, DL UMTS: 384 kbps/UL 384 kbp, DL DC-HSPA+: 42 Mbps (CAT24)/UL 11.5 Mbps (CAT7)

GPS GPS Bands

WCDMA R99,
 3GPP Release 5, 6, 7 and 8 UMTS Specification
 Standalone, A-GPS (MS-A, MS-B)
 GPS: L1 (1575.42MHz)
 GLONASS: L1 (1602MHz)
 BeidouB1(1561.098MHz)
 Galileo E1 (1575.42)
 QZSS(1575.42 MHz)

Maximum Data Rates

LTE: ue-CategoryDL 16, (DL : 1 Gbps)
 ue-CategoryUL 18 , (UL: 211Mbps)
 DC-HSPA+: 42 Mbps (Download), 11.5 Mbps (Upload)

Maximum Output Power

HPUE: Not supported
 LTE: 23 dBm in all band except (B30= 22dBm& B48= 21dBm)
 UMTS: 23.5 dBm

Maximum Power Consumption

M.2, 3052-S3 Key B

Form Factor

8 g

Weight

52 mm × 30 mm × 2.3 mm

Dimensions

(Length x Width x Thickness)

M.2, 3052-S3 Key B

embedded eSIM

Support

Technical Specifications – Networking

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

**Gigabit class Category 16 4G LTE module is optional and must be configured at the factory. Module designed for up to 1 Gbps download speeds as carriers deploy 5 carrier aggregation and 100MHz channel bandwidth, requires activation and separately purchased service contract. Backwards compatible to HSPA 3G technologies. 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.

Qualcomm 9205

| | |
|---|---|
| Technology/Operating bands* | FDD LTE: 2100 (Band 1), 1900 (Band 2), 1800 (Band 3), 1700/2100 (Band 4), 850 (Band 5), 900 (Band 8), 700 (Band 12 lower), 700 (Band 13 upper), 700 (Band 14 upper), 850 (Band 18 lower), 850 (Band 19 upper), 800 (Band 20), 1900 (Band 25), 850 (Band 26), 800 (Band 27), 700 (Band 28), 1700/2100 (Band 66), 700 (band 85) MHz. GSM/GPRS/EGPRS: 850, 900, 1800, 1900MHz. |
| Wireless protocol standards | l 3GPP TS 51.010-1 V10.5.0: Mobile Station (MS) conformance specification; Part 1: Conformance specification l 3GPP TS 36.521-1 V14.3.0: User Equipment (UE) conformance specification; Radio transmission and reception; Part 1: Conformance testing l 3GPP TS 21.111 V10.0.0: USIM and IC card requirements l 3GPP TS 51.011 V4.15.0: Specification of the Subscriber Identity Module –Mobile Equipment (SIM-ME) interface l 3GPP TS 31.102 V10.11.0: Characteristics of the Universal Subscriber Identity Module (USIM) application l 3GPP TS 31.11 V10.16.0: Universal Subscriber Identity Module (USIM) Application Toolkit (USAT) l 3GPP TS 36.124 V10.3.0: Electro Magnetic Compatibility (EMC) requirements for mobile terminals and ancillary equipment l 3GPP TS 27.007 V10.0.8: AT command set for User Equipment (UE) l 3GPP TS 27.005 V10.0.1: Use of Data Terminal Equipment - Data Circuit terminating Equipment (DTE– DCE) interface for Short Message Service (SMS) and Cell Broadcast Service (CBS) |
| GPS | Standalone GPS/Beidou/Glonass, A-GPS (MS-A, MS-B) |
| GPS Bands | 1575.42 MHz ± 1.023 MHz, GLONASS 1596-1607MHz, Beidou 1561.098 MHz |
| Maximum Data Rates | LTE FDD: 375 Kbps (Download), 1119 Kbps (Upload) GSM: - GPRS: 107 Kbps (Download), 85.6 Kbps (Upload) - EGPRS: 296 Kbps (Download), 236.8 Kbps (Upload) |
| Maximum Output Power | LTE: 21.5 dBm in all band GSM:34dBm |
| Maximum Power Consumption | LT E: 1,200 mA (peak); 900 mA (average) HSPA +: 1,100 mA (peak); 800 mA (average) |
| Form Factor | M.2, 2242-S3 Key B |
| Weight | 5.5 g |
| Dimensions (Length x Width x Thickness) | 22 x 42 x 2.3 mm |
| embedded eSIM | Support |

NFC Mirage module (NXP NPC300 I2C 10mmx17mm)

Technical Specifications – Networking

| | | |
|---|---|---|
| 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 Reader (PCD-VCD) Mode(1) | Tag Type 1, Type 2, Type3 and Type 4, NFCIP-1 and NFCIP-2 ISO/IEC 14443 A ISO/IEC 14443 B ISO/IEC 15693 MIFARE 1K MIFARE 4K MIFARE DESFire FeliCa Jewel and Topaz cards | |
| 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 | |
| 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 | 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. | |

AUDIO

HD Stereo Codec ALC3315

Technical Specifications – Networking

| | |
|---|--|
| Audio I/O Ports | Headset connector supports a CTIA |
| Internal Speaker Amplifier | Using External AMP for 42 internal speaker. |
| Multi-streaming Capable Sampling | Playback multi-streaming can be enabled in the audio control panel to allow independent audio streams to be sent to/from the front and rear jacks or integrated speaker. |
| Wavetable Syntheses | DAC: 48000Hz ADC: Internal MIC: 48000Hz External MIC: 44100Hz |
| Analog Audio | Support 3.5mm Headset : CTIA only and Headphone-out |
| # of Channels on Line-Out | No line out |
| Internal Speaker | Yes |

FINGERPRINT READER

| | |
|------------------------------------|---|
| Sensor vendor | Synaptics FS7605 |
| Sensor type | Capacitive |
| DPI resolution | 363 DPI |
| Scan area | 104 x 86 pixels |
| False Rejection Rate | <3% |
| False Acceptance Rate | < 0.001% |
| Mobile Voltage Operation | 3.0V to 3.6V |
| Operating Temperature | 0°~60°C |
| Current Consumption Image | 100mA max |
| Low Latency Wait For Finger | 260uA |
| Capture Rate | Image transmitter output frequency 9.6MHz |
| ESD Resistance | IEC 61000-4-2 4B (+15KV) |
| 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: 330g +/- 10g | |
| | Input | Input Efficiency | 88% at 115 Vac and 89% at 230Vac |
| | | Input frequency range | 47 ~ 63 Hz |
| | Output | Input AC current | 2.7 A at 90 Vac and Maximum Load |
| | | Output power | 150W |
| | | DC output | 19.5V |
| | | Hold-up time | 5ms at 115 Vac input |

Technical Specifications – Networking

| | | | |
|---|--------------------------------------|---|----------------------------------|
| | | Output current limit | <16.0A |
| | | AC Inlet Type | C6 |
| | | DC Cable Connector | 4.5mm Barrel Type |
| | 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 | 20% to 95% |
| | | Storage Humidity | 10% to 95% |
| | EMI and Safety Certifications | CE Mark-- full compliance with LVD and EMC directives Worldwide safety standards-- IEC60950-1 and IEC62368-1 : 2018, EN62368-1:2014+A11, UL62368-1 Agency approvals-- C-UL-US, TUV/GS, TUV/PSE, EN55032 Class B, FCC Class B, CISPR32 Class B, CCC and CECP, CU(EAC), EAEU, KCC(Safety+EMC), NOM-001 and 029 NYCE, nRcan, NRCS, ISC, SEC, PSB, Argentina S-mark, Australia GEMS and RCM, BIS, BSMI, UAE, UKCA DoC | |
| HP 200W Slim 4.5 mm PFC Right Angle Smart (3-pin) AC Power Adapter | Dimensions | 165x79x25.4mm | |
| | Weight | unit: 530g +/- 10g | |
| | Input | Input Efficiency | 88% at 115 Vac and 89% at 230Vac |
| | | Input frequency range | 47 ~ 63 Hz |
| | | Input AC current | 3.0 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 |
| | | AC Inlet Type | C14 |
| | | DC Cable Connector | 4.5mm Barrel Type |
| | 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 | 20% to 95% |
| | | Storage Humidity | 10% to 95% |
| | EMI and Safety Certifications | CE Mark-- full compliance with LVD and EMC directives Worldwide safety standards-- IEC60950-1 and IEC62368-1 : 2018, EN62368-1:2014+A11, UL62368-1 Agency approvals-- C-UL-US, TUV/GS, TUV/PSE, EN55032 Class B, FCC Class B, CISPR32 Class B, CCC and CECP, CU(EAC), EAEU, KCC(Safety+EMC), NOM-001 and 029 NYCE, nRcan, NRCS, ISC, SEC, PSB, Argentina S-mark, Australia GEMS and RCM, BIS, BSMI, UAE, UKCA DoC | |
| HP 230W Slim 4.5 mm PFC Right Angle Smart (3-pin) AC Power Adapter | Dimensions | 180x88x25.4mm | |
| | Weight | unit: 625g +/- 10g | |
| | Input | Input Efficiency | 88% at 115 Vac and 89% at 230Vac |

Technical Specifications – Networking

| | | |
|--|--|---|
| | 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 |
| | AC Inlet Type | C14 |
| | DC Cable Connector | 4.5mm Barrel Type |
| 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 | 20% to 95% |
| | Storage Humidity | 10% to 95% |
| EMI and Safety Certifications | CE Mark-- full compliance with LVD and EMC directives | |
| | Worldwide safety standards-- IEC60950-1 and IEC62368-1 : 2018, EN62368-1:2014+A11, UL62368-1 | |
| | Agency approvals-- C-UL-US, TUV/GS, TUV/PSE, EN55032 Class B, FCC Class B, CISPR32 Class B, CCC and CECP, CU(EAC), EAEU, KCC(Safety+EMC), NOM-001 and 029 NYCE, nRcan, NRCS, ISC, SEC, PSB, Argentina S-mark, Australia GEMS and RCM, BIS, BSMI, UAE, UKCA DoC | |
| 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.

**Recharges up to 50% within 30 minutes when the system is off or in standby mode when used with the power adapter provided with the notebook. Power adapter minimum of 65 watts required for battery capacities 56Whr or less. Power adapter minimum of 100 watts required for battery capacities greater than 56Whr and less than 83Whr. Power adapter minimum of 120 watts required for battery capacities greater than 83Whr and less than 100Whr. After charging has reached 90% capacity, charging speed will return to normal. Charging time may vary +/-10% due to System tolerance.

Technical Specifications – Environmental

ENVIRONMENTAL DATA

Eco-Label Certifications & declarations

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

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

Sustainable Impact Specifications

- [Product Carbon Footprint](#)
- Ocean-bound plastic in SPEAKER
- 24% post-consumer recycled plastic
- 80% recycled metal
- External Power Supply 90% Efficiency
- Low halogen
- Outside Box and corrugated cushions are 100% sustainably sourced and recyclable
- Molded Paper Pulp Cushion inside box is 100% sustainably sourced and recyclable.
- Bulk packaging available

System Configuration

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

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

| | 115VAC, 60Hz | 230VAC, 50Hz | 100VAC, 50Hz |
|-------------------------------|--------------|--------------|--------------|
| Normal Operation (Short idle) | 6.32 W | 4.86 W | 7.69 W |
| Normal Operation (Long idle) | 2.37 W | 1.41 W | 2.03 W |
| Sleep | 2.37 W | 1.41 W | 2.03 W |
| Off | 0.36 W | 0.39 W | 0.36 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) | 16.57 BTU/hr | 21.55 BTU/hr | 26.22 BTU/hr |
| Normal Operation (Long idle) | 4.81 BTU/hr | 8.08 BTU/hr | 6.92 BTU/hr |
| Sleep | 4.81 BTU/hr | 8.08 BTU/hr | 6.92 BTU/hr |
| Off | 1.33 BTU/hr | 1.23 BTU/hr | 1.23 BTU/hr |

Technical Specifications – Environmental

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

| Declared Noise Emissions (in accordance with ISO 7779 and ISO 9296) | Sound Power (L _{wAd} , bels) | Sound Pressure (L _{pAm} , decibels) |
|---|--|---|
| Typically Configured – Idle | 2.9 | 20.8 |
| Fixed Disk – Random writes | 2.9 | 21.0 |
| Optical Drive – Sequential reads | 2.9 | 21.0 |

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 92.4% recycle-able when properly disposed of at end of life.

Packaging Materials

| | | |
|------------------|---------------------------------------|-------|
| External: | PAPER/Corrugated | 363 g |
| | PAPER/Molded pulp | 160 g |
| Internal: | PAPER/PAPER | 3 g |
| | PLASTIC/Polyethylene low density-LDPE | 17g |

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

The corrugated paper packaging materials contains at least 56.3% recycled content.

RoHS Compliance

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

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

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

To obtain a copy of the HP RoHS Compliance Statement, see [HP RoHS position statement](#).

Technical Specifications – Environmental

Material Usage

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

- 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 (PBEBs)
- Polybrominated Biphenyl Oxides (PBBOs)
- Polychlorinated Biphenyl (PCB)
- Polychlorinated Terphenyls (PCT)
- Polyvinyl Chloride (PVC) – except for wires and cables, and certain retail packaging has been voluntarily removed from most applications.
- Radioactive Substances
- Tributyl Tin (TBT), Triphenyl Tin (TPT), Tributyl Tin Oxide (TBTO)

Packaging Usage

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

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

End-of-life Management and Recycling

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

The EU WEEE directive (2002/95/EC) requires manufacturers to provide treatment information for each product type for use by treatment facilities. This information (product disassembly instructions) is posted on the Hewlett Packard web site at: <http://www.hp.com/go/recyclers>.

Technical Specifications – Environmental

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

HP Inc. Corporate Environmental Information

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

Global Citizenship Report

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

Eco-label certifications

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

ISO 14001 certificates:

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

and

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

Footnotes

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

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

| Type | Description | Part # |
|-------------------------|--|---------|
| Audio/Video | TBD | |
| Bags and Cases | HP Renew Business 17.3 Laptop Backpack | 3E2U5AA |
| | HP Renew Business 17.3 Laptop Bag | 3E2U6AA |
| | HP Renew Executive 16 Laptop Backpack | 6B8Y1AA |
| | HP Renew Executive 16 Laptop Bag | 6B8Y2AA |
| | HP Campus XL Marble Stone Backpack | 7J592AA |
| | HP Campus XL Marble Stone Backpack | 7K0E2AA |
| | HP Campus XL Tie Dye Backpack | 7J593AA |
| | HP Campus XL Tie Dye Backpack | 7K0E3AA |
| Docking station | HP Thunderbolt 280W G4 Dock w/Combo Cable | 4J0G4AA |
| | HP Thunderbolt 280W TAA G4 Dock w/Combo Cable | 4J0J9AA |
| Adapter / Dongle | HP HDMI to VGA Adapter | H4F02AA |
| | HP USB-C to USB 3.0 Adapter | N2Z63AA |
| | HP USB-C to DisplayPort Adapter | N9K78AA |
| | HP USB-C to VGA Adapter | N9K76AA |
| | HP USB-C to VGA Adapter | P7Z54AA |
| | HP USB-C to HDMI 2.0 Adapter | 1WC36AA |
| | HP USB-C to HDMI 2.0 Adapter | 2PC54AA |
| | HP 7.4 mm to 4.5 DC dongle | K0Q39AA |
| | HP USB-C to RJ45 Adapter G2 | 4Z527AA |
| | HP USB-C to RJ45 Adapter G2 | 4Z534AA |
| | HP USB 3.0 to Gig RJ45 Adapter G2 | 4Z727AA |
| | HP USB-C to DisplayPort Adapter G2 | 8Y8Y1AA |
| | HP USB-C to USB-C 100W Cable | 5AR72AA |
| Hub | HP USB-C to USB-A Hub | Z6A00AA |
| Keyboard/Combo | TBD | |
| Mouse | TBD | |
| Power | HP zBook 230W Slim Smart 4.5mm AC Adapter | 6E6M1AA |
| Commodity | HP 2TB PCIe-4x4 NVMe TLC M.2 Solid State Drive | 6D8L6AA |
| | 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 |

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

HP Nano Combination Cable Lock

63B28AA

HP Essential Nano Combination Cable Lock

63B31AA

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| Date of change: | Version History: | | Description of change: |
|------------------------|-------------------------|---------|--|
| April 24, 2024 | From v1 to v2 | Added | ENVIRONMENTAL DATA section |
| May 11, 2024 | From v2 to v3 | Changed | WEIGHTS & DIMENSIONS section |
| July 18, 2024 | From v3 to v4 | Changed | At A Glance, DISPLAY, SOFTWARE AND SECURITY sections |
| July 18, 2024 | From v4 to v5 | Changed | GRAPHICS, DRIVE CONTROLLERS sections |
| July 18, 2024 | From v5 to v6 | Changed | Format |
| August 21, 2024 | From v6 to v7 | Changed | NETWORKING/COMMUNICATIONS section |
| October 8, 2024 | From v7 to v8 | Changed | DRIVE CONTROLLERS section |