Overview

HP ProDesk 2 Tower G1a E Desktop AI PC



1. Slim-height Bay - supporting an optical disk drive (Optional)
2. Power Button
3. Combo jack, Headphone/ Microphone
4. (2) SuperSpeed USB 5Gbps signaling rate port[1]
5. (2) SuperSpeed USB 10Gbps signaling rate port[1]
6. (1) USB-C 3.2 G1 (5G)

Not shown

(1) PCI Express 4.0 x16[2]
(1) PCI Express 3.0 x1
(1) M.2 for WLAN
(1) M.2 2280 storage

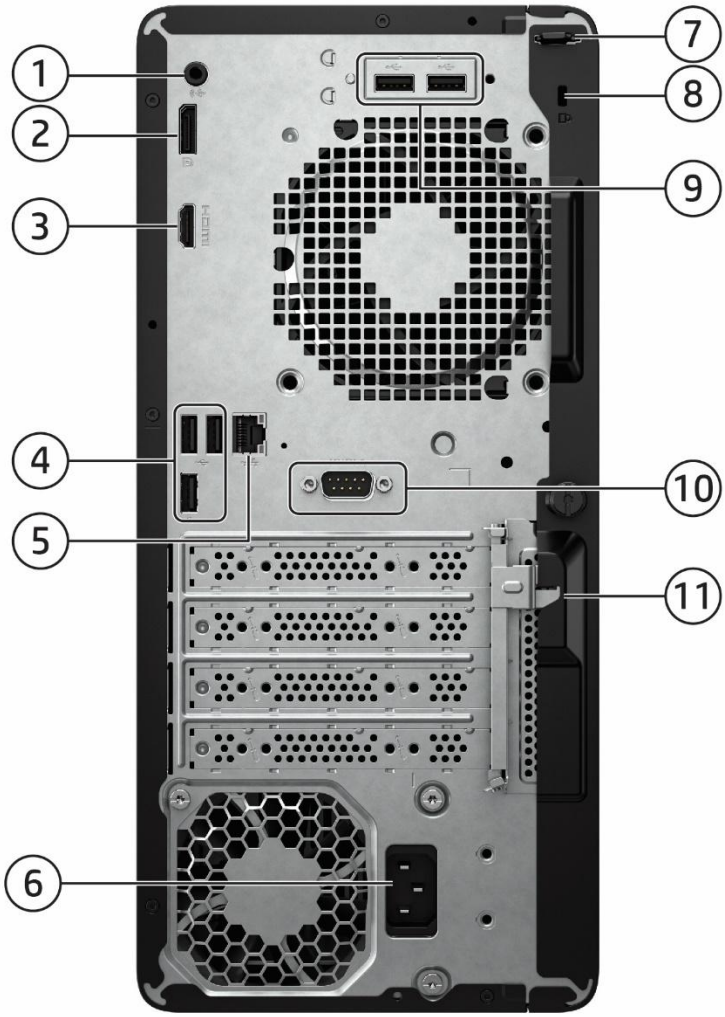
Bays

(1) 3.5" internal HDD with bay (Optional)
(1) 9.5mm internal optical drive bay

1. SuperSpeed USB 10Gbps = USB 3.2 Gen2. SuperSpeed USB 5Gbps = USB 3.2 Gen1.
2. Support discrete graphic cards and storage devices only.

Overview

HP ProDesk 2 Tower G1a E Desktop AI PC



1. Audio Line-out- retask as Line-in
2. DisplayPort 1.4a
3. HDMI 1.4b
4. Connector (3) USB 2.0 port
5. RJ-45 Network
6. Power Cord Connector[1]
7. Padlock loop
8. Security cable lock slot
9. Connector (2) USB 2.0 port (option)
10. Serial Port (option)
11. Integrated accessories cable lock

Not shown

(1) PS/2 Port (Optional)
(1) Parallel Port (Optional via PCIex1 slot)
(1) 4 Serial Port (Optional via PCIex1 slot)
(1) Internal speaker (optional)

1. Power cord connector will be in different position, depends on which power supply configured.

Overview

AT A GLANCE

- Windows 11 Pro 64, Win 11 Home 64, Windows 11 Home Single Language, or FreeDOS
- AMD PRO 665 chipset supporting Ryzen 8000 series desktop processors featuring AMD Radeon Graphics.
- Supports an optional discrete graphics card.
- Integrated 10/100/1000 Ethernet Controller or Realtek RTL8852BE-VT 802.11ax 2x2 Wi-Fi 6 + Bluetooth® 5.4 Wireless Card (802.11ax 2x2, supporting gigabit data rate), or Realtek RTL8852CE 802.11ax 2x2 Wi-Fi 6E + Bluetooth® 5.3 Wireless Card (802.11ax 2x2, supporting gigabit data rate).
- Up to 64GB DDR5-5600 Unbuffered Memory (UDIMM).
- Independent monitor support via DP and HDMI interfaces.
- TPM2.0 support (dTPM).
- Supports both Hard Disk Drives and PCIe® NVMe™ M.2 SSD or PCIe® NVMe™ TLC M.2 SSD.
- Up to 10 USB Ports (including native 2 SuperSpeed USB 5Gbps signaling rate ports, 2 SuperSpeed USB 10Gbps signaling rate ports, 1 USB Type-C® 5Gbps, 3 USB 2.0 ports and 2 USB 2.0 ports (option)).
- 180W 90% HE power supply and 280W/400W 92% HE power supply.
- Security cable lock supported (sold separately).
- Optional HP Services available[1]; terms and conditions vary by country; certain restrictions and exclusions apply.

1. HP Services are optional. Service levels and response times for HP Care Services 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.

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

PRODUCT NAME

HP ProDesk 2 Tower G1a E Desktop AI PC

OPERATING SYSTEM

Preinstalled	Windows 11 Pro[1] Windows 11 Home - HP recommends Windows 11 Pro for Business[1] Windows 11 Home Single Language - HP recommends Windows 11 Pro for Business[1] FreeDOS

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.

PROCESSORS

AMD Ryzen 8000 Series Desktop Processors with RDNA 3 integrated Graphics

AMD Ryzen 7 8700G 8 Core, 16 Threads, 24MB Cache, 5.1GHz Boost/4.2GHz Base Frequency
AMD Ryzen 5 8600G 6 Core, 12 Threads, 22MB Cache, 5.0GHz Boost/4.3GHz Base Frequency
AMD Ryzen 5 8500G 6 Core, 12 Threads, 22MB Cache, 5.0GHz Boost/3.5GHz Base Frequency
AMD Ryzen 5 PRO 8500G 6 Core, 12 Threads, 22MB Cache, 5.0GHz Boost/3.5GHz Base Frequency
AMD Ryzen 5 8400F 6 Core, 22 Threads, 16MB Cache, 4.7GHz Boost/4.2GHz Base Frequency
AMD Ryzen 3 8300G 4 Core, 8 Threads, 12MB Cache, 4.9GHz Boost/3.4GHz Base Frequency

CHIPSET

AMD PRO 665

GRAPHICS

Discrete Graphics

AMD Radeon™ 780M (Integrated in Ryzen 7 & 7 Pro)
AMD Radeon™ 740M (Integrated in Ryzen 5 & 5 Pro)
AMD Radeon™ 740M (Integrated in Ryzen 3 & 3 Pro)

Discrete Graphics

AMD Radeon™ RX 6300 Graphics (2GB GDDR6)
NVIDIA GeForce RTX 5060 8 GB GDDR7 FH PCIe x16 Graphics

NOTE: HEVC (H.265) video driver is not available by default, and the HEVC (H.265) driver option can be configured at the time of purchase.

MEMORY

8GB DDR5-5200 UDIMM (1x8GB)
16GB DDR5-5200 UDIMM (1x16GB)
16GB DDR5-5200 UDIMM (2x8GB)[1]
32GB DDR5-5200 UDIMM (1x32GB)
32GB DDR5-5200 UDIMM (2x16GB)[1]
64GB DDR5-5200 UDIMM (2x32GB)[1]
24GB DDR5-5600 UDINN NECC(1x24GB)
24GB DDR5-4800 UDINN NECC(1x24GB)
48GB DDR5-5600 UDINN NECC(2x24GB)
48GB DDR5-4800 UDINN NECC(2x24GB)

Note: Memory supports data transfer rates up to 5600 MT/s on select processor configurations. Other system configurations may operate at lower speeds. Dual-rank (2R) memory may operate at up to 5200 MT/s when populated with matching part numbers. Actual data rate varies by configuration.

STORAGE

NOTE: Starting from November 1st, 2023, all shipments will require Windows to be installed when selecting a SSD.
HDD can only be configured as additional data drives and not as the boot drive.

SATA3 - 3.5"

2TB 7200 RPM SATA Hard Disk Drive

1TB 7200 RPM SATA Hard Disk Drive

NOTE: For hard drives and solid state drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 36GB (for Windows) of system disk is reserved for the system recovery software.

Solid State Drives

256GB M.2 2280 PCIe NVMe SSD256GB* M.2 NVMe

512GB M.2 2280 PCIe NVMe SSD512GB* M.2 NVMe

1TB M.2 2280 PCIe NVMe SSD1TB* M.2 NVMe

2TB M.2 2280 PCIe NVMe SSD128GB* M.2 2230 PCIe NVMe*

256GB M.2 2280 PCIe NVMe Three Layer Cell SSD[1]128GB* M.2 2280 PCIe NVMe Three Layer Cell SSD

512GB M.2 2280 PCIe NVMe Three Layer Cell SSD256GB* M.2 2280 PCIe NVMe Three Layer Cell SSD

1TB M.2 2280 PCIe NVMe Three Layer Cell SSD512GB* M.2 2280 PCIe NVMe Three Layer Cell SSD

2TB M.2 2280 PCIe NVMe Three Layer Cell SSD1TB* M.2 2280 PCIe NVMe Three Layer Cell SSD

NOTE: For hard drives and solid state drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 36GB (for Windows) of system disk is reserved for the system recovery software.
***NOTE**: Available in select countries only.

OPTICAL DISC DRIVES

DVD-ROM 9.5mm

DVD-Writer[1] 9.5mm

1. HD-DVD disks cannot be played on this drive. No support for DVD-RAM. Actual speeds may vary. Don't copy copyright-protected materials. Double Layer discs can store more data than single layer discs. Discs burned with this drive may not be compatible with many existing single-layer DVD drives and players.

NETWORKING[1]

Ethernet (RJ-45)

Integrated 10/100/1000M GbE LAN

Network Adapter Intel FoxPond2 I226-T1 2.5GbE

Wi-Fi® and Bluetooth®

Realtek RTL8852BE-VT 802.11ax 2x2 Wi-Fi 6 + Bluetooth® 5.4 Wireless Card (802.11ax 2x2, supporting gigabit data rate)

Realtek RTL8852CE 802.11ax 2x2 Wi-Fi 6E + Bluetooth® 5.3 Wireless Card (802.11ax 2x2, supporting gigabit data rate)

1. Wireless access point and internet service required and sold separately. Availability of public wireless access points limited. Wi-Fi 5 (802.11 ac) is backwards compatible with prior 802.11 specs.
NOTE: Wireless cards are optional or add-on features and requires separately purchased wireless access point and internet service. Availability of public wireless access points limited.

AUDIO / MULTIMEDIA

Realtek ALC3602-CG codec
Integrated Hi-Definition Audio
Combo Jack, Headphone / Microphone
Audio Line-out- retask as Line-in

KEYBOARDS AND POINTING DEVICES[1]

Keyboard

HP 125 v2 AntiMic Wired Keyboard (China only)
HP 320K v2 Keyboard
HP Bus Slim v2 Smart Card Wired Keyboard
HP 655 v2 Black Wireless Keyboard/Mouse Kit

Mouse

HP Wired 320M Mouse
HP Wired 125 AntiM Mouse (China only)
HP Black 125 Wired Mouse
HP Wired 128 LSR Mouse
HP USB Hardened Optical Wired Mouse

1. Keyboards and mouse are optional or add-on features. A keyboard and mouse are required for this device. If you do not already have a keyboard and mouse, please refer to a list of compatible keyboards on the “Recommended Accessories” page.

PORTS

Front

Slim-height Bay - supporting an optical disk drive (Optional)
Power Button
Combo jack, Headphone / Microphone
(2) SuperSpeed USB 10Gbps signaling rate port
(2) SuperSpeed USB 5Gbps signaling rate port
(1) USB-C© 5 Gbps*

Not shown

(1) PCI Express 4.0 x16
(1) PCI Express 3.0 x1
(1) M.2 for WLAN
(1) M.2 2280 storage

Rear

Audio Line-out- retask as Line-in
HDMI Port 1.4b
DisplayPort 1.4a
(3) USB 2.0 port
RJ-45 Network connector
Serial Port (Optional)
(2) USB 2.0 port (Option)
Power cord connector
Padlock loop
Integrated accessories cable lock

Not shown

(1) PS/2 Port (Optional on selected sku)
(1) Parallel Port (Optional via PCIex1 slot)
(1) 4x Serial port (Optional via PCIex1 slot)
(1) Internal Speaker (Optional)

NOTE*: SuperSpeed USB 10Gbps = USB 3.2 Gen2. SuperSpeed USB 5Gbps = USB 3.2 Gen1

BAYS

(1) 9.5mm external slimline ODD bay (Optional)
(1) 3.5" internal HDD with bay (Optional)

SOFTWARE COMPONENTS AND APPLICATIONS WITH WINDOWS

Security and Protection
McAfee – MLS

HP Utilities and Support
HP Documentation
HP Support Assistant

BTB
HP Setup Integrated OOBE (GDPR)

Hardware Enabling Drivers or software utility
HP System Event Utility

BIOS
Administrator Password
Self recovery
Hard drive utilities
HP Secure erase feature
Secure Boot
Cover Removal Sensor
UEFI Self Certification Level: 2.9

1. Free 1-year subscription of McAfee LiveSafe service included. Internet access required and not included. Subscription required after expiration
2. Sold separately and requires Internet access for activation.
3. Simply sign up and start using Xerox® DocuShare® Go. No credit card. No obligation. Data will become unavailable unless a subscription is entered before the end of the 90 day free trial period. See visit https://http://www.xerox.com/docusharego for details.
4. Internet access required and not included.
5. Easily switch between speaker and microphone sources with intuitive controls and a consistent app experience.

***NOTE**: Available in Latin America countries only.

POWER SUPPLY[1]

180 W
EPA90 Power Supply
280W
EPA92 Power Supply
400 W
EPA92 Power Supply

1. All power supplies are not available in every region.

DIMENSIONS AND WEIGHT

Dimensions

6.10 x 12.13 x 13.27 in
(155 x 308 x 337mm)

Weight

14.88 lbs / 6.75 kg

UNIT ENVIRONMENT AND OPERATING CONDITIONS

General Unit Operating Guidelines

- Keep the computer away from excessive moisture, direct moisture and the extremes of heat and cold, to ensure that unit is operated within the specified operating range.
- Leave a 10.2 cm (4 in) clearance on all vented sides of the computer to permit the required airflow.
- Never restrict airflow into the computer by blocking any vents or air intakes.
- Do not stack computers on top of each other or place computers so near each other that they are subject to each other's re-circulated or preheated air.
- Occasionally clean the air vents on the front, back, and any other vented side of the computer. Lint, dust and other foreign matter can block the vents and limit the airflow.
- If the computer is to be operated within a separate enclosure, intake and exhaust ventilation must be provided on the enclosure, and the same operating guidelines listed above will still apply.

Temperature Range	Operating: 5° to 35° C[1] Non-operating: -30° to 60° C[1]
Relative Humidity	Operating: 15% to 80% (non-condensing at ambient) Non-operating: 15% to 80% (non-condensing at ambient)
Maximum Altitude (unpressurized)	Operating: 5000 m Non-operating: 50000ft (15240 m)

1. Operating temperature is de-rated 1.0 deg C per 300 m (1000 ft) to 3000 m (10,000 ft) above sea level, no direct sustained sunlight. Maximum rate of change is 10 deg C/Hr. The upper limit may be limited by the type and number of options installed.

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 • TUV ultra-low noise • US ENERGY STAR® • EPEAT Gold* or EPEAT Silver** registered in the United States. See http://www.epeat.net for registration status in your country. • TCO Certified • China Energy Conservation Program (CECP) • Clean Energy Certificates (CEL) • Minimum Energy Performance Standard (Korea/Vietnam/A/Z MEPS) • Ukraine energy • Commission Regulation (EC) No 617/2013 (ErP Lot 3)
Sustainable Impact Specifications	• Product Carbon Footprint (hp.com) • 46.10% post-consumer recycled plastic • 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 Desktop model is based on a “Typically Configured Desktop”.

Energy Consumption (in accordance with US ENERGY STAR® test method)	**115VAC, 60Hz**	**230VAC, 50Hz**	**100VAC, 50Hz**
Normal Operation (Short idle)	14.99 W	13.61 W	15.47 W
Normal Operation (Long idle)	N/A	N/A	N/A
Sleep	1.98 W	1.98 W	2.24 W
Off	0.32 W	0.32 W	0.32 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)	51 BTU/hr	47 BTU/hr	53 BTU/hr
Normal Operation (Long idle)	N/A	N/A	N/A
Sleep	7 BTU/hr	7 BTU/hr	8 BTU/hr
Off	1 BTU/hr	1 BTU/hr	1 BTU/hr
	NOTE: Heat dissipation is calculated based on the measured watts, assuming the service level is attained for one hour.		

Declared Noise Emissions (in accordance with ISO 7779 and ISO 9296)	**Sound Power (L_{WAd}, bels)**	**Sound Pressure (L_{pAm}, decibels)**
Typically Configured – Idle	3.2	25
Fixed Disk – Random writes	3.5	26
Optical Drive – Sequential reads	3.3	25
Longevity and Upgrading	This product can be upgraded, possibly extending its useful life by several years. Upgradeable features and/or components contained in the product may include: Spare parts are available throughout the warranty period and or for up to “5” years after the end of production.	
Batteries	This battery(s) in this product comply with EU Directive 2006/66/EC Batteries used in the product do not contain: Mercury greater the1ppm by weight Cadmium greater than 20ppm by weight Battery size: CR2032 (coin cell) Battery type: Lithium	

Additional Information	• This product is in compliance with the Restrictions of Hazardous Substances (RoHS) directive - 2011/65/EC. • This HP product is designed to comply with the Waste Electrical and Electronic Equipment (WEEE) Directive – 2002/96/EC. • This product is in compliance with California Proposition 65 (State of California; Safe Drinking Water and Toxic Enforcement Act of 1986). • This product is in compliance with the IEEE 1680.1 (EPEAT) standard at the Gold level, see http://www.epeat.net. • Plastics parts weighing over 25 grams used in the product are marked per ISO11469 and ISO1043. • This product contains 28.2% post-consumer recycled plastic (by wt.) • This product is 92.9% recycle-able when properly disposed of at end of life.		
Packaging Materials	**External:**	PAPER/Corrugated	1048 g
		PAPER/Paperboard	108 g
		PAPER/Molded Pulp	676 g
		OTHER/other	58 g
	The plastic packaging material contains at least 0.0% recycled content.		
	The corrugated paper packaging materials contains at least 35.0% recycled content.		
RoHS Compliance	HP Inc. complies fully with materials regulations. We were among the first companies to extend the restrictions in the European Union (EU) Restriction of Hazardous Substances (RoHS) Directive to our products worldwide through the HP GSE. HP has contributed to the development of related legislation in Europe, as well as China, India, and Vietnam. We believe the RoHS directive and similar laws play an important role in promoting industry-wide elimination of substances of concern. We have supported the inclusion of additional substances—including PVC, BFRs, and certain phthalates—in future RoHS legislation that pertains to electrical and electronics products. We met our voluntary objective to achieve worldwide compliance with the new EU RoHS requirements for virtually all relevant products by July 2013, and we will continue to extend the scope of the commitment to include further restricted substances as regulations continue to evolve. To obtain a copy of the HP RoHS Compliance Statement, see HP RoHS position statement.		
Material Usage	This product does not contain any of the following substances in excess of regulatory limits (refer to the HP General Specification for the Environment at http://www.hp.com/hpinfo/globalcitizenship/environment/pdf/gse.pdf): • Asbestos • Certain Azo Colorants • Certain Brominated Flame Retardants – may not be used as flame retardants in plastics • Cadmium • Chlorinated Hydrocarbons • Chlorinated Paraffins • Formaldehyde • Halogenated Diphenyl Methanes • Lead carbonates and sulfates • Lead and Lead compounds • Mercuric Oxide Batteries • Nickel – finishes must not be used on the external surface designed to be frequently handled or carried by the user. • Ozone Depleting Substances • Polybrominated Biphenyls (PBBs) • Polybrominated Biphenyl Ethers (PBBEs) • Polybrominated Biphenyl Oxides (PBBOs) • Polychlorinated Biphenyl (PCB) • Polychlorinated Terphenyls (PCT)		

	• Polyvinyl Chloride (PVC) – except for wires and cables, 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 Inc. offers end-of-life HP product return and recycling programs in many geographic areas. To recycle your product, please go to: http://www.hp.com/go/reuse-recycle or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner. The EU WEEE directive (2002/95/EC) requires manufacturers to provide treatment information for each product type for use by treatment facilities. This information (product disassembly instructions) is posted on the Hewlett Packard web site at: http://www.hp.com/go/recyclers. These instructions may be used by recyclers and other WEEE treatment facilities as well as HP OEM customers who integrate and re-sell HP equipment. 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

SERVICE AND SUPPORT

On-site Warranty[1]: Available three-year (3-3-3) or one-year (1-1-1) limited warranty (varies by country) delivers on-site, next business day[2] service for parts and labor and complimentary limited technical support[3]. Three-year onsite and labor are not available in all countries. Service offers terms up to 3 years by choosing an optional HP Care Pack[4] To choose the right level of service for your HP product, visit HP Care Pack Central: http://www.hp.com/go/cpc.

1: Terms and conditions may vary by country. Certain restrictions and exclusions apply. Other warranty variations may be offered in your region.
2: On-site service may be provided pursuant to a service contract between HP and an authorized HP third-party provider, and is not available in certain countries. Global service response times are based on commercially reasonable best effort and may vary by country.
3: Technical support applies only to HP-configured and third-party HP qualified hardware and software.
4: 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.

GRAPHICS

AMD UHD Graphics (integrated)	
DisplayPort™	Multimode capable; supports HDCP, Display Port Audio), Onboard support HBR2 link rates/option DP support to HBR2 and Multi-Stream Technology for a maximum of 2-displays connected to any output controlled by AMD® Graphics
HDMI (on board)	Supports HDMI 2.1 features (onboard HDMI support HDMI 2.1 FRL8; Option HDMI support HDMI 2.1 TMDS) Supports HDCP 2.3 (Support HDCP 1.4/2.3) Supports audio over HDMI
Graphics/Video API Support	VP9 H.264 H.265 decode with 8bit and 10bit depth and up to 4K@24, 30 and 60 FPS video at Vmin. 32b HDR Format (999e5). DX12.
Max. Resolution (Onboard HDMI)	8K @30Hz / 4K @120Hz 24bpp
Max. Resolution (Option HDMI)	TMDS: 4096 x 2160 @60Hz
Max. Resolution (On board DP)	HBR3: 8K @30Hz / 4K @120Hz 24bpp

Note: The actual amount of maximum graphics memory can be less than the amounts listed above depending upon your computer's configuration.
Note: Other resolutions may be available but are not recommended as they may not have been tested and qualified by HP
Only supported on displays connected to the external DisplayPort™ connector.

AMD Radeon™ RX 6300 2GB GDDR6 Graphics card

Engine Clock	Base: 1512 Mhz Boost: 2040 Mhz
Memory Size / Width	2GB / 32bits
Graphic Memory Type / Clock	512Mx 32 GDDR6, 1 pcs / 16Gbs
Max. Resolution (HDMI)	7680x4320@60Hz
Max. Resolution (DP)	7680x4320@120Hz
Multi Display Support	2 displays
HDCP Compliance	Yes
Rear I/O connectors (bracket)	HDMIx1+DPx1 (LP)
Cooling (active/passive)	Active
Total power consumption (W)	57W
Form-factor	X:160.2mm/Y:68.9mm/Z: 22.6mm PCB with single slot

NVIDIA GeForce RTX 5060 8 GB GDDR7 FH PCIe x16 Graphics

Engine Clock	Base: 2280 MHz Boost: 2497 MHz
Frame Buffer Size / Width	8GB / 128bit
Graphic Memory Type / Clock	512Mx 32 GDDR7 @ 4pcs / 28Gps
Max. Resolution (HDMI)	4096x2160 x 36bpp@120Hz or 7680x4320 36bpp DSC @60Hz
Max. Resolution (DP)	3840x2160 x 30bpp @120Hz or 7680x4320 36bpp @60Hz
Multi Display Support	Up to 4 display
HDCP Compliance	Yes
Rear I/O connectors (bracket)	HDMIx1+ DPx3
Cooling (active/passive)	Active fansink with 4 pin fan control
Total power consumption (W)	145 W
Card dimension	ATX: (X:188mm/Y:111.15mm/Z: 38.0mm)

NOTE: 8 pins connector requires for RTX5060 with 400W PSU or 500W PSU

STORAGE*

NOTE: Starting from November 1st, 2023, all shipments will require Windows to be installed when selecting a SSD.
HDD can only be configured as additional data drives and not as the boot drive.

HP 2TB 7.2K rpm SATA 6.0Gb/s 3.5" Hard Disk Drive

Capacity	2TB
Rotational Speed	7,200 rpm
Interface	SATA 6Gb/s NCQ
Buffer Size	64MB
Logical Blocks	3,907,029,168
Seek Time	Read: <8.5 ms Write: <9.5 ms
Height	1.028 in/26.11 mm
Width	4.0 in/101.6 mm
Operating Temperature	32° to 140° F (0° to 60° C)

NOTE: For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 36GB (for Windows) is reserved for system recovery software.

1TB 7.2K rpm SATA 6.0Gb/s 3.5” Hard Disk Drive

Capacity	1TB
Rotational Speed	7,200 rpm
Interface	Serial ATA 3.0 (6.0 Gb/s)
Buffer Size	64MB
Logical Blocks	1,953,525,168
Seek Time	Single Track: 2.0 ms Average: 11 ms Full-Stroke: 21 ms
Height	1 in/2.54 cm
Width	Media diameter: 3.5 in/8.89 cm Physical size: 4 in/10.2 cm
Operating Temperature	41° to 131° F (5° to 55° C)

NOTE: For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 36GB (for Windows) is reserved for system recovery software.

256GB M.2 2280 PCIe NVMe Three Layer Cell SSD

Drive Weight	< 10g
Capacity	256GB
Height	2.38mm
Length	80mm
Width	22mm
Interface	PCIE Gen4x4
Maximum Sequential Read	Up to 2700MB/s
Maximum Sequential Write	Up to 1000MB/s
Logical Blocks	500,118,192
Operating Temperature	0° to 70°C (32° to 158°F) [ambient temp]
Features	APST; ASPM L1.2; NVME spec 1.2

NOTE: For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 36GB (for Windows) is reserved for system recovery software.

512GB M.2 2280 PCIe NVMe Three Layer Cell SSD

Drive Weight	< 10g
Capacity	512GB
Height	2.38mm
Length	80mm
Width	22mm
Interface	PCIE Gen4x4
Maximum Sequential Read	Up to 2900MB/s
Maximum Sequential Write	Up to 1100MB/s
Logical Blocks	1,000,215,216
Operating Temperature	0° to 70°C (32° to 158°F) [ambient temp]
Features	APST; ASPM L1.2; NVME spec 1.2

NOTE: For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 36GB (for Windows) is reserved for system recovery software.

1TB M.2 2280 PCIe NVMe Three Layer Cell SSD

Capacity	1TB
Interface	PCIE Gen4x4
Minimum Sequential Read	6400 MB/s ±10%
Minimum Sequential Write	5000 MB/s ±10%
Logical Blocks	2,000,409,264
Features	TRIM; L1.2; Pyrite 2.0

NOTE: For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 36GB (for Windows) is reserved for system recovery software.

2TB M.2 2280 PCIe NVMe Three Layer Cell SSD

Capacity	2TB
Interface	PCIE Gen4x4
Minimum Sequential Read	6400 MB/s ±10%
Minimum Sequential Write	5000 MB/s ±10%
Logical Blocks	4,000,797,360
Features	TRIM; L1.2; Pyrite 2.0

NOTE: For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 36GB (for Windows) is reserved for system recovery software.

256GB M.2 2280 PCIe NVMe SSD

Drive Weight	< 10g
Capacity	256GB
Height	2.38mm
Length	80mm
Width	22mm
Interface	PCIE Gen4x4
Minimum Sequential Read	Up to 1600MB/s
Minimum Sequential Write	Up to 780MB/s
Logical Blocks	500,118,192
Operating Temperature	0° to 70°C (32° to 158°F) [ambient temp]
Features	APST; ASPM L1.2; NVME spec 1.2

NOTE: For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 36GB (for Windows) is reserved for system recovery software.

512GB M.2 2280 PCIe NVMe SSD

Drive Weight	< 10g
Capacity	512GB
Height	2.38mm
Length	80mm
Width	22mm
Interface	PCIE Gen4x4
Minimum Sequential Read	Up to 2200MB/s ±10%
Minimum Sequential Write	Up to 860MB/s
Logical Blocks	1,000,215,216
Operating Temperature	0° to 70°C (32° to 158°F) [ambient temp]
Features	APST; ASPM L1.2; NVME spec 1.2

NOTE: For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 36GB (for Windows) is reserved for system recovery software.

1TB M.2 2280 PCIe NVMe SSD

Capacity	1TB
Interface	PCIE Gen4x4
Minimum Sequential Read	2200 MB/s ±10%
Minimum Sequential Write	1600 MB/s ±10%
Logical Blocks	2,000,409,264
Features	TRIM; L1.2

NOTE: For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 36GB (for Windows) is reserved for system recovery software.

2TB M.2 2280 PCIe NVMe SSD

Capacity	2TB
Interface	PCIE Gen4x4
Minimum Sequential Read	5400 MB/s ±10%
Minimum Sequential Write	4700 MB/s ±10%
Logical Blocks	4,000,797,360
Features	TRIM; L1.2

OPTICAL DISC DRIVES

HP 9.5mm Desktop G2 Slim DVD Writer Drive

Height	9.5 mm height	
Orientation	Either horizontal or vertical	
Interface type	SATA/ATAPI	
Disc recording capacity	Up to 8.5 GB DL or 4.7 GB standard	
Dimensions (W x H x D)	5.04 x 0.37 x 5.0 in (128 x 9.5 x 127 mm) without bezel	
Weight (max)	0.31 lb (140 g)	
Read Speeds	DVD-R DL	Up to 6X
	DVD+R	Up to 8X
	DVD+RW	Up to 8X
	DVD+R DL	Up to 6X
	DVD-R	Up to 8X
	DVD-RW	Up to 6X
	CD-R	Up to 24X
	CD-RW	Up to 10X
	DVD-RW, DVD+RW	Up to 8X
	DVD-R DL, DVD+R DL	Up to 8X
	DVD+R, DVD-R	Up to 8X
	DVD-ROM DL, DVD-ROM	Up to 8X
	CD-ROM, CD-R	Up to 24X
	CD-RW	Up to 24X
Access time (typical reads, including settling)	Random DVD-ROM: 170 ms (typical), CD-ROM: 170 ms (typical) Full Stroke DVD-ROM: 320 ms (typical), CD-ROM: 320 ms (typical) Stop Time 6 seconds (typical)	
Power	Source Slimline SATA DC power receptacle DC Power Requirement 5 VDC ± 5%-100 mV ripple p-p DC Current 5 VDC (< 1000 mA typical, 1600 mA maximum)	
Environmental conditions (operating - non-condensing)	Temperature 41° to 122° F (5° to 50° C) Relative Humidity 10% to 80% Maximum Wet Bulb Temperature 84° F (29° C)	

HP 9.5mm Desktop G2 Slim DVD-ROM Drive

Height	9.5 mm height	
Orientation	Either horizontal or vertical	
Interface type	SATA/ATAPI	
Disc recording capacity	Up to 8.5 GB DL or 4.7 GB standard	
Dimensions (W x H x D)	5.04 x 0.37 x 5.0 in (128 x 9.5 x 127 mm) without bezel	
Weight (max)	0.31 lb (140 g)	
Read Speeds	DVD-R DL	Up to 6X
	DVD+R	Up to 8X
	DVD+RW	Up to 8X
	DVD+R DL	Up to 6X
	DVD-R	Up to 8X
	DVD-RW	Up to 6X
	CD-R	Up to 24X
	CD-RW	Up to 10X
	DVD-RW, DVD+RW	Up to 8X
	DVD-R DL, DVD+R DL	Up to 8X
	DVD+R, DVD-R	Up to 8X
	DVD-ROM DL, DVD-ROM	Up to 8X
	CD-ROM, CD-R	Up to 24X
	CD-RW	Up to 24X
Access time (typical reads, including settling)	Random DVD-ROM: 170 ms (typical), CD-ROM: 170 ms (typical) Full Stroke DVD-ROM: 320 ms (typical), CD-ROM: 320 ms (typical) Stop Time 6 seconds (typical)	
Power	Source Slimline SATA DC power receptacle DC Power Requirement 5 VDC ± 5%-100 mV ripple p-p DC Current 5 VDC (< 1000 mA typical, 1600 mA maximum)	
Environmental conditions (operating - non-condensing)	Temperature 41° to 122° F (5° to 50° C) Relative Humidity 10% to 80% Maximum Wet Bulb Temperature 84° F (29° C)	

NETWORKING

10/100/1000 NIC	
Ethernet Features	10 Mbit/s operation (10BASE-T; IEEE 802.3i; IEEE 802.3 clauses 13-14) 100 Mbit/s operation (100BASE-TX; IEEE 802.3u; IEEE 802.3 clauses 21-30) 1000 Mbit/s operation (1000BASE-T; IEEE 802.3ab; IEEE 8023 clauses 40) Auto-Negotiation (Automatic Speed Selection) Full Duplex Operation at all Speeds, Half Duplex operation at 10 and 100 Mbit/s
Power Management	ACPI compliant – multiple power modes Situation-sensitive features reduce power consumption Advanced link down power saving for reducing link down power consumption
Performance Features	TCP/IP/UDP Checksum Offload (configurable) Protocol Offload (ARP & NS) Large send offload and Giant send offload Receiving Side Scaling Jumbo Frame 9K
Manageability	Wake-on-LAN from standby and hibernation (Magic Packet and Microsoft Wake-Up Frame); Wake-on-LAN from off (Magic Packet only) PXE 2.1 Remote Boot Statistics Gathering (SNMP MIB II, Ethernet-like MIB, Ethernet MIB (802.3x, clause 30) Comprehensive diagnostic and configuration software suite Virtual Cable Doctor for Ethernet cable status
Interface	PCIe + SMBus
NIC Device Driver Name	PCIe GBE Ethernet Family Controller

Intel I226-T1 2.5GbE Ethernet Network Adapter	
Connector	RJ-45
System Interface	PCI (Intel proprietary) + SMBus
Data rates supported	1. 10 Mbit/s operation (10BASE-T; IEEE 802.3i; IEEE 802.3 clauses 13-14) 2. 100 Mbit/s operation (100BASE-TX; IEEE 802.3u; IEEE 802.3 clauses 21-30) 3. 1000 Mbit/s operation (1000BASE-T; IEEE 802.3ab; IEEE 802.3 clauses 40) 4. 2.5 Gbit/s operation (2.5GBASE-T; IEEE 802.3bz Clause 126) 5. Auto-Negotiation (Automatic Speed Selection) Full Duplex Operation at all Speeds, Half Duplex operation at 10 & 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) IEEE 802.3i 10BASE-T IEEE 802.3u 100BASE-TX IEEE 802.3ab 1000BAE-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

Technical Specifications – Networking and Communications

Power consumption	Cable Disconnection: 25mW 100Mbps Full Run: 450mW 1000Mbp Full Run: 1000mW 2500Mbp Full Run: 4500mW WoL Enable(S3/S4/S5): 50mW WoL Disable(S3/S4/S5): 25mW
Power	ACPI compliant – multiple power modes
Management	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

Realtek RTL8852BE-VT 802.11ax 2x2 Wi-Fi 6 + Bluetooth® 5.4 Wireless Card (802.11ax 2x2, supporting gigabit data rate)	
Wireless LAN Standards[1]	IEEE 802.11a IEEE 802.11b IEEE 802.11g IEEE 802.11n IEEE 802.11ac IEEE 802.11ax IEEE 802.11d IEEE 802.11e IEEE 802.11h IEEE 802.11i IEEE 802.11k IEEE 802.11r IEEE 802.11v
Interoperability	Wi-Fi certified modules
Frequency Bands	802.11b/g/n/ax • 2.402 – 2.482 GHz 802.11a/n/ac/ax • 4.9 – 4.95 GHz (Japan) • 5.15 – 5.25 GHz • 5.25 – 5.35 GHz • 5.47 – 5.725 GHz • 5.825 – 5.850 GHz

Data Rates	• 802.11b: 1, 2, 5.5, 11 Mbps • 802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps • 802.11a: 6, 9, 12, 18, 24, 36, 48, 54 Mbps • 802.11n: max 300Mbps • 802.11ac: max 866.7Mbps • 802.11ax: max 1201Mbps
Modulation	Direct Sequence Spread Spectrum, OFDM, BPSK, QPSK, CCK, 16-QAM, 64-QAM, 256-QAM, 1024QAM
Security[2]	• IEEE and WiFi certified 64 / 128 bit WEP encryption for a/b/g mode only • AES-CCMP: 128 bit in hardware • 802.1x authentication • WPA, WPA2: 802.1x. WPA-PSK, WPA2-PSK, TKIP, and AES. • WPA2 certification • WPA3 certification • IEEE 802.11i • WAPI
Network Architecture Models	Ad-hoc (Peer to Peer) Infrastructure (Access Point Required)
Roaming	IEEE 802.11 compliant roaming between access points
Output Power[3]	• 802.11b: +18.5dBm minimum • 802.11g: +17.5dBm minimum • 802.11a: +18.5dBm minimum • 802.11n HT20(2.4GHz): +15.5dBm minimum • 802.11n HT40(2.4GHz): +14.5dBm minimum • 802.11n HT20(5GHz): +15.5dBm minimum • 802.11n HT40(5GHz): +14.5dBm minimum • 802.11ac VHT80(5GHz): +11.5dBm minimum • 802.11ax HE40(2.4GHz): +10dBm minimum • 802.11ax HE80(5GHz): +10dBm minimum
Power Consumption	• Transmit mode:2.5 W • Receive mode:2 W • Idle mode (PSP) 180 mW (WLAN Associated) • Idle mode:50 mW (WLAN unassociated) • Connected Standby/Modern Standby: 10mW • Radio disabled: 8 mW
Power Management	ACPI and PCI Express compliant power management 802.11 compliant power saving mode
Receiver Sensitivity[4]	802.11b, 1Mbps: -93.5dBm maximum 802.11b, 11Mbps: -84dBm maximum 802.11a/g, 6Mbps: -86dBm maximum 802.11a/g, 54Mbps: -72dBm maximum 802.11n, MCS07: -67dBm maximum 802.11n, MCS15: -64dBm maximum

Technical Specifications – Networking and Communications

	802.11ac, MCS0: -84dBm maximum 802.11ac, MCS9: -59dBm maximum •802.11ax, MCS11(HE40): -57dBm maximum •802.11ax, MCS11(HE80): -54dBm maximum
Antenna type	High efficiency antenna with spatial diversity. Two embedded dual band 2.4/5 GHz antennas are provided to the card to support WLAN MIMO communications and Bluetooth communications
Form Factor	PCI-Express M.2 MiniCard
Dimensions	1. Type 2230: 2.4 x 22.0 x 30.0 mm
Weight	1. Type 2230: 2.8g
Operating Voltage	3.3v +/- 9%
Temperature	Operating: 14° to 158° F (–10° to 70° C) Non-operating: –40° to 176° F (–40° to 80° C)
Humidity	Operating: 10% to 90% (non-condensing) Non-operating: 5% to 95% (non-condensing)
Altitude	Operating: 0 to 10,000 ft (3,048 m) Non-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 Card Technology	
Bluetooth® Specification	4.0/4.1/4.2/5.0/5.1/5.2/5.3/5.4 Wireless Card Compliant
Frequency Band	2402 to 2480 MHz
Number of Available Channels	Legacy: 0~79 (1 MHz/CH) BLE: 0~39 (2 MHz/CH)
Data Rates and Throughput	Legacy: 3 Mbps data rate; throughput up to 2.17 Mbps BLE: 1 Mbps data rate; throughput up to 0.2 Mbps Legacy: Synchronous Connection Oriented links up to 3, 64 kbps, voice channels Legacy: Asynchronous Connection Less links 2178.1 kbps/177.1 kbps asymmetric (3-DH5) or 864 kbps symmetric (3-EV5)
Transmit Power	The Bluetooth component shall operate as a Class II Bluetooth device with a maximum transmit power of + 4 dBm for BR and EDR.
Power Consumption	Peak (Tx): 330 mW Peak (Rx): 230 mW Selective Suspend: 17 mW
Bluetooth® Software Supported Link Topology	Microsoft Windows Bluetooth Software
Power Management	Microsoft Windows ACPI, and USB Bus Support
Certifications	FCC (47 CFR) Part 15C/E, Section 15.247, 15.249 ETSI 300 328, ETSI 301 893

Technical Specifications – Networking and Communications

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 5.1 ESR9/10 Compliance LE Advertisement Extensions Channel Selection Algo Limited High Duty Cycle Non-Connectable Advertising 2Mbps LE LE Long Range

1. Wi-Fi 6 is designed to support gigabit data rate when transferring files between two devices connected to the same router. Requires a wireless router, sold separately, that supports 80MHz and higher channels.
Wireless access point and Internet service required and sold separately. Availability of public wireless access points limited. Wi-Fi 6 (802.11ax) is backwards compatible with prior 802.11 specs.
2. 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.
3. Check latest software/driver release for updates on supported security features.
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).

Realtek RTL8852CE 802.11ax 2x2 Wi-Fi 6E + Bluetooth® 5.3 Wireless Card (802.11ax 2x2, supporting gigabit data rate)	
Wireless LAN Standards[1]	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
Interoperability	Wi-Fi certified
Frequency Band	802.11b/g/n/ax • 2.402 – 2.482 GHz 802.11a/n/ac/ax • 5.15 – 5.25 GHz • 5.25 – 5.35 GHz • 5.47 – 5.725 GHz • 5.825 – 5.850 GHz • 5.955 – 6.415 GHz • 6.435 – 6.515 GHz • 6.535 – 6.875 GHz • 6.895 – 7.115 GHz
Data Rates	• 802.11b: 1, 2, 5.5, 11 Mbps • 802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps • 802.11a: 6, 9, 12, 18, 24, 36, 48, 54 Mbps • 802.11n: MCS 0 ~ MCS 15, (20MHz, and 40MHz) • 802.11ac: MCS0 ~ MCS9, (20MHz, 40MHz, ,80MHz & 160MHz) • 802.11ax: MCS0 ~ MCS11, (20MHz, 40MHz, ,80MHz & 160MHz)
Modulation	Direct Sequence Spread Spectrum OFDM, BPSK, QPSK, CCK, 16-QAM, 64-QAM, 256-QAM, 1024QAM
Security[2]	• IEEE and WiFi certified 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 (personal) certification • IEEE 802.11i • WAPI • EAP
Network Architecture Models	Ad-hoc (Peer to Peer) Infrastructure (Access Point Required)
Roaming	IEEE 802.11 compliant roaming between access points

Technical Specifications – Networking and Communications

Output Power[3]	• 802.11b: +17dBm minimum • 802.11g: +16dBm minimum • 802.11a: +17dBm minimum • 802.11n HT20(2.4GHz): +14dBm minimum • 802.11n HT40(2.4GHz): +13dBm minimum • 802.11n HT20(5GHz): +14dBm minimum • 802.11n HT40(5GHz): +13dBm minimum • 802.11ac VHT80(5GHz): +10dBm minimum • 802.11ac VHT160(5GHz): +10dBm minimum • 802.11ax HE40(2.4GHz): +12dBm minimum • 802.11ax HE80(5GHz): +10dBm minimum • 802.11ax HE160(5GHz): +10dBm minimum • 802.11ax HE80(6GHz): +10dBm minimum • 802.11ax HE160(6GHz): +10dBm minimum
Power Consumption	• Transmit mode: 2.5 W • Receive mode: 2 W • Idle mode (PSP) 180 mW (WLAN Associated) • Idle mode: 50 mW (WLAN unassociated) • Connected Standby/Modern Standby: 10mW • Radio disabled: 8 mW
Power Management	ACPI and PCI Express compliant power management 802.11 compliant power saving mode
Receiver Sensitivity[4]	• 802.11b, 1Mbps: -93.5dBm maximum • 802.11b, 11Mbps: -84dBm maximum • 802.11a/g, 6Mbps: -86dBm maximum • 802.11a/g, 54Mbps: -72dBm maximum • 802.11n, MCS07: -67dBm maximum • 802.11n, MCS15: -64dBm maximum • 802.11ac, MCS0(VHT80): -84dBm maximum • 802.11ac, MCS9(VHT80): -59dBm maximum • 802.11ac, MCS9(VHT160): -58.5dBm maximum • 802.11ax, MCS11(HE40): -57dBm maximum • 802.11ax, MCS11(HE80): -54dBm maximum • 802.11ax, MCS11(HE160): -53.5dBm maximum
Antenna type	High efficiency antenna with spatial diversity 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
Weight	1. Type 2230: 2.8g
Operating Voltage	3.3v +/- 9%
Temperature	Operating: 14° to 158° F (–10° to 70° C) Non-operating: –40° to 176° F (–40° to 80° C)
Humidity	Operating: 10% to 60% (non-condensing) Non-operating: 5% to 95% (non-condensing)
Altitude	Operating: 0 to 10,000 ft (3,048 m) Non-operating: 0 to 50,000 ft (15,240 m)
LED Activity	N/A

Technical Specifications – Networking and Communications

HP Integrated Module with Bluetooth® 4.0/4.1/4.2/5.0/5.1/5.2/5.3 Wireless Card Technology	
Bluetooth® Specification	4.0/4.1/4.2/5.0/5.1/5.2/5.3 Wireless Card Compliant
Frequency Band	2402 to 2480 MHz
Number of Available Channels	Legacy: 0~79 (1 MHz/CH) BLE: 0~39 (2 MHz/CH)
Data Rates and Throughput	Legacy: 3 Mbps data rate; throughput up to 2.17 Mbps BLE: 1 Mbps data rate; throughput up to 0.2 Mbps Legacy: Synchronous Connection Oriented links up to 3, 64 kbps, voice channels Legacy: Asynchronous Connection Less links 2178.1 kbps/177.1 kbps asymmetric (3-DH5) or 864 kbps symmetric (3-EV5)
Transmit Power	The Bluetooth component shall operate as a Class II Bluetooth device with a maximum transmit power of + 4 dBm for BR and EDR.
Power Consumption	Peak (Tx): 330 mW Peak (Rx): 230 mW Selective Suspend: 17 mW
Bluetooth® Software Supported Link Topology	Microsoft Windows Bluetooth Software
Power Management	Microsoft Windows ACPI, and USB Bus Support
Certifications	FCC (47 CFR) Part 15C/E, Section 15.247, 15.249, 15.407 ETSI 300 328, ETSI 301 893, ETSI 303 687
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 Windows Bluetooth profiles support Bluetooth 5.3 Periodic Advertisement interval Encryption key size control enhancements

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

HIGH DEFINITION AUDIO

Type	Integrated
HD Stereo Codec	Realtek ALC3602-CG codec
Audio I/O Ports	6 channel DAC/ 4 channel ADC, support the combo jack for CTIA and OMTP, and support the Line-in/ Line-out/ Mic-in and re-tasking on jacks.
Internal Speaker Amplifier	Embedded 2W mono class-D amplifier for the internal speaker.
Multi-streaming Capable	Playback multi-streaming can be enabled in the audio control UI to allow independent audio streams to output to the front and rear jacks or integrated speaker.
HD Audio Codec	ALC3602-CG
Sampling	DAC supports 16bit ~ 24 bit, sampling rate 44.1K/ 48K/ 96K/ 192K Hz ADC supports 16bit ~ 24 bit, sampling rate 44.1K/ 48K/ 96K/ 192K Hz
Wavetable Syntheses	Yes
Analog Audio	Yes
# of Channels on Line-Out	Stereo
Internal Speaker	Yes
External Speaker Jack*	2W class D mono amplifier for the internal speaker only. External speakers must be powered externally.

POWER SUPPLY

Operating Voltage Range	90 – 264 VAC
Rated Voltage Range	100-240V AC
Rated Line Frequency	50/60 HZ
Operating Line Frequency	47 – 63 Hz
Rated Input Current	180 W: <2.3A 280W: <3.3A 400W: <5.2A
Rated Input Current with Energy Efficient* Power Supply	**180W** active PFC / **Efficiency at 115Vac** 80PLUS Gold certified 87/90/87% at 20/50/100% load **Efficiency at 230Vac** 90/92/89% at 20/50/100% load Which meet 80PLUS Gold **280W/400W** active PFC / **Efficiency at 115Vac** 80PLUS Platinum certified 90/92/89% efficient at 20/50/100% load **Efficiency at 230Vac** 91/93/90% at 20/50/100% load Which meet 80PLUS Gold
DC Output	+12 V
Current Leakage (NFPA 99: 2102)	Less than 500 microamps of leakage current at 120 Vac with the ground wire disconnected, as required for Non-patient Electrical Appliances and Equipment used in a patient care facility or that contact patients in normal use. Per section 10.3.5.1. Less than 100 microamps of leakage current at 120 Vac with the ground wire intact with normal polarity, as required for Non-patient Electrical Appliances and Equipment used in a patient care facility or that contact patients in normal use. Per section 10.3.5.1.
Power Supply Fan	180W: 70*25mm (linear type) 280W/400W: 70x25mm (PWM type)

WEIGHT AND DIMENSIONS

Chassis	6.10 x 12.13 x 13.27 in (155 x 308 x 337 mm) (w/ bezel)
System Volume	16 L
System Weight*	13.45 lb / 6.1 kg
Packaged (HxWxD)	11.3 x 15.75 x 19.65 in 287 x 400 x 499 mm
Shipping Weight	20.22 lb / 9.17 kg
Palletization Profile	6 units per layer 7 layer max 42 per pallet Footprint 84.21 x 39.37 x 47.24 in (2139 x 1000 x1200 mm)

After-Market Options (availability may vary by region)

AFTERMARKET OPTIONS

Type	Description	Part #
Memory	HP 8GB DDR5-5600 DIMM	A9TF0AA
	HP 16GB DDR5-5600 DIMM	A9TF1AA
	HP 32GB DDR5-5600 DIMM	A9TF3AA
Storage	HP PCIe Gen 4 NVME TLC M.2 512GB SSD	406L8AA
	HP PCIe Gen 4 NVME TLC M.2 1TB SSD	406L7AA
	HP 1TB 7200rpm SATA 6Gb/s 3.5” Hard Drive	QK555AA
Graphics	AMD Radeon RX 6300 2GB GDDR6 DP+HDMI	7Y6P7AA
Networking	Intel I226-T1 2.5GbE Ethernet Network Adapter	9P1U8AA
Security	HP Business PC Security Lock V3 Kit	3XJ17AA
	HP Keyed Cable Lock 10mm kit	T1A62AA
	HP Master Keyed Cable Lock 10mm	T1A63AA
	HP Combination Standard Cable Lock	T0Y15AA
	HP Essential Combination Lock	T0Y16AA
Cables/Adapters	HP HDMI Standard Cable Kit	T6F94AA
	HP USB to Serial Port Adapter	J7B60AA
	HP PCIe x1 Parallel Port Card	N1M40AA
Input	HP Business Slim v2 Smart Card USB Keyboard	A71J9AA
	HP 125 G2 Wired Keyboard	AY2Y7AA
	HP 125 Wired Mouse	265A9AA
	HP 128 Laser Wired Mouse	265D9AA
	HP Wired Desktop 320M Mouse	9VA80AA
	HP 320K G2 Wired Keyboard	9SR37UT
	HP Wired Desktop 320MK G2 Mouse and Keyboard Combo	9SR36UT
	HP 655 Wireless Keyboard and Mouse Combo G2	4R009UT
	HP 405 Multi-Device Wired Backlit Keyboard	7N7C1AA
	HP 455 G2 Programmable WRLS USB Keyboard	B08ZDAA
	HP 475 Dual-Mode Wireless Keyboard	7N7B9AA
Others	HP S101 Speaker bar	5UU40AA
	HP Z G3 Conferencing Speaker Bar wStand	647Y2AA

Change Log

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Date of change:	Version History:	Change	Description of change:
January 13, 2025	From v1 to v2	Update	Environmental data values updated
January 16, 2025	From V2 to V3	Update	Processors updated
January 21, 2025	From V3 to V4	Removal	NECC word removed from Memory section
February 18, 2025	From V4 to V5	Correction	760M corrected to 740M in integrated radeon graphics section
March 13, 2025	From V5 to V6	Removal	Disclaimer from MEMORY section removed
March 31, 2025	From V6 to V7	Correction	Maximum of displays changed to 2 in DisplayPort in Graphics section
May 12, 2025	From V7 to V8	Addition	AMD Ryzen 5 8600G 6 Core to Processors section
July 18, 2025	From V8 to V9	Update	TCO Certification added to Environmental table
July 25, 2025	From V9 to V10	Correction	All M.2 2280 PCIe NVMe SSD´s interface and speed based corrected to PCIE Gen4x4 and minimum sequential read/write respectively.
July 31, 2025	From v10 to v11	Update	NVIDIA GeForce RTX 5060 added to Graphics sections
October 16, 2025	From v11 to v12	Addition	BIOS added to Software section
December 9, 2025	From v12 to v13	Udpate	AMD Ryzen 5 8400F cache updated to 22 / BIOS in SW section
February 11, 2026	From v13 to v14	Update	Memory cards added
September 11, 2026	From v14 to v15	Addition	Note to Graphics table added
November 21, 2026	From v15 to v16	Update	Note added to Memory section / DDR5 updated in At a Glance section