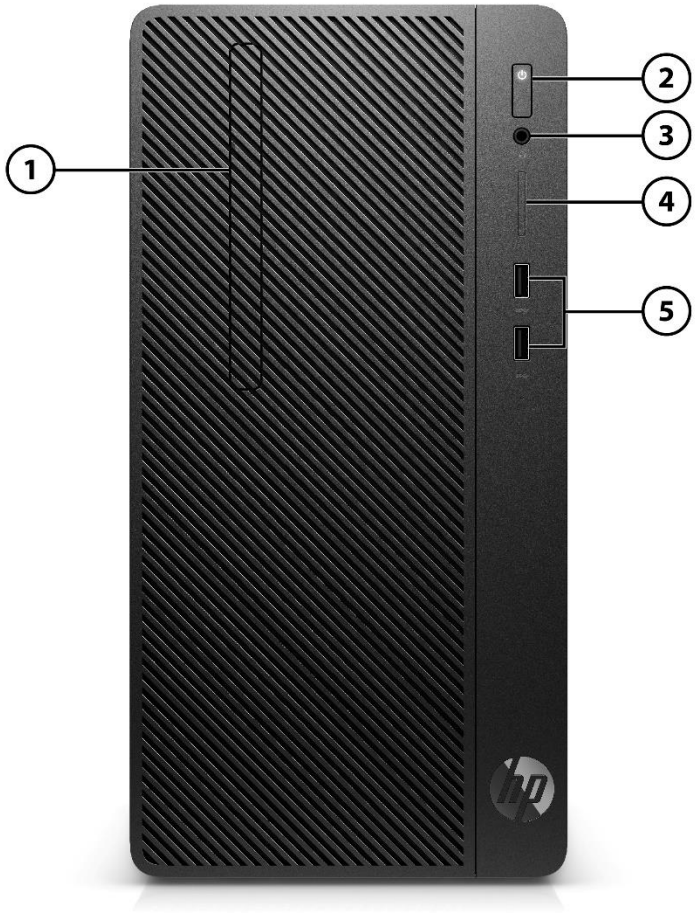
Overview

HP Desktop Pro A Microtower Business PC

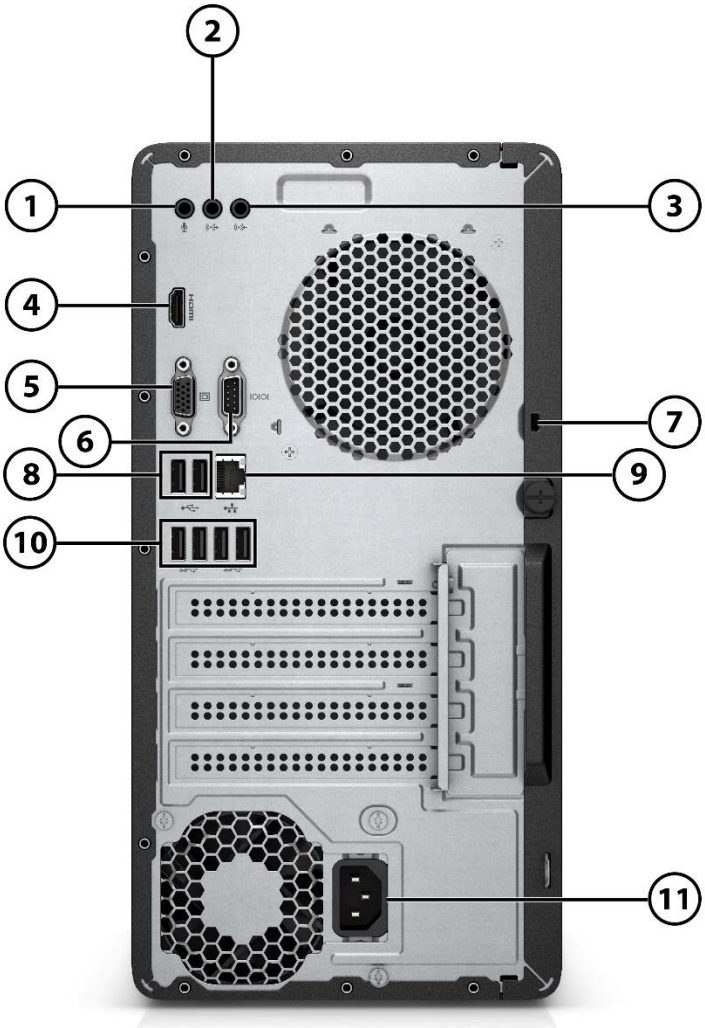


	Front	Not Shown
1.	Slim-height Bay - supporting an optical disk drive (optional)	(1) PCI Express x16
2.	Power Button	(1) PCI Express x1
3.	Combo jack, Headphone/ Microphone	(1) M.2 for WLAN
4.	SD Card Reader	(1) M.2 2230/2280 storage
5.	(2) USB 3.1 Gen1 Ports	(1) 3.5" internal HDD bay
		(1) 3.5”/2.5” internal HDD bay (share bay)

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

Overview

HP Desktop Pro A Microtower Business PC



Rear

1. Audio Mic in
2. Audio Line in
3. Audio Link out
4. HDMI Port (port will be covered up when discrete graphic card is configured on shipped machine)
5. VGA Port (port will be covered up when discrete graphic card is configured on shipped machine)
6. Serial Port

   (2) PS/2 Ports (Optional)
7. Security Lock Slot
8. (2) USB 2.0 Port
9. RJ-45 Network Connector
10. (4) USB 3.1 Gen1 Port
11. Power Cord Connector

Not Shown

(1) Parallel Port (Optional via PCIex1 slot)

Overview

AT A GLANCE

- Windows 10 Pro, Windows 10 Home or FreeDos 2.0
- AMD B350 Chipset, supporting AMD Integrated Radeon™ R5/R7 Graphics
- Supports an optional discrete graphics card
- Integrated 10/100/1000 Ethernet Controller or Realtek ac 1x1+BT 4.2 LE with 1 Antenna
- Up to 32 GB DDR4-2666 Unbuffered Memory (UDIMM)
- Independent monitor support via VGA/HDMI interfaces
- Supports both Hard Disk Drives and SATA TLC / M.2 PCIe NVMe Solid State Drives
- Audio in, Audio out and Mic in support 5.1 channel
- 8 USB ports (including 6 USB 3.1 Gen1)
- 180W/310W 90% HE power supply
- Security cable lock supported (sold separately)
- Protected by HP Services; terms and conditions vary by country; certain restrictions and exclusions apply
- TPM 2.0 support (fTPM)[1]
- Dust filter available

1.TPM feature will not be supported on machines pre-configured with FreeDOS
In selected countries, machines pre-configured with Windows OS will be shipped with TPM disabled.

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

Features

PRODUCT NAME

HP Desktop Pro A Microtower Business PC

OPERATING SYSTEM

Preinstalled	Windows 10 Pro 64[1*] Windows 10 Home 64[1*]
Pre-installed (other)	FreeDOS 2.0[*]

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 10 is automatically updated, which is always enabled. ISP fees may apply and additional requirements may apply over time for updates. See http://www.windows.com/

*Also Available in Brazil

PROCESSORS[2]

AMD® PRO A6*
APU AMD PRO A6-9500 7Gen Dual Core 3.5GHz LGA 65W
(Boost Clock 3.8GHz, 1MB L2 Cache, 2 cores)

AMD® PRO A8
APU AMD PRO A8-9600 7Gen Quad Core 3.1GHz LGA 65W
(Boost Clock 3.4GHz, 2MB L2 Cache, 4 cores)

AMD® PRO A10
APU AMD PRO A10-9700 7Gen Quad Core 3.5GHz LGA 65W
(Boost Clock 3.8GHz, 2MB L2 Cache, 4 cores)

AMD® Ryzen3 Pro*
CPU AMD Ryzen3-Pro 1200 Quad Core 3.1GHz LGA 65W
(Boost Clock 3.4GHz, 2MB L2 Cache / 8MB L3 Cache, 4 cores)

APU AMD Ryzen3-Pro 1300 Quad Core 3.5GHz LGA 65W
(Boost Clock 3.7GHz, 2MB L2 Cache / 8MB L3 Cache, 4 cores)

AMD® Ryzen5 Pro*
CPU AMD Ryzen5-Pro 1500 4C 3.5GHz LGA 65W
(Boost Clock 3.7GHz, 2MB L2 Cache / 16MB L3 Cache, 4 cores)

CPU AMD Ryzen5 2600 Hexa Core 3.4GHz LGA 65W
(Boost Clock 3.9GHz, 3MB L2 Cache / 16MB L3 Cache, 6 cores)

AMD® Ryzen3
APU AMD Ryzen3 2200G Quad Core 3.5GHz LGA 65W with Radeon™ Vega 8 Graphics
(Boost Clock 3.7GHz, 2MB L2 Cache / 4MB L3 Cache, 4 cores)

AMD® Ryzen5*
APU AMD Ryzen5 2400G 4C 3.6GHz LGA 65W
with Radeon™ Vega 11 Graphics (Boost Clock 3.9GHz, 2MB L2 Cache / 4MB L3 Cache, 4 cores)

Features

2. Multi-core 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. AMD's numbering is not a measurement of clock speed.
*Also Available in Brazil

CHIPSET

AMD B350*

GRAPHICS[3]

Integrated
AMD Integrated HD Graphics varies by processors

Discrete Graphics
AMD Radeon R5 420 1GB FH DP VGA PCIe x8[4*]
AMD Radeon R7 430 2GB FH DP VGA PCIe x8*
NVIDIA GeForce GT730 1GB PCIe x8 HDMI GFX
NVIDIA GeForce GT730 2GB PCIe x8 DP GFX*

3. HD content required to view HD images.
4. Selected countries only.
*Also Available in Brazil

MEMORY[5]

Form Factor
Microtower

Type
DDR4 2666 1.2v (Transfer rates up to 2666 MT/s)

Maximum
32 GB capacity

# of Slots
2 DIMM
4GB DDR4-2666 UDIMM NECC (1x4GB)*
8GB DDR4-2666 UDIMM NECC (1x8GB)
8GB (2x4GB) 2666 DDR4 1.2v DIMM*
16GB DDR4-2666 UDIMM NECC (1x16GB)
16GB DDR4-2666 UDIMM NECC (2x8GB)*

5. Running at 2400 MT/s when configure w/ A-series APU.
*Also Available in Brazil

Features

STORAGE[6]

SATA3 - 3.5" or 2.5" 6Gb/s HDDs
2TB 7200 RPM SATA Hard Disk Drive
1TB 7200 RPM SATA Hard Disk Drive*
500GB 7200 RPM SATA Hard Disk Drive*
128GB 2.5" TLC SSD*
256GB 2.5" TLC SSD*

M.2 Solid State Drives
128GB M.2 NVMe (Value) SSD
256GB M.2 NVMe (Value) SSD

SD Card Reader[7]
SD/SDHC/SDXC SD Card Reader*

6. For hard drives and solid state drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 36 GB (for Windows 10) of system disk is reserved for the system recovery software.
7. Card sold separately
*Also Available in Brazil

OPTICAL DISK DRIVES[8]

DVD-ROM 9.5mm*
DVD-Writer 9.5mm*

8. Optical drives are optional or add on features. Duplication of copyrighted material is strictly prohibited. Actual speeds may vary. Double Layer media compatibility will widely vary with some home DVD players and DVD-ROM drives.
*Also Available in Brazil

NETWORKING/COMMUNICATIONS[9]

Networking

Integrated 10/100/1000M GbE LAN

Wi-Fi and Bluetooth®
ac 1x1 +Bluetooth 4.2 LE M.2 2230 PCI-e+USB WW with 1 Antenna

9. 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 ALC3601*
Combo Jack, Headphone/ Microphone*
Support 2W Internal speaker*

Features

KEYBOARDS/POINTING DEVICES[10]

Keyboards
USB Business Slim Wired Keyboard
HP USB Keyboard*
Business Slim USB Antimicrobial Wired Keyboard (China)
Business Slim PS/2 Wired Keyboard
No KB Option*

Mouse
Antimicrobial USB Mouse (China)
HP Optical USB Mouse*
Universal Wired Mouse USB
USB Hardened Mouse (India)
HP PS/2 Mouse (for machine configured with PS/2 port)
No Mouse Option*

10. Keyboards and mouse are optional or add-on features.
*Also Available in Brazil

PORTS/SLOTS

Front I/O Ports
Combo jack, Headphone/ Microphone*
SD Card Reader*
(2) USB 3.1 Gen1 Ports*

Rear I/O Ports
Audio Mic in*
Audio Line in*
Audio Link out*
HDMI Port (port will be covered up when discrete graphic card is configured on shipped machine)*
VGA Port (port will be covered up when discrete graphic card is configured on shipped machine)*

Serial Port
(2) USB 2.0 Port*
RJ-45 Network Connector*
(4) USB 3.1 Gen1 Port*

Not Shown
(2) PS/2 Ports (Optional)*
(1) Parallel Port (Optional via PCIex1 slot)*

BAYS

9.5mm external slimline ODD bay (optional)*
3.5" internal HDD bay*
3.5 or 2.5” internal HDD bay (share bay)*

Features

SOFTWARE COMPONENTS AND APPLICATIONS WITH WINDOWS

Preinstalled Software (varies by country)

Preinstalled (varies by country)*

Security and Protection

McAfee LiveSafe™ (1 year subscription)[13*]

Productivity

Microsoft Office Pro 2016 and Office 365 (Office Centennial)

Dropbox[12*]

ODD Playback and TV Tuners

Power Media Player 14 for HP Consumer PCs with DVD (ODD SKU only)*

Movies

Netflix*

App Stores and Content Purchasing*

Amazon*

HP Utilities and Support

HP Documentation*

HP JumpStart*

HP Recovery Manager*

PBR*

HP SSRM*

HP Audio Switch*

HP Support Assistant*

BTB

HP Setup Integrated OOBE*

Bing*

Priceline*

Hardware Enabling Drivers or software utility

HP ePrint[11*]

HP System Event Utility*

Netclone*

11. Requires an internet connection to HP web-enabled printer and HP ePrint account registration. For a list of eligible printers, supported documents and image types and other HP ePrint details, see http://www.hp.com/go/businessmobileprinting.

12. 25GB of storage for 12 months. Subscription required thereafter or for additional storage capacity.

13. Subscription required.

*Also Available in Brazil

Features

POWER

Power Supply

180 W
EStar Libra2 EPA90 (Gold) Full range 115V/230V

310 W[15*]
SFF ENTL EPA90 (Gold) Full range 115V/230V*

15. 310W PSU selected countries only.
*Also Available in Brazil

DIMENSIONS & WEIGHT

(configured with 1 HDD and 1 ODD)

Chassis (H x W x D)
6.69 x 13.3 x 10.92 in (170 x 338 x 277.5 mm)

System Weight
11.9 lbs / 5.4 kg

Packaging dimensions and weight	**Dimensions**	11.46 x 15.35 x 19.65 in 291 x 390 x499 mm
	Weight	17.64lb / 8 kg

Security Features
TPM 2.0 support (fTPM)1[6]
Security cable slot

16.TPM feature will not be supported on machines pre-configured with FreeDOS
In selected countries, machines pre-configured with Windows OS will be shipped with TPM disabled.

CERTIFICATIONS

CECP
SEPA
ENERGY STAR® certified
CEL
FCC
UL
RoHS
CCC
CE

17. EPEAT® registered where applicable/supported. EPEAT registration varies by country. See www.epeat.net for registration status by country.

Features

SERVICE AND SUPPORT

On-site Warranty: One-year (1-1-1) limited warranty delivers, next business day service for parts and labor and includes free support 24 x 7. One-year onsite and labor are not available in all countries. Service offers terms up to 5 years by choosing an optional HP Care Pack. To choose the right level of service for your HP product, visit HP Care Pack Central: www.hp.com/go/cpc

NOTE 1: Terms and conditions may vary by country. Certain restrictions and exclusions apply. Other warranty variations may be offered in your region.
NOTE 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.
NOTE 3: Technical support applies only to HP-configured and third-party HP qualified hardware and software. 24 x 7 support may not be available in some countries.

Technical Specifications

GRAPHICS

Integrated AMD HD Graphics (Bristol Ridge & Summit Ridge & Raven Ridge)	
DisplayPort™	• DP++ • DisplayPort audio: ○ Linear PCM, Dolby Digital (AC-3), Dolby® TrueHD, DTS Studio Sound™ ○ LPCM at sample rates: 32 kHz, 44.1 kHz, 48 kHz, 88.2 kHz, 96 kHz, 176.4 kHz, and 192 kHz, Bits per sample: 16, 20, and 24 ○ Supports up to 8 channels • 4, 2, or 1-lane transmission • 5.4 Gbps (HBR2), 2.7 Gbps (HBR) , and 1.62 Gbps (RBR) link bit rates • DisplayPort Multi-Stream Transport (MST) for up to three independent video and audio streams on one DisplayPort connector. . The total number of supported displays is also limited by the bandwidth required by the attached DisplayPort capable displays. For example only one 3840 x2160 or 4096 x 2160 display can be connected to a DisplayPort output. • Supports HDCP2.1 • Supports stereoscopic 3D gaming, Blu-ray 3D, and stereoscopic 3D video for 120-Hz frame sequential monitors
Memory	Allocated at system startup and configurable using F10 setup with values of 128MB, 256MB, 512MB and 1024MB. Additional memory that is not in use by the host will be dynamically allocated and will vary depending on the total installed system memory.
Maximum Graphics Memory	Microsoft Windows 10:Variable*
Maximum Color Depth	32 bits/pixel, 8-bits per color component
Graphics/Video API Support	AMD Eyefinity AMD Eyefinity support for up to four displays when at least two displays are operating with DisplayPort 1.2 multi-streaming. Power Management • AMD PowerPlay™ power management technology ○ Dynamic power gating for GPU, UVD, VCE, GFX, DCE, and Graphics Memory Controller (GMC)Dynamic refresh rate supported with digital panels that support this feature • Frame Buffer Compression 3D Acceleration Features DirectX® 12 compliant, including full speed 32-bit floating point per component operations: • Shader Model 5 geometry and pixel support in a unified shader architecture ○ Graphics Core Next (GCN) architecture ○ Advanced shader instructions, including flexible flow control with CPU-level flexibility on branching ○ Read/Write caching system, replacing texture cache with a unified read-write two-level cache ○ Vertex, pixel, geometry, compute, domain, and hull shaders ○ 32-bit and 64-bit floating point processing per component ○ High performance dynamic branching and flow control ○ Shader instruction store, using an advanced caching system ○ Advanced shader design, with ultra-threading sequencer for high efficiency operations ○ Advanced, high performance branching support, including static and dynamic branching ○ High dynamic range rendering with floating point blending, texture filtering, and anti-aliasing support ○ 16-bit and 32-bit floating point components for high dynamic range computations ○ Full anti-aliasing on render surfaces up to and including 128-bit floating point formats • Support for OpenCL™ 1.2, DirectCompute 11 and Microsoft C++ AMP • Support for OpenGL 4.1/4.1+ • Motion Video Acceleration Features

Technical Specifications

	• Supports DVD, Blu-ray, and SDTV/HDTV content playback with low CPU usage
	• Supports stereoscopic 3D Blu-ray
	• Video compression engine:
	  ○ Dedicated hardware (VCE 2.0) assisted encoding of HD video streams to H.264 (main profile)
	  ○ Support H.264 SVC temporal scalability
	  ○ Real-time transcoding by encoding the output from UVD with reduction of CPU utilization and power consumption
	
	• Motion video decode acceleration technology:
	
	  ○ Dedicated hardware (UVD) for H.264, MPEG4, VC-1, MVC, and MPEG2 decode:
	  ○ H.264 implementation based on the ISO/IEC 14496-10 specification
	  ○ MPEG6 implementation based on the ISO/IEC 14496-2 specification
	  ○ VC-1 implementation based on the SMPTE 421M specification
	  ○ MPEG2 implementation based on the ISO 13818-2 specification
	  ○ Multi View Coding (MVC) for Blu-ray 3D content
	  ○ WMV-9 implementation
	  ○ Real time high-definition and standard definition stream decode
	  ○ Real time dual high-definition stream decode

Supported Display Resolutions and Refresh Rates	
Supported Display Resolutions and Refresh Rates	640 x 480 @85Hz 720 x 400@70Hz 800 x 600@85Hz 1024 x 768@85Hz 1152 x 864@85Hz 1280 x 720@85Hz 1280 x 768@85Hz 1280 x 800@85Hz 1280 x 960@85Hz 1280 x 1024@85Hz 1366 x 768@60Hz 1440 x 900@60Hz 1600 x 900@85Hz 1680 x 1050@75Hz 1920 x 1080@60Hz 1920 x 1200@85Hz 1600 x 1200@85Hz 1920 x 1440@85Hz 2048 x 1536@75Hz 2560 x 1440@59.951Hz 2560 x 1600@60Hz 3840 x 2160@60Hz 4096 x 2160@60Hz

Technical Specifications

VGA and DVI-A (analog) display modes	
Resolution/ Depth (bpp) /Refresh Rates	640 x 480 @85Hz 720 x 400@70Hz 800 x 600@85Hz 1024 x 768@85Hz 1152 x 864@85Hz 1280 x 720@85Hz 1280 x 768@85Hz 1280 x 800@85Hz 1280 x 960@85Hz 1280 x 1024@85Hz 1366 x 768@60Hz 1440 x 900@60Hz 1600 x 900@85Hz 1680 x 1050@75Hz 1920 x 1080@60Hz 1920 x 1200@85Hz 1600 x 1200@85Hz 1920 x 1440@85Hz 2048 x 1536@75Hz 2560 x 1440@59.951Hz 2560 x 1600@60Hz 3840 x 2160@60Hz 4096 x 2160@60Hz
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	

AMD Radeon™ R5 420 1GB FH DP VGA PCIe x8	Engine Clock	700MHz
	Memory Clock	900MHz
	Memory Size(width)	1GB(64-bit)
	Memory Type	128 M x 32 GDDR5 @ 2
	Max. Resolution(Analog VGA)	2048x1536x32bpp@75Hz
	Max. Resolution(HDMI)	N/A
	Max. Resolution(DP)	4096x2160@60Hz
	Multi Display Support	2 Displays
	HDCP Compliance	Yes
	Rear I/O connectors(bracket)	DP+VGA
	Cooling(active/passive)	Active fan-sink(Active cooling with dynamic speed)
	Total power consumption(W)	<50W
	PCB form-factor with bracket	PCIex8 LP(half height)PCB with FH bracket

Technical Specifications

Resolution	Refresh Rate*	VGA (DVI-VGA adapter)	DVI-D	DisplayPort	Standard
640 x 480	60, 75, 85	X		X	VESA DMT, C+I52:I89VT 0.31M3
720 x 400	70	X		X	IBM VGA
800 x 600	60, 75, 85	X		X	VESA DMT, CVT0.48M3
1024 x 768	60, 75, 85	X		X	VESA DMT, CVT 0.79M3
1152 x 864	60, 75, 85	X		X	VESA DMT, CVT 0.83MA
1280 x 720	60, 75, 85	X		X	VESA DMT, CVT 0.92M9, CEA-770.3
1280 x 768	60, 60RB, 75, 85	X		X	VESA DMT, CVT 0.98M9/0.98M9-R
1280 x 800	60, 75, 85	X		X	VESA DMT
1280 x 960	60, 75, 85	X		X	VESA DMT
1280 x 1024	60, 75, 85	X		X	VESA DMT, CVT 1.31M4
1366 x 768	60, 60RB	X		X	VESA DMT
1440 x 900	60, 60RB	X		X	VESA DMT
1600 x 900	60, 60RB, 75, 85	X		X	VESA DMT
1680 x 1050	60, 60RB, 75	X		X	VESA DMT, CVT 1.76MA/1.76MA-R
1920 x 1080	60	X		X	VESA DMT, CVT 2.07M9, SMPTE 274M
1920 x 1200	60, 60RB, 75, 85	X		X	DMT, CVT 2.30MA/2.30MA-R
1600 x 1200	60, 75, 85	X		X	VESA DMT, 1.92M3
1920 x 1440	60, 75, 85	X		X	VESA DMT, CVT 2.76M3
2048 x 1536	60,75	X		X	CVT 3.15M3
2560 x 1440	59.951			X	CVT 3.69M9-R
2560 x 1600	60, 60RB			X	VESA DMT, CVT 4.10MA/4.10MA-R
3840 x 2160	24			X	CVT-RBv1/v2 (8.29M9-R), SMPTE 274M
3840 x 2160	25			X	CVT-RBv1/v2 (8.29M9-R), SMPTE 274M

Technical Specifications

3840 x 2160	30			X	CVT-RBv1/v2 (8.29M9-R), SMPTE 274M
3840 x 2160	50			X	CVT-RBv1/v2 (8.29M9-R), SMPTE 274M
3840 x 2160	60			X	CVT-RBv1/v2 (8.29M9-R), SMPTE 274M
4096 x 2160	24			X	CVT-RBv1/v2 (8.85M-R), SMPTE 274M
4096 x 2160	25			X	CVT-RBv1/v2 (8.85M-R), SMPTE 274M
4096 x 2160	30			X	CVT-RBv1/v2 (8.85M-R), SMPTE 274M
4096 x 2160	50			X	CVT-RBv1/v2 (8.85M-R), SMPTE 274M
4096 x 2160	60			X	CVT-RBv1/v2 (8.85M-R), SMPTE 274M
1920 x 1080	60			X	VESA (SMPTE 274M)
1920 x 1080	50			X	SMPTE 274M
1920 x 1080	30			X	SMPTE 274M
1920 x 1080	24			X	SMPTE 274M
1280 x 720	60			X	VESA (CEA-770.3)
1280 x 720	50			X	SMPTE 296M
720 x 480	60			X	MHL (CEA-770.2)

AMD Radeon™ R7 430 2GB FH DP VGA PCIe x8	Engine Clock	780 MHz
	Memory Clock	1100 MHz
	Memory Size(width)	2GB (128-bit)
	Memory Type	128Mx32 DDR5@4pcs
	Max. Resolution(Analog VGA)	2048x1536x32bpp @75Hz
	Max. Resolution(HDMI)	N/A
	Max. Resolution(DP)	4096x2160 @60Hz
	Multi Display Support	2 DIsplays
	HDCP Compliance	Yes
	Rear I/O connectors(bracket)	DP+VGA
	Cooling(active/passive)	Active fan-sink(Active cooling with dynamic speed)
	Total power consumption(W)	<50W
	PCB form-factor with bracket	PCIex8 LP(half height)PCB with FH bracket

Technical Specifications

Resolution	Refresh Rate*	VGA (DVI-VGA adapter)	DVI-D	DisplayPort	Standard
640 x 480	60, 75, 85	X		X	VESA DMT, CVT 0.31M3
720 x 400	70	X		X	IBM VGA
800 x 600	60, 75, 85	X		X	VESA DMT, CVT0.48M3
1024 x 768	60, 75, 85	X		X	VESA DMT, CVT 0.79M3
1152 x 864	60, 75, 85	X		X	VESA DMT, CVT 0.83MA
1280 x 720	60, 75, 85	X		X	VESA DMT, CVT 0.92M9, CEA-770.3
1280 x 768	60, 60RB, 75, 85	X		X	VESA DMT, CVT 0.98M9/0.98M9-R
1280 x 800	60, 75, 85	X		X	VESA DMT
1280 x 960	60, 75, 85	X		X	VESA DMT
1280 x 1024	60, 75, 85	X		X	VESA DMT, CVT 1.31M4
1366 x 768	60, 60RB	X		X	VESA DMT
1440 x 900	60, 60RB	X		X	VESA DMT
1600 x 900	60, 60RB, 75, 85	X		X	VESA DMT
1680 x 1050	60, 60RB, 75	X		X	VESA DMT, CVT 1.76MA/1.76MA-R
1920 x 1080	60	X		X	VESA DMT, CVT 2.07M9, SMPTE 274M
1920 x 1200	60, 60RB, 75, 85	X		X	DMT, CVT 2.30MA/2.30MA-R
1600 x 1200	60, 75, 85	X		X	VESA DMT, 1.92M3
1920 x 1440	60, 75, 85	X		X	VESA DMT, CVT 2.76M3
2048 x 1536	60,75	X		X	CVT 3.15M3
2560 x 1440	59.951			X	CVT 3.69M9-R
2560 x 1600	60, 60RB			X	VESA DMT, CVT 4.10MA/4.10MA-R
3840 x 2160	24			X	CVT-RBv1/v2 (8.29M9-R), SMPTE 274M
3840 x 2160	25			X	CVT-RBv1/v2 (8.29M9-R), SMPTE 274M

Technical Specifications

3840 x 2160	30			X	CVT-RBv1/v2 (8.29M9-R), SMPTE 274M
3840 x 2160	50			X	CVT-RBv1/v2 (8.29M9-R), SMPTE 274M
3840 x 2160	60			X	CVT-RBv1/v2 (8.29M9-R), SMPTE 274M
4096 x 2160	24			X	CVT-RBv1/v2 (8.85M-R), SMPTE 274M
4096 x 2160	25			X	CVT-RBv1/v2 (8.85M-R), SMPTE 274M
4096 x 2160	30			X	CVT-RBv1/v2 (8.85M-R), SMPTE 274M
4096 x 2160	50			X	CVT-RBv1/v2 (8.85M-R), SMPTE 274M
4096 x 2160	60			X	CVT-RBv1/v2 (8.85M-R), SMPTE 274M
1920 x 1080	60			X	VESA (SMPTE 274M)
1920 x 1080	50			X	SMPTE 274M
1920 x 1080	30			X	SMPTE 274M
1920 x 1080	24			X	SMPTE 274M
1280 x 720	60			X	VESA (CEA-770.3)
1280 x 720	50			X	SMPTE 296M
720 x 480	60			X	MHL (CEA-770.2)

NVIDIA® GeForce® GT730 1GB HDMI DVI PCIe x8 HDMI GFX

Engine Clock	902 MHz
Memory Clock	1250 MHz
Memory Size(width)	1GB (64-bit)
Memory Type	128Mx32 DDR5@2pcs
Max. Resolution(Analog VGA)	N/A
Max. Resolution(HDMI)	4096x2160 @24Hz
Max. Resolution(DP)	N/A
Multi Display Support	2 DIsplays
HDCP Compliance	Yes
Rear I/O connectors(bracket)	DVI-I + HDMI (VGA, via DVI-VGA adapter)
Cooling(active/passive)	Active fan-sink(Active cooling with dynamic speed)
Total power consumption(W)	<35W
PCB form-factor with bracket	PCIex8 LP(half height)PCB with FH bracket

Technical Specifications

Resolution	Refresh Rate*	VGA (DVI-VGA adapter)	DVI-D	DisplayPort	Standard
640 x 480	60, 75, 85	X			VESA DMT, CVT 0.31M3
720 x 400	70	X			IBM VGA
800 x 600	60, 75, 85	X			VESA DMT, CVT0.48M3
1024 x 768	60, 75, 85	X			VESA DMT, CVT 0.79M3
1152 x 864	60, 75, 85	X			VESA DMT, CVT 0.83MA
1280 x 720	60, 75, 85	X			VESA DMT, CVT 0.92M9, CEA-770.3
1280 x 768	60, 60RB, 75, 85	X			VESA DMT, CVT 0.98M9/0.98M9-R
1280 x 800	60, 75, 85	X			VESA DMT
1280 x 960	60, 75, 85	X			VESA DMT
1280 x 1024	60, 75, 85	X			VESA DMT, CVT 1.31M4
1366 x 768	60, 60RB	X			VESA DMT
1440 x 900	60, 60RB	X			VESA DMT
1600 x 900	60, 60RB, 75, 85	X			VESA DMT
1680 x 1050	60, 60RB, 75	X			VESA DMT, CVT 1.76MA/1.76MA-R
1920 x 1080	60	X			VESA DMT, CVT 2.07M9, SMPTE 274M
1920 x 1200	60, 60RB, 75, 85	X			DMT, CVT 2.30MA/2.30MA-R
1600 x 1200	60, 75, 85	X			VESA DMT, 1.92M3
1920 x 1440	60, 75, 85	X			VESA DMT, CVT 2.76M3
2048 x 1536	60,75	X			CVT 3.15M3
2560 x 1440	59.951				CVT 3.69M9-R
2560 x 1600	60, 60RB				VESA DMT, CVT 4.10MA/4.10MA-R
3840 x 2160	24				CVT-RBv1/v2 (8.29M9-R), SMPTE 274M

Technical Specifications

3840 x 2160	25				CVT-RBv1/v2 (8.29M9-R), SMPTE 274M
3840 x 2160	30				CVT-RBv1/v2 (8.29M9-R), SMPTE 274M
3840 x 2160	50				CVT-RBv1/v2 (8.29M9-R), SMPTE 274M
3840 x 2160	60				CVT-RBv1/v2 (8.85M-R), SMPTE 274M
4096 x 2160	24				CVT-RBv1/v2 (8.85M-R), SMPTE 274M
4096 x 2160	25				CVT-RBv1/v2 (8.85M-R), SMPTE 274M
4096 x 2160	30				CVT-RBv1/v2 (8.85M-R), SMPTE 274M
4096 x 2160	50				VESA (SMPTE 274M)
4096 x 2160	60				SMPTE 274M
1920 x 1080	60				SMPTE 274M
1920 x 1080	50				SMPTE 274M
1920 x 1080	30				VESA (CEA-770.3)
1920 x 1080	24				SMPTE 296M
1280 x 720	60				MHL (CEA-770.2)
1280 x 720	50				ITU-R BT.1358
720 x 480	60				CEA (VESA DMT)
720 x 576	50				VESA DMT, CVT 0.31M3
640 x 480	60				IBM VGA

Technical Specifications

NVIDIA® GeForce® GT730 2GB DP DVI PCIe x8 GFX	Engine Clock	902 MHZ
	Memory Clock	1250Mhz
	Memory Size(width)	2GB (64-bit)
	Memory Type	256Mx32 DDR5 @ 2pcs
	Max. Resolution(Analog VGA)	N/A
	Max. Resolution(HDMI)	2560x1600 @60Hz
	Max. Resolution(DP)	4096x2160 @60Hz
	Multi Display Support	2 Displays
	HDCP Compliance	Yes
	Rear I/O connectors(bracket)	DVI-I+DP
	Cooling(active/passive)	Active fan-sink(Active cooling with dynamic speed)
	Total power consumption(W)	<35W
	PCB form-factor with bracket	PCIex8 LP(half height)PCB with FH bracket

Technical Specifications

Resolution	Refresh Rate*	VGA (DVI-VGA adapter)	DVI-D	DisplayPort	Standard
640 x 480	60, 75, 85	X		X	VESA DMT, CVT 0.31M3
720 x 400	70	X		X	IBM VGA
800 x 600	60, 75, 85	X		X	VESA DMT, CVT0.48M3
1024 x 768	60, 75, 85	X		X	VESA DMT, CVT 0.79M3
1152 x 864	60, 75, 85	X		X	VESA DMT, CVT 0.83MA
1280 x 720	60, 75, 85	X		X	VESA DMT, CVT 0.92M9, CEA-770.3
1280 x 768	60, 60RB, 75, 85	X		X	VESA DMT, CVT 0.98M9/0.98M9-R
1280 x 800	60, 75, 85	X		X	VESA DMT
1280 x 960	60, 75, 85	X		X	VESA DMT
1280 x 1024	60, 75, 85	X		X	VESA DMT, CVT 1.31M4
1366 x 768	60, 60RB	X		X	VESA DMT
1440 x 900	60, 60RB	X		X	VESA DMT
1600 x 900	60, 60RB, 75, 85	X		X	VESA DMT
1680 x 1050	60, 60RB, 75	X		X	VESA DMT, CVT 1.76MA/1.76MA-R
1920 x 1080	60	X		X	VESA DMT, CVT 2.07M9, SMPTE 274M
1920 x 1200	60, 60RB, 75, 85	X		X	DMT, CVT 2.30MA/2.30MA-R
1600 x 1200	60, 75, 85	X		X	VESA DMT, 1.92M3
1920 x 1440	60, 75, 85	X		X	VESA DMT, CVT 2.76M3
2048 x 1536	60,75	X		X	CVT 3.15M3
2560 x 1440	59.951			X	CVT 3.69M9-R
2560 x 1600	60, 60RB			X	VESA DMT, CVT 4.10MA/4.10MA-R
3840 x 2160	24			X	CVT-RBv1/v2 (8.29M9-R), SMPTE 274M
3840 x 2160	25			X	CVT-RBv1/v2 (8.29M9-R), SMPTE 274M

Technical Specifications

3840 x 2160	30			X	CVT-RBv1/v2 (8.29M9-R), SMPTE 274M
3840 x 2160	50			X	CVT-RBv1/v2 (8.29M9-R), SMPTE 274M
3840 x 2160	60			X	CVT-RBv1/v2 (8.85M-R), SMPTE 274M
4096 x 2160	24			X	CVT-RBv1/v2 (8.85M-R), SMPTE 274M
4096 x 2160	25			X	CVT-RBv1/v2 (8.85M-R), SMPTE 274M
4096 x 2160	30			X	CVT-RBv1/v2 (8.85M-R), SMPTE 274M
4096 x 2160	50			X	VESA (SMPTE 274M)
4096 x 2160	60			X	SMPTE 274M
1920 x 1080	60			X	SMPTE 274M
1920 x 1080	50			X	SMPTE 274M
1920 x 1080	30			X	VESA (CEA-770.3)
1920 x 1080	24			X	SMPTE 296M
1280 x 720	60			X	MHL (CEA-770.2)
1280 x 720	50			X	ITU-R BT.1358
720 x 480	60			X	CEA (VESA DMT)
720 x 576	50			X	VESA DMT, CVT 0.31M3
640 x 480	60			X	IBM VGA

Technical Specifications

STORAGE[1]

2 TB 7.2K rpm SATA 6.0Gb/s 3.5" Hard Disk Drive	**Capacity**	2 TB
	Rotational Speed	7,200 rpm
	Interface	SATA 6.0 Gb/s
	Cache, Multi-segmented (MB)	64 MB
	Height	1.028 in/26.11 mm
	Width	4.0 in/101.6 mm
	Depth	5.787 in/146.99 mm
	Weight	1.38 lb/626 g
	Operating Temperature	41° to 131° F (5° to 55° C)
1 TB 7.2K rpm SATA 6.0Gb/s 3.5" Hard Disk Drive	**Capacity**	1 TB
	Rotational Speed	7,200 rpm
	Interface	SATA 6.0 Gb/s
	Buffer Size	32 MB
	Logical Blocks	1,953,525,168
	Seek Time (typical reads, includes controller overhead, including settling)	Single Track: 2.0 ms Average: 11 ms Full-Stroke: 21 ms
	Height	1 in/2.54 cm
	Width (nominal)	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)
500 GB 7.2K rpm SATA 6.0Gb/s 3.5" Hard Disk Drive	**Capacity**	500 GB
	Rotational Speed	7,200 rpm
	Drive Type	Serial ATA 3.0 (6.0 Gb/s)
	Interface	32 MB
	Buffer Size	976,773,168
	Seek Time	Single Track: 2.0 ms Average: 11 ms Full-Stroke: 21 ms
	Height (nominal)	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)

Technical Specifications

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
	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)	Up to 0.31 lb (140g) without bezel
	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

Technical Specifications

	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)
	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)
128 GB PCIE NVME M.2 2280 Value (Non-SED) Solid State Drive	**Unformatted Capacity**	128GB
	Architecture	3D TLC NAND Flash
	Interface	PCIE Gen3 x4
	Form Factor	M.2 2280
	Dimensions (W x H x D)	22mm x 80mm x 2.23mm
	Weight	< 10g
	Bandwidth Performance	Sequential Read: Up to 770 MB/s Sequential Write: Up to 450 MB/s Random Read: Up to 35K IOPs Random Write: Up to 91K IOPs
	Power	Total Power Consumption (TYP) 100mW (Active) 40mW (Idle)
	Useful Drive Life	72TBW
	Environmental (all conditions, non-condensing)	Operating Temperature: 0° to 70°C Relative Humidity: 5% to 95% Shock: 1,000 G/0.5 ms

Technical Specifications

256GB PCIE NVME M.2 2280 Value (Non-SED) Solid State Drive	**Unformatted Capacity**	256GB
	Architecture	3D TLC NAND Flash
	Interface	PCIE Gen3 x4
	Form Factor	M.2 2280
	Dimensions (W x H x D)	22mm x 80mm x 2.23mm
	Weight	< 10g
	Bandwidth Performance	Sequential Read: Up to 1570 MB/s Sequential Write: Up to 540 MB/s Random Read: Up to 71K IOPs Random Write: Up to 112K IOPs
	Power	Total Power Consumption (TYP) 100mW (Active) 40mW (Idle)
	Useful Drive Life	144TBW
	Environmental (all conditions, non-condensing)	Operating Temperature: 0° to 70°C Relative Humidity: 5% to 95% Shock: 1,000 G/0.5 ms

NOTE: For hard drives and solid state drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 36 GB (for Windows 10) of system disk is reserved for the system recovery software.

128GB M.2 2280 SATA TLC (Non-SED) Solid State Drive	**Unformatted Capacity**	128GB
	Architecture	TLC NAND Flash
	Interface	SATA 3.2 (6.0 Gb/s)
	Form Factor	M.2 2280
	Dimensions (W x H x D)	22mm x 80mm x 2.23mm
	Weight	< 10g
	Bandwidth Performance	Sequential Read: Up to 520MB/s Sequential Write: Up to 450 MB/s Random Read: Up to 70K IOPs Random Write: Up to 30K IOPs
	Power	Total Power Consumption (TYP) 150mW (Active) 50mW (Idle)
	Useful Drive Life	72TBW
	Environmental (all conditions, non-condensing)	Operating Temperature: 0° to 70°C Relative Humidity: 5% to 95% Shock: 1,000 G/0.5 ms

NOTE: For hard drives and solid state drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 36 GB (for Windows 10) of system disk is reserved for the system recovery software.

Technical Specifications

256GB M.2 2280 SATA TLC (Non-SED) Solid State Drive	**Unformatted Capacity**	256GB
	Architecture	TLC NAND Flash
	Interface	SATA 3.2 (6.0 Gb/s)
	Form Factor	M.2 2280
	Dimensions (W x H x D)	22mm x 80mm x 2.23mm
	Weight	< 10g
	Bandwidth Performance	Sequential Read: Up to 520MB/s Sequential Write: Up to 450 MB/s Random Read: Up to 73K IOPs Random Write: Up to 50K IOPs
	Power	Total Power Consumption (TYP) 150mW (Active) 50mW (Idle)
	Useful Drive Life	72TBW
	Environmental (all conditions, non-condensing)	Operating Temperature: 0° to 70°C Relative Humidity: 5% to 95% Shock: 1,000 G/0.5 ms

NOTE: For hard drives and solid state drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 36 GB (for Windows 10) of system disk is reserved for the system recovery software.

Technical Specifications

HIGH DEFINITION AUDIO

Type	Integrated
HD Stereo Codec	Realtek ALC3601
Audio I/O Ports	Front Combo jack, Headphone/ Microphone(Headphone-out 0.5 Ohm Output Impedance, expects at least a 32 ohm load, Microphone-in 150-K ohm Input Impedance) Rear Line-out(190 ohms Output Impedance, expects at least a 10-K ohm load). Mic-in(150-K ohm Input Impedance) Line-in(Input the audio singal to system via the loopback cable) When plug in all rear side jacks, can switch the function to 5.1 ch via audio GUI.
Internal Speaker Amplifier	Codec embeded amp for supportting 2W mono speaker.
Multi-streaming Capable	Multi-streaming can be enabled in the Realtek control panel to allow independent audio streams to be sent to/from the front and rear jacks.
Sampling	Independent sampling rates for DAC's and ADC's; supports resolutions from 16 to 24-bit, 44.1K/ 48 K/96K / 192K Hz for DAC and16 bit, 44.1K/ 48K/ 96K/ 192K Hz for ADC
Wavetable Syntheses	Yes
Analog Audio	Yes
# of Channels on Line-Out	Stereo(Left channel/ Right channel)
Internal Speaker	Yes
External Speaker Jack	2W class D mono amplifier for the internal speaker only. External speakers must be powered externally.

Technical Specifications

NETWORKING

Integrated 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

Technical Specifications

Realtek 802.11ac (1x1) WiFi and Bluetooth® 4.2 Combo[1]

Wireless LAN Standards	IEEE 802.11a IEEE 802.11b IEEE 802.11g IEEE 802.11n IEEE 802.11ac	
Interoperability	Wi-Fi certified	
Frequency Bands	802.11b/g/n	• 2.402 – 2.482 GHz
	802.11a/n	• 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: MCS 0 ~ MCS 15, (20MHz, and 40MHz) • 802.11ac : MCS0 ~ MCS9, (1SS, and 2SS) (20MHz, 40MHz, and 80MHz)	
Modulation	Direct Sequence Spread Spectrum BPSK, QPSK, CCK, 16-QAM, 64-QAM, 256-QAM	
Security	• IEEE and WiFi compliant 64 / 128 bit WEP encryption for a/b/g mode only • AES-CCMP: 128 bit in hardware • 802.1x authentication • WPA, WPA2: 802.1x. WPA-PSK, WPA2-PSK, TKIP, and AES. • WPA2 certification • IEEE 802.11i • Cisco Certified Extensions, all versions through CCX4 and CCX Lite • WAPI	
Network Architecture Models	Ad-hoc (Peer to Peer) Infrastructure (Access Point Required)	
Roaming	IEEE 802.11 compliant roaming between access points	
Output Power	• 802.11b : +14dBm minimum • 802.11g : +12dBm minimum • 802.11a : +12dBm minimum • 802.11n HT20(2.4GHz) : +12dBm minimum • 802.11n HT40(2.4GHz) : +12dBm minimum • 802.11n HT20(5GHz) : +10dBm minimum • 802.11n HT40(5GHz) : +10dBm minimum • 802.11ac VHT80(5GHz) : +10dBm minimum	
Power Consumption	• Transmit mode2.0 W • Receive mode1.6 W • Idle mode (PSP)180 mW(WLAN Associated) • Idle mode50 mW(WLAN unassociated) • Connected Standby 10mW • Radio disabled8 mW	

Technical Specifications

Power Management	ACPI and PCI Express compliant power management 802.11 compliant power saving mode	
Receiver Sensitivity	02.11b, 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 : -84dBm maximum 802.11ac, MCS9 : -59dBm maximum	
Antenna type	High efficiency antenna. One embedded dual band 2.4/5 GHz antenna is provided to the card to support WLAN communications and Bluetooth communications	
Form Factors	PCI-Express M.2 MiniCard	
Dimensions	Type 2230 : 2.3 x 22.0 x 30.0 mm	
Weight	Type 2230 : 2.8g	
Operating Voltage	3.3v +/- 9%	
Temperature	Operating: Non-operating:	14° to 158° F (–10° to 70° C) –40° to 176° F (–40° to 80° C)
Humidity	Operating: Non-operating:	10% to 90% (non-condensing) 5% to 95% (non-condensing)
Altitude	Operating: Non-operating:	0 to 10,000 ft (3,048 m) 0 to 50,000 ft (15,240 m)
LED Activity	LED Amber – Radio OFF; LED White – Radio ON	

HP Integrated Module with Bluetooth 4.0/4.1/4.2 Wireless Technology

Bluetooth® Specification	4.0/4.1/4.2 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.

Receiver Sensitivity Legacy

Power Consumption	Peak (Tx) 330 mW Peak (Rx) 230 mW Selective Suspend 17 mW

Technical Specifications

Range	Legacy : 0~79 (1 MHz/CH) BLE : 0~39 (2 MHz/CH)
Electrical Interface	USB 2.0 compliant
Bluetooth® Software Supported	Microsoft Windows Bluetooth® Software
Link Topology	
Power Management Certifications	ETS 300 328, ETS 300 826 Low Voltage Directive IEC950 UL, CSA, and CE Mark
Bluetooth® Profiles Supported	FCC (47 CFR) Part 15C, Section 15.247 & 15.249
Power Management Certifications	Microsoft Windows ACPI, and USB Bus Support
Certifications	BT4.1-ESR 5/6/7 Compliance
Bluetooth® Profiles Supported	LE Link Layer Ping LE Dual Mode LE Link Layer LE Low Duty Cycle Directed Advertising LE L2CAP Connection Oriented Channels Train Nudging & Interlaced Scan BT4.2 ESR08 Compliance LE Secure Connection- Basic/Full LE Privacy 1.2 –Link Layer Privacy LE Privacy 1.2 –Extended Scanner Filter Policies LE Data Packet Length Extension FAX Profile (FAX) Basic Imaging Profile (BIP)2 Headset Profile (HSP) Hands Free Profile (HFP) Advanced Audio Distribution Profile (A2DP)

1. Wireless access point and Internet service is required. Availability of public wireless access point is limited. The specifications for the 802.11ac WLAN are draft specifications and are not final. If the final specifications differ from the draft specifications, it may affect the ability of the notebook to communicate with other 802.11ac WLAN devices

Technical Specifications

POWER

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	180W : <2.3A; 310W: <4A
Rated Input Current with Energy Efficient* Power Supply	180W active PFC 87/90/87% efficient at 20/50/100% load (115V) 88/91/88% efficient at 20/50/100% load (230V); 310W active PFC 87/90/87% efficient at 20/50/100% load (115V) 88/91/88% efficient at 20/50/100% load (230V)
DC Output	+12.1V
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	70*25mm (linear type)

DIMENSIONS & WEIGHT

Chassis (W x H x D)	6.69 x 13.3 x 10.92 in (170 x 338 x 277.5 mm)
System Volume	915.36cu in 15L
System Weight*	11.9 lbs / 5.4 kg
Tower Stand (H x W x D)	13.42 x 6.69 x 10.92 in (340.8 x 170 x 277.5 mm)
Packaged (H x W x D)	11.46 x 15.35 x 19.65 in 291 x 390 x499 mm
Shipping Weight	17.64lb / 8 kg
Palletization Profile	6 units per layer 7 layer max 42 per pallet Footprint -85.31x39.37x47.24 in (2167 x 1000 x1200 mm)

Technical Specifications

ENVIRONMENTAL & INDUSTRY

Eco-Label Certifications & declarations

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

• IT ECO declaration

• US ENERGY STAR®

• EPEAT® Gold registered in the United States. See http://www.epeat.net for registration status in your country.

System Configuration

The configuration used for the Energy Consumption and Declared Noise Emissions data for the Ultra-slim Desktop model is based on a typically configured PC featuring a hard disk drive, a high efficiency power supply, and a Microsoft Windows® operating system.

Energy Consumption (in accordance with US ENERGY STAR® test method)	**115VAC, 60Hz**	**230VAC, 50Hz**	**100VAC, 60Hz**
Normal Operation (Short idle)	19.99	20.21	20.17
Normal Operation (Long idle)	16.54	17.23	16.53
Sleep	0.75	0.75	0.72
Off	0.32	0.35	0.32

NOTE: Energy efficiency data listed is for an ENERGY STAR® compliant product if offered within the model family . HP computers marked with the ENERGY STAR® Logo are compliant with the applicable U.S. Environmental Protection Agency (EPA) ENERGY STAR® specifications for computers. If a model family does not offer ENERGY STAR® compliant configurations, then energy efficiency data listed is for a typically configured PC featuring a hard disk drive, a high efficiency power supply, and a Microsoft Windows® operating system.

Heat Dissipation*	**115VAC, 60Hz**	**230VAC, 50Hz**	**100VAC, 60Hz**
Normal Operation (Short idle)	68.18	68.92	68.77
Normal Operation (Long idle)	56.39	58.76	56.37
Sleep	2.55	2.56	2.44
Off	1.1	1.2	1.1

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

Technical Specifications

Declared Noise Emissions (in accordance with ISO 7779 and ISO 9296)	Sound Power (L_{WAd}, bels)	Sound Pressure (L_{pAm}, decibels)
Typically Configured – Idle	3.5	25.4
Fixed Disk – Random writes	3.5	25.6

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 (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 contains 0% post-consumer recycled plastic (by wt.)
- This product is 95.1% recycle-able when properly disposed of at end of life.

Packaging Materials

External: PAPER/Corrugated

Internal: PLASTIC/EPS (Expanded Polyethylene)

PLASTIC/Polyethylene low density

The Plastic packaging material is made from 10.5% recycled content.

The corrugated paper packaging materials contains at least 43.8% recycled content.

Material Usage

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

- Asbestos
- Certain Azo Colorants
- Certain Brominated Flame Retardants – may not be used as flame retardants in plastics
- Cadmium
- Chlorinated Hydrocarbons
- Chlorinated Paraffins
- Formaldehyde
- Halogenated Diphenyl Methanes
- Lead carbonates and sulfates
- Lead and Lead compounds

- Mercuric Oxide Batteries
- Nickel – finishes must not be used on the external surface designed to be frequently handled or carried by the user.
- Ozone Depleting Substances
- Polybrominated Biphenyls (PBBs)
- Polybrominated Biphenyl Ethers (PBBEs)
- Polybrominated Biphenyl Oxides (PBBOs)
- Polychlorinated Biphenyl (PCB)
- Polychlorinated Terphenyls (PCT)
- Polyvinyl Chloride (PVC) – except for wires and cables, 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.

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 certifications:

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

and

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

Technical Specifications

COUNTRY OF ORIGIN

China

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

Type	Description	Part #
Memory	HP 4GB DDR4-2666 DIMM	3TK85AA
	HP 8GB DDR4-2666 DIMM	3TK87AA
	HP 16GB DDR4-2666 DIMM	3TK83AA
Storage	HP 500GB SATA 6.0Gb/s Hard Drive	QK554AA
	HP 1TB 7200rpm SATA 6Gbps Hard Drive	QK555AA
	HP Turbo Drive Gen2 256GB M.2 SSD Drive	1CA51AA
	HP 256GB SATA TLC Non-SED Solid State Drive	P1N68AA
	HP 9.5mm G3 8/6/4 SFF G4 400 SFF/MT DVD Writer	1CA53AA
Graphics	NVIDIA GT 730 2GB DP Card	Z9H51AA
	AMD Radeon R7 430 Card	1MX32AA
Security	HP Business PC Security Lock V2 Kit	N3R93AA
	HP Keyed Cable Lock 10mm kit	T1A62AA
Adapters	HP PCIe x1 Parallel Port Card	N1M40AA
	HP HDMI Standard Cable Kit	T6F94AA
	HP USB to Serial Port Adapter	J7B60AA
Networking	Intel Ethernet I210-T1 GbE NIC Card	E0X95AA
Input	HP USB Mouse	QY777AA
	HP USB Hardened Mouse	P1N77AA
	HP USB Keyboard	QY776AA
	HP PS/2 Business Slim Keyboard	N3R86AA
	HP USB Business Slim Keyboard	N3R87AA
	HP Conferencing Keyboard	K8P74AA
	HP USB Antimicrobial Slim Keyboard and Mouse	Z9H50AA
Others	HP Business Headset v2	T4E61AA

Summary of Changes

Date of change:	Version History:		Description of change:
April 30, 2018	V1 to V2	Update	Processors
May 7, 2018	V2 to V3	Update	GT730 1GB graphics card
May 30, 2018	V3 to V4	Update	Processors
June 20, 2018	V4 to V5	Update	Operating system, Processor, Chipset, Optical disk, Audio, Ports, Bays sections