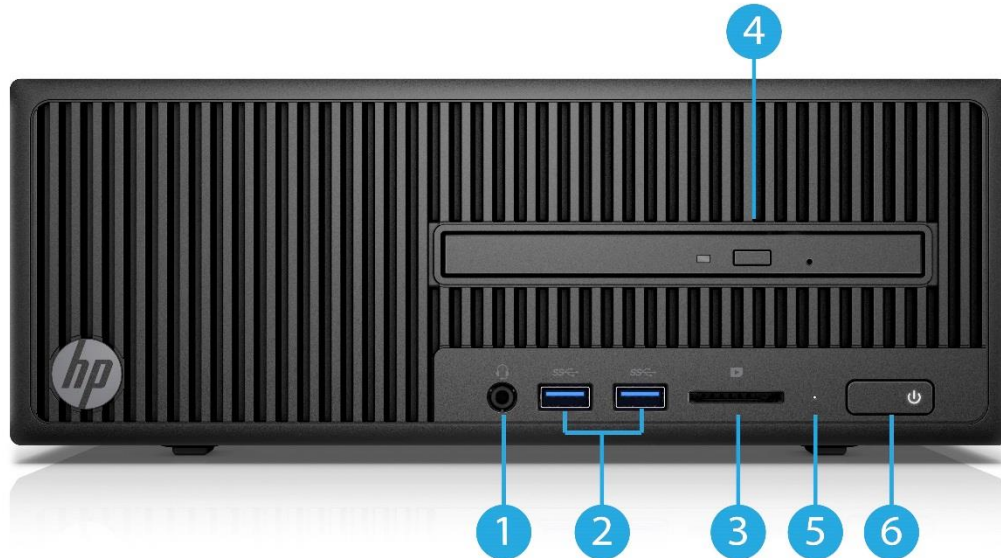


Overview

HP 280 G2 Small Form Factor Business PC



Front

1. Microphone/Headphone Combo Jack
2. (2) USB 3.0 Ports
3. 3-in1 SD Media Card Reader
4. Slim-height Bay - supporting an optical disk drive (optional)
5. PC Status LED
6. Power Button

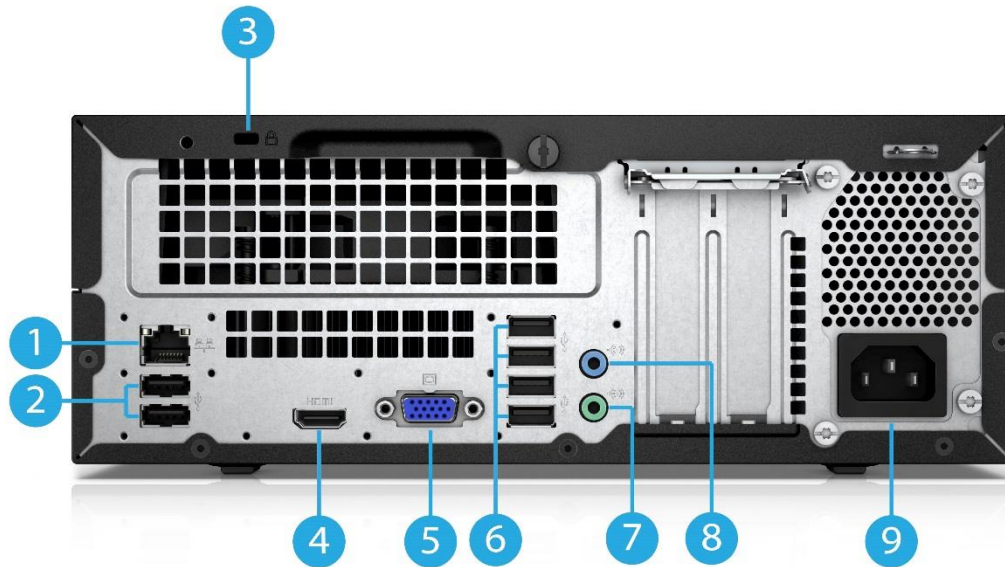
Not Shown

- Slots (1) PCI Express x16 Graphics Connector
(1) PCI Express x1 Accessory Connector

- Bays (1) 3.5" internal storage drive bay

Overview

HP 280 G2 Small Form Factor Business PC



Back

- | | |
|----------------------------|-------------------------|
| 1. RJ-45 Network Connector | 6. (4) USB 2.0 Ports |
| 2. (2) USB 2.0 Ports | 7. Audio Line Out |
| 3. Security Lock Slot | 8. Audio Line In |
| 4. HDMI Port | 9. Power Cord Connector |
| 5. VGA Port | |

Overview

AT A GLANCE

- Windows 10 Pro , Windows 10 Home, NeoKylin Linux (select countries only) or FreeDOS 2.0 operating systems
- Intel® H110 chipset supporting Intel® 6th generation Intel® Celeron®, Pentium®, Core™ i3 and i5 processors featuring Intel® HD Graphics
- Supports an optional discrete graphics card
- Integrated 10/100/1000 Ethernet Controller
- Supports Wake-on-LAN (WOL)
- Up to 32GB DDR4 Unbuffered Memory (UDIMM)
- Supports both Hard Disk and Solid State Drives
- Independent monitor support via VGA video interfaces
- TPM 2.0 support (firmware)
- High definition audio
- 8 USB ports (including 2-USB 3.0 ports)
- 3-in1 SD Media Card Reader
- 180W energy efficient internal power supply
- Security cable lock supported (sold separately)
- Protected by HP Services; terms and conditions vary by country; certain restrictions and exclusions apply

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

Standard Features and Configurable Modules

OPERATING SYSTEMS

Preinstalled (Windows)

Windows 10 Pro 64*
Windows 10 Home 64*

Pre-installed (Other)

FreeDOS 2.0
NeoKylin Linux 64-bit Commercial OS (select countries only)

Web-supported

Windows 10 Pro 64
Windows 10 Home 64

*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.microsoft.com>.

Your product does not support Windows 8 or Windows 7. In accordance with Microsoft's support policy, HP does not support the Windows® 8 or Windows 7 operating system on this product or provide any Windows® 8 or Windows 7 drivers on <http://www.support.hp.com>.

CHIPSET

Intel® H110 Chipset

PROCESSOR*

Intel® Celeron®

Intel® Celeron® G3900 with Intel® HD Graphics 510 (2.8 GHz, 2 MB cache, 2 cores)

Intel® Pentium®

Intel® Pentium® G4400 with Intel® HD Graphics 510 (3.3 GHz, 3 MB cache, 2 cores)

Intel® Core™ i3

Intel® Core™ i3-6100 with Intel® HD Graphics 530 (3.7 GHz, 3 MB cache, 2 cores)

|

Intel® Core™ i5

Intel® Core™ i5-6500 with Intel® HD Graphics 530 (3.2 GHz, 6 MB cache, 4 cores)

*Multicore is designed to improve performance of certain software products. Not all customers or software applications will necessarily benefit from use of this technology. Performance and clock frequency will vary depending on application workload and your hardware and software configurations. Intel's numbering is not a measurement of higher performance.

Standard Features and Configurable Modules

MEMORY*

Both slots are customer accessible / upgradeable, Supports Dual Channel Memory

Form Factor	Type	Maximum	# of Slots
Small Form Factor	DDR4-2133 (Transfer rates up to 2133 MT/s)	32 GB capacity	2 DIMM

2GB DDR4-2133 DIMM (1x2GB)

4GB DDR4-2133 DIMM (1x4GB)

8GB DDR4-2133 DIMM (1x8GB)

8GB DDR4-2133 DIMM (2x4GB) (Dual Channel)

*NOTE: For systems configured with more than 3 GB of memory and a 32-bit operating system, all memory may not be available due to system resource requirements. Addressing memory above 4 GB requires a 64-bit operating system. Memory modules support data transfer rates up to 2133 MT/s; actual data rate is determined by the system's configured processor. See processor specifications for supported memory data rate.

STORAGE*

SATA 3.5" 6Gb/s HDDs*

500GB 7200 RPM SATA Hard Disk Drive

1TB 7200 RPM SATA Hard Disk Drive

Solid State Drives 2.5" *

128GB SATA Value SSD

SD Card Reader**

3-in1 SD Media Card Reader

*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.

**Card sold separately

OPTICAL DISC DRIVES*

HP 9.5mm Desktop G2 Slim DVD-ROM Drive

HP 9.5mm Desktop G2 Slim DVD Writer Drive

*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.

GRAPHICS

Integrated

Intel® Integrated HD Graphics Varies by Processor

Discrete (optional for selected countries only)

NVIDIA® GeForce® GT 730 2GB PCIe x8

Standard Features and Configurable Modules

AUDIO/MULTIMEDIA

HD audio with Realtek ALC3252 Audio Codec
Combo Microphone/Headphone Jack
Line-out and Line-in rear port (3.5mm)

NETWORKING

Ethernet (RJ-45)

Integrated 10/100/1000M Gigabit Ethernet Controller with Realtek RTL8111HSH –CG

- Supports Wake-on-LAN (WOL)

Wireless*

Intel® 3168 802.11ac with PCIe x1 WLAN/ Bluetooth® Combo*®
Intel® 3168 802.11ac with PCIe x1 WLAN/ Bluetooth® Combo*® Disabled

* 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.

PORTS

Front I/O Ports

Two (2) USB 3.0 ports
One (1) Microphone/Headphone Combo Jack

Rear I/O Ports

Six (6) USB 2.0 ports
One (1) RJ45 network connection
One (1) Audio Line out
One (1) Audio Line in
One (1) VGA
One (1) HDMI

Internal I/O Ports

One (1) PCIe x 16 (3.0)
One (1) PCIe x 1 (2.0)

BAYS

One (1) 1st 3.5" Hard Disc Drive Bay
One (1) 9.5mm Slim ODD Bay
One (1) Secure Digital (SD) Reader Bay

KEYBOARDS AND POINTING DEVICES*

Keyboards

Business Slim USB Antimicrobial Standalone Wired Keyboard
HP USB Business Slim Keyboard

Mice

Standard Features and Configurable Modules

HP USB Mouse (China only)

HP USB Mouse

*Keyboards and mouse are optional or add-on features.

SOFTWARE COMPONENTS AND APPLICATIONS WITH WINDOWS

Preinstalled (varies by country)

BIOS

Power On Authentication

Multimedia

Cyberlink Power Media Player

Cyberlink Power2Go (Secure Burn)

HP Value Add Software

HP ePrint Driver¹

HP Recovery Manager

HP Support Assistant

Windows 10 Welcome App

3rd Party

Foxit PhantomPDF Express for HP (optional, US only)

Microsoft Products

Buy Office

Bing Search

Skype

Manageability

Discover HP Touchpoint Manager²

SECURITY FEATURES

Trusted Platform Module (TPM) 2.0 (firmware)

Security cable slot

1. 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>).
2. Subscription required.

POWER SUPPLY*

- 180 W, up to 85% efficient

*Note: All power supplies are not available in every region.

Standard Features and Configurable Modules

DIMENSIONS AND WEIGHT (configured with 1 HDD and 1 ODD)

Chassis (D x W x H)	11.42 x 10.63 x 3.94 in 290 x 270 x 100 mm
System Weight	8.88 lbs / 4.03 kg (for 3.5" HDD) 8.07 lbs / 3.66 kg (for 2.5" SSD)

PACKAGING DIMENSIONS AND WEIGHT

Dimensions	19.65 x 15.71 x 8.98 in (499 x 399 x 228 mm)
Weight	15.5 lbs / 7.03 kg (for 3.5" HDD) 14.68 lbs / 6.66 kg (for 2.5" SSD)

PALLETIZATION AND CONTAINER

Type	Normal 40'G container
Pallet Size	47.24 x 39.37 x 4.96 in 1200 x 1000 x 126 mm
Pallet Profile	1 product/carton 6 cartons/layer 9 layers/pallet Total = 54 pcs per pallet
Pallet Size Loaded	47.24 x 39.37 x 86.81 in 1200 x 100 x 2205 mm
Container Profile	21 pallets/40'G container
Product Quantity per Container	54 x 21 = 1134 pcs

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: 50° to 95° F (10° to 35° C)* Non-operating: -22° to 140° F (-30° to 60° C)
Relative Humidity	Operating: 10% to 90% (non-condensing at ambient) Non-operating: 5% to 95% (non-condensing at ambient)
Maximum Altitude (unpressurized)	Operating: 10,000 ft (3048 m) Non-operating: 30,000 ft (9144 m)

Standard Features and Configurable Modules

* 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.

CERTIFICATIONS

EPEAT® Silver*

CECP

SEPA

WEEE (Waste, Electric and electronic equipment)

ENERGY STAR® 6.1

CEL

FCC

UL

RoHS

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

SERVICE AND SUPPORT

On-site Warranty: One-year (1-1-1) or Three-year (3-3-3) limited warranty delivers three years of on-site, next business day² service for parts and labor and complimentary limited technical support. One-year/Three-year onsite and labor are not available in all countries. Service offers terms up to 5 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: 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.

NOTE 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 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.

Technical Specifications - Graphics

GRAPHICS

Intel® HD Graphics (integrated)			
HDMI	Multimode capable; supports HDCP, HDMI Audio (2 streams), HBR2 link rates and Multi-Stream Technology for a maximum of 3 displays (including the integrated panel)		
Maximum Graphics Memory	Microsoft Windows 7	Windows 8.1	Windows 10
	Up to 1.7GB	Up to 1.8GB	>4 GB
Note: the actual amount of maximum graphics memory can be less than the amounts listed above depending upon your computer's configuration.			
Maximum Color Depth	24/30/36		
Graphics/Video API Support	6th Generation Core™ processors: <ul style="list-style-type: none"> • Next Generation Intel® Clear Video Technology HD Support is a collection of video playback and enhancement features that improve the end user's viewing experience <ul style="list-style-type: none"> ○ Encode/transcode HD content ○ Playback of high definition content including Blu-ray Disc ○ Superior image quality with sharper, more colorful images • DirectX Video Acceleration (DXVA) support for accelerating video processing <ul style="list-style-type: none"> ○ Full AVC/VC1/MPEG2/HEVC HW Decode • Advanced Scheduler 2.0, 1.0 • Windows 7, Windows 8.1, Windows 10, Linux OS Support • DirectX 12.1 • OpenGL 4.4 • Open CL 1.2 (Intel® HD Graphics 510) • Open CL 1.2/2.0 (Intel® HD Graphics 530) 		
Supported Display Resolutions and Refresh Rates			
Note: other resolutions may be available but are not recommended as they may not have been tested and qualified by HP			
	Resolution	Refresh Rates	
	800x600	60 Hz	
	1024x768	60 Hz	
	1152x864	60 Hz	
	1280x600	60 Hz	
	1280x720	60 Hz	
	1280x800	60 Hz	
	1280x960	60 Hz	
	1280x1024	60 Hz	
	1360x768	60 Hz	
	1366x768	60 Hz	
	1400x1050	60 Hz	
	1440x900	60 Hz	
	1600x900	60 Hz	
	1600x1200*	60 Hz	
	1680x1050	60 Hz	
	1920x1080	60 Hz	
* Only supported on displays connected to the external DisplayPort connector.			

Technical Specifications - Graphics

NVIDIA® GeForce® GT 730 2GB PCIe x8 Graphics Card

Introduction	Get impressive graphics and high resolution dual-display performance in a low profile, PCI Express x8 graphics add-in card based on the NVIDIA® Kepler™ Graphics Processor. Improve your everyday PC, Web conferencing, and video or photo editing.
Memory	2GB DDR3 64-bit wide frame buffer operating at 900 MHz
Controller Clock Speed	NVIDIA® Kepler™ GPU operating at 902 MHz
Multi-display Support	A maximum of 4 displays are supported by the card.
Graphics /API support	Supports Microsoft DirectX 12, OpenGL 4.4 and OpenCL 2 APIs, Shade Model 5, UVD 4.2, VCE 2.0, and DirectCompute 11
Output Connectors	1 x Dual-Link DVI-I, 1x DisplayPort; Includes DVI to VGA adapter Display Port output is multi-mode capable, support Audio, HBR2 and MST

Supported Display Resolutions and Refresh Rates

Note: other resolutions may be available but are not recommended as they may not have been tested and qualified by HP

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

Technical Specifications - Graphics

1920 x 1440	60, 75, 85	X	X	X	VESA DMT, CVT 2.76M3
2048 x 1536	60,75	X	X	X	CVT 3.15M3
2560 x 1440	59.951		X	X	CVT 3.69M9-R
2560 x 1600	60, 60RB		X	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
3840 x 2160	30		X	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	60			X	CVT-RBv1/v2 (8.85M-R), SMPTE 274M
1920 x 1080	60		X	X	VESA (SMPTE 274M)
1920 x 1080	50		X	X	SMPTE 274M
1920 x 1080	30		X	X	SMPTE 274M
1920 x 1080	24		X	X	SMPTE 274M
1280 x 720	60		X	X	VESA (CEA-770.3)
1280 x 720	50		X	X	SMPTE 296M
720 x 480	60		X	X	MHL (CEA-770.2)
720 x 576	50		X	X	ITU-R BT.1358
640 x 480	60		X	X	CEA (VESA DMT)

* >60 refresh rates only for analog (VGA) signaling

Technical Specifications – Hard Disk and Solid State Storage

1TB 7.2K rpm SATA 6.0Gb/s 3.5” Hard Disk Drive		
Capacity	1,000,204,886,016 bytes	
Rotational Speed	7,200 rpm	
Interface	Serial ATA 3.0 (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 (nominal)	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)	
<p>NOTE: "For hard drives and solid state drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 16 GB (for Windows 7) and 36 GB (for Windows 8.1/10) of system disk is reserved for the system recovery software."</p>		

500GB 7.2K rpm SATA 6.0Gb/s 3.5” Hard Disk Drive		
Capacity	500,107,862,016 bytes	
Rotational Speed	7,200 rpm	
Interface	Serial ATA 3.0 (6.0 Gb/s)	
Buffer Size	16 MB	
Logical Blocks	976,773,168	
Seek Time (typical reads, includes controller overhead, including settling)	Single Track:	2.0 ms
	Average:	11 ms
	Full-Stroke:	21 ms
Height (nominal)	1 in/2.54 cm	

Technical Specifications – Hard Disk and Solid State Storage

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)
<p>NOTE: "For hard drives and solid state drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 16 GB (for Windows 7) and 36 GB (for Windows 8.1/10) of system disk is reserved for the system recovery software."</p>	

128GB SATA 2.5" Value (Non-SED) Solid State Drive		
Unformatted Capacity	128 GB	
Architecture	TLC NAND Flash	
Interface	SATA 3.2 (6.0 Gb/s)	
Form Factor	2.5 inch	
Dimensions (W x H x D)	6.98 x 0.7 x 10.05 cm	
Weight	31g	
Bandwidth Performance	Sustained Sequential Read:	Up to 510 MB/s
	Sustained Sequential Write:	Up to 330 MB/s
	Random Read:	Up to 38K IOPs
	Random Write:	Up to 70K IOPs
Power	DC power requirement:	5 VDC 5%-100 mV ripple p-p
	Total power consumption:	50mW (active); 20mW (idle)
Useful Drive Life	72TB written, up to 40GB/day for 5 years	
Environmental (all conditions, non-condensing)	Operating Temperature:	32° to 158° F (0° to 70° C)
	Relative Humidity:	5% to 95%
	Shock:	1,500 G/0.5 ms
<p>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 Windows10) of system disk is reserved for the system recovery software."</p>		

Technical Specifications - Removable Storage

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)	
	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	9.5mm	

Technical Specifications - Removable Storage

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/-R/+RW/ -RW/+R DL /-R DL	Up to 8X
	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)
Power	Source	Slimline SATA DC power receptacle
	DC Power Requirement	5 VDC \pm 5%-100 mV ripple p-p
	DC Current	5 VDC - <1000 mA typical, < 1600 mA maximum
Environmental (all conditions non-condensing)	Temperature	41° to 122° F (5° to 50° C)
	Relative Humidity	10% to 80%
	Maximum Wet Bulb Temperature (operating)	84° F (29° C)

Technical Specifications - Audio

High Definition Audio	
Type	Integrated
HD Stereo Codec	Realtek 2.1-channel ALC3252 codec
Audio I/O Ports	Front Headphone-Out(Gain=0 dB, 1 ohm Input Impedance, function is configurable by audio driver)
	Rear Line-In/Microphone input (Gain=0 dB ,27-K ohm Input Impedance, function is configurable by audio driver)
	Rear Line-Out*(Gain=0 dB, 200 ohm Input Impedance, function is configurable by audio driver)
	All ports are 3.5mm
Internal Speaker Amplifier	N/A
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	8 kHz - 192 kHz
Wavetable Syntheses	Yes – Uses OS soft wavetable
Analog Audio	Yes
# of Channels on Line-Out	Stereo (Left & Right channels)
Internal Speaker	No
External Speaker Jack	Yes

Technical Specifications - Networking/Communication

Realtek RTL8111HSH -CG GbE		
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 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) Jumbo Frame 9K Auto MDI/MDIX Crossover cable detection
	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
	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	PCI Express 1.1 x1 to fully support ASPM L0s/L1 and CLKREQ
	NIC Device Driver Name	PCIe GbE Ethernet Family Controller

Intel® 3168 802.11ac with PCIe x1 WLAN/ Bluetooth® Combo*		
Wireless LAN Standards	IEEE 802.11a IEEE 802.11b IEEE 802.11g IEEE 802.11n IEEE 802.11ac	
Interoperability	Wi-Fi certification	
Frequency Bands	802.11b/g/n	2.402 – 2.482 GHz Note: The FCC has declared as of January 1, 2015 products that utilize passive scanning on channel 12/13 and are capable of transmitting must fully comply with requirements of 15.247 or otherwise disable those channels.

Technical Specifications - Networking/Communication

	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 Note: Indonesia only supports 5.725 - 5.825 GHz (CH149 - CH161)
Data Rates		<ul style="list-style-type: none"> 802.11b: 1, 2, 5.5, 11 Mbps 802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps 802.11a: 6, 9, 12, 18, 24, 36, 48, 54 Mbps 802.11n: MCS 0 ~ MCS 15, (20MHz, and 40MHz) 802.11ac : MCS0 ~ MCS7, (1SS) (20MHz, 40MHz, and 80MHz)
Modulation		Direct Sequence Spread Spectrum BPSK, QPSK, CCK, 16-QAM, 64-QAM, 256-QAM
Security¹		<ul style="list-style-type: none"> IEEE and WiFi compliant 64 / 128 bit WEP encryption for a/b/g mode only AES-CCMP: 128 bit in hardware 802.1x authentication WPA, WPA2: 802.1x. WPA-PSK, WPA2-PSK, TKIP, and AES. WPA2 certification IEEE 802.11i Cisco Certified Extensions, all versions through CCX4 and CCX Lite WAPI
		¹ Check latest software/driver release for updates on supported security features.
Network Architecture Models		Ad-hoc (Peer to Peer) Infrastructure (Access Point Required)
Roaming		802.11r Fast Roaming
Output Power²		<ul style="list-style-type: none"> 802.11b : +16dBm minimum 802.11g : +14dBm minimum 802.11a : +14dBm minimum 802.11n HT20(2.4GHz) : +14dBm minimum 802.11n HT40(2.4GHz) : +12dBm minimum 802.11n HT20(5GHz) : +14dBm minimum 802.11n HT40(5GHz) : +12dBm minimum 802.11ac 80MHz(5GHz) : +11dBm minimum
		² Maximum output power may vary by country according to local regulations.
Power Consumption		Transmit: 2.0 W (max) Receive: 1.6 W (max) Idle mode (PSP): 180 mW (WLAN Associated) Idle mode: 50 mW (WLAN unassociated)

Technical Specifications - Networking/Communication

	Connect Standby: 10 mW (WLAN+BT) Radio disabled: 5 mW	
Power Management	ACPI and PCI Express compliant power management 802.11 compliant power saving mode	
Receiver Sensitivity³	802.11b, 1Mbps : -94dBm maximum 802.11b, 11Mbps : -86dBm maximum 802.11g, 6Mbps : -88dBm maximum 802.11g, 54Mbps : -74dBm maximum 802.11a, 6Mbps : -88dBm maximum 802.11a, 54Mbps : -74dBm maximum 802.11n, MCS07 : -69dBm maximum 802.11n, MCS15 : -66dBm maximum 802.11ac, 1SS, MCS-0 : -86dBm maximum 802.11ac, 1SS, MCS-9 : -61dBm maximum 802.11ac, 2SS, MCS-0 : -83dBm maximum 802.11ac, 2SS, MCS-9 : -58dBm maximum	
	³ 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).	
Antenna type	High efficiency antenna with spatial diversity, mounted in the display enclosure Two embedded dual band 2.4/5 GHz antennas are provided to the card to support WLAN MIMO communications and Bluetooth communications	
Form Factors	PCI-Express M.2 MiniCard	
Dimensions	Type 2230 : 2.3 x 22.0 x 30.0 mm Or Type 1630 : 2.3 x 16.0 x 30.0 mm	
Weight	Type 2230 : 2.8g Or Type 1630 : 2g	
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 White – Radio ON	
* Wireless access point and Internet service required and not included. Availability of public wireless access points limited.		
HP Integrated Module with Bluetooth 4.0/4.1/4.2 Wireless Technology		
Bluetooth Specification	4.0/4.1/4.2 Compliant	

Technical Specifications - Networking/Communication

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	<table border="1"> <thead> <tr> <th>Modulation</th> <th>0.01% BER</th> <th>0.001% BER</th> </tr> </thead> <tbody> <tr> <td>GFSK</td> <td>-80 dBm</td> <td>-70 dBm</td> </tr> <tr> <td>$\pi/4$-DQPSK</td> <td>-80 dBm</td> <td>-70 dBm</td> </tr> <tr> <td>8DPSK</td> <td>-80 dBm</td> <td>-70 dBm</td> </tr> </tbody> </table>			Modulation	0.01% BER	0.001% BER	GFSK	-80 dBm	-70 dBm	$\pi/4$ -DQPSK	-80 dBm	-70 dBm	8DPSK	-80 dBm	-70 dBm
Modulation	0.01% BER	0.001% BER													
GFSK	-80 dBm	-70 dBm													
$\pi/4$ -DQPSK	-80 dBm	-70 dBm													
8DPSK	-80 dBm	-70 dBm													
Power Consumption	Peak (Tx) 330 mW Peak (Rx) 230 mW Selective Suspend 17 mW														
Range	Legacy Up to 33 ft (10 m) BLE Up to 99 ft (30 m)														
Electrical Interface	USB 2.0 compliant														
Bluetooth Software Supported Link Topology	Microsoft Windows Bluetooth Software														
Electrical Interface Bluetooth Software Supported Security	Point to Point, Multipoint Pico Nets up to 7 slaves														
	Full support of Bluetooth Security Provisions														
Power Management Certifications	Microsoft Windows ACPI, and USB Bus Support														
	Self-configurable to optimize power conservation in all operating modes, including Standby, Hold, Park, and Sniff														
Security	All necessary regulatory approvals for supported countries, including:														
Certifications Bluetooth Profiles Supported	FCC (47 CFR) Part 15C, Section 15.247 & 15.249														
Power Management Certifications	ETS 300 328, ETS 300 826														
	Low Voltage Directive IEC950														

Technical Specifications - Networking/Communication

Certifications Bluetooth Profiles Supported	<ul style="list-style-type: none"> UL, CSA, and CE Mark Serial Port Profile (SPP)¹ Service Discovery Application Profile (SDAP) Dial-Up Networking (DUN)^{1,2} Generic Object Exchange Profile (GOEP)^{1,2} Object Push Profile (OPP)^{1,2} Hard Copy Cable Replacement (HCRP)^{1,2} Personal Area Networking Profile (PAN)^{1,2} Human Interface Device Profile (HID)^{1,2} Hands Free Profile (HFP) Advanced Audio Distribution Profile (A2DP) Audio Video Remote Control Profile (AVRCP)
Bluetooth V4.1/V4.2 support feature	<ul style="list-style-type: none"> V4.1: ESR5/6/7 compliant V4.2: ESR8 compliant, LE Secure Connection – Basic.

After-Market Options (availability may vary by region)

<u>Type</u>	<u>Description</u>	<u>Part #</u>
Memory	HP 4GB DDR4-2133 DIMM	P1N51AA
	HP 8GB DDR4-2133 DIMM	P1N52AA
Storage	HP 500GB SATA 6.0Gb/s Hard Drive	QK554AA
Graphics	NVIDIA GeForce GT 730 2GB PCIe x8 Card	N3R90AA
Security	HP Business PC Security Lock V2 Kit	N3R93AA
Multimedia	HP Business Headset v2	N3R89AA
	HP USB Business Speakers v2	T4E61AA
Input	HP USB Keyboard	QY776AA
	HP Conferencing Keyboard	K8P74AA
	HP USB Conferencing Keyboard	N8N57AA
	HP USB Business Slim Keyboard	N3R87AA
	HP USB Antimicrobial Keyboard and Mouse (China Only)	K7X25AA

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Change Log

Date of change:	Version History:		Description of change:
	Version 1 to 2		
December 5, 2016	V2 to 3	Update	SuperMulti references deleted
February 1, 2017	V3 to 4	Update	Software Components and Applications with Windows Section updated. HP BIOS Config Utility (BCU) deleted
April 26, 2017	V4 to 5	Update	Audio Section Updated