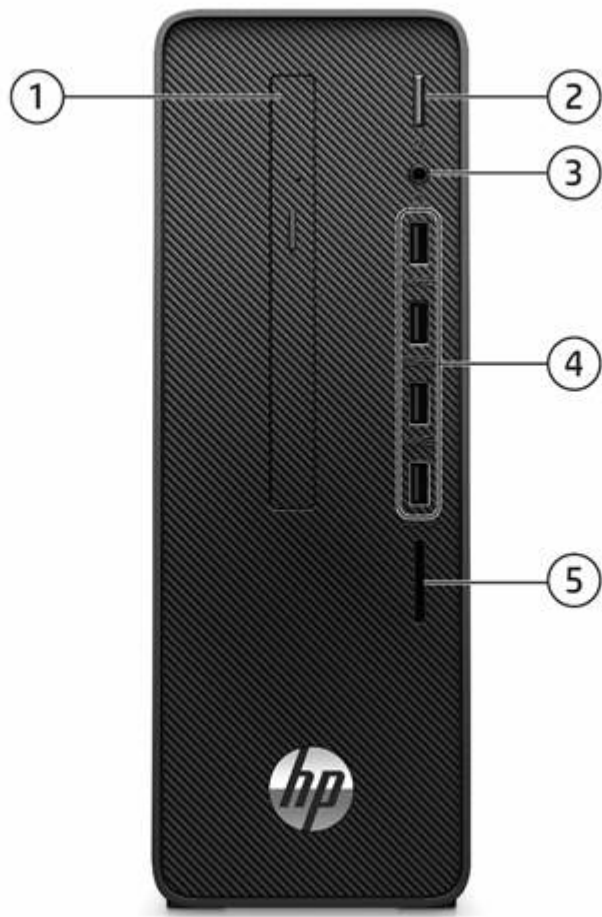


Overview

HP 290 G3 Small Form Factor Business PC



Front

- 1. Slim-height Bay - supporting an optical disk drive (optional)
- 2. Power Button
- 3. Microphone/Headphone Combo Jack
- 4. (4) SuperSpeed USB 5Gbps signaling rate Ports¹
- 5. SD Media Card Reader

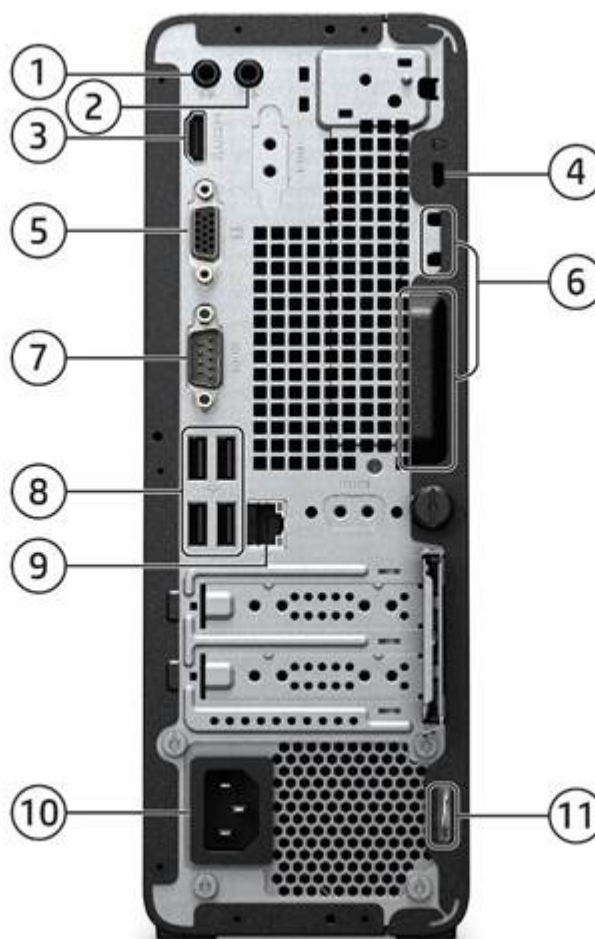
Not Shown

- Slots
- (1) PCI Express x16
 - (1) PCI Express x1
 - (1) M.2 for WLAN
 - (1) M.2 2242/2280 storage
- Bays
- (1) 3.5" or (2) 2.5" internal storage with caddy (share bay)
 - (1) 9.5mm internal optical drive bay

1. SuperSpeed USB 5Gbps = USB3.2 Gen1

Overview

HP 290 G3 Small Form Factor Business PC



Back

- | | |
|---------------------------|--------------------------------------|
| 1. Audio Line out | 6. Integrated accessories cable lock |
| 2. Audio Line in | 7. Serial Port |
| 3. HDMI Port ¹ | 8. (4) USB 2.0 ports |
| 4. Standard lock slot | 9. RJ-45 Network Connector |
| 5. VGA Port ¹ | 10. Power Cord Connector |
| | 11. Padlock Loop |

Not Shown

Parallel Port (Optional via PCIe slot)
 4 Serial Port (Optional via PCIe slot)²
 PS/2 Port (Optional)
 Intrusion Sensor (Optional)

1. Port will be covered up when configured with processor which is without internal graphics.
 2. Available to selected region.

Standard Features and Configurable Modules

AT A GLANCE

- Windows 10 Pro, Windows 10 Home or FreeDOS
- Intel® B460 chipset supporting Intel® 10th generation processors, featuring Intel® UHD Graphics
- Supports an optional discrete graphics card
- Integrated 10/100/1000 Ethernet Controller or 802.11a/b/g/n/ac (1x1) Wi-Fi® and Bluetooth® 4.2 Combo
- Up to 64GB DDR4-2933 Unbuffered Memory (UDIMM)
- Independent monitor support via VGA and HDMI interfaces
- TPM 2.0 support (firmware)¹
- Supports both Hard Disk Drives and SATA TLC / M.2 PCIe NVMe Solid State Drives
- 8 USB Ports (including 4 SuperSpeed USB 5Gbps ports)
- 180W Full range 115V/230V EPA 90%/85%³
- Security cable lock supported (sold separately)
- Intrusion sensor supported (optional)
- Optional Care Services available; terms and conditions vary by country; certain restrictions and exclusions apply²

1. TPM feature will be supported on machine pre-configured with FreeDOS, but will default set as disabled in BIOS setup menu. In some cases, machines pre-configured with Windows OS might ship with TPM turned off.

2. HP Care Services sold separately. 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 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.

3. 85% is for specific regions only.

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

OPERATING SYSTEMS

Preinstalled (Windows)

Windows 10 Pro 64¹

Windows 10 Home 64¹

Pre-installed (Other)

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 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>.

PROCESSORS

Standard Features and Configurable Modules

Intel® Celeron® Processors^{2,3,4}

CPU Intel Celeron G5900 Dual Core 3.4GHz 2666MHz 58W (3.4 GHz, 2 MB cache, 2 cores)

CPU Intel Celeron G5905 Dual Core 3.4GHz 2666MHz 58W (3.4 GHz, 2 MB cache, 2 cores)

Intel® Pentium®^{2,3}

CPU Intel Pentium G6400 Dual Core 4.0GHz 2666MHz 58W (4.0 GHz, 4 MB cache, 2 cores)

CPU Intel Pentium G6600 Dual Core 4.2GHz 2666MHz 58W (4.2 GHz 4 MB cache, 2 cores)

Intel 10th Processors

Intel® Core™ i3^{2,3,4}

CPU Intel Core i3-10100 4C 3.6GHz 2666MHz 65W (3.6GHz, turbo up to 4.1GHz, 6 MB cache, 4 cores)

Intel® Core™ i5^{2,3,4}

CPU Intel Core i5-10400 6C 2.9GHz 2666MHz 65W (2.9GHz, turbo up to 4.0GHz, 12 MB cache, 6 cores)*

CPU Intel Core i5-10500 6C 3.1GHz 2666MHz 65W (3.1GHz, turbo up to 4.2GHz, 12 MB cache, 6 cores)

Intel® Core™ i7^{2,3,4}

CPU Intel Core i7-10700 8C 2.9GHz 2933MHz 65W (2.9GHz, turbo up to 4.6GHz, 16MB cache, 8 cores)

2. Your product does not support Windows 8 or Windows 7, In accordance with Microsoft's support policy, HP does not support the Windows® 8 or Windows 7 operating system on products configured with Intel 8th generation and forward processors or provide any Windows® 8 or Windows 7 drivers on <http://www.support.hp.com>

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

4. In accordance with Microsoft's support policy, HP does not support the Windows 8 or Windows 7 operating system on products configured with Intel and AMD 7th generation and forward processors or provide any Windows 8 or Windows 7 drivers on <http://www.support.hp.com>.

CHIPSET

Intel® B460 Chipset

GRAPHICS

Integrated^{4,5}

Intel® UHD

Graphics 630 (integrated on 10th Core i processors and Pentium Gold G6600 processor)

Intel® UHD

Graphics 610 (integrated on Pentium Gold G6400 and Celeron)

Discrete Graphics

AMD Radeon™ R7 430 2GB GFX

4. HD content required to view HD images.

5. Integrated Intel software is available on select models only and requires separately purchased projector, tv or computer monitor with an integrated or external receiver. External receivers connect to the projector, tv or computer monitor via a standard VGA, HDMI cable, also sold separately.

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 2666 (Transfer rates up to 2666 MT/s) DDR4 2933 (Transfer rates up to 2933 MT/s)	64 GB capacity	2 DIMM ⁶
4 GB DDR4-2666 UDIMM (1x4GB)			
4GB DDR4-2933 UDIMM NECC (1x4GB)			
8GB DDR4-2933 UDIMM (1x8GB)			
8GB DDR4-2933 UDIMM (1x4GB)			
16GB DDR4-2933 UDIMM NECC (2x8GB)			
16GB DDR4-2933 UDIMM NECC (1x16GB)			
64GB DDR4-2933 UDIMM NECC (2x32GB)			
8 GB DDR4-2666 UDIMM (1x8GB)			
8 GB DDR4-2666 UDIMM (2x4GB)			
16 GB DDR4-2666 UDIMM (1x16GB)			
16 GB DDR4-2666 UDIMM (2x8GB)			
64GB DDR4-2666 UDIMM (2x32GB)			

6. Memory modules support data transfer rates up to 2933 MT/s; actual data rate is determined by the system's configured processor. See processor specifications for supported memory data rate.
NOTE: DDR3-2933 UDIMM is only available for 10th Gen i7 processor.

STORAGE AND DRIVES

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

M.2 Solid State Drives

- 128GB M.2 NVMe
- 256GB M.2 NVMe
- 512GB M.2 NVMe

SD Card Reader⁷

SD/SDHC/SDXC SD Card Reader

Intel Optane Memory*

SSD Intel 16GB 2280 Optane Memory

7. Card sold separately.
***NOTE:** Optional per configuration

OPTICAL DISC DRIVES

Standard Features and Configurable Modules

DVD-ROM 9.5mm⁸

DVD-Writer 9.5mm⁸

8. Optical drives are optional or add on features. HD-DVD disks cannot be played on this drive. No support for DVD-RAM. Actual speeds may vary. Don't copy copyright-protected materials.

NETWORKING/COMMUNICATIONS

Networking

Integrated 10/100/1000M GbE LAN

Wi-Fi® and Bluetooth®⁹

802.11a/b/g/n/ac (1x1) Wi-Fi® and Bluetooth® 4.2 Combo

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. Wi-Fi 5 (802.11 ac) is backwards compatible with prior 802.11 specs.

AUDIO/MULTIMEDIA

Integrated Hi-Definition Audio

Combo Jack, Headphone/ Microphone

Line-in/ Line-out (3.5mm)

KEYBOARDS/POINTING DEVICES/BUTTONS AND FUNCTIONS KEYS

Keyboard

USB Business Slim Wired Keyboard

HP USB Wired Keyboard

Business Slim USB Antimicrobial Wired Keyboard (China)

No KB Option

Mouse

Antimicrobial USB Mouse (China)

HP Optical USB Mouse

Universal Wired USB Mouse

USB Hardened Mouse (Specific region)

No Mouse Option

PORTS

Standard Features and Configurable Modules

Front

- Slim-height Bay - supporting an optical disk drive (optional)
- (4) SuperSpeed USB 5Gbps signaling rate
- SD Media Card Reader
- Microphone/Headphone Combo Jack
- Power Button

Not Shown

- (1) PCI Express x16
- (1) PCI Express x1
- (1) M.2 for WLAN
- (1) M.2 2242/2280 storage

Rear

- Audio Line out
- Audio Line in
- HDMI Port
- Standard lock slot
- VGA Port
- Serial Port
- (4) USB 2.0 port
- RJ-45 Network Connector
- Power Cord Connector
- Padlock loop
- Integrated Accessories Cable Lock

Not Shown

- (1) Parallel Port (Optional via PClex1 slot)
- (1) 4x Serial port (Optional via PClex1 slot)¹⁰
- (1) PS/2 Port (Optional)
- (1) Intrusion Sensor (Optional)

10. Available for selected regions

BAYS

- (1) 3.5" or (2) 2.5" internal storage with caddy (share bay)
- (1) 9.5mm internal optical drive bay

SOFTWARE COMPONENTS AND APPLICATIONS WITH WINDOWS

Standard Features and Configurable Modules

Security and Protection

McAfee* LiveSafe™ 11

Productivity

Buy Office (sold separately)

Dropbox¹²

ODD Playback

sMedio True DVD for HP

Movies

Netflix¹⁴

App Stores and Content Purchasing

Amazon¹³

HP Utilities and Support

HP Documentation

HP JumpStarts

HP Audio Switch¹⁴

HP Support Assistant¹⁵

BTB

HP Setup Integrated OOBE

Hardware Enabling Drivers or software utility

HP System Event Utility

***NOTE:** Available for LA region only.

11. Free 1-year subscription of McAfee LiveSafe service included. Internet access required and not included. Subscription required after expiration

12. New Dropbox users are eligible to get 25 GB of Dropbox space free for 12 months from date of registration. For complete details and terms of use, including cancellation policies, visit the Dropbox website at <https://www.dropbox.com/help/space/hp-promotion>. Internet service required and not included.

13. Internet access required and not included.

14. Easily switch between speaker and microphone sources with intuitive controls and a consistent app experience

15. For more information visit hp.com/go/hpsupportassistant [Link will vary outside of the U.S.] HP Support Assistant is available for Android and Windows based PCs.

POWER

Power Supply

180 W

EPA85 (Gold) Full range 115V/230V

WEIGHT AND DIMENSIONS

Standard Features and Configurable Modules

(configured with 1 HDD and 1 ODD)

Chassis (W x H x D)	3.74 x 10.63 x 11.65 in (95 x 270 x 296 mm)
System Weight	8.82 lbs / 4 kg*

*NOTE: Weight varies by configuration and component

UNIT ENVIRONMENTAL AND OPERATING CONDITIONS

General Unit Operating Guidelines

Environmental and Industry		<ul style="list-style-type: none">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 ¹⁶
	Non-operating:	-30° to 60° ¹⁶
Relative Humidity	Operating:	5% to 90% (non-condensing at ambient)
	Non-operating:	5% to 90% (non-condensing at ambient)
Maximum Altitude (unpressurized)	Operating:	5,000 m
	Non-operating:	50,000 ft (15240 m)

16. 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.

SERVICE AND SUPPORT

Standard Features and Configurable Modules

On-site Warranty¹⁷: Available three-year (3-3-3) or one-year (1-1-1) limited warranty (varies by country) delivers on-site, next business day¹⁸ service for parts and labor and complimentary limited technical support¹⁹. Three-year onsite and labor are not available in all countries. Service offers terms up to 5 years by choosing an optional HP Care Service²⁰. To choose the right level of service for your HP product, visit HP Care Pack Central: <http://www.hp.com/go/cpc>.

17. Terms and conditions may vary by country. Certain restrictions and exclusions apply. Other warranty variations may be offered in your region.

18. 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.

19. Technical support applies only to HP-configured and third-party HP qualified hardware and software.

20. 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 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® UHD Graphics 630 (integrated on Core i7/i5/i3/Pentium G6500 and above processors) Intel® UHD Graphics 610 (integrated on Pentium G6400 and below/ and Celeron)			
DisplayPort™	Multimode capable; supports HDCP, DisplayPort™ 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	32 bits/pixel		
Graphics/Video API Support	10 th Generation Intel® Core™ processors/Pentium G6500 and above: <ul style="list-style-type: none">• With Intel® UHD Graphics 630• DirectX 12, OpenGL 4.3, OpenCL 1.2, Intel® Quick Sync Video Pentium G6400 and below/ and Celeron <ul style="list-style-type: none">• With Intel® UHD Graphics 610• DirectX 12, OpenGL 4.3, OpenCL 1.2, Intel® Quick Sync Video		
Supported Display Resolutions and Refresh Rates	Max. Resolution (VGA) 2048 x 1536@60Hz Max. Resolution (HDMI) 4096 x 2160@60Hz		
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™ R7 430 2GB Graphics Card

Engine Clock	780 MHz
Memory Clock	1100 MHz
Memory Size(width)	2GB(64-bit)
Memory Type	256M x 32 GDDR5
Max. Resolution(VGA)	2048x1536
Max. Resolution(DP)	4096x2160@60Hz
Multi Display Support	2 displays
HDCP Compliance	yes
Rear I/O connectors(bracket)	VGA+DP
Cooling(active/passive)	Active fan-sink (Active cooling with dynamic speed)
Total power consumption(W)	<50W
PCB form-factor with bracket	LP PCB with FH/LP bracket

Technical Specifications - Storage

STORAGE

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

Capacity	2 TB
Rotational Speed	7,200 rpm
Interface	SATA 6Gb/s NCQ
Buffer Size	64 MB
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)

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

Capacity	1 TB
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	Read: <8.5 ms Write: <9.5 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)

Technical Specifications - Storage

500GB 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	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)

128 GB M.2 2280 PCIe NVMe Three Layer Cell SSD	
Drive Weight	< 10g
Capacity	128 GB
Height	2.38mm
Length	80mm
Width	22mm
Interface	PCIe Gen3x4
Maximum Sequential Read	Up to 2800MB/s
Maximum Sequential Write	Up to 600MB/s
Logical Blocks	250,069,680
Operating Temperature	0° to 70°C (32° to 158°F) [ambient temp]
Features	APST; ASPM L1.2; NVME spec 1.2

256 GB M.2 2280 PCIe NVMe Three Layer Cell SSD	
Drive Weight	< 10g
Capacity	256 GB
Height	2.38mm
Length	80mm
Width	22mm
Interface	PCIe Gen3x4
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

Technical Specifications - Storage

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

Drive Weight	< 10g
Capacity	512 GB
Height	2.38mm
Length	80mm
Width	22mm
Interface	PCIe Gen3x4
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

256 GB M.2 2280 PCIe NVMe SSD

Drive Weight	< 10g
Capacity	256 GB
Height	2.38mm
Length	80mm
Width	22mm
Interface	PCIe Gen3
Maximum Sequential Read	Up to 1600MB/s
Maximum 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

512 GB M.2 2280 PCIe NVMe SSD

Drive Weight	< 10g
Capacity	512 GB
Height	2.38mm
Length	80mm
Width	22mm
Interface	PCIe Gen3
Maximum Sequential Read	Up to 1600MB/s
Maximum 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

Technical Specifications - Storage

500 GB 7200RPM 2.5in SATA HDD

Capacity	500 GB
Rotational Speed	7,200 rpm
Interface	SATA 6 Gb/s
Buffer Size	32 MB
Logical Blocks	976,773,168
Seek Time	12 ms (Average)
Height	0.267 in/6.8 mm (nominal)
Width (nominal)	2.75 in/70 mm (nominal)
Operating Temperature	41° to 131° F (5° to 55° C)

1TB 7200RPM 2.5in SATA HDD

Capacity	1 TB
Rotational Speed	7,200 rpm
Interface	SATA 6 Gb/s
Buffer Size	32 MB
Logical Blocks	1,953,525,168
Seek Time	12 ms (Average)
Height	0.374 in/9.5 mm (nominal)
Width (nominal)	2.75 in/70 mm (nominal)
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 30GB of disk is reserved for system recovery software.

Technical Specifications – Optical Disc Drives

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)

Technical Specifications – Optical Disc Drives

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)

Technical Specifications – Audio

High Definition Audio

Type	Integrated
HD Audio Codec	Realtek ALC3601
Audio I/O Ports	Front side Combo jack for supporting CTIA, Rear side Line-in/ Line-out/ Mic-in jacks
Wavetable Syntheses	Yes
Analog Audio	Yes
Internal Speaker	NA
DAC Sampling Rates	16 to 24-bit; 44.1K/ 48 K/96K / 192K Hz
ADC Sampling Rates	16 bit, 44.1K/ 48K/ 96K/ 192K Hz

Technical Specifications - Power

POWER SUPPLY

P/S 180W SFF ENTS20L EAP85

Operating Voltage Range	180 - 264 VAC
Rated Voltage Range	200-240V AC
Rated Line Frequency	50/60 HZ
Operating Line Frequency	47 - 63 Hz
Rated Input Current	180W : <1.3A
Rated Input Current with Energy Efficient* Power Supply	82/85/82% 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	50 x 20 mm (linear type)

P/S 180W SFF ENTS20L EAP90

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
Rated Input Current with Energy Efficient* Power Supply	87/90/87% efficient at 20/50/100% load (115Vac) 88/92/88% 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	50 x 20 mm (linear type)

Technical Specifications – Weights and Dimensions

WEIGHTS AND DIMENSIONS

Chassis (W x D x H)	3.74 x 11.93 x 10.63 in (95 x 303 x 270 mm) (w/ bezel)
System Volume	463.16cu in 7.6L
System Weight*	8.82 lbs / 4 kg
Packaged (H x W x D)	13.46 x 7.72 x 19.65 in 342 x 196 x 499 mm
Shipping Weight*	13.2 lb / 6 kg
Shipping Weight (Molded Pulp)*	13.86 lb / 6.3 kg
Palletization Profile	12-units per layer 6 layer max 72 per pallet Footprint (H x W x D) 85.91 x 39.37 x 47.24 in (2182 x 1000 x 1200 mm)

*NOTE: Weight varies by configuration and component

Technical Specifications – Networking

NETWORKING

10/100/1000 Integrated 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

Realtek 802.11ac (1x1) Wi-Fi® and Bluetooth® 4.2 Combo *

Wireless LAN Standards1	IEEE 802.11a IEEE 802.11b IEEE 802.11g IEEE 802.11n IEEE 802.11ac 1. Wireless access point and Internet service required and not included. Availability of public wireless access points limited.	
Interoperability	Wi-Fi® certified modules	
Frequency Bands	802.11b/g/n	<ul style="list-style-type: none">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.
	802.11a/n	<ul style="list-style-type: none">4.9 - 4.95 GHz (Japan)5.15 - 5.25 GHz5.25 - 5.35 GHz5.47 - 5.725 GHz5.825 - 5.850
Data Rates	<ul style="list-style-type: none">802.11b: 1, 2, 5.5, 11 Mbps802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps802.11a: 6, 9, 12, 18, 24, 36, 48, 54 Mbps802.11n: MCS 0 ~ MCS 15, (20MHz, and 40MHz)802.11ac : MCS0 ~ MCS9, (1SS, and 2SS) (20MHz, 40MHz, and 80MHz)	

Technical Specifications – Networking

Modulation	<p>Direct Sequence Spread Spectrum</p> <p>BPSK, QPSK, CCK, 16-QAM, 64-QAM, 256-QAM</p>
Security²	<ul style="list-style-type: none"> • IEEE and 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 <p>2 Check latest software/driver release for updates on supported security features.</p>
Network Architecture Models	<p>Ad-hoc (Peer to Peer)</p> <p>Infrastructure (Access Point Required)</p>
Roaming	<p>IEEE 802.11 compliant roaming between access points</p>
Output Power³	<ul style="list-style-type: none"> • 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 <p>3. Maximum output power may vary by country according to local regulations.</p>
Power Consumption	<ul style="list-style-type: none"> • Transmit mode 2.0 W • Receive mode 1.6 W • Idle mode (PSP) 180 mW (WLAN Associated) • Idle mode 50 mW (WLAN unassociated) • Connected Standby 10mW • Radio disabled 8 mW
Power Management	<p>ACPI and PCI Express compliant power management</p> <p>802.11 compliant power saving mode</p>
Receiver Sensitivity⁴	<p>802.11b, 1Mbps : -93.5dBm maximum</p> <p>802.11b, 11Mbps : -84dBm maximum</p> <p>802.11a/g, 6Mbps : -86dBm maximum</p> <p>802.11a/g, 54Mbps : -72dBm maximum</p> <p>802.11n, MCS07 : -67dBm maximum</p> <p>802.11n, MCS15 : -64dBm maximum</p> <p>802.11ac, MCS0 : -84dBm maximum</p> <p>802.11ac, MCS9 : -59dBm maximum</p> <p>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).</p>
Antenna type	<p>High efficiency antenna.</p> <p>One embedded dual band 2.4/5 GHz antenna is provided to the card to support WLAN communications and Bluetooth communications</p>

Technical Specifications – Networking

Form Factor	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 854 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
Range	Legacy : 0~79 (1 MHz/CH) BLE : 0~39 (2 MHz/CH)
Electrical Interface	USB 2.0 compliant
Bluetooth Software Supported Link Topology	Microsoft Windows Bluetooth Software
Power Management Certifications	Microsoft Windows ACPI, and USB Bus Support
Certifications Bluetooth Profiles Supported	BT4.1-ESR 5/6/7 Compliance LE Link Layer Ping LE Dual Mode

Technical Specifications – Networking

	<div>LE Link Layer</div> <div>LE Low Duty Cycle Directed Advertising</div> <div>LE L2CAP Connection Oriented Channels</div> <div>Train Nudging & Interlaced Scan</div> <div>BT4.2 ESR08 Compliance</div> <div>LE Secure Connection- Basic/Full</div> <div>LE Privacy 1.2 -Link Layer Privacy</div> <div>LE Privacy 1.2 -Extended Scanner Filter Policies</div> <div>LE Data Packet Length Extension</div> <div>FAX Profile (FAX)</div> <div>Basic Imaging Profile (BIP)2</div> <div>Headset Profile (HSP)</div> <div>Hands Free Profile (HFP)</div> <div>Advanced Audio Distribution Profile (A2DP)</div>
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After-Market Options (availability may vary by region)

AFTER MARKET OPTIONS

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	AMD Radeon™ R7 430 2GB 2DP Card	5JW82AA
Security	HP Business PC Security Lock V3 Kit	3XJ17AA
	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 Grey v2 Mouse	Z9H74AA
	HP USB Keyboard	QY776AA
	HP USB Business Slim Keyboard	N3R87AA
	HP USB Antimicrobial Slim Keyboard and Mouse	Z9H50AA
Others	HP Business Headset v2	T4E61AA
	HP S101 Speaker bar	5UU40AA

Change Log

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Date of change:	Version History:		Description of change:
July 24, 2020	From v1 to v2	Added	Intel Celeron G5905
July 29, 2020	From v2 to v3	Correction	Dimensions order