Overview

HP Elite Slice





Back

1. Power button
2. Hard drive light
3. Power connector
4. RJ-45 (network) jack
5. USB Type-C™ 3.1 Gen 1 USB port (60 W input, DisplayPort™ Alternate Mode)
6. 2 USB Type A 3.1 Gen 1 ports
7. Dual-Mode DisplayPort™ (DP++)
8. HDMI port
9. UltraSlim cable lock slot

Overview

HP Elite Slice





Back

1. USB Type-C™ 3.1 Gen 1 (15w charging) port
2. Audio-out (headphone)/Audio-in (microphone)
3. Touch Fingerprint Sensor(optional)

Overview

HP Elite Slice for Meeting Rooms





Back

1. Call
2. Mute
3. Volume down
4. Volume up
5. Hang up

Standard Features and Configurable Modules

At A Glance

- Ultra-small form factor
- Two models available:
  - HP Elite Slice
  - HP Elite Slice for Meeting Rooms
- Modular system, from top and base, enhances the interactive experience through unique technology
  - Optional Integrated Cover functionality (optional and must be purchased when configuring your unit)
    - HP Wireless Charging*
    - HP Collaboration Cover with capacitive touch Skype for Business keys (comes with HP Elite Slice for Meeting Rooms)
      - Call or Answer/ Mute/Volume Up/ Volume Down/ Hang up/End or Reject
  - Optional Cable-less Expansion Accessories (sold separately)
    - HP ODD Module
    - HP Audio Module
    - VESA Plate
- HP Sure Start with Dynamic Protection
  - Self-healing BIOS with Sure Start with Dynamic Protection
- USB Type-C™ 3.1 with 60W power input
  - Can be powered by a Display* and pass through DP with one cable
- Optional Touch Fingerprint Sensor
- Windows 10, Windows 10 to Windows 7 Downgrade, FreeDos 2.0UEFI BIOS developed and engineered by HP for better security, manageability and software image stability
- Intel® Q170 chipset supporting Intel 6th generation Core™ processors, featuring integrated Intel HD Graphics and Intel® vPro™ Technology (available with select processors)
- Intel® HD graphics
- Intel® Ethernet Connection I219LM GbE LOM integrated network connection
- DDR4 (up to 32GB) Synchronous Dynamic Random Access Memory (SDRAM)
- Multi-independent monitor support via HDMI and digital DisplayPort™ video interfaces
- Conexant CX7501 audio codec
- High efficiency energy saving power supply options
- ENERGY STAR® certified. EPEAT® Gold registered where applicable/supported. See www.epeat.net for registration status by country.
- Optimized for Skype for Business
- Configurations available with Intel® Unite 3.0
- Low halogen [3]
- Protected by HP Services, including limited warranties up to 3-3-3 (terms and conditions vary by country; certain restrictions and exclusions apply); Care Packs available with up to 5 years Next Business Day Onsite Hardware Support
- Lengthy purchase lifecycles and image stability

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

* All modules sold separately or as an optional feature. Covers are optional and require factory configuration and cannot be combined with other Slice covers. HP Elite Slice with Wireless Charging Cover requires factory configuration and will be available at a future date.

Standard Features and Configurable Modules

ADDITIONAL MODELS

HP Elite Slice for Meeting Rooms

Make meetings smoother with an integrated conferencing solution designed for the office of the future. Simple, secure, and easily managed, it combines one-touch controls, Skype for Business™ and Intel® Unite™ wireless sharing with the soul and manageability of a powerful PC.

- **Comes with additional pre-loaded conferencing software**
  - Intel Unite 3.0 with Skype for Business plugin pre-loaded
  - HP Collaboration Keyboard software pre-loaded [1]
- **Comes with all the standard features of HP Elite Slice except:**
  - Does not come with Fingerprint reader
- **Recommended options** (optional and can be configured at purchase)
  - HP Audio Module
  - HP VESA Plate

[1] HP Collaboration keyboard software allows One Touch meetings with Intel Unite Skype for Business plugin.

OPERATING SYSTEMS

Preinstalled (Windows)

Windows 10 Pro 64*
Windows 10 Home 64*
Windows 10 Pro 64 (National Academic License)***
Windows 7 Professional 64 (available through downgrade rights from Windows 10 Pro)****
Windows 7 Professional 32 (available through downgrade rights from Windows 10 Pro)****

Pre-installed (Other)

FreeDOS 2.0**
NeoKylin Linux 64**

Web-supported

Windows 10 Pro 64
Windows 10 Home 64
Windows 10 Enterprise 64
Windows 7 Professional 64
Windows 7 Professional 32

*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.
**HP Elite Slice for Meeting Rooms will not work with these operating systems.
***Some devices for academic use will automatically be updated to Windows 10 Pro Education with the Windows 10 Anniversary Update. Features vary; see https://aka.ms/ProEducation for Windows 10 Pro Education feature information.
****This system is preinstalled with Windows 7 Pro software and also comes with a license and media for Windows 10 Pro software. You may only use one version of the Windows software at a time. Switching between versions will require you to uninstall one version and install the other version. You must back up all data (files, photos, etc.) before uninstalling and installing operating systems to avoid loss of your data

CHIPSET

Standard Features and Configurable Modules

Intel® Skylake Q170 PCH-H – vPro™

PROCESSOR*

Intel® Core™ i3 - (Not available on HP Elite Slice for Meeting Rooms model)

Intel® Core™ i3-6100T with Intel® HD Graphics 530 (3.2 GHz, 3 MB cache, 2 cores)
Intel® Core™ i3-6300T with Intel® HD Graphics 530 (3.3 GHz, 4 MB cache, 2 cores)

Intel® Core™ i5

Intel® Core™ i5-6500T with Intel® HD Graphics 530 (2.5 GHz, 6 MB cache, 4 cores)
Intel® Core™ i5-6600T with Intel® HD Graphics 530 (32.7 GHz, 6 MB cache, 4 cores)

Intel® Core™ i7

Intel® Core™ i7-6700T with Intel® HD Graphics 530 (32.8 GHz, 8 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.

MEMORY*

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

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

Configurations

4GB DDR4-2133 SODIMM (1x4GB)
8GB DDR4-2133 SODIMM (1x8GB)
8GB DDR4-2133 SODIMM (2x4GB)
16GB DDR4-2133 SODIMM (1x16GB)
16GB DDR4-2133 SODIMM (2x8GB)
32GB DDR4-2133 SODIMM (2x16GB)

*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* (optional and M.2 Drive must be configured at purchase)

Hard Drives 2.5"*

500 GB 7200 RPM
500GB 5400 RPM 2.5in 8GB Hybrid

Solid State Drives M.2 NVMe

256GB Turbo Drive G2 Solid State Drive
256GB Turbo Drive G2 TLC Cell Solid State Drive
512GB Turbo Drive G2 Solid State Drive

Standard Features and Configurable Modules

512GB Turbo Drive G2 TLC Cell Solid State Drive

Sata Solid State Drives 2.5" *

128GB SSD Value Drive
256GB SSD Self Encrypted OPAL2 TLC Drive
256GB SSD TLC Drivel
256GB SSD Value Drive
512GB SSD Self Encrypted OPAL2 TLC Drive
512GB SSD TLC Drive
Intel® Pro 5400S 240GB SSD Drive
Intel® Pro 5400S 240GB SSD Self Encrypted OPAL2 Drive

2nd SATA Storage Drives 2.5" *

500 GB 7200 RPM 2nd
500GB 5400 RPM 2.5in 8GB Hybrid 2nd
128GB SSD Value Drive 2nd
256GB SSD Self Encrypted OPAL2 TLC Drive 2nd
256GB SSD TLC Drivel 2nd
256GB SSD Value Drive 2nd
512GB SSD Self Encrypted OPAL2 TLC Drive 2nd
512GB SSD TLC Drive 2nd
Intel Pro 5400S 240GB SATA 2nd Solid State Drive 2nd
Intel Pro 5400S 240GB SATA Self Encrypted OPAL2 2nd Solid State Drive 2nd

*__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.

OPTICAL DISC DRIVES* (optional)

HP ODD Module (optional)

*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. Note that DVD-RAM cannot read or write to 2.6GB Single Sided/5.2 Double Sided-Version 1.0 Media.

GRAPHICS

Integrated

Intel® HD Graphics 530 with GT2 support , WIDI capable*, DP1.2, HDMI, USB-C port, DirectX 3D

*WIDI not supported on Intel Unite 3.0.

AUDIO/MULTIMEDIA

Conexant CX7501 codec
1x Universal audio jack (w/ re-tasking)
1x 2W internal speaker

Standard Features and Configurable Modules

HP Audio Module (optional)

Standard Features and Configurable Modules

NETWORKING

Ethernet (RJ-45)

Wired Intel® i219LM GbE LOM

Wireless (optional and must be configured at purchase)*

Intel® 3165 ac 1x1 +Bluetooth non-vPro

Intel® 7265 ac 2x2 +Bluetooth non-vPro

Intel® 8260 ac 2x2 +Bluetooth vPro

Intel® 8260 ac 2x2 +Bluetooth non-vPro

* 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. 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.

PORTS

External I/O Ports

1 Universal audio jack (with re-tasking) connector

1 USB Type-C™ (USB 3.1 Gen 1, 15W output) connector

1 USB Type-A (USB 3.1, charging) connector

1 USB Type-A (USB 3.1, S4/S5 wake) connector

1 USB Type-C™ (Alternate Mode DP, USB 3.1 Gen 1, 15W output, 60W input) connector

1 DisplayPort™ connector

1 HDMI connector

1 RJ-45 connector

1 DC-in 7.4mm barrel

Internal I/O Ports

HP Slice Connector (USB C data rates)

SLOTS

1 M.2 2230 PCIe for WLAN (802.11ac 2x2) + BT4.1

1 M.2 2280 PCIe for NVMe SSD

KEYBOARDS AND POINTING DEVICES (optional and must be configured at purchase)*

Keyboards

HP USB Business Slim Keyboard

HP Wireless Slim Keyboard and Mouse (optional, select countries only)

HP Conferencing Keyboard

Mice

HP USB Wired 1000dpi Laser Mouse

HP USB Mouse

HP Wireless Slim Mouse

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

SOFTWARE COMPONENTS AND APPLICATIONS WITH WINDOWS

Preinstalled (varies by country)

BIOS
HP BIOSphere with Sure Start with Dynamic Protection[1]
HP DriveLock
HP BIOS Protection[2]:
- BIOS Update via Network
- Master Boot Record Security
- Power On Authentication
- Pre-Boot Security
- Secure Erase[3]
- Hybrid Boot
- Measured Boot
- Secure Boot
- Absolute Persistence Module[4]
- Preboot Authentication

Multimedia
CyberLink Power Media Player
HP Audio
Native Miracast Support[5]

HP Value Add Software
HP ePrint Driver [6]
HP Recovery Manager
HP Support Assistant
HP Notifications
HP Power Saver
HP Sure Connect
HP Velocity
Windows 10 Welcome App

Microsoft Products
Bing Search
Skype for Business Certified[7]

Manageability
HP Driver Packs[8]
HP SoftPaq Download Manager (SDM)
HP System Software Manager (SSM)[8]
HP BIOS Config Utility (BCU)[8]
HP Client Catalog[8]
HP CIK for Microsoft SCCM[8]
LANDESK Management[9]
Discover HP Touchpoint Manager
HP Image Assistant[8]

Conferencing (only available on HP Elite Slice for Meeting Rooms)

Standard Features and Configurable Modules

Intel Unite 3.0 with Skype for Business plugin pre-loaded

HP Collaboration Keyboard software pre-loaded [12]

Client Security Software

HP Drive Encryption[10]

HP Client Security

- HP Security Manager (including Credential Manager and Password Manager)
- HP Drive Lock
- HP Fingerprint Sensor
- Absolute Persistence Module

Microsoft Defender[11]

Standard

TPM 2.0 Embedded Security Chip (Common Criteria EAL4+ Certified)
For more information on HP Client Security Software Suite, refer to http://www.hp.com/go/clientsecurity.

1. Available only on business PCs with HP BIOS.
2. May require a manual recovery step if all copies of BIOS are compromised or deleted
3. For the methods outlined in the National Institute of Standards and Technology Special Publication 800-88.
4. Absolute agent is shipped turned off, and will be activated when customers activate a purchased subscription. Subscriptions can be purchased for terms ranging multiple years. Service is limited, check with Absolute for availability outside the U.S. The Absolute Recovery Guarantee is a limited warranty. Certain conditions apply. For full details visit: http://www.absolute.com/company/legal/agreements/ computrace-agreement. Data Delete is an optional service provided by Absolute Software. If utilized, the Recovery Guarantee is null and void. In order to use the Data Delete service, customers must first sign a Pre-Authorization Agreement and either obtain a PIN or purchase one or more RSA SecurID tokens from Absolute Software.
5. Miracast is a wireless technology your PC can use to project your screen to TVs, projectors, and streaming media players that also support Miracast. You can use Miracast to share what you're doing on your PC and present a slide show. For more information: http://windows.microsoft.com/en-us/windows-8/project-wireless-screen-miracast
6. 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 www.hp.com/go/eprintcenter). Requires optional broadband module. Broadband use requires separately purchased service contract. Check with service provider for coverage and availability in your area. Separately purchased data plans or usage fees may apply. Print times and connection speeds may vary.
7. Skype is not offered in China.
8. Not preinstalled, however available for download at http://www.hp.com/go/clientmanagement
9. Subscription required.
10. Data is protected prior to Drive Encryption login. Turning the PC off or into hibernate logs out of Drive Encryption and prevents data access.
11. Opt in and internet connection required for updates.
12. HP Collaboration keyboard software allows One Touch meetings with Intel Unite Skype for Business plugin.

SECURITY MANAGEMENT

Sure Start 2.0 with private SPI flash

Active Health (Black box flight recorder)

Infineon TPM SLB9670 TPM 2.0 / TPM 1.2

HP Dual Head Keyed Cable Lock Kit (optional and must be configured at purchase)

Synaptic Metallica USB 8x8mm fingerprint reader (optional and must be configured at purchase)

Standard Features and Configurable Modules

SPI ROM

64 Mb (8 MB) + 64 Mb (8 MB) Firebird SPI part

BIOS

BIOS: HP Full-featured UEFI, Common core

Key features of the HP BIOS include:

- Deployment and manageability – HP BIOS provides several technologies that help integrate the HHP Elite Slice into the enterprise, such as PXE, remote configuration, remote control, and F10 Setup support for 12 languages.
- Update your BIOS via the cloud or standardize on a BIOS version hosted on Enterprise network.
- Select models feature either Intel® Standard Manageability or Intel® Core™ vPro™ Processor Technology.
- Stability – HP BIOS supports the HP stable product roadmap by releasing only critical BIOS changes to the factory and advanced change notification.
- UEFI specification 2.1
- Absolute Persistence agent – For tracking and tracing services, available in select countries, separate software and purchase of a subscription is required.
- Thermal and power management – The HP BIOS provides and enables thermal and power management technologies so component temperatures are managed for high reliability and to assist in operating the HP Business Desktop computer in any enterprise environment.
- Acoustic performance – Industry leading acoustic emissions across the range of operating conditions.
- Serviceability – HP BIOS provides diagnostic and detailed service information.
- Upgrades and recovery – HP BIOS provides numerous ways to upgrade HP Business Desktop computers, including BIOS updates from within DOS (DOSFlash), BIOS updates from within Windows (HPQFlash), HP Client Manager, and fail-safe recovery. In addition, the HP Business Desktop BIOS Utilities tool enables replicated BIOS setup throughout the Enterprise; it is available from within the BIOS software and from the support website.
- HP BIOS uses PKI signing of the BIOS for trusted BIOS upgrades and recovery.

Additional HP BIOS Features:

- Power-On password – Helps prevent an unauthorized user from powering on the system.
- Administrator password – Also known as the setup password, this helps prevent unauthorized changes to the system configuration. If the administrator password is not known, the BIOS version cannot be changed and changes cannot be made to BIOS settings using F10 setup or under the OS.
- Advanced Configuration and Power Interface (ACPI) – Represents a significant innovation in power and configuration management, allowing operating systems and applications to manage power based on activity and usage. HP Elite models use ACPI to provide power conservation features.

S5 Max Power Savings setting supports EU Lot6 requirement and allows the computer to power down below 1W is S5 (when turned off). When S5 Max Power Savings feature is enabled power to slots is turned off along with WOL functionality.

Sure Start with Dynamic Protection

- BIOS Integrity checking – Sure Start protection ensures that only trusted BIOS code is executed and not rootkits, viruses and malware. Verification is done upon boot up, shutdown and while on.
- Sure Start is set by default to automatically repair the BIOS if corrupted or compromised but is policy driven for better manageability.

Standard Features and Configurable Modules

- Protecting beyond BIOS – Integrity checking and repair is extended to other data that should be protected such as network configuration parameters (network name), platform specific information (i.e. system IDs) and other code the system needs to boot.

Audit enabled – System Audit via Sure Start Event Logs capture data such as incident, repair date and time for troubleshooting and investigating.

Core™ vPro™ Processors

INTEL® 6th GENERATION CORE™ vPRO™ PROCESSORS

All HP Elite Slice models featuring this technology include processors that are part of the Intel® Stable Image Platform Program (SIPP) designed to ensure the stability promise inherent in the value proposition of the HP Elite Slice, thus making these models the most stable, secure, and manageable platforms available to enterprises today.

Intel® Advanced Management Technology (AMT) v11.0 – An advanced set of remote management features and functionality which provides network administrators the latest and most effective tools to remotely discover, heal, and protect networked client systems regardless of the system's health or power state. AMT 11.0 includes the following advanced management functions:

- Power Management (on, off, reset)
- Hardware Inventory (includes BIOS and firmware revisions
- Hardware Alerting
- Agent Presence
- System Defense Filters
- SOL/IDER
- Cisco NAC/SDN Support
- ME Wake-on-LAN
- DASH 1.1 compliance
- IPv6 Support
- Fast Call for Help - a client inside or outside the firewall may initiate a call for help via BIOS screen, periodic connections, or alert triggered connection
- Remote Scheduled Maintenance - pre-schedule when the PC connects to the IT or service provider console for maintenance. Remote PCs can get required patches, be inventoried, etc by connecting to their IT console or Service Provider when it's convenient.
- Remote Alerts - automatically alert IT or service provider if issues arise
- Access Monitor - Provides oversight into Intel® AMT actions to support security requirements
- PC Alarm Clock
- Microsoft NAP Support
- Host Base set-up and configuration
- Management Engine (ME) firmware roll back
- Wireless AMT functionality on Desktop (WoDT)
- Enhanced KVM resolution

POWER SUPPLY* (optional and must be configured at purchase)

65 Watt DM Ext Power Adapter External Power Supply

90 Watt DM Ext Power Adapter External Power Supply

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

Standard Features and Configurable Modules

DIMENSIONS AND WEIGHT (configured with 1 HDD)

Chassis (H x W x D)	6.5 x 6.5 x 1.38 in 16.5 x 16.5 x 3.55 cm
System Weight	2.31 lbs / 1.05 kg

PACKAGING DIMENSIONS AND WEIGHT

Dimensions	20.47 x 9.13 x 4.92 in 52.0 x 23.2 x 12.5cm
Weight	6.6 lbs / 3.0 kg

COLOR

Sparkle black color, Copper metal finishes

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, bottom 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)

* 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

Low Halogen
RoHS2 2.06 Compliance
Phthalate restrictions (DINP, DIDP, DnOP, DnPP)
ENERGY STAR® 6
EPEAT® Gold*
EuP Lot6 (<0.5W Off) – Tier 2
ErP Lot 3

Standard Features and Configurable Modules

5.08 ACPI Compliant

*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: Protected by an HP standard three-year (3-3-3) or one-year (1-1-1) limited warranty (varies by region). Certain restrictions and exclusions apply. Limited warranty delivers, next business day service for parts and labor and includes Complimentary Limited Technical Support. 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.

COUNTRY OF ORIGIN

China

Technical Specifications - Graphics

GRAPHICS

Intel® HD Graphics (integrated)			
DisplayPort	Multimode capable; supports HDCP, Display Port Audio (2 streams maximum), HBR2 link rates and Multi-Stream Technology for a maximum of 3 displays)		
HDMI	Supports up to 3840x2160 @ 30 Hz.		
USB-C	The rear USB-C connector supports Display Port Alternate Mode, HDCP, Display Port Audio (2 streams maximum), HBR2 link rates and Multi-Stream Technology for a maximum of 3 displays)		
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	6th Generation Core™ processors:
	• 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
	  ○ Encode/transcode HD content
	  ○ Playback of high definition content including Blu-ray Disc with optional ODD Module.
	  ○ Superior image quality with sharper, more colorful images
	• DirectX Video Acceleration (DXVA) support for accelerating video processing
	  ○ Full AVC/VC1/MPEG2/HEVC HW Decode
	• Advanced Scheduler 2.0, 1.0
	• DirectX 12.1
	• OpenGL 4.4
	• 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

Technical Specifications - Graphics

1920x1080	60 Hz
1920x1200	60 Hz
1920x1440	60 Hz
2560x1440	60 Hz
2560x1600	60 Hz
3840x2160	30 Hz
3840x2160*	60 Hz
4096x2160	30 Hz
4096x2160*	60Hz
* Only supported on displays connected to the DisplayPort or rear USB-C connector.	

Technical Specifications - Storage

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	
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)	

HP 500 GB SATA 6G 2.5” 8GB Solid State Hybrid Drive (SSHD)*		
Formatted Capacity	500 GB	
Spindle Speed	5,400 rpm +/- 0.2%	
Drive Type	Solid State Hybrid Drive (SSHD) technology with NAND Flash	
Interface	SATA 6 Gb/s	
Cache Buffer	64 MB	
NAND Flash Commercial Multilevel Cell (cMLC)	8 GB	
Number of Sectors	976,773,168	
Seek Time (typical reads)	Single Track:	2.0 ms
	Average:	12 ms
Height	0.268 +/-.008 in (6.8 +/- 0.2 mm)	
Width	2.750 +/- 0.010 in (69.85 +/- 0.25 mm)	

Technical Specifications - Storage

Length	3.951 +0.008 / -0.010 in (100.35 +0.20 / -0.25 mm)
Weight	0.209 lb/95 g (max)
Operating Temperature	41° to 131° F (5° to 55° C)
***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.	

HP 256 GB Turbo Drive SSD-M.2 PCIe Card*			
Formatted Capacity	256 GB		
Architecture	Solid State Drive M.2 PCIe Gen 2 x4 AHCI; NCQ Command Set		
Interface	M.2 PCIe Gen 2 x4		
Form Factor	M.2 2280		
Height	7 mm ± 0.20		
Width	.8 mm ± 0.08		
Length	50 mm ± 0.15		
Weight (typical)	Up to 10 g		
Data Transfer Rate (128k Sequential)	Sequential Read	Up to 2150 MB/s	
	Sequential Write	Up to 1200 MB/s	
Power Watts	Power consumption (avg):	Power-Up: N/A Read: 4 W Write: 5.1 W Standby: 700 mW Idle: 70 mW	
Environmental (all conditions, non-condensing)	Operating Temperature:		32° to 158° F (0° to 70° C)
	Relative Humidity:		5% to 95%
	Shock (Linear 2 m/Sec half-sine):		1000 G peak (operating)
***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 - Storage

256GB Turbo Drive G2 TLC Non-SED Solid State Drive			
Unformatted Capacity	256 GB		
Architecture	Solid State Drive with TLC NAND Flash and PCIE interface. Complies with NVMe Standard Power Saving Modes: L1 substates support Multi Queue support		
Interface	PCI-E Gen3 x 4		
Form Factor	M.2 2280		
Height	3.73 mm		
Width	22.00 ± 0.15 mm		
Length	80.00 ± 0.15 mm		
Weight	Up to 8 g		
Bandwidth Performance	Sustained Sequential Read:	Up to 1580 MB/s	
	Sustained Sequential Write:	Up to 300 MB/s	
Power	Power consumption:	Active: Typical 4.5W; Idle: Typical 1.7W L1.2: Typical 2.5mW	
Mean Time Between Failure (MTBF)	1,500,000 hours		
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	

HP 512GB Turbo Drive G2 SSD-M.2 PCIe Card*	
Formatted Capacity	512,288 MB

Technical Specifications - Storage

Architecture	Solid State Drive M.2 PCIe Gen 3 x4 NVMe; NVMe 1.1a Compliant		
Interface	M.2 PCIe Gen 3 x4 NVMe		
Form Factor	M.2 2280 DS		
Height	22 mm ± 0.16		
Width	.8 mm ± 0.08		
Length	50 mm ± 0.15		
Weight (typical)	Up to 10 g		
Data Transfer Rate (128k Sequential)	Sequential Read	Up to 2150 MB/s	
	Sequential Write	Up to 1550 MB/s	
Power Watts	Power consumption (avg):	Power-Up: N/A Read: 4.3 W Write: 6.5 W Standby: 700 mW Idle: 70 mW	
Environmental (all conditions, non-condensing)	Operating Temperature:		32° to 158° F (0° to 70° C)
	Relative Humidity:		5% to 95%
	Shock (Linear 2 m/Sec half-sine):		1000 G peak (operating)
***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.			

256GB Turbo Drive G2 TLC Non-SED Solid State Drive	
Unformatted Capacity	256 GB
Architecture	Solid State Drive with TLC NAND Flash and PCIE interface. Complies with NVMe Standard Power Saving Modes: L1 substates support Multi Queue support

Technical Specifications - Storage

Interface	PCI-E Gen3 x 4	
Form Factor	M.2 2280	
Height	3.73 mm	
Width	22.00 ± 0.15 mm	
Length	80.00 ± 0.15 mm	
Weight	Up to 8 g	
Bandwidth Performance	Sustained Sequential Read:	Up to 1580 MB/s
	Sustained Sequential Write:	Up to 300 MB/s
Power	Power consumption:	Active: Typical 4.5W; Idle: Typical 1.7W L1.2: Typical 2.5mW
Mean Time Between Failure (MTBF)	1,500,000 hours	
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

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

Technical Specifications - Storage

	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
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."		

256GB Turbo Drive G2 TLC OPAL2.0 SED Solid State Drive	
Unformatted Capacity	256 GB
Architecture	Solid State Drive with TLC NAND Flash and PCIE interface. Complies with NVMe Standard Power Saving Modes: L1 substates support Multi Queue support TCG OPAL2.0 compliance
Interface	PCI-E Gen3 x 4
Form Factor	M.2 2280
Height	3.73 mm
Width	22.00 ± 0.15 mm
Length	80.00 ± 0.15 mm
Weight	Up to 8 g

Technical Specifications - Storage

Bandwidth Performance	Sustained Sequential Read:	Up to 2200 MB/s
	Sustained Sequential Write:	Up to 1000 MB/s
Power	Power consumption:	Active: Typical 6.1W; Idle: Typical 40mW L1.2: Typical 5mW
Mean Time Between Failure (MTBF)	1,500,000 hours	
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

256 GB SATA 2.5" TLC Solid State Drive*			
Formatted Capacity	256 GB		
Architecture	Solid State Drive with SATA interface; ATA 8 Compliant and SATA 2.6 compliant		
Interface	Serial ATA 3 (6.0 Gb/s)		
Form Factor	2.5 inch		
Height	7 mm ± 0.20		
Width	69.85 mm ± 0.25		
Length	100.2 mm ± 0.25		
Weight (typical)	36.5 g (+2)		
Data Transfer Rate (128k Sequential)	Sequential Read	Up to 500 MB/s	
	Sequential Write	Up to 455 MB/s	
Power Watts	Power consumption (avg):	Read: 95 mW Write: 95 mW Standby: 70 mW DEVSLP: <7 mW	
	Operating Temperature:		32° to 158° F (0° to 70° C)

Technical Specifications - Storage

Environmental (all conditions, non-condensing)	Relative Humidity:	5% to 95%
	Shock (2 m Sec half-sine):	1500 G peak 0.5ms (operating)
*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.		

256GB SATA 2.5" Value (Non-SED) Solid State Drive		
Unformatted Capacity	256 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
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 - Storage

512GB Turbo Drive G2 TLC OPAL2.0 SED Solid State Drive			
Unformatted Capacity	512 GB		
Architecture	Solid State Drive with TLC NAND Flash and PCIE interface. Complies with NVMe Standard Power Saving Modes: L1 substates support Multi Queue support TCG OPAL2.0 compliance		
Interface	PCI-E Gen3 x 4		
Form Factor	M.2 2280		
Height	3.73 mm		
Width	22.00 ± 0.15 mm		
Length	80.00 ± 0.15 mm		
Weight	Up to 8 g		
Bandwidth Performance	Sustained Sequential Read:	Up to 2200 MB/s	
	Sustained Sequential Write:	Up to 1000 MB/s	
Power	Power consumption:	Active: Typical 6.1W; Idle: Typical 40mW L1.2: Typical 5mW	
Mean Time Between Failure (MTBF)	1,500,000 hours		
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

512 GB SATA 2.5” TLC Solid State Drive*

Technical Specifications - Storage

Formatted Capacity	512 GB		
Architecture	Solid State Drive with SATA interface; ATA 8 Compliant and SATA 2.6 compliant		
Interface	Serial ATA 3 (6.0 Gb/s)		
Form Factor	2.5 inch		
Height	7 mm ± 0.20		
Width	69.85 mm ± 0.25		
Length	100.2 mm ± 0.25		
Weight (typical)	36.5 g (+2)		
Data Transfer Rate (128k Sequential)	Sequential Read	Up to 500 MB/s	
	Sequential Write	Up to 455 MB/s	
Power Watts	Power consumption (avg):	Read: 95 mW Write: 95 mW Standby: 70 mW DEVSLP: <7 mW	
Environmental (all conditions, non-condensing)	Operating Temperature:		32° to 158° F (0° to 70° C)
	Relative Humidity:		5% to 95%
	Shock (2 m Sec half-sine):		1500 G peak 0.5ms (operating)
*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.			

240 GB SATA 2.5 TLC Non-SED SSD (Pro5400S)	
Unformatted Capacity	240 GB
Architecture	Triple-Level Cell (TLC) NAND
Interface	Serial ATA 3.0 (6.0 Gb/s)
Form Factor	2.5 inch
Height	7mm height
Width	69.85 mm ± 0.25

Technical Specifications - Storage

Length	100.45 mm max		
Weight	Up to 65 g		
Bandwidth Performance	Sustained Sequential Read:	Up to 540 MB/s	
	Sustained Sequential Write:	Up to 110 MB/s (Burst up to 460 MB/s)	
Power	Power consumption:	Active : typical 100mW; Idle : typical 60mW;	
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

240GB SATA 2.5" Opal2 SED Solid State Drive (Pro 5400S)		
Unformatted Capacity	240 GB	
Architecture	Solid State Drive with TLC NAND Flash and SATA interface. Fully complies with ATA/ATAPI-7 Standard (Partially Complies with ATA/ATAPI-8) Power Saving Modes: DIPM (Partial / Slumber mode) Support NCQ : Up to 32 depth Synchronous Signal Recovery Support TCG Storage Architecture Core Specification 2.0	
Interface	Serial ATA 3.0 (6.0 Gb/s)	
Form Factor	2.5 inch	
Height	7mm height	
Width	69.85 mm ± 0.25	
Length	100.45 mm max	
Weight	Up to 65 g	
Bandwidth Performance	Sustained Sequential Read:	Up to 540 MB/s

Technical Specifications - Storage

	Sustained Sequential Write:	Up to 110 MB/s (Burst up to 460 MB/s)	
Power	Power consumption:	Active : typical 100mW; Idle : typical 60mW;	
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

Technical Specifications - Audio

High Definition Audio

Conexant CX7501	
Type	Integrated
HD Stereo Codec	Conexant 2 channel CX7501 codec
Audio I/O Ports	1x 3.5mm Universal Audio Jack that supports: Stereo Headphones Stereo Headsets (OMTP or CTIA style with integrated mono microphone) Stereo Line level Input for recording external analog sources Stereo Line level Output for driving externally powered speakers Stereo (or Mono) Microphone input
Internal Speaker Amplifier	2.8W integrated Class D amplifier
Sampling	Up to 192KHz for the DAC and 96KHz for the ADC
Analog Audio	Yes
# of Channels	Stereo (Left & Right channels)
Internal Speaker	1x2W

Intel® I219LM Gigabit Network Connection LOM (standard)	
Connector	RJ-45
System Interface	PCIe + SMBus
Controller	Intel® I219LM Gigabit Ethernet Controller
Data rates supported	Supports operation at 10/100/1000 Mb/s data rates
IEEE Compliance	IEEE 802.3 Ethernet interface for 1000BASE-T, 100BASETX, and 10BASET applications (802.3ab, 802.3u, and 802.3i, respectively). EEE 802.3az support [Low Power Idle (LPI) mode] IEEE 802.3u auto-negotiation conformance
Performance	Jumbo Frames (up to 9 kB) 802.1Q & 802.1p Receive Side Scaling (RSS) Two Queues (Tx & Rx)
Power	• Ultra Low Power at cable disconnect (<1 mW) enables platform support for connected standby • Reduced power consumption during normal operation and power down modes • Integrated Intel® Auto Connect Battery Saver (ACBS) • Single-pin LAN Disable for easier BIOS implementation • Fully integrated Switching Voltage Regulator (iSVR) • Low Power Link-Up (LPLU)
MAC/PHY Interconnect	• PCIe-based interface for active state operation (S0 state) • SMBus-based interface for host and management traffic (Sx low power state)
Management Interface	• MDC/MDIO management interface
Security & Manageability	• Intel® vPro™ support with appropriate Intel chipset components

Intel 7265 802.11ac 2x2 DualBand Combo PCIe x1 Card		
	Wireless LAN Standards	IEEE 802.11a IEEE 802.11b IEEE 802.11g IEEE 802.11n IEEE 802.11ac
	Interoperability	Wi-Fi certified
	Frequency Band	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.

		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 no support this band)
	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[1]	• 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[2]	• 802.11b : +16dBm minimum • 802.11g : +14dBm minimum • 802.11a : +14dBm minimum • 802.11n HT20(2.4GHz) : +13dBm minimum • 802.11n HT40(2.4GHz) : +13dBm minimum • 802.11n HT20(5GHz) : +12dBm minimum • 802.11n HT40(5GHz) : +12dBm minimum • 802.11ac 80MHz(5GHz) : +11dBm minimum
	Power Consumption	Transmit: 2.0 W (max) Receive: 1.6 W (max) Idle mode (PSP): 180 mW (WLAN Associated) Idle mode: 60 mW (WLAN unassociated) Radio disabled: 30 mW
	Power Management	ACPI and PCI Express compliant power management 802.11 compliant power saving mode
	Receiver Sensitivity[3]	802.11b, 1Mbps : -94dBm maximum 802.11b, 11Mbps : -86dBm maximum 802.11g, 6Mbps : -88dBm maximum 802.11g, 54Mbps : -74dBm maximum 802.11a, 6Mbps : -86dBm maximum 802.11a, 54Mbps : -72dBm 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	
	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 Factor	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 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	
	1. Check latest software/driver release for updates on supported security features. 2. Maximum output power may vary by country according to local regulations. 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).		

	HP Integrated Module with Bluetooth® 4.0+EDR Wireless Technology	
	Bluetooth® Specification	4.0+EDR Compliant
	Frequency Band	2402 to 2480 MHz
	Number of Available Channels	79 (1 MHz) available channels
	Data Rates and Throughput	3 Mbps data rate; throughput up to 2.17 Mbps
		Synchronous Connection Oriented links up to 3, 64 kbps, voice channels
		Asynchronous Connection Less links 2178.1 kbps/177.1 kbps asymmetric or 1306.9 kbps symmetric
	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	**Modulation** / **0.01% BER** / **0.001% BER** GFSK / -80 dBm / -70 dBm π/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	Up to 33 ft (10 m)
	Electrical Interface	USB 2.0 compliant
	Bluetooth® Software Supported Link Topology	Microsoft Windows Bluetooth® Software
	Electrical Interface	Point to Point, Multipoint Pico Nets up to 7 slaves

	Bluetooth® Software Supported Security	Full support of Bluetooth® Security Provisions
	Power Management **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
	Certifications **Bluetooth® Profiles Supported**	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] File Transfer Profile (FTP) Synchronization Profile (SYNC) Hard Copy Cable Replacement (HCRP)[1,2] Personal Area Networking Profile (PAN)[1,2] Human Interface Device Profile (HID)[1,2] FAX Profile (FAX) Basic Imaging Profile (BIP)[2] Headset Profile (HSP) Hands Free Profile (HFP) Advanced Audio Distribution Profile (A2DP)

Intel® 3165 1x1 Dual Band 802.11ac WLAN/ Bluetooth® Combo*		
Wireless LAN Standards	IEEE 802.11 ac/a/b/g/n	
Interoperability	Wi-Fi certification	
	WLAN + Bluetooth® Combo M.2 Card device shall meet all of the requirements to support Bluetooth® 4.1 and backwards compatible with 2.1 with EDR	
Frequency Band	802.11b/g/n	2.402-2.482 GHz
	802.11a/n/ac	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 does not support this band)
Antenna Interface	With antennas installed in the system, the antenna peak gain is less than +3dBi in the 2.4GHz band and less than +4dBi in the 5GHz band to allow the device to meet regulatory limits.	

Data Rates	• 02.11b: 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: card will support rates for NSS=1 and NSS=2 for RX and TX for 20 and 40 MHz channels. Short and long guard interval shall be supported. • 802.11ac: card will support rates for NSS=1 and NSS=2 for RX and TX for 80 MHz channels. 433Mbps for 1x.
Security	• I 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 V5 • WAPI
	Note: Check latest software/driver release for updates on supported security features.
Roaming	802.11r Fast Roaming
Output Power (Transmitting)	• 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) : +12dBm minimum
	Notes: 1. RF Tx power have to meet minimum criteria and with +1.5dBm tolerance but -1.5dBm. 2. RF Parameter will be verified by R&S CMW500 via link mode.
Power Consumption	Transmit: 2.0 Watts
	Receive: 1.6 Watts
	Idle mode (PSP): 180 mW (WLAN associated)
	Idle mode: 50 mW (WLAN unassociated)
	Connect Standby 10mW (WLAN+BT)
	Radio off: 5 mW
	Peak operating: 330 mW

Bluetooth® Power Consumption	Receive: 230 mW	
	USB selective suspend: 17 mW	
Power Management	The product conforms to the ACPI and PCI Express M.2 bus methods to manage power of the WLAN components. Supports all 802.11 compliant power-save modes. These include the basic Power Save Polling (PSP) in 802.11 and Automatic Power Save Delivery (APSD) defined in 802.11e.	
Receiver Sensitivity for FER <10%	802.11b, 1Mbps: -94dBm maximum 802.11b, 11Mbps: -86dBm maximum 802.11a/g, 6Mbps: -88dBm maximum 802.11a/g, 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	
	Note: 1. Rx sensitivity have to meet maximum criteria and with -1.5dBm tolerance but +1.5dBm. 2. Note: RF Parameter will be verified by R&S CMW500 via link mode.	
Form Factors	PCI Express M.2 form factor	
Operating Voltage	The card will be powered by a 3.3V, ± 9% supply from the host system.	
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)
* Wireless access point and Internet service required and not included. Availability of public wireless access points 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.		

Intel® 8260 2x2 Dual Band 802.11ac WLAN/ Bluetooth® Combo*		
Wireless LAN Standards	IEEE 802.11 ac/a/b/g/n	
Interoperability	Wi-Fi certification	
	WLAN + Bluetooth® Combo M.2 Card device shall meet all of the requirements to support Bluetooth® 4.1 and backwards compatible with 2.1 with EDR	
Frequency Band	802.11b/g/n	2.402-2.482 GHz
	802.11a/n/ac	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 does not support this band)
Antenna Interface	With antennas installed in the system, the antenna peak gain is less than +3dBi in the 2.4GHz band and less than +4dBi in the 5GHz band to allow the device to meet regulatory limits.	
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: card will support rates for NSS=1 and NSS=2 for RX and TX for 20 and 40 MHz channels. Short and long guard interval shall be supported. • 802.11ac: card will support rates for NSS=1 and NSS=2 for RX and TX for 80 MHz channels. 433Mbps for 1x1 and 867Mbps for 2x2.	
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 V5 • WAPI	
	Note: Check latest software/driver release for updates on supported security features.	
Roaming	802.11r Fast Roaming	
Output Power (Transmitting)	• 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) : +12dBm minimum	
	Notes: 1. RF Tx power have to meet minimum criteria and with +1.5dBm tolerance but -1.5dBm. 2. RF Parameter will be verified by R&S CMW500 via link mode. .	
Power Consumption	Transmit: 2.0 Watts	
	Receive: 1.6 Watts	

	Idle mode (PSP): 180 mW (WLAN associated)	
	Idle mode: 50 mW (WLAN unassociated)	
	Connect Standby 10mW (WLAN+BT)	
	Radio off: 5 mW	
Bluetooth® Power Consumption	Peak operating: 330 mW	
	Receive: 230 mW	
	USB selective suspend: 17 mW	
Power Management	The product conforms to the ACPI and PCI Express M.2 bus methods to manage power of the WLAN components. Supports all 802.11 compliant power-save modes. These include the basic Power Save Polling (PSP) in 802.11 and Automatic Power Save Delivery (APSD) defined in 802.11e.	
Receiver Sensitivity for FER <10%	802.11b, 1Mbps: -94dBm maximum 802.11b, 11Mbps: -86dBm maximum 802.11a/g, 6Mbps: -88dBm maximum 802.11a/g, 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	
	Note: 1. Rx sensitivity have to meet maximum criteria and with -1.5dBm tolerance but +1.5dBm. 2. Note: RF Parameter will be verified by R&S CMW500 via link mode.	
Form Factors	PCI Express M.2 form factor	
Operating Voltage	The card will be powered by a 3.3V, ± 9% supply from the host system.	
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)
* Wireless access point and Internet service required and not included. Availability of public wireless access points 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.		

Type	Description	Part #
HP Displays	HP EliteDisplay S240uj with wireless charging	T7B66AA
	HP EliteDisplay S270c 27-inch Curved Monitor	K1M38AA
	HP EliteDisplay E272q 27-inch QHD Monitor	M1P04AA
	HP Z34c 34-inch Curved Monitor	K1U77A4
	HP LD5511 55-inch Large Format Display (For HP Elite Slice for Meeting Rooms)	T5X84AA
Memory	HP 2GB DDR4-2133 SoDIMM	W8Q56AA
	HP 4GB DDR4-2133 SoDIMM	P1N53AA
	HP 8GB DDR4-2133 SoDIMM	P1N54AA
	HP 16GB DDR4-2133 SoDIMM	P1N55AA
Storage	HP ODD Module	X8U73AA
	HP 256GB SATA 3D Non-SED Solid State Drive	N1M49AA
	HP 256GB Sata Value SSD Drive	W0U55AA
	HP 500GB SATA 6G 2.5 (8GB Cache) SSHD Drive	E1C62AA
Security	HP UltraSlim 10mm Cable Lock	T1A62AA
Power	HP Desktop 65w Power Supply Kit	L2X04AA
	HP Desktop 90w Power Supply Kit	L4R65AA
Mounting	HP VESA Plate	X8U74AA
	HP DST Security Wall Mount	
Adapters	HP DisplayPort™ to HDMI 4K Adapter	K2K92AA
	HP DVI Cable	DC198A
	HP USB-C to VGA Adapter	N9K76AA
	HP USB to Serial Port Adapter	J7B60AA
	HP USB-C to USB 3.0 Adapter	N2Z63AA
	HP USB-C to DisplayPort Adapter	N9K78AA
	HP USB-C to HDMI Adapter	N9K77AA
	HP HDMI Standard Cable Kit	T6F94AA
Multimedia	HP Audio Module	X8U72AA
	HP UC Wireless Headset	W3K09AA
Input	HP Conferencing Keyboard	K8P74AA
	HP USB Conferencing Keyboard	N8N57AA
	HP USB Business Slim Keyboard	N3R87AA
	HP USB Business Slim Keyboard and Mouse and Mousepad	T4E63AA

HP Wireless Business Slim Keyboard and Mouse	N3R87AA
HP USB Hardened Mouse	P1N77AA
HP USB 1000dpi Laser Mouse	QY778AA
HP Mouse Pad	W5V98AV

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Change Log

Date of change:	Version History:		Description of change:
	Version 1 to 2		
November 7, 2016	Version 2 to 3	Update	(not available with HP Elite Slice for Meeting Rooms) was deleted from Finger print reader
December 1, 2016	Version 3 to 4	Update	At a Glance and Operating Systems sections updated