

### Overview

### HP ProBook 455 G4 Notebook PC



#### Front

1. Microphones (2)
2. Webcam light
3. Webcam
4. Wireless on/off button
5. Speaker mute button
6. Fingerprint Reader
7. Touchpad
8. Hard Drive LED
9. SD Card reader
10. USB Type-C™ (1)
11. USB 3.0 port
12. HDMI port
13. External VGA monitor port
14. Power button
15. Power connector

### Overview



- |  |                          |
|--|--------------------------|
| 1. Optical drive eject button (select models only) | 4. Ethernet port (RJ-45) |
| 2. Headphone/Microphone combo jack                 | 5. Security lock slot    |
| 3. USB 2.0 ports (2)                               |                          |

#### Rear/Left

### Overview

### At A Glance

- Windows 10 Home 64, Windows 10 Pro MSNA 64, FreeDOS 2.0
- Durable multi-layer soft touch painted LCD cover and brushed aluminum keyboard deck that keeps system looking good longer
- Full-sized spill-resistant keyboard with a thin layer of Mylar film to prevent minor spills; full separate numeric keypad
- Large Clickpad with gestures support
- Enhanced security features including HP Client Security Manager and optional HP Fingerprint Reader and TPM 2.0
- HP 3D DriveGuard helps protect critical information while you're on the move.
- HDMI port for connecting to high-resolution displays
- USB Type-C™, and USB 3.0 ports
- HP Audio optimized for high fidelity audio
- Widescreen LED-backlit HD display with 16:9 aspect ratio with available 15.6-inch diagonal HD
- Accelerated Processing Unit and graphics from AMD
- Wireless on/off and speaker mute button to conveniently manage the connectivity and speaker.
- Passed MIL-STD testing<sup>1</sup>
- Flexible wireless connectivity options controlled by HP Connection Manager:
  - Integrated 802.11 b/g/n (1x1) with Bluetooth® 4.0 combo card
  - Integrated 802.11 a/b/g/n/ac (2x2) with Bluetooth 4.2 High Speed combo card

1. MIL STD 810G testing was not intended to demonstrate fitness for U.S. Department of Defense contract requirements or for military use. Test results are not a guarantee of future performance under these test conditions. Damage under the MIL STD test conditions or any accidental damage requires an optional HP Accidental Damage Protection Care Pack.

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



### Features

#### PRODUCT NAME

**HP ProBook 455 G4 Notebook PC**

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#### OPERATING SYSTEM

<b>Preinstalled</b>	Windows 10 Pro 64 <sup>1</sup> Windows 10 Pro (National Academic only) <sup>1</sup> Windows 10 Home 64 <sup>1</sup> Windows 10 Home Single Language 64 <sup>1</sup> Windows 10 Home 64 (National Academic only) <sup>1</sup> FreeDOS 2.0 NeoKylin Linux 64
<b>Web-only Support</b>	Windows 10 Pro 64 <sup>1</sup> Windows 10 Home 64 <sup>1</sup> Windows 10 Enterprise 64 <sup>1</sup>

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.microsoft.com>.

**NOTE:** Your product does not support Windows 8 or Windows 7

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

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#### ACCELERATED PROCESSING UNIT

AMD A10-9600P (3.3GHz/2 MB L2, Quad 15W) with Radeon™ R5 Graphics<sup>1,2</sup>  
AMD A9-9410 (3.5GHz/1 MB L2, Dual 15W) with Radeon™ R5 Graphics<sup>1,2</sup>  
AMD A6-9210 (2.8GHz/1 MB L2, Dual 15W) with Radeon™ R4 Graphics <sup>1,2</sup>

1. Processor speed denotes maximum performance mode; processors will run at lower speeds in battery optimization mode.
  2. 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. AMD's numbering is not a measurement of clock speed.
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#### CHIPSET

Integrated with processor

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### Features

## GRAPHICS

### Integrated graphics<sup>1</sup>

AMD A10-9600P (3.3GHz/2 MB L2, Quad 15W) with Radeon™ R5 Graphics

AMD A9-9410 (3.5GHz/1 MB L2, Dual 15W) with Radeon™ R5 Graphics

AMD A6-9210 (2.8GHz/1 MB L2, Dual 15W) with Radeon™ R4 Graphics

1. Minimum DDR4-1866 required. Dual graphics may be enabled by single channel memory configurations but is not recommended as some memory sensitive applications might have lower dual graphics performance.

## DISPLAY

### Internal

(39.62 cm) 15.6" diagonal HD SVA eDP LED-backlit HD anti-glare 1 WLAN Antenna (1366 x 768)<sup>1</sup>

(39.62 cm) 15.6" diagonal HD SVA eDP LED-backlit HD anti-glare 2 WLAN Antennas (1366 x 768)<sup>1</sup>

(39.62 cm) 15.6" diagonal HD SVA eDP LED-backlit HD anti-glare 1 camera WLAN Antenna (1366 x 768)<sup>1</sup>

(39.62 cm) 15.6" diagonal HD SVA eDP LED-backlit HD anti-glare 2 camera WLAN Antennas (1366 x 768)<sup>1</sup>

(39.62 cm) 15.6" diagonal FHD SVA eDP LED-backlit HD anti-glare with camera 1 WLAN Antenna (1920 x 1080)<sup>1</sup>

(39.62 cm) 15.6" diagonal FHD SVA eDP LED-backlit HD anti-glare with camera 2 WLAN Antennas (1920 x 1080)<sup>1</sup>

### External

Up to 32-bit per pixel color depth

#### VGA

Port supports resolutions up to 2048 x 1536 external resolution @60 Hz

#### HDMI

Supports direct connection to high-definition displays with up to 4096 x 2160 @24 Hz resolution and 7-channel audio with one convenient cable (not included)

1. HD content required to view HD images.

**NOTE:** Resolutions are dependent upon monitor capability, and resolution and color depth settings.

## STORAGE AND DRIVES

### Primary Storage Bay

#### Hard Drives

1TB/ 2TB 5400 rpm SMART SATA HDD

500 GB 7200 rpm SMART SATA HDD

#### Solid State Drive (by 2.5" converter)

M.2 2280 128 GB SSD SATA

#### HP 3D DriveGuard (Windows only)

The hard drive is mounted directly to the notebook frame, reducing the transmission of shock to the hard drive



### Features

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

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### OPTICAL DRIVES

#### Fixed 9.0 mm (0.35 in) SATA Optical Drive

DVD+/-RW SuperMulti DL Drive<sup>1</sup>

DVD-ROM Drive<sup>2</sup>

No optical drive option

1. Sold separately as an optional feature. Double Layer discs can store more data than single layer discs. However, double-layer discs burned with this drive may not be compatible with many existing single-layer DVD drives and players. Don't copy copyright protected materials.

2. Sold separately as an optional feature.

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### MEMORY

#### Standard

DDR4 PC4 -1866 (Transfer rates up to 1866 MT/s)

Two SODIMM slots supporting single-channel memory

4 GB, 8 GB, and 16 GB SODIMMs

#### Maximum

Upgradeable to 16384 MB with optional 8192 MB SODIMMs in slots 1 and 2

**NOTE:** Due to the non-industry standard nature of some third-party memory modules, we recommend HP branded memory to ensure compatibility. If you mix memory speeds, the system will perform at the lower memory speed.

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### NETWORKING/COMMUNICATIONS

#### Wireless

Support for a broad range of secure, integrated wireless LAN featuring support for the latest industry standards. Integrated Bluetooth is also available (factory configurable only) and can be combined with any of the supported wireless LAN options.

#### Wireless LAN (WLAN)<sup>1</sup>

Realtek 802.11b/g/n (1x1) and Bluetooth® 4.0 Combo

Intel® Dual Band Wireless-AC 7265 802.11a/b/g/n/ac (2x2) WiFi and Bluetooth® 4.2 Combo (non-vPro)

#### Communications

Realtek 10/100/1000 Ethernet Controller<sup>2</sup>

1. Sold separately as an optional feature. Requires wireless access point and Internet access. Availability of public wireless access points limited.

2. The term "10/100/1000" or "Gigabit" Ethernet indicates compatibility with IEEE standard 802.3ab for Gigabit Ethernet, and does not connote actual operating speed of 1 Gb/s. For high-speed transmission, connection to a Gigabit Ethernet server and network infrastructure is required.



### Features

#### AUDIO/MULTIMEDIA

##### Audio

HP Audio

Integrated stereo speakers

Integrated digital microphone (dual-microphone array when equipped with optional webcam)

Function keys for microphone mute, volume up, volume down

Headphone/Microphone combo jack

##### Webcam

Optional 720p HD webcam <sup>1,2</sup>

- HD format (widescreen)
- Supports videoconferencing and still image capture
- High quality fixed focus lens
- Video capture at various resolutions up to 1280x720 resolution (720p) and up to 30fps
- M-JPEG compression supports higher frame rates for video capture and videoconferencing
- Improved low light sensitivity
- Improved dynamic range
- Skype-ready<sup>3,4</sup>

1. Available on select models.

2. HD content required to view HD images.

3. Internet access required.

4. Not available in China.

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#### KEYBOARDS/POINTING DEVICES/BUTTONS & FUNCTION KEYS

##### Keyboard

The HP spill-resistant keyboard is designed using a thin layer of Mylar film under the keyboard. The 101/102-key compatible keyboard features a full-pitch key layout with desktop keyboard features, such as editing keys, both left and right control and alt keys, and function keys. US and International key layouts are available. Includes a separate numeric keypad. Backlit keyboard available as an option.

##### Pointing Devices

Touchpad with gestures support, on/off button with LED indicator, two-way scroll, two pick buttons

##### Buttons and Function Keys

Separate launch buttons provide easy access to wireless on/off and speaker mute. Function keys provide control of features including: standby mode, display brightness, external display, microphone mute, volume down, volume up and keyboard backlight on/off (select models only).

##### Function Keys

ESC: system information

F1 - Sleep

F2 - Blank

F3 - Backlight Toggle (for backlit keyboard) or Blank

F4 - Display Switching

F5 - Brightness Down

F6 - Brightness Up

F7 - Blank

F8 - Volume Down

F9 - Volume Up

F10 - Mic Mute

F11 - Blank



### Features

F12 – Blank

#### **Clickpad requirements**

On/off control by driver  
Taps enabled as default

#### **Gestures**

(Windows 10)  
Disabled by default  
3 Finger Flick  
2 Finger Rotate  
Momentum Motion  
1 Finger Vertical Scroll

#### **Windows 10**

Support PTP with Miniport driver  
Settings enabled by default by MSFT:  
2 Finger Scrolling  
2 Finger Zoom (Pinch)  
OSD (enable/disable)  
3 finger tap - Cortana  
3 finger flick –App switch  
4 finger tap – Action Center

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## SOFTWARE AND SECURITY

### **Software Included**

#### **BIOS**

HP BIOSphere<sup>1</sup>  
HP DriveLock | HP Automatic DriveLock  
HP BIOS Protection<sup>2</sup>  
BIOS Update via Network  
Master Boot Record Security  
Power On Authentication  
Pre-Boot Security  
Secure Erase<sup>3</sup>  
HP Spare Key<sup>10</sup>  
Hybrid Boot  
Measure Boot  
Secure Boot  
Absolute Persistence Module<sup>4</sup>

#### **Multi Media**

Cyberlink Power Media Player<sup>12</sup>  
Native Miracast Support<sup>5</sup>

#### **Communication**

HP Mobile Connect<sup>6,11</sup>

#### **HP Value Add Software**

HP ePrint Driver<sup>7</sup>





### Features

- HP Recovery Manager
- HP Support Assistant
- HP Jumpstart

#### Microsoft Products

- Buy Office
- Bing Search
- Skype for Business Certified<sup>8</sup>

#### Manageability

- HP Driver Packs<sup>9</sup>
- HP SoftPaq Download Manager (SDM)
- HP System Software Manager (SSM)<sup>9</sup>
- HP BIOS Config Utility (BCU)<sup>9</sup>
- HP Client Catalog<sup>9</sup>
- HP CIK for Microsoft SCCM<sup>9</sup>
- LANDESK Management
- HP Image Assistant<sup>9</sup>

For more information on HP Client Management Solutions refer to: [www.hp.com/go/clientmanagement](http://www.hp.com/go/clientmanagement).

#### Client Security Software

- HP Security Manager (including Credential Manager and Password Manager)
- HP Drive Lock
- HP Password Manager
- Absolute Persistence Module
- Power On Authentication
- Microsoft Defender<sup>11</sup>

#### Standard

- TPM 2.0 (1.2 optional)
- HP Fingerprint reader
- Security lock slot

For more information on HP Client Security Software Suite, refer to [www.hp.com/go/clientsecurity](http://www.hp.com/go/clientsecurity).

1 Available only on business PCs with HP BIOS. HP BIOSphere features may vary depending on the PC platform & configuration.

2 May require a manual recovery step if all copies of BIOS are compromised or deleted. BIOS adheres to NIST SP800-147.

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 HP Mobile Connect is only available on preconfigured devices with WWAN. For geographic availability refer to [www.hp.com/go/mobileconnect](http://www.hp.com/go/mobileconnect)

7 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](http://www.hp.com/go/eprintcenter)). Requires optional broadband



### Features

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.

8 Skype is not offered in China.

9 Not preinstalled, however available on manageability website.

10 Requires initial user set up.

11 Microsoft Defender (Windows 10 only)

12 Only available with optical drive.

### POWER

#### Power Supply

45W Smart 4.5mm AC Adapter

Not available for ASIA, PRC, INDIA, JPN2, JPN/ENG

Power cord included is 1.8 m (+/- 0.1 m) or 1.0 m (+/- 0.1 m).

#### Primary Battery

HP 3-cell (48 WHr) Lithium-Ion Battery

#### Battery Life<sup>1</sup>

Platform	Other HW Details	Battery	SSD	HDD
HP Probook 455 G4	AMD A10-9600P APU, Optimal SKU	3 cell (48Whr)	Up to 8 hrs and 45 mins	Up to 8 hrs
HP Probook 455 G4	AMD A9-9410 APU, AMD A6-9210 APU, Optimal SKU	3 cell (48Whr)	Up to 10 hrs and 15 mins	Up to 9 hrs

1. Windows 10/MM14 battery life will vary depending on various factors including product model, configuration, loaded applications, features, use, wireless functionality, and power management settings. The maximum capacity of the battery will naturally decrease with time and usage. See [www.bapco.com](http://www.bapco.com) for additional details

#### System Standby Time\*

TBD

\* Standby life will vary depending on various factors including battery, Memory, CPU, EC and LAN chip. The maximum capacity of the battery will naturally decrease with time and usage.

#### Power Conservation

### WEIGHTS & DIMENSIONS

#### Weight

Lightest possible configuration across battery and panel options (HD Panel, No-ODD, 3-cell (48Whr) Battery, HDD)

Starting at 4.58 lb / 2.08 kg

Lightest Weight Configurations (across panel, battery and ODD options, if applicable)

	3-cell (48Whr)
No-ODD	4.58 lb / 2.08 kg
ODD	4.82 lb / 2.19 kg

#### Dimensions (w x d x h)

38.2 x 26.3 x 2.44 cm (15.04 x 10.35 x 0.96 in)



### Features

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#### PORTS/SLOTS

##### Ports

- (1) USB 3.0
- (1) USB Type-C™
- (2) USB 2.0
- (1) HDMI 1.4
- (1) VGA
- (1) Headphone/Microphone Combo Jack
- (1) Power connector – One
- (1) RJ-45

##### Digital Media Slots

Multi Media Reader Slot supporting SD, SDHC, SDXC (Up to 2TB)

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#### SERVICE AND SUPPORT

HP Services offers 3-year and 1-year limited warranties and 90-day software limited warranty options depending on country. Batteries have a default one year limited warranty except for Long Life batteries which will have same 1-year or 3-year limited warranty as the platform. On-site service and extended coverage is also available. HP Care Pack Services are optional extended service contracts that go beyond the standard limited warranties. To choose the right level of service for your HP product, use the HP Care Pack Services Lookup Tool at: <http://www.hp.com/go/cpc>.

**NOTE:** Certain restrictions and exclusions apply. Consult the HP Customer Support Center for details.  
<http://h20000.www2.hp.com/bizsupport/TechSupport/ProductRoot.jsp>

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### Technical Specifications

#### SYSTEM UNIT

<b>Stand-Alone Power Requirements</b> (AC Power)	<b>Nominal Operating Voltage</b>	19V
	<b>Average Operating Power</b>	5.7W
	<b>Max Operating Power</b>	< 45W
<b>Temperature</b>	<b>Operating</b>	32° to 95° F (0° to 35° C) (not writing optical) 41° to 95° F (5° to 35° C) (writing optical)
	<b>Non-operating</b>	-4° to 140° F (-20° to 60° C)
<b>Relative Humidity</b>	<b>Operating</b>	10% to 90%, non-condensing
	<b>Non-operating</b>	5% to 95%, 101.6° F (38.7° C) maximum wet bulb temperature
<b>Shock</b>	<b>Operating</b>	40 G, 2 ms, half-sine
	<b>Non-operating</b>	200 G, 2 ms, half-sine
<b>Random Vibration</b>	<b>Operating</b>	0.75 grms
	<b>Non-operating</b>	1.50 grms
<b>Altitude</b> (unpressurized)	<b>Operating</b>	-50 to 10,000 ft (-15.24 to 3,048 m)
	<b>Non-operating</b>	-50 to 40,000 ft (-15.24 to 12,192 m)
<b>Planned Industry Standard Certifications</b>	<b>UL</b>	Yes
	<b>CSA</b>	Yes
	<b>FCC Compliance</b>	Yes
	<b>ENERGY STAR®</b>	Select models*
	<b>EPEAT®</b>	Registered Gold in United States**
	<b>ICES</b>	Yes
	<b>Australia / NZ A-Tick Compliance</b>	Yes
	<b>CCC</b>	Yes
	<b>Japan VCCI Compliance</b>	Yes
	<b>KC</b>	Yes
	<b>BSMI</b>	Yes
	<b>CE Marking Compliance</b>	Yes
	<b>BNCI or BELUS</b>	Yes
	<b>CIT</b>	Yes
	<b>GOST</b>	Yes
	<b>Saudi Arabian Compliance (ICCP)</b>	Yes
<b>SABS</b>	Yes	
<b>UKRSERTCOMPUTER</b>	Yes	

\* Configurations of the HP ProBook 455 G4 that are ENERGY STAR qualified are identified as HP ProBook 455 G4 ENERGY STAR on HP websites and on [www.energystar.gov](http://www.energystar.gov).

\*\* EPEAT registration varies by country. See [www.epeat.net](http://www.epeat.net) for registration status by country. EPEAT status listed above applies to U.S.

For accessibility information on HP products, please visit: <http://www.hp.com/accessibility>.



### Technical Specifications

#### DISPLAYS

<b>Panel LCD 15.6 FHD AG WLED SVA 45%cg 220nits eDP Slim</b>	<b>Active Area (W x H)</b>	344.2 x 193.5 (mm)
	<b>Dimensions (W x H)</b>	360 x 224.3 (mm) max
	<b>Diagonal Size</b>	15.6 (inch)
	<b>Thickness</b>	3.2 (mm) max
	<b>Weight</b>	370 g max
	<b>Interface</b>	eDP 1.2
	<b>Surface Treatment</b>	Anti-Glare (AG)
	<b>Contrast Ratio</b>	300:1 (typical)
	<b>Refresh Rate</b>	60 Hz
	<b>Brightness</b>	220 nits
	<b>Pixel Resolution - Format</b>	1920 x 1080 (FHD)
	<b>Pixel Resolution - Configuration</b>	RGB
	<b>Backlight</b>	LED
	<b>Color Gamut Coverage</b>	45%
	<b>Color Depth</b>	6 bits + Hi FRC
	<b>Viewing Angle</b>	SVA 45/45/25/35
<b>Touch Point Supported</b>	N/A	
<b>Other Features</b>	N/A	
<b>Pen Enabled</b>	No	

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<b>Panel LCD 15.6 HD AG WLED SVA 45%cg 220nits eDP Slim</b>	<b>Active Area (W x H)</b>	344.2 x 193.5 (mm)
	<b>Dimensions (W x H)</b>	360 x 224.3 (mm) max
	<b>Diagonal Size</b>	15.6 (inch)
	<b>Thickness</b>	3.2 (mm) max
	<b>Weight</b>	370 g max
	<b>Interface</b>	eDP 1.2
	<b>Surface Treatment</b>	Anti-Glare (AG)
	<b>Contrast Ratio</b>	300:1 (typical)
	<b>Refresh Rate</b>	60 Hz
	<b>Brightness</b>	220 nits
	<b>Pixel Resolution - Format</b>	1366 x 768 (HD)



### Technical Specifications

<b>Pixel Resolution - Configuration</b>	RGB
<b>Backlight</b>	LED
<b>Color Gamut Coverage</b>	45%
<b>Color Depth</b>	6 bits + Hi FRC
<b>Viewing Angle</b>	SVA 45/45/25/35
<b>Touch Point Supported</b>	10-point multi-touch
<b>Other Features</b>	AS
<b>Pen Enabled</b>	No

### STORAGE AND DRIVES

#### HARD DRIVES

##### Internal Storage

<b>500 GB* 5400 rpm SATA Hard Drive</b>	<b>Capacity</b>	500 GB	
	<b>Drive Weight</b>	0.20 lbs (92 g) ~ 0.21 lbs (95 g)	
	<b>Rotation Speed</b>	5400 rpm	
	<b>Cache Buffer</b>	Up to 16 MB	
	<b>NAND Type/Size</b>	N/A	
	<b>Height</b>	0.28 in (7 mm)	
	<b>Width</b>	2.75 in (69.85 mm)	
	<b>Interface</b>	ATA-8, SATA 3.0	
	<b>Interface Transfer Rate</b>	600 MB/s	
	<b>Seek Time</b>	<b>Single Track</b>	1.5 ~ 2 ms
		<b>Average</b>	13 ~ 16 ms
		<b>Maximum</b>	18 ~ 22 ms
	<b>Logical Blocks</b>	976,773,168	
	<b>Operating Temperature</b>	32° to 140° F (0° to 60° C) [top cover temp]	
<b>Security Features</b>	ATA Security		
<b>Other Features</b>	S.M.A.R.T., NCQ, Ultra DMA		

<b>500 GB* 7200 rpm SATA Hard Drive</b>	<b>Capacity</b>	500 GB
	<b>Drive Weight</b>	0.20 lbs (92 g) ~ 0.21 lbs (95 g)
	<b>Rotation Speed</b>	7200 rpm
	<b>Cache Buffer</b>	Up to 32 MB
	<b>NAND Type/Size</b>	N/A



### Technical Specifications

<b>Height</b>	0.28 in (7 mm)
<b>Width</b>	2.75 in (69.85 mm)
<b>Interface</b>	ATA-8, SATA 3.0
<b>Interface Transfer Rate</b>	600 MB/s
<b>Seek Time</b>	<b>Single Track</b> 2 ~ 1.5 ms <b>Average</b> 11 ~ 13 ms <b>Maximum</b> 18 ~ 22 ms
<b>Logical Blocks</b>	976,773,168
<b>Operating Temperature</b>	32° to 140° F (0° to 60° C) [top cover temp]
<b>Security Features</b>	ATA Security
<b>Other Features</b>	S.M.A.R.T., NCQ, Ultra DMA

#### 1TB\* 5400 rpm SATA Hard Drive

<b>Capacity</b>	1 TB
<b>Drive Weight</b>	0.25 lbs (115 g) ~ 0.22 lbs (102 g)
<b>Rotation Speed</b>	5400 rpm
<b>Cache Buffer</b>	8 MB
<b>NAND Type/Size</b>	N/A
<b>Height</b>	0.37 in (9.5 mm)
<b>Width</b>	2.75 in (69.85 mm)
<b>Interface</b>	ATA-8, SATA 3.0
<b>Interface Transfer Rate</b>	600 MB/s
<b>Seek Time</b>	<b>Single Track</b> 2 ms <b>Average</b> 13 ms <b>Maximum</b> 15 ~ 22 ms
<b>Logical Blocks</b>	1,953,525,168
<b>Operating Temperature</b>	32° to 140° F (0° to 60° C) [top cover temp]
<b>Security Features</b>	ATA Security
<b>Other Features</b>	S.M.A.R.T., NCQ, Ultra DMA

#### 2TB\* 5400 rpm SATA Hard Drive

<b>Capacity</b>	2 TB
<b>Drive Weight</b>	0.29lbs (130 g)
<b>Rotation Speed</b>	5400 rpm
<b>Cache Buffer</b>	32 MB
<b>NAND Type/Size</b>	N/A
<b>Height</b>	0.37 in (9.5 mm)
<b>Width</b>	2.75 in (69.85 mm)
<b>Interface</b>	ATA-8, SATA 3.0



### Technical Specifications

<b>Interface Transfer Rate</b>	600 MB/s						
<b>Seek Time</b>	<table> <tr> <td><b>Single Track</b></td> <td>2 ms</td> </tr> <tr> <td><b>Average</b></td> <td>12 ms</td> </tr> <tr> <td><b>Maximum</b></td> <td>22 ms</td> </tr> </table>	<b>Single Track</b>	2 ms	<b>Average</b>	12 ms	<b>Maximum</b>	22 ms
<b>Single Track</b>	2 ms						
<b>Average</b>	12 ms						
<b>Maximum</b>	22 ms						
<b>Logical Blocks</b>	3,907,029,168						
<b>Operating Temperature</b>	32° to 140° F (0° to 60° C) [top cover temp]						
<b>Security Features</b>	ATA Security						
<b>Other Features</b>	S.M.A.R.T., NCQ, Ultra DMA						

### SOLID STATE DRIVE

<b>SSD 128GB 2280 M2 SATA-3 Value</b>	<b>Capacity</b>	128 GB				
	<b>Form-Factor (I/O)</b>	M.2 2280				
	<b>NAND Type</b>	TLC				
	<b>Drive Weight</b>	0.01 lb (6 g) ~ 0.02 lb (10 g)				
	<b>Height</b>	0.09 in (2.3 mm)				
	<b>Width</b>	0.87 in (22 mm)				
	<b>Interface</b>	ATA-8, SATA 3.0				
	<b>Performance</b>	<table> <tr> <td><b>Maximum Sequential Read</b></td> <td><b>Maximum Sequential Write</b></td> </tr> <tr> <td>530 ~ 535 MB/s</td> <td>185 ~ 515 MB/s</td> </tr> </table>	<b>Maximum Sequential Read</b>	<b>Maximum Sequential Write</b>	530 ~ 535 MB/s	185 ~ 515 MB/s
<b>Maximum Sequential Read</b>	<b>Maximum Sequential Write</b>					
530 ~ 535 MB/s	185 ~ 515 MB/s					
	<b>Logical Blocks</b>	250,069,680				
	<b>Operating Temperature</b>	32° to 158°F (0° to 70°C) [case temp]				
	<b>Features</b>	ATA Security; DIPM; TRIM; DEVSLP				

\* For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 30GB for Windows 10 of system disk is reserved for system recovery software.

### OPTICAL DRIVES

<b>DVD+/-RW SuperMulti DL Drive</b>	<b>Access Times</b>	<b>Random</b>	<140ms CD (typical) < 160ms DVD (typical)
	<b>Weight</b>	150g max.	
	<b>Max Data Transfer Rate</b>	24X CD-ROM 8X DVD-ROM 24X CD-R 10X CD-RW 8X DVD+R 8X DVD+RW 8X DVD-R 6X DVD-RW 6X - DVD+R Dual Layer	





### Technical Specifications

	6X - DVD-R Dual Layer 5X DVD-RAM
<b>Transfer Mode</b>	UDMA Mode 5
<b>Interface</b>	Gen 1 SATA
<b>Supported Media</b> (read)	CD-DA, CD-TEXT, CD-ROM, CD-ROM XA, MIXED MODE CD, CD-I, CD-I Bridge (Photo-CD, Video CD), Multisession CD (Photo-CD, CD-EXTRA, Portfolio, CD-R, CD-RW), CD-R, CD-RW, DVD-ROM (DVD-5, DVD-9, DVD-10, DVD-18), DVD-R, DVD-RW, DVD+R, DVD+RW, DVD-RAM
<b>Supported Media</b> (write)	CD-R, CD-RW, DVD+R, DVD+RW, DVD-R, DVD-RW, DVD-RAM, DVD+R DL, DVD-R DL
<b>Max Media Capacity</b> (read)	8.5 GB
<b>Max Media Capacity</b> (write)	8.5 GB
<b>Transport</b>	Tray Loading

<b>DVD-ROM Drive</b>	<b>Access Times</b>	<b>Random</b>	< 140ms CD (typical) < 160ms DVD (typical)
	<b>Max Data Transfer Rate</b>	24X CD-ROM 8X-DVD	
	<b>Transfer Mode</b>	UDMA Mode 5	
	<b>Interface</b>	Gen 1 SATA	
	<b>Supported Media</b> (read)	CD-DA, CD-TEXT, CD-ROM, CD-ROM XA, MIXED MODE CD, CD-I, CD-I Bridge (Photo-CD, Video CD), Multisession CD (Photo-CD, CD-EXTRA, Portfolio, CD-R, CD-RW), CD-R, CD-RW, DVD-ROM (DVD-5, DVD-9, DVD-10, DVD-18), DVD-R, DVD-RW, DVD+R, DVD+RW, DVD-RAM	
	<b>Supported Media</b> (write)	None	
	<b>Max Media Capacity</b> (read)	8.5GB	
	<b>Transport</b>	Tray Loading	

### SECURITY

<b>HP Fingerprint Reader</b> (optional)	<b>Mobile Voltage Operation</b>	3.0V-3.6V Single Supply
	<b>Operating Temperature</b>	32° – 158°F (0° – 70°C)
	<b>Current Consumption @ 3.3V</b>	Less than 70 mA peak imaging and scrolling Less than 25 mA hardware finger detection Advanced Power Management
	<b>High-Rate Image Capture</b>	Up to 240 image frames /sec
	<b>ESD Resistance</b>	IEC 61000-4-2 Level 4 (±15KV)
	<b>Detection Matrix</b>	192 x 16 Pixels 9.7 mm x 0.81 mm 500 ppi High-Resolution Images



### Technical Specifications

#### NETWORKING/COMMUNICATIONS

<b>Integrated Realtek 10/100/1000 NIC</b>	<b>Ethernet Features</b>	<p>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</p>
	<b>Power Management</b>	<p>ACPI compliant - multiple power modes            Situation-sensitive features reduce power consumption            Advanced link down power saving for reducing link down power consumption</p>
	<b>Performance Features</b>	<p>TCP/IP/UDP Checksum Offload (configurable)            Protocol Offload (ARP &amp; NS)            Large send offload and Giant send offload            Receiving Side Scaling</p>
	<b>Manageability</b>	<p>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</p>
	<b>Interface</b>	<p>PCI Express 1.1 x1 to fully support ASPM L0s/L1 and CLKREQ</p>
	<b>NIC Device Driver Name</b>	<p>Realtek PCIe GBE Ethernet Family Controller</p>

\*Wireless access point and internet service required. Availability of public wireless access points limited.

<b>Realtek 802.11 b/g/n (1x1) with Bluetooth® v4.0 combo *</b>	<b>Wireless LAN Standards</b>	<p>IEEE 802.11b            IEEE 802.11g            IEEE 802.11n</p>
	<b>Interoperability</b>	<p>Wi-Fi certified</p>
	<b>Frequency Band</b>	<p>2.402 – 2.482 GHz</p>
	<b>Data Rates</b>	<p>802.11b: 1, 2, 5.5, 11 Mbps            802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps            802.11n: card will support rates for NSS=1 for RX and TX for 20 MHz channels. Short and long guard interval will be supported.</p>
	<b>Modulation</b>	<p>Direct Sequence Spread Spectrum            BPSK, QPSK, CCK, 16-QAM, 64-QAM</p>
	<b>Security<sup>1</sup></b>	<p>IEEE and WiFi compliant 64 / 128 bit WEP encryption for a/b/g mode only            AES-CCMP: 128 bit in hardware 802.1x authentication types WPA, WPA2:</p>



### Technical Specifications

	802.1x. WPA-PSK, WPA2-PSK, TKIP, and AES. WPA2 certification IEEE 802.11i Cisco Certified Extensions, all versions through V5 WAPI
<b>Network Architecture Models</b>	Ad-hoc (Peer to Peer) Infrastructure (Access Point Required)
<b>Roaming</b>	IEEE 802.11 compliant roaming between access points
<b>Output Power<sup>2</sup></b>	13.5 dBm, nominal
<b>Power Consumption</b>	Transmit: 2.0 W (max) Receive: 1.6 W (max) Associated to Access Point, Idle: 250 mW nominal Wireless Button Off: 100 mW nominal Radio disabled: 75 mW nominal
<b>Power Management</b>	ACPI compliant power management 802.11 compliant power saving mode
<b>Receiver Sensitivity<sup>3</sup></b>	802.11b:-95 dBm (1 Mbps), -93 dBm (2 Mbps), -91 dBm (5.5 Mbps), -88 dBm (11 Mbps)  802.11g:-90 dBm (6 Mbps), -89 dBm (9 Mbps), -87 dBm (12 Mbps), -85 dBm (18 Mbps), -82 dBm (24 Mbps), -79 dBm (36 Mbps), -76 dBm (48 Mbps), -74 dBm (54 Mbps)  802.11n:-70dBm (72.2 Mbps)
<b>Antenna type</b>	High efficiency antenna with spatial diversity, mounted in the display enclosure
<b>Form Factor</b>	PCI-Express Half-MiniCard
<b>Weight</b>	0.013 lb (6 g)
<b>Dimensions</b>	0.19 x 1.06 x 1.18 in (4.75 x 26.8 x 30 mm)
<b>Operating Voltage</b>	3.3v +/- 9%
<b>Temperature</b>	<b>Operating</b> 14° to 158° F (-10° to 70° C) <b>Non-operating</b> -40° to 176° F (-40° to 80° C)
<b>Humidity</b>	<b>Operating</b> 10% to 90% (non-condensing) <b>Non-operating</b> 5% to 95% (non-condensing)
<b>Altitude</b>	<b>Operating</b> 0 to 10,000 ft (3,048 m) <b>Non-operating</b> 0 to 50,000 ft (15,240 m)
<b>LED Activity</b>	<b>Amber</b> – Radio OFF; <b>White</b> – Radio ON
<b>Notes</b>	<ol style="list-style-type: none"> <li>1. Check latest software/driver release for updates on supported security features.</li> <li>2. Maximum output power may vary by country according to local regulations.</li> <li>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).</li> </ol>



### Technical Specifications

#### Bluetooth 4.0 Wireless Technology

<b>Bluetooth Specification</b>	2.1+EDR, 3.0, 4.0 Compliant	
<b>Dimensions</b>	1.18 x 0.26 x 0.13 in (30 x 6.5 x 3.25 mm)	
<b>Frequency Band</b>	2402 to 2480 MHz	
<b>Number of Available Channels</b>	79 (1 MHz) available channels	
<b>Data Rates and Throughput</b>	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	
<b>Transmit Power</b>	Max 4 dBm (Bluetooth Class II)	
<b>Receiver Sensitivity</b>	Better than -80 dBm at 0.1 % raw bit error rate	
<b>Power Consumption</b>	Average 230mW Sleep <1 mW	
<b>Antenna</b>	Internally integrated within module	
<b>Range</b>	Up 33 ft (10 m)	
<b>Electrical Interface</b>	USB 2.0 compliant Microsoft Windows Plug and Play compliant	
<b>Bluetooth Software Supported</b>	Broadcom Bluetooth for Windows Microsoft Windows Bluetooth Software	
<b>Link Topology</b>	Point to Point, Multipoint Pico Nets up to 7 slaves	
<b>Security</b>	Full support of Bluetooth Security Provisions	
<b>Power Management</b>	Microsoft Windows ACPI, and USB Bus Support Self configurable to optimize power conservation in all operating modes, including Standby, Hold, Park, and Sniff	
<b>Certifications</b>	All necessary regulatory approvals for supported countries, including: FCC (47 CFR) Part 15C, Section 15.247 & 15.249 ETS 300 328, ETS 300 826 Low Voltage Directive IEC950 UL, CSA, and CE Mark	
<b>Temperature</b>	<b>Operating</b>	-4° to 158° F (-20° to 70° C)
	<b>Non-operating</b>	-40° to 176° F (-40° to 80° C)
<b>Humidity</b>	<b>Operating</b>	10% to 90%
	<b>Non-operating</b>	5% to 95%
<b>Altitude</b>	<b>Operating</b>	15,000 ft (4,572 m)
	<b>Non-operating</b>	40,000 ft (12,192 m)



### Technical Specifications

#### Bluetooth Profiles Supported

- Serial Port Profile (SPP)<sup>1</sup>
- Service Discovery Application Profile (SDAP)
- Dial-Up Networking (DUN)<sup>1,2</sup>
- Generic Object Exchange Profile (GOEP)<sup>1,2</sup>
- Object Push Profile (OPP)<sup>1,2</sup>
- File Transfer Profile (FTP)
- Synchronization Profile (SYNC)
- Hard Copy Cable Replacement (HCRP)<sup>1,2</sup>
- Personal Area Networking Profile (PAN)<sup>1,2</sup>
- Human Interface Device Profile (HID)<sup>1,2,3</sup>
- FAX Profile (FAX)
- Basic Imaging Profile (BIP)<sup>2</sup>
- Headset Profile (HSP)
- Hands Free Profile (HFP)
- Advanced Audio Distribution Profile (A2DP)

<sup>1</sup> indicates the profile is supported by Microsoft Windows XP SP2

<sup>2</sup> indicates the profile is part of Windows Vista

\*Wireless access point and internet service required. Availability of public wireless access points limited.

#### Intel® 802.11 a/b/g/n/ac (2x2) +Bluetooth® 4.2 Combo\*

#### Interoperability Frequency Band

- IEEE 802.11a
- IEEE 802.11b
- IEEE 802.11g
- IEEE 802.11n
- IEEE 802.11ac

Wi-Fi certified

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



### Technical Specifications

	<ul style="list-style-type: none"> <li>• 802.11a: 6, 9, 12, 18, 24, 36, 48, 54 Mbps</li> <li>• 802.11n: MCS 0 ~ MCS 15, (20MHz, and 40MHz)</li> <li>• 802.11ac: MCS0 ~ MCS9, (1SS, and 2SS) (20MHz, 40MHz, and 80MHz)</li> </ul>
<b>Modulation</b>	Direct Sequence Spread Spectrum BPSK, QPSK, CCK, 16-QAM, 64-QAM, 256-QAM
<b>Security<sup>1</sup></b>	<ul style="list-style-type: none"> <li>• IEEE and WiFi compliant 64 / 128 bit WEP encryption for a/b/g mode only</li> <li>• AES-CCMP: 128 bit in hardware</li> <li>• 802.1x authentication</li> <li>• WPA, WPA2: 802.1x. WPA-PSK, WPA2-PSK, TKIP, and AES.</li> <li>• WPA2 certification</li> <li>• IEEE 802.11i</li> <li>• Cisco Certified Extensions, all versions through CCX4 and CCX Lite</li> <li>• WAPI</li> </ul>
<b>Network Architecture Models</b>	Ad-hoc (Peer to Peer) Infrastructure (Access Point Required)
<b>Roaming</b>	IEEE 802.11 compliant roaming between access points
<b>Output Power<sup>2</sup></b>	<ul style="list-style-type: none"> <li>• 802.11b : +16dBm minimum</li> <li>• 802.11g : +14dBm minimum</li> <li>• 802.11a : +14dBm minimum</li> <li>• 802.11n HT20(2.4GHz) : +14dBm minimum</li> <li>• 802.11n HT40(2.4GHz) : +12dBm minimum</li> <li>• 802.11n HT20(5GHz) : +14dBm minimum</li> <li>• 802.11n HT40(5GHz) : +12dBm minimum</li> </ul>
<b>Power Consumption</b>	Transmit: 2.0 W (max) Receive: 1.6 W (max) Idle mode (PSP): 180 mW (WLAN Associated) Idle mode: 50 mW (WLAN unassociated) Connect Standby: 10 mW (WLAN+BT) Radio disabled: 5 mW
<b>Power Management</b>	ACPI and PCI Express compliant power management 802.11 compliant power saving mode
<b>Receiver Sensitivity<sup>3</sup></b>	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
<b>Antenna type</b>	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



### Technical Specifications

<b>Form Factor</b>	PCI-Express M.2 MiniCard	
<b>Dimensions</b>	Type 2230: 2.3 x 22.0 x 30.0 mm Or Type 1630: 2.3 x 16.0 x 30.0 mm	
<b>Weight</b>	Type 2230: 2.8g Or Type 1630: 2g	
<b>Operating Voltage</b>	3.3v +/- 9%	
<b>Temperature</b>	Operating	14° to 158° F (–10° to 70° C)
	Non-operating	–40° to 176° F (–40° to 80° C)
<b>Humidity</b>	Operating	10% to 90% (non-condensing)
	Non-operating	5% to 95% (non-condensing)
<b>Altitude</b>	Operating	0 to 10,000 ft (3,048 m)
	Non-operating	0 to 50,000 ft (15,240 m)
<b>LED Activity</b>	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).

\* Wireless access point and internet service required. 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.

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

<b>Bluetooth Specification</b>	4.0/4.1/4.2 Compliant
<b>Frequency Band</b>	2402 to 2480 MHz
<b>Number of Available Channels</b>	Legacy: 0~79 (1 MHz/CH) BLE: 0~39 (2 MHz/CH)
<b>Data Rates and Throughput</b>	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)
<b>Transmit Power</b>	The Bluetooth component shall operate as a Class II Bluetooth device with a maximum transmit power of + 4 dBm for BR and EDR.



### Technical Specifications

#### AUDIO/MULTIMEDIA

<b>Hardware</b>	<b>Implementation</b>	Conexant
	<b>Function Key Volume Controls</b>	Volume up, volume down, and mute
	<b>Full Duplex</b>	Yes
	<b>Microphone In</b>	Stereo
	<b>Headphone/Line Out</b>	Stereo
	<b>Integrated Microphone</b>	Yes, dual digital microphone array
	<b>Audio Output Quality</b>	<b>Frequency Response</b>
	<b>Signal to Noise Ratio</b>	106 dB (DAC), 102dB (ADC)
	<b>Total Harmonic Distortion</b>	91dB THD+n on Line Out/HP (0.003%)
	<b>Noise Floor</b>	Up to 192kHz
	<b>Play/Record Sampling Rate(s)</b>	Up to 96Khz
	<b>DAC</b>	16, 20 or 24-bit
	<b>ADC</b>	16, 20 or 24-bit
<b>Integrated Stereo Speakers</b>	<b>Power Rating</b>	2 Watts
	<b>Impedance</b>	4 Ohms

#### POWER

<b>HP 65W Smart AC Adapter 3-prong (EM Model)</b>	<b>Dimensions</b>	4.96 x 1.96 x 1.18 in (12.6cmx5.0cmx3.0cm)		
	<b>Weight</b>	1.65 lb (275g) max		
	<b>Input</b>	<b>Input Voltage</b>	90V to 264V	
		<b>Input Efficiency</b>	87% min at 115V/230V	
	<b>Output</b>	<b>Input frequency range</b>	47 to 63 Hz	
		<b>Input AC current</b>	1.7 A at 90 VAC and maximum load	
		<b>Output power</b>	65W(19.5V/3.33A) ; 7.5W(5V/1.5A)	
		<b>DC output</b>	19.5V	
		<b>Hold-up time</b>	5 msec at 115 VAC input	
		<b>Output current limit</b>	<11A, Over voltage protection- 29V max automatic shutdown	
		<b>Connector</b>	4.5mm Barrel Type, 3 pin/grounded, mates with interchangeable cords	
	<b>Environmental Design</b>	<b>Operating temperature</b>	0° to 35° C	
		<b>Non-operating (storage) temperature</b>	-20° to 85° C	
		<b>Altitude</b>	0 to 5,000 m	
<b>Humidity</b>		0% to 95%		
<b>Storage Humidity</b>		0% to 95%		





### Technical Specifications

<b>Safety Certifications</b>	CE Mark - EMC directives; Worldwide safety standards - IEC60950, EN60950, UL60950, Class1, SELV; Agency approvals - C-UL-US, NORDICS, DENAN, EN55022 Class B, FCC Class B, CISPR22 Class B, CCC, NOM-1 NYCE; Reliability - failure rate of less than 0.1% annually within the first three years of operation.
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<b>HP 45W Smart AC Adapter</b>	<b>Dimensions</b>	3.78 x 1.95 x 0.88 in (9.6 x 4.95 x 2.24 cm)	
	<b>Input</b>	90 to 265 VAC	
		<b>Input Efficiency</b>	87% min at 115 VAC
		<b>Input frequency range</b>	47 to 63 Hz
	<b>Output</b>	<b>Input AC current</b>	1.4 A at 90 VAC and maximum load
		<b>Output power</b>	45W
		<b>DC output</b>	19.5V
		<b>Hold-up time</b>	5 msec at 115 VAC input
		<b>Output current limit</b>	<8A, Over voltage protection- 29V max automatic shutdown
	<b>Connector</b>	3 pin/grounded, mates with interchangeable cords	
	<b>Environmental Design</b>	<b>Operating temperature</b>	32° to 95° F (0° to 35° C)
		<b>Non-operating (storage) temperature</b>	-4° to 121° F (-20° to 85° C)
		<b>Altitude</b>	0 to 16,405 ft (0 to 5,000 m)
<b>Humidity</b>		0% to 95%	
	<b>Storage Humidity</b>	0% to 95%	
<b>EMI and Safety Certifications</b>	CE Mark - full compliance with LVD and EMC directives; Worldwide safety standards - IEC60950, EN60950, UL60950, Class1, SELV; Agency approvals - C-UL-US, NORDICS, DENAN, EN55022 Class B, FCC Class B, CISPR22 Class B, CCC, NOM-1 NYCE; Reliability - failure rate of less than 0.1% annually within the first three years of operation.		

<b>3-Cell (48 WHr) Long Life Lithium-Ion battery</b>	<b>Dimensions (H x W x L)</b>	7.0. x180.48x88.95 mm (0.273 x 7.09 x 3.49 inch)	
	<b>Weight (max)</b>		
	<b>Weight</b>	0.22 kg (0.48lb)	
		3cell Lithium-Ion	
	<b>Cells/Type Energy</b>	<b>Voltage</b>	11.4V/ 10.95V
		<b>Amp-hour capacity</b>	4.212Ah /4.385Ah
	<b>Temperature Temperature</b>	<b>Watt-hour capacity</b>	48Wh
		<b>Operating (Charging)</b>	32° to 113° F (0° to 45° C)
		<b>Operating (Discharging)</b>	14° to 122° F (-10° to 60° C)
	<b>Battery Re-Charge Time</b>	<b>Non-operating</b>	-4° to 122° F (-20° to 60° C)
<b>System in OFF or Standby Mode</b>		<3 hours	
<b>Fuel Gauge LED</b>	No		



### Technical Specifications

<b>Warranty</b>	1 year*
<b>Optional Travel Battery Available</b>	No

\*Batteries have a default one year limited warranty except for Long Life batteries which will have same 1-year or 3-year limited warranty as the platform.

### ENVIRONMENTAL

#### Eco-Label Certifications & declarations

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

- IT ECO declaration
- US ENERGY STAR®
- EPEAT <Gold> registered in the United States. See <http://www.epeat.net> for registration status in your country.

#### System Configuration

The configuration used for the Energy Consumption and Declared Noise Emissions data for the Notebook model is based on a “Typically Configured Notebook”.

#### Energy Consumption (in accordance with US ENERGY STAR® test method)

	115VAC, 60Hz	230VAC, 50Hz	100VAC, 60Hz
Normal Operation (Short idle)	8.83 W	9.15 W	8.83 W
Normal Operation (Long idle)	4.70 W	4.81 W	4.69 W
Sleep	0.41 W	0.43 W	0.41 W
Off	0.29 W	0.32 W	0.28 W



### Technical Specifications

Note:

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

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### COUNTRY OF ORIGIN

China

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

Type	Description	Part #
<b>Docking</b>	HP 3001pr USB 3 Port Replicator	F3S42AA
	HP 3005pr USB 3.0 Port Replicator	H1L08AA#xxx
	HP Display and Notebook Stand	E8G00AA#xxx
<b>Input/Output</b>	HP Stylish Wireless Keyboard and Mouse	H4B79AA#xxx
	HP USB Essential Keyboard and Mouse	H6L29AA
	HP 2.4 GHz Keyboard and Mouse	G1K29AA#xxx
	HP Ultra Mobile Wireless Mouse	H6F25AA#xxx
	HP Comfort Grip Wireless Mouse	H2L63AA
	HP 3-Button USB Laser Mouse	H4B81AA
	HP USB Travel Mouse	G1K28AA
	HP Ultrathin Wireless Mouse SE	L9V77AA
	HP Ultrathin Wireless Mouse	L9V78AA
	HP HDMI to DVI Adapter	F5A28AA
	HP Wireless Display Adapter	J1V25AA#xxx
	HP Stereo USB Headset	T1A67AA
	HP Stereo 3.5mm Headset	T1A66AA
	<b>Power</b>	HP 45W Smart AC Adapter 4.5mm
HP 65W Smart AC Adapter		H6Y89AA#xxx
HP 65W Slim AC Adapter		H6Y82AA#xxx
HP 90W Slim Combo AC Adapter w/ USB		H6Y84AA#xxx
HP Power Bank		N9F71AA#xxx
<b>Storage</b>	HP External USB Optical Drive	F2B56AA
<b>Security</b>	HP UltraSlim Keyed Cable Lock	H4D73AA
	HP USB Smart Card Reader	F6V67AA
	15.6" Privacy Filter	V8Z58AA
	HP Essential Combination Lock	TOY16AA
	HP Combination Lock	TOY15AA
	HP Keyed Cable lock	TOY14AA
	HP Keyed Cable Lock 10mm	T1A62AA
HP Dual Head Keyed Cable Lock	T1A64AA	
<b>UCC</b>	HP Conferencing Keyboard	K8P74AA#xxx
	HP Speaker Phone	K7V16AA
	HP Wired Headset	K7V17AA



### Summary of Changes

Date of change:	Version History:	Description of change:
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