Overview

HP ProBook 645 G4

Right

1.	Webcam (Select models)	**9.**	HDMI port (Cable not included)
2.	Webcam LED (Select models)	**10.**	USB 3.1 Gen 1 port
3.	Internal microphones (2)	**11.**	USB 3.1 Gen 1 charging port
4.	Power connector	**12.**	USB Type-C™ charging port
5.	MicroSD card slot	**13.**	HDD LED indicator
6.	Docking connector	**14.**	Fingerprint reader (Select models)
7.	VGA port	**15.**	Clickpad
8.	Ethernet port		

Overview

Left

1. Smart Card Reader (Select models)
2. Audio combo jack
3. USB 3.1 Gen 1 port

4. Security lock slot (Lock sold separately)
5. Power button

Overview

AT A GLANCE

- Windows 10 versions or FreeDOS 2.0
- Precision-crafted slim design with fingerprint resistant modern, fresh and comfortable natural silver finish
- Efficiently powerful, highly secure, and reliable AMD Ryzen™ PRO processor with Radeon™ Vega graphics designed for a highly responsive experience that helps secure your data, device, and identity
- HP Premium keyboard, spill resistant with optional backlit design
- Large Clickpad with gestures support
- Enhanced security features including TPM2.0, HP Privacy Camera, optional Smart Card Reader, optional Finger Print Reader, and HP Sure Start Gen4.
- LED-backlit display
  35.56 cm (14") diagonal HD and FHD or Touch FHD with camera and with WWAN
- HDMI port for connecting to high-resolution displays
- Optional HD webcam with dual-microphone array for video conferencing
- Three USB 3.1 Gen1 ports (1 charging) and one USB-C port (PD+DP, Gen1)
- Flexible wireless connectivity options
- Battery life up to 10 hours 15 minutes with fast charging technology
- Dual storage combines SSD fast boot up and app access with cost effective HDD mass storage
- Passed MIL-STD 810G testing[1]
- Compliance with FCC (Class B)

1. MIL-STD-810G testing is conducted on select HP products. Testing is not intended to demonstrate fitness of U.S. Department of Defense (DoD) contract requirements or for military use. Test results are not a guarantee of future performance under these test conditions. 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.

Technical Specifications

PRODUCT NAME

HP ProBook 645 G4

OPERATING SYSTEM

Preinstalled Windows 10 Pro 64[1]
Windows 10 Home 64 (National Academic only)[1,2]
Windows 10 Home 64[1]
Windows 10 Home Single Language 64[1]
FreeDOS 2.0

1. Not all features are available in all editions or versions of Windows. Systems may require upgraded and/or separately purchased hardware, drivers, software or BIOS update to take full advantage of Windows functionality. Windows 10 is automatically updated, which is always enabled. ISP fees may apply and additional requirements may apply over time for updates. See http://www.windows.com/.

2. 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.

PROCESSORS

AMD Ryzen™ 3 PRO 2300U Mobile Processor with Radeon™ Vega Graphics
(2 GHz base frequency, up to 3.4 GHz, 6 MB cache, 4 cores)[3,4]
AMD Ryzen™ 5 PRO 2500U Mobile Processor with Radeon™ Vega Graphics
(2 GHz base frequency, up to 3.6 GHz, 6 MB cache, 4 cores)[3,4]
AMD Ryzen™ 7 PRO 2700U Mobile Processor with Radeon™ Vega Graphics
(2.2 GHz base frequency, up to 3.8 GHz, 6 MB cache, 4 cores)[3,4]

Processor Family
AMD Ryzen™ 3 PRO APU processor
AMD Ryzen™ 5 PRO APU processor
AMD Ryzen™ 7 PRO APU processor

3. Multicore is designed to improve performance of certain software products. Not all customers or software applications will necessarily benefit from use of this technology. Performance and clock frequency will vary depending on application workload and your hardware and software configurations. AMD's numbering, branding and/or naming is not a measurement of higher performance.
4. Processor speed denotes maximum performance mode; processors will run at lower speeds in battery optimization mode.

CHIPSET

Chipset is integrated with processor

Technical Specifications

GRAPHICS

Integrated
AMD Radeon™ Vega Graphics

DISPLAY

Non-Touch HD
35.56 cm (14") diagonal HD SVA eDP anti-glare LED-backlit, 220 cd/m², 45% NTSC, (1366 x 768)[5,6]
35.56 cm (14") diagonal HD SVA eDP anti-glare LED-backlit, 220 cd/m², 45% NTSC, (1366 x 768) for camera[5,6]
35.56 cm (14") diagonal HD SVA eDP anti-glare LED-backlit, 220 cd/m², 45% NTSC, (1366 x 768) for WWAN[5,6]
35.56 cm (14") diagonal HD SVA eDP anti-glare LED-backlit, 220 cd/m², 45% NTSC, (1366 x 768) for camera and for WWAN[5,6]

Non-Touch FHD
35.56 cm (14") diagonal FHD IPS eDP anti-glare LED-backlit, 220 cd/m², 45% NTSC, (1920 x 1080)[5,6]
35.56 cm (14") diagonal FHD IPS eDP anti-glare LED-backlit, 220 cd/m², 45% NTSC, (1920 x 1080) for camera[5,6]
35.56 cm (14") diagonal FHD IPS eDP anti-glare LED-backlit, 220 cd/m², 45% NTSC, (1920 x 1080) for WWAN[5,6]
35.56 cm (14") diagonal FHD IPS eDP anti-glare LED-backlit, 220 cd/m², 45% NTSC, (1920 x 1080) for camera and for WWAN[5,6]

Touch FHD
35.56 cm (14") diagonal FHD IPS eDP LED-backlit touch screen 220 cd/m², 45% NTSC, (1920 x 1080) for camera and for WWAN[5,6]

5. HD content required to view HD images.
6. Resolutions are dependent upon monitor capability, and resolution and color depth settings.

Docking station model	Total number of supported displays (incl. the notebook display)	Max. resolutions supported	Dock Connectors	Technical limitations
HP UltraSlim Docking Station	3	Dual 2.5K @ 60Hz	2xDP, 1xVGA	Dual 2.5k only with both displays into DP
HP Thunderbolt Dock G2	3	Single 4K@60Hz (3840 x 2160)	2xDP, 1xVGA, 1xTB,1xUSB-C alt-mode	System will perform at USB 3.0 Gen1 speeds when connected to the dock (5Gbits) Thunderbolt port will function as a USB 2.0 port with data and power out (15W) only.
HP USB-C Dock G4	3	Dual 2K @ 60Hz Single 4K @ 60Hz (3840 x 1440)	1xHDMI, 2xDP	
HP USB-C Universal Dock	3	Dual 4K @ 60Hz Single 5K @ 60Hz	2xDP	
HP USB-C Travel Dock	2	Single 2K @ 60Hz	1xHDMI, 1xVGA	Single external display Only HDMI or VGA at the time
HP USB-C Mini Dock	2	Single 4K @ 30Hz	1xHDMI, 1xVGA	Single external display Only HDMI or VGA at the time

Technical Specifications

STORAGE AND DRIVES

Primary Storage
500 GB 7200 rpm[7]
500 GB 7200 rpm Self Encrypting Drive (FIPS-140-2)[7]
1 TB 7200 rpm[7]

Primary M.2 Storage
128 GB SATA-3 SS TLC[7]
256 GB SATA-3 TLC OPAL2[7]
256 GB PCIe NVMe SS Value[7]
256 GB PCIe Gen3x4 NVMe SS TLC[7]
512 GB SATA SS TLC (FIPS)[7]
512 GB PCIe Gen3x4 NVMe SS TLC[7]
1 TB PCIe Gen3x4 NVMe SS TLC[7]

7. For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 30 GB (for Windows 10) is reserved for system recovery software.

MEMORY

Maximum Memory
32 GB DDR4-2400 SDRAM[8]

Memory
4 GB Total System Memory (4 GB x 1)[8]
8 GB Total System Memory (4 GB x 2)[8]
8 GB Total System Memory (8 GB x 1)[8]
12 GB Total System Memory (8 GB + 4 GB)[8]
16 GB Total System Memory (16 GB x 1)[8]
16 GB Total System Memory (8 GB x 2)[8]
32 GB Total System Memory (16 GB x2)[8]

Memory Slots
2 SODIMM
Both slots are customer accessible / upgradeable
DDR4 PC4 SODIMMS - System supports run rate at 2400
Supports Dual Channel Memory

8. 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.

Technical Specifications

NETWORKING/COMMUNICATIONS

WLAN
Intel® Dual Band Wireless-AC 3168 802.11a/b/g/n/ac (1x1) Wi-Fi® and Bluetooth® 4.2 Combo, non-vPro™[9]
Intel® Dual Band Wireless-AC 8265 802.11a/b/g/n/ac (2x2) Wi-Fi® and Bluetooth® 4.2 Combo, non-vPro™[9]
Realtek 802.11ac (2x2) Wi-Fi® and Bluetooth® 4.2 Combo[9]
Realtek 802.11ac (1x1) Wi-Fi® and Bluetooth® 4.2 Combo[9]

WWAN
LTE CAT4: Huawei HP lt4132, LTE/HSPA+ w/GPS M.2[10]
LTE CAT9: Fibocom Intel(R) XMM(TM) 7360 LTE-Advanced lt4210 LTE/HSPA+ w/GPS[10]

NFC
NXP NPC300 Near Field Communication Module[11]

WPAN Bluetooth
Bluetooth® 4.2 supported via all supported WLAN modules[9]

Ethernet
Realtek RTL8111EPH-CG 10/100/1000 Ethernet NIC with DASH Support[12]

9. Wireless access point and Internet service required and sold separately. 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.
10. WWAN module requires separately purchased service contract. Check with service provider for coverage and availability in your area. Connection speeds will vary due to location, environment, network conditions, and other factors. 4G LTE not available on all products, in all regions.
11. Sold separately or as an optional feature.
12. 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.

AUDIO/MULTIMEDIA

Audio
2 Integrated stereo speakers
Integrated dual array microphone

Webcam
720p HD HP Privacy Camera[5,11,13]

5. HD content required to view HD images.
11. Sold separately or as an optional feature.
13. Internet access required.

Technical Specifications

KEYBOARDS/POINTING DEVICES/BUTTONS & FUNCTION KEYS

Keyboard
HP Advanced Keyboard
ClickPad, Spill-resistant with drain
ClickPad, Spill-resistant with drain, DuraKeys & Backlit
Dual Point, Spill-resistant with drain, DuraKeys & Backlit

Function Keys
ESC: system information
F1 - Display Switching
F2 - Blank or Privacy
F3 - Brightness Down
F4 - Brightness Up
F5 - Speaker Mute
F6 - Volume Down
F7 – Volume Up
F8 - Mic Mute
F9 - Backlight Toggle (for backlit keyboard) or Blank
F10 - NumLock
F11 - Wifi Toggle
F12 – Sleep

Clickpad requirements:
On/off control by driver
Taps enabled as default
Gestures:
(Win 10):
Disabled by default:
3 Finger Flick
2 Finger Rotate
Momentum Motion
1 Finger Vertical Scroll
Win 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

Technical Specifications

SOFTWARE AND SECURITY

Preinstalled Software

BIOS

HP BIOSphere Gen4[17]

HP DriveLock & Automatic DriveLock

BIOS Update via Network

Master Boot Record Security

Power On Authentication

Secure Erase[18]

Absolute Persistence Module[19]

Pre-boot Authentication

HP Wireless Wakeup

Software

HP Native Miracast Support[15]

HP LAN-Wireless Protection

HP Velocity

HP 3D DriveGuard

HP ePrint + JetAdvantage[20]

HP Hotkey Support - CMIT

HP Recovery Manager

HP Jumpstart

HP Support Assistant[21]

HP Noise Cancellation Software

HP Host Based MAC Address Manager

Buy Office

Manageability Features

HP Driver Packs[22]

HP System Software Manager (SSM)

HP BIOS Config Utility (BCU)

HP Client Catalog

HP Manageability Integration Kit Gen2[23]

Ivanti Management Suite

Technical Specifications

Client Security Software

HP Client Security Suite Gen4 including:[25]

HP Security Manager[26] (including Credential Manager, HP Password Manager, HP Spare Key)

Power On Authentication

HP Fingerprint Sensor[28]

HP Device Access Manager

Microsoft Defender[27]

Security Management

Secure Erase[18]

TPM 2.0 Embedded Security Chip shipped with Windows 10 (Common Criteria EAL4+ Certified)

SATA 0,1 port disablement (viaBIOS)

RAID configurations[29]

Serial, USB enable/disable (viaBIOS)

Power-on password (viaBIOS)

Setup password (viaBIOS)

Support for chassis padlocks and cable lock devices

Integrated hood sensor

HP Sure Click[30]

Security
TPM

Model: TPM SLB9670 VQ2.0 FW7.63RS3 913310-002

Version: TPM 2.0

Revision: 1.16

FIPS 140-2 Compliant: No

Smartcard Reader

Model number: Alcor AU9560

FIPS 201 Compliant: Yes

IPv6 Certification

No

MD5 Hash

Please follow the instructions below to access MD5 Hash.

Log-on to http://hp.com/support, enter your product name, select software and drivers, select OS, select driver. After selecting the driver, click on "Associated files" and then click on "Download". When opening the file, under "Purpose" you should see the appropriate "SOFTPAQ MD5:" Field

Technical Specifications

Is the BIOS on this notebook ISO/IEC 19678:2015 (formerly NIST 800-147) compliant?:

Yes

UEFI version: 2.5

16. Miracast is a wireless technology your PC can use to project your screen to TVs, projectors, and streaming

17. HP BIOSphere Gen4 features may vary depending on the PC platform and configurations. Requires Intel® or AMD 8th generation processors.

18. Secure Erase for the methods outlined in the National Institute of Standards and Technology Special Publication 800-88. Supported on Elite platforms with BIOS version F.03 or higher.

19. 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.

20. HP ePrint Driver requires an Internet connection to HP web-enabled printer and HP ePrint account registration (for a list of eligible printers, supported documents and image types and other HP ePrint details, see http://www.hp.com/go/eprintcenter). Print times and connection speeds may vary.

21. HP Support Assistant requires Windows and Internet access.

22. HP Driver Packs not preinstalled, however available for download at http://www.hp.com/go/clientmanagement.

23. HP Manageability Integration Kit can be downloaded from http://www8.hp.com/us/en/ads/clientmanagement/overview.html

24. Ivanti Management Suite subscription required.

25. HP Client Security Suite Gen 4 requires Windows and Intel® or AMD 8th generation processors.

26. HP Password Manager requires Internet Explorer or Chrome or FireFox. Some websites and applications may not be supported. User may need to enable or allow the add-on / extension in the internet browser.

27. Microsoft Defender Opt in and internet connection required for updates.

28. HP Fingerprint Sensor sold separately or as an optional feature.

29. RAID configuration is optional and does require a second hard drive.

30. HP Sure Click is available on select HP platforms and supports Microsoft® Internet Explorer and Chromium™. Check http://h20195.www2.hp.com/v2/GetDocument.aspx?docname=4AA7-0922ENW for all compatible platforms as they become available.

QuickSpecs

Technical Specifications

POWER

Power Supply

HP Smart 45 W right angle 4.5 mm AC Adapter[31]

HP Smart 65 W right angle 4.5 mm AC Adapter[31]

HP Smart 45 W right angle 4.5 mm AC Adapter 2-prong (Japan only)[31]

45 W USB Type-C™ adapter[31]

65 W USB Type-C™ adapter[31]

Primary Battery

HP Long Life 3-cell, 48 Wh Li-ion[32]
HP Fast Charge Technology - 90% in 90minutes

Power Cord

3-wire plug (C5), 1.8m, Sticker, Conventional[31]
3-wire plug (C5), 1.0m, Sticker, Conventional[31]
2-wire plug (C5), 1.0m, Sticker, Conventional (Japan only) [31]

Battery Life

Up to 10 hours 15 minutess (with SSD)[33]

31. Availability may vary by country.
32. Battery is internal and not replaceable by customer. Serviceable by warranty.
33. 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 http://www.bapco.com for additional details.

WEIGHTS & DIMENSIONS

Weight

Starting at 3.8 lb (non-touch); Starting at 4.26 lb (touch)[34]
Starting at 1.73 kg (non-touch); Starting at 1.93 kg (touch)[34]

Dimensions (W x D x H)
Non-touch
13.4 x 9.5 x 0.83 in
34 x 24 x 2.095 cm

Touch
13.4 x 9.5 x 0.87 in
34 x 24 x 2.195 cm

34. Weight will vary by configuration.

Technical Specifications

PORTS/SLOTS

Ports

1 USB 3.1 Type-C™ (Power delivery, DisplayPort 1.4)
1 USB 3.1 Gen 1 (charging)
2 USB 3.1 Gen 1
1 HDMI 1.4[35]
1 RJ-45
1 VGA
1 headphone/microphone combo
1 AC power

Expansion Slots

1 docking connector
1 microSD (multi-format digital media reader)

35. HDMI cable sold separately.

SERVICE AND SUPPORT

HP Services offers 3 year and 1 year limited warranties and 90 day support options depending on country. 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[36]

36. HP Care Packs are sold separately. Service levels and response times for HP Care Packs may vary depending on your geographic location. Service starts on date of hardware purchase. Restrictions and limitations apply. For details, visit http://www.hp.com/go/cpc. HP services are governed by the applicable HP terms and conditions of service provided or indicated to Customer at the time of purchase. Customer may have additional statutory rights according to applicable local laws, and such rights are not in any way affected by the HP terms and conditions of service or the HP Limited Warranty provided with your HP Product.

Technical Specifications

ENVIRONMENTAL & INDUSTRY

<table>
<tr>
<td rowspan="2">Environmental Data</td>
<td>Eco-Label Certifications & declarations</td>
<td colspan="3">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® Silver registered in the United States. Based on US EPEAT® registration according to IEEE 1680.1–2018 EPEAT®. Status varies by country. Visit http://www.epeat.net for more information.</td>
</tr>
<tr>
<td>System Configuration</td>
<td colspan="3">The configuration used for the Energy Consumption and Declared Noise Emissions data for the Notebook model is based on a "Typically Configured Notebook".</td>
</tr>
</table>

Energy Consumption (in accordance with US ENERGY STAR® test method)	**115VAC, 60Hz**	**230VAC, 50Hz**	**100VAC, 60Hz**
Normal Operation (Short idle)	9.76 W	9.19 W	9.22 W
Normal Operation (Long idle)	6.55 W	7.66 W	6.72 W
Sleep	0.91 W	0.95 W	0.92 W
Off	0.52 W	0.53 W	0.54 W

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

Heat Dissipation*	**115VAC, 60Hz**	**230VAC, 50Hz**	**100VAC, 60Hz**
Normal Operation (Short idle)	33 BTU/hr	31 BTU/hr	32 BTU/hr
Normal Operation (Long idle)	22 BTU/hr	26 BTU/hr	23 BTU/hr
Sleep	3 BTU/hr	3 BTU/hr	3 BTU/hr
Off	2 BTU/hr	2 BTU/hr	2 BTU/hr

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

Declared Noise Emissions	Sound Power (L_{WAd}, bels)	Sound Pressure (L_{pAm}, decibels)

Technical Specifications

(in accordance with ISO 7779 and ISO 9296)		
Typically Configured – Idle	3	22
Fixed Disk – Random writes	3.9	34
Longevity and Upgrading	This product can be upgraded, possibly extending its useful life by several years. Upgradeable features and/or components contained in the product may include:	
	Spare parts are available throughout the warranty period and or for up to "5" years after the end of production.	
Batteries	This battery(s) in this product comply with EU Directive 2006/66/EC Batteries used in the product do not contain: Mercury greater the1ppm by weight Cadmium greater than 20ppm by weight Battery size: CR2032 (coin cell) Battery type: Lithium Battery size: CR2032 (coin cell) Battery type: Lithium"	
Additional Information	• This product is in compliance with the Restrictions of Hazardous Substances (RoHS) directive - 2011/65/EC. • This HP product is designed to comply with the Waste Electrical and Electronic Equipment (WEEE) Directive – 2002/96/EC. • This product is in compliance with California Proposition 65 (State of California; Safe Drinking Water and Toxic Enforcement Act of 1986). • This product is in compliance with the IEEE 1680.1 (EPEAT) standard at the Silver level, see http://www.epeat.net • Plastics parts weighing over 25 grams used in the product are marked per ISO11469 and ISO1043. • This product contains 0% post-consumer recycled plastic (by wt.) • This product is 94.4% recycle-able when properly disposed of at end of life.	

Packaging Materials	**External:**	PAPER/Corrugated	225 g
		PAPER/Paper	40 g
	Internal:	PLASTIC/Polyethylene Expanded - EPE	31 g
		PLASTIC/Polyethylene low density – LDPE	7 g
	The plastic packaging material contains at least 50% recycled content.		
	The corrugated paper packaging materials contains at least 75% recycled content.		
Material Usage	This product does not contain any of the following substances in excess of regulatory limits (refer to the HP General Specification for the Environment at http://www.hp.com/hpinfo/globalcitizenship/environment/pdf/gse.pdf): • Asbestos • Certain Azo Colorants		

Technical Specifications

		- Certain Brominated Flame Retardants – may not be used as flame retardants in plastics - Cadmium - Chlorinated Hydrocarbons - Chlorinated Paraffins - Formaldehyde - Halogenated Diphenyl Methanes - Lead carbonates and sulfates - Lead and Lead compounds - Mercuric Oxide Batteries - Nickel – finishes must not be used on the external surface designed to be frequently handled or carried by the user. - Ozone Depleting Substances - Polybrominated Biphenyls (PBBs) - Polybrominated Biphenyl Ethers (PBBEs) - Polybrominated Biphenyl Oxides (PBBOs) - Polychlorinated Biphenyl (PCB) - Polychlorinated Terphenyls (PCT) - Polyvinyl Chloride (PVC) – except for wires and cables, has been voluntarily removed from most applications. - Radioactive Substances - Tributyl Tin (TBT), Triphenyl Tin (TPT), Tributyl Tin Oxide (TBTO)
	Packaging Usage	HP follows these guidelines to decrease the environmental impact of product packaging: - Eliminate the use of heavy metals such as lead, chromium, mercury and cadmium in packaging materials. - Eliminate the use of ozone-depleting substances (ODS) in packaging materials. - Design packaging materials for ease of disassembly. - Maximize the use of post-consumer recycled content materials in packaging materials. - Use readily recyclable packaging materials such as paper and corrugated materials. - Reduce size and weight of packages to improve transportation fuel efficiency. - Plastic packaging materials are marked according to ISO 11469 and DIN 6120 standards.
	End-of-life Management and Recycling	Hewlett-Packard offers end-of-life HP product return and recycling programs in many geographic areas. To recycle your product, please go to: http://www.hp.com/go/reuse-recycle or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner. The EU WEEE directive (2002/95/EC) requires manufacturers to provide treatment information for each product type for use by treatment facilities. This information (product disassembly instructions) is posted on the Hewlett Packard web site at: http://www.hp.com/go/recyclers. These instructions may be used by recyclers and other WEEE treatment facilities as well as HP OEM customers who integrate and re-sell HP equipment.

Technical Specifications

	HP, Inc. Corporate Environmental Information	For more information about HP's commitment to the environment: Global Citizenship Report http://www.hp.com/hpinfo/globalcitizenship/gcreport/index.html Eco-label certifications http://www8.hp.com/us/en/hp-information/environment/ecolabels.html ISO 14001 certificates: http://h20195.www2.hp.com/V2/GetDocument.aspx?docname=c04755842 http://www.hp.com/hpinfo/globalcitizenship/environment/pdf/cert.pdf

SERVICE AND SUPPORT

HP Services offers a 1-year limited warranties and 90 day support options depending on country. Batteries have a default one year limited warranty. 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.[37]

37 . HP Care Packs are sold separately. Service levels and response times for HP Care Packs may vary depending on your geographic location. Service starts on date of hardware purchase. Restrictions and limitations apply. For details, visit http://www.hp.com/go/cpc. HP services are governed by the applicable HP terms and conditions of service provided or indicated to Customer at the time of purchase. Customer may have additional statutory rights according to applicable local laws, and such rights are not in any way affected by the HP terms and conditions of service or the HP Limited Warranty provided with your HP Product.

Technical Specifications

DISPLAYS

14" diagonal FHD UWVA anti-glare flat LED backlit non-touch; 220 cd/m²; 45% sRGB (1920 x 1080)

Outline Dimensions (W x H)	320.9x205.6 (max)
Active Area	309.31 x 173.99
Weight	290 max.
Diagonal Size	14 (inch)
Thickness	3.0mm max
Interface	eDP 1.2
Surface Treatment	Anti-Glare (AG)
Touch Enabled	None
Contrast Ratio	600:1 (typ) - AG
Refresh Rate	60Hz
Brightness	220 nits
Pixel Resolution	1920 x 1080 (FHD)
Format of LCD Pixel Arrangement	RGB
Backlight	LED
Color Gamut Coverage	45% of NTSC
Color Depth	6 bits + Hi FRC
Viewing Angle	UWVA 85/85/85/85

Technical Specifications

14" diagonal FHD UWVA anti-glare flat LED backlit touch; 220 cd/m²; 45% sRGB (1920 x 1080)

Outline Dimensions (W x H)	320.9x205.6 (max)
Active Area	309.31 x 173.99
Weight	290 max.
Diagonal Size	14 (inch)
Thickness	3.0mm max
Interface	eDP 1.2
Surface Treatment	BV
Touch Enabled	Yes
Contrast Ratio	600:1 (typ) – AG
Refresh Rate	60Hz
Brightness	220 nits
Pixel Resolution	1920 x 1080 (FHD)
Format LCD Pixel Arrangement	RGB
Backlight	LED
Color Gamut Coverage	45% of NTSC
Color Depth	6 bits + Hi FRC
Viewing Angle	UWVA 85/85/85/85

Technical Specifications

14" diagonal HD SVA anti-glare LED-backlit non-touch; 220 cd/m²; 45% sRGB (1366 x 768)

Outline Dimensions (W x H)	320.9 x 205.6 (mm) max
Active Area	309.40 x 173.95 (mm)
Weight	290 g max
Diagonal Size	14 (inch)
Thickness	3.0 (mm) max
Interface	eDP 1.2
Surface Treatment	Anti-Glare (AG)
Touch Enabled	None
Contrast Ratio	300:1 (typical)
Refresh Rate	60 Hz
Brightness	220 nits
Pixel Resolution	1366 x 768 (HD)
Format of LCD Pixel Arrangement	RGB
Backlight	LED
Color Gamut Coverage	45% of NTSC
Color Depth	6 bits + Hi FRC
Viewing Angle	SVA 40/40/15/30

NOTE: All specifications represent the typical specifications provided by HP's component manufacturers; actual performance may vary either higher or lower.

Technical Specifications

STORAGE

HDD 500 GB 7200RPM 7mm SATA		
Drive Weight	0.21 lb (95 g)	
Rotation speed	7200RPM	
Cache Buffer	Up to 32MB	
Height	0.28 in (7 mm)	
Width	2.75 in (69.85 mm)	
Interface	ATA-8, SATA 3.0	
Transfer Rate	600 MB/s	
Seek Time	Single Track: 2 ~ 1.5 ms; Average: 11 ~ 13 ms; Maximum: 18 ~ 22 ms	
Logical Blocks	976773168	
Operating Temperature	32° to 140°F (0° to 60°C) [ambient temp]	
Security Features	ATA Security	
Features	S.M.A.R.T., NCQ, Ultra DMA	

HDD 500 GB 7200RPM 7mm FIPS SATA Opal2		
Drive Weight	0.21 lb (95 g)	
Rotation speed	7200 rpm	
Cache Buffer	Up to 32MB	
Height	0.28 in (7 mm)	
Width	2.75 in (69.85 mm)	
Interface	ATA-8, SATA 3.0	
Transfer Rate	600 MB/s	
Seek Time	Single Track: 2 ~ 1.5 ms; Average: 11 ~ 13 ms; Maximum: 18 ~ 22 ms	
Logical Blocks	976,773,168	
Operating Temperature	32° to 140°F (0° to 60°C) [ambient temp]	
Security Features	ATA Security; TCG Opal 2.x, FIPS	
Features	S.M.A.R.T., NCQ, Ultra DMA	

QuickSpecs

Technical Specifications

HDD 1 TB 7200RPM 7mm SATA 2.5in

Drive Weight	90g
Rotation speed	7200rpm
Cache Buffer	128MB
Height	7.2mm Max.
Width	69.85mm
Interface	ATA-8, SATA 3.0
Transfer Rate	600 MB/s
Seek Time	Single Track: 1.5 ms; Average: 13 ms; Maximum: 32 ms
Logical Blocks	1,953,525,168
Operating Temperature	0~60°C
Security Features	ATA Security
Features	S.M.A.R.T., NCQ, Ultra DMA, TRIM

Technical Specifications

SSD 128 GB 2280 M2 SATA-3 TLC		
Drive Weight	0.02 lb (10 g)	
Capacity	128 GB	
NAND Type	TLC	
Height	0.09 in (2.3 mm)	
Width	0.87 in (22 mm)	
Interface	ATA-8, SATA 3.0	
Maximum Sequential Read	Up To 520 MB/s	
Maximum Sequential Write	Up To 450 MB/s	
Logical Blocks	250,069,680	
Operating Temperature	32° to 158°F (0° to 70°C) [ambient temp]	
Features	DIPM; TRIM; DEVSLP	

SSD 256 GB 2280 M2 PCIe-3x4 SS NVMe TLC		
Drive Weight	0.02 lb (10 g)	
Capacity	256 GB	
NAND Type	TLC	
Height	0.09 in (2.3 mm)	
Width	0.87 in (22 mm)	
Interface	PCIe NVMe Gen3X4	
Maximum Sequential Read	Up To 2600 MB/s	
Maximum Sequential Write	Up To 900 MB/s	
Logical Blocks	500,118,192	
Operating Temperature	32° to 158°F (0° to 70°C) [ambient temp]	
Features	TRIM; L1.2	

SSD 256 GB 2280 M2 SATA-3 Self Encrypted OPAL2 TLC		
Drive Weight	0.02 lb (10 g)	
Capacity	256 GB	
NAND Type	TLC	
Height	0.09 in (2.3 mm)	
Width	0.87 in (22 mm)	
Interface	ATA-8, SATA 3.0	
Maximum Sequential Read	Up To 530 MB/s	
Maximum Sequential Write	Up To 515 MB/s	
Logical Blocks	500,118,192	
Operating Temperature	32° to 158°F (0° to 70°C) [ambient temp]	
Features	DIPM; TRIM; DEVSLP	

Technical Specifications

256 GB 2280 PCIe NVMe Value Solid State Drive		
	Drive Weight	0.02 lb (10 g)
	Capacity	256 GB
	NAND Type	MLC
	Height	0.09 in (2.3 mm)
	Width	0.87 in (22 mm)
	Interface	PCIe NVMe Gen3X4
	Maximum Sequential Read	Up To 1700 MB/s
	Maximum Sequential Write	Up To 600 MB/s
	Logical Blocks	703,282,608
	Operating Temperature	32° to 158°F (0° to 70°C) [ambient temp]
	Features	TRIM; L1.2

SSD 512 GB 2280 M2 PCIe-3x4 SS NVMe TLC		
	Drive Weight	0.02 lb (10 g)
	Capacity	512 GB
	NAND Type	TLC
	Height	0.09 in (2.3 mm)
	Width	0.87 in (22 mm)
	Interface	PCIe NVMe Gen3X4
	Maximum Sequential Read	Up To 2600 MB/s
	Maximum Sequential Write	Up To 1400 MB/s
	Logical Blocks	1,000,215,216
	Operating Temperature	32° to 158°F (0° to 70°C) [ambient temp]
	Features	TRIM; L1.2

SSD 512 GB 2280 M2 SATA-3 TLC FIPS		
	Drive Weight	0.02 lb (10 g)
	Capacity	512GB
	NAND Type	TLC
	Height	0.09 in (2.3 mm)
	Width	0.87 in (22 mm)
	Interface	ACS-3, SATA 3.2
	Maximum Sequential Read	Up To 530 MB/s
	Maximum Sequential Write	Up To 400 MB/s
	Logical Blocks	1,000,215,216
	Operating Temperature	32° to 158°F (0° to 70°C) [ambient temp]
	Features	DIPM; TRIM; DEVSLP

Technical Specifications

SSD 1 TB 2280 PCIe-3x4 NVMe TLC SS

Drive Weight	0.02 lb (10 g)
Capacity	1 TB
NAND Type	TLC
Height	0.09 in (2.3 mm)
Width	0.87 in (22 mm)
Interface	PCIe NVMe Gen3X4
Maximum Sequential Read	2900
Maximum Sequential Write	2000
Logical Blocks	2,000,409,263
Operating Temperature	32° to 158°F (0° to 70°C) [ambient temp]
Features	TRIM; L1.2

Technical Specifications

POWER

AC Adapter 65 Watt nPFC USB Type C™	Dimensions	74x74x28.5mm	
	Weight	unit: 245g +/- 10g	
	Input	**Input Efficiency**	81.5% min at 115 Vac/ 230Vac @ 5V/3A 86.7% min at 115 Vac/ 230Vac @ 9V/3A 88% min at 115 Vac/ 230Vac @ 10V/5A 88% min at 115 Vac/ 230Vac @ 12V/5A 89% min at 115 Vac/ 230Vac @ 15V/4.33A 89% min at 115 Vac/ 230Vac @ 20V/3.25A
		Input frequency range	47 ~ 63 Hz
		Input AC current	1.7 A at 90 VAC and maximum load
	Output	**Output power**	65W
		DC output	5V/9V/10V/12V/15V/20V
		Hold-up time	5ms at 115 Vac input
		Output current limit	<8.0A
	Connector	Duck head / duck head power cord, without Smart ID DC connector	
	Environmental Design	**Operating temperature**	32°Fto 95°F (0°to 35°C)
		Non-operating (storage) temperature	-4°F to 185°F (-20°to 85°C)
		Altitude	0 to 16,400 ft (0 to 5000m)
		Humidity	5% to 95%
		Storage Humidity	5% to 95%
	EMI and Safety Certifications	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. MTBF - over 100,000 hours at 25°C ambient condition.	

Technical Specifications

AC Adapter 45 Watt nPFC USB Type C™			62.0x62.0x28.5mm
	Weight		unit: 220g +/- 10g
	Input	**Input Efficiency**	Average Efficiency of 25%, 50%, 75%, 100% load condition with 115Vac/230Vac Spec:5V : 81.5%9V : 86.7%10V : 87.5%12V : 87.8%15V : 87.8%20V : 87.8%
		Input frequency range	47 ~ 63Hz
		Input AC current	Max. 1.4 A at 90 Vac
	Output	**Output power**	5V/15W 9V/27W 10V/37.5W 12V/45W 15V/45W 20V/45W
		DC output	5V / 9V / 10V /12V / 15V / 20V
		Hold-up time	5ms at 115 Vac input
		Output current limit	<5.0A
	Connector		USB Type-C™
	Environmental Design	**Operating temperature**	32°F to 95°F (0°to 35°C)
		Non-operating (storage) temperature	-4°F to 185°F (-20°to 85°C)
		Altitude	0 to 16,400 ft (0 to 5000m)
		Humidity	20% to 95%
		Storage Humidity	10% to 95%
	Safety Certifications		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. MTBF - over 200,000 hours at 25°C ambient condition.

Technical Specifications

HP 45W Smart AC adapter	**Dimensions**	3.74 x 1.57 x 1.04 in (9.5 x 4.0 x 2.65 cm)	
	Weight	0.386 lb (175g) max	
	Input	90 to 265 VAC	
		Input Efficiency	87.74% at 115Vac and 88.4% at 230Vac
		Input frequency range	47 to 63 Hz
		Input AC current	1.4 A at 90 VAC
	Output	**Output power**	45W
		DC output	19.5V
		Hold-up time	5 msec at 115 VAC input
		Output current limit	<8.0A
	Connector	4.5mm Barrel Type, 3 pin/grounded, mates with interchangeable cords	
	Environmental Design	**Operating temperature**	32° to 95° F (0° to 35° C)
		Non-operating (storage) temperature	-4° to 185° F (-20° to 85° C)
		Altitude	0 to 16,400 ft (0 to 5,000 m)
		Humidity	20% to 95%
		Storage Humidity	10% to 95%
	EMI and Safety Certifications	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. MTBF - over 200,000 hours at 25°C ambient condition.	
HP 65W Smart AC adapter	**Dimensions**	107.0x47.0x30.0mm	
	Weight	unit: 250g +/- 10g	
	Input	**Input Efficiency**	88.0 % at 115 Vac and 89.0 % at 230Vac
		Input frequency range	47 ~ 63 Hz
		Input AC current	Max. 1.7 A at 90 Vac
	Output	**Output power**	65W
		DC output	19.5V
		Hold-up time	5ms at 115 Vac input
		Output current limit	<11.0A
	Connector	4.5mm Barrel Type	
	Environmental Design	**Operating temperature**	32°F to 95°F (0°to 35°C)
		Non-operating (storage) temperature	-4°F to 185°F (-20°to 85°C)
		Altitude	0 to 16,400 ft (0 to 5000m)
		Humidity	20% to 95%
		Storage Humidity	10% to 95%
	EMI and Safety Certifications	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. MTBF - over 200,000 hours at 25°C ambient condition.	
	Dimensions	102x55x30mm	

QuickSpecs

Technical Specifications

HP 65W EM Smart AC adapter	Weight	270g +/- 10g	
	Input	Input Efficiency	87% min at 115V/230V
		Input frequency range	47 to 63 Hz
		Input AC current	1.7 A at 90 VAC and maximum load
	Output	Output power	
		DC output	65W(19.5V/3.33A)
		Hold-up time	5 msec at 115 VAC input
		Output current limit	<11A, Over voltage protection- 29V max automatic shutdown
	Connector	4.5mm Barrel Type, 3 pin/grounded, mates with interchangeable cords	
	Environmental Design	Operating temperature	0° to 35° C
		Non-operating (storage) temperature	-20° to 85° C
		Altitude	0 to 5,000 m
		Humidity	0% to 95%
		Storage Humidity	0% to 95%
	EMI and Safety Certifications	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.	

HP 65W Watt Smart Travel Adapter	Dimensions	120.0x57.6x16.7mm	
	Weight	unit: 250g +/- 10g	
	Input	Input Efficiency	88.0 % at 115 Vac and 89.0 % at 230Vac
		Input frequency range	47 ~ 63 Hz
		Input AC current	Max. 1.7 A at 90 Vac
	Output	Output power	65W
		DC output	19.5V/5V
		Hold-up time	5ms at 115 Vac input
		Output current limit	<11.0A
	Connector	4.5mm/7.4mm tips	
	Environmental Design	Operating temperature	32°F to 95°F (0°to 35°C)
		Non-operating (storage) temperature	-4°F to 185°F (-20°to 85°C)
		Altitude	0 to 16,400 ft (0 to 5000m)
		Humidity	20% to 95%
		Storage Humidity	10% to 95%
	EMI and Safety Certifications	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. MTBF - over 200,000 hours at 25°C ambient condition.	

	Dimensions (H x W x L)	8.05. x185.15x95 mm

Technical Specifications

Battery CD 3 Cell WHr 48 Long Life -PR+PL Fast Charge	**Weight**	0.26 kg	
	Cells/Type	3cell Lithium-Ion Polymer cell / 606072 3cell Lithium-Ion Prismatic cell / 606080	
	Energy	**Voltage**	11.4V
		Amp-hour capacity	4.212Ah /4.0Ah
		Watt-hour capacity	50Wh
	Temperature	**Operating (Charging)**	32˚ to 113˚ F (0˚ to 45˚ C)
		Operating (Discharging)	14˚ to 122˚ F (-10˚ to 60˚ C)
	Fuel Gauge LED	N/A	
	Warranty	3 years[6]	
	Optional Travel Battery Available	No	

COUNTRY OF ORIGIN

China

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

Type	Description	Part #
Cases	HP 15.6 Business Top Load	2SC66AA
	HP Slim Top Load	F3W15AA
	HP Slim Backpack	F3W16AA
Docking	HP 2013 UltraSlim Docking Station	D9Y32AA
	HP USB-C Dock G4	3FF69AA
	HP USB-C Universal Dock	1MK33AA
Input/Output	HP Slim USB Keyboard and Mouse	T6T83AA
	HP Slim Wireless Keyboard and Mouse	T6L04AA
	HP Ultra Mobile Wireless Mouse	H6F25AA
	HP Comfort Grip Wireless Mouse	H2L63AA
	HP Wireless Premium Mouse	1JR31AA
	HP Slim Bluetooth Mouse	F3J92AA
	HP USB Premium Mouse	1JR32AA
	HP USB Travel Mouse	G1K28AA
	HP Elite Presenter Mouse	2CE30AA
	HP HDMI to DVI Adapter	F5A28AA
	HP HDMI to VGA	H4F02AA
	HP USB-C to DP	N9K78AA
	HP USB-C to USB-A Hub	Z6A00AA
	HP USB-C to VGA	N9K76AA
	HP Stereo 3.5mm Headset	T1A66AA
	HP Stereo USB Headset	T1A67AA
Power	HP 45W Smart AC Adapter	H6Y88AA
	HP 65W Smart AC Adapter	H6Y89AA
	HP 45W USB-C Power Adapter	1HE07AA
	HP 65W USB-C Power Adapter	1HE08AA
	HP USB-C Notebook Power Bank	2NA10AA
Storage	HP External USB Optical Drive	F2B56AA
	HP 128GB TLC M.2 SATA-3	2JB95AA
	HP 256GB TLC PCIe 3x4 NVMe M.2 SSD	1FU87AA
	HP 512GB TLC PCIe 3x4 NVMe M.2 SSD	1FU88AA
Security	HP Docking Station Cable Lock	AU656AA#XXX
	HP 14.0" Notebook Privacy Filter	J6E65AA
	HP Keyed Cable Lock 10mm	T1A62AA

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

Memory	HP 4GB DDR4 Memory	Z4Y84AA
	HP 8GB DDR4 Memory	Z4Y85AA
	HP 16GB DDR4 Memory	Z4Y86AA
UCC	HP Wireless Collaboration Keyboard	Z9N39AA
	HP USB Collaboration Keyboard	Z9N38AA
	HP UC Speaker Phone	K7V16AA
	HP UC Wireless Mono Headset	W3K08AA
	HP UC Wireless Duo Headset	W3K09AA
Displays	HP ProDisplay P223 21.5-inch Monitor	X7R61AA
	HP ProDisplay P240va 23.8-inch Monitor	N3H14AA
	HP EliteDisplay E243 23.8-inch Monitor	1FH47AA

Summary of Changes

Date of change:	Version History:	Updated	Description of change:
March 30, 2018	V1 to V2	Updated	Processors, at a glance section updated
May 23, 2018	V2 to V3	Updated	Docking stations table added
May 29, 2018	V3 to V4	Updated	HDD´s removed
June 7, 2018	V4 to V5	Updated	Battery life, Dimensions & Weight updated
September 26, 2018	V5 to v6	Removed	360GB Intel PCle SSD
October 8, 2018	V6 to v7	Added	Compliance in at a glance section
February 13, 2019	V7 to v8	Removed	Phonewise Software
June 12, 2019	V8 to v9	Updated	EPEAT
June 28, 2019	V9 to v10	Updated	Color Gamut
October 9, 2019	V10 to v11	Updated	Ports Section