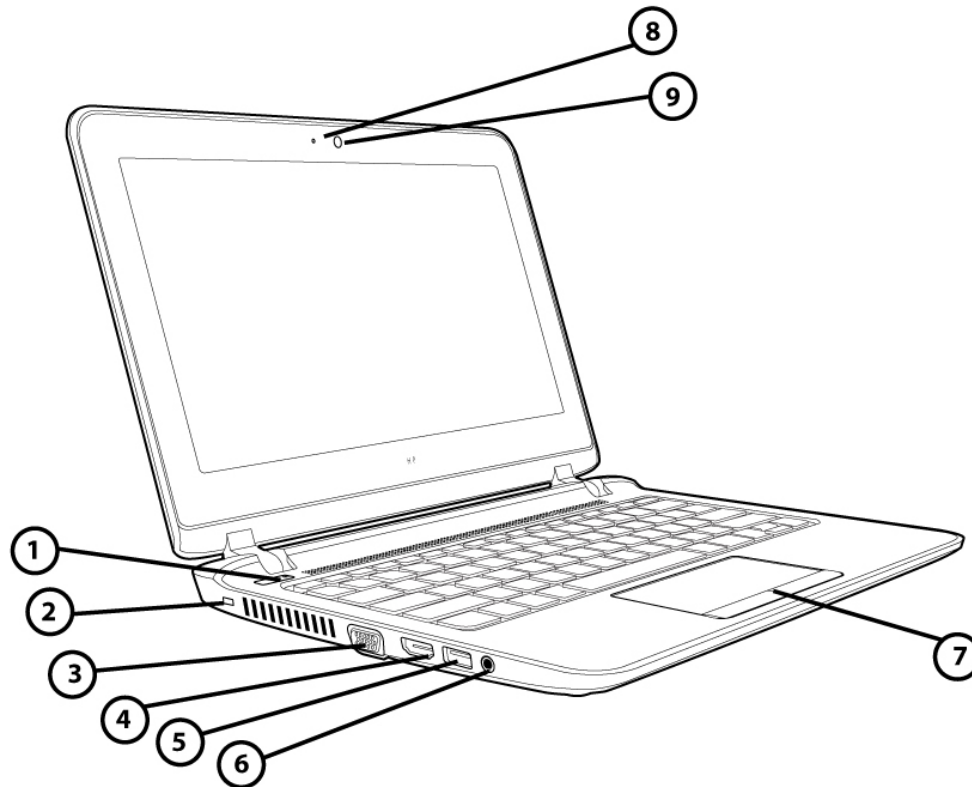


Overview

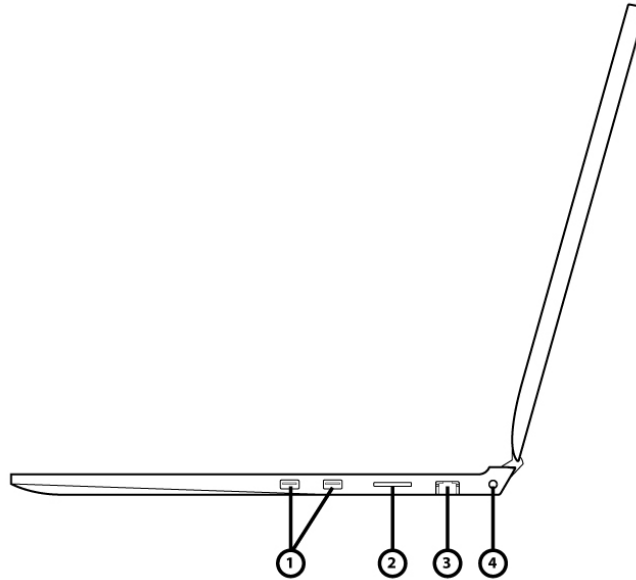
HP ProBook 11 G1 Education Edition Notebook



Front, Left

- | | |
|-----------------|------------------------------|
| 1. Power Button | 6. 3.5mm Combo Headphone/Mic |
| 2. Lock Slot | 7. Touchpad |
| 3. VGA Port | 8. Webcam LED |
| 4. HDMI Port | 9. Webcam |
| 5. USB 3.0 Port | |

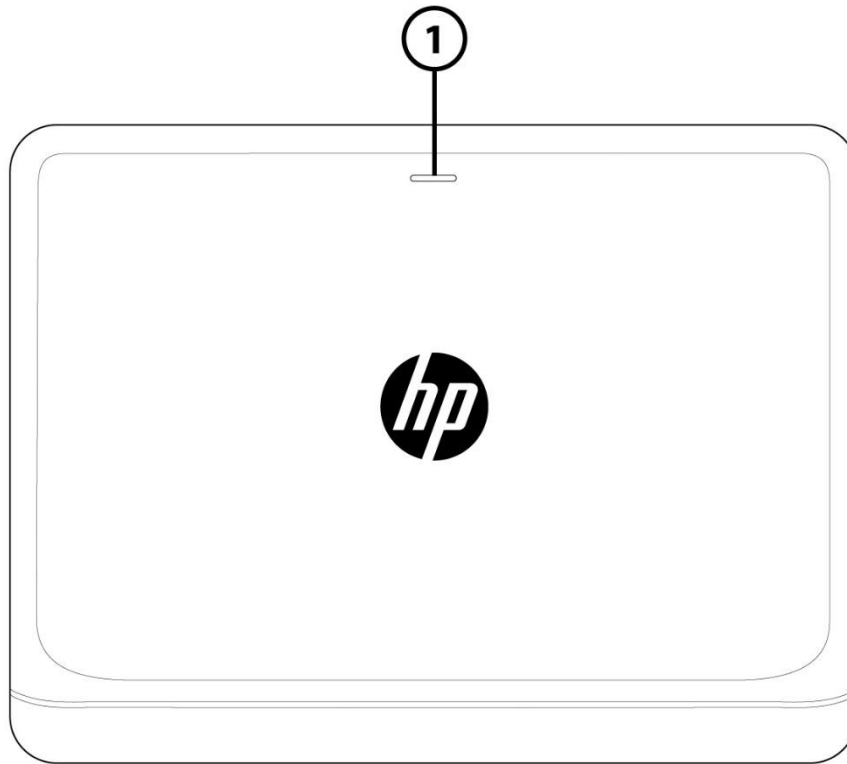
Overview



Right side

1. 2 USB 3.0 Ports
2. SD Card Slot
3. RJ-45 Port (Ethernet)
4. AC Power Connector (4.5mm)

Overview



Closed view - top

1. Network access indicator/LED light

Overview

At A Glance

- This light, durable notebook features a reinforced chassis design
- Weight starting at 3.48 lbs (1.58 kg) for Non Touch; 3.76 lbs (1.71 kg) for Touch
- Windows 10 versions, Windows 8.1 versions, Windows 7 versions, or FreeDOS 2.0
- Choice of Intel® Core™ i3, Intel® Pentium®, or Intel® Celeron® Processors
- Battery life up to 16 hours and 15 minutes
- 11.6-inch diagonal display (1366 x 768) in matte or touch screens with Corning® Gorilla® Glass 3
- Full size island style spill resistant keyboard (tested to IP41 standard)
- Touchpad support multi gestures, Win 8.1 modern TouchPad gestures and PS/2 interface
- Choice of up to 500 GB hard drives or 180 GB solid state drives
- Memory options up to 8 GB
- Integrated HP TrueVision HD Webcam
- Supports a broad range of wireless WLAN or WWAN options for connectivity on the go
- HP 3-cell battery (36 WHr) or optional HP 6-cell long life battery (64 WHr)
- Integrated Intel® UMA Graphics
- DTS Sound+™ with integrated stereo speakers and single digital microphones
- HP Multi-Format Digital Media Card Reader

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

Features

PRODUCT NAME

HP ProBook 11 G1 Education Edition Notebook

OPERATING SYSTEM

Preinstalled	Windows 10 Pro 64 ¹ Windows 10 Home 64 ¹ Windows 10 Home 64 ¹ Windows 8.1 Pro 64 ¹ Windows 8.1 64 ¹ Windows 7 Professional 64 (available through downgrade rights from Windows 10 Pro) ³ Windows 7 Professional 64 (available through downgrade rights from Windows 8.1 Pro) ² Windows 7 Professional 64 ¹ FreeDOS 2.0
Web Support	Windows 10 Pro 64 ¹ Windows 10 Home 64 ¹ Windows 10 Home 64 ¹ Windows 8.1 Pro 64 ¹ Windows 8.1 64 ¹ Windows 7 Professional 64 (available through downgrade rights from Windows 10 Pro) ³ Windows 7 Professional 64 (available through downgrade rights from Windows 8.1 Pro) ² Windows 7 Professional 64 ¹ Windows 10 Enterprise 64 ¹ Windows 8.1 Enterprise 64 ¹ Windows 8 64 ¹ Windows 7 Enterprise 64 ¹

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://http://www.microsoft.com>
2. This system is preinstalled with Windows 7 Professional software and also comes with a license and media for Windows 8 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.
3. This system is preinstalled with Windows 7 Professional 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

PROCESSOR

Intel® Core™ i3-5005U with Intel HD Graphics 5500 (2 GHz, 3 MB cache, 2 cores)¹
Intel® Pentium® 3805U with Intel HD Graphics (1.9 GHz, 2 MB cache, 2 cores)¹
Intel® Celeron® 3205U with Intel HD Graphics (1.5 GHz, 2 MB cache, 2 cores)¹

Features

1. Multi-Core is designed to improve performance of certain software products. Not all customers or software applications will necessarily benefit from use of this technology. 64-bit computing on Intel® architecture requires a computer system with a processor, chipset, BIOS, operating system, device drivers, and applications enabled for Intel® 64 architecture. Processors will not operate (including 32-bit operation) without an Intel® 64 architecture-enabled BIOS. Performance will vary depending on your hardware and software configurations. Intel's numbering is not a measurement of higher performance.

CHIPSET

Chipset is integrated with processor

GRAPHICS

Intel® HD 5500 Graphics (available on Core i3-5005U configurations)

Intel® HD Graphics (available on Celeron/Pentium configurations)

DISPLAY

Internal

11.6-inch diagonal HD LED (3.6mm) SVA, 220nits, Touch (1366 x 768) with Corning® Gorilla® Glass 3

11.6-inch diagonal HD AG LED flat (3.6mm) SVA, 220nits, (1366 x 768)

Note: HD content required to view HD images.

HDMI v1.4 port on Unit

Supporting: up to 1080p, 1920 x 1080 @ 60Hz

VGA (Dsub 15 pin) supporting:

1920 x 1200 external resolution @ 60Hz

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

STORAGE AND DRIVES

Supports single 2.5" 7.0mm SATA Hard Drives

Single HDD configurations

500 GB (5400 rpm)

M.2 2280 SSD

64 GB Solid State Drive (Windows 8.1 only)

128 GB Solid State Drive

180 GB Solid State Drive

NOTE: For Solid State Drives (SSD), GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 16 GB (for Windows 7) and up to 30 GB (for Windows 8 and 10) is reserved for system recovery software

MEMORY

Standard

One SODIMM slots—customer accessible / upgradeable

DDR3L PC3-12800 SDRAM 1600 (Transfer rates up to 1600 MT/s)

Features

Supports

2048 MB Total System Memory (2048 MB x 1)
4096 MB Total System Memory (4096 MB x 1)
8192 MB Total System Memory (8192 MB x 1)

Maximum

Supports up to 8 GB max system memory

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.

NETWORKING/COMMUNICATIONS

Wireless LAN (WLAN)¹

Intel® Dual Band Wireless-AC 3160 802.11 a/b/g/n/AC 1x1 +Bluetooth® Combo
Intel® Dual Band Wireless-AC 7260 802.11 a/b/g/n/AC 2x2 +Bluetooth® Combo
Realtek 802.11 b/g/n 1x1 +Bluetooth® Combo

Wireless WAN (WWAN)^{1,2}

HP hs3110 HSPA+ Mobile Broadband

1. Wireless access point and Internet service is required and is not included. Availability of public wireless access points limited.
2. Sold separately or as an optional feature.

Communications

Integrated 10/100/1000 Gigabit Ethernet; supports PXE boot

AUDIO/MULTIMEDIA

Audio

DTS Sound +™
Integrated dual stereo speakers
Single digital microphone with echo cancellation/noise suppression

Webcam

Integrated HD* webcam

- HP TrueVision HD¹ camera
- Fixed (no tilt) + activity LED on LCD cover
- 1280x720 by 30 frames per second

1. HD content required to view HD images.

KEYBOARDS/POINTING DEVICES

Keyboard

100% Full size island style keyboard
Anti-peel protection on key caps
Spill resistant keyboard (tested to IP41 standard)

Pointing Devices

Touchpad (tested to IP41 standard)
Taps enabled as default

Features

Support Multi Gestures - ability to turn on and off
Support Win8.1 Modern TouchPad Gestures
Support PS/2 interface

SOFTWARE AND SECURITY

BIOS

HP BIOSphere¹
HP DriveLock
HP BIOS Protection²
BIOS Update via Network
Master Boot Record Security
Power On Authentication
Pre-Boot Security
Secure Erase³
Hybrid Boot (Windows 8.1 only)
Measured Boot (Windows 8.1 only)
Secure Boot (Windows 8.1 only)
Absolute Persistence Module⁴

Multimedia

Cyberlink PowerDVD
Cyberlink YouCam BE (Windows 7 only)

Communication

Intel® Wireless Display (WiDi) Software for Windows⁵

HP Value Add Software

HP ePrint Driver⁶
HP Mobile Connect
HP Recovery Disc Creator
HP Recovery Manager
HP Support Assistant
HP 3D DriveGuard
HP Wireless Hotspot
HP User Guide with Warranty Documentation
HP SoftPaq Download Manager

3rd Party

Foxit PhantomPDF Express for HP

Microsoft Products

Buy Office
Bing Search
Skype¹³

Features

Security

Windows Defender ⁷

TPM 1.2¹⁰

Smart Card Reader

Security lock slot

Preboot Authentication

HP School Pack

HP Online Learning Platform ¹²

HP Classroom Manager Student Edition¹⁴

Microsoft FreshPaint – Metro

Microsoft OneNote

Oxford® Advanced Learner's Dictionary

Oxford University Press

SparkVUE® by PASCO

Manageability

HP SoftPaq Download Manager (SDM)

HP System Software Manager (SSM) ⁸

HP BIOS Config Utility (BCU) ⁸

HP CIK for Microsoft SCCM ⁸

LANDESK Management ⁹

For more information on HP Client Management Solutions refer to: <http://www.hp.com/go/clientmanagement>.

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. BIOS adheres to NIST SP800-147
3. For the methods outlined in the National Institute of Standards and Technology Special Publication 800-88.
4. 1 year license of Computrace Data Protect to lock and prevent unauthorized access and remotely delete personal data. License must be activated by customer. See <http://www.absolute.com/landing/2012/computrace-hp> for complete details. Service may be limited, check with Absolute for availability outside the U.S.
5. Integrated Intel® Wi-Di Display is available on select configurations only and requires a separate projector, TV or monitor with an integrated or external Wi-Di receiver. For more information on Intel® Wi-Di Display visit <http://www.intel.com/go/wirelessdisplay>
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. Windows Defender requires Windows 8.
8. Not preinstalled, however available on manageability website.
9. Subscription required.
10. Firmware TPM is version 2.0, a subset of the TPM 2.0 specification version v0.89 as implemented by Intel Platform Trust Technology (PTT).
11. For more information visit <http://www.life-global.org>
12. Check <http://www.hp.com/go/teachingwithtechnology> for regional availability.

Features

13. Skype is not offered in China.
14. HP Classroom Manager for Teachers is required and sold separately for control and device locking from the teacher's Windows desktop console; no locking and control functionality originates from HP Classroom Manager for Student.

POWER

Power Supply

HP 45W Smart AC Adapter
 HP 65W EM Smart AC Adapter (PRC, India only)
 3.2 ft/1.0m 3-prong power cord

Primary Battery

HP 3-cell battery (36Whr)
 Optional HP 6-cell Long Life battery (64Whr)¹

1. Sold separately or as an optional feature.

Battery Life¹

	Celeron	Pentium	Core i3
3-cell HDD	7hr (HDD: HGST 500G)	7hr 45min (HDD: Western Digital 500 G)	8hr (HDD: Toshiba 500G)
3-cell SSD	9hr (SSD: Intel 180G)	9hr (SSD: Intel 180G)	9hr 15min (SSD: Intel 180G)
6-cell HDD	14hr (HDD: HGST 500G)	13hr 30min (HDD: Western Digital 500 G)	13hr 45min (HDD: Toshiba 500G)
6-cell SSD	15hr 15min (SSD: Intel 180G)	16hr 15min (SSD: Intel 180G)	15hr 15min (SSD: Intel 180G)

1. Windows 8 MM12 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 for additional details.

System Standby Time

TBD

WEIGHTS & DIMENSIONS

Weight

Non Touch

Starting at 3.48 lbs (1.58 kg)
 (3-cell battery, non-touch, with SSD)

Starting at 3.87 lbs (1.76 kg)
 (6-cell battery, non-touch, with Solid State Drive)

Touch

Starting at 3.76 lbs (1.71 kg)
 (3-cell battery, touch, with Solid State Drive)

Starting at 4.15 lbs (1.88 kg)
 (6-cell battery, non-touch, with Solid State Drive)

Features

Weight varies by configuration and components.

Dimensions (w x d x h)

8.95 x 11.88 x 1 in (at front)

22.74 x 30.18 x 2.54 cm (at front)

PORTS/JACKS/SLOTS

Ports/Jacks

(1) Headphone/MIC combo audio jack

(1) AC Power connector

(3) USB 3.0 Ports (two on one side, third on the opposite side)

(1) RJ-45 / Ethernet

HP Multi-Format Digital Media Card Reader

Support SD/SDHC/SDXC

Push-Push Insertion/Removal

SIM Slot

Populated on WWAN configurations only (tool-less user-accessible)

SERVICE AND SUPPORT

HP Services offers 1-year and 90 day 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 Services¹ are optional² 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>. *Sold separately or as an optional feature.

1. Service levels and response times for HP Care Services may vary depending on your geographic location. Service starts on date of hardware purchase. Restrictions and limitations apply. For details, visit <http://www.hp.com/go/cpc>
2. Sold separately or as an optional feature.

Technical Specifications

NETWORKING/ COMMUNICATIONS

Wireless LAN (WLAN)¹

**Intel® Dual Band
Wireless-AC 3160
802.11 a/b/g/n/AC 1x1
+Bluetooth® Combo**

Wireless LAN Standards

IEEE 802.11a
IEEE 802.11b
IEEE 802.11g
IEEE 802.11n
IEEE 802.11ac
Wi-Fi certified
802.11b/g/n

Interoperability Frequency Band

- 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 only supports 5.725 - 5.825 GHz (CH149 - CH161)

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 ~ MCS7, (1SS) (20MHz, 40MHz, and 80MHz)

Modulation

Direct Sequence Spread Spectrum

BPSK, QPSK, CCK, 16-QAM, 64-QAM, 256-QAM

Security¹

- 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 Roaming Output Power²

Ad-hoc (Peer to Peer)

Infrastructure (Access Point Required)

IEEE 802.11 compliant roaming between access points

- 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

Technical Specifications

	<ul style="list-style-type: none"> • 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
Receiver Sensitivity³	802.11 compliant power saving mode 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 14° to 158° F (-10° to 70° C) Non-operating -40° to 176° F (-40° to 80° C)
Humidity	Operating 10% to 90% (non-condensing) Non-operating 5% to 95% (non-condensing)
Altitude	Operating 0 to 10,000 ft (3,048 m) Non-operating 0 to 50,000 ft (15,240 m)
LED Activity	LED Amber – Radio OFF; LED White – Radio ON
	<ol style="list-style-type: none"> 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

Technical Specifications

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

**Intel® Dual Band
 Wireless-AC 7260
 802.11 a/b/g/n/AC 2x2
 +Bluetooth® Combo**

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 <ul style="list-style-type: none"> • 2.402 – 2.482 GHz

Technical Specifications

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

- 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:

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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

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- 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

Ad-hoc (Peer to Peer)

Models

Infrastructure (Access Point Required)

Roaming

IEEE 802.11 compliant roaming between access points

Output Power²

- 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 Sensitivity³

802.11b, 1Mbps : -94dBm maximum

Technical Specifications

	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
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Weight	Type 2230 : 2.8g
	Or
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Operating Voltage	3.3v +/- 9%
Temperature	Operating 14° to 158° F (-10° to 70° C)
	Non-operating -40° to 176° F (-40° to 80° C)
Humidity	Operating 10% to 90% (non-condensing)
	Non-operating 5% to 95% (non-condensing)
Altitude	Operating 0 to 10,000 ft (3,048 m)
	Non-operating 0 to 50,000 ft (15,240 m)
LED Activity	LED Amber – Radio OFF; LED White – Radio ON
	4. Check latest software/driver release for updates on supported security features.
	5. Maximum output power may vary by country according to local regulations.
	6. 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).

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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	<table border="1"> <thead> <tr> <th>Modulation</th> <th>0.01% BER</th> <th>0.001% BER</th> </tr> </thead> <tbody> <tr> <td>GFSK</td> <td>-80 dBm</td> <td>-70 dBm</td> </tr> </tbody> </table>	Modulation	0.01% BER	0.001% BER	GFSK	-80 dBm	-70 dBm
Modulation	0.01% BER	0.001% BER					
GFSK	-80 dBm	-70 dBm					

Technical Specifications

$\pi/4$ -DQPSK	-80 dBm	-70 dBm
8DPSK	-80 dBm	-70 dBm

Power Consumption

Peak (Tx) 330 mW
 Peak (Rx) 230 mW
 Selective Suspend 17 mW

Range

Up to 33 ft (10 m)

Electrical Interface

USB 2.0 compliant

Bluetooth Software Supported

Microsoft Windows Bluetooth Software

Link Topology

Point to Point, Multipoint Pico Nets up to 7 slaves

Electrical Interface

Bluetooth Software Supported

Full support of Bluetooth Security Provisions

Security

Power Management

Microsoft Windows ACPI, and USB Bus Support

Power Management

Self-configurable to optimize power conservation in all operating modes, including Standby, Hold, Park, and Sniff

Certifications

All necessary regulatory approvals for supported countries, including:

Security

Certifications

FCC (47 CFR) Part 15C, Section 15.247 & 15.249

Bluetooth Profiles Supported

Power Management

ETS 300 328, ETS 300 826

Certifications

Low Voltage Directive IEC950

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)

Certifications

Bluetooth Profiles Supported

Realtek 802.11
 b/g/n 1x1
 +Bluetooth® Combo

Wireless LAN Standards

IEEE 802.11b
 IEEE 802.11g
 IEEE 802.11n

Interoperability

Wi-Fi certified



Technical Specifications

Frequency Band	802.11b/g/n <ul style="list-style-type: none"> • 2.402 – 2.482 GHz <p>Note: The FCC has declared as of September 1, 2014 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.</p>
Data Rates	802.11b: 1, 2, 5.5, 11 Mbps 802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps 802.11n: MCS 0 ~ MCS 07, (20MHz)
Modulation	Direct Sequence Spread Spectrum
Security¹	BPSK, QPSK, CCK, 16-QAM, 64-QAM, <ul style="list-style-type: none"> • IEEE and WiFi compliant 64 / 128 bit WEP encryption for a/b/g mode only • AES-CCMP: 128 bit in hardware • 802.1x authentication • WPA, WPA2: 802.1x. WPA-PSK, WPA2-PSK, TKIP, and AES. • WPA2 certification • IEEE 802.11i • Cisco Certified Extensions, all versions through CCX4 and CCX Lite • WAPI
Network Architecture Models	Ad-hoc (Peer to Peer) Infrastructure (Access Point Required)
Roaming	IEEE 802.11 compliant roaming between access points
Output Power²	<ul style="list-style-type: none"> • 802.11b : +16dBm minimum • 802.11g : +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
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
Receiver Sensitivity³	802.11 compliant power saving mode 802.11b, 1Mbps : -94dBm maximum 802.11b, 11Mbps : -86dBm maximum 802.11g, 6Mbps : -88dBm maximum 802.11g, 54Mbps : -74dBm maximum 802.11n, MCS07 : -69dBm maximum 802.11n, MCS15 : -66dBm maximum
Antenna type	High efficiency antenna with spatial diversity, mounted in the display enclosure Two embedded antennas for 2.4GHz are provided to the card to support WLAN and Bluetooth communications. (Support Dual antenna or Single antenna, depend on platform requirement)

Technical Specifications

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	14° to 158° F (–10° to 70° C)
	Non-operating	–40° to 176° F (–40° to 80° C)
Humidity	Operating	10% to 90% (non-condensing)
	Non-operating	5% to 95% (non-condensing)
Altitude	Operating	0 to 10,000 ft (3,048 m)
	Non-operating	0 to 50,000 ft (15,240 m)
LED	LED Amber – Radio OFF; LED White – Radio ON	

Activity

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	<table border="1"> <thead> <tr> <th>Modulation</th> <th>0.01% BER</th> <th>0.001% BER</th> </tr> </thead> <tbody> <tr> <td>GFSK</td> <td>-80 dBm</td> <td>-70 dBm</td> </tr> <tr> <td>$\pi/4$-DQPSK</td> <td>-80 dBm</td> <td>-70 dBm</td> </tr> <tr> <td>8DPSK</td> <td>-80 dBm</td> <td>-70 dBm</td> </tr> </tbody> </table>			Modulation	0.01% BER	0.001% BER	GFSK	-80 dBm	-70 dBm	$\pi/4$ -DQPSK	-80 dBm	-70 dBm	8DPSK	-80 dBm	-70 dBm
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Range	Up to 33 ft (10 m)														
Electrical Interface	USB 2.0 compliant														
Bluetooth Software Supported Link Topology	Microsoft Windows Bluetooth Software														
Electrical Interface Bluetooth Software Supported Security	Point to Point, Multipoint Pico Nets up to 7 slaves Full support of Bluetooth Security Provisions														
Power Management	Microsoft Windows ACPI, and USB Bus Support														
Power Management Certifications	Self-configurable to optimize power conservation in all operating modes, including Standby, Hold, Park, and Sniff														
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Bluetooth Profiles Supported															
Power Management	ETS 300 328, ETS 300 826														

Technical Specifications

Certifications

Low Voltage Directive IEC950
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 Serial Port Profile (SPP)¹
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Certifications Bluetooth Profiles Supported

Hard Copy Cable Replacement (HCRP)^{1,2}
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 Advanced Audio Distribution Profile (A2DP)

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 (Sort idle)	6.45 W	6.60 W	6.55 W
Normal Operation (Long idle)	5.16 W	5.22 W	5.05 W
Sleep	0.39 W	0.46 W	0.39 W
Off	0.31 W	0.39 W	0.30 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.

Technical Specifications

Heat Dissipation*	115VAC, 60Hz	230VAC, 50Hz	100VAC, 60Hz
Normal Operation (Short idle)	22 BTU/hr	23 BTU/hr	22 BTU/hr
Normal Operation (Long idle)	18 BTU/hr	18 BTU/hr	17 BTU/hr
Sleep	1 BTU/hr	3 BTU/hr	1 BTU/hr
Off	1 BTU/hr	1 BTU/hr	1 BTU/hr

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

Declared Noise Emissions (in accordance with ISO 7779 and ISO 9296)	Sound Power (L _{WAd} , bels)	Sound Pressure (L _{pAm} , decibels)
Typically Configured – Idle	2.8	21
Fixed Disk – Random writes	2.8	21

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:

- 3 USB ports
- 1 PC card slot (type I/II)
- 1 ExpressCard/54 slot
- 1 IEEE 1394 Port
- 2 SODIMM memory slots
- Optional expansion base docking station
- 1 multi-bay II storage port
- Interchangeable HDD

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 the 1ppm by weight

Cadmium greater than 20ppm by weight

Battery size: CR2032 (coin cell)

Battery type: Lithium

Technical Specifications

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 (EPEAT) standard at the gold level, see www.epeat.net
- Plastics parts weighing over 25 grams used in the product are marked per ISO11469 and ISO1043.
- This product contains 8 % post-consumer recycled plastic (by wt.)
- This product is 98.1 % recycle-able when properly disposed of at end of life.

Packaging Materials

External:	PAPER/Corrugated	339.7 g
Internal:	PLASTIC/EPE (Expanded Polyethylene)	43.5 g
	PLASTIC/Polyethylene low density	12.1 g
	PLASTIC/Plast. Other	1.8 g

The plastic packaging material contains at least 30 % recycled content.

The corrugated paper packaging materials contains at least 30 % 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
- 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, and certain retail packaging has been voluntarily removed from most applications.
- Radioactive Substances
- Tributyl Tin (TBT), Triphenyl Tin (TPT), Tributyl Tin Oxide (TBTO)

Technical Specifications

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.

Hewlett-Packard 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://www.hp.com/hpinfo/globalcitizenship/environment/pdf/PC_GBU_Product_Design_ISO_14K_Certificate.pdf

and

<http://www.hp.com/hpinfo/globalcitizenship/environment/pdf/cert.pdf>

COUNTRY OF ORIGIN

China

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

Category	Description	Part number
Cases	HP Essential Top Load Case	H2W17AA
	HP Essential Backpack	H1D24AA
	HP Slim Ultrabook Top Load	F3W15AA
	HP Slim Ultrabook Backpack	F3W16AA
Stands and Docking	HP 3001pr USB 3.0 Port Replicator	F3S42AA
	HP 3005pr USB 3.0 Port Replicator	H1L08AA
Input Devices	HP Stylish Wireless KB/Mouse	H4B79AA
	HP 2.4 GHz Keyboard and Mouse	G1K29AA
	HP Stylish USB KB/Mouse	H4B80AA
	HP X4000b Bluetooth Mouse	H3T50AA
	HP External USB Optical Drive	F2B56AA
Adapters	HP HDMI to DVI Adapter	F5A28AA
	HP Wireless Display Adapter	J1V25AA
Charging	HP 45W Smart AC Adapter (4.5mm)	H6Y88AA
Power	HP DS06XL Battery	TBD
Security	HP UltraSlim Keyed Cable Lock	H4D73AA
Charging Cart	20 Notebook Managed Charging Cart	QL489AA
	20 Notebook Charging Cart	QL488AA
	30 Notebook Managed Charging Cart	QL490AA
	30 Notebook Charging Cart	H4F31AA
Displays	HP V242h 24-inch LED Backlit Monitor	K6X12AA
	HP ProDisplay P242va 24-inch LEB Backlit Monitor	K7X32AA
	HP EliteDisplay S24ml 23-inch MHL Monitor	F4M47AA

Summary of Changes

Date of change	Version History		Description of change
April 6, 2015	Version 1 to 2	Added	Environmental data.
April 29, 2015	V2 to V3	Added	Weights for a 6 cell battery to Touch and NonTouch And Battery life
		Removed	Environmental Data TBD
		Changed	SSD to Solid State Drive
May 22, 2015	V3 to V4	Changed	Post-consumer recycled plastic estimate
June 29, 2015	V4 to V5	Added	Windows 10 added to Overview in page 4, OS list and footnotes on pages 5, 6. 64 GB Solid State Drive page 6
		Removed	320 GB (5400 rpm) page 6
		Updated	Battery time pages 4 and 10
July 8, 2015	V5 to V6	Removed	All Windows 7 32 Operating Systems page 5
		Added	Note about availability in footer.
January 20, 2016	V6 to V7	Added	BIOS adheres to NIST SP800-147 to footnote 2 in Software BIOS section
February 4, 2016	V7 to V8		Removed Software
February 12, 2016	V8 to V9	Removed	Software
February 23, 2016	V9 to V10	Updated	with Corning® Gorilla® Glass 3

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