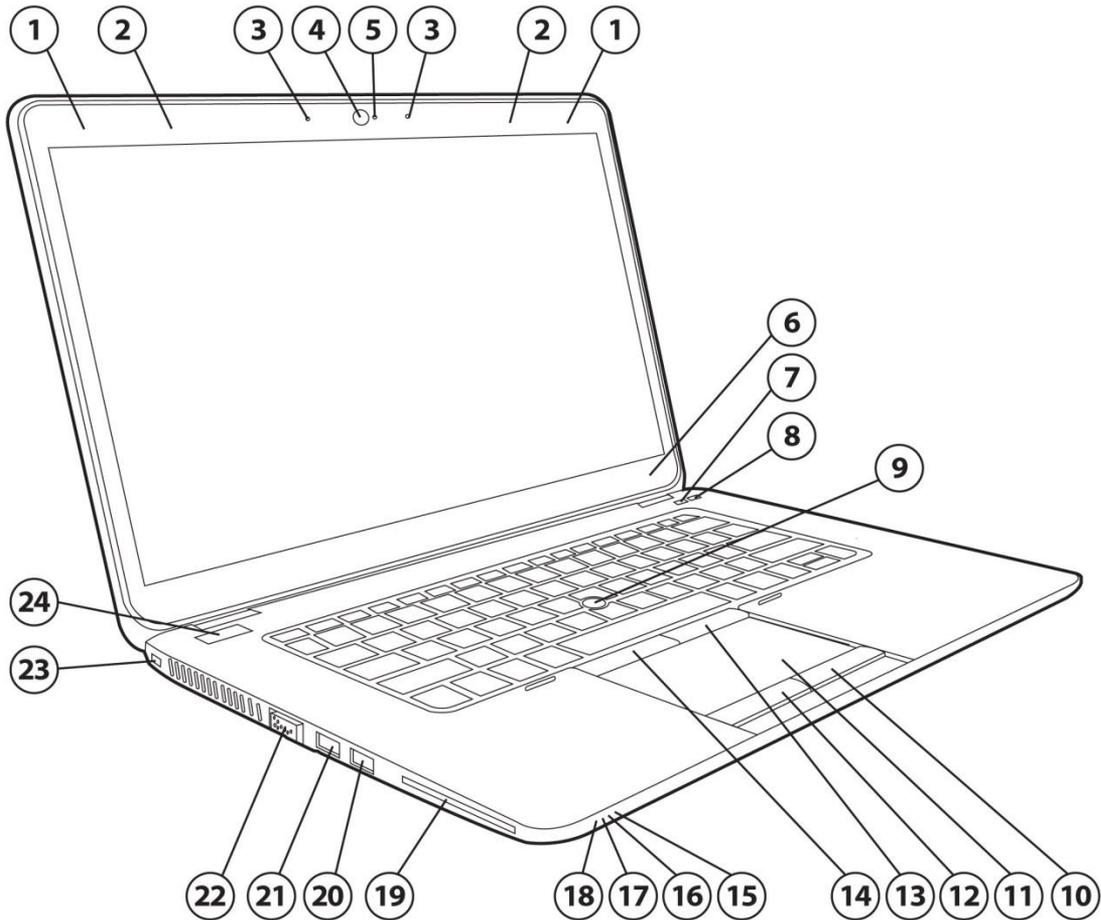


### Overview

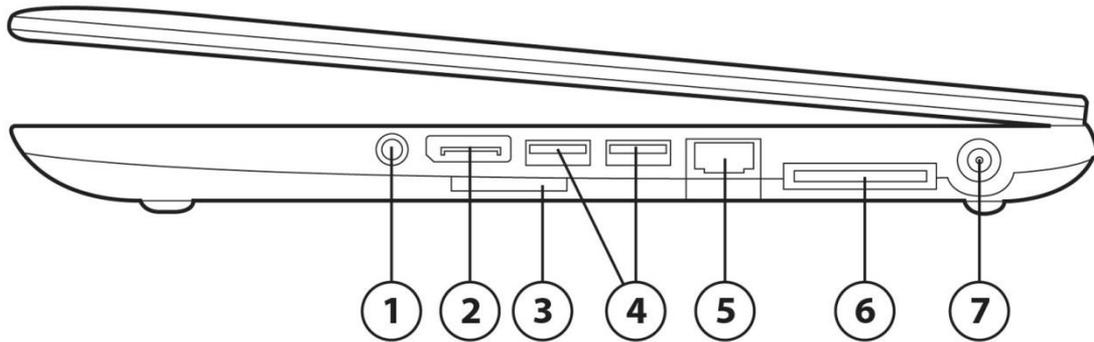
### HP ZBook 15u G2 Mobile Workstation



#### Front/Left View

- |                                      |                                 |
|--------------------------------------|---------------------------------|
| 1. WLAN antennas (2)                 | 13. Right pointing stick button |
| 2. WWAN antennas (2)                 | 14. Left pointing stick button  |
| 3. Internal microphones (2)          | 15. Hard drive light            |
| 4. Webcam (select models only)       | 16. AC adapter/Battery light    |
| 5. Webcam light (select models only) | 17. Power light                 |
| 6. Internal display switch           | 18. Wireless light              |
| 7. Wireless button                   | 19. Smart card reader           |
| 8. Volume mute button                | 20. USB 3.0 port                |
| 9. Point stick                       | 21. USB 3.0 charging port       |
| 10. Right TouchPad button            | 22. External VGA monitor port   |
| 11. TouchPad zone                    | 23. Security cable slot         |
| 12. Left TouchPad button             | 24. Power button                |

### Overview



#### Right

- |   |                                   |
|---|-----------------------------------|
| 1. Audio-out (headphone) jack/Audio-in(microphone) jack | 5. Drop-jaw Ethernet port (RJ-45) |
| 2. DisplayPort  | 6. Docking port                   |
| 3. Memory card reader                                   | 7. Power connector                |
| 4. USB 3.0 ports (2)                                    |                                   |

### Overview

#### At A Glance

- Windows 8.1 versions, Windows 7 versions, Ubuntu Linux, or FreeDOS
- Thin and light form factor and industrial design
- Durable HP Duracase with magnesium-reinforced chassis, HP DuraFinish with brushed aluminum on top cover and smooth aluminum around top, right, and left sides chassis with hematite /graphite color, HP DisplaySafe frame, latch-less design with precision aluminum-alloy hinges, optional backlight keyboard in full aluminum deck, chemically strengthened glass touchpad, and updated system functions indicators
- Passed the military standard Mil-Std-810G testing for drop, vibration, shock, high temperature, low temperature, temperature shock, dust, altitude, and humidity \*
- Workstation-caliber AMD® FirePro® discrete graphics: AMD FirePro M4170 (1 GB dedicated GDDR5); AMD Enduro™ graphics technology enabled for improved battery life.
- ISV certified to provide fast and reliable performance with workstation applications, including manipulation of 3D textures
- Choice of 5th generation Intel® Core™ i7 and i5 processors
- Intel Core i7 with vPro and Core i5 with vPro technology (optional)
- HP Performance Advisor for optimal configuration, compatibility and performance
- Up to two DDR3L SODIMMs, for system memory up to 16GB
- Supports up to 3 independent displays via internal LCD Panel, system DisplayPort, system VGA, or using the HP UltraSlim Docking Station DisplayPort and VGA ports (sold separately). Supports DisplayPort 1.2 monitors
- DTS Studio Sound™ HD audio optimized for high fidelity audio with immersive surround sound with deep, rich bass and crystal clear dialog without distortion at high volume
- Choice of battery solutions: primary 3-cell (50 Whr) HP Long Life Battery, and optional secondary 6-cell (60 Whr) slice battery.
- 2 discrete buttons with LED indicator for convenient one touch access: Wireless On/Off, Volume Mute
- Widescreen 15-inch diagonal anti-glare LED-backlit display:
  - FHD (1920x1080) eDP with PSR with standard viewing angle, FHD (1920x1080) eDP with PSR with ultra-wide viewing angle
- Supports a broad range of wireless LAN and wireless WAN options, including 4G LTE, for connectivity on the go.
- Internal storage options include:
  - Choice of tool free capable, user-removable hard drive up to 1 TB with HP 3D DriveGuard protection
  - SATA 6 Gb/s 128/180/240/256/512 GB Solid State Drive or 180/256 GB SED Solid State Drive or 256 GB Z Turbo Drive (PCIe SSD)\*\*
- Security features including HP Client Security Manager, with central management
- Low halogen\*\*\*, ENERGY STAR certified and EPEAT® TBD registered in the U.S. EPEAT status varies by country- please see [epeat.net](http://epeat.net).
- HP BIOS self-healing technology including HP Sure Start to prevent, detect, and remedy known and unknown BIOS attacks.

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

### Features

## OPERATING SYSTEM

<b>Preinstalled OS</b>	Windows 8.1 Pro 64 <sup>1</sup>
	Windows 7 Professional 64 (available through downgrade rights from Windows 8.1 Pro) <sup>2</sup>
	Windows 7 Professional 64 <sup>1</sup>
	Windows 8.1 Professional 64 <sup>1</sup> for education
	FreeDOS 2.0
	Ubuntu (64-bit) <sup>3</sup>
<b>Supported OS</b>	Windows 8.1 Enterprise 64 <sup>1</sup>
	Windows 7 Enterprise 32 <sup>1</sup>
	Windows 7 Enterprise 64 <sup>1</sup>
	Windows 7 Ultimate 32 <sup>1</sup>
	Windows 7 Ultimate 64 <sup>1</sup>

## PROCESSOR\*

- 5th Generation Intel® Core™ i7 5600U (2.6 GHz, 4 MB cache, 2 cores)\* Up to 3.2 GHz with Intel Turbo Boost Technology
- 5th Generation Intel® Core™ i7 5500U (2.4 GHz, 4 MB cache, 2 cores)\* Up to 3.0 GHz with Intel Turbo Boost Technology
- 5th Generation Intel® Core™ i5 5300U (2.3 GHz, 3 MB cache, 2 cores)\* Up to 2.9 GHz with Intel Turbo Boost Technology
- 5th Generation Intel® Core™ i5 5200U (2.2 GHz, 3 MB cache, 2 cores)\* Up to 2.7 GHz with Intel Turbo Boost Technology

\* 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.

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## CHIPSET

Non-applicable, processor specific

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### Features

#### INTEL CORE I5 WITH VPRO/CORE I7 WITH VPRO TECHNOLOGY CAPABLE

Intel Core i5 with vPro and Core i7 with vPro technology is a selectable feature that is available on units configured with select processors, a qualified Intel Centrino® WLAN module and a preinstalled Windows operating system. It provides advances in remote manageability, security, energy efficient performance, and wireless connectivity. Intel Active Management Technology 9.0 (iAMT) offers built-in manageability and proactive security for networked mobile workstations, even when they are powered off\* or when the operating system is inoperable. It can help identify threats before they reach the network, isolate infected systems, and update mobile workstations regardless of their power state.

\*Requires a Windows operating system, network hardware and software, connection with a power source, and a direct (non-VPN) corporate network connection which is either cable or wireless LAN.

**NOTE:** Some functionality of Intel Core i5 with vPro/Core i7 with vPro technology, such as Intel Active Management technology and Intel Virtualization technology, requires additional third-party software in order to run. Availability of future "virtual appliances" applications for Intel Core i5 with vPro/Core i7 with vPro technology is dependent on third-party software providers. Compatibility with future "virtual appliances" is yet to be determined.

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#### GRAPHICS

Intel HD 5500 Graphics\*

AMD FirePro M4170 FireGL (1 GB dedicated GDDR5)

Microsoft DirectX 11.1 (Shader Model 5.0) and OpenGL 4.2 capable

AMD Enduro™ Technology supported.

\* Supports up to 3 independent displays via internal LCD Panel, system DisplayPort, system VGA, or using the HP UltraSlim Docking Station DisplayPort and VGA ports (sold separately).

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#### DISPLAY

##### Internal

15.6" diagonal LED-backlit FHD eDP anti-glare SVA (1920x1080)

15.6" diagonal LED-backlit FHD UWVA IPS eDP anti-glare + PSR (1920 x 1080)

##### External

Up to 30-bit (2<sup>30</sup>) per pixel "Deep Color"  
(total of 1,073,741,824 color variations)

##### VGA

Port supports resolutions up to 1920 x 1200 at 60 Hz, and lower resolutions up to 75 Hz.

##### DisplayPort w/MST (Multi-stream Transport)

Supports resolutions up to QFHD 3840 x 2160, 24/30-bit color depth at 60 Hz, and WUXGA (1920 x 1200) monitors, with 24/30-bit color depth up to 120 Hz.

##### DisplayPort Features

- Multi-stream Transport (MST): Multi-stream Transport is a DP 1.2 feature that allows daisy chaining of DP 1.2 monitors (requires monitor with DP 1.2 MST capability), or the use of DP 1.2 hubs with MST to achieve a maximum of 3 active displays.

##### DVI-D (single link)

DVI support requires a DP-to-DVI adapter (sold separately). Dual-Link DVI is supported with an active USB powered adapter (sold separately).

### Features

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

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## STORAGE AND DRIVES

### Primary Storage Bay

#### Hard Drives\*

1 TB 7200rpm SMART SATA III

500 GB 7200 rpm SMART SATA III

500 GB 7200 rpm SMART SATA III Self Encrypting Drive

500 GB 5400 rpm SMART SATA III I Self Encrypting Drive FIPS 140-2 compliant

#### Solid State Drive

128/180/240/256/512 GB SATA 6 Gb/sec

180/256 GB SATA 6 Gb/sec Self Encrypting Drive

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

The hard drive is mounted directly to the notebook frame, reducing the transmission of shock to the hard drive. Uses three-axis digital motion detection with intelligent sensitivity to help protect the hard drive during normal use from shock and vibration. The digital accelerometer temporarily halts all data transfer and parks the hard drive when abrupt motion is detected.

#### Turbo Drive Storage Slot (M.2)

256 GB PCIe Solid State Drive

**NOTE:** If 256 GB Z Turbo Drive (PCIe SSD) is selected, it will be set as the primary storage drive, and any of the HDD and SSD can be configured as secondary storage.

**NOTE:** For hard drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 16 GB (for Windows 7) of system and up to 30 GB (for Windows 8) disk is reserved for system recovery software.

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## MEMORY

### Standard

DDR3L 1.35V SDRAM (1600 MHz)

Two SODIMM slots supporting dual-channel memory

4 GB and 8 GB SODIMMs

### Maximum

Upgradeable to 16384 MB with optional 8192 MB SODIMMs in both slots

### Dual-channel

Maximized dual-channel performance requires SODIMMs of the same size and speed in both memory slots.

\* Maximum memory capacities assume Windows 64-bit operating systems or Linux. With Windows 32-bit operating systems, memory above 3 GB may not all be available due to system resource requirements.

**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

### Features

#### Local Area Network (LAN) options

Integrated Intel I218-LM Gigabit Network Connection (10/100/1000)\*

#### Wireless

Support for a broad range of secure, integrated wireless LAN and wireless WAN options featuring support for the latest industry standards. Broadband Wireless (WWAN) requires a Windows operating system and is available in select countries as a standard, factory configurable feature only. Integrated Bluetooth is also available (factory configurable only) and can be combined with any of the supported wireless LAN and wireless WAN options.

#### Wireless LAN options\*\*

Intel Dual Band Wireless-AN 7265 802.11a/b/g/n (2x2) WiFi + Bluetooth 4.0 Combo Adapter

Intel Dual Band Wireless-AC 7265 802.11a/b/g/n (2x2) WiFi + Bluetooth 4.0 Combo Adapter

Intel Dual Band Wireless-NB 7265 802.11 a/b/g/n (2x2) WiFi Adapter

Intel Dual Band Wireless-AC 3160 802.11 ac (1x1) WiFi and Bluetooth 4.0 Combo Adapter

#### WWAN \*\*\* (Mobile Broadband) options

HP hs3110 HSPA+ Intel® Mobile Broadband Module

HP lt4211 LTE/EV-DO/HSPA+ Gobi™ 4G Mobile Broadband Module

HP lt4112 LTE/HSPA+ Gobi™ 4G Mobile Broadband Module

#### Intel® Wireless Display (WiDi)\*\*\*\*

Intel® WiDi technology enables users to stream content wirelessly from a compatible computer to a projector, TV or monitor.

\*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.

\*\*Wireless access point and Internet service is required and is not included. Availability of public wireless access points limited.

\*\*\* WWAN is an optional feature and WWAN connection requires wireless data service contract, network support, and is not available in all areas. Contact your service provider to determine the coverage area and availability. Connection speeds will vary based on location, environment, network conditions and other factors. 4G LTE not available on all products, in all regions and only available on products featuring Intel processors.

\*\*\*\* Integrated Intel Wi-Di feature is available on select configurations only and requires separately purchased projector, TV or monitor with an integrated or external Wi-Di receiver.

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### NEAR FIELD COMMUNICATIONS (NFC)

<b>Chipset</b>	NPC100
<b>System interface</b>	I <sup>2</sup> C
<b>Frequency</b>	13.56 MHz
<b>NFC Modes Supported</b>	Reader/Writer, Peer-to-Peer, Card Emulation

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### AUDIO/MULTIMEDIA

#### Audio

DTS Studio Sound HD Audio (Windows OS only)

Integrated stereo speakers

### Features

Integrated microphone (dual-microphone array when equipped with optional webcam)  
Function keys for microphone mute, volume up, volume down Stereo headphone/line out  
Stereo microphone/line in

#### **Webcam**

720p HD\* webcam (select models)

- 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

\* HD content required to view HD images.

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## KEYBOARDS/POINTING DEVICES/BUTTONS & FUNCTION KEYS

#### **Keyboard**

Optional backlit keyboard with Function key control to toggle backlit brightness setting - off/full/half brightness  
The HP spill-resistant keyboard is designed using a thin layer of Mylar film under the keyboard and a drain system that funnels fluid through a hole in the bottom of the notebook. This minimizes the risk of damage to sensitive components underneath. 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, function keys, and 19.05 x 19.05 mm key pitch (center-to-center spacing). U.S. and International key layouts are available. Other features include hot keys for instant access to power conservation and brightness.

#### **Pointing Devices**

Touchpad with On/Off button, two-way scroll, gestures, two pick buttons  
Point stick with two additional point stick buttons  
Image sensor touchpad for enhanced performance and improved precision on scroll and gesture

#### **Buttons and Function Keys**

Separate launch buttons provide easy access to the following features: wireless on/off, volume mute. Function keys provide control of the following features: standby mode, external display, volume down, volume up, HP Power Assistant (Windows 7 only), and display brightness.

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### Features

#### SOFTWARE AND SECURITY

##### Preinstalled Software with Windows Operating System

<b>Included</b>	<b>Windows 8</b>	<b>Windows 7</b>
<b>BIOS</b>	HP BIOSphere <sup>1</sup> HP Sure Start <sup>2</sup> HP DriveLock HP BIOS Protection <sup>3</sup> HP Disk Sanitizer External Edition <sup>4</sup> BIOS Update via Network Master Boot Record Security Power On Authentication Pre-Boot Security Secure Erase <sup>6</sup> Absolute Persistence Module <sup>7</sup>	HP BIOSphere <sup>1</sup> HP Sure Start <sup>2</sup> HP DriveLock HP BIOS Protection <sup>3</sup> HP Disk Sanitizer External Edition <sup>4</sup> BIOS Update via Network Master Boot Record Security Power On Authentication Pre-Boot Security Secure Erase <sup>6</sup> Hybrid Boot Measured Boot Secure Boot Absolute Persistence Module <sup>7</sup>
<b>MultiMedia</b>	CyberLink Power DVD, BD CyberLink YouCam BE	CyberLink Power DVD, BD
<b>Communication</b>	HP GPS and Location <sup>8</sup> HP Connection Manager <sup>9</sup> Intel® Wireless Display (WiDi) Software for Windows <sup>11</sup>	HP Mobile Connect HP Wireless Hotspot <sup>10</sup> Intel® Wireless Display (WiDi) Software for Windows <sup>11</sup> HP Roaming Alert Native Miracast Support <sup>12</sup>
<b>HP Value Add</b>	HP 3D DriveGuard HP ePrint Driver <sup>13</sup> HP Hotkey HP PageLift <sup>14</sup> HP Support Assistant HP Recovery Manager HP Recovery Disk Creator	HP 3D DriveGuard HP ePrint Driver <sup>13</sup> HP Hotkey HP PageLift <sup>14</sup> HP Support Assistant HP Registration App
<b>3<sup>rd</sup> Party</b>	Foxit PhantomPDF Express	Foxit PhantomPDF Express
<b>Microsoft Products</b>	Buy Office Bing Search	Buy Office Bing Search
<b>Manageability</b>	HP Driver Packs <sup>15</sup> HP SoftPaq Download Manager (SDM) HP System Software Manager (SSM) <sup>15</sup> HP BIOS Config Utility (BCU) <sup>15</sup> HP Client Catalog <sup>15</sup> HP CIK for Microsoft SCCM <sup>15</sup> LANDESK Management <sup>16</sup>	HP Driver Packs <sup>15</sup> HP SoftPaq Download Manager (SDM) HP System Software Manager (SSM) <sup>15</sup> HP BIOS Config Utility (BCU) <sup>15</sup> HP Client Catalog <sup>15</sup> HP CIK for Microsoft SCCM <sup>15</sup> LANDESK Management <sup>16</sup>

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

### Features

<b>Client Security Software</b>	<ul style="list-style-type: none"> <li>HP Device Access Manager</li> <li>HP Drive Encryption <sup>17</sup></li> <li>HP File Sanitizer<sup>18</sup></li> <li>HP Security Manager</li> <li>Microsoft Security Essentials <sup>19</sup></li> </ul>	<ul style="list-style-type: none"> <li>HP Device Access Manager</li> <li>HP Drive Encryption <sup>17</sup></li> <li>HP File Sanitizer <sup>18</sup></li> <li>HP Security Manager</li> <li>Microsoft Defender</li> </ul>
<b>Standard</b>	<ul style="list-style-type: none"> <li>TPM 1.2</li> <li>Integrated Smart Card Reader</li> <li>Security lock slot</li> <li>Pre-boot Authentication</li> </ul>	<ul style="list-style-type: none"> <li>TPM 1.2</li> <li>Integrated Smart Card Reader</li> <li>Security lock slot</li> <li>Pre-boot Authentication</li> </ul>

**NOTE:** The Absolute Persistence agent is shipped turned off, and must be activated by customers when they purchase a subscription. Subscriptions can be purchased for terms ranging multiple years. Service is limited, check with Absolute for availability outside the U.S.

For more information on HP Client Security Software Suite, refer to <http://www.hp.com/go/clientsecurity>.

#### Footnotes:

- <sup>1</sup> Available only on business PCs with HP BIOS.
- <sup>2</sup> HP Sure Start is the first and only self-healing technology solution created to protect against malware and virus attacks aimed at the BIOS.
- <sup>3</sup> May require a manual recovery step if all copies of BIOS are compromised or deleted.
- <sup>4</sup> For the use cases outlined in the DOD 5220.22-M Supplement. Only supports traditional Hard Drives.
- <sup>5</sup> Requires initial user set up.
- <sup>6</sup> For the methods outlined in the National Institute of Standards and Technology Special Publication 800-88.
- <sup>7</sup> 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.
- <sup>8</sup> GPS access requires an unobstructed path to multiple satellites. Performance may be affected if/when used inside of buildings, bridges or heavily congested metropolitan areas. Requires separately purchased GPS navigation software available from multiple GPS applications.
- <sup>9</sup> 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)
- <sup>10</sup> The wireless hotspot application requires an active internet connection that is shared with the connecting devices. Wireless hotspot data usage may incur additional charges. Check with your service provider for plan details.
- <sup>11</sup> 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 [www.intel.com/go/wirelessdisplay](http://www.intel.com/go/wirelessdisplay)
- <sup>12</sup> 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>
- <sup>13</sup> 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/businessmobileprinting](http://www.hp.com/go/businessmobileprinting)).
- <sup>14</sup> Requires Windows 7 or higher
- <sup>15</sup> Subscription required.

### Features

<sup>16</sup> Data is protected prior to Drive Encryption login. Turning the PC off or into hibernate logs out of Drive Encryption and prevents data access.

<sup>17</sup> For the use cases outlined in the DOD 5220.22-M Supplement. Supports standard Hard Drives. Initial setup required.

<sup>18</sup> Opt in and internet connection required for updates.

#### Additional Software Available from the Web

HP SoftPaq Download Manager  
HP Software System Manager  
Vigyanlabs IPM+

#### Workstation ISV Certifications

Find the latest list of certifications at: <http://www.hp.com/united-states/campaigns/workstations/partnerships.html>

#### HP Remote Graphics Software

The remote desktop solution for serious workstation users and their most demanding applications.

Download at: [www.hp.com/go/RGS](http://www.hp.com/go/RGS)

#### HP Performance Advisor

HP Performance Advisor enables optimal configuration of HP Mobile Workstations delivering stability and best performance. HP Performance Advisor will guide your system setup allowing a "custom" configuration that best matches the workstation to user requirements.

Download at: [www.hp.com/go/performanceadvisor](http://www.hp.com/go/performanceadvisor)

#### HP Recovery Manager

Models shipped with Windows 7 include HP Recovery Manager. HP Recovery Manager enables fast recovery of the factory preinstalled image if the system becomes corrupted or if important system files are accidentally deleted. Up to 36 GB (for Windows 7) of system and up to 36 GB (for Windows 8) disk is reserved for system recovery software.

#### Security

See Software section above.

#### Other Standard Security Features

Integrated Smart Card Reader  
One-Step Logon  
Common Criteria EAL4+ Augmented Certified Discrete TPM 1.2 Embedded Security Chip  
Security lock slot  
Support for Intel AT

#### Optional Security Features

HP Fingerprint Sensor (optional)  
Absolute Data Protect\* with GPS Tracking - Subscription based security solution providing the ability to track, initiate physical recovery, conduct asset management, and perform remote data delete by utilizing GPS technology. GPS functionality requires HP Mobile Broadband Module.

\* The Absolute Data Protect agent is shipped turned off, and must be activated by customers when they purchase a subscription. Subscriptions can be purchased for terms ranging multiple years. Service is limited, check with Absolute for availability outside the U.S.

### Features

#### HP Client Security

HP offers a variety of scalable hardware, software, and BIOS-based security features to help you defend your organization against viruses and other threats. These integrated security features safeguard what matters to you the most - your data, device and identity. Now, be confident your fleet of devices is protected in multiple layers of HP Client Security protection.

HP BIOS Protection keeps you up and running with enhanced protection against virus attacks and other threats. And if the BIOS is accidentally compromised, the auto recovery feature automatically restores it to its fully functional state.

HP Sure Start detects and negates a BIOS attack with automatic recovery of the BIOS even when the installation is accidentally compromised (i.e. power outage). When HP Sure Start heals the BIOS an event log is generated that an IT administrator can retrieve so the business is aware of a BIOS attack. Golden copy of BIOS is stored in protected nonvolatile memory providing redundant, hardware-based protection against a new generation of attacks. This helps to future-proof your technology and business.

An optional fingerprint reader and integrated Smart Card Reader help keep your identity secure. The security cable slot helps keep your notebook physically secure.

HP Drive Encryption+ with TPM enhanced security protects your data on your hard drive from unauthorized access. Authentication is required before Windows will even start.

Or you can even permanently destroy data on your hard drive in preparation for your system disposal or redeployment with Secure Erase.

This hardware-based solution encrypts and decrypts data as it is written or read from the hard drive and is supported by HP Drive Encryption+. You get faster encryption performance than that of software-based encryption solutions.

+ Requires Windows. Data is protected prior to Drive Encryption login. Turning the PC off or into hibernate logs out of Drive Encryption and prevents data access.

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## POWER

### Power Supply

HP 65W Smart AC Adapter  
Power cord is 6 feet (1.8 m)

### Primary Battery

HP 3-cell Long Life Polymer/Prismatic Battery (50 WHr)

### Battery Life

Battery life up to **xx** hours and **xx** minutes\*\*\*

Primary Battery	+HDD	+ 2.5" SSD
50 Whr, 3-cell	Up to xx hours xx minutes	Up to xx hours xx minutes
50Whr+Slice 60Whr	Up to xx hours xx minutes	Up to xx hours xx minutes

### System Standby Time

Up to TBD weeks

\*Battery life will vary depending on the product model, configuration, loaded applications, features, use, wireless

### Features

functionality and power management settings. The maximum capacity of the battery will naturally decrease with time and usage. See MobileMark07 battery benchmark <http://www.bapco.com/products/mobilemark2007> for additional details.

#### Power Conservation

AMD Enduro™ Technology  
Hibernation  
Standby  
ACPI compliance

### ENVIRONMENTAL

US ENERGY STAR®  
IT ECO declaration  
EPEAT® TBD EPEAT® registered where applicable. EPEAT registration varies by country. See [www.epeat.net](http://www.epeat.net) for registration status by country.

**NOTE:** 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.

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### WEIGHTS & DIMENSIONS

#### Weight – Non-touch

Starting at 4.23 lb. (1.91 kg) with 3cell 50Whr battery, without hard drive and with 256 GB Z Turbo Drive (PCIe SSD)

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

0.84 x 14.78 x 9.98 in      21.42 x 375.5 x 253.6 mm

**NOTE:** Weight varies by configuration and components.

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### PORTS/SLOTS

#### Ports

- (1) VGA
- (1) DisplayPort 1.2
- (1) USB 3.0 Charging Port
- (3) USB 3.0 Port
- (1) RJ-45 / Ethernet
- (1) Side Docking connector
- (1) Secondary battery connector
- (1) Headphone/Microphone Combo
- (1) AC Port

#### Digital Media Slots

SD UHS-II Flash Media slot - One (Supports next generation SD (Secure Digital), backward compatible to SDHC, SDXC, Integrated Smart Card Reader (Compatible with ISO 7816 compliant Smart Cards PC/SC interface support)

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### SERVICE AND SUPPORT

HP Services offers 3-year, 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.

### Features

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>

### Technical Specifications

#### SYSTEM UNIT

<b>Stand-Alone Power Requirements (AC Power)</b>	<b>Nominal Operating Voltage</b>	19.5 V dc @ 3.3 A		
	<b>Average Operating Power</b>		<b>Windows 7 (32-bit)</b>	<b>Windows 7 (64-bit)</b>
		AMD FirePro Graphics	16.28 W	16.8 W
<b>Temperature</b>	<b>Max Operating Power</b>	< 65 W		
	<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>Relative Humidity</b>	<b>Non-operating</b>	-4° to 140° F (-20° to 60° C)		
	<b>Operating</b>	10% to 90%, non-condensing		
<b>Shock</b>	<b>Non-operating</b>	5% to 95%, 101.6° F (38.7° C) maximum wet bulb temperature		
	<b>Operating</b>	40 G, 2 ms, half-sine		
<b>Random Vibration</b>	<b>Non-operating</b>	200 G, 2 ms, half-sine		
	<b>Operating</b>	0.75 grms		
<b>Altitude (unpressurized)</b>	<b>Non-operating</b>	1.50 grms		
	<b>Operating</b>	-50 to 10,000 ft. (-15.24 to 3,048 m)		
<b>Planned Industry Standard Certifications</b>	<b>Non-operating</b>	-50 to 40,000 ft. (-15.24 to 12,192 m)		
	<b>UL</b>	Yes		
	<b>CSA</b>	Yes		
	<b>FCC Compliance</b>	Yes		
	<b>ENERGY STAR®</b>	Select models*		
	<b>EPEAT</b>	Gold target**		
	<b>ICES</b>	Yes		
	<b>Australia / NZ A-Tick Compliance</b>	Yes		
	<b>CCC</b>	Yes		
	<b>Japan VCCI Compliance</b>	Yes		
<b>KCC</b>	Yes			
<b>BSMI</b>	Yes			
<b>CE Marking Compliance</b>	Yes			

\* Configurations that are ENERGY STAR qualified are identified as 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

#### DISPLAY

**15.6" diagonal LED-backlit FHD eDP anti-glare SVA (1920x1080)**

<b>Outline Dimensions</b> (W x H x D)	14.17 x 8.83 x 0.15 in (36.0 x 22.43 x 0.32 cm)	
<b>Active Area</b>	13.55 x 7.62 in (34.42 x 19.36 cm)	
<b>Weight</b>	< 0.84 lb. (380 g) (max)	
<b>Diagonal Size</b>	15.6 in (39.62 cm)	
<b>Surface Treatment</b>	Anti-glare	
<b>Contrast Ratio</b>	400:1 (typical)	
<b>Refresh Rate</b>	60 Hz	
<b>Brightness</b>	300 nit (typical)	
<b>Pixel Resolution</b>	<b>Format</b>	1920 x 1080 (FHD)
	<b>Configuration</b>	RGB Stripe
<b>Interface</b>	eDP 1.2 (2 lane)	
<b>LCD Mode</b>	TN	
<b>PPI</b>	142 ppi	
<b>Viewing Angle</b>	SVA 30/30/20/10 (Left/Right/Down/Up)	

**15.6" diagonal LED-backlit FHD UWVA IPS eDP anti-glare + PSR (1920 x 1080)**

<b>Outline Dimensions</b> (W x H x D)	14.17 x 8.83 x 0.15 in (36.0 x 22.43x0.32 cm)	
<b>Active Area</b>	13.55 x 7.62 in (34.42 x 19.36)	
<b>Weight</b>	< 0.79 lb. (360g) (max)	
<b>Diagonal Size</b>	15.6 in (39.62 cm)	
<b>Surface Treatment</b>	Anti-glare	
<b>Contrast Ratio</b>	600:1 (typ) - AG	
<b>Refresh Rate</b>	60 Hz	
<b>Brightness</b>	300 nit (typical)	
<b>Pixel Resolution</b>	<b>Format</b>	1920 x 1080 (FHD)
	<b>Configuration</b>	RGB Stripe
<b>Interface</b>	eDP 1.3+PSR (2 lane)	
<b>LCD Mode</b>	IPS/MVA/FFS	
<b>PPI</b>	142 ppi	
<b>Viewing Angle</b>	UWVA 85/85/85/85	

### Technical Specifications

#### STORAGE AND DRIVES\*

##### Internal Storage

<b>500 GB 5400 rpm SATA FIPS* Hard Drive</b>	<b>Drive Weight</b>	0.25 lbs. (95g)		
	<b>Capacity</b>	500 GB		
	<b>Height</b>	0.28 in (7 mm)		
	<b>Width</b>	2.75 in (70 mm)		
	<b>Interface</b>	ATA-8, SATA 2.6, 3.0 Gb/s, NCQ		
	<b>Transfer Rate</b>	<b>Synchronous</b> (maximum)	300 MB/s (Drive Capability)	
	<b>Seek Time</b> (typical reads, including settling)	<b>Single Track</b>	1.5 ms	
		<b>Average</b>	11 ms	
		<b>Maximum</b>	22 ms	
	<b>Cache</b>	16 MB		
	<b>Rotational Speed</b>	5400 rpm		
	<b>Logical Blocks</b>	976,773,168		
	<b>Operating Temperature</b>	32° to 140° F (0° to 60° C) [ambient temp]		
<b>Features</b>	ATA Security, TCG Opal SSC 2.0 and FIPS 140-2-level2			

\* FIPS-certified, hardware-based AES-256 encryption image.

<b>1 TB 7200 rpm SATA Hard Drive</b>	<b>Drive Weight</b>	0.25 lbs. (115g)		
	<b>Capacity</b>	1 TB		
	<b>Height</b>	0.37 in (9.5 mm)		
	<b>Width</b>	2.75 in (70 mm)		
	<b>Interface</b>	ATA-8, SATA 3.0		
	<b>Transfer Rate</b>	<b>Synchronous</b> (maximum)	600 MB/s (Drive Capability)	
	<b>Seek Time</b> (typical reads, including settling)	<b>Single Track</b>	2 ms	
		<b>Average</b>	13 ms	
		<b>Maximum</b>	15 ms	
	<b>Rotational Speed</b>	7200 rpm		
	<b>Logical Blocks</b>	1,953,525,168		
	<b>Operating Temperature</b>	32° to 140° F (0° to 60° C) [ambient temp]		
	<b>Features</b>	ATA Security; S.M.A.R.T., NCQ, Ultra DMA		

<b>500 GB 7200 rpm SATA Hard Drive</b>	<b>Drive Weight</b>	0.20lbs(92g- 0.21 lbs. (95g)		
	<b>Capacity</b>	500 GB		
	<b>Height</b>	0.28 in (7 mm)/ 0.38 in (9.7 mm)		
	<b>Width</b>	2.75 in (69.85 mm)		
	<b>Interface</b>	ATA-8, SATA 3.0		
	<b>Transfer Rate</b>	<b>Synchronous</b> (maximum)	600 MB/s (Drive Capability)	
	<b>Seek Time</b> (typical reads, including settling)	<b>Single Track</b>	1.5 ms – 2ms	
		<b>Average</b>	12 ms – 13ms	
		<b>Maximum</b>	18ms - 22 ms	
	<b>Rotational Speed</b>	7200 rpm		
	<b>Logical Blocks</b>	976,773,168		
	<b>Operating Temperature</b>	32° to 140° F (0° to 60° C) [ambient temp]		

### Technical Specifications

	Features	ATA Security; S.M.A.R.T., NCQ, Ultra DMA		
<b>500 GB 7200 rpm SMART SATA 3 Self Encrypting Drive</b>	<b>Drive Weight</b>	0.21 lbs. (115g)		
	<b>Capacity</b>	500 GB		
	<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>Transfer Rate</b>	<b>Synchronous</b> (maximum)	300 MB/s (Drive Capability)	
	<b>Seek Time</b> (typical reads, including settling)	<b>Single Track</b>	2 ms	
		<b>Average</b>	13 ms	
		<b>Maximum</b>	18 ms	
	<b>Cache</b>	32 MB		
	<b>Rotational Speed</b>	7200 rpm		
	<b>Logical Blocks</b>	976,773,168		
	<b>Operating Temperature</b>	32° to 140° F (0° to 60° C) [case temp]		
<b>Features</b>	ATA Security; TCG OPAL v1.00			
<b>SATA 6 Gb/s 512 GB, 2.5-inch Solid State Drive</b>	<b>Drive Weight</b>	0.17lb (78g)		
	<b>Capacity</b>	512 GB		
	<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>Performance</b>	<b>Maximum Sequential Read</b>	505 MB/s	
		<b>Maximum Sequential Write</b>	470 MB/s	
	<b>Logical Blocks</b>	1,000,215,216		
	<b>Operating Temperature</b>	32° to 158°F (0° to 70°C) [case temp]		
	<b>Features</b>	ATA Security; DIPM; TRIM; DEVSLP		
<b>SATA 6 Gb/s 256 GB, 2.5-inch Solid State Drive</b>	<b>Drive Weight</b>	0.17 lb. (78 g)		
	<b>Capacity</b>	256 GB		
	<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>Performance</b>	<b>Maximum Sequential Read</b>	Up to 460 MB/s	
		<b>Maximum Sequential Write</b>	Up to 260 MB/s	
	<b>Logical Blocks</b>	500,118,192		
	<b>Operating Temperature</b>	32° to 158°F (0° to 70°C) [ambient temp]		
	<b>Features</b>	ATA Security; DIPM; TRIM		
<b>SATA 6 Gb/s 256 GB, 2.5-inch SATA SED Solid State Drive</b>	<b>Drive Weight</b>	0.17 lb. (78 g)		
	<b>Capacity</b>	256 GB		
	<b>Height</b>	0.28 in (7 mm)		

### Technical Specifications

<b>Width</b>	2.75 in (69.85 mm)	
<b>Interface</b>	ATA-8, SATA 3.0	
<b>Performance</b>	<b>Maximum Sequential Read</b>	<b>Maximum Sequential Write</b>
	Up to 550 MB/s	Up to 500 MB/s
<b>Logical Blocks</b>	500,118,192	
<b>Operating Temperature</b>	32° to 158°F (0° to 70°C) [ambient temp]	
<b>Features</b>	ATA Security; DIPM; TRIM	

<b>SATA 6 Gb/s 240 GB, 2.5-inch SATA Solid State Drive</b>	<b>Drive Weight</b>	0.17 lb. (78 g)	
	<b>Capacity</b>	240 GB	
	<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>Performance</b>	<b>Maximum Sequential Read</b>	<b>Maximum Sequential Write</b>
		Up to 540 MB/s	Up to 490 MB/s
	<b>Logical Blocks</b>	468,862,128	
<b>Operating Temperature</b>	32° to 158°F (0° to 70°C) [ambient temp]		
<b>Features</b>	ATA Security; DIPM; TRIM		

### Technical Specifications

<b>SATA 6 Gb/s 180 GB, 2.5-inch Solid State Drive</b>	<b>Drive Weight</b>	0.17 lb. (78 g)	
	<b>Capacity</b>	180 GB	
	<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>Performance</b>	<b>Maximum Sequential Read</b>	<b>Maximum Sequential Write</b>
		Up to 540 MB/s	Up to 490 MB/s
	<b>Logical Blocks</b>	351,651,888	
	<b>Operating Temperature</b>	32° to 158°F (0° to 70°C) [ambient temp]	
	<b>Features</b>	ATA Security; DIPM; TRIM; DEVSLP	

<b>SATA 6 Gb/s 128 GB, 2.5-inch Solid State Drive</b>	<b>Drive Weight</b>	0.17 lb. (78 g)	
	<b>Capacity</b>	128 GB	
	<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>Performance</b>	<b>Maximum Sequential Read</b>	<b>Maximum Sequential Write</b>
		Up to 550 MB/s	Up to 350 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	

### Technical Specifications

<b>Z Turbo Drive 256 GB, M.2 PCIe Solid State Drive</b>	<b>Drive Weight</b>	0.02 lb. (10 g)		
	<b>Capacity</b>	256 GB		
	<b>Height</b>	0.24 in (6.1 mm)		
	<b>Width</b>	0.87 in (22.1 mm)		
	<b>Interface</b>	ATA-8, PCIe 2.0		
	<b>Performance</b>	<b>Maximum Sequential Read</b>	<b>Maximum Sequential Write</b>	
		730 MB/s	620 MB/s	
	<b>Logical Blocks</b>	500,118,192		
	<b>Operating Temperature</b>	32° to 158°F (0° to 70°C) [ambient temp]		
	<b>Features</b>	ATA Security; DIPM; TRIM; DEVSLP		

\*For hard drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 16 GB (for Windows 7) of system and up to 30 GB (for Windows 8) disk is reserved for system recovery software.

### SECURITY

<b>HP Fingerprint Sensor</b>	<b>Voltage</b>	3.0-3.6V
	<b>Operating temperature</b>	14° - 167°F (-10° - 75°C)
	<b>Current consumption image</b>	36mA
	<b>Low latency wait for finger</b>	950 uA
	<b>Capture rate</b>	3000 lines/sec
	<b>ESD Resistance</b>	IEC 6100-4-2 4B (+/-15KV)
	<b>Detection Matrix</b>	200*1 (plus another secondary line); 508 dpi, sensor area 12*3 mm

### NETWORKING/COMMUNICATION

<b>Intel® I218-LM Gigabit Network Connection</b>	<b>Ethernet Features</b>	10 Mbit/s operation (10BASE-T; IEEE 802.3i; IEEE 802.3 clauses 13-14)
		100 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 802.3. 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		
<b>Power Management</b>	ACPI compliant - multiple power modes	
	Energy Detect Low Power Mode(Green Ethernet)	
<b>Performance Features</b>	TCP/IP/UDP Checksum Offload (configurable)	
	Protocol Offload( ARP & NS)	

### Technical Specifications

	<p>Large send offload and Giant send offload</p> <p>Receiving Side Scaling</p> <p>MACSec Offload (802.3ae)</p> <p>Intel vPro</p> <p>iSCSI Boot</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)</p> <p>PXE 2.1 Remote Boot</p> <p>Statistics Gathering (SNMP MIB II, Ethernet-like MIB, Ethernet MIB (802.3x, clause 30))</p> <p>Comprehensive diagnostic and configuration software suite</p> <p>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> <p><b>NOTE:</b> Intel 82579 PCIe interface is not PCIe compliant. It operates at half of PCIe specification V1.1 (2.5GT/S) speed.</p>
<b>NIC Device Driver Name</b>	Intel 82579LM/82579V Ethernet Network Connection

<b>HP hs3110 HSPA+ Intel® Mobile Broadband Module*</b>	<b>Technology/Operating Bands</b>	HSPA+: 2100 (Band 1), 1900 (Band 2), 850 (Band 5), 700 (Band 17) MHz E-GPRS: 1900 (Band 2), 1800 (Band 3), 850 (Band 5), 900 (Band 8) MHz
	<b>Wireless Protocol Standards</b>	WCDMA R99, 3GPP Release 5, 6 and 7 UMTS Specification E-GPRS: Class B, Multi-slot class 33, coding schemes CS1 - CS4 and MSC1 - MSC9
	<b>Maximum Data Rates</b>	DC-HSPA+: 42 Mbps (Download), 5.76 Mbps (Upload) HSPA+: 21.6 Mbps (Download), 5.76 Mbps (Upload) EDGE: 236.8 kbps (Download), 236.8 kbps (Upload) GPRS: 85.6 kbps(Download), 85.6 kbps (Upload)
	<b>GPS</b>	Standalone, A-GPS
	<b>GPS Bands</b>	1575.42 MHz (± 1.023 MHz), GLONASS 1596-1607MHz
	<b>Maximum Output Power</b>	HSPA+: 23.5 dBm E-GPRS 1900/1800: 26.5 dBm E-GPRS 900/850: 27.5 dBm GPRS 1900/1800: 29.5 dBm GPRS 900/850: 32.5 dBm
	<b>Maximum Power Consumption</b>	HSPA+: 1,100 mA (peak); 800 mA (average) E-GPRS: 2,800 mA (peak); 700 mA (average)
	<b>Form Factor</b>	M.2, 3042-S3 Key B
	<b>Weight</b>	6g
	<b>Dimensions</b> (Length x Width x Thickness)	1.65 x 1.18 x 0.09 in (42 x 30 x 2.3 mm)

\* Mobile Broadband is an optional feature. Connection requires wireless data service contract, network support, and is not available in all areas. Contact service provider to determine the coverage area and availability. Connection speeds will vary due to location, environment, network conditions, and other factors.

### Technical Specifications

**HP It4211 LTE/EV-DO/HSPA+ Gobi™ 4G Mobile Broadband Module**

**Technology/Operating Bands**

LTE: 1900 (Band 2), 1700/2100 (Band 4), 850 (Band 5), 700 (Band 13 upper SMH), 700 (Band 17 lower SMH), 1900 MHz (Band 25, extended PCS) MHz

HSPA+: 2100 (Band 1), 1900 (Band 2), 1700/2100 (Band 4), 850 (Band 5), 900 (Band 8) MHz

E-GPRS: 1900 (Band 2), 1800 (Band 3), 850 (Band 5), 900 (Band 8) MHz

EV-DO: 800 (BC0), 1900 (BC1) MHz

**Wireless Protocol Standards**

3GPP Release 8 LTE Specification

WCDMA R99, 3GPP Release 5, 6 and 7 UMTS Specification

E-GPRS: Class B, Multi-slot class 33, coding schemes CS1 - CS4 and MSC1 - MSC9

EVDO Release 0 and Release A

**GPS**

Standalone, A-GPS

**GPS Bands**

1575.42 MHz (± 1.023 MHz), GLONASS 1596-1607MHz

**Maximum Data Rates**

LTE: 100 Mbps (Download), 50 Mbps (Upload)

DC-HSPA+: 42 Mbps (Download), 5.76 Mbps (Upload)

HSPA+: 21.6 Mbps (Download), 5.76 Mbps (Upload)

EDGE: 236.8 kbps (Download), 236.8 kbps (Upload)

GPRS: 85.6 kbps (Download), 85.6 kbps (Upload)

CDMA 1x: DL 153.6 kbps/UL 153.6 kbps

EVDO Rev.A: DL 3.1 Mbps/UL 1.8 Mbps

**Maximum Output Power**

LTE: 23 dBm

HSPA+: 23.5 dBm

E-GPRS 1900/1800: 26.5 dBm

E-GPRS 900/850: 27.5 dBm

GPRS 1900/1800: 29.5 dBm

GPRS 900/850: 32.5 dBm

CDMA/EVDO: 24dBm

**Maximum Power Consumption**

LTE: 1,200 mA (peak); 900 mA (average)

HSPA+: 1,100 mA (peak); 800 mA (average)

E-GPRS: 2,800 mA (peak); 700 mA (average)

EVDO: 1000mA (peak); 720mA (average)

**Form Factor**

M.2, 3042-S3 Key B

**Weight**

6 g

**Dimensions** (Length x Width x Thickness)

1.65 x 1.18 x 0.09 in (42 x 30 x 2.3 mm)

\* Mobile Broadband is an optional feature. Connection requires wireless data service contract, network support, and is not available in all areas. Contact service provider to determine the coverage area and availability. Connection speeds will vary due to location, environment, network conditions, and other factors. 4G LTE not available on all products or in all countries.

### Technical Specifications

<b>HP It4112 LTE/HSPA+ Gobi™ 4G Mobile Broadband Module</b>	<b>Technology/Operating Bands</b>	LTE: 2100 (Band 1), 1900 (Band 2), 1800 (Band 3), 850 (Band 5), 2600 (Band 7), 900 (Band 8), 800 MHz (Band 20, DD800) MHz HSPA+: 2100 (Band 1), 1900 (Band 2), 850 (Band 5), 900 (Band 8) MHz E-GPRS: 1900 (Band 2), 1800 (Band 3), 850 (Band 5), 900 (Band 8) MHz
	<b>Wireless Protocol Standards</b>	3GPP Release 8 LTE Specification WCDMA R99, 3GPP Release 5, 6 and 7 UMTS Specification E-GPRS: Class B, Multi-slot class 33, coding schemes CS1 - CS4 and MSC1 - MSC9
	<b>GPS</b>	Standalone, A-GPS
	<b>GPS Bands</b>	1575.42 MHz (± 1.023 MHz), GLONASS 1596-1607MHz
	<b>Maximum Data Rates</b>	LTE: 100 Mbps (Download), 50 Mbps (Upload) DC-HSPA+: 42 Mbps (Download), 5.76 Mbps (Upload) HSPA+: 21.6 Mbps (Download), 5.76 Mbps (Upload) EDGE: 236.8 kbps (Download), 236.8 kbps (Upload) GPRS: 85.6 kbps(Download), 85.6 kbps (Upload)
	<b>Maximum Output Power</b>	LTE: 23 dBm HSPA+: 23.5 dBm E-GPRS 1900/1800: 26.5 dBM E-GPRS 900/850: 27.5 dBM GPRS 1900/1800: 29.5 dBm GPRS 900/850: 32.5 dBm
	<b>Maximum Power Consumption</b>	LTE: 1,200 mA (peak); 900 mA (average) HSPA+: 1,100 mA (peak); 800 mA (average) E-GPRS: 2,800 mA (peak); 700 mA (average)
	<b>Form Factor</b>	M.2, 3042-S3 Key B
	<b>Weight</b>	6 g
	<b>Dimensions</b> (Length x Width x Thickness)	1.65 x 1.18 x 0.09 in (42 x 30 x 2.3 mm)

\*Mobile Broadband is an optional feature. Connection requires wireless data service contract, network support, and is not available in all areas. Contact service provider to determine the coverage area and availability. Connection speeds will vary due to location, environment, network conditions, and other factors. 4G LTE not available on all products or in all countries.

### Technical Specifications

<p><b>Intel Dual Band Wireless-AN 7265 802.11a/b/g/n (2x2) Wi-Fi + Bluetooth 4.0 Combo Adapter*</b></p>	<p><b>Wireless LAN Standards</b></p> <p><b>Interoperability</b></p> <p><b>Frequency Band</b></p>	<p>IEEE 802.11a IEEE 802.11b IEEE 802.11g IEEE 802.11n</p> <p>Wi-Fi certified</p> <p>802.11b/g/n    2.402 - 2.482 GHz <i>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</i></p> <p>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 <i>Note: Indonesia only supports 5.725 - 5.825 GHz (CH149 - CH161)</i></p>
<p><b>Antenna Structure</b></p> <p><b>Data Rates</b></p> <p><b>Modulation</b></p> <p><b>Security<sup>1</sup></b></p>	<p>2 transmit; 2 receive (2x2)</p> <p>802.11a: 6, 9, 12, 18, 24, 36, 48, 54 Mbps 802.11b: 1, 2, 5.5, 11 Mbps 802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps 802.11n: MCS 0 ~ MCS 15, (20MHz, and 40MHz)</p> <p>Direct Sequence Spread Spectrum CCK, BPSK, QPSK, 16-QAM, 64-QAM</p> <ul style="list-style-type: none"> <li>• IEEE and Wi-Fi 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>	
<p><b>Sub-channels</b></p> <p><b>Network Architecture Models</b></p> <p><b>Roaming</b></p> <p><b>Output Power<sup>2</sup></b></p>	<p>Multinational support with frequency bands and channels compliant to local regulations.</p> <p>Ad-hoc (Peer to Peer) Infrastructure (Access Point Required)</p> <p>IEEE 802.11 compliant roaming between band Access Points</p> <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) : +13dBm minimum</li> <li>• 802.11n HT40(2.4GHz) : +13dBm minimum</li> <li>• 802.11n HT20(5GHz) : +12dBm minimum</li> <li>• 802.11n HT40(5GHz) : +12dBm minimum</li> </ul>	
<p><b>Power Consumption</b></p> <p><b>Power Management</b></p>	<p>Transmit: 2.0 Watts (max) Receive: 1.6 Watts (max) Idle mode<sup>3</sup> (PSP): 180 mW (WLAN Associated) Idle mode: 60 mW (WLAN unassociated) Radio off: 30 mW</p> <p>ACPI and PCI Express compliant power management</p>	

### Technical Specifications

<b>Receiver Sensitivity<sup>4</sup></b>	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	
<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 and Bluetooth communications	
<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) -40° to 176° F (-40° to 80° C)
	Non-operating	
<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 Off - Radio OFF; Solid LED On - Radio ON	
	<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. In Power Save Polling mode and on battery power.</li> <li>4. Receiver sensitivity is measured at a packet error rate of 8% for 802.11b (CCK modulation) and a packet error rate of 10% for 802.11a/g (OFDM modulation).</li> <li>5. WLAN supplier's client utility is required for Cisco Compatible Extensions support with Microsoft Windows XP. WLAN may also be compatible with certain third-party software suppliers. WLAN supplier IHV extensions required for Cisco Compatible Extensions support for Microsoft Windows Vista.</li> </ol>	

<b>HP Integrated Module with Bluetooth 4.0+EDR Wireless Technology</b>	<b>Bluetooth Specification</b>	4.0+EDR Compliant
	<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

### Technical Specifications

<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												
<b>Receiver Sensitivity</b>	<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><math>\pi/4</math>-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											
<b>Power Consumption</b>	Peak (Tx) 330 mW Peak (Rx) 230 mW Selective Suspend 17 mW												
<b>Antenna</b>	Internally integrated within module												
<b>Range</b>	Up to 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												

### Intel Dual Band Wireless-AC 7265 802.11a/b/g/n (2x2) Wi-Fi and Bluetooth 4.0 Combo Adapter

<b>Wireless LAN Standards</b>	IEEE 802.11a IEEE 802.11b IEEE 802.11g IEEE 802.11n IEEE 802.11ac
<b>Interoperability</b>	Wi-Fi certified
<b>Frequency Band</b>	802.11b/g/n  2.402 - 2.482 GHz <b>Note:</b> 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 <ul style="list-style-type: none"> <li>• 4.9 - 4.95 GHz (Japan)</li> <li>• 5.15 - 5.25 GHz</li> <li>• 5.25 - 5.35 GHz</li> <li>• 5.47 - 5.725 GHz</li> <li>• 5.825 - 5.850 GHz</li> </ul> <b>Note:</b> Indonesia only supports 5.725 - 5.825 GHz (CH149 - CH161)
<b>Antenna Structure</b>	2 transmit; 2 receive (2x2)
<b>Data Rates</b>	802.11a: 6, 9, 12, 18, 24, 36, 48, 54 Mbps 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 and NSS=2 for RX and TX for 20 and 40 MHz channels. Short and long guard interval shall be supported. 802.11ac: MCS0 ~ MCS9, (1SS, and 2SS) (20MHz, 40MHz, and 80MHz)

### Technical Specifications

<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 Wi-Fi 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) : +13dBm minimum</li> <li>• 802.11n HT40(2.4GHz) : +13dBm minimum</li> <li>• 802.11n HT20(5GHz) : +12dBm minimum</li> <li>• 802.11n HT40(5GHz) : +12dBm minimum</li> <li>• 802.11ac 80MHz(5GHz) : +11dBm 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: 60 mW (WLAN unassociated) Radio disabled: 30 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>	<p>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)</p> <p>802.11b:-95 dBm (1 Mbps), -93 dBm (2 Mbps), -91 dBm (5.5 Mbps), -88 dBm (11 Mbps)</p> <p>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)</p> <p>802.11n:-69 dBm (150 Mbps), -66 dBm (300 Mbps)</p>
<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
<b>Form Factor</b>	PCI-Express Half-MiniCard
<b>Dimensions</b>	0.134 x 1.06 x 1.18 in (3.4 x 26.8 x 30 mm)
<b>Weight</b>	3.1g
<b>Operating Voltage</b>	3.3v +/- 9%
<b>Temperature</b>	Operating 14° to 158° F (-10° to 70° C)

### Technical Specifications

<b>Humidity</b>	Non-operating	-40° to 176° F (-40° to 80° C)
	Operating	10% to 90% (non-condensing)
<b>Altitude</b>	Non-operating	5% to 95% (non-condensing)
	Operating	0 to 10,000 ft. (3,048 m)
<b>LED Activity</b>	Non-operating	0 to 50,000 ft. (15,240 m)
	LED Amber - Radio OFF; LED White - Radio ON	

1. Check latest software/driver release for updates on supported security features.
2. Maximum output power may vary by country according to local regulations.
3. Receiver sensitivity is measured at a packet error rate of 8% for 802.11b (CKK modulation) and a packet error rate of 10% for 802.11a/g (OFDM modulation).

### HP Integrated Module with Bluetooth 4.0+EDR Wireless Technology

<b>Bluetooth Specification</b>	4.0+EDR Compliant
<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>	The Bluetooth component shall operate as a Class II Bluetooth device with a maximum transmit power of +4 dBm for BR and EDR
<b>Receiver Sensitivity</b>	Better than -20 dBm at 0.1 % raw bit error rate
<b>Power Consumption</b>	Peak (Tx) 330 mW Peak (Rx) 230 mW Selective Suspend 17 mW
<b>Antenna</b>	Internally integrated within module
<b>Range</b>	Up to 33 ft. (10 m)
<b>Electrical Interface</b>	USB 2.0 compliant
<b>Bluetooth Software Supported</b>	Microsoft Windows Plug and Play compliant 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>Bluetooth Profiles Supported</b>	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)

### Technical Specifications

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</sup>  
FAX Profile (FAX)  
Basic Imaging Profile (BIP)<sup>2</sup>  
Headset Profile (HSP)  
Hands Free Profile (HFP)  
Advanced Audio Distribution Profile (A2DP)

1. Indicates the profile is supported by Microsoft Windows XP SP2

2. Indicates the profile is part of Windows Vista

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

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### Technical Specifications

**Intel Dual Band Wireless- NB 7265 802.11 a/b/g/n (2x2) Wi-Fi Adapter\***

<b>Wireless LAN Standards</b>	IEEE 802.11a IEEE 802.11b IEEE 802.11g IEEE 802.11n
<b>Interoperability</b>	Wi-Fi certified
<b>Frequency Band</b>	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

- 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)

**Antenna Structure**  
**Data Rates**

2 transmit; 2 receive (2x2)  
802.11a: 6, 9, 12, 18, 24, 36, 48, 54 Mbps  
802.11b: 1, 2, 5.5, 11 Mbps  
802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps  
802.11n: MCS 0 ~ MCS 15, (20MHz, and 40MHz)

**Modulation**

Direct Sequence Spread Spectrum  
CCK, BPSK, QPSK, 16-QAM, 64-QAM

**Security<sup>1</sup>**

- IEEE and Wi-Fi 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

**Sub-channels**

Multinational support with frequency bands and channels compliant to local regulations.

**Network Architecture Models**

Ad-hoc (Peer to Peer)  
Infrastructure (Access Point Required)

**Roaming**

IEEE 802.11 compliant roaming between band Access Points

**Output Power<sup>2</sup>**

- 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

### Technical Specifications

<b>Power Consumption</b>	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	
<b>Power Management</b>	ACPI and PCI Express compliant power management 802.11 compliant power saving mode	
<b>Receiver Sensitivity<sup>4</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 : -86dBm maximum 802.11a, 54Mbps : -72dBm maximum 802.11n, MCS07 : -69dBm maximum 802.11n, MCS15 : -66dBm 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 and Bluetooth communications	
<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. In Power Save Polling mode and on battery power.
  4. Receiver sensitivity is measured at a packet error rate of 8% for 802.11b (CCK modulation) and a packet error rate of 10% for 802.11a/g (OFDM modulation).
  5. WLAN supplier's client utility is required for Cisco Compatible Extensions support with Microsoft Windows XP. WLAN may also be compatible with certain third-party software supplicants. WLAN supplier IHV extensions required for Cisco Compatible Extensions support for Microsoft Windows Vista.
- \* Wireless access point and internet service required. Availability of public wireless access points limited.

### Technical Specifications

**Intel Dual Band Wireless-AC 3160 802.11 ac (1x1) Wi-Fi and Bluetooth 4.0 Combo\* Adapter**

**Wireless LAN Standards**

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

**Interoperability Frequency Band**

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 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

**Security<sup>1</sup>**

- IEEE and Wi-Fi compliant 64 / 128 bit WEP encryption for a/b/g mode only
- AES-CCMP: 128 bit in hardware
- 802.1x authentication
- WPA, WPA2: 802.1x. WPA-PSK, WPA2-PSK, TKIP, and AES.
- WPA2 certification
- IEEE 802.11i
- Cisco Certified Extensions, all versions through CCX4 and CCX Lite
- WAPI

**Network Architecture Models**

Ad-hoc (Peer to Peer)  
Infrastructure (Access Point Required)

**Roaming**

IEEE 802.11 compliant roaming between access points

**Output Power<sup>2</sup>**

- 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)

### Technical Specifications

	Idle mode: 60 mW (WLAN unassociated) Radio disabled: 30 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 : -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
<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
<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>HP Integrated Module with Bluetooth 4.0+EDR Wireless Technology</b>	<b>Bluetooth Specification</b>	4.0+EDR Compliant
	<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>	The Bluetooth component shall operate as a Class II Bluetooth device with a maximum transmit power of +4 dBm for BR and EDR
	<b>Receiver Sensitivity</b>	Better than -20 dBm at 0.1 % raw bit error rate
	<b>Power Consumption</b>	Peak (Tx) 330 mW Peak (Rx) 230 mW

### Technical Specifications

	Selective Suspend 17 mW
<b>Antenna</b>	Internally integrated within module
<b>Range</b>	Up to 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>Bluetooth Profiles Supported</b>	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</sup> FAX Profile (FAX) Basic Imaging Profile (BIP) <sup>2</sup> Headset Profile (HSP) Hands Free Profile (HFP) Advanced Audio Distribution Profile (A2DP)

1. Indicates the profile is supported by Microsoft Windows XP SP2

2. Indicates the profile is part of Windows Vista

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

### Near Field Communications Controller

<b>Dimensions (L x W x H)</b>	Module 25 mm by 10 mm by 2.0 mm
<b>Chipset</b>	NPC100
<b>System interface</b>	I <sup>2</sup> C
<b>NFC RF standards</b>	ISO/IEC 14443 A ISO/IEC 14443 B ISO/IEC 15693 ISO/IEC 18092 ECMA-340 NFCIP-1 Target and Initiator ECMA-320 NFCIP-2
<b>NFC Forum Support</b>	Tag Type 1, Type 2, Type3 and Type 4, NFCIP-1 and NFCIP-2

### Technical Specifications

<b>Reader (PCD-VCD) Mode(1)</b>	ISO/IEC 14443 A ISO/IEC 14443 B ISO/IEC 15693 MIFARE 1K MIFARE 4K MIFARE DESFire FeliCa Jewel and Topaz cards	
<b>Card Emulation (PICC-VICC) Mode(1)</b>	ISO/IEC 14443 A ISO/IEC 14443 B and B' MIFARE FeliCa	
<b>Frequency</b>	13.56 MHz	
<b>NFC Modes Supported</b>	Reader/Writer, Peer-to-Peer, Card Emulation	
<b>Raw RF Data Rates</b>	106, 212, 424, 848 kbps	
<b>Operating temperature</b>	0°C to 70°C	
<b>Storage temperature</b>	-20°C to 125°C	
<b>Humidity</b>	10-90% operating 5-95% non-operating	
<b>Supply Operating voltage</b>	2.97 to 5.5 Volts	
<b>I/O Voltage</b>	1.8V or 3.3V	
<b>Power Consumption (Booster enable, VBAT= 3.3V, VCC_BOOST = 5V)</b>	<b>Mode</b>	<b>Power Consumption, Typical<sup>(2)</sup></b>
	Polling	7.3 mA
	Detected Test Tag Type 1	Total 283.8 mA Net Module 236.8 mA
	Detected Test Tag Type 2	Total 288.8 mA Net Module 241.8 mA
	Detected Test Tag Type 3	Total 287.7 mA Net Module 240.7 mA
	Detected Test Tag Type 4	Total 282.3 mA Net Module 235.3 mA
<b>Antenna</b>	Antenna connector, 0.5mm pitch, 7 connector FPC. Antenna matching is external to module.	

### AUDIO/MULTIMEDIA - DTS SOUND+

<b>Hardware</b>	<b>Implementation</b>	IDT 92HD91
	<b>Function Key</b>	Volume up, volume down, and mute
	<b>Volume Controls</b>	
	<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 when equipped with optional webcam

<b>Audio Output Quality</b>	<b>Frequency Response</b>	20 Hz - 20 kHz
	<b>Signal to Noise Ratio</b>	>85 dB

### Technical Specifications

<b>Total Harmonic Distortion</b>	0.01%
<b>Noise Floor</b>	-110 dB
<b>Play/Record Sampling Rate(s)</b>	8 kHz - 48kHz
<b>DAC</b>	16, 20 or 24-bit
<b>ADC</b>	16 or 20-bit

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<b>Integrated Stereo Speakers</b>	<b>Power Rating</b>	2 Watts
	<b>Impedance</b>	4 Ohms

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### Technical Specifications

#### POWER

<b>HP 65W Smart AC Adapter</b>	<b>Dimensions</b>	4.17 x 1.85 x 1.1 in (10.6 x 4.7 x 2.8 cm)	
	<b>Weight</b>	0.62 lb. (280 g)	
	<b>Input</b>	100 to 240 VAC	
		<b>Input Efficiency</b>	87% min at 115 VAC/230VAC
		<b>Input frequency range</b>	47 to 63 Hz
		<b>Input AC current</b>	1.7 A at 90 VAC, 0.85 A at 180 VAC
	<b>Output</b>	<b>Output power</b>	65W
		<b>DC output</b>	18.5V
		<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>	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 149° F (-20° to 65° C)
		<b>Altitude</b>	0 to 10,000 ft. (0 to 3,048 m)
		<b>Humidity</b>	20% to 80%
	<b>Storage Humidity</b>	10% to 90%	
<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; MTBF - over 200,000 hours at 25°C ambient condition.		

<b>3-cell HP Long Life (50Whr) Lithium-Ion Polymer</b>	<b>Dimensions (H x W x L)</b>	7.8 x 4.01 x 0.3 in(19.89x10.28x0.84 cm)		
	<b>Weight</b>	280 g		
	<b>Cells/Type</b>	3-cell Lithium-Ion Polymer		
	<b>Energy</b>	<b>Voltage</b>	11.1	
		<b>Amp-hour capacity</b>	4.504Ah	
		<b>Watt-hour capacity</b>	50Wh	
	<b>Temperature</b>	<b>Operating (Charging)</b>	32° to 113° F (0° to 45° C)	
		<b>Operating (Discharging)</b>	14° to 140° F (-10° to 60° C)	
		<b>Non-operating</b>	-4° to 140° F (-20° to 60° C)	
	<b>Battery Re-Charge Time</b>	<b>System in OFF or Standby Mode</b>	3 hours	
<b>Fuel Gauge LED</b>	No			
<b>Warranty</b>	1 year or 3 years*			

\*Battery warranty depends on the platform warranty.

### Technical Specifications

	<b>Optional Travel Battery Available</b>	No	
<b>6-cell HP Long Life (60WHr) Lithium-Ion Polymer</b>	<b>Dimensions (H x W x L)</b>	12.59 x 8.6 x 0.59 in (32 x 21.85 x 1.51cm)	
	<b>Weight</b>	603 g	
	<b>Cells/Type</b>	3-cell Lithium-Ion Polymer	
	<b>Energy</b>	Voltage	11.1
		Amp-hour capacity	5.4Ah
		Watt-hour capacity	60 Wh
	<b>Temperature</b>	Operating (Charging)	32° to 113° F (0° to 45° C)
		Operating (Discharging)	14° to 140° F (-10° to 60° C)
		Non-operating	-4° to 140° F (-20° to 60° C)
	<b>Battery Re-Charge Time</b>	<b>System in OFF or Standby Mode</b>	3 hours
<b>Fuel Gauge LED</b>		Yes	
<b>Warranty</b>		1 year or 3 years* *Battery warranty depends on the platform warranty.	
<b>Optional Travel Battery Available</b>		Yes	

### Country of Origin

China

### Technical Specifications

#### ENVIRONMENTAL DATA

##### 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)	11.76 W	11.45 W	11.26 W
Normal Operation (Long idle)	5.06 W	4.97 W	4.92 W
Sleep	0.73 W	0.78 W	0.73 W
Off	0.35 W	0.4 W	0.35 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)	40 BTU/hr	39 BTU/hr	39 BTU/hr
Normal Operation (Long idle)	17 BTU/hr	17 BTU/hr	17 BTU/hr
Sleep	2 BTU/hr	3 BTU/hr	2 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 <sub>WAd</sub> , bels)	Sound Pressure (L <sub>pAm</sub> , decibels)
Typically Configured – Idle	2.9	22
Fixed Disk – Random writes	3.0	22

##### 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

### Technical Specifications

- 1 multi-bay II storage port
- Interchangeable HDD??

<edit list of features as required>

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

Battery size: 6-cell high capacity Lithium-Ion battery (optional 8 cell available)

Battery type:

### 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](http://www.epeat.net)
- Plastics parts weighing over 25 grams used in the product are marked per ISO11469 and ISO1043.
- This product contains 8.4 % post-consumer recycled plastic (by wt.)
- This product is 98.1 % recycle-able when properly disposed of at end of life.

### Packaging Materials

<b>External:</b>	PAPER/Corrugated	475 g
<b>Internal:</b>	PLASTIC/EPE (Expanded Polyethylene)	47 g
	PLASTIC/Polyethylene low density	26 g

The plastic packaging material contains at least 50 % recycled content.

The corrugated paper packaging materials contains at least 70 % 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

### Technical Specifications

- 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)

### 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/qcreport/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](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>

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

Type	Description	Part #
<b>Memory</b>	HP 4 GB DDR3L-1600 1.35V SODIMM	H6Y75AA#xxx
	HP 8 GB DDR3L-1600 1.35V SODIMM	H6Y77AA#xxx
<b>Cases</b>	HP Business Top Load Case (fits up to 15.6")	H5M92AA
	HP Business Backpack (fits up to 17.3")	H5M90AA
	HP Essential Top Load Case (up to 15.6")	H2W17AA#xxx
	HP Professional Leather Case (up to 17.3")	H4J94AA
	HP Business 4 Wheel Roller Case (fits up to 17.3")	H5M93AA
<b>Docking</b>	HP Adjustable Dual Monitor Stand	AW664AA#xxx
	HP Adjustable Display Stand	AW663AA#xxx
	HP UltraSlim Docking Station	D9Y32AA#xxx
<b>Input/Output - Mice</b>	HP Wireless Mobile Mouse	H2L63AA
	HP Stylish USB KB/Mouse	H4B80AA#xxx
<b>Adapters</b>	HP 90W Slim AC Adapter	H6Y83AA#xxx
	HP 65W Slim AC Adapter	H6Y82AA#xxx
	HP 90W Slim Combo Adapter w/USB Adapter	H6Y84AA#xxx
<b>Storage - External Storage</b>	HP External USB Optical Drive (expected availability 10/1/13)	F2B56AA#xxx
	HP 2013 MWS Upgrade Bay DVD	G1Y57AA
	HP 2013 MWS Upgrade Bay 750GB HDD	G1Y56AA
	HP External USB Optical Drive	F2B56AA
	HP 500GB 7200rpm HDD*	F3B97AA
	HP 750GB 7200rpm HDD*	H2P67AA
	HP 128GB Solid State Drive*	F4P50AA
	HP 180GB Solid State Drive*	H4T75AA
	HP 512GB Solid State Drive*	J2V75AA
	HP MWS HDD/SDD Bracket Only	J2D73AA
* If you are not replacing an existing drive in your system, separate HP MWS HDD/SDD Bracket (J2D73AA) required for installation of this drive.		
<b>Batteries</b>	HP CM03XL Notebook Battery	E7U24AA
<b>Health and Education</b>	HP 20-Notebook Managed Charging Cart	QL489AA#xxx
	HP 20-Notebook Charging Cart	QL488AA#xxx
	HP 30-Notebook Managed Charging Cart	QL490AA#xxx
	HP 30-Notebook Charging Cart	H4F31AA#xxx
<b>Security</b>	HP Docking Station Cable Lock	AU656AA#xxx
	HP UltraSlim Keyed Cable Lock	H4D73AA

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

***Wireless***

HP hs3110 HSPA+ Mobile Module

E5M76AA

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### Summary of Changes

<b>Date of change:</b>	<b>Version History:</b>		<b>Description of change:</b>
February 1, 2015	From v1 to v2	Added	VGA port from PORTS/SLOTS section, Environmental data.

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