

### Overview

### HP 240 G7 Notebook PC



1. Webcam LED
2. Webcam
3. Internal microphone
4. Touchpad
5. Touchpad button
6. Power indicator LED

#### Left

7. Hard drive indicator LED
8. SD Card slot
9. USB 2.0 port
10. Security lock slot (Lock sold in select countries)
11. Power button

### Overview



1. AC Smart Pin adapter plug
2. RJ-45/Ethernet port
3. HDMI port (Cable not included)

#### Right

4. USB 3.1 Gen 1 port
5. USB 3.1 Gen 1 port
6. Audio combo jack

### Overview

### AT A GLANCE

- Preinstall with Windows 10 versions, FreeDOS
- Choice of 10th 8th Generation Intel® Core™, Intel® Pentium®, or Intel® Celeron® processors
- 14" diagonal FHD IPS anti-glare micro-edge WLED backlit (1920x1080)
- Choice of Integrated Intel® Iris® Plus graphics, UHD Graphics 620, HD Graphics 620, HD Graphics 610, UHD Graphics 605, UHD Graphics 600 Graphics or Switchable Discrete Graphics AMD Radeon™ 530, 620
- Dark Ash Silver color with texture pattern
- Up to 1 TB Hard Drive or 256 GB M.2 PCIe Value Solid State Drive
- Weight starting at 1.52 kg (3.4 lbs)
- Security features including FW TPM 2.0 and security lock slot (Lock not included)
- Full size textured island-style keyboard
- Touchpad with gestures support
- HP webcam with single digital microphone and HD (supporting WDR- Wide Dynamic Range) or VGA camera
- Two USB 3.1 (Gen 1) ports and One USB 2.0 port
- Wireless LAN (WLAN) up to 802.11ac to keep you connected
- Up to 12 hours 15 mins (Intel® 10th generation CPU, HD display, Solid State Drive & 3-cell 41 WHr battery)

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

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### Features

## PRODUCT NAME

HP 240 G7 Notebook PC

## OPERATING SYSTEM

<b>Preinstalled</b>	Windows 10 Pro 64 <sup>1</sup>
	Windows 10 Home 64 <sup>1</sup>
	Windows 10 Home Single Language 64 <sup>1</sup>
	Windows 10 Pro 64 (National Academic only) <sup>1,2</sup>
	FreeDOS

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

2. Some devices for academic use will automatically be updated to Windows 10 Pro Education with the Windows 10 Anniversary Update. Features vary; see <https://aka.ms/ProEducation> for Windows 10 Pro Education feature information.

## PROCESSOR

Intel® Core™ i3-10110U Processor with Intel® UHD Graphics (2.1 GHz base frequency, up to 4.1 GHz with Intel® Turbo Boost Technology, 4MB cache, 2 cores)<sup>3,4,5,6</sup>

Intel® Core™ i5-10210U Processor with Intel® UHD Graphics (1.60 GHz base frequency, up to 4.20 GHz with Intel® Turbo Boost Technology, 6MB cache, 4 cores)<sup>3,4,5,6</sup>

Intel® Core™ i7-10510U Processor with Intel® UHD Graphics (1.80 GHz base frequency, up to 4.90 GHz with Intel® Turbo Boost Technology, 8MB cache, 4 cores)<sup>3,4,5,6</sup>

### Processor Family

10th Generation Intel® Core™ i7 processor (i7-1065G7/ i7-10510U)<sup>6</sup>

10th Generation Intel® Core™ i5 processor (i5-1035G1/i5-10210U)<sup>6</sup>

10th Generation Intel® Core™ i3 processor (i3-1005G1/i3-10110U)<sup>6</sup>

8th Generation Intel® Core™ i3 processor (i3-8130U)

3. Multicore is designed to improve performance of certain software products. Not all customers or software applications will necessarily benefit from use of this technology. Performance and clock frequency will vary depending on application workload and your hardware and software configurations. Intel's numbering, branding and/or naming is not a measurement of higher performance.

4. Processor speed denotes maximum performance mode; processors will run at lower speeds in battery optimization mode.

5. Intel® Turbo Boost performance varies depending on hardware, software and overall system configuration. See <http://www.intel.com/technology/turboboost> for more information.

### Features

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

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## CHIPSET

Intel® SOC Chipset

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## GRAPHICS

### Integrated

Intel® Iris® Plus graphics<sup>30</sup>

Intel® UHD Graphics 620<sup>7</sup>

Intel® HD Graphics 620<sup>7</sup>

Intel® HD Graphics 610

Intel® UHD Graphics 605<sup>7</sup>

Intel® UHD Graphics 600<sup>7</sup>

### Discrete

AMD Radeon™ RX 520 (2 GB GDDR5 dedicated)<sup>8</sup>

AMD Radeon™ 620(2 GB GDDR5 dedicated)<sup>8</sup>

### Supports

Support HD decode, DX12, HDMI 1.4b<sup>9</sup>

7. HD content required to view HD images.

8. AMD Dynamic Switchable Graphics technology requires an Intel processor, plus an AMD Radeon™ discrete graphics configuration and is not available on FreeDOS and Linux OS. With AMD Dynamic Switchable Graphics technology, full enablement of all discrete graphics video and display features may not be supported on all systems (e.g. OpenGL applications will run on the integrated GPU or the APU as the case may be).

9. HDMI cable sold separately.

30. Intel® Iris® Xe Graphics capabilities require system to be configured with Intel® Core™ i5 or i7 processors and dual channel memory. Intel® Iris® Xe Graphics with Intel® Core™ i5 or i7 processors and single channel memory will only function as UHD graphics.

### Features

## DISPLAY

### Internal

#### Non-Touch

35.56 cm (14") diagonal HD SVA eDP anti-glare WLED-backlit slim-flat, 220 cd/m<sup>2</sup>, 45% NTSC (1366 x 768)<sup>7,10</sup>

35.6 cm (14") diagonal, FHD (1920 x 1080), IPS, narrow bezel, anti-glare, 250 nits, 45% NTSC<sup>7,10</sup>

#### HDMI

Port supports resolutions up to 1920 x 1200 external resolution @60 Hz

7. HD content required to view HD images.

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

## STORAGE AND DRIVES

### Primary Storage

1 TB 5400 rpm SATA<sup>11</sup>

500 GB 7200 rpm SATA<sup>11</sup>

500 GB 5400 rpm SATA<sup>11</sup>

### Primary M.2 Storage

128 GB M.2 SATA-3 TLC Solid State Drive<sup>11</sup>

256 GB M.2 SATA-3 TLC Solid State Drive<sup>11</sup>

256 GB PCIe® NVMe™ M.2 Value Solid State Drive<sup>11</sup>

512 GB PCIe® NVMe™ M.2 Value Solid State Drive<sup>11</sup>

SSD 256GB PCIe NVMe+SSD 16GB 3D Xpoint(Intel® Optane™)<sup>12,13</sup>

SSD 512GB PCIe NVMe+SSD 32GB 3D Xpoint(Intel® Optane™)<sup>12,13</sup>

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

12. Intel® Optane™ memory system acceleration does not replace or increase the DRAM in your system. Requires 8th Gen or higher Intel® Core™ processor, BIOS version with Intel® Optane™ supported, Windows 10 64-bit, and an Intel® Rapid Storage Technology (Intel® RST) driver.

13. Intel® Optane™ memory H10 only for Intel® PCIe® NVMe™ QLC M.2 SSD.

## MEMORY

### Standard

#### Maximum Memory

16 GB DDR4-2666 SDRAM 1216 GB DDR4-2400 SDRAM<sup>14</sup>

16 GB DDR4-2133 SDRAM<sup>14</sup>

**Memory** 16 GB DDR4-2666 SDRAM (2 X 8 GB)

16 GB DDR4-2400 SDRAM (2 X 8 GB)<sup>14</sup>

12 GB DDR4-2400 SDRAM (4 GB + 8 GB)<sup>14</sup>

### Features

8 GB DDR4-2666 SDRAM (1 x 8 GB)  
8 GB DDR4-2400 SDRAM (1 x 8 GB)  
8 GB DDR4-2400 SDRAM (2 x 4 GB)<sup>14</sup>  
8 GB DDR4-2666 SDRAM (2 x 4 GB)  
4 GB DDR4-2666 SDRAM (1 x 4 GB)  
4 GB DDR4-2400 SDRAM (1 x 4 GB)  
12 GB DDR4-2133 SDRAM (4 GB + 8 GB)<sup>14</sup>  
8 GB DDR4-2133 SDRAM (1 x 8 GB)  
4 GB DDR4-2133 SDRAM (1 x 4 GB)

#### Memory Slots

2 SODIMM (Intel® 8th & 10th Generation Intel® Core™ processor)  
DDR4 PC4 SODIMMS, system runs at 2666 (Intel 8th Gen (KBL) runs at 2400)  
Supports Dual Channel Memory  
1 SODIMM (Intel® Pentium®, Celeron® processors)  
All slots are customer non-accessible / non-upgradeable

**NOTE:** All slots are customer non-accessible / non-upgradeable.

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

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## NETWORKING/COMMUNICATIONS

#### WLAN

Realtek 802.11ac (2x2) WLAN and Bluetooth® 4.2 Combo (MU-MIMO supported)<sup>15</sup>  
Realtek 802.11ac (2x2) WLAN and Bluetooth® 5.0 Combo (MU-MIMO supported)<sup>15</sup>  
Realtek 802.11ac (1x1) WLAN and Bluetooth® 4.2 Combo (MU-MIMO supported)<sup>15</sup>  
Realtek 802.11b/g/n (1x1) and Bluetooth® 4.2 Combo<sup>13</sup>

#### Miracast

Compatible with Miracast-certified devices <sup>16</sup>

#### Ethernet

Integrated 10/100/1000 GbE NIC <sup>17</sup>

15. Wireless access point and Internet service required and sold separately. Availability of public wireless access points limited.

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

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

### Features

#### AUDIO/MULTIMEDIA

**Audio**

2 Integrated stereo speakers

**Camera**

HP TrueVision HD Camera <sup>7,18</sup>

**Webcam**

VGA webcam <sup>18,19</sup>

7. HD content required to view HD images.

18. Sold separately or as an optional feature.

19. Internet access required.

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#### KEYBOARDS/TOUCHPAD

**Keyboard**

Full size island-style keyboard

**Pointing Device**

Touchpad with multi-touch gesture support

**Function Keys**

F1 - Open " How to get help in Windows 10" webpage

F2 - Brightness Down

F3 - Brightness Up

F4 - Display Switching

F5 - Blank

F6 - Mute

F7 - Volume Down

F8 -Volume Up

F9 - Previous

F10 - Play/Pause

F11 - Next

F12 - Airplane mode

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#### SOFTWARE AND SECURITY

**Preinstalled Software**

HP JumpStarts

HP Documentation

HP Setup Integrated OOBE

HP SSRM

HP Audio Switch

HP Support Assistant <sup>20</sup>

McAfee LiveSafe™

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### Features

#### Security Management

TPM 2.0<sup>21</sup>

Security lock slot (Lock sold separately)

20. HP Support Assistant requires Windows and Internet access.

21. Firmware TPM is version 2.0 implemented by Intel Platform Trust Technology (PTT)

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## POWER

#### Power Supply

HP Smart 65 W External AC power adapter <sup>22,24</sup>

HP Smart 65 W EM External AC power adapter <sup>22,24</sup>

HP Smart 45 W External AC power adapter <sup>22</sup>

#### Primary Battery

HP Long Life 3-cell, 41 Wh Li-ion <sup>23</sup>

HP Long Life 4-cell, 46 Wh Li-ion Battery (India only)

Support battery fast charging - Approximately 90% in 90 minutes<sup>24</sup>

#### Battery Life

Up to 12 hours 15 mins (Intel® 10th generation CPU, HD display, Solid State Drive & 3-cell 41 WHr battery)<sup>25</sup>

#### Power Cord

1M (3.28 feet) length power cord

#### Battery Weight

0.18 kg

0.39 lb

22. Availability may vary by country.

23. Battery is internal and not replaceable by customer. Serviceable by warranty.

24. Recharges the battery up to 90% within 90 minutes when the system is off or in standby mode. Power adapter with a minimum capacity of 65 watts is required. After charging has reached 90% capacity, charging will return to normal. Charging time may vary +/-10% due to System tolerance.

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

### Features

## WEIGHTS & DIMENSIONS

### Product Weight

Starting at 3.3 lbs<sup>26</sup>

Starting at 1.52 kg<sup>26</sup>

### Product Dimensions (W x D x H)

13.19 x 9.21 x 0.78 in

33.5 x 23.4 x 1.99 cm

26. Weight will vary by configuration.

## PORTS/SLOTS

### Ports/Connectors

2 USB 3.1 Gen 1

1 USB 2.0

1 HDMI v1.4b<sup>9</sup>

1 RJ-45

1 AC power

1 Headphone/microphone combo jack

### Expansion Slots

1 multi-format digital media reader

Supports SD, SDHC, SDXC

9. HDMI cable sold separately.

## SERVICE AND SUPPORT

HP Services offers 1-year limited warranties and 90 day software limited warranty options depending on country. Batteries have a default one year limited warranty except for Long Life batteries which will have same 1-year or 3-year limited warranty as the platform. Refer to <http://www.hp.com/support/batterywarranty/> for additional battery information. 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>.<sup>27</sup>

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

### Technical Specifications

#### SYSTEM UNIT

##### Stand-Alone Power Requirements (AC Power)

Nominal Operating Voltage	19.5 V
Average Operating Power	Win 10
Integrated graphics	7.69W
Max Operating Power	Discrete < 65W UMA < 45W

##### Temperature

Operating	32° to 95° F (0° to 35° C) (not writing optical) 41° to 95° F (5° to 35° C) (writing optical)
Non-operating	-4° to 140° F (-20° to 60° C)

##### Relative Humidity

Operating	10% to 90%, non-condensing
Non-operating	5% to 95%

##### Shock

Operating	40 G, 2 ms duration, half-sine
Non-operating	240 G, 2 ms duration, half-sine

##### Random Vibration

Operating	1.043 grms
Non-operating	3.5 grms

##### Planned Industry Standard Certifications

UL	Yes
CSA	No
FCC Compliance	Yes
ENERGY STAR®	Yes <sup>28</sup>
EPEAT® 2019	Yes, Silver in U.S. <sup>29</sup>
ICES	Yes
Australia /	Yes
NZ A-Tick Compliance	Yes
CCC	Yes
Japan VCCI Compliance	Yes
KC	Yes
BSMI	Yes
CE Marking Compliance	Yes
BNCI or BELUS	Yes
CIT	Yes
GOST	Yes
Saudi Arabian Compliance (ICCP)	Yes
SABS	Yes
UKRSERTCOMPUTER	Yes

### Technical Specifications

28. Configurations of the HP 240 G7 that are ENERGY STAR® certified<sup>2</sup> are identified as HP 240 G7 ENERGY STAR on HP websites and on <http://www.energystar.gov>.

29. Based on US EPEAT® registration according to IEEE 1680.1-2018 EPEAT®. Status varies by country. Visit <http://www.epeat.net> for more information.

### Technical Specifications

#### DISPLAYS

<b>14" HD WLED Anti-Glare diagonal (1366 x 768) slim-flat (3.0mm), SVA, eDP</b>	<b>Outline Dimensions (W x H x D)</b>	320.9 x 250.6 x 3.0
	<b>Active Area</b>	309.5 x 174.05
	<b>Weight</b>	270g max
	<b>Diagonal Size</b>	14.0 (inch)
	<b>Thickness</b>	3.0 (mm) max
	<b>Interface</b>	eDP 1.2
	<b>Surface Treatment</b>	AG
	<b>Contrast Ratio</b>	300:1 (typ. AG)
	<b>Refresh Rate</b>	60Hz
	<b>Brightness</b>	220nits typical
	<b>Pixel Resolution</b>	1366 x 768 (HD)
	<b>Format of LCD Pixel Arrangement</b>	RGB
	<b>Backlight</b>	LED
	<b>Color Gamut Coverage</b>	45% of NTSC
	<b>Color Depth</b>	6 bits
<b>Viewing Angle</b>	40/40/15/30	

### Technical Specifications

#### STORAGE AND DRIVES

<b>500 GB 5400 rpm SATA Hard Drive</b>	<b>Drive Weight</b>	92g(0.20lb)
	<b>Rotation speed</b>	5400 rpm
	<b>Cache Buffer</b>	Up to 128MB
	<b>Height</b>	7.0 +/- 0.2 mm (0.28 +/- .008 in)
	<b>Width</b>	69.85 +/- 0.25 mm (2.750 +/- 0.010 in)
	<b>Interface</b>	ATA-8, SATA 3.0
	<b>Transfer Rate</b>	600 MB/s
	<b>Seek Time</b>	Single Track: 1.5 ms Average: 13 ms Maximum: 32 ms
	<b>Logical Blocks</b>	976,773,168
	<b>Operating Temperature</b>	0° to 60°C
	<b>Security Features</b>	ATA Security
	<b>Features</b>	S.M.A.R.T., NCQ, Ultra DMA

<b>500 GB 7200 rpm SATA Hard Drive</b>	<b>Drive Weight</b>	92g(0.20lb)
	<b>Rotation speed</b>	7200 rpm
	<b>Cache Buffer</b>	Up to 128MB
	<b>Height</b>	7.0 +/- 0.2 mm (0.28 +/- .008 in)
	<b>Width</b>	69.85 +/- 0.25 mm (2.750 +/- 0.010 in)
	<b>Interface</b>	ATA-8, SATA 3.0
	<b>Transfer Rate</b>	Single Track: 1.5 ms Average: 13 ms Maximum: 32 ms
	<b>Logical blocks</b>	976,773,168
	<b>Operating temperature</b>	0° to 60°C
	<b>Security features</b>	ATA Security
	<b>Features</b>	S.M.A.R.T., NCQ, Ultra DMA
	<b>Transfer rate</b>	600 MB/s

### Technical Specifications

<b>1 TB 5400 rpm SATA Hard Drive Weight Drive</b>		90g(0.198lb)
	<b>Rotation speed</b>	5400 rpm
	<b>Cache Buffer</b>	Up to 128MB
	<b>Height</b>	<7.2mm
	<b>Width</b>	69.85 +/- 0.25 mm (2.750 +/- 0.010 in)
	<b>Interface</b>	ATA-8, SATA 3.0
	<b>Transfer Rate</b>	600 MB/s
	<b>Seek Time</b>	Single Track: 1.5 ms Average: 13 ms Maximum: 32 ms
	<b>Logical Blocks</b>	976,773,168
	<b>Operating Temperature</b>	0° to 60°C
	<b>Security Features</b>	ATA Security
	<b>Features</b>	S.M.A.R.T., NCQ, Ultra DMA

<b>128 GB 2280 M2 SATA-3 TLC Solid State Drive</b>	<b>Drive Weight</b>	0.02 lb (10 g)
	<b>NAND Type/Size</b>	TLC/128GB
	<b>Height</b>	0.09 in (2.3 mm)
	<b>Width</b>	0.87 in (22 mm)
	<b>Interface</b>	ATA-8, SATA 3.0
	<b>Transfer Rate</b>	550MB/s
	<b>Logical Blocks</b>	250,069,680
	<b>Operating Temperature</b>	32° to 158°F (0° to 70°C) [ambient temp]
	<b>Security Features</b>	ATA Security
	<b>Features</b>	DIPM; TRIM; DEVSLP

<b>256 GB 2280 M2 SATA-3 TLC Solid State Drive</b>	<b>Drive Weight</b>	0.02 lb (10 g)
	<b>Height</b>	0.09 in (2.3 mm)
	<b>Width</b>	0.87 in (22 mm)
	<b>Interface</b>	ATA-8, SATA 3.0
	<b>Transfer Rate</b>	550MB/s
	<b>Logical Blocks</b>	500,118,192
	<b>Operating Temperature</b>	32° to 158°F (0° to 70°C) [ambient temp]

### Technical Specifications

<b>Security Features</b>	ATA Security
<b>Features</b>	DIPM; TRIM; DEVSLP

<b>256 GB 2280 M2 PCIe NVMe Value Solid State Drive</b>	<b>Form Factor</b>	M.2 2280
	<b>Capacity</b>	256 GB
	<b>NAND Type</b>	TLC
	<b>Height</b>	0.09 in (2.3 mm)
	<b>Width</b>	0.87 in (22 mm)
	<b>Weight</b>	0.01 lb (6 g) ~ 0.02 lb (10 g)
	<b>Interface</b>	PCIe NVMe Gen3x2
	<b>Maximum Sequential Read</b>	Up To 1500 MB/s
	<b>Maximum Sequential Write</b>	Up To 900 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>	TRIM; L1.2

<b>16 GB Intel Optane Solution PCIe Gen3x2 M.2 SSD</b>	Form Factor	M.2 2280
	Capacity	16 GB
	NAND Type	3D Xpoint
	Height	0.09 in (2.3 mm)
	Width	0.87 in (22 mm)
	Interface	PCIe NVMe Gen3x2
	Maximum Sequential Read	1350MB/s
	Maximum Sequential Write	290MB/s
	Logical Blocks	31,257,387
	Operating Temperature	32° to 158°F (0° to 70°C) [ambient temp]



### Technical Specifications

## NETWORKING/COMMUNICATIONS

### WLAN

<b>Realtek RTL8822BE 802.11 ac 2x2 WLAN and Bluetooth® 4.2 Combo Adapter (MU-MIMO supported)<sup>1</sup></b>	<b>Wireless LAN Standards</b>	<ul style="list-style-type: none"> <li>IEEE 802.11a</li> <li>IEEE 802.11b</li> <li>IEEE 802.11g</li> <li>IEEE 802.11n</li> <li>IEEE 802.11ac</li> </ul>
	<b>Interoperability</b>	Wi-Fi CERTIFIED™
	<b>Frequency Band</b>	<ul style="list-style-type: none"> <li>•802.11b/g/n 2.402 – 2.482 GHz</li> <li>•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</li> </ul>
	<b>Data Rates</b>	<ul style="list-style-type: none"> <li>• 802.11b: 1, 2, 5.5, 11 Mbps</li> <li>• 802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps</li> <li>• 802.11a: 6, 9, 12, 18, 24, 36, 48, 54 Mbps</li> <li>• 802.11n: MCS 0 ~ MCS 15, (20MHz, and 40MHz)</li> <li>• 802.11ac: MCS0 ~ MCS9, (1SS, and 2SS) (20MHz, 40MHz, and 80MHz)</li> </ul>
	<b>Modulation</b>	Direct Sequence Spread Spectrum BPSK, QPSK, CCK, 16-QAM, 64-QAM, 256-QAM
	<b>Security<sup>3</sup></b>	<ul style="list-style-type: none"> <li>• IEEE 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: +14dBm minimum</li> <li>• 802.11g: +12dBm minimum</li> <li>• 802.11a: +12dBm minimum</li> <li>• 802.11n HT20(2.4GHz): +12dBm minimum</li> <li>• 802.11n HT40(2.4GHz): +12dBm minimum</li> </ul>

### Technical Specifications

	<ul style="list-style-type: none"> <li>• 802.11n HT20(5GHz): +10dBm minimum</li> <li>• 802.11n HT40(5GHz): +10dBm minimum</li> <li>• 802.11ac VHT80(5GHz): +10dBm minimum</li> </ul>
<b>Power Consumption</b>	Transmit mode: 2.0 W Receive mode: 1.6 W Idle mode (PSP)180 mW (WLAN Associated) Idle mode: 50 mW (WLAN unassociated) Connected Standby/Modern Standby: 10mW Radio disabled: 8 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: -93.5dBm maximum 802.11b, 11Mbps: -84dBm maximum 802.11a/g, 6Mbps: -86dBm maximum 802.11a/g, 54Mbps: -72dBm maximum 802.11n, MCS07: -67dBm maximum 802.11n, MCS15: -64dBm maximum 802.11ac, MCS0: -84dBm maximum 802.11ac, MCS9: -59dBm 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
<b>Weight</b>	Type 2230: 2.8g
<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
<b>HP Integrated Module with Bluetooth 4.0/4.1/4.2 Wireless Technology</b>	
<b>Bluetooth® Specification</b>	4.0/4.1/4.2 Compliant

### Technical Specifications

<b>Frequency Band</b>	2402 to 2480 MHz
<b>Number of Available Channels</b>	Legacy: 0~79 (1 MHz/CH) BLE: 0~39 (2 MHz/CH)
<b>Signaling Data Rate</b>	Legacy: 3 Mbps Signaling data rate <sup>1</sup> BLE: 1 Mbps Signaling data rate <sup>1</sup> <ol style="list-style-type: none"><li>Actual throughput may vary.</li></ol>
	Legacy: Synchronous Connection Oriented links up to 3, 64 kbps, voice channels
	Legacy: Asynchronous Connection Less links 2178.1 kbps/177.1 kbps asymmetric (3-DH5) or 864 kbps symmetric (3-EV5)
<b>Transmit Power</b>	The Bluetooth component shall operate as a Class II Bluetooth device with a maximum transmit power of + 4 dBm for BR and EDR.

- Wireless access point and internet service required and sold separately. Availability of public wireless access points limited.
- 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.
- Check latest software/driver release for updates on supported security features.
- 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).

### Technical Specifications

<b>Realtek RTL8723DE 802.11 bgn (1x1) WLAN and Bluetooth® 4.2 Combo Adapter<sup>1</sup></b>	<b>Wireless LAN Standards</b>	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
	<b>Data Rates</b>	• 802.11b: 1, 2, 5.5, 11 Mbps • 802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps • 802.11n: MCS 0 ~ MCS 7, (20MHz, and 40MHz)
	<b>Modulation</b>	Direct Sequence Spread Spectrum BPSK, QPSK, CCK, 16-QAM, 64-QAM
	<b>Security<sup>3</sup></b>	<ul style="list-style-type: none"> <li>• IEEE 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: +14dBm minimum</li> <li>• 802.11g: +12dBm minimum</li> <li>• 802.11n HT20(2.4GHz): +12dBm minimum</li> <li>• 802.11n HT40(2.4GHz): +12dBm minimum</li> </ul>
	<b>Power Consumption</b>	<ul style="list-style-type: none"> <li>• Transmit mode 2.0 W</li> <li>• Receive mode 1.6 W</li> <li>• Idle mode (PSP)180 mW (WLAN Associated)</li> <li>• Idle mode 50 mW (WLAN unassociated)</li> <li>• Connected Standby 10mW</li> <li>• Radio disabled 8 mW</li> </ul>
	<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: -93.5dBm maximum 802.11b, 11Mbps: -84dBm maximum 802.11g, 6Mbps: -86dBm maximum 802.11g, 54Mbps: -72dBm maximum 802.11n, MCS07: -67dBm maximum

### Technical Specifications

<b>Antenna type</b>	High efficiency antenna.	
	One embedded dual band 2.4/5 GHz antenna is provided to the card to support WLAN 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	
<b>Weight</b>	Type 2230: 2.8g	
<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	

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

<b>Bluetooth® Specification</b>	4.0/4.1/4.2 Compliant	
<b>Frequency Band</b>	2402 to 2480 MHz	
<b>Number of Available Channels</b>	Legacy: 0~79 (1 MHz/CH) BLE: 0~39 (2 MHz/CH)	
<b>Signaling Data Rate</b>	Legacy: 3 Mbps Signaling data rate <sup>1</sup> BLE: 1 Mbps Signaling data rate <sup>1</sup> <a href="#">1. Actual throughput may vary.</a>	
	Legacy: Synchronous Connection Oriented links up to 3, 64 kbps, voice channels	
	Legacy: Asynchronous Connection Less links 2178.1 kbps/177.1 kbps asymmetric (3-DH5) or 864 kbps symmetric (3-EV5)	
<b>Transmit Power</b>	The Bluetooth component shall operate as a Class II Bluetooth device with a maximum transmit power of + 4 dBm for BR and EDR.	

1. Wireless access point and internet service required and sold separately. Availability of public wireless access points limited.
2. 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.
3. Check latest software/driver release for updates on supported security features.

### Technical Specifications

4. 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).

### Technical Specifications

<b>Realtek RTL8821CE 802.11 ac 1x1 WLAN and Bluetooth® 4.2 Combo Adapter (MU-MIMO supported)<sup>1</sup></b>	<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  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
	<b>Data Rates</b>	• 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)
	<b>Modulation</b>	Direct Sequence Spread Spectrum BPSK, QPSK, CCK, 16-QAM, 64-QAM, 256-QAM
	<b>Security<sup>3</sup></b>	<ul style="list-style-type: none"> <li>• IEEE 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: +14dBm minimum</li> <li>• 802.11g: +12dBm minimum</li> <li>• 802.11a: +12dBm minimum</li> <li>• 802.11n HT20(2.4GHz): +12dBm minimum</li> <li>• 802.11n HT40(2.4GHz): +12dBm minimum</li> <li>• 802.11n HT20(5GHz): +10dBm minimum</li> <li>• 802.11n HT40(5GHz): +10dBm minimum</li> </ul>

### Technical Specifications

<b>Power Consumption</b>	<ul style="list-style-type: none"> <li>• 802.11ac VHT80(5GHz): +10dBm minimum</li> <li>• Transmit mode 2.0 W</li> <li>• Receive mode 1.6 W</li> <li>• Idle mode (PSP) 180 mW (WLAN Associated)</li> <li>• Idle mode 50 mW (WLAN unassociated)</li> <li>• Connected Standby 10mW</li> <li>• Radio disabled 8 mW</li> </ul>
<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: -93.5dBm maximum 802.11b, 11Mbps: -84dBm maximum 802.11a/g, 6Mbps: -86dBm maximum 802.11a/g, 54Mbps: -72dBm maximum 802.11n, MCS07: -67dBm maximum 802.11n, MCS15: -64dBm maximum 802.11ac, MCS0: -84dBm maximum 802.11ac, MCS9: -59dBm maximum
<b>Antenna type</b>	High efficiency antenna.
	One embedded dual band 2.4/5 GHz antenna is provided to the card to support WLAN 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
<b>Weight</b>	Type 2230: 2.8g
<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
<b>HP Integrated Module with Bluetooth 4.0/4.1/4.2 Wireless Technology</b>	
<b>Bluetooth® Specification</b>	4.0/4.1/4.2 Compliant
<b>Frequency Band</b>	2402 to 2480 MHz
<b>Number of Available</b>	Legacy: 0~79 (1 MHz/CH)



### Technical Specifications

<b>Channels</b>	BLE: 0~39 (2 MHz/CH)
<b>Signaling Data Rate</b>	Legacy: 3 Mbps Signaling data rate <sup>1</sup> BLE: 1 Mbps Signaling data rate <sup>1</sup> <ol style="list-style-type: none"><li>Actual throughput may vary.</li></ol> Legacy: Synchronous Connection Oriented links up to 3, 64 kbps, voice channels  Legacy: Asynchronous Connection Less links 2178.1 kbps/177.1 kbps asymmetric (3-DH5) or 864 kbps symmetric (3-EV5)
<b>Transmit Power</b>	The Bluetooth component shall operate as a Class II Bluetooth device with a maximum transmit power of + 4 dBm for BR and EDR.

- Wireless access point and internet service required and sold separately. Availability of public wireless access points limited.
- 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.
- Check latest software/driver release for updates on supported security features.
- 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).

### Technical Specifications

<b>Realtek RTL8822CE</b>	<b>Wireless LAN Standards</b>	IEEE 802.11a IEEE 802.11b IEEE 802.11g IEEE 802.11n IEEE 802.11ac IEEE 802.11d IEEE 802.11e IEEE 802.11h IEEE 802.11i IEEE 802.11k IEEE 802.11r IEEE 802.11v
<b>802.11ac 2x2 Wi-Fi + BT5</b>	<b>Interoperability</b>	Wi-Fi® certified
	<b>Frequency Band</b>	<ul style="list-style-type: none"> <li>•802.11b/g/n 2.402 – 2.482 GHz</li> <li>•802.11a/n/ac 4.9 – 4.95 GHz (Japan) 5.15 – 5.25 GHz 5.25 – 5.35 GHz 5.47 – 5.725 GHz 5.825 – 5.850 GHz</li> </ul>
	<b>Data Rates</b>	<ul style="list-style-type: none"> <li>• 802.11b: 1, 2, 5.5, 11 Mbps</li> <li>• 802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps</li> <li>• 802.11a: 6, 9, 12, 18, 24, 36, 48, 54 Mbps</li> <li>• 802.11n: MCS 0 ~ MCS 15, (20MHz, and 40MHz)</li> <li>• 802.11ac : MCS0 ~ MCS9, (1SS, and 2SS) (20MHz, 40MHz &amp; 80MHz)</li> </ul>
	<b>Modulation</b>	Direct Sequence Spread Spectrum BPSK, QPSK, CCK, 16-QAM, 64-QAM, 256-QAM
	<b>Security<sup>3</sup></b>	<ul style="list-style-type: none"> <li>•IEEE 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>•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: +18.5dBm minimum</li> <li>• 802.11g: +17.5dBm minimum</li> </ul>

### Technical Specifications

	<ul style="list-style-type: none"> <li>• 802.11a: +18.5dBm minimum</li> <li>• 802.11n HT20(2.4GHz): +15.5dBm minimum</li> <li>• 802.11n HT40(2.4GHz): +14.5dBm minimum</li> <li>• 802.11n HT20(5GHz): +15.5dBm minimum</li> <li>• 802.11n HT40(5GHz): +14.5dBm minimum</li> <li>• 802.11ac VHT80(5GHz): +11.5dBm minimum</li> <li>• 802.11ac VHT160(5GHz): +11.5dBm minimum</li> </ul>
<b>Power Consumption</b>	<ul style="list-style-type: none"> <li>• Transmit mode 2.0 W</li> <li>• Receive mode 1.6 W</li> <li>• Idle mode (PSP) 180 mW (WLAN Associated)</li> <li>• Idle mode 50 mW (WLAN unassociated)</li> <li>• Connected Standby/Modern Standby: 10mW</li> <li>• Radio disabled 8 mW</li> </ul>
<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: -93.5dBm maximum 802.11b, 11Mbps: -84dBm maximum 802.11a/g, 6Mbps: -86dBm maximum 802.11a/g, 54Mbps: -72dBm maximum 802.11n, MCS07: -67dBm maximum 802.11n, MCS15: -64dBm maximum 802.11ac, MCS0: -84dBm maximum 802.11ac, MCS9: -59dBm 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 with CNVi Interface
<b>Dimensions</b>	Type 2230: 2.3 x 22.0 x 30.0 mm Type 1216: 1.67 x 12.0 x 16.0 mm
<b>Weight</b>	Type 2230: 2.8 g Type 126: 1.3 g
<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)

### Technical Specifications

	Non-operating: 0 to 50,000 ft (15,240 m)
<b>LED Activity</b>	LED Amber – Radio OFF LED OFF – Radio ON
<b>HP Integrated Module with Bluetooth 4.0/4.1/4.2/5.0 Wireless Technology</b>	
<b>Bluetooth Specification</b>	4.0/4.1/4.2/5.0 Compliant
<b>Frequency Band</b>	2402 to 2480 MHz
<b>Number of Available Channels</b>	Legacy: 0~79 (1 MHz/CH) BLE: 0~39 (2 MHz/CH)
<b>Signaling Data Rate</b>	Legacy: 3 Mbps Signaling Data Rate 2.17 Mbps BLE: 1 Mbps Signaling Data Rate 0.2 Mbps <a href="#">1. Actual throughput may vary.</a>
	Legacy: Synchronous Connection Oriented links up to 3, 64 kbps, voice channels
	Legacy: Asynchronous Connection Less links 2178.1 kbps/177.1 kbps asymmetric (3-DH5) or 864 kbps symmetric (3-EV5)
<b>Transmit Power</b>	The Bluetooth component shall operate as a Class II Bluetooth device with a maximum transmit power of + 4 dBm for BR and EDR.
<b>Power Consumption</b>	Peak (Tx) 330 mW Peak (Rx) 230 mW Selective Suspend 17 mW
<b>Electrical Interface</b>	USB 2.0 compliant
<b>Bluetooth Software Supported</b>	Microsoft Windows Bluetooth Software
<b>Link Topology</b>	
<b>Power Management</b>	Microsoft Windows ACPI, and USB Bus Support
<b>Certifications</b>	FCC (47 CFR) Part 15C, Section 15.247 & 15.249
<b>Power Management Certifications</b>	ETS 300 328, ETS 300 826 Low Voltage Directive IEC950 UL, CSA, and CE Mark
<b>Bluetooth Profiles Supported</b>	BT4.1-ESR 5/6/7 Compliance LE Link Layer Ping LE Dual Mode LE Link Layer LE Low Duty Cycle Directed Advertising LE L2CAP Connection Oriented Channels Train Nudging & Interlaced Scan BT4.2 ESR08 Compliance

### Technical Specifications

LE Secure Connection- Basic/Full  
LE Privacy 1.2 –Link Layer Privacy  
LE Privacy 1.2 –Extended Scanner Filter Policies  
LE Data Packet Length Extension  
FAX Profile (FAX)  
Basic Imaging Profile (BIP)2  
Headset Profile (HSP)  
Hands Free Profile (HFP)  
Advanced Audio Distribution Profile (A2DP)

1. Wireless access point and internet service required and sold separately. Availability of public wireless access points limited.
  2. 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.
  3. Check latest software/driver release for updates on supported security features.
  4. 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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### Technical Specifications

<b>Realtek RTL8822CE 802.11ac 2x2 Wi-Fi® and Bluetooth® 5.0<sup>1</sup></b>	<b>Wireless LAN Standards</b>	<ul style="list-style-type: none"> <li>IEEE 802.11a</li> <li>IEEE 802.11b</li> <li>IEEE 802.11g</li> <li>IEEE 802.11n</li> <li>IEEE 802.11ac</li> <li>IEEE 802.11d</li> <li>IEEE 802.11e</li> <li>IEEE 802.11h</li> <li>IEEE 802.11i</li> <li>IEEE 802.11k</li> <li>IEEE 802.11r</li> <li>IEEE 802.11v</li> </ul>
	<b>Interoperability</b>	Wi-Fi CERTIFIED™
	<b>Frequency Band</b>	<ul style="list-style-type: none"> <li>•802.11b/g/n 2.402 – 2.482 GHz</li> <li>•802.11a/n/ac 4.9 – 4.95 GHz (Japan) 5.15 – 5.25 GHz 5.25 – 5.35 GHz 5.47 – 5.725 GHz 5.825 – 5.850 GHz</li> </ul>
	<b>Data Rates</b>	<ul style="list-style-type: none"> <li>•802.11b: 1, 2, 5.5, 11 Mbps</li> <li>•802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps</li> <li>•802.11a: 6, 9, 12, 18, 24, 36, 48, 54 Mbps</li> <li>•802.11n: MCS 0 ~ MCS 15, (20MHz, and 40MHz)</li> <li>•802.11ac: MCS0 ~ MCS9, (1SS, and 2SS) (20MHz, 40MHz, 80MHz &amp; 160MHz)</li> </ul>
	<b>Modulation</b>	Direct Sequence Spread Spectrum BPSK, QPSK, CCK, 16-QAM, 64-QAM, 256-QAM
	<b>Security<sup>3</sup></b>	<ul style="list-style-type: none"> <li>•IEEE 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>•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: +18.5dBm minimum</li> <li>• 802.11g: +17.5dBm minimum</li> </ul>

### Technical Specifications

	<ul style="list-style-type: none"> <li>• 802.11a: +18.5dBm minimum</li> <li>• 802.11n HT20(2.4GHz): +15.5dBm minimum</li> <li>• 802.11n HT40(2.4GHz): +14.5dBm minimum</li> <li>• 802.11n HT20(5GHz): +15.5dBm minimum</li> <li>• 802.11n HT40(5GHz): +14.5dBm minimum</li> <li>• 802.11ac VHT80(5GHz): +11.5dBm minimum</li> <li>• 802.11ac VHT160(5GHz): +11.5dBm minimum</li> </ul>
<b>Power Consumption</b>	<ul style="list-style-type: none"> <li>• Transmit mode 2.0 W</li> <li>• Receive mode 1.6 W</li> <li>• Idle mode (PSP) 180 mW (WLAN Associated)</li> <li>• Idle mode 50 mW (WLAN unassociated)</li> <li>• Connected Standby/Modern Standby: 10mW</li> <li>• Radio disabled 8 mW</li> </ul>
<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: -93.5dBm maximum 802.11b, 11Mbps: -84dBm maximum 802.11a/g, 6Mbps: -86dBm maximum 802.11a/g, 54Mbps: -72dBm maximum 802.11n, MCS07: -67dBm maximum 802.11n, MCS15: -64dBm maximum 802.11ac, MCS0: -84dBm maximum 802.11ac, MCS9: -59dBm 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 with CNVi Interface
<b>Dimensions</b>	Type 2230: 2.3 x 22.0 x 30.0 mm Type 1216: 1.67 x 12.0 x 16.0 mm
<b>Weight</b>	Type 2230: 2.8 g Type 126: 1.3 g
<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)

### Technical Specifications

	Non-operating: 0 to 50,000 ft (15,240 m)
<b>LED Activity</b>	LED Amber – Radio OFF LED OFF – Radio ON
<b>HP Integrated Module with Bluetooth 4.0/4.1/4.2/5.0 Wireless Technology</b>	
<b>Bluetooth Specification</b>	4.0/4.1/4.2/5.0 Compliant
<b>Frequency Band</b>	2402 to 2480 MHz
<b>Number of Available Channels</b>	Legacy: 0~79 (1 MHz/CH) BLE: 0~39 (2 MHz/CH)
<b>Signaling Data Rate</b>	Legacy: 3 Mbps Signaling Data Rate 2.17 Mbps BLE: 1 Mbps Signaling Data Rate 0.2 Mbps <a href="#">1. Actual throughput may vary.</a>
	Legacy: Synchronous Connection Oriented links up to 3, 64 kbps, voice channels
	Legacy: Asynchronous Connection Less links 2178.1 kbps/177.1 kbps asymmetric (3-DH5) or 864 kbps symmetric (3-EV5)
<b>Transmit Power</b>	The Bluetooth component shall operate as a Class II Bluetooth device with a maximum transmit power of + 4 dBm for BR and EDR.
<b>Power Consumption</b>	Peak (Tx) 330 mW Peak (Rx) 230 mW Selective Suspend 17 mW
<b>Electrical Interface</b>	USB 2.0 compliant
<b>Bluetooth Software Supported</b>	Microsoft Windows Bluetooth Software
<b>Link Topology</b>	
<b>Power Management</b>	Microsoft Windows ACPI, and USB Bus Support
<b>Certifications</b>	FCC (47 CFR) Part 15C, Section 15.247 & 15.249
<b>Power Management Certifications</b>	ETS 300 328, ETS 300 826 Low Voltage Directive IEC950 UL, CSA, and CE Mark
<b>Bluetooth Profiles Supported</b>	BT4.1-ESR 5/6/7 Compliance LE Link Layer Ping LE Dual Mode LE Link Layer LE Low Duty Cycle Directed Advertising LE L2CAP Connection Oriented Channels Train Nudging & Interlaced Scan BT4.2 ESR08 Compliance



### Technical Specifications

LE Secure Connection- Basic/Full  
LE Privacy 1.2 –Link Layer Privacy  
LE Privacy 1.2 –Extended Scanner Filter Policies  
LE Data Packet Length Extension  
FAX Profile (FAX)  
Basic Imaging Profile (BIP)2  
Headset Profile (HSP)  
Hands Free Profile (HFP)  
Advanced Audio Distribution Profile (A2DP)

1. Wireless access point and internet service required and sold separately. Availability of public wireless access points limited.
2. 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.
3. Check latest software/driver release for updates on supported security features.
4. 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).

### Technical Specifications

#### Realtek Ethernet (10/100/1000)

#### Ethernet Features

10 Mbit/s operation (10BASE-T; IEEE 802.3i; IEEE 802.3 clauses 13-14)  
 100 Mbit/s operation (100BASE-TX; IEEE 802.3u; IEEE 802.3 clauses 21-30)  
 1000 Mbit/s operation (1000BASE-T; IEEE 802.3ab; IEEE 8023 clauses 40)  
 Auto-Negotiation (Automatic Speed Selection)  
 Full Duplex Operation at all Speeds, Half Duplex operation at 10 and 100 Mbit/s  
 IEEE 802.1p QoS (Quality of Service) Support  
 IEEE 802.1q VLAN support  
 IEEE 802.3x Flow Control (IEEE 802.3 clauses 31-32; configurable)  
 IEEE 802.3az EEE (Energy Efficient Ethernet)  
 Jumbo Frame 9K  
 Auto MDI/MDIX Crossover cable detection

#### Power Management

ACPI compliant - multiple power modes  
 Situation-sensitive features reduce power consumption  
 Advanced link down power saving for reducing link down power consumption

#### Performance Features

TCP/IP/UDP Checksum Offload (configurable)  
 Protocol Offload (ARP & NS)  
 Large send offload and Giant send offload  
 Receiving Side Scaling

#### Manageability

Wake-on-LAN from standby and hibernation (Magic Packet and Microsoft Wake-Up Frame); Wake-on-LAN from off (Magic Packet only)  
 PXE 2.1 Remote Boot  
 Statistics Gathering (SNMP MIB II, Ethernet-like MIB, Ethernet MIB (802.3x, clause 30)  
 Comprehensive diagnostic and configuration software suite  
 Virtual Cable Doctor for Ethernet cable status

#### Interface

PCI Express 1.1 to support ASPM L1

#### NIC Device Driver Name

Realtek PCIe GBE Ethernet Family Controller

### Technical Specifications

#### POWER

##### HP 65W Smart AC adapter

<b>Dimensions (H x W x D)</b>	90 x 51 x 28.5 mm	
<b>Weight</b>	230 g <i>Not including power cord. Power cord varies by country</i>	
<b>Input</b>	100 to 240 VAC	
<b>Output</b>	<b>Input Efficiency</b>	88.0 % at 115 VAC and 89.0 % at 230VAC
	<b>Input frequency range</b>	50~ 60 Hz
	<b>Input AC current</b>	Max. 1.7 A at 90 VAC
	<b>Output power</b>	65W
	<b>DC output</b>	19.5V
	<b>Hold-up time</b>	5ms at 115 VAC input
<b>Connector</b>	4.5mm Barrel Type,	
<b>Environmental Design</b>	<b>Operating temperature</b>	32°F to 95°F (0°C to 35°C)
	<b>Non-operating (storage) temperature</b>	-4°F to 185°F (-20°C to 85°C)
	<b>Altitude</b>	-4°F to 185°F (-20°C to 85°C)
	<b>Humidity</b>	The power supply can be operated at 5,000 m above sea level
	<b>Storage Humidity</b>	
<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.	

##### 45 W AC adapter

<b>Dimensions (H x W x D)</b>	95 x 40 x 26.5mm	
<b>Weight</b>	200 g <i>Not including power cord. Power cord varies by country</i>	
<b>Input</b>	100 to 240 VAC	
<b>Input</b>	<b>Input Efficiency</b>	87.8 % at 115 VAC and 88.5 % at 230VAC
	<b>Input frequency range</b>	50~ 60 Hz
	<b>Input AC current</b>	Max. 1.4 A at 90 VAC
<b>Output</b>	<b>Output power</b>	45W
	<b>DC output</b>	19.5V
	<b>Hold-up time</b>	5ms at 115 Vac input

### Technical Specifications

	<b>Output current limit</b>	The power supply shall limit the maximum steady state output current to an average current of 8 Amperes.	
<b>Connector</b>	4.5mm Barrel Type		
<b>Environmental Design</b>	<b>Operating temperature</b>	32°F to 95°F (0°C to 35° C)	
	<b>Non-operating (storage) temperature</b>	-4°F to 185°F (-20°C to 85°C)	
	<b>Altitude</b>	-4°F to 185°F (-20°C to 85°C)	
	<b>Humidity</b>	The power supply can be operated at 5,000 m above sea level	
	<b>Storage Humidity</b>		
<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>HP 65 W Smart AC adapter (EM)</b>	<b>Dimensions (H x W x D)</b>	102 x 55 x 30mm	
	<b>Weight</b>	270 g Not including power cord. Power cord varies by country	
	<b>Input</b>	100 to 240 VAC	
		<b>Input Efficiency</b>	88.0 % at 115 VAC and 89.0 % at 230VAC
		<b>Input frequency range</b>	50~ 60 Hz
		<b>Input AC current</b>	Max. 1.7 A at 90 VAC
	<b>Output</b>	<b>Output power</b>	65W
		<b>DC output</b>	19.5V
		<b>Hold-up time</b>	5ms at 115 Vac input
		<b>Output current limit</b>	The power supply shall limit the maximum steady state output current to an average current of 11 Amperes.
		<b>Connector</b>	4.5mm Barrel Type,
	<b>Environmental Design</b>	<b>Operating temperature</b>	32°F to 95°F (0°C to 35° C)
		<b>Non-operating (storage) temperature</b>	-4°F to 185°F (-20°C to 85°C)
		<b>Altitude</b>	The power supply can be operated at 5,000 m above sea level
<b>Humidity</b>		The power supply shall withstand without degradation with 95% relative humidity, non-condensing, both operating and non-operating.	
<b>Storage Humidity</b>			

### Technical Specifications

#### EMI and Safety Certifications

- \*CE Mark - full compliance with LVD and EMC directives
- \* Worldwide safety standards - IEC60950, EN60950, UL60950, Class1, SELV; Agency approvals - C-UL-US, NORDICS, DENAN, EN55022 Class B, FCC Class B, CISPR22 Class B, CCC, NOM-1 NYCE.
- \* MTBF - over 200,000 hours at 25°C ambient condition.

#### HP 3-cell Li-Ion Long Life - Fast Charge (41 WHr)

<b>Dimensions (H x W x L)</b>	6.0 x 186.85 x 90.2 mm (0.236 x 7.35 x 3.55 inch)
<b>Weight</b>	0.18 kg (0.39 lb)
<b>Cells/Type</b>	3cell Lithium-Ion Polymer cell / 515974
<b>Voltage</b>	11.34 V
<b>Amp-hour capacity</b>	3.62 Ah
<b>Watt-hour capacity</b>	41Wh
<b>Operating (Charging)</b>	32° to 113° F (0° to 45° C)
<b>Operating (Discharging)</b>	14° to 122° F (-10° to 60° C)
<b>Optional Travel Battery Available</b>	No

#### HP 3-cell Li-Ion Long Life - Fast Charge (41 WHr)

<b>Dimensions</b>	6.0 x 186.85 x 90.2 mm (0.236 x 7.35 x 3.55 inch)
<b>Weight</b>	0.19 kg (0.41 lb)
<b>Cells/Type</b>	3cell Lithium-Ion Prismatic cell / 496080
<b>Voltage</b>	11.55V
<b>Amp-hour capacity</b>	3.615Ah/3.63Ah
<b>Watt-hour capacity</b>	41Wh
<b>Operating (Charging)</b>	32° to 113° F (0° to 45° C)
<b>Operating (Discharging)</b>	14° to 122° F (-10° to 60° C)
<b>Optional Travel Battery Available</b>	No

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

Category	Description	Part Number
<b>Input/Output</b>	HP Slim Wireless Keyboard and Mouse	T6L04AA
	HP 3-Button USB Laser Mouse	H4B81AA
	HP USB Travel Mouse	G1K28AA
	HP Comfort Grip Wireless Mouse	H2L63AA
	HP Ultra Mobile Wireless Mouse	H6F25AA#xxx
	HP HDMI to DVI Adapter	F5A28AA
<b>Power</b>	HP 45W Smart AC Adapter 4.5mm	H6Y88AA#XXX
	HP 65W Smart AC Adapter	H6Y89AA#xxx
	HP 65W Slim AC Adapter	H6Y82AA#xxx
<b>Storage</b>	HP External USB Optical Drive	F2B56AA
<b>Memory</b>	HP 4GB 2666Mhz DDR4	4VN05AA
	HP 8GB 2666Mhz DDR4	4VN06AA
	HP 4GB DDR4 3200 Memory	286H5AA
	HP 8GB DDR4 3200 Memory	286H8AA
<b>UCC</b>	HP Stereo USB Headset	T1A67AA
	HP Stereo 3.5mm Headset	T1A66AA
	HP UC Wired Headset	K7V17AA
<b>Displays</b>	HP EliteDisplay S14 14-inch USB-C Portable Monitor	3HX46AA

### Summary of Changes

<b>Date of change:</b>	<b>Version History:</b>		<b>Description of change:</b>
June 17, 2020	From V1 to V2		Display section updated
September 2, 2020	From V2 to V3		Processor, network and display sections update
September 21, 2020	From V3 to V4		Storage updated
November 4, 2020	From V4 to V5	Updated	Removed - Intel® Iris® Xe Graphics from processor name and added Iris footnote in graphics section
April 16, 2021	From V5 to V6	Updated	Memory section updated
June 10, 2021	From V6 to V7	Update	Security lock slot in Overview section
	From V7 to V6		

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